Ports $40 – $4F

Port	Access	BIT	Function	Notes
$40	(read_n / write)	ID $08	MSX2+ FS-A1 Series	Z80B 5.37MHz
		ID $D4	1chipMSX / Zemmix Neo	OCM-PLD v2.4 or later
$41	(read_n / write)	0	Smart Command ID	CPL or $FF (Null)
		1		
		2		
		3		
		4		
		5		
		6		
		7		
$42	(read / write_n)	0	CPU Clock	Virtual DIP-SW1
		1	Video Output (MSB)	Virtual DIP-SW2
		2	Video Output (LSB)	Virtual DIP-SW3
		3	Cartridge Slot-1	Virtual DIP-SW4
		4	Cartridge Slot-2 (MSB)	Virtual DIP-SW5
		5	Cartridge Slot-2 (LSB)	Virtual DIP-SW6
		6	Current Mapper Size	Virtual DIP-SW7
		7	Current MegaSD Mode	Virtual DIP-SW8
$43	(read / write_n)	0	Lock Mak for Toggles	CPU Clock
		1		Video Output
		2		Audio Mixer & CMT
		3		Cartridge Slot-1
		4		Cartridge Slot-2
		5		Hard Reset Key
		6		Internal Mapper
		7		Internal MegaSD
$44	(read / write_n)	0	Lights I/O	Led 1 Status
		1		Led 2 Status
		2		Led 3 Status
		3		Led 4 Status
		4		Led 5 Status
		5		Led 6 Status
		6		Led 7 Status
		7		Led 8 Status
$45	(read / write_n)	0	PSG Volume Level	BIT 0 (LSB)
		1		BIT 1
		2		BIT 2 (MSB)
	(read only)	3	PSG Mute	Status
	(read / write_n)	4	Master Volume Level	BIT 0 (LSB)
		5		BIT 1
		6		BIT 2 (MSB)
	(read only)	7	Master Mute	Status
$46	(read / write_n)	0	OPLL Volume Level	BIT 0 (LSB)
		1		BIT 1
		2		BIT 2 (MSB)
	(read only)	3	OPLL Mute	Status
	(read / write_n)	4	SCC-I Volume Level	BIT 0 (LSB)
		5		BIT 1
		6		BIT 2 (MSB)
	(read only)	7	SCC-I Mute	Status
$47	(read only)	0	CPU Custom Speed Level	BIT 0 (LSB)
		1		BIT 1
		2		BIT 2 (MSB)
		3	Turbo MegaSD (tMSD)	Status
		4	Turbo Pana Redirection (tPR)	Status
		5	VDP Speed Mode	0=Normal, 1=Fast
		6	Next Mapper Size	0=2048kB, 1=4096kB
		7	Next MegaSD Mode	Status
$48	(read only)	0	Turbo Pana	Status
		1	Current Keyboard Layout	0=JP, 1=Non-JP
		2	CMT (Cassette Magnetic Tape)	Status
		3	Lights Mode	0=Auto, 1=ON
		4	Red Mode (Led 0)	Status
		5	Last Reset Flag	0=Cold, 1=Warm
		6	Reset Required Flag	Status
		7	MegaSD Blink	Status
$49	(read only)	0	Pseudo Stereo	Status
		1	External Clock Mode	0=Sync to CPU, 1=3.58Mhz
		2	Machine Type ID	BIT 0 (LSB)
		3		BIT 1
		4	(0=1chipMSX, 1=Zemmix Neo, …)	BIT 2
		5		BIT 3 (MSB)
		6	NTSC/PAL Type	0=Forced, 1=Auto
		7	Forced Video Mode	0=60Hz (NTSC), 1=50Hz (PAL)
$4A	(read only)	0	Right Inverse Audio	Status
		1	Pixel Ratio 1:1 for LED Display	BIT 0 (LSB)
		2		BIT 1
		3		BIT 2 (MSB)
		4	Centering YJK Modes/R25 Mask	Status
		5	Assignment of Legacy Output	0=To VGA, 1=To VGA+
		6	Free	$FF (Null)
		7	Free	
$4B	(read only)	0	Free	$FF (Null)
		1		
		2		
		3		
		4		
		5		
		6		
		7		
$4C	(read only)	0	CPU Clock	Hard DIP-SW1
		1	Video Output (MSB)	Hard DIP-SW2
		2	Video Output (LSB)	Hard DIP-SW3
		3	Cartridge Slot-1	Hard DIP-SW4
		4	Cartridge Slot-2 (MSB)	Hard DIP-SW5
		5	Cartridge Slot-2 (LSB)	Hard DIP-SW6
		6	Internal Mapper	Hard DIP-SW7
		7	Internal MegaSD	Hard DIP-SW8
$4D	(read / write_n)	0	64kB VRAM Slot ID (Page 0)	BIT 0 (LSB)
		1		BIT 1
		2		BIT 2
		3		BIT 3 (MSB)
		4	64kB VRAM Slot ID (Page 1)	BIT 0 (LSB)
		5		BIT 1
		6		BIT 2
		7		BIT 3 (MSB)
$4E	(read only)	0	OCM-PLD main version X.Y(.z) (range 0.0.z - 25.5.z)	BIT 0 (LSB)
		1		BIT 1
		2		BIT 2
		3		BIT 3
		4		BIT 4
		5		BIT 5
		6		BIT 6
		7		BIT 7 (MSB)
$4F	(read only)	0	I/O Revision ID (0 - 31)	BIT 0 (LSB)
		1		BIT 1
		2		BIT 2
		3		BIT 3
		4		BIT 4 (MSB)
		5	OCM-PLD sub version (x.y).Z	BIT 0 (LSB)
		6	(range x.y.0 - x.y.3)	BIT 1 (MSB)
		7	Default Keyboard Layout	Status

