

ICM PROGRAMMABLE CONTROLLER

PART NO. ICM-CT-01

HIGH SPEED COUNTER

DESCRIPTION

The High Speed Counter gives you the added dimension of count rates up to 10 KHZ. This feature card is programmable and its' setpoint is stored in EPROM. You may use this card as a single or dual counter.

FEATURES

Easy connection to the Bear Bones CPU, its' Expander, or Baby Bear. No additional panel space used when connected to the Bear Bones. Reset and enable functions fully programmable. LED's furnished for each counter input. Page selectable so that it fits anywhere in the I/O address set.

SPECIFICATIONS

Supply Voltage	5 VDC	
Power Consumption	100 ma maximum	
Maximum Count Rate	10 KHZ	
Maximum Setpoint	Single Counter	16,777,215
	Dual Counter	4,095 each
Input Signal Level	5 to 24 VDC	60 MADC continuous
		3 AMP for 1 sec.
		2 MADC minimum

APPLICATIONS

The High Speed Counter Card gives you the ability to implement those count applications that are too fast for the Bear or Baby Bear. Your application could be counting an output from an encoder. You might use this product as a totalizer. This card is page selectable so you can put it anywhere in your I/O structure. It can mount directly over a Bear Bones or a Bear Bones Expander. This card can plug into the PIC Baby Bear and mounts directly on the panel.

OPERATION

The counter(s) function as true binary counters. The counter(s) will accept counts when the reset line is low and it is enabled, see page 3. If the counter is disabled no more counts will be accepted but the current count will be retained. When reset the current count will be set to zero.

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CORPORATION

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DESCRIPTION

HIGH SPEED COUNTER CARD

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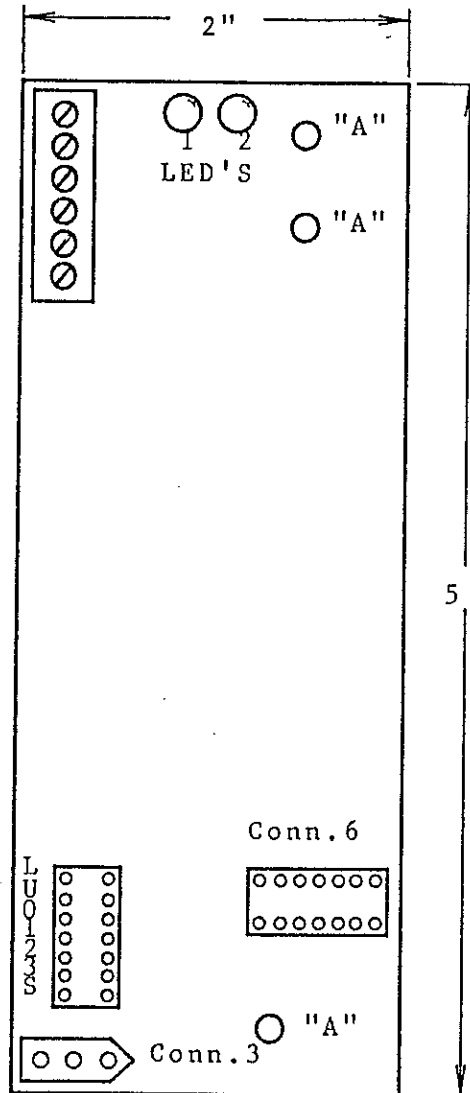
HIGH SPEED COUNTER

No Connection-----
Counter 2(-)-----
Counter 2(+)-----
No Connection-----
Counter 1(-)-----
Counter 1(+)-----

CASE	Pins	
	U	L
U	X	0
L	0	X

PAGE	Pins		
	0	1	2
0	X	X	X
1	0	X	X
2	X	0	X
3	0	0	X
4	X	X	0
5	0	X	0
6	X	0	0
7	0	0	0

Counter	Pin
	S
ONE	X
TWO	0



Mtg. holes "A"
.170" Dia.
typ. 3 places.

Mtg. holes
match Bear Bones
& Expander Mtg.

