ICM PROGRAMMABLE CONTROLLER

PART NO PIC-BB-XX

PIC BEAR CONTROLLER

DESCRIPTION

The PIC-BB-XX series of programmable controllers is a complete, expandable system. You just add your programmed eprom and your controller is ready. This single board controller is sold with all the hardware for your real world inputs and outputs installed. The power supply is also included with provisions for mounting the transformer off board.

TABLE 1

PIC BEAR	LINE POWER	I/O GROUPS Inputs	Outputs
PIC-BB-14	120VAC	2	2
PIC-BB-15	120VAC	1	1 & 3
PIC-BB-16	120VAC	3	1 & 3
PIC-BB-17	24VAC	3	1 & 3
PIC-BB-18	240VAC	4	4
PIC-BB-19	120VAC	1	5

SPECIFICATIONS

CPU TYPE	Single bit processor
MEMORY	4K (ICM-ME-07);8K (ICM-ME-09); 16K(ICM-ME-10)
INPUTS	See Table 2 page 8
OUTPUTS	See Table 2 page 8
POWER	120VAC at 25°C, 14.4 W all 8 outputs OFF; 15.8 W all 8 outputs ON
PROGRAMMING	Standard ladder logic
SCAN TIME	2 msec per 1,000 instructions
TEMPERATURE RANGE	0 to 60° C
DIMENSIONS	8"H x 9"W x 3"D
CLOCK	500 KHZ
TIME BASE	0.1 second, Input 1/02
FIELD TERMINATIONS	14AWG maximum wire size, with or without lugs.
WATCH DOG LED	Blinks to indicate that the system clock is running.
LINE FUSE (TS-#3)	Recommend 1 amp no delay
5VDC SUPPLY	Will operate entire system and drive up to 40 outputs at one time. Additional outputs require optional power supply (ICM-PS-04)

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PIC BEAR CONTROLLER

APPLICATION

This stand alone controller requires only a memory prom (with your program) and connections to the real world. It is all you need to accept contact closures and drive your solenoids or pick-up your motor starters. This controller is dedicated to Page 1 of the I/O address set. The inputs and outputs that are available are 8 thru 15. The CUB expander ICM-IO-30 adds the capabilities of inputs and outputs 3 thru 8, see data sheet 7809-27. Should further expansion be required refer to ICM-IO-XX data sheet 7809-28 to add inputs and outputs in groups of 8 each. The maximum I/O count is 125 inputs and 125 outputs.

OPERATION

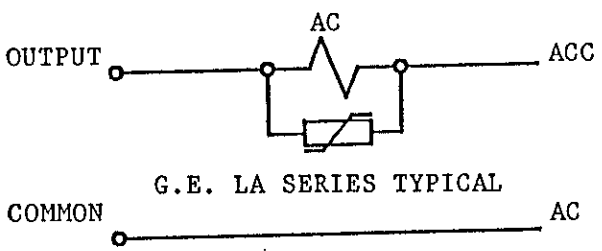
These controllers utilize the 14500 single bit processor. Instructions are read one at a time. The result of the instruction and the status of the data line are stored in the resultant register. If a normally open contact is programmed and the data line is high the resultant register is set to one. If a normally closed contact is programmed and the data line is low the resultant register is set to one. If a standard output symbol is programmed and the resultant register is one the output is energized. If a complimented output symbol is programmed and the resultant register is one the output is de-energized.

OPTIONS

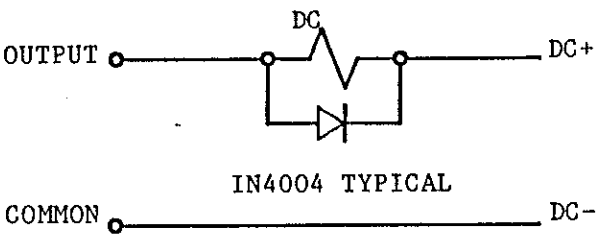
The PIC Bear offers the new memory capability of 4/8/16K memory. You can also add the convenience of pull apart terminal strips. This minimizes change out time and reduces the possibility of re-wiring errors.

PRECAUTIONS

It is highly recommended that all output drivers be protected by connecting varistors to AC loads and snubbers to DC loads. Pictorial examples are shown below. Be sure to size these protective devices to service the loads you connect.



