AQUARIUS mx

USB BASIC v1.3

Deck 1-0

Supplemental BASIC Commands for Aquarius MX

Aquarius System Development
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OVERVIEW

USB BASIC is a set of commands and functions that extend the original Aquarius BASIC language for use with the Aquarius MX expander.

- Works on Aquarius MX and Micro Expander modules
- Leverages USB drive for rapid access to digital storage
- Implements a RTC (Real Time Clock) for TimeDate functionality
- Expands addressing capabilities of BASIC commands
- Runs as a ROM, so Ext BASIC is not accessible (Aquarius II and modded Aquarius)

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NEW FEATURES

- Numeric references in most BASIC commands updated
  - Can accept signed integers (-32768 to 32767)
  - Can accept unsigned integers (0 to 65535)
  - Can accept hexadecimal values ($0000 to $FFFF)
- Support for Dallas DS1244Y RTC (RealTime Clock) for DateTime functions
- PEEK & POKE commands expanded
  - Can accept auto-incrementing start address with multiple trailing values
  - Can accept start address and TO keyword with end address for repeated single value
  - Can accept STEP keywords for counts, followed by one or more bytes
- PT3 Player has been migrated to a standalone ROM file (PT3PLAY.ROM)

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SCHEDULE

Plan for roll-out of USB BASIC v1.3

TESTING & ROLLOUT

- Alpha Testers needed to run test plans on real and emulated hardware
  - 5 MAY 2023 – Test plans ready; Test ROM available to download and burn
  - 10 MAY 2023 – Alpha Testing complete
- Beta Testers needed to run unstructured tests on real and emulated hardware
  - 11 MAY 2023 – Final ROM and documentation ready to download and test
  - 16 MAY 2023 – All testing complete
- 17 MAY 2023 – General Release (TARGET)
  - Integrators to begin offering replacement ROMs
  - Instructions on RTC installation for existing Hardware complete

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COMMANDS

Review of Original and New USB BASIC Commands

COMMANDS - ORIGINAL

- ATN( )
- CALL xx
- CAT
- CD " "
- CLS x
- COPY aa,bb,cc
- DEBUG
- DEC( )
- DEEK( )
- DEF FN
- DEL " "
- DIR
- DOKE xx, zz
- DTM$( )
- EDIT
- HEX$( )
- IN( )
- JOY( )
- KEY( )
- LOAD " ", x
- LOCATE x,y
- OUT x, z
- PSG( )
- RUN " "
- SAVE " ", xx, z
- SDTM " "
- VER( )

COMMANDS – NEW, v1.3

- ATN( )
- CALL xx
- CAT
- CD " "
- CLS x
- COPY aa,bb,cc
- DEBUG
- DEC( )
- DEEK( )
- DEF FN
- DEL " "
- DIR
- DOKE xx, zz
- DTM$( )
- EDIT
- HEX$( )
- IN( )
- JOY( )
- KEY( )
- LOAD " ", x
- LOCATE x,y
- OUT x, z
- PSG( )
- RUN " "
- SAVE " ", xx, z
- SDTM " "
- VER( )

ATN( )

Mathematical function that returns the arctangent of a number. The result is the angle (in radians) whose tangent is the number fed to the function.

EXAMPLES:

```
PRINT ATN(0)

10 J=12
20 X=ATN(J)*180/3.14159
```

CALL xx

Causes the Aquarius to jump to a machine code routine at the address given.

EXAMPLES:

```
CALL 8192

20 CALL $4000
```

CAT

Displays a brief listing of the files in the current directory of the USB drive (immediate mode only!).

EXAMPLE:

```
CAT
<..          > <DATA        > RUN-ME    BAS
<SCR         >
```

CD " "

Changes the Current Directory of the USB drive to the one supplied, otherwise, displays the name of the Current Directory.

EXAMPLES:

```
CD "DATA"

CD
/DATA

CD ".."
```

(Goes to previous directory)

CLS x

Clears the screen of all color and text to a default black text on cyan background (value 6), unless a value for color is supplied: (FG * 16) + BG

EXAMPLES:

```
CLS

10 CLS 9

10 CLS $0006
```

COPY aa,bb,cc

Copies a section of memory starting from address aa to the address beginning at bb for a size of cc bytes.