SMART COMMANDS TABLE

Code	(dec)	Description
$00	(000)	Null Command (reserved)
$01	(001)	Set Turbo Pana Redirection OFF (default)
$02	(002)	Set Turbo Pana Redirection ON
$03	(003)	Set Standard Speed 3.58MHz
$04	(004)	Set Custom Speed 4.10MHz
$05	(005)	Set Custom Speed 4.48MHz
$06	(006)	Set Custom Speed 4.90MHz
$07	(007)	Set Custom Speed 5.39MHz
$08	(008)	Set Custom Speed 6.10MHz
$09	(009)	Set Custom Speed 6.96MHz
$0A	(010)	Set Custom Speed 8.06MHz (aka "Turbo 10MHz") (default)
$0B	(011)	Set Turbo MegaSD OFF
$0C	(012)	Set Turbo MegaSD ON (default)
$0D	(013)	Set External Slot-1 + External Slot-2
$0E	(014)	Set Internal SCC-I Slot-1 + External Slot-2
$0F	(015)	Set External Slot-1 + Internal SCC-I Slot-2
$10	(016)	Set Internal SCC-I Slot-1 + Internal SCC-I Slot-2
$11	(017)	Set External Slot-1 + Internal ASCII-8K Slot-2
$12	(018)	Set Internal SCC-I Slot-1 + Internal ASCII-8K Slot-2
$13	(019)	Set External Slot-1 + Internal ASCII-16K Slot-2
$14	(020)	Set Internal SCC-I Slot-1 + Internal ASCII-16K Slot-2
$15	(021)	Set Japanese Keyboard Layout
$16	(022)	Set Non-Japanese Keyboard Layout
$17	(023)	Set Display Mode 15KHz Composite/S-Video
$18	(024)	Set Display Mode 15KHz RGB w/ Audio Out (requires a VGA to SCART cable)
$19	(025)	Set Display Mode 31Khz VGA for LED TV or LED Display (50Hz+60Hz)
$1A	(026)	Set Display Mode 31Khz VGA+ for CRT Monitor (legacy output) (50Hz+60Hz)
$1B	(027)	Set VDP Speed Normal Mode (default)
$1C	(028)	Set VDP Speed Fast Mode (V9958 only)
$1D	(029)	Reserve MegaSD OFF (warm reset to set)
$1E	(030)	Reserve MegaSD ON (warm reset to set)
$1F	(031)	Set MegaSD Blink OFF
$20	(032)	Set MegaSD Blink ON (default)
$21	(033)	Set Lights Mode OFF w/ Auto LEDs Control (default)
$22	(034)	Set Lights Mode ON + Red Led OFF
$23	(035)	Set Lights Mode ON + Red Led ON
$24	(036)	Internal Audio Preset #1 "Mute Sound"
$25	(037)	Internal Audio Preset #2 "Middle Sound"
$26	(038)	Internal Audio Preset #3 "High Sound" (default)
$27	(039)	Set CMT OFF (default) (disabled w/ MSX turbo-R BIOS)
$28	(040)	Set CMT ON (requires a cassette recorder) (disabled w/ MSX turbo-R BIOS)
$29	(041)	Lock Turbo Toggles
$2A	(042)	Unlock Turbo Toggles
$2B	(043)	Lock Display Toggles
$2C	(044)	Unlock Display Toggles
$2D	(045)	Lock Audio Mixer & CMT Toggles
$2E	(046)	Unlock Audio Mixer & CMT Toggles
$2F	(047)	Lock Slot-1 Toggles
$30	(048)	Unlock Slot-1 Toggles
$31	(049)	Lock Slot-2 Toggles
$32	(050)	Unlock Slot-2 Toggles
$33	(051)	Lock Slot-1 & Slot-2 Toggles
$34	(052)	Unlock Slot-1 & Slot-2 Toggles
$35	(053)	Lock Hard Reset Key
$36	(054)	Unlock Hard Reset Key
$37	(055)	Lock Mapper Toggle
$38	(056)	Unlock Mapper Toggle
$39	(057)	Lock MegaSD Toggle
$3A	(058)	Unlock MegaSD Toggle
$3B	(059)	Lock All Toggles
$3C	(060)	Unlock All Toggles (default)
$3D	(061)	Set Pseudo-Stereo OFF (default)
$3E	(062)	Set Pseudo-Stereo ON (requires an external sound cartridge)
$3F	(063)	Sync External Bus Clock to CPU Speed (default)
$40	(064)	Set External Bus Clock 3.58MHz
$41	(065)	Set Turbo Pana 5.37MHz
$42	(066)	Set Right Inverse Audio OFF (default)
$43	(067)	Set Right Inverse Audio ON
$44	(068)	Internal Audio Preset #4 "Emphasis PSG Sound"
$45	(069)	Internal Audio Preset #5 "Emphasis SCC-I Sound"
$46	(070)	Internal Audio Preset #6 "Emphasis OPLL Sound"
$47 .. $4F	(071 .. 079)	Vertical Offset 16 (useful for Ark-A-Noah) .. 19 (default) .. 24 (useful for Space Manbow)
$7F	(127)	Pixel Ratio 1:1 for LED Display (default is 0) (range 0-7) (60Hz only)
$80	(128)	Null Command (useful for programming)
$81	(129)	Assign Legacy Output to VGA
$82	(130)	Assign Legacy Output to VGA+ (default)
$B0 .. $B7	(176 .. 183)	Set Master Volume 0 .. 7 (default level is 7)
$B8 .. $BF	(184 .. 191)	Set PSG Volume 0 .. 7 (default level is 4)
$C0 .. $C7	(192 .. 199)	Set SCC-I Volume 0 .. 7 (default level is 4)
$C8 .. $CF	(200 .. 207)	Set OPLL Volume 0 .. 7 (default level is 4)
$D0	(208)	Force NTSC Mode
$D1	(209)	Standard NTSC/PAL Mode (bound by Control Register 9) (default)
$D2	(210)	Force PAL Mode
$D3	(211)	Restore Default Keyboard Layout only
$D4	(212)	Null Command (reserved)
$D5	(213)	Restore Default Turbo Mode only
$D6	(214)	Set Centering YJK Modes/R25 Mask OFF (default)
$D7	(215)	Set Centering YJK Modes/R25 Mask ON
…	…	
$F9	(249)	Reserve Slot-0 Primary Mode (warm reset to set) (internal OPLL disabled)
$FA	(250)	Reserve System Logo ON (warm reset only)
$FB	(251)	Cold Reset
$FC	(252)	Warm Reset w/ Mapper 2048kB
$FD	(253)	Warm Reset
$FE	(254)	Warm Reset w/ Mapper 4096kB
$FF	(255)	Restore All Default + Reserve Default Mapper & MegaSD

