TRS-80® Color Computer MICRO-COMPUTER SYSTEM

Start-Up

1. Turn the television set ON.
2. Select channel 3 or 4.
3. Set the Antenna Switch to "CONPUTER".
4. Turn on any accessory equipment (e.g., a printer).
5. If you're useing a Program Pak™, insert it now, befor turning on the Computer
6. Turn the Computer ON.
7. If you're not useing a Program Pak™, the Color BASIC or Extended Color BASIC start-up message will appear on the TV, followed by: OK

The Computer in now ready to use.

Note: Information pertaining to Extended Color BASIC *only* is shaded like this paragraph. Non-shaded information pertains to both Extended and non-Extended Color BASIC.

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Video Control Codes

Dec	Hex	PRINT CHR$ *(code)*
8	08	Backspaces and erases current character.
13	0D	Line feed with carrige return.
32	20	Space.

Operators

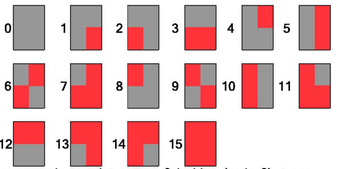
Each operator or group of operators is precedent over the group below it.

↑	Exponentiation
-,+	Unary negative, positive
*,/	Multiplication, division
+,-	Addition and concatenation, subtraction
<,>,=,<=,>=,<>	Relational tests
NOT	
AND	
OR	

Graphic Character Codes

Given the *color* (1-8) and the *pattern* (0-15), this formula will generate the correct code:

code = 128 + 16 * (*color* -1) + *pattern*



For example to print pattern 9 in blue (code 3), type:

```
C = 128 + 16 * (3 - 1) + 9
? CHR$(C)
```

Functions

Argument ranges are indicted by special symbols:

numeric: (*-10^38,+10^38*)
x: (0-255)
y: (0-191)
location: (0-65535)
code: (0-255)
str: string argument
var: veriable name

ABS (numeric) Computes absolute value

```
Y = ABS(5)
```

ASC (str) Returns ASCII code of first charactr of specifed *string*.

```
A = ASC(T$)
```

ATN (numeric) Returnes arctangent in radians.

```
Y = ATN(X/3)
```

CHR$ (code) Returnes character for ASCII control or graphics *code*.

```
? CHR$(191)
P$ = CHR$(1)
```

COS (numeric) Returns cosine of an angle given in radians

```
Y=COS(7)
```

EOF (f) Returns FALSE (0) if there is more data: TRUE (-1) if end of file has been read. For cassette, *f* = -1, for keyboard *f* = 0.

```
EOF = (-1)
EOF(0)
```

EXP (numeric) Returuns natural exponential of number (e^{number}).

```
Y = EXP(7)
```

EXP (numeric) Returuns truncated (whole number) value.

```
Y = FIX(7.6)
```

HEX$ (numeric) Computes hexadecimal value.

```
PRINT HEX$(30
Y = HEX$(X/16)
```

INKEY$ Checke the keyboard and returns the key being pressed (if any).

```
A$ = INKEY$
```

INT$ (numeric) Converts a number to an integer.

```
X = INT(5.2)
```

JOYSTK (J) Returns the horizontal or vertical coordinate of (*J*) of the left or right joystick:
0 = horizoontal, left joystick
1 = vertical, left joystick
2 = horizoontal, right joystick
3 = vertical, right joystick

```
M = JOYSTK(0)
M = JOYSTK(K)
```

LEFT$ (str,lenght) Returns left portion (length chaaracters) of string.

```
P$ = LEFT$(M$,7)
```

LEN (numeric) Returns he lenght of a string.

```
X = LEN(SEN$)
```

LOG (numeric) Returns natural logarithm.

```
Y = LOG(353)
```

MEM Finds the amount of free memory.

```
PRINT MEM
```

MID$ (str,pos,length) Returns a substring of another string starting at *pos.* If *lenght* is omitted, the entire string right of position is returned.

```
F$ = MID$(A$,3)
? MID$(A$,3,2)
```

PEEK (location) Returns the contens of specified memory location

```
A = PEEK(X,Y)
```

POINT (x,y) Tests weather specified graphics cell is on or off, x (horizonal) = 0-63;y (vertical) = 0-31. The value returned is -1 if the cell is in a text character: node: 0 if is off, or the color code if it is on. See CLS for color codes.

```
IF POINT(10, 10) THEN PRINT "ON" ELSE PRINT
"OFF"
```

POS (device) Returns current print position. Device -1 = printer,-2 = display

```
PRINT TAB(8) POS(0)
```