G.E. LA SERIES TYPICAL



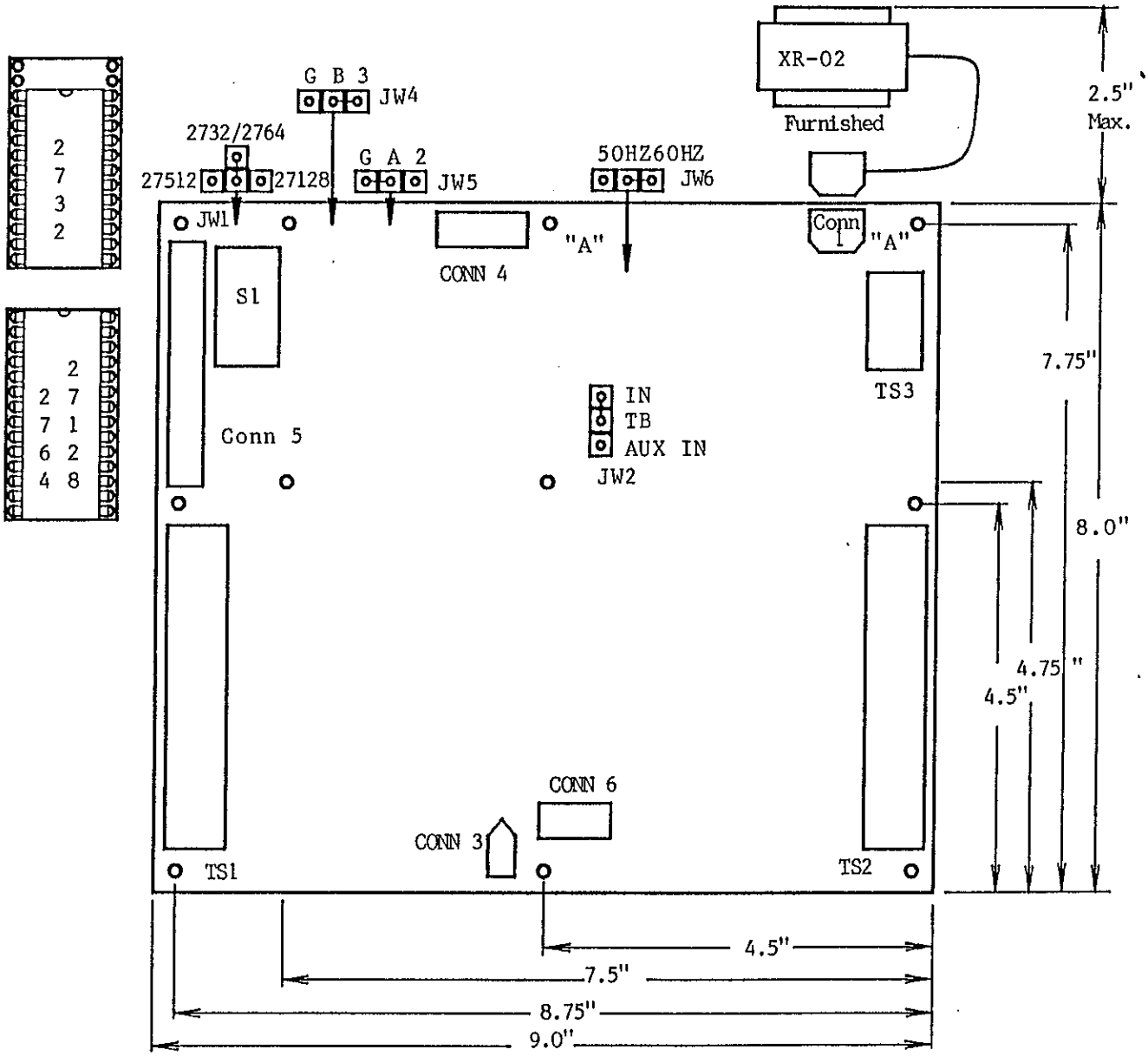
IN4004 TYPICAL

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: Addition of snubbers may increase drop out time of DC devices 200 to 500%. AC loads are not usually effected.

PIC BEAR CONTROLLER



When cutting traces an "exacto Knife" is recommended. Be sure all of the trace is removed. "Bridging" refers to a solder connection across the pads. Use a 27W or less soldering iron with rosin core solder. Deviation may void warranty.

CAUTION: Connect transformer before wiring TS3 to line.

CAUTION: Either of the holes labeled "A" must be mounted with metal standoffs to insure proper grounding.

PIC BEAR CONTROLLER

TERMINAL STRIPS

Interfaces line power, input devices, and output devices to the BEAR BONES and BEAR BONES PLUS.