Note: Align counter over center holes and avoid the input/output terminal blocks.

Note: Specifications subject to change without notice.

WARNING

The ICM High Speed Counter, 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 counter. Precautions must be taken to provide mechanical and/or electrical safeguards external to the counter.

HIGH SPEED COUNTER

FUNCTIONS

Inputs, other than counter 1 and 2, are outputs from the PLC. When programming the coil symbol is used. Outputs from the counter are inputs to the PLC. In the programming section the contact symbol is used. You may assign the counter to any page from 0 thru 7 except page 1. Page one is reserved for the CPU. Should you select page 1 random and unreliable operation may occur. In the tables below the page number is represented by an "X".

COUNTER INPUT

X/00	Group 1 LSB (set low)
X/01	Group 2 NSB (set low)
X/02	Group 3 MSB (set low)
X/03	Counter latch (set high)
X/04	Counter 1 Reset (set low)
X/05	Counter 2 Reset (set low)
X/06	Counter 1 Enable (set low)
X/07	Counter 2 Enable (set high)

FUNCTION

COUNTER OUTPUT


X/00	Bit 1 (least significant)
X/01	Bit 2
X/02	Bit 3
X/03	Bit 4
X/04	Bit 5
X/05	Bit 6
X/06	Bit 7
X/07	Bit 8

FUNCTION

PRE-PROGRAMMING

Set the card for one or two counters, see sheet 2. The card is set for one counter at the factory. With one counter selected connect your pulse train to counter 1+ and 1-.

Select the page address you wish to use. Remember do not use page 1! The High Speed Counter is shipped from the factory preselected for page 0. The card is also preselected for lower case. You received enough paging links to select any address within our address set. The factory preselection gives you addresses 0/00 thru 0/07.

	
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PRE-PROGRAMMING (con't)

Most applications of this card will use a setpoint. For our example we will assume a set point of 10,551,296. A single counter application allows counting to 16,777,215. You must assign any 24 CRs' to act as the counter bits. We will use CRs' 84 thru 107 with 107 used as the most significant bit. The table below illustrates the value of each CR.


<u>CR</u>	<u>BIT</u>	<u>VALUE</u>	<u>CR</u>	<u>BIT</u>	<u>VALUE</u>
107	24	8,388,608	95	12	2,048
106	23	4,194,304	94	11	1,024
105	22	2,097,152	93	10	512
104	21	1,048,576	92	9	256
103	20	524,288	91	8	128
102	19	262,144	90	7	64
101	18	131,072	89	6	32
100	17	65,536	88	5	16
99	16	32,768	87	4	8
98	15	16,385	86	3	4
97	14	8,192	85	2	2
96	13	4,096	84	1	1

Note that if two counters are used each has a maximum setpoint of 4,095. Counter one would use CRs' 84 thru 95. Counter two would use CRs' 96 thru 107 with CR 96 as the one bit and CR 107 as the 2048 bit. Remember that any of the 491 CRs, available to you in a Bear or Baby Bear may be used for the counter.

We must now determine which CRs' must be on to enable a setpoint of 10,551,610. Look at our table and find the largest number that is smaller than 10,551,610. The example shows how to establish which of the CRs' must be on.

Setpoint	10,551,610
CR 107	8,388,610
Remainder	2,162,686
CR 105	2,097,150
Remainder	65,536
CR 100	65,536

CRs' 107, 105 and 100 must be on and all others off.

	
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HIGH SPEED COUNTER

PROGRAMMING

Rung	8 MEG BIT CR CR-107	Contacts 5,-5
1	()	
.1	4 MEG BIT CR CR-106	Contacts 5,-5
.2	2 MEG BIT CR CR-105	Contacts 6,-6
.3	1 MEG BIT CR CR-104	Contacts 6,-6
.4	.5 MEG BIT CR CR-103	Contacts 7,-7
.5	.2 MEG BIT CR CR-102	Contacts 7,-7
.6	.1 MEG BIT CR CR-101	Contacts 8,-8
.7	65 K BIT CR CR-100	Contacts 8,-8



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HIGH SPEED COUNTER

PROGRAMMING (con't)