EXAMPLES:

```
COPY $3000,$3000+440,120
```

Copy the top three lines of characters on the screen to the middle of the screen

```
10 COPY $C000,$8000,$4000
```

Copy the memory in the cartridge space to the top 16k of the 32k expansion

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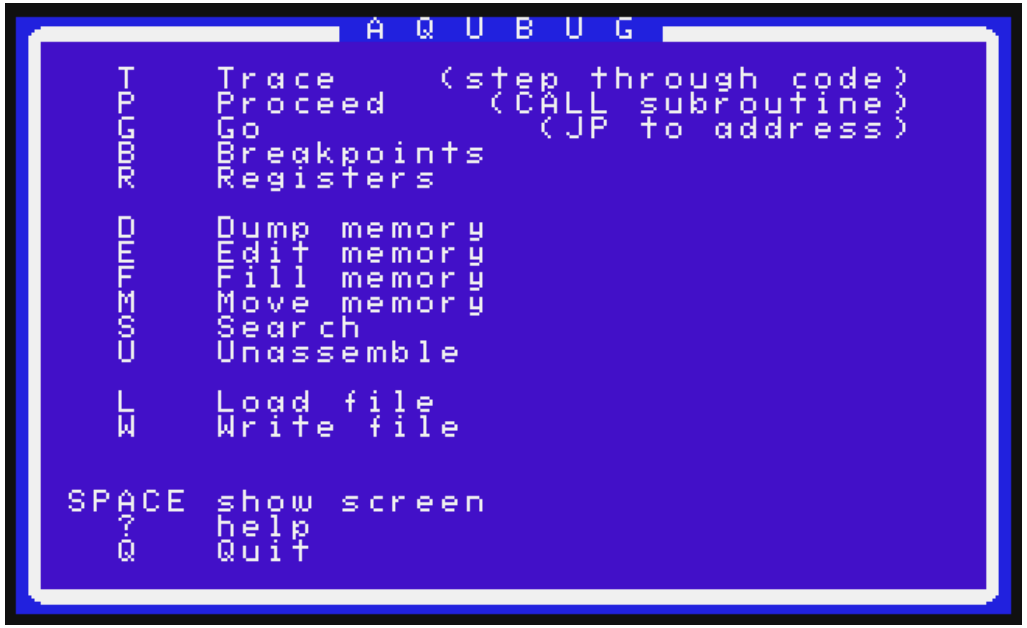
DEBUG

Launches the built-in AquBug Debugger in the Aquarius MX ROM.

EXAMPLE:

```
DEBUG
```



DEC( )

Returns the DECimal value of the hexadecimal number in <string>.

EXAMPLES:

```
PRINT DEC("FFFF")
```

Prints `65535`

```
10 A$=HEX$(32)
20 PRINT DEC(A$)
```

Prints `32`

DEEK( ) – "DOUBLE PEEK"

Reads a word from memory location <address>, returning a number between 0 and 65535.

EXAMPLES:

```
POKE DEEK(14337),PEEK(14349)
```

Remove cursor from screen

```
10 PRINT DEEK($384B)
```

Prints the top of BASIC memory address

DEF FN / FN

This sets up a user-defined function that can be used later in the program. The function can consist of any mathematical formula.

EXAMPLES:

```
10 DEF FN A(X)=X+7
20 PRINT FN A(9)
```

Prints `16` (9 + 7)

DEL " "

Deletes the file or directory supplied in quotes.

EXAMPLES:

```
DEL "RUN-ME.BAS"
```

Deletes file named `run-me.bas`

```
20 A$="data.bin"
10 DEL A$
```

Deletes filename in A$, `data.bin`

DIR

Displays a complete listing of the files in the current directory of the USB drive, with file type and size (immediate mode only!).

EXAMPLE:

```
DIR
..              <dir>    data          <dir>
run-me     BAS   139    splash    SCR 2048
Ok
```

DOKE xx, zz – "DOUBLE POKE"

Write 16 bit (2 byte) word to Memory Location(s).

