

ICM PROGRAMMABLE CONTROLLER

 ICM-BB-12,13
 PART NO PIC-BB-21,22

BABY BEAR BONES PLC

DESCRIPTION

The Baby Bear Bones is a 5 input/5 output Programmable Logic Controller (PLC) for the smaller system control applications. It's single board design will fit into industry standard break-away plastic relay track or mount with Bear Bones hardware kits. For more inputs and outputs, 8 in/8 out expanders are available. Cable connected to or stacked with the Baby Bear Bones. The inputs are self supplying - no external voltage is needed. The outputs are normally open relay contacts or an adjustable time delay module.

FEATURES

Internal time base (software timers)
 On board logic supply
 Self-supplied inputs (can be wired sourcing or sinking, see sheet 8).
 "Watch Dog" LED indicates the processor is running Visual indication of on/off state of inputs and outputs. Outputs reset on loss of PLC primary voltage.
 Can be stacked on expander PIC-10-54; Data Sheet 7809-50.
 Can be cable connected to expander ICM-IO-20; Data Sheet 7809-44.
 Will accept Bear Bones Expanders (BB-21,22 only).

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. The inputs and outputs that are available are 1/03 thru 1/07. The expanders add the capabilities of inputs and outputs 1/08 thru 1/15, see Standard Options.

PROGRAMMING

Programming is accomplished by using the Dixelbiss ICM-PR-05 programmer. It uses a ladder diagram format with special functions such as drums, counters, timers, sequencers etc. It will also "burn" your program onto a EPROM for on-line operation. See manual ICM-UM-05 for more details.

STANDARD OPTIONS

Timer module - ICM-TM-05 thru TM-10, data sheet 7809-45
 16 I/O Expander - ICM-IO-20 (side by side mounting) data sheet 7809-44
 16 I/O Expander - ICM-IO-54 (stackable) data sheet 7809-51
 To provide a quick disconnect capability for the I/O terminals add a "P" to the base part number. Example An ICM-BB-13 becomes an ICM-BB-13(P).
 Hardware mounting kit ICM-HP-03. Spacers, nuts, screws, lockwashers.



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ON BOARD OPTIONS

See figure 2 page 7 for the location of the option pads and how to configure them to your needs.

JW-1 - EPROM The board is configured for a 4K EPROM (2732). It can be reconfigured for a 2K EPROM (2716).

JW-3 - EXPANSION The board is configured for 10 functions, it can be reconfigured for 32 functions. If this option is selected output I/O3 is sacrificed.

JW-4 - LINE FREQ. This option allows you to reconfigure the board from 60 to 50 HZ. The software timers will still be accurate.

JW-5 - INPUT SOURCE The Baby Bear Bones will furnish 12 VDC to your inputs. You may change this to 5VDC on board. You may also elect to furnish your own DC source up to 24VDC.

SPECIFICATIONS

CPU TYPE Single bit processor, 15 code instruction set.

PROGRAM MEMORY 4K x 8 capacity, selectable to 2K x 8, single supply, EPROM or ROM (ICM-IF-BB).

TEMPORARY MEMORY (designated as internal "CR")
256 x 1 capacity normal, 512 x 1 using expansion option.


User Range - CR1 - CR235 Standard.
CR1 - CR491 See option 2.
Subtract 12 CR's for each special function used.

SCAN CLOCK 200KHZ \pm 20%

TIME BASE .1 sec. period/100 HZ, readable at input I/O2
Accuracy: BB-12 + .9% at 25°
BB-13, 22 dependant on 60HZ/50HZ line frequency

WARNING

The Baby Bear Bones, 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.

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SCAN TIME 5 micro seconds per instruction, 5 milli seconds for 1000 instructions.

LOSS OF PRIMARY RESET Loss of primary to reset: 18mS duration: .2 sec min.

POWER SUPPLY 5VDC \pm 5%, 360 MADC 12 VDC, \pm 15%, 600 MADC

POWER CONSUMPTION Logic supply 1.2w max. I/O supply 2.2w max.

INPUT SUPPLY REQUIREMENTS BB-12,21 10.5VDC - 15VDC @ 1 Amp max.
BB-13,22 10.5VAC - 15VAC @ 1 Amp max.

Note: Baby Bear Model BB-13,22 is supplied with step-down transformer.
Input 90-130VAC @ 1 Amp max.

