

# Acc4

Mx4 Options I/O Board



# **Acc4 Mx4 Options I/O Board**

## **User's Guide**

### **V4.0**

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# 1 Introduction

The Acc4 [Mx4 I/O] option adds (20) inputs and (13) outputs to the Mx4's already existing I/O capability. The ACC4 I/Os are all TTL level and can be used in conjunction with boards such as Gordos and Opto 22.

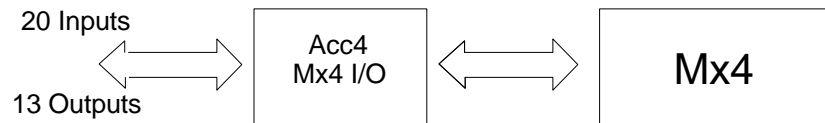


Fig. 1-1: Acc4 [Mx4 I/O] - Mx4 Block Diagram

The (20) inputs, and (13) outputs may be used in DSPL programming and/or read from or write to via Mx4's Dual Port RAM by the host (see Chapter 3, Mx4 DPR/DSPL Support).

*Introduction*

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# 2 Installing the Hardware

## Acc4 [Mx4 I/O] Mechanical Specifications

The Acc4 [Mx4 I/O] plugs onto the Mx4 controller via three connectors (see Fig. 2-1). The card is secured with these three connectors; however, if desired, a securing fastener may also be used.



**Note :** If the Acc4 [Mx4 I/O] is being used in conjunction with a Vx4++ daughterboard, the Acc4 [Mx4 I/O] should be plugged onto the Mx4, and the Vx4++ should be plugged onto the Acc4 [Mx4 I/O].

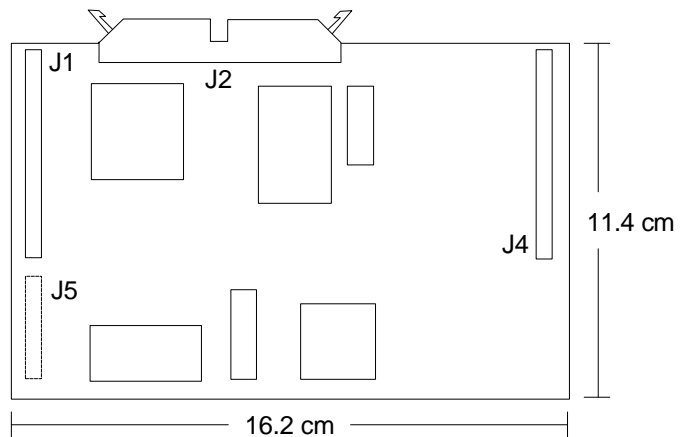


Fig. 2-1: Acc4 [Mx4 I/O] Dimensions and Connectors

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Acc4 [Mx4 I/O]	To PC/AT Mx4	To VME Mx4
J1	J2	J1
J4	J4	J4
J5	J1	J6