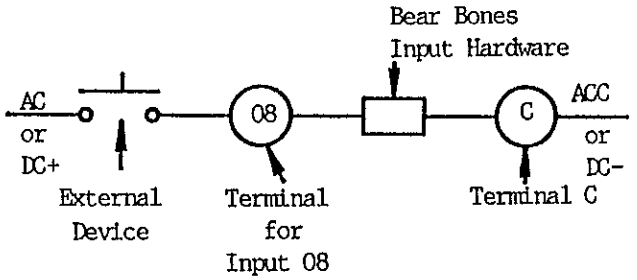
TS3

GND	The Ground wire terminates here and to chassis.
ACC	The Grounded conductor terminates here.
AC	The Ungrounded conductor terminates here.

TS1

08	Input 08
09	Input 09
10	Input 10
11	Input 11
C	Common to Above
C	Common to Below
12	Input 12
13	Input 13
14	Input 14
15	Input 15

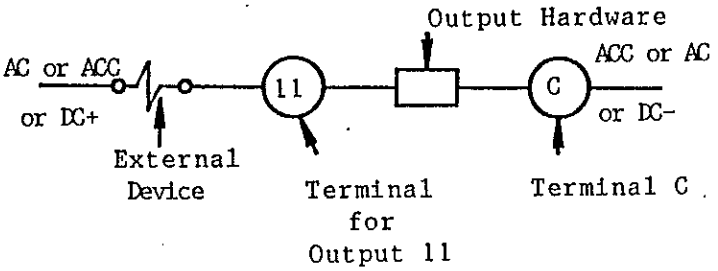
EXAMPLE OF EXTERNAL CONNECTIONS FOR INPUTS



TS2

08	Output 08
09	Output 09
10	Output 10
11	Output 11
C	Common to Above
C	Common to Below
12	Output 12
13	Output 13
14	Output 14
15	Output 15

EXAMPLE OF EXTERNAL CONNECTIONS FOR OUTPUTS

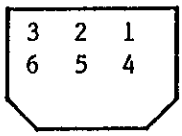


NOTE: For output connections AC and ACC may be interchanged. See sheet 8 for additional connection comments.

PIC BEAR CONTROLLER

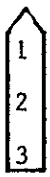
CONNECTOR 1

Interfaces the transformer to the PIC BEAR. Transformer mounted separate from board.



Pins
4 & 6 Connects the transformer primary to TS 3
1 & 3 Connects the transformer secondary to the power supply
2 & 5 Connects the transformer secondary to the time base circuit

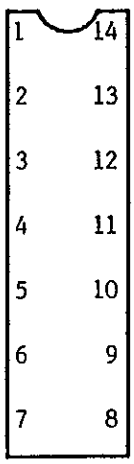
CONNECTOR 3



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

CONNECTOR 4

Interfaces the CUB expander I/O to the BEAR BONES



Pin
1 Card Ground
2 Not connected (see page 7, Clock Jumper)
3 Input #3
4 Input #4
5 Input #5
6 Input #6
7 Input #7
8 Card Ground
9 Output #3
10 Output #4
11 Output #5
12 Output #6
13 Output #7
14 +5 VDC Logic Supply

NOTE: Only 5 input and 4 output points are available with CONNECTOR 4. You can connect only one type of expander here. See 7809-27, 7809-32, 7809-35. The PIC BEAR uses output 3 for executive programming. Should you elect to use output 0/3, you will loose 22 timer/counter functions.

PIC BEAR CONTROLLER

CONNECTOR 5

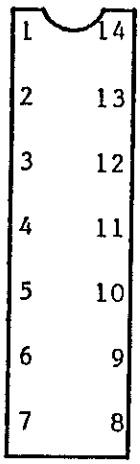
ICM all new interfaces connected here can command the BEAR BONES.

CONN 5

Eprom address line 12	1	2	Eprom address line 13
Eprom address line 7	3	4	Eprom address line 8
Eprom address line 6	5	6	Eprom address line 9
Eprom address line 5	7	8	Eprom address line 11
Eprom address line 4	9	10	Output enable low
Eprom address line 3	11	12	Eprom address line 10
Eprom address line 2	13	14	Eprom chip enable
Eprom address line 1	15	16	Instruction bit #3 to ICU
Single step	17	18	Eprom address line Ø
Halt	19	20	Instruction bit #2 to ICU
Eprom I/O line ØØ	21	22	Instruction bit #1 to ICU
Data	23	24	Instruction bit Ø to ICU
Halt status	25	26	Eprom I/O line Ø2
Eprom I/O line Ø1	27	28	Eprom I/O line Ø3
Resultant register	29	30	Program counter reset
Clock not	31	32	Program counter clock
Master reset	33	34	Read line
Ground	35	36	+5 VDC
Ground	37	38	27512 switch 1
27512 switch 3	39	40	27512 switch 2

CONNECTOR 6

Interfaces the I/O expanders to the BEAR BONES.