<u>INPUTS</u>	Qty 5	Voltage	Sensitivity			
			Turn On Resistance	Turn Off Resistance	Turn On Current	Turn Off Current
on board	5		1.5K	3.5K	.8mA	.3mA
selectable	12		10K	15K	.8mA	.3mA
user supply	24		25K	35K	.8mA	.3mA

Voltage	Response	
	Turn On	Turn Off
+5	2mS max.	15mS max.
+12	2mS max.	15mS max.
+24	2mS max.	2mS max.

Isolation: 1500V

OUTPUTS Qty. up to 5


N.O. Relay contacts - isolated from each other

Relay module contacts rated 2 Amp at 120VAC or 28 VDC resistive. Optional 8 Amp at 120VAC.

Contacts are shunted with snubber circuitry to help suppress transients.

FIELD TERMINATION: #14AWG max wire size per location. No lugs.

LINE FUSE Customer supplied. Recommended .5 Amp, 220V no delay

	
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Operating Temp. Range: 0-60°C

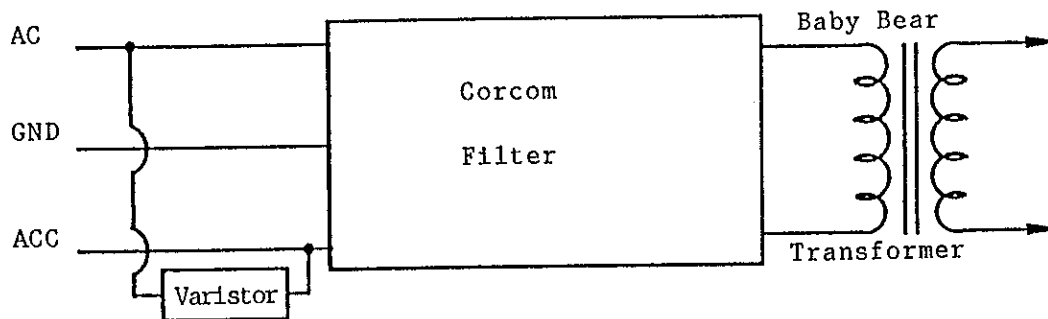
Dimensions: 4.0 x 8.75", vertical clearance 2:

Weight: 0.4# less transformer

NOTE: Specifications subject to change without notice.

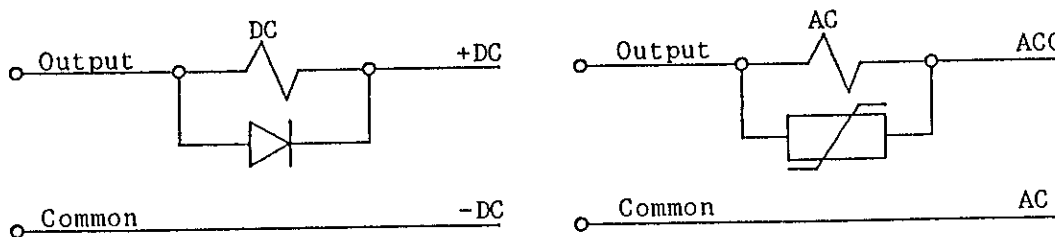
LINE NOISE

The Baby Bear Bones is designed to operate in normal industrial environments. Should you experience problems with your service, please consider the following suggestions.



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.

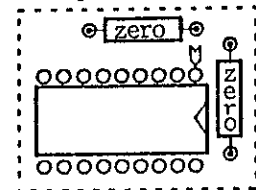


NOTE: Addition of snubbers may increase drop out time of DC devices 200 to 500%. AC loads are not usually effected.