Table 2-1: Mx4 - Acc4 [Mx4 I/O] Connections

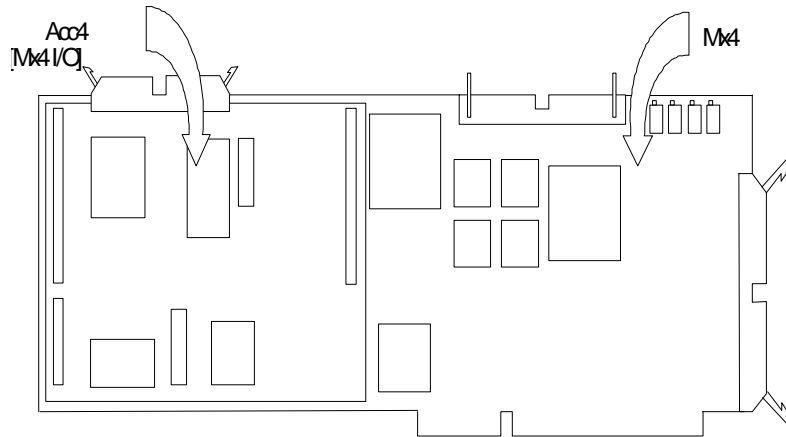


Fig. 2-2: Acc4 [Mx4 I/O] Mounted on PC/AT Mx4

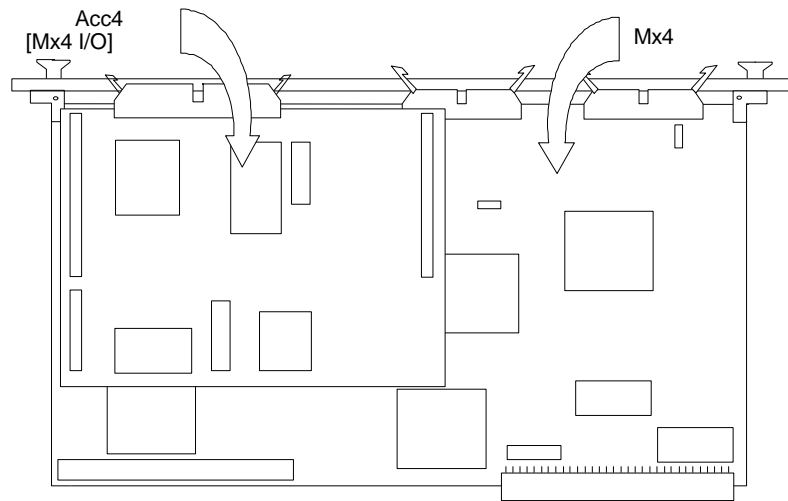


Fig. 2-3: Acc4 [Mx4 I/O] Mounted on VME Mx4

## Acc4 [Mx4 I/O] Cabling

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The Acc4 [Mx4 I/O] contains a single user-available connector as illustrated in Fig. 2-4. The J2 connector includes the discrete inputs and outputs (additional Mx4 I/O)

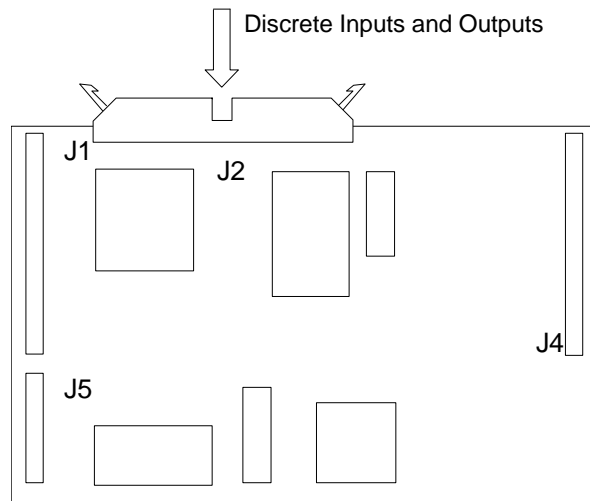


Fig. 2-4: Acc4 [Mx4 I/O] Connector Signals

### J2 Connector ... I/O Interface

The Acc4 J2 connector is a (50-pin dual row header). This connector includes the Acc4 [Mx4 Quad ADC] signals as well as additional discrete inputs and outputs for the Mx4 controller, Acc4 [Mx4 I/O].

Table 2-2 specifies the pinout for the Acc4 [Mx4 I/O] [Mx4Quad ADC] 50-pin header. The table includes signal level (type) and I/O functionality (with respect to the Acc4 card).

PIN	SIGNAL	LEVEL	I/O	DESCRIPTION
1	ACC4IN0	TTL	I	general purpose input
2	ACC4IN1	TTL	I	general purpose input
3	ACC4IN2	TTL	I	general purpose input
4	ACC4IN3	TTL	I	general purpose input
5	ACC4IN4	TTL	I	general purpose input
6	ACC4IN5	TTL	I	general purpose input
7	ACC4IN6	TTL	I	general purpose input
8	ACC4IN7	TTL	I	general purpose input
9	ACC4IN8	TTL	I	general purpose input
10	ACC4IN9	TTL	I	general purpose input
11	ACC4IN10	TTL	I	general purpose input
12	ACC4IN11	TTL	I	general purpose input
13	ACC4IN12	TTL	I	general purpose input
14	ACC4IN13	TTL	I	general purpose input
15	ACC4IN14	TTL	I	general purpose input
16	ACC4IN15	TTL	I	general purpose input
17	ACC4IN16	TTL	I	general purpose input
18	ACC4IN17	TTL	I	general purpose input
19	ACC4IN18	TTL	I	general purpose input
20	ACC4IN19	TTL	I	general purpose input
21	ACC4OUT0	TTL	O	general purpose output
22	ACC4OUT1	TTL	O	general purpose output
23	ACC4OUT2	TTL	O	general purpose output
24	ACC4OUT3	TTL	O	general purpose output
25	ACC4OUT4	TTL	O	general purpose output
26	ACC4OUT5	TTL	O	general purpose output
27	ACC4OUT6	TTL	O	general purpose output
28	ACC4OUT7	TTL	O	general purpose output
29	ACC4OUT8	TTL	O	general purpose output
30	nc	TTL	-	no connection
31	ACC4OUT9	TTL	O	general purpose output
32	nc	-	-	no connection
33	ACCOUT10	TTL	O	general purpose output
34	nc	-	-	no connection
35	ACCOUT11	TTL	O	general purpose output
36	nc	-	-	no connection
37	ACCOUT12	TTL	O	general purpose output
38	nc	-	-	no connection
39	+12V	-	O	-