Rung		32 K	
		BIT	
		CR	
		CR-099	Contacts
2	+	-- (/) --	9,-9
		16 K	
		BIT	
		CR	
		CR-098	Contacts
.1	+	-- (/) --	9,-9
		8 K	
		BIT	
		CR	
		CR-097	Contacts
.2	+	-- (/) --	10,-10
		4 K	
		BIT	
		CR	
		CR-096	Contacts
.3	+	-- (/) --	10,-10
		2 K	
		BIT	
		CR	
		CR-095	Contacts
.4	+	-- (/) --	11,-11
		1 K	
		BIT	
		CR	
		CR-094	Contacts
.5	+	-- (/) --	11,-11
		.5 K	
		BIT	
		CR	
		CR-093	Contacts
.6	+	-- (/) --	12,-12
		.25 K	
		BIT	
		CR	
		CR-092	Contacts
.7	+	-- (/) --	12,-12

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HIGH SPEED COUNTER


PROGRAMMING (con't)

Rung		.12 K	
		BIT	
		CR	
		CR-091	Contacts
3	----- (/) -----		13,-13
		64	
		BIT	
		CR	
		CR-090	Contacts
.1	----- (/) -----		13,-13
		32	
		BIT	
		CR	
		CR-089	Contacts
.2	----- (/) -----		14,-14
		16	
		BIT	
		CR	
		CR-088	Contacts
.3	----- (/) -----		14,-14
		8	
		BIT	
		CR	
		CR-087	Contacts
.4	----- (/) -----		15,-15
		4	
		BIT	
		CR	
		CR-086	Contacts
.5	----- (/) -----		15,-15
		2	
		BIT	
		CR	
		CR-085	Contacts
.6	----- (/) -----		16,-16
		1	
		BIT	
		CR	
		CR-084	Contacts
.7	----- (/) -----		16,-16

HIGH SPEED COUNTER

PROGRAMMING (con't)

Rung			GROUP ONE CTR. 0/00	Contacts
4			--()--	8,12,15
			GROUP TWO CTR. 0/01	Contacts
.1			--()--	8,12,15
			GROUP THREE CTR. 0/02	Contacts
.2			--()--	7,11,15
			CTR. LATCH	
			0/03	Contacts
.3			--(/)--	7,11,15
			GROUP THREE CTR. 0/02	Contacts
.4			--(/)--	7,11,15
	HIGHEST 8 MEG		EQUAL	
	LEVEL BIT		CR	
	INPUT CR			
Rung	0/07	CR-107	CR-001	Contacts
5	--]	[---[CMP]	--()--	-5,5,-5, 5,-6,6, 7,-7,7, -8,8,-8, 8,-9,9, -9,9,-10, 10,-10, 10,-11, 11,-11, 11,-12, 12,-12, 12,-13, 13,-13, 13,-14,
		1		

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HIGH SPEED COUNTER

PROGRAMMING (con't)

	EQUAL CR	8 MEG BIT CR	INPUTS > ST.PT. CR-002	14,-14, 14,-15, 15,-15, 15,-16, 16,-16, 16,17, -17
.1	+--]	CR-001	()	Contacts 17,-17
	16	1		
	EQUAL CR	CR-001	(OEN)	Contacts ***
.2	+--]	16		
	SECOND LEVEL INPUT	4 MEG BIT CR	EQUAL CR CR-001	Contacts
.3	+--]	0/06	()	-5,5,-5, 5,-6,6, -6,6,-7, 7,-7,7, -8,8,-8, 8,-9,9, -9,9,-10, 10,-10, 10,-11, 11,-11, 11,-12, 12,-12, 12,-13, 13,-13, 13,-14, 14,-14, 14,-15, 15,-15, 15,-16,
	[[CMP]		
		1		



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HIGH SPEED COUNTER

PROGRAMMING (con't)