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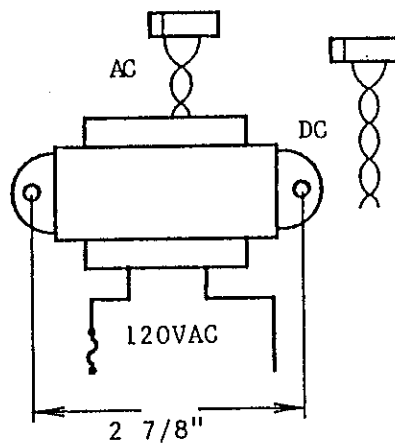
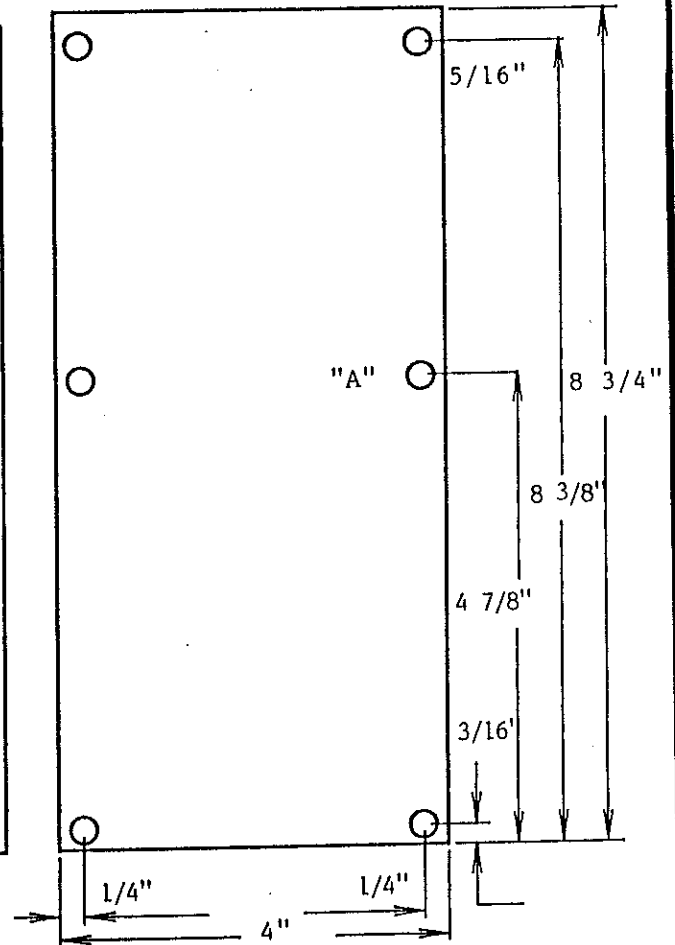
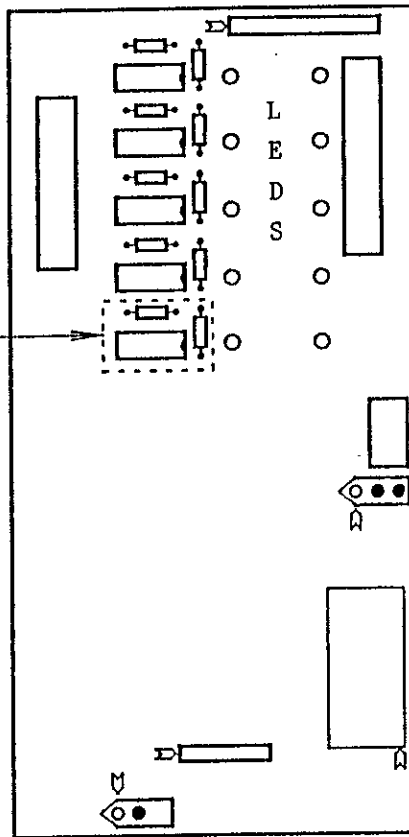
Socket configuration output 1/03



Sockets 1/04-1/07

Identical

Available on PIC-BB-21,22 only. See sheet 8.



CAUTION! Hole labeled "A" must be connected to chassis ground.

The output socket can be bypassed by soldering in zero ohm resistors as shown. The on board circuitry will furnish 12VDC at 30ma. This configuration is ideal for driving high power solid state relays.

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CONNECTION 8 - Receptacle for BABY BEAR EXPANDER.

1	+5VDC out
2	+12VDC out
3	
4	Word bit 0 out
5	Word bit 1 out
6	Card common
7	
8	Word bit 2 out
9	Input data channel
10	Output data channel
11	Write out
12	Word bit 3 out
13	System clock out
14	Reset out
15	Page 1 enable

Conn 2
Outputs

	1/03
	1/04
	1/05
	1/06
	1/07

CONNECTOR 5 - Receptacle for Intelligent Programmer

ICM programmers connected here
control the BABY BEAR BONES.

PIN

1	1	Clock control (Single Step)
2	2	Connecting to ground halts the controller
3	3	Not used
4	4	Data Line
5	5	Not used
6	6	Not used
7	7	Not used
8	8	Keying pin, no connection
9	9	Connecting to ground resets the controller
10	10	Card common