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PIN	SIGNAL	LEVEL	I/O	DESCRIPTION
40	-12V	-	O	-
41	Ang. GND	-	O	-
42	Ang. GND	-	O	-
43	ADC1	+/-10v	I	analog input 1
44	ADC2	+/-10v	I	analog input 2
45	ADC3	+/-10v	I	analog input 3
46	ADC4	+/-10v	I	analog input 4
47	Dig. GND	-	O	-
48	Dig. GND	-	O	-
49	+5v	-	O	-
50	+5v	-	O	-

### J2 Connector Pinout

Table 2-2: Acc4 [Mx4 I/O] [Mx4 Quad ADC] J2 Connector Pinout



**Note:** The analog inputs ADC1 - ADC4 have an input voltage range of -10v to +10v. It is recommended that the input signals include over-voltage clamping protection to prevent damage to the Acc4.

## Inputs

The Acc4 [Mx4 I/O] includes 20 user-defined TTL logic inputs. The Acc4 user-defined input signals are TTL logic level inputs. The inputs are equipped with pull-up resistors which are implemented as current sources (see Fig. 2.5).

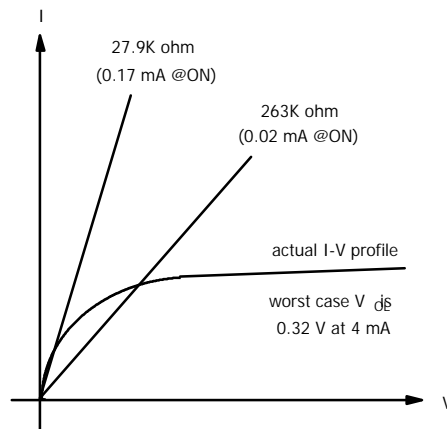


Fig. 2-5: Acc4 [Mx4 I/O] Input (Pull-Up Resistor) Current Source

By default, the inputs are defined as active-LOW. That is, 0v applied to an input results in an active, or ON, input; +5v applied to an input results in an inactive, or OFF input. The logic state of the inputs may be individually selected via the INP\_STATE command.

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Fig. 2-6 illustrates two possible configurations for interfacing external input circuitry to Acc4 [Mx4 I/O] inputs: optically-isolated input and same-ground input.

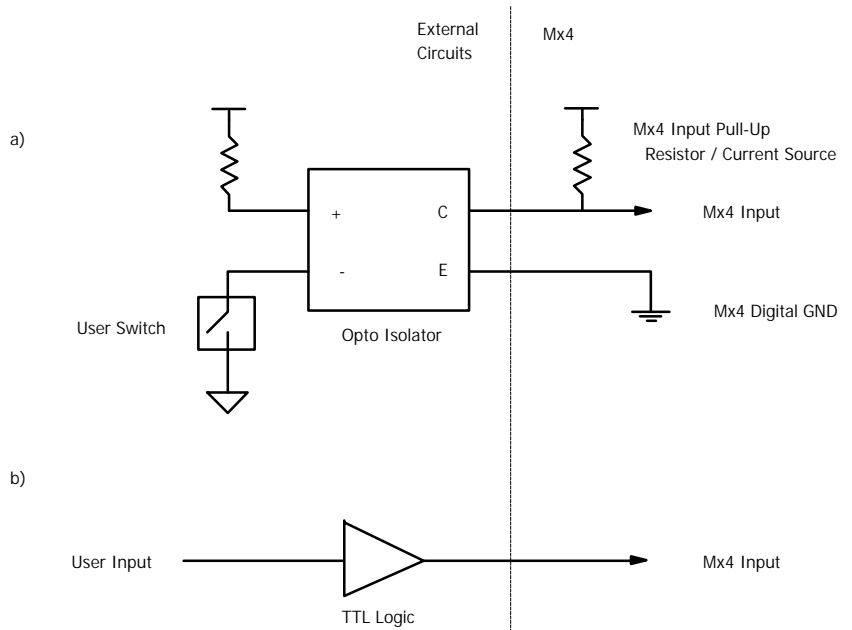


Fig. 2-6: Interfacing Input Signals to Acc4 [Mx4 I/O]  
a) Optical Isolated Input  
b) Same-Ground Input

## Outputs

The Acc4 [Mx4 I/O] includes 13 programmable outputs. The Acc4 [Mx4 I/O] output signals are TTL logic level outputs with a fan out of one (that is, a Acc4 [Mx4 I/O] output should not be used to drive more than one TTL logic gate). As an example of interfacing to the Acc4 [Mx4 I/O] output signals, Fig. 2-7 illustrates a relay output circuit.