I/O Reserved to IPL-ROM

Port	Access	BITs	Function	Notes
$4E	(write_n only)	BIT 0 - 6	Free	$FF (Null)
		BIT 7	JIS2 Enabler	0=JIS1+JIS2, 1=JIS1 only
$4F	(write_n only)	BIT 0 - 6	Free	$FF (Null)
		BIT 7	F4 Device Mode	0=Normal, 1=Inverted

More info at MSX Assembly Page! < http://map.grauw.nl/resources/msx_io_ports.php#switch_io >

R/W Logic

R/W Logic			
Positive	0 = OFF	(read / write)	
	1 = ON		
Negative	0 = ON	(read_n / write_n)	
	1 = OFF		

Toggles

Toggles	Binding
CPU Clock	[F12] or [DIP-SW1]
Video Output	[(SHIFT+)PRNSCR] or [DIP-SW2/3]
Audio Mixer & CMT	[(SHIFT+)PGUP/PGDOWN/F9/F10/F11] & [SCRLCK]
Cartridge Slot-1	[SHIFT+F12] or [DIP-SW4]
Cartridge Slot-2	[SHIFT+SCRLCK] or [DIP-SW5/6]
System Reset	[HARD RESET KEY] Fast or Long-Click (normal or full reboot)
Internal Mapper	[DIP-SW7] only
Internal MegaSD	[DIP-SW8] only