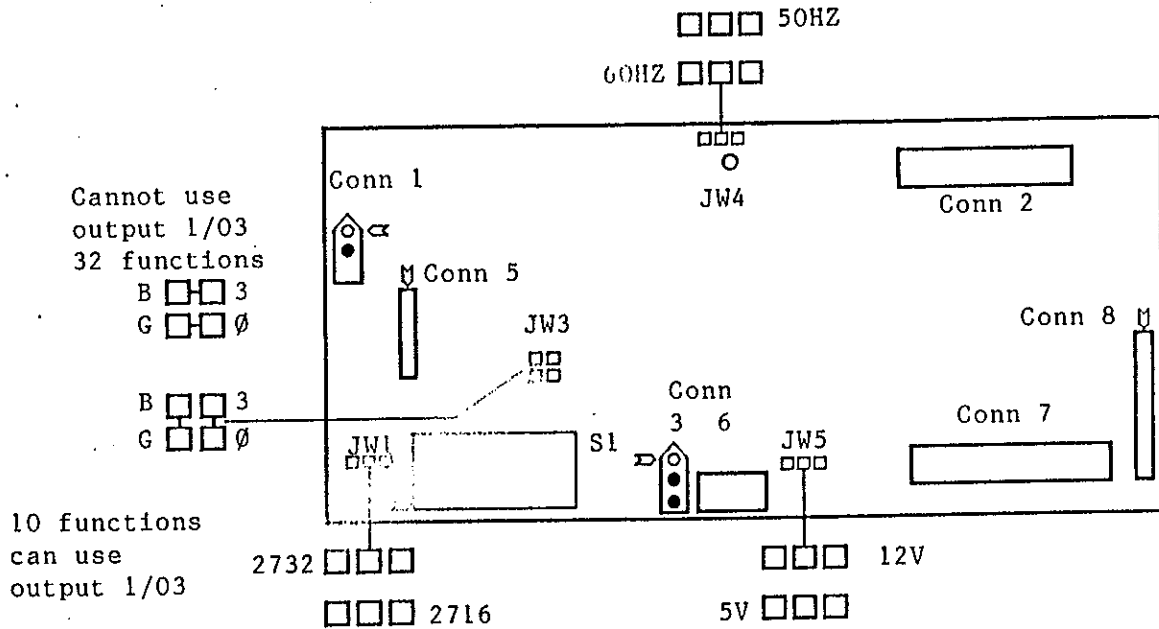
Conn 7
Inputs

+ V	
1/03	
1/04	
1/05	
1/06	
1/07	
COM	

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Figure 2



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.

If you decide to furnish your own external source of DC to our inputs you must insure that JW5 has no solder bridges or traces intact. The external DC source must then be wired to Conn 7.

Connectors 3 and 6 available on PIC-BB-21,22 only.

Power Input
BB-13,22 BB-12,21



1 -
2 +

NOTE: On BB-12,21 JW4 should be set for 60HZ

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CONNECTOR 6

Data buss access. Outputs are not buffered

<u>PIN</u>		<u>FUNCTION</u>
	1	Reset out
	2	System clock out
1	14	Word bit 3 out
2	13	Write bit out
3	12	Output data channel
4	11	Input data channel
5	10	Word bit 2 out
6	9	Word bit 1 out
7	8	Word bit 0 out
	10	Page bit 3 out
	11	Page bit 2 out
	12	Page bit 1 out
	13	Page bit 0 out
	14	Card common

CONNECTOR 3



The Bear Bones Expanders connect to the Baby Bear Bones Plus at Connectors 3 and 6. This feature available on PIC-BB-21, 22 only.