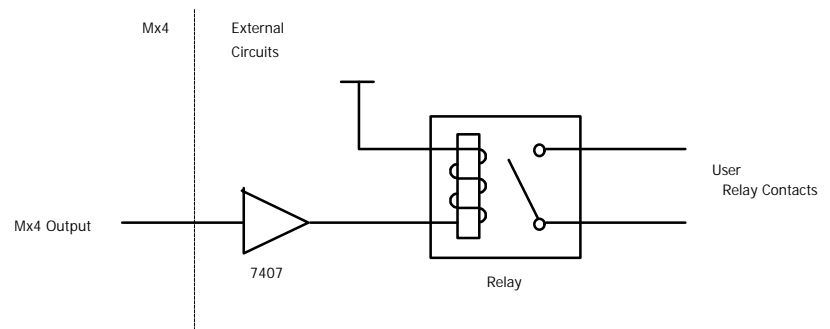


Fig. 2-7: Interfacing a Relay to a Acc4 [Mx4 I/O] Output

The Acc4 [Mx4 I/O] outputs are active-LOW. That is, an ON output is an output at 0v, an OFF output is an output at +5v. The ON/OFF state of the outputs is determined by the OUTP\_ON and OUTP\_OFF commands.

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# 3 Mx4 DPR/DSPL Support

The inputs and outputs on Acc4 [Mx4 I/O], may be used in both DSPL and real time command (RTC) programming and/or read from Mx4's Dual Port RAM by the host.

The real-time status of the 20 external user-defined ACC4 [Mx4 I/O] inputs is available in DSPL in the 16-bit registers `INP3_REG` and `INP4_REG`. A set bit indicates an active input.

The real-time status of the 13 external user defined outputs on ACC4 can be changed by DSPL/RTC instructions `OUTP_ON` and `OUTP_OFF`.

For use in Host-based programming, the inputs and outputs are available through the Mx4 Dual Port RAM. This has been described in the PARREAD command and Parameter Update Table at the end of this chapter.

## DSPL

---

The Acc4 [Mx4 I/O] option is supported in DSPL with the followin registers and commands.

**INP1\_REG, INP2\_REG  
INP3\_REG, INP4\_REG**

IDENTIFIER

**IDENTIFIER** DSPL Input Registers 1-4.

**USAGE** DSPL (PLC, Motion)

**DESCRIPTION**

The real time status of the 22 external user-defined Mx4 inputs is available in DSPL in the 16-bit registers `INP1_REG` and `INP2_REG`. The real time status of the 20 external user-defined ACC4 inputs is available in DSPL in the 16-bit registers `INP3_REG` and `INP4_REG`. A set bit (bit = 1) indicates an active input condition.

The input bit registers may only be used with the bitwise operators in conditional expressions within the DSPL conditional structures, `IF`, `WHILE` and `WAIT_UNTIL`. A user defined bit mask that must be used in conjunction with the bitwise operator `&` must follow the hexadecimal format `0x????`, where `????` is a 16-bit hexadecimal mask. For example, a mask value of `0x0204` will mask out all bits except bits 2 and 9.

<u>Name</u>	<u>Bit Format</u>	<u>Input</u>
inp1_reg	bit 0	IN0
	bit 1	IN1
	bit 2	IN2
	bit 3	IN3
	bit 4	IN4
	bit 5	IN5
	bit 6	IN6
	bit 7	IN7
	bit 8	IN8
	bit 9	IN9
	bit 10	IN10
	bit 11	IN11
	bit 12	IN12
	bit 13	IN13
	bit 14	IN14
	bit 15	IN15

## INP1\_REG, INP2\_REG cont. INP3\_REG, INP4\_REG

IDENTIFIER

<u>Name</u>	<u>Bit Format</u>	<u>Input</u>
inp2_reg	bit 0	IN16
	bit 1	IN17
	bit 2	IN18
	bit 3	IN19
	bit 4	IN20
	bit 5	IN21
inp3_reg	bits 6 - 15	unused
	bit 0	ACC4IN0
	bit 1	ACC4IN1
	bit 2	ACC4IN2
	bit 3	ACC4IN3
	bit 4	ACC4IN4
	bit 5	ACC4IN5
	bit 6	ACC4IN6
	bit 7	ACC4IN7
	bit 8	ACC4IN8
	bit 9	ACC4IN9
	bit 10	ACC4IN10
	bit 11	ACC4IN11
	bit 12	ACC4IN12
	bit 13	ACC4IN13
	bit 14	ACC4IN14
inp4_reg	bit 15	ACC4IN15
	bit 0	ACC4IN16
	bit 1	ACC4IN17
	bit 2	ACC4IN18
	bit 3	ACC4IN19
	bits 4 - 15	unused