PPOINT (x,y) Test whether specified graphice cell is on or off and returns color code of specified cell.

```
PPOINT(13,35)
```

RIGHT$ (str,lenght) Returns right portion of the string.

```
ZIP$=RIGHT$(AD$,5)
```

SGN (numeric) Returns sign of specified numeric expression:
-1 if argument is negative
0 if argument is 0
+1 if argument is positive

```
X = SGN(A*B)
```

SIN (numeric) Returns sine of angle given in radians.

```
Y = SIN(5)
```

STRING$ (length,code or string) Returns a string of characters (of specified length) specified by ASCII code or by the first character of the string.

```
? STRING$(5,"%")
? STRING$(5,91)
```

STR$ (numeric) Converts a numeric expression to a string.

```
S$ = STR$(X)
```

SQR$ (numeric) Returns the square root of a number.

```
Y$ = SQR(5+3)
```

TAN (numeric) Returns tangent of angle in radians.

```
Y = TAN(47,7)
```

TIMER Returns contents or allows setting of timer (0-65535).

```
? TIMER
TIMER = 0
```

USR$ (numeric) Calls user's machine-language subrourine.

```
X = USR(Y)
```

VAL (str) Converts a string to a number.

```
A = VAL(B$)
```

VARPTR (var) Returns address of pointer to the specified variable.

```
Y = USR(VARPTR(X) )
```

Control Keys

←	Cancels last character typed: moves cursor back one space
SHIFT ←	Erases current line.
BREAK	Interrupts anything in progress and returns to command level.
CLEAR	Clears the screen.
ENTER	Signifies end of current line.
SPACEBAR	Enters a space (blank) character and moves cursor one space forward.
SHIFT @	Causes currently ececuting program to pause (press any key to continue.
SHIFT 0	All-caps/upper-lowercase keyboard switch. (Lowercase displayed as reversed capitals.)

Special Characters

'	Abbreviation for REM.
$	Makes variable string type.
:	Separates statements on the same line.
?	Same as PRINT.
,	PRINT punctuation: spaces over to the next 16-column PRINT zone.
;	PRINT punctuation: separates items in a PRINT list but does not add spaces when they are output.

Error Messages

Abbreviation	Explanation
/0	Division by 0
AO	File already OPEN
BS	Subscript out of range
CN	Can't continue
DD	Redimensioned array
DN	Device number error
DS	Direct statement in file
FC	Illegal function call
FD	Bad file data
FM	Bad file mode
ID	Illegal direct
IE	Input past end of file
I/O	Input/Output error
LS	String too long
NF	NEXT without FOR
NO	File not open
OD	Out of data
OM	Out of memory
OS	Out of string space
OV	Overflow
RG	RETURN without GOSUB
SN	Syntax error
ST	String formula too complex
TM	Type mismatch
UL	Undefined line

TRS-80® COLOR BASIC and EXTENDED COLOR BASIC

TRS-80® COLOR BASIC and EXTENDED COLOR BASIC

Statements

AUDIO Connects or disconnects cassette output to TV speaker.
```
AUDIO ON
AUDIO OFF
```

CIRCLE (*x,y*),*r*,*c*,*hw*,*start*,*end* Draws a circle with center at point(*x,y*) radius *r*, specified color *c*, hight/width ratio(*hw*) of 0-4.Circle can start and end at specified point(0-1)
```
CIRCLE(128,96),50,4,1,.5,.75
```

CLEAR *n,h* Reserves *n* bytes of string storage space. Erases variables. *h* specifies highest BASIC address
```
CLEAR
CLEAR 500
CLEAR 100,14000
```

CLOAD Loads specified program file from cassette. If file name is not specified, first file encountered is loaded. File name must be eight character/spaces or fewer.
```
CLOAD
CLOAD "PROGRAM"
```

CLOADM Loads machine-language program from cassette. An offset address to add the loading address may be specified.
```
CLOADM "PROG"
CLOADM
CLOADM"PROG",1000
```

CLOSE *d* Closes open files.
```
CLOSE
CLOSE-2
```

CLS *c* Clears display to specified color *c*. If color is not specified, green is used.