EXAMPLES:

`DOKE 14340,1382`	Set USR() function address
`DOKE $3028,$6162`	Put the characters `ab` at the top left of the screen

DTM$( )

If a RTC (Real Time Clock) is installed, returns a DateTime string in one of two formats.

EXAMPLES:

```
PRINT DTM$(0)
```
Prints `23051208140700` (YYMMDDHHMMSSCC)

```
10 A$=DTM$(1)
20 PRINT LEFT$(A$,10)
30 PRINT RIGHT$(A$,8)
```
Prints `2023-05-12`

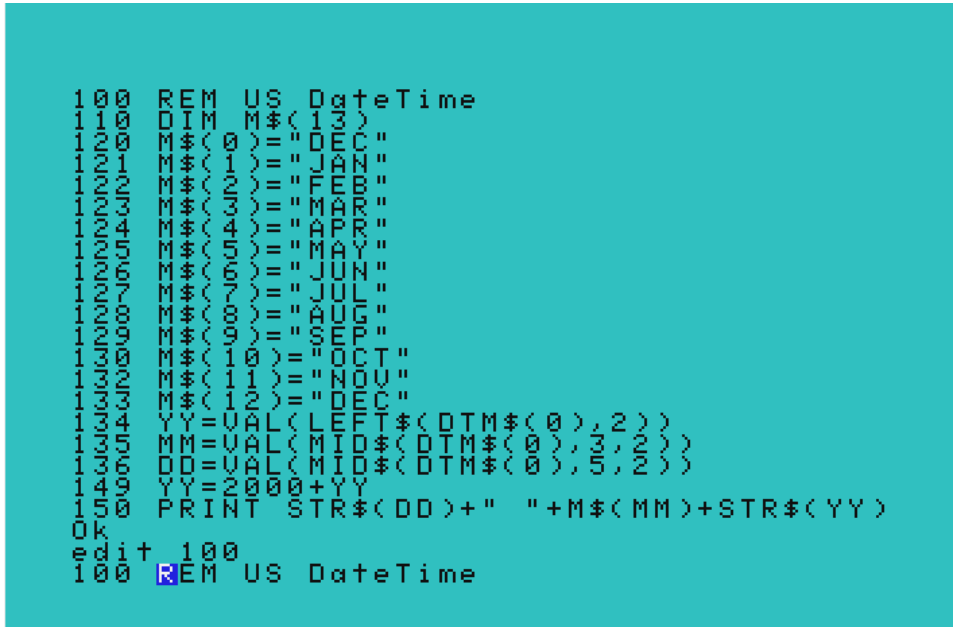
Prints `08:14:07`

EDIT

Activates the built-in, single line BASIC editor in the Aquarius MX ROM.

DETAILS:

```
CURSOR is shown as BLUE box
                with WHITE text
CTRL + P     = cursor left
CTRL + /     = cursor right
DELETE/BKSP = delete char left of cursor
text keyed   = adds text at cursor
RETURN       = enters/commits edits
```



```
100 REM US DateTime
110 DIM M$(13)
120 M$(0)="DEC"
121 M$(1)="JAN"
122 M$(2)="FEB"
123 M$(3)="MAR"
124 M$(4)="APR"
125 M$(5)="MAY"
126 M$(6)="JUN"
127 M$(7)="JUL"
128 M$(8)="AUG"
129 M$(9)="SEP"
130 M$(10)="OCT"
132 M$(11)="NOV"
133 M$(12)="DEC"
134 YY=VAL(LEFT$(DTM$(0),2))
135 MM=VAL(MID$(DTM$(0),3,2))
136 DD=VAL(MID$(DTM$(0),5,2))
149 YY=2000+YY
150 PRINT STR$(DD)+" "+M$(MM)+STR$(YY)
Ok
edit 100
100 REM US DateTime
```

HEX$( )

Returns string containing <number> in two-byte hexadecimal format.

EXAMPLES:

```
PRINT HEX$(255)
```
Prints `00FF`

```
10 PRINT HEX$(PEEK(12288))
```
Prints `0020`

IN( )

Reads a byte from the I/O port specified by LSB of <address>.

