BEAR BONES I/O EXPANDER
TTL OR CMOS COMPATIBLE

DESCRIPTION

The ICM-IO-XX I/O expander is a complete auxiliary sub-system for the Bear Bones controller, see data sheet 7809-26. You need only select which I/O group you wish this expander to be and then plug it into the Bear Bones controller or another expander.

TABLE 1

	IN PUTS	OUT PUTS	GROUP (Table 2)
ICM-IO-51	8	8	1 for TTL interface
ICM-IO-52	8	Ø	2 for CMOS interface
ICM-IO-53	Ø	8	
User Supply			

SPECIFICATIONS

INPUTS	See Table 2
OUTPUTS	See Table 2
POWER	5VDC at 25°C 1 MADC all I/O OFF 100 MADC all I/O ON
TEMPERATURE RANGE	0 to 60°C
DIMENSIONS	5.4"H x 5.1"W x 1.5"D
FIELD TERMINATIONS	18 AWG maximum wire size

APPLICATION

This I/O expander requires pull-ups, see Table 2. You need only to preselect its page identification and plug it into your Bear Bones controller or another expander. This expander contains all the hardware for real world inputs and real world outputs. It receives its logic power from the Bear Bones. It receives instructions from and transmits data to the Bear Bones via cables 3 and 6, see Fig 1.

OPERATION

This expander operates on the instructions from the Bear Bones controller and must be connected to it either directly or through another expander.

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OPTIONS This expander can be addressed in the field. This address can be changed by you at any time.

NOTE: The address selector allows you to determine the page and I/O bit of your expander. The expander is shipped with jumpers installed at page bits 1, 2, 4 and at lower I/O. The expander is therefore selected to be page 0 and I/O 0-7. To change the page and I/O please refer to Truth Tables. To change jumpers remove the entire pad from the socket. Watch the location of the keying notch when re-inserting.

TRUTH TABLES

PAGE BIT			
PAGE	1	2	4
0	X	X	X
1	DO NOT SELECT		
2	X	0	X
3	0	0	X
4	X	X	0
5	0	X	0
6	X	0	0
7	0	0	0

	I/O BIT	
JUMPER	UPPER	LOWER
LOWER	X	0
UPPER	0	X

X = JUMPER
0 = NO JUMPER

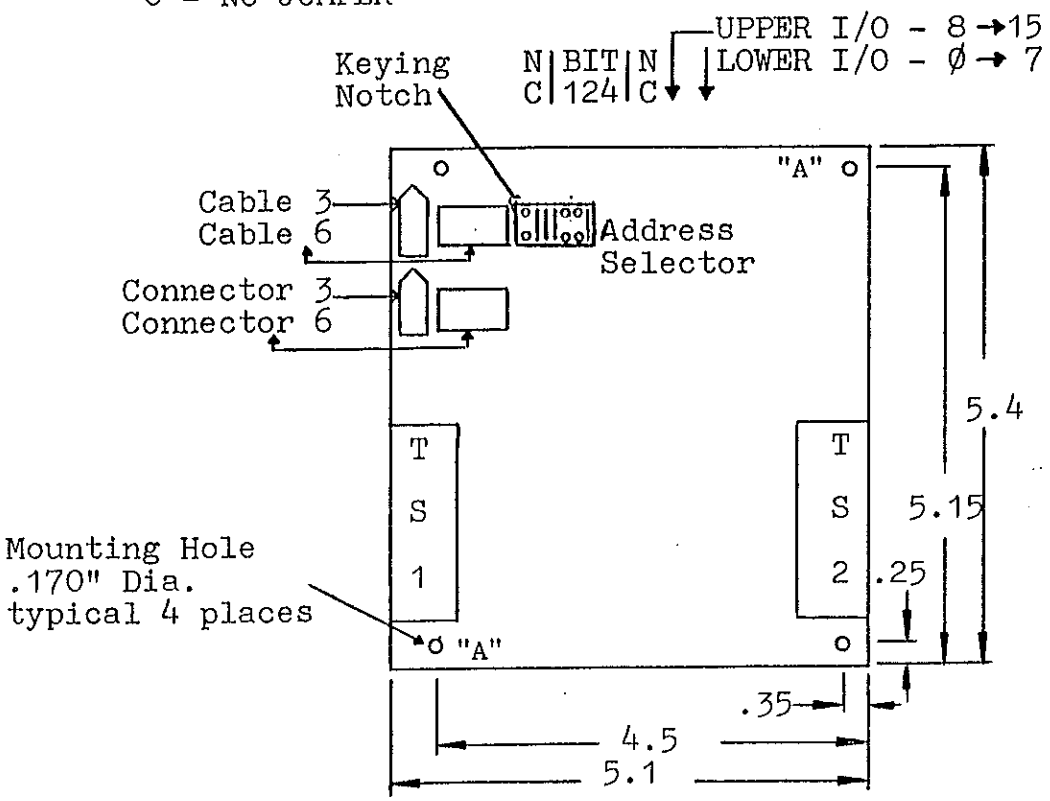

FIGURE 1

NOTE: Depending on the mounting hardware used, it may be necessary to install insulating washers between the expander and the hardware at holes marked "A".