**SEE ALSO** ~, &, AND, OR

### EXAMPLE

The conditional expression in the DSPL IF statement below will evaluate to TRUE if bit 0, 5, or 14 in input register 1 is set (bit = 1):

```
IF (INP1_REG & 0x4021)
```

## INP\_STATE

---

**FUNCTION**      Configure Logic State of Inputs

**SYNTAX**        INP\_STATE (inp<sub>1</sub>, inp<sub>2</sub>, inp<sub>3</sub>, inp<sub>4</sub>)

**USAGE**                DSPL (Motion), Host (command code: B4h)

### ARGUMENTS

inp<sub>1</sub>      bit coding the logic state of inputs

bit = 0    :      active LOW input  
bit = 1    :      active HIGH input

bit 15    :      IN15

thru      ·      thru

bit 0     :      IN0

inp<sub>2</sub>      bit coding the logic state of inputs

bit = 0    :      active LOW input  
bit = 1    :      active HIGH input

bit 6-15 :      NOT USED

bit 5     :      IN21

bit 4     :      IN20

bit 3     :      IN19

bit 2     :      IN18

bit 1     :      IN17

bit 0     :      IN16

## INP\_STATE cont.

---

inp<sub>3</sub> bit coding the logic state of inputs

bit = 0	:	active LOW input
bit = 1	:	active HIGH input
bit 15	:	ACCIN15
	:	
thru	:	thru
	:	
bit 0	:	ACCIN0

inp<sub>4</sub> bit coding the logic state of inputs

bit = 0	:	active LOW input
bit = 1	:	active HIGH input
bit 4-15	:	NOT USED
bit 3	:	ACC4IN19
bit 2	:	ACC4IN18
bit 1	:	ACC4IN17
bit 0	:	ACC4IN16

When used in DSPL, arguments *inp<sub>1</sub>*, *inp<sub>2</sub>*, *inp<sub>3</sub>*, *inp<sub>4</sub>*, may be selected as variables.

## INP\_STATE cont.

---

### DESCRIPTION

This command allows the user to define the logic state of the Mx4 and Acc4 inputs. Each input may be configured as active LOW or active HIGH (TTL logic levels) (the Mx4 inputs are level sensitive).



**Note:** At power-up and reset, Mx4 and ACC4 inputs default as active LOW.

**SEE ALSO** none

### EXAMPLE

Configure the IN0 input as active HIGH input. The remaining inputs are to be configured as active LOW.

```
INP_STATE (0x0001,0x0000,0x0000,0x0000,0x0000)
```

## OUTP\_OFF

---

**FUNCTION** Set Outputs to 'Off' State

**SYNTAX** OUTP\_OFF (outp<sub>1</sub>, outp<sub>2</sub>)

**USAGE** DSPL (Motion), Host (command code: 55h)

### ARGUMENTS

outp<sub>1</sub> bit coding of the Mx4 outputs

if bit=0 no change in output status  
if bit=1 output = HIGH TTL voltage

bit 15 unused  
bit 14 unused  
bit 13 unused  
bit 12 OUT12 output  
bit 11 OUT11 output  
bit 10 OUT10 output  
bit 9 OUT9 output  
bit 8 OUT8 output  
bit 7 OUT7 output  
bit 6 OUT6 output  
bit 5 OUT5 output  
bit 4 OUT4 output  
bit 3 OUT3 output  
bit 2 OUT2 output  
bit 1 OUT1 output  
bit 0 OUT0 output

outp<sub>2</sub> bit coding of the Acc4 outputs

if bit=0 no change in output status  
if bit=1 output = HIGH TTL voltage

bit 15 unused  
bit 14 unused  
bit 13 unused  
bit 12 ACC4OUT12 output  
bit 11 ACC4OUT11 output  
bit 10 ACC4OUT10 output

## OUTP\_OFF cont.

---

bit 9	ACC4OUT9 output
bit 8	ACC4OUT8 output
bit 7	ACC4OUT7 output
bit 6	ACC4OUT6 output
bit 5	ACC4OUT5 output
bit 4	ACC4OUT4 output
bit 3	ACC4OUT3 output
bit 2	ACC4OUT2 output
bit 1	ACC4OUT1 output
bit 0	ACC4OUT0 output

When used in DSPL, arguments `outp1`, `outp2`, may be selected as variables

### DESCRIPTION

This command allows the 'OFF' status of all outputs to be set.