	EQUAL CR	4 MEG BIT CR		INPUTS > ST.PT. CR-002	16,-16, 16,17, -17 Contacts 17,-17
.4	CR-001	CR-106	16	1	()
	EQUAL CR				Contacts ***
.5	CR-001		16		(OEN)
Rung	THIRD LEVEL INPUT	2 MEG BIT CR		EQUAL CR	Contacts
6	0/05	CR-105		CR-001	()
		[CMP]			-5,5,-5, 5,-6,6, -6,6,-7, 7,-7,7, -8,8,-8, 8,-9,9, -9,9,-10, 10,-10, 10,-11, 11,-11, 11,-12, 12,-12, 12,-13, 13,-13, 13,-14, 14,-14, 14,-15, 15,-15, 15,-16, 16,-16, 16,17, -17



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HIGH SPEED COUNTER

PROGRAMMING (con't)

.1	EQUAL	2 MEG	INPUTS	
	CR	BIT	>	
		CR	T.PT.	
	CR-001	CR-105	R-002	Contacts
	+--]	16	()	17,-17
		1		
.2	EQUAL			
	CR			
	CR-001		OEN)	Contacts
	+--]	16		***
.3	FOURTH	1 MEG	EQUAL	
	LEVEL	BIT	CR	
	INPUT	CR	CR-001	Contacts
	0/04	CR-104	()	-5,5,-5,
	+--]	1		5,-6,6,
		[CMP]		-6,6,-7,
				7,-7,7,
				-8,8,-8,
				8,-9,9,
				-9,9,-10,
				10,-10,
				10,-11,
				11,-11,
				11,-12,
				12,-12,
				12,-13,
				13,-13,
				13,-14,
				14,-14,
				14,-15,
				15,-15,
				15,-16,
				16,-16,
				16,17,
				-17



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HIGH SPEED COUNTER

PROGRAMMING (con't)

	EQUAL CR	1 MEG BIT CR	INPUTS > ST.PT. CR-002	Contacts 17,-17
.4	+--]/[	16	1	()
	EQUAL CR			Contacts ***
.5	+--]	16	(OEN)	
Rung	FIFTH LEVEL INPUT	.5 MEG BIT CR	EQUAL CR	Contacts
7	0/03 +--]	CR-103 [CMP]	CR-001 ()	-5,5,-5, 5,-6,6, -6,6,-7, 7,-7,7, -8,8,-8, 8,-9,9, -9,9,-10, 10,-10, 10,-11, 11,-11, 11,-12, 12,-12, 12,-13, 13,-13, 13,-14, 14,-14, 14,-15, 15,-15, 15,-16, 16,-16, 16,17, -17

HIGH SPEED COUNTER

PROGRAMMING (con't)

.1	EQUAL	.5 MEG	INPUTS	
	CR	BIT	>	
	CR-001	CR-103	ST.PT.	
			CR-002	Contacts
	16	1	()	17,-17
.2	EQUAL			
	CR			
	CR-001		(OEN)	Contacts
	16			***
.3	SIXTH	.2 MEG	EQUAL	
	LEVEL	BIT	CR	
	INPUT	CR	CR-001	Contacts
	0/02	CR-102	()	-5,5,-5,
		1		5,-6,6,
				-6,6,-7,
				7,-7,7,
				-8,8,-8,
				8,-9,9,
				-9,9,-10,
				10,-10,
				10,-11,
				11,-11,
				11,-12,
				12,-12,
				12,-13,
				13,-13,
				13,-14,
				14,-14,
				14,-15,
				15,-15,
				15,-16,
				16,-16,
				16,17,
				-17



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HIGH SPEED COUNTER

PROGRAMMING (con't)

	EQUAL	.2 MEG	INPUTS	
	CR	BIT	>	
		CR	ST.PT.	
	CR-001	CR-102	CR-002	Contacts
.4	---]/[	---]/[	( )	17,-17
	16	1		
	EQUAL			
	CR			
	CR-001			Contacts
.5	---]	[	(OEN)	***
	16			
	SEVENTH	.1 MEG	EQUAL	
	LEVEL	BIT	CR	
	INPUT	CR		
Rung	0/01	CR-101	CR-001	Contacts
8	---]	[---[CMP]	()	-5,5,-5,
		1		5,-6,6,
				-6,6,-7,
				7,-7,7,
				-8,8,-8,
				8,-9,9,
				-9,9,-10,
				10,-10,
				10,-11,
				11,-11,
				11,-12,
				12,-12,
				12,-13,
				13,-13,
				13,-14,
				14,-14,
				14,-15,
				15,-15,
				15,-16,
				16,-16,
				16,17,
				-17