0-Black
1-Green 5-Buff
2-Yellow 6-Cyan
3-Blue 7-Magenta
4-Red 8-Orange

```
CLS
CLS 3
```

COLOR (*forground,background*) Sets forground and background color.
```
COLOR 1,3
```

CONT Continues program execution after pressing (BREAK) or useing STOP statement
```
CONT
```

CSAVE Saves program on cassette (program name must be eight character/spaces or less). If A is specified, program saved is ASCII format.
```
CSAVE "PROGRAM"
CSAVE "PROGRAM",A
```

CSAVEM *name, start, end, transfer* Writes out a machine-language file.
```
CSAVEM "X" ,4E,6F,5F
```

DAVA Stores data in your program. Use READ to assign this data to variables.
```
DATA 5,3,PEARS
DATA PAPER,PEN
```

DEF FN Defines numeric function
```
DEF FNC(X)=X8*3
```

DEFUSR *n* Defines entry point for USR function *n*. *n*=0-9
```
DEFUSR 5=45643
```

DEL Deletes program lines.
```
DEL -
DEL 25
DEL 25-
DEL -25
DEL 10-25
```

DIM Dimensions one or more arrays.
```
DIM R(65),W(40)
DIM AR$(8,25)
```

DLOAD Loads BASIC program at a specified baud.
baud.
0 = 300 baud 1 = 1200 baud
```
DLOAD "X",1
```

DRAW Draws a line beginning at specified starting point of specified length of specified color. Will also draw to scale, draw blank lines, draw non-updated lines, and execute substrings. If starting point in not specified, last DRAW position or (128,96) is used.
```
DRAW "BM100,100;S10;U25;BR25;ND25,XA$;"
```

EDIT Allows editing of program line.
*n*C Changes *n* number of characters.
*n*D Deletes *n* numbers of characters.
I Allows insertion of new characters.
H Deletes rest of line and allows insert.
L Lists current line and continues edit.
*n*S*c* Searches from *n*th occurrence of character *c*.
X Extends line.
(SHIFT) (↑) Escape from subcommand.
n (SPACEBAR) Moves curser *n* spaces right.
n (↑) Moves cursor *n* spaces to left.
```
EDIT 25(ENTER)
```

END Ends program.
```
END
```

EXEC (*address*) Transfers control to machine-language programs as specified address. If *address* is omitted, control is transferred to address set in last CLOADM.
```
EXEC
EXEC 32453
```

FOR . . TO Creates a loop in program which the Computer must **STEP**/ repeat from the first number to the last number you specify. **NEXT** Use STEP to specify how much to increment the number each time through the loop. If you omit STEP, one is used.
```
FOR X=2 TO 5 : NEXT X
FOR A=1 TO 10 STEP 5 : NEXT A
FOR M=30 TO 10 STEP -5 : NEXT M
```

GET (*start*)-(*end*),*destination*, G Read the graphic contents of a rectangle into an array for future use by PUT.
```
GET(5,20)-(3,8),V,G
```

GOSUB Calls a subroutine beginning at specified line number.
```
GOSUB 500
```

GOTO Jumps to a specified line number.
```
GOTO 300
```

IF TEST THEN . . . ELSE *action 1, action 2* Preforms a test. IF it is true, the Computer executes action 1. If false, action 2 is executed.
```
IF A=5 THEN 30
```

INPUT Causes the Computer to stop and await input from the keyboard.
```
INPUT X$
INPUT "NAME";N$
```

INPUT#-1 Inputs data from cassette.
```
INPUT#-1,A
```

INSTR (*position,search,target*) Searches for the first occurrence of *target* string in *search* string beginning at *position*. *Returns the position at which the match is found.*
```
? INSTR(5,X$,Y$
```

LET Assigns value to veriable (optional).
```
LET A$="JDB A"
```

LIST Lists specified line(S) or entire program on screen.
```
LIST
LIST 50-85
LIST 30
LIST -30
LIST 30-
```

LLIST Lists specified line(S) or entire program to printer.
```
LLIST
LLIST 50-85
LLIST 30
LLIST -30
LLIST 30-
```

LINE (*x1,y1*)-(*x2,y2*), PSET or PRESET, BF Draw a line from (*x1,y1*) to (*x2,y2*). if (*x1,y1*) is omitted, the last end point or (128,96) is used. PSET selets forground color and PRESET selects background color. ,B draws a box with (*x1,y1*) and (*x2,y2*) as the oppsing corners. ,BF will fill in the box with forground color.
```
LINE (5,3)-(6,6),PSET
```

LINE INPUT Input line from keyboard.
```
LINE INPUT "ANSWER";X$
```

MID$ (*oldstr,position,length*) Replaces a portion of one string with another string.
```
MID$(A$,14,2)="KS"
```

MOTOR Turns cassette ON or OFF
```
MOTOR ON
MOTOR OFF
```

NEW Erases everything in memory.
```
NEW
```

ON. . .GOSUB Multi-way brach to call specified subroutines.
```
ON X GOSUB 50,100
```