**SEE ALSO**     `OUTP_ON`

### APPLICATION

This command can be used for a general purpose logical output operation.

#### **Command Sequence Example**

No preparation is required before running this instruction.

### EXAMPLE

Turn 'off' the OUT0, OUT5, OUT6, and OUT12 Mx4 outputs as well as ACC4OUT0 and ACC4OUT4.

```
OUTP_OFF (0x1061,0x0011)
```

## OUTP\_ON

---

**FUNCTION** Set Outputs to 'On' State

**SYNTAX** OUTP\_ON (outp<sub>1</sub>,outp<sub>2</sub>)

**USAGE** DSPL (Motion), Host (command code: 56h)

### ARGUMENTS

outp<sub>1</sub> bit coding of the Mx4 outputs

if bit=0 no change in output status  
if bit=1 output = LOW TTL voltage

bit 15 unused  
bit 14 unused  
bit 13 unused  
bit 12 OUT12 output  
bit 11 OUT11 output  
bit 10 OUT10 output  
bit 9 OUT9 output  
bit 8 OUT8 output  
bit 7 OUT7 output  
bit 6 OUT6 output  
bit 5 OUT5 output  
bit 4 OUT4 output  
bit 3 OUT3 output  
bit 2 OUT2 output  
bit 1 OUT1 output  
bit 0 OUT0 output

outp<sub>2</sub> bit coding of the Acc4 outputs

if bit=0 no change in output status  
if bit=1 output = LOW TTL voltage

bit 15 unused  
bit 14 unused  
bit 13 unused  
bit 12 ACC4OUT12 output  
bit 11 ACC4OUT11 output  
bit 10 ACC4OUT10 output

## OUTP\_ON cont.

---

bit 9	ACC4OUT9 output
bit 8	ACC4OUT8 output
bit 7	ACC4OUT7 output
bit 6	ACC4OUT6 output
bit 5	ACC4OUT5 output
bit 4	ACC4OUT4 output
bit 3	ACC4OUT3 output
bit 2	ACC4OUT2 output
bit 1	ACC4OUT1 output
bit 0	ACC4OUT0 output

When used in DSPL, arguments `outp1`, `outp2`, may be selected as variables.

### DESCRIPTION

This command allows the 'ON' status of all outputs to be set.

### SEE ALSO

`OUTP_OFF`

### APPLICATION

This command can be used for a general purpose logical output operation.

#### **Command Sequence Example**

No preparation is required before running this instruction.

### EXAMPLE

Enable or turn 'on' the OUT1, OUT11, and OUT12 outputs.

```
OUTP_ON (0x1802,0x0000)
```

## DPR/RTC

---

The Acc4 [Mx4 I/O] option is supported in real time command (RTC) and DPR updating with the following commands.

### **INP\_STATE**

---

**FUNCTION**     Configure Logic State of Inputs  
**DPR ORDER**   command code, inp<sub>1</sub>, inp<sub>2</sub>, inp<sub>3</sub>, inp<sub>4</sub>  
**USAGE**         Host (command code: B4h), DSPL (Motion)

#### **ARGUMENTS**

inp<sub>1</sub>     a single word, coding the logic state of inputs

bit = 0   :     active LOW input  
bit = 1   :     active HIGH input

bit 15   :     IN15  
          :  
thru     :     thru  
          :  
bit 0    :     IN0

inp<sub>2</sub>     a single byte, coding the logic state of inputs

bit = 0   :     active LOW input  
bit = 1   :     active HIGH input

bit 6-15 :     NOT USED

bit 5     :     IN21  
bit 4     :     IN20  
bit 3     :     IN19  
bit 2     :     IN18

bit 1 : IN17  
bit 0 : IN16

### **INP\_STATE cont.**

---

inp<sub>3</sub> a single word, coding the logic state of inputs

bit = 0 : active LOW input  
bit = 1 : active HIGH input

bit 15 : ACCIN15  
:  
thru : thru  
:  
bit 0 : ACCIN0

inp<sub>4</sub> a single byte, coding the logic state of inputs

bit = 0 : active LOW input  
bit = 1 : active HIGH input

bit 4-15 : NOT USED

bit 3 : ACC4IN19  
bit 2 : ACC4IN18  
bit 1 : ACC4IN17  
bit 0 : ACC4IN16

---

## INP\_STATE cont.

---

### DESCRIPTION

This command allows the user to define the logic state of the Mx4 and Acc4 inputs. Each input may be configured as active LOW or active HIGH (TTL logic levels) (the Mx4 inputs are level sensitive).