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HIGH SPEED COUNTER

PROGRAMMING (con't)

.1	EQUAL	.1 MEG	INPUTS	Contacts
	CR	BIT	>	
	CR-001	CR-101	ST.PT.	17,-17
			CR-002	
	16	1	()	
.2	EQUAL			Contacts
	CR			
	CR-001		(OEN)	***
	16			
.3	EIGHTH	65 K	EQUAL	Contacts
	LEVEL	BIT	CR	
	INPUT	CR	CR-001	-5,5,-5,
	0/00	CR-100	()	
		1		5,-6,6,
				-6,6,-7,
				7,-7,7,
				-8,8,-8,
				8,-9,9,
				-9,9,-10,
				10,-10,
				10,-11,
				11,-11,
				11,-12,
				12,-12,
				12,-13,
				13,-13,
				13,-14,
				14,-14,
				14,-15,
				15,-15,
				15,-16,
				16,-16,
				16,17,
				-17

HIGH SPEED COUNTER

PROGRAMMING (con't)

	EQUAL 65 K CR BIT	INPUTS > ST.PT. CR-002	Contacts 17,-17
	CR-001 CR-100 --]/[-----]/[16 1	()	
.5	EQUAL CR CR-001 --] [----- 16	(OEN)	Contacts ***
.6		GROUP THREE CTR. 0/02	Contacts 7,11,15
.7		GROUP TWO CTR. 0/01	Contacts 8,12,16
Rung 9	HIGHEST 32 K LEVEL BIT INPUT CR 0/07 CR-099 --] [-----[CMP] 2	EQUAL CR CR-001	Contacts -5,5,-5, 5,-6,6, -6,6,-7, 7,-7,7, -8,8,-8, 8,-9,9, -9,9,-10, 10,-10, 10,-11, 11,-11, 11,-12, 12,-12, 12,-13, 13,-13, 13,-14,

HIGH SPEED COUNTER


PROGRAMMING (con't)

	EQUAL 32 K	INPUTS	14,-14,
	CR BIT	>	14,-15,
	CR	ST.PT.	15,-15,
	CR-001 CR-099	CR-002	15,-16,
.1	+---]/[-----]/[-----	()	16,-16,
	16 2		16,17,
			-17
	EQUAL		
	CR		
	CR-001		Contacts
.2	+---] [-----	(OEN)	***
	16		
	SECOND 16 K	EQUAL	
	LEVEL BIT	CR	
	INPUT CR		
	0/06 CR-098	CR-001	Contacts
.3	+---] [-----[CMP]-----	()	-5,5,-5,
	2		5,-6,6,
			-6,6,-7,
			7,-7,7,
			-8,8,-8,
			8,-9,9,
			-9,9,-10,
			10,-10,
			10,-11,
			11,-11,
			11,-12,
			12,-12,
			12,-13,
			13,-13,
			13,-14,
			14,-14,
			14,-15,
			15,-15,
			15,-16,

HIGH SPEED COUNTER

PROGRAMMING (con't)

	EQUAL CR	16 K BIT CR	INPUTS > ST.PT. CR-002	16,-16, 16,17, -17 Contacts 17,-17
.4	CR-001	CR-098	()	
	16	2		
	EQUAL CR			Contacts ***
.5	CR-001		(OEN)	
	16			
	THIRD LEVEL INPUT	8 K BIT CR	EQUAL CR CR-001	Contacts -5,5,-5, 5,-6,6, -6,6,-7, 7,-7,7, -8,8,-8, 8,-9,9, -9,9,-10, 10,-10, 10,-11, 11,-11, 11,-12, 12,-12, 12,-13, 13,-13, 13,-14, 14,-14, 14,-15, 15,-15, 15,-16, 16,-16, 16,17, -17
Rung 10	0/05	CR-097	()	
		[CMP]		
		2		