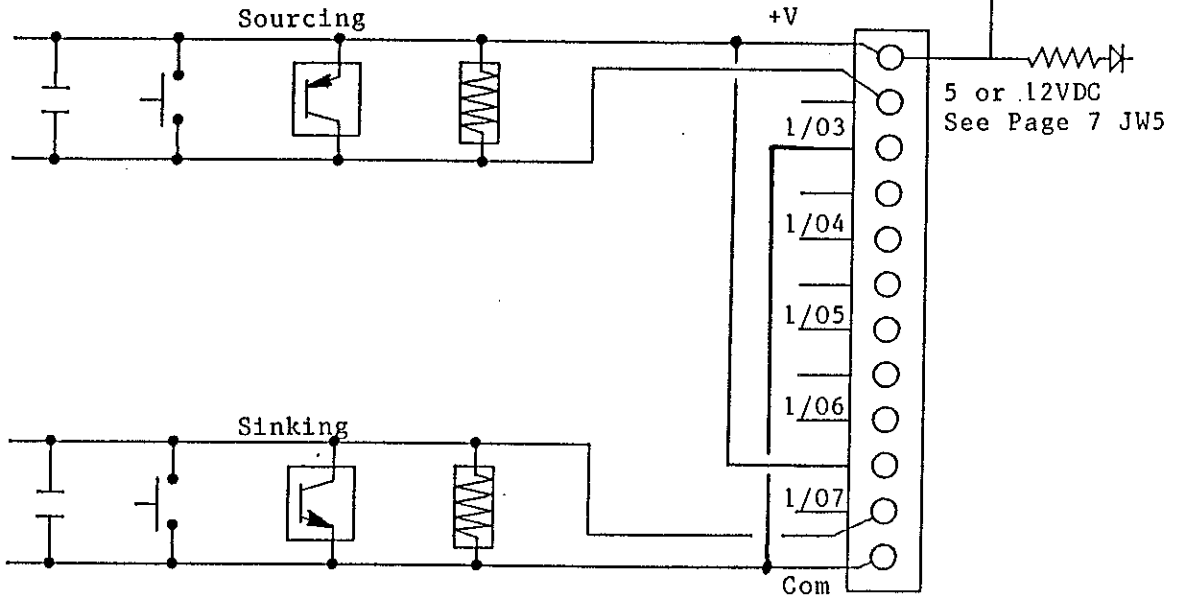
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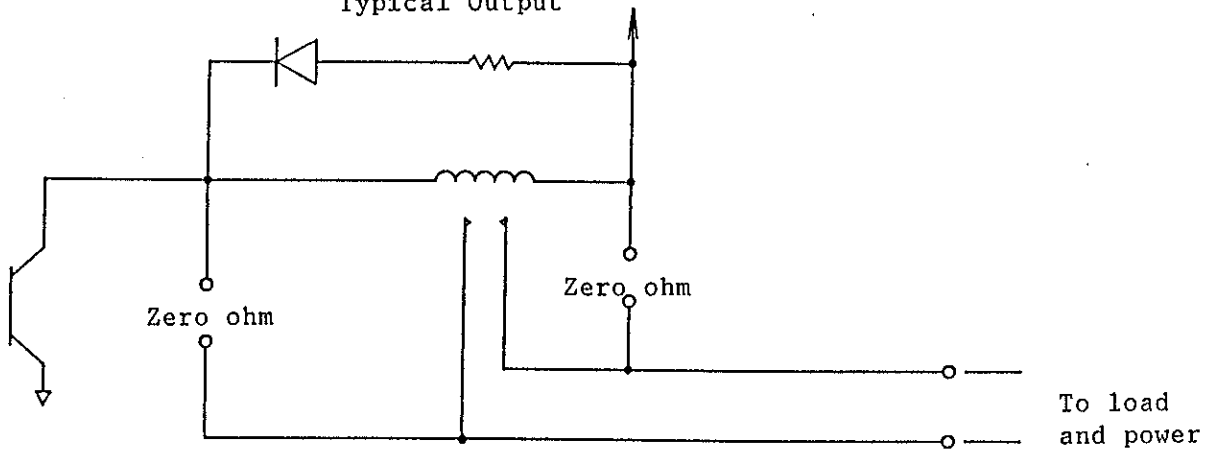
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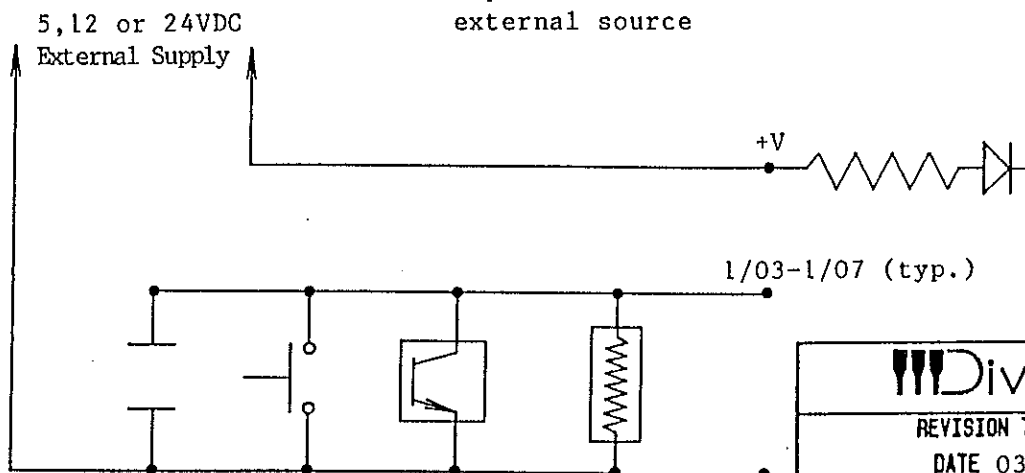
Input Connections



Typical Output



Inputs with external source



COM

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