**Note:** At power-up and reset, Mx4 and Acc4 inputs default as active LOW.

**SEE ALSO**    EN\_INP

### EXAMPLE

Configure the IN0-7 and ACC4IN8-15 inputs as active HIGH inputs. The remaining inputs are to be configured as active LOW.

The value of the RTC arguments is:

inp <sub>1</sub>	:	00FFh
inp <sub>2</sub>	:	0000h
inp <sub>3</sub>	:	FF00h
inp <sub>4</sub>	:	0000h

---

## **OUTP\_OFF**

---

**FUNCTION** Set Outputs to 'Off' State

**DPR ORDER** command code, outp<sub>1</sub>, outp<sub>2</sub>

**USAGE** Host (command code: 55h), DSPL (Motion)

**ARGUMENTS**

outp<sub>1</sub> a single word, bit coding the Mx4 outputs

if bit=0 no change in output status

if bit=1 output = HIGH TTL voltage

bit 15 unused

bit 14 unused

bit 13 unused

bit 12 OUT12 output

bit 11 OUT11 output

bit 10 OUT10 output

bit 9 OUT9 output

bit 8 OUT8 output

bit 7 OUT7 output

bit 6 OUT6 output

bit 5 OUT5 output

bit 4 OUT4 output

bit 3 OUT3 output

bit 2 OUT2 output

bit 1 OUT1 output

bit 0 OUT0 output

outp<sub>2</sub> a single word, bit coding the Acc4 outputs

if bit=0 no change in output status

if bit=1 output = HIGH TTL voltage

bit 15 unused

bit 14 unused

bit 13 unused

bit 12 ACC4OUT12 output

bit 11 ACC4OUT11 output

bit 10 ACC4OUT10 output

## **OUTP\_OFF cont.**

---

bit 9	ACC4OUT9 output
bit 8	ACC4OUT8 output
bit 7	ACC4OUT7 output
bit 6	ACC4OUT6 output
bit 5	ACC4OUT5 output
bit 4	ACC4OUT4 output
bit 3	ACC4OUT3 output
bit 2	ACC4OUT2 output
bit 1	ACC4OUT1 output
bit 0	ACC4OUT0 output

### **DESCRIPTION**

This command allows the 'OFF' status of all outputs to be set.

**SEE ALSO**    OUTP\_ON

### **APPLICATION**

This command can be used for a general purpose logical output operation.

#### ***Command Sequence Example***

No preparation is required before running this instruction.

### **EXAMPLE**

Turn 'off' the Mx4 OUT0, OUT5, OUT6, and OUT12 outputs and all of the Acc4 outputs.

The arguments for this instruction will be:

outp <sub>1</sub>	:	1061h
outp <sub>2</sub>	:	FFFFh

## OUTP\_ON

---

**FUNCTION** Set Outputs to 'On' State

**DPR ORDER** command code, outp<sub>1</sub>, outp<sub>2</sub>

**USAGE** Host (command code: 56h), DSPL (Motion)

### ARGUMENTS

outp<sub>1</sub> a single word, bit coding the Mx4 outputs

if bit=0 no change in output status  
if bit=1 output = LOW TTL voltage

bit 15 unused  
bit 14 unused  
bit 13 unused  
bit 12 OUT12 output  
bit 11 OUT11 output  
bit 10 OUT10 output  
bit 9 OUT9 output  
bit 8 OUT8 output  
bit 7 OUT7 output  
bit 6 OUT6 output  
bit 5 OUT5 output  
bit 4 OUT4 output  
bit 3 OUT3 output  
bit 2 OUT2 output  
bit 1 OUT1 output  
bit 0 OUT0 output

outp<sub>2</sub> a single word, bit coding the Acc4 outputs

if bit=0 no change in output status  
if bit=1 output = LOW TTL voltage

bit 15 unused  
bit 14 unused  
bit 13 unused  
bit 12 ACC4OUT12 output  
bit 11 ACC4OUT11 output  
bit 10 ACC4OUT10 output  
bit 9 ACC4OUT9 output  
bit 8 ACC4OUT8 output

## OUTP\_ON cont.

---

bit 7	ACC4OUT7 output
bit 6	ACC4OUT6 output
bit 5	ACC4OUT5 output
bit 4	ACC4OUT4 output
bit 3	ACC4OUT3 output
bit 2	ACC4OUT2 output
bit 1	ACC4OUT1 output
bit 0	ACC4OUT0 output

### DESCRIPTION

This command allows the 'ON' status of all outputs to be set.

**SEE ALSO**    OUTP\_OFF

### APPLICATION

This command can be used for a general purpose logical output operation.

#### ***Command Sequence Example***

No preparation is required before running this instruction.