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PROGRAMMING (con't)

.1	EQUAL	8 K	INPUTS	
	CR	BIT	>	
	CR-001	CR-097	ST.PT.	
			CR-002	Contacts
	16	2	()	17,-17
.2	EQUAL			
	CR			
	CR-001		(OEN)	Contacts
	16			***
.3	FOURTH	4 K	EQUAL	
	LEVEL	BIT	CR	
	INPUT	CR	CR-001	Contacts
	0/04	CR-096	()	-5,5,-5,
		2		5,-6,6,
				-6,6,-7,
				7,-7,7,
				-8,8,-8,
				8,-9,9,
				-9,9,-10,
				10,-10,
				10,-11,
				11,-11,
				11,-12,
				12,-12,
				12,-13,
				13,-13,
				13,-14,
				14,-14,
				14,-15,
				15,-15,
				15,-16,
				16,-16,
				16,17,
				-17




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HIGH SPEED COUNTER

PROGRAMMING (con't)

	EQUAL	4 K		INPUTS	
	CR	BIT		>	
		CR		ST. PT.	
	CR-001	CR-096		CR-002	Contacts
.4	+]	/	[----- () -----
		16		2	17,-17
	EQUAL				
	CR				
	CR-001				Contacts
.5	+	]	[	----- (OEN) -----	***
		16			
	FIFTH	2 K		EQUAL	
	LEVEL	BIT		CR	
	INPUT	CR			
Rung	0/03	CR-095		CR-001	Contacts
11	+	]	[	----- [CMP] -----	() -----
				2	-5,5,-5,,
					5,-6,6,
					-6,6,-7,
					7,-7,7,
					-8,8,-8,
					8,-9,9,
					-9,9,-10,
					10,-10,
					10,-11,
					11,-11,
					11,-12,
					12,-12,
					12,-13,
					13,-13,
					13,-14,
					14,-14,
					14,-15,
					15,-15,
					15,-16,
					16,-16,
					15,17,
					-17

	
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HIGH SPEED COUNTER

PROGRAMMING (con't)

.1	EQUAL	2 K	INPUTS	
	CR	BIT	>	
		CR	ST.PT.	
	CR-001	CR-095	CR-002	Contacts
	---]/[	---]/[	( )	17,-17
	16	2		
.2	EQUAL			
	CR			
	CR-001		(OEN)	Contacts
	---] [***
	16			
.3	SIXTH	1 K	EQUAL	
	LEVEL	BIT	CR	
	INPUT	CR	CR-001	Contacts
	0/02	CR-094	()	-5,5,-5,
	---] [	[CMP]		5,-6,6,
		2		-6,6,-7,
				7,-7,7,
				-8,8,-8,
				8,-9,9,
				-9,9,-10,
				10,-10,
				10,-11,
				11,-11,
				11,-12,
				12,-12,
				12,-13,
				13,-13,
				13,-14,
				14,-14,
				14,-15,
				15,-15,
				15,-16,
				16,-16,
				16,17,
				-17




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HIGH SPEED COUNTER

PROGRAMMING (con't)

	EQUAL 1 K	INPUTS	
	CR BIT	>	
	CR	ST.PT.	
	CR-001 CR-094	CR-002	Contacts
.4	+--]/[-----]/[-----	()	17,-17
	16 2		
	EQUAL		
	CR		
	CR-001		Contacts
.5	+--] [-----	(OEN)	***
	16		
	SEVENTH .5 K	EQUAL	
	LEVEL BIT	CR	
	INPUT CR		
Rung	0/01 CR-093	CR-001	Contacts
12	+--] [---[CMP]-----	()	-5,5,-5,
	2		5,-6,6,
			-6,6,-7,
			7,-7,7,
			-8,8,-8,
			8,-9,9,
			-9,9,-10,
			10,-10,
			10,-11,
			11,-11,
			11,-12,
			12,-12,
			12,-13,
			13,-13,
			13,-14,
			14,-14,
			14,-15,
			15,-15,
			15,-16,
			16,-16,
			16,17,
			-17