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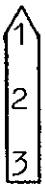
CABLE 3 and CONNECTOR 3

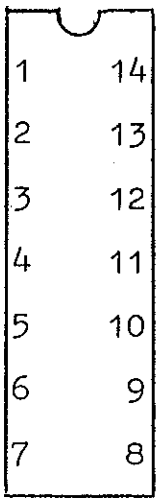
Interfaces logic power to the I/O expanders and the Bear Bones.



Pin	
1	Card Ground
2	+5VDC Logic Power
3	Card Ground

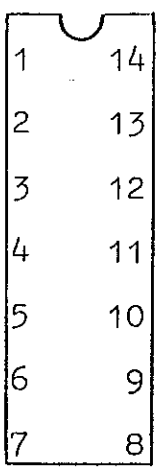
CABLE 6 and CONNECTOR 6

Interfaces this expander to the Bear Bones and/or other expanders.



Pin	
1	Connecting to +5VDC resets outputs
2	Program clock synchronizes the I/O expander and the Bear Bones.
3	IO/CR bit 3 status
4	+5VDC = write to outputs; ØVDC = read from inputs
5	Data channel for outputs
6	Data channel for inputs
7	IO/CR bit 2 status
8	IO/CR bit 1 status
9	IO/CR bit Ø status
10	Page bit 3 status; +5VDC for pages 8-F; ØVDC for pages Ø-7.
11	Page bit 2 status; +5VDC for pages 4-7 and C-F; ØVDC for pages Ø-3 and 8-b.
12	Page bit 1 status; +5VDC for pages 2,3,6,7,A,b,E,F; ØVDC for pages 0,1,4,5,8,9,C,d.
13	Page bit Ø status; +5VDC for pages 1,3,5,7,9,b,d,F; ØVDC for pages 0,2,4,6,8,A,C,E.
14	Card Ground

J-1 Identifies the page number and upper/lower position of the expander.



Pin	
1	No Connection
2	Page bit 1
3	Page bit 2
4	Page bit 4
5	Card Ground
6	Common
7	
8	Lower bit
9	Upper bit
10	Card Ground
11	Card Ground
12	Card Ground
13	Card Ground
14	No Connection