Pin	
1	Connecting to +5 VDC resets outputs
2	Program clock synchronizes the I/O expanders and the BEAR BONES
3	IO/CR Bit 3 status
4	+5 VDC = write to outputs; 0 VDC = 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	Same as connector 5 pin 6
11	Same as connector 5 pin 12
12	Same as connector 5 pin 13
13	Same as connector 5 pin 14
14	Card Ground

PIC BEAR CONTROLLER

CAUTION! Be sure to remove 1/8" minimum of a trace when a cut is called for. Jumpers must be soldered. The user is responsible for his soldering techniques. Please feel free to consult ICM Applications at the Home Office.

50/60 HZ JUMPERS

The PIC BEAR is shipped with the 60 HZ trace intact. To convert the 50 HZ, cut the trace between O and 60 HZ, then install a jumper from G to 50 HZ.

2732/2764; 27128; 27512 EPROM JUMPER

The PIC BEAR is shipped with jumper 2732/2764 intact. You can install an ICM-ME-07 (2732) or an ICM-ME-09 (2764) without making any trace changes. To use an ICM-ME-10 (27128) cut the 2732/2764 to A11 trace and solder a jumper from 27128 to A11. 2732=4K; 2764=8K; 27128=16K.

CLOCK JUMPER

The BEAR BONES is shipped with the IN (internal) trace intact. To convert to the AUX (external) capability cut the trace between TB and IN, then install a jumper from TB to AUX IN.

FUNCTION TRACES

The PIC BEAR is shipped with traces B to 3 and G to A intact. This allows you a complete set of 32 functions.

Traces set B to 3 for 32 functions, set G to B for 10 functions. When set for 32 functions, Output 1/03 cannot be used.

SHIPPING TRACES

Contact the factory prior to attempting to make changes in the RAM jumpers, you may disable the programmable timers/counters.

THE REAL WORLD

While we design special circuitry including opto coupling, to isolate the controller from noise, external snubbing may be beneficial when energizing inductive loads.

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.

WARNING: 2732 or 2732A EPROMS originally programmed for a Bear Bones must be re-programmed in the PR-05 Ver 1.6 or higher as a PIC Bear to insure proper operation in a PIC Bear.

INPUTS

GROUP	SIGNAL LEVEL	POWER	FUSE	TURN ON/OFF	MINIMUM TURN ON CURRENT	ISOLATION	LED	OPTO
1	90-130VAC	1.2W	1 AMP	25MS MAX	2.0 MA	1500V	Y	Y
2	7-32VDC	1.3W	1 AMP	10/25 MS MAX	2.0 MA	1500V	Y	Y
3	10-40VAC	1.2W	1 AMP	10/25 MS MAX	2.0 MA	1500V	Y	Y
4	90-260VAC	2.4W	1 AMP	25MS MAX	2.0 MA	1500V	Y	Y

NOTE: FOR GROUPS 1,3,4 CONNECT ACC TO COMMON. FOR GROUP 2 CONNECT DC- TO COMMON.

OUTPUTS

GROUP	SIGNAL LEVEL	POWER	FUSE	TURN ON/OFF	OVER VOLT.	Ø X	ISOLATION	LED	OPTO
1 & 3	12-130VAC: .01-2A	240W	2 AMP	1/2 CYCLE	400 PEAK	Y	7500V	Y	Y
2	7-32VDC: 2A	54W	2 AMP	5 MS MAX	80VDC	N/A	1500V	Y	Y
4	35-260VAC; .01-2A	240W	1 AMP	1/2 CYCLE	600 PEAK	Y	7500V	Y	Y
5	12-130VAC .01-1A	120W	1 AMP	1/2 CYCLE	400 PEAK	Y	7500V	Y	Y

NOTE: FOR GROUPS 1,3,4 & 5 CONNECT AC TO COMMON TO AVOID SWITCHING THE NEUTRAL CONDUCTOR. OUTPUT LEAKAGE CURRENT IS LESS THAN 1 MA FOR AC OUTPUTS.
FOR GROUP 2 CONNECT DC- TO COMMON.