GAS Monitor
Version 2.33
9/21/81

This is a description of the GAS Monitor - Version 2.33. It is a 16K Monitor in EPROMs that resides at both 0H-3FFFH and 8000H-BFFFH. If you need to view memory between 0H and 3FFFH, you must switch to the High Monitor; this is a command (^W) in DEBUG Mode.

There are several things that must be added to the system for some of the Monitor options to work correctly. This Monitor supports software breakpoints, and for them to work correctly, a RST4 (28H) must be supported. At this location in Low RAM, there must be the following Assembly Language code: PSW PUSH, 60H A MVI, CCH OUT, 3C9C JMP, (this is EPROM (0H-3FFFH), Screen RAM (4000H-7FFFH), READ/WRITE RAM (8000H-FFFF)). In the future, if the GAS Monitor is modified, the 3C9C JMP, will have to be modified to reflect the new address of a routine called DEBUGD. SEE "GAS PORT" SECTION

Since the breakpoints supported are software breakpoints, it really performs a Break On Opcode Read at a particular address, and this opcode is not executed. CALLs cannot be STEPped through so that if you want to step through a CALLed routine, you must set a breakpoint within the routine itself.

This Monitor also supports disassembly of code which will work properly in the Low Monitor. If you are in the High Monitor and you need to disassemble, the TERSE RST0 (.dbeg.) must be resident in Low Memory.

In addition, the GAS Monitor also uses static RAM from FFE0H-FFFFH, and uses FF00H-FFDAH for its stack and variable space. These areas should NOT be modified. At present, the stack and variable space is in the disk buffers so that they will have garbage in them upon returning from the Monitor.

This Monitor was written using the Alpha Numeric Key Hex Codes for the TeleVideo Model 950 Terminal. See Page 5 for a list of the Hex codes generated by this terminal.

- All characters may be entered in upper or lower case.
- The BS or <- keys will delete a character.
- ^X or <ESC> will cancel the line being entered.
- In cases where more than one value is expected, hit <CR> for the next prompt.
- A BELL will be sounded for all invalid input.

MONITOR COMMANDS

MONITOR Prompt -- M> Valid keys excepted while in MONITOR Mode:

^A	Arcade Boot
^C	CP/M Boot
^G	Go At 0 (Map in RAM at 0H)
^H	HELP (Displays the valid commands)
^R	RAM Test
^T	GAS TERSE Boot

DEBUG COMMANDS

DEBUG Prompt -- D>
Valid keys accepted while in DEBUG Mode:

^W Switch to the High/Low Monitor

A Disassemble
INPUT: Hex address to begin disassembly at
Then it waits for one of the following inputs:
<Space Bar> continue the disassembly
<Anything> return to DEBUG Mode

B Breakpoint
INPUT: Hex address to break at (must be an opcode).

C Clear Breakpoint
INPUT: none

D Dump Memory
INPUT: Hex address to begin dumping at
Dumps 32 bytes of memory beginning at the specified address
Then it waits for one of the following inputs:
<Space Bar> Dump the next 32 bytes
<Anything> return to DEBUG Mode

F Fill Memory
INPUT: Mask, Address, and Hex Length

G Go (At)
INPUT: <CR> Go at the value of the Program Counter (PC)
Addr Go at the specified Hex Address

H Help
INPUT: none
Displays the valid commands and tells you which
Monitor you are in.

I Interrupts
INPUT: <CR> displays the current Interrupt Status
<E> sets the status to "Enabled"
<D> sets the status to "Disabled"

L Move Memory
INPUT: Source, Destination, and Hex Length

M Modify Memory
INPUT: Hex Address to begin modifying at
It then displays the address and current contents and waits
for one of the following inputs:
<Down Arrow> Moves down one byte in memory
<Up Arrow> Moves up one byte in memory
<CR> Same as <Down Arrow>
<ESC> Return to DEBUG Mode
New Hex value for the location.
NOTE: If a value is entered and then any of the above keys,
the value is taken and stored.

N Dump Memory where previous dump left off
INPUT: none
Works just like the D Command.

P Modify Port
INPUT: Port Number to begin modifying at
Works just like the M Command

Q Quit
INPUT: none
Return to MONITOR Mode

R Modify Register
INPUT: none
Works just like the M Command, where all the registers on a Z80 are sequentially stepped through.

S Step
INPUT: none
Steps one instruction as long as there was a previous breakpoint set and that's where the program counter is.

U Continuous Port Read
INPUT: Port Number
Reads the specified port and displays its contents until any key is hit on the keyboard.

V Continuous Port Write
INPUT: Port Number, Mask, Optional Second Mask
Keeps outputing either the first mask or alternating between masks if two were entered to the specified port until any any key is hit on the keyboard.

X Dump Registers
INPUT: none
Dumps out the regular set of Z80 registers with an asterisk under each flag that is set.

Z Dump Alternate Registers
INPUT: none
Dumps out the alternate set of Z80 registers with an asterisk under each flag that is set.

ALPHA NUMERIC KEY HEX CODES

CHARACTER	UNSHIFT	LOCK	SHIFT	CNTL
A a	61	41	41	01
B b	62	42	42	02
C c	63	43	43	03
D d	64	44	44	04
E e	65	45	45	05
F f	66	46	46	06
G g	67	47	47	07
H h	68	48	48	08
I i	69	49	49	09
J j	6A	4A	4A	0A
K k	6B	4B	4B	0B
L l	6C	4C	4C	0C
M m	6D	4D	4D	0D
N n	6E	4E	4E	0E
O o	6F	4F	4F	0F
P p	70	50	50	10
Q q	71	51	51	11
R r	72	52	52	12
S s	73	53	53	13
T t	74	54	54	14
U u	75	55	55	15
V v	76	56	56	16
W w	77	57	57	17
X x	78	58	58	18
Y y	79	59	59	19
Z z	7A	5A	5A	1A
1 !	31	31	21	00
2 @	32	32	40	00
3 #	33	33	23	00
4 $	34	34	24	00
5 %	35	35	25	00
6 ^	36	36	5E	1E
7 &	37	37	26	00
8 *	38	38	2A	00
9 (	39	39	28	00
0)	30	30	29	00
- _	2D	2D	5F	1F
\ |	5C	5C	7C	1C
{ }	7B	7B	7D	00
[ ]	5B	5B	5D	1D
; :	3B	3B	3A	00
' "	27	27	22	00
, <	2C	2C	3C	00
. >	2E	2E	3E	00
/ ?	2F	2F	3F	00
` ~	60	60	7E	00

ALPHA NUMERIC KEY HEX CODES

EXTRA KEYS		SHIFT	UNSHIFT
SPACE BAR	<SP>	20	20
LINE FEED	<LF>	0A	0A
RETURN	<CR>	0D	0D
ENTER	<CR>	0D	0D
DEL	<DEL>	7F	7F
ESC	<ESC>	1B	1B
BACK SP	<BS>	08	08
TAB	<TAB>	09	09
BACK TAB		1B 49	1B 49
PRINT		1B 50	1B 4C
HOME		1E	1E
DOWN ARROW		16	0A
UP ARROW		0B	1B 6A
LEFT ARROW		08	08
RIGHT ARROW		0C	0C
LINE INS		1B 45	1B 4E
LINE DEL		1B 52	1B 4F
CHAR INS		1B 51	1B 71
CHAR DEL		1B 57	1B 72
LINE ERASE		1B 54	1B 74
PAGE ERASE		1B 59	1B 79
SEND		1B 37	1B 36
CLEAR SPACE		1A	1B 2A

------ END OF GAS MONITOR - Version 2.33 ------