ON. . .GOTO Mulit-way branch to specified lines.
```
ON X GOTO 190,200
```

OPEN *m,#d,f* Opens file(*f*) at: Screen or Keyboard(0); Cassette(-1); Printer(-2). for input(I), or output (o).
```
OPEN "O",-1,"DATA"
```

PAINT (*x,y*),*c*,*b* Paints graphic screen starting at point(*x,y*) with specified color *c* and stoping at border (*b*) of specified color.
```
PAINT(10,10),2,4
```

PCLEAR *n* Reserves *n* number of 1.5K graphics memory pages.
```
PCLEAR 8
```

PCLS *c* Clears screen with specified color *c*. If color code is omitted, current background color is used. (See CLS for color codes.)
```
PCLS 3
```

PCOPY Copy graphics from source page to destination page
```
PCOPY 5 TO 6
```

PLAY Plays music of specified note (A-G or 1-12),octave (O), volume (V),note-lenght (L), tempo (T), pause (P), and allows execuition of substrings. Also sharps (# or +) and flats (-).
```
PLAY "L1;A#;P8;V10;T3;L2;B-;9;XA$;"
```

PMODE *mode,start-page* Selects resolution and first memory page.
```
PMODE 4,1
```

POKE (*location, value*) Puts value (0-255) into specified memory location.
```
POKE 15872,255
```

PRESET Reset a point to background color.
```
PRESET (5,6)
```

PRINT Prints specified message or number on TV screen.
```
PRINT "HI"
```

PRINT#-1 Writes data to cassette.
```
PRINT A$
? A$
PRINT#-1,A
```

PRINT#-2 Prints an item or list of items on the printer..
```
PRINT#-1;CAP$
```

PRINT TAB Moves the cursor to specified column position.
```
PRINT TAB(5)"NAME"
```

PRINT USING Prints numbers in specified format.

#	Formats number. `PRINT USING "####";52,2`
.	Decimal point.. `PRINT USING "##.#";58,6`
,	Displays comma to left of every third charcter. `PRINT USING "####,";144.0`
++	Fills leading spaces with asterisks.. `PRINT USING "++##.##";33.3`
$	Places $ ahead of number. `PRINT USING "$##.##";33.33`
$$	Floating dollar sign. `PRINT USING "$$#.#";11.544`
**$	Floating dollar sign. `PRINT USING "++$##.##";18.333`
+	In first position, causes sign to be printed. In last position, causes sign to be printed after the number. `PRINT USING "+##.#";-216`
↑↑↑↑	Exponential format. `PRINT USING "++##.#↑↑↑↑";546`
-	Minus sign after negative number. `PRINT USING "##.##-";-534.7`
!	Returns first string character. `PRINT USING "!";"YELLOW"`
%spaces%	String field; length of field is number of spaces plus 2.. `PRINT USING "%  %";"BLUE"`

PRINT @*location* Prints specified message at specified text screen location.
```
PRINT @256,"HI"
PRINT @256,A$
```

PSET (*x,y,c*) Sets a specified point (*x,y*) to specified color *c*. If *c* is omitted, forground is used.
```
PSET(5,6,3)
```

PUT (*start*)-(*end*),*source, action* Stores graphics from source onto start/end rectangle on the screen. (Array rectangle size must match GET rectangle size.
```
PUT(3,2)-(5,6),V,PSET
```

READ Reads the next item in DATA line and assigns it to specified variable.
```
READ A$
READ C,B
```

REM Allows insertion of comments in program line. Everything after REM is ignored by Computer.
```
REM THIS IS IGNORED
10 ? X$:REM IGNORED
```

RENUM *newline, startline, increment* Allows program line renumbering.
```
RENUM 1000,5,100
```

RESET (*x,y*) Resets a point.
```
RESET(14,15)
```

RESTORE Sets the Computer's pointer back to first item on the first DATA line.
```
RESTORE
```

RETURN Returne the Computer from subroutine to the BASIC word following GOSUB.
```
RETURN
```

RUN Executes a program.
```
RUN
```

SCREEN *screen-type,color-set* Selects either graphics(1) or text(0) screen and color-set(0 or 1).
```
SCREEN 1,1
```

SET (*x,y,c*) Sets a dot at specified test screen location to specified color.
```
SET(14,13,3)
```

SKIPF Skips to next program on cassette tape, or to end of specified program.
```
SKIPF"PROGRAM"
```

SOUND *tone, duration* Sounds specified tone for specified duration.
```
SOUND 128,3
```

STOP Stops execution of a program.
```
STOP
```

TROFF Turns off program tracer.
```
TROFF
```

TRON Turns on program tracer.
```
TRON
```

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