EXAMPLES:

`PRINT IN(252)`	Prints cassette port input status
`10 S=IN($FE)`	Set variable S to Printer Ready status

JOY( )

Reads an input value from the joystick(s).

EXAMPLES:

`PRINT JOY(0)`	Prints value from either joystick/control pad
`10 Z=JOY(1)`	Set variable Z to value from left joystick/control pad
`50 PRINT HEX$(JOY(2))`	Prints hex value from right joystick/control pad

KEY( )

Reads a key value input from the keyboard.

EXAMPLES:

```
PRINT HEX$(KEY(0))
```

Wait until a key is pushed and print hex value

```
10 A=KEY(1000)
```

Scan the keyboard up to 1000 times or until a key is pushed, and assign the value to variable a

LOAD " ", aa

Loads a file into memory at the specified address. The following filetypes don't require an address, as the system knows where to load them: .CAQ, .ROM, .BAS, .SCR.

EXAMPLES:

`LOAD "RUN-ME.BAS"`	Loads file named `run-me.bas`
`20 LOAD "data.bin",8192`	Loads file named `data.bin` to address 8192
`40 LOAD "splash.scr"`	Loads file named `splash.scr` to CHRRAM and COLRAM

LOCATE x, y

Moves the cursor to a specified column and row on the screen. Note that in immediate mode, the cursor returns to the next row, so the command is more useful in a BASIC program loop.

EXAMPLES:

```
LOCATE 1,0
```

Moves cursor to first character of top row

```
10 LOCATE 20,12
20 PRINT CHR$(KEY(0))
```

Moves cursor to the middle of the screen and prints the character of the first key pressed

OUT x, z

Sends a value (z) to the specified IO device (x).

EXAMPLES:

`OUT 246, 12`	Send a value of `12` to the SOUND chip
`10 X=14:OUT $FC, X`	Send a value of `14` to the Cassette sound port

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PSG x, z, ...

Send a value (z) to the specified sound chip register (x). Multiple pairs of values may be strung together separated by commas.

EXAMPLES:

```
PSG 8,15,9,15,10,15
```

Set volume of all sound channels to 15 (max)

```
10 PSG 8,15,0,148,1,1,7,56
20 A=KEY(0):PSG 8,0
```

Play a Db4 on channel A, and wait for a key press before stopping the sound

RUN " "

Loads a file into memory and runs it. Only works properly with the following filetypes: .CAQ, .ROM, .BAS. (Note that old program will be overwritten!)

EXAMPLES:

```
RUN "SNAFU.ROM"
```

Loads and runs file named `SNAFU.rom`

```
20 RUN "game.bas"
```

Loads and runs file named `game.bas`

SAVE " ", aa, zz

Saves a file from memory address (aa) for a specified length (zz). If no address and length are given, it assumed to save from BASIC program space, and should be given a .BAS suffix by user when named.

EXAMPLES:

```
SAVE "TESTER.BAS"
```

Saves the current BASIC program to a file named `TESTER.BAS`

```
20 SAVE "DATA.BIN",$8000,32
```

Saves 32 bytes of memory starting at $8000 to a file named `DATA.BIN`

SDTM " "

If a RTC (Real Time Clock) is installed, sets the date when the string is entered in the format "YYMMDDHHMMSS". Note that the century is assumed to be 20, and the centiseconds are assumed to be 00.

EXAMPLES:

```
SDTM "230512081407"
```
Sets RTC to `2023-05-12 08:14:07`

```
10 SDTM "010101000000"
```
Sets RTC to `2001-01-01 00:00:00`

VER( )

Returns the current version of USB BASIC. The value in parenthesis is typically 0, but can be any integer between -32768 and 65535.

EXAMPLES:

```
PRINT HEX$(VER(0))
```

Prints `0103` for USB BASIC v1.3

```
20 A=VAL(HEX$(VER(0)))
30 IF A<103 THEN PRINT "No"
```

Checks version and prints `No` if less than 103.

QUESTIONS?

- Visit GitHub site at https://github.com/1stage/Aquarius-MX
- Email Sean Harrington, sph@1stage.com

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