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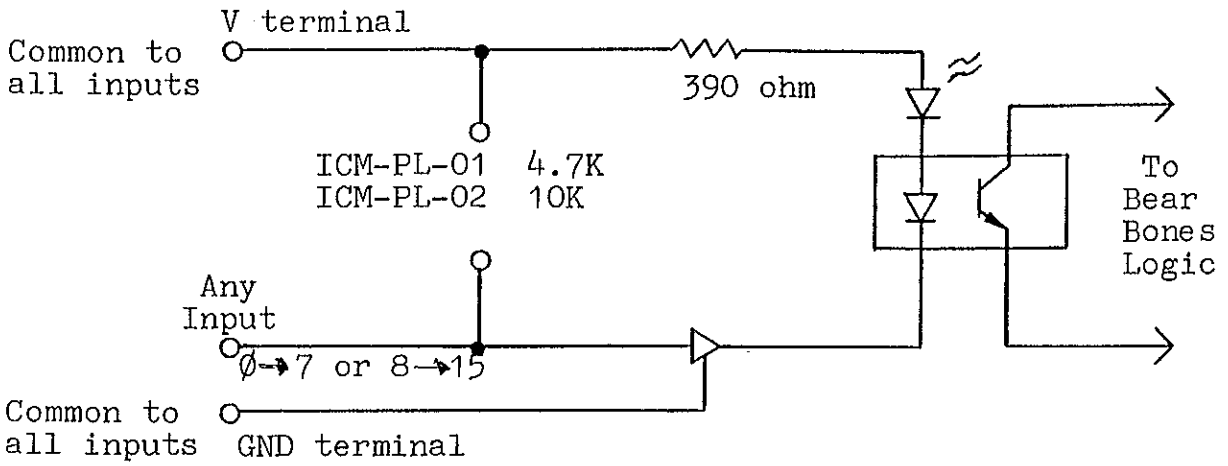
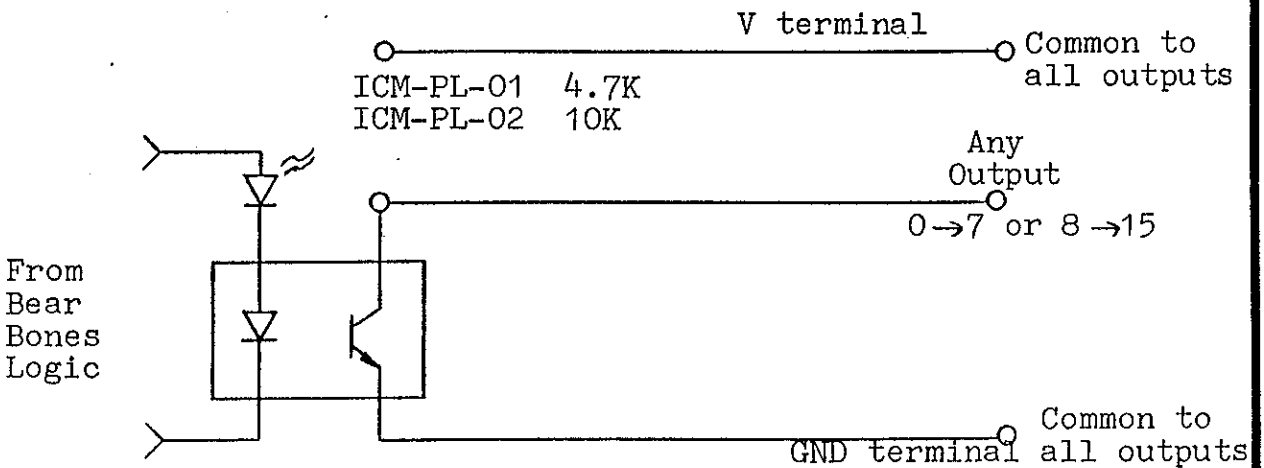
INPUT CIRCUIT



OUTPUT CIRCUIT



The pull-up resistor packages (ICM-PL-01, ICM-PL-02) are not furnished with the expander. Should your circuits require that pull-ups be added on this expander order by the above part numbers.

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INPUT TERMINALS
TS-1

Input address determined by page selection

See Sheet 2

For input ratings see Sheet 6

OUTPUT TERMINALS
TS-2

Output address determined by page selection

See Sheet 2

For output ratings see Sheet 6

W A R N I N G

The ICM Programmable Controller, as with other solid state controls, must not be used in applications which would be hazardous to personnel in the event of failure of the controller. Precautions must be taken to provide mechanical and/or electrical safeguards external to the controller.

NOTE: Specifications subject to change without notice.

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INPUTS

GROUP	SIGNAL LEVEL	INPUT CURRENT	LOGIC "0" / "1"	TURN ON TURN OFF	PULL UPS	ISOL	LED	OPTO
1	TTL 5VDC Drivers	1 MADC	0 to 2.1VDC/2.2VDC to VS	.08ms/1.5ms	ICM-PL-01 4.7K	1500V	Y	Y
2	CMOS 5VDC Drivers	.5MADC	" "	.06ms/1.2ms	ICM-PL-02 10K	1500V	Y	Y
2	CMOS 12VDC Drivers	1.5MADC	" "	.06ms/1.2ms	ICM-PL-02 10K	1500V	Y	Y
2	CMOS 15VDC Drivers	2.0MADC	" "	.06ms/1.2ms	ICM-PL-02 10K	1500V	Y	Y

OUTPUTS

GROUP	SIGNAL LEVEL	OUTPUT CHARACTERISTICS SOURCE	OUTPUT CHARACTERISTICS SINK	TURN ON TURN OFF	PULL UPS	ISOL	LED	OPTO
1	5VDC TTL	.8 units at 40 μA/Unit	8.75 units at 1.6MA/Unit	2μs/0.1ms	ICM-PL-01 4.7K	1500V	Y	Y
2	5VDC CMOS	.025MA	14MA	2μs/0.1ms	ICM-PL-02 10K	1500V	Y	Y
2	12VDC CMOS	.06 MA	13.0MA	2μs/0.1ms	ICM-PL-02 10K	1500V	Y	Y
2	15VDC CMOS	.075MA	12.5MA	2μs/0.1ms	ICM-PL-02 10K	1500V	Y	Y