### EXAMPLE

Turn 'on' the Mx4 OUT0 and OUT1 outputs and the Acc4 ACC4OUT2 and ACC4OUT3 outputs.

The arguments for this instruction will be:

outp <sub>1</sub>	:	0003h
outp <sub>2</sub>	:	0006h

## PARREAD addendum (See Mx4 User's Guide)

---

### 15. Output status (m=22h)

0B8h	bit 7	: ACC4OUT7
	bit 6	: ACC4OUT6
	bit 5	: ACC4OUT5
	bit 4	: ACC4OUT4
	bit 3	: ACC4OUT3
	bit 2	: ACC4OUT2
	bit 1	: ACC4OUT1
	bit 0	: ACC4OUT0
0B9h	bit 7	: OUT5
	bit 6	: OUT7
	bit 5	: OUT9
	bit 4	: OUT11
	bit 3	: OUT6
	bit 2	: OUT8
	bit 1	: OUT10
	bit 0	: OUT12
0BAh	bit 4	: ACC4OUT12
	bit 3	: ACC4OUT11
	bit 2	: ACC4OUT10
	bit 1	: ACC4OUT9
0BBh	bit 0	: ACC4OUT8
	bit 7	: OUT3
	bit 6	: OUT2
	bits 5-4	: not used
	bit 3	: OUT4
	bits 2-0	: not used
0BDh	bit 5-7	: not used
	bit 7	: OUT0
	bit 6	: OUT1
	bits 5-0	: not used
0BEh		not used
0BFh		not used

## PARREAD cont.

---

16.	Logic state of inputs (m=23h)
0B8h	echo inp <sub>1</sub> low byte of INP_STATE
0B9h	echo inp <sub>2</sub> high byte of INP_STATE
0BAh	bit 7 echo inp <sub>2</sub> bit 5
	bit 6 echo inp <sub>2</sub> bit 4
	bit 5 0
	bit 4 0
	bit 3 echo inp <sub>2</sub> bit 3
	bit 2 echo inp <sub>2</sub> bit 2
	bit 1 echo inp <sub>2</sub> bit 1
	bit 0 echo inp <sub>3</sub> bit 0
0BBh	echo inp <sub>3</sub> low byte of INP_STATE
0BCh	echo inp <sub>3</sub> high byte of INP_STATE
0BDh	echo inp <sub>4</sub> low byte of INP_STATE
0BEh	
	not used
0BFh	

## Parameter Updates (08Ch - 114h)

addendum (See Mx4 User's Guide)

NAME	ADDRESS	ACCESS		DESCRIPTION
		Mx4	HOST	
VEC4VAR	08Ch - 093h	WO	RO	*V4++ variable viewing window
* NOTE: Available with V4++ drive control option.				
INPUT	094h	WO	RO	real-time status of inputs. A set bit indicates active: bit 0: IN0 bit 1: IN1 bit 2: IN2 bit 3: IN3 bit 4: IN4 bit 5: IN5 bit 6: IN6 bit 7: IN7
INPUT	095h	WO	RO	real-time status of inputs. A set bit indicates active: bit 0: IN8 bit 1: IN9 bit 2: IN10 bit 3: IN11 bit 4: IN12 bit 5: IN13 bit 6: IN14 bit 7: IN15
INPUT	096h	WO	RO	real-time status of inputs. A set bit indicates active: bit 0: IN16 bit 1: IN17 bit 2: IN18 bit 3: IN19 bit 4: IN20 bit 5: IN21 bit 6-7: not used

### Parameter Updates (08Ch - 114h) cont.

NAME	ADDRESS	ACCESS		DESCRIPTION
		Mx4	HOST	
INPUT	097h	WO	RO	real-time status of inputs. A set bit indicates active: bit 0: ACC4IN0 bit 1: ACC4IN1 bit 2: ACC4IN2 bit 3: ACC4IN3 bit 4: ACC4IN4 bit 5: ACC4IN5 bit 6: ACC4IN6 bit 7: ACC4IN7
INPUT	098h	WO	RO	real-time status of inputs. A set bit indicates active: bit 0: ACC4IN8 bit 1: ACC4IN9 bit 2: ACC4IN10 bit 3: ACC4IN11 bit 4: ACC4IN12 bit 5: ACC4IN13 bit 6: ACC4IN14 bit 7: ACC4IN15
INPUT	099h	WO	RO	real-time status of inputs. A set bit indicates active: bit 0: ACC4IN16 bit 1: ACC4IN17 bit 2: ACC4IN18 bit 3: ACC4IN19 bit 4-7: not used
reserved	09Ah - 0A6h	-	-	reserved locations

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