	
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HIGH SPEED COUNTER

PROGRAMMING (con't)

	EQUAL CR	.5 K BIT CR	INPUTS > ST.PT. CR-002	Contacts
.1	CR-001	CR-093	()	17,-17
	16	2		
	EQUAL CR			Contacts
.2	CR-001		(OEN)	***
	16			
	EIGHTH LEVEL INPUT	.25 K BIT CR	EQUAL CR	Contacts
.3	0/00	CR-092	CR-001	()
		[CMP]		-5,5,-5, 5,-6,6, -6,6,-7, 7,-7,7, -8,8,-8, 8,-9,9, -9,9,-10, 10,-10, 10,-11, 11,-11, 11,-12, 12,-12, 12,-13, 13,-13, 13,-14, 14,-14, 14,-15, 15,-15, 15,-16, 16,-16, 16,17, -17
		2		




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HIGH SPEED COUNTER

PROGRAMMING (con't)

	EQUAL .25 K CR BIT	INPUTS > ST.PT. CR-002	Contacts 17,-17
.4	CR-001 CR-092 16 2	()	
	EQUAL CR CR-001	(OEN)	Contacts ***
.5	16		
		GROUP TWO CTR. 0/01	Contacts 8,12,16
.6		()	
		GROUP ONE CTR. 0/00	Contacts 8,12,16
.7		(/)	
	HIGHEST .12 K LEVEL BIT INPUT CR	EQUAL CR CR-001	Contacts
Rung 13	0/07 CR-091 [CMP] 3	()	-5,5,-5, 5,-6,6, -6,6,-7, 7,-7,7, -8,8,-8, 8,-9,9, -9,9,-10, 10,-10, 10,-11, 11,-11, 11,-12, 12,-12, 12,-13, 13,-13, 13,-14,

	
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HIGH SPEED COUNTER

PROGRAMMING (con't)

	EQUAL .12 K		INPUTS	14,-14,
	CR BIT		>	14,-15,
	CR		ST.PT.	15,-15,
	CR-001 CR-091		CR-002	15,-16,
.1	+--]/[-----]/[-----		()	16,-16,
	16 3			16,17,
				-17
	EQUAL			
	CR			
	CR-001			
.2	+--] [-----		(OEN)	Contacts
	16			***
	SECOND 64		EQUAL	
	LEVEL BIT		CR	
	INPUT CR			
	0/06 CR-090		CR-001	Contacts
.3	+--] [-----[CMP]		()	-5,5,-5,
	3			5,-6,6,
				-6,6,-7,
				7,-7,7,
				-8,8,-8,
				8,-9,9,
				-9,9,-10,
				10,-10,
				10,-11,
				11,-11,
				11,-12,
				12,-12,
				12,-13,
				13,-13,
				13,-14,
				14,-14,
				14,-15,
				15,-15,
				15,-16,



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HIGH SPEED COUNTER

PROGRAMMING (con't)

	EQUAL 64 CR BIT CR	INPUTS > ST.PT. CR-002	16,-16, 16,17, -17 Contacts 17,-17
.4	CR-001 CR-090] / [] / [] / [] 16 3	()	
.5	EQUAL CR CR-001] [] 16	(OEN)	Contacts ***
Rung 14	THIRD 32 LEVEL BIT INPUT CR O/05 CR-089] [] [CMP] 3	EQUAL CR CR-001 ()	Contacts -5,5,-5, 5,-6,6, -6,6,-7, 7,-7,7, -8,8,-8, 8,-9,9, -9,9,-10, 10,-10, 10,-11, 11,-11, 11,-12, 12,-12, 12,-13, 13,-13, 13,-14, 14,-14, 14,-15, 15,-15, 15,-16, 16,-16, 16,17, -17

HIGH SPEED COUNTER

PROGRAMMING (con't)

.1	EQUAL	32	INPUTS	
	CR	BIT	>	
	CR-001	CR-089	ST.PT.	
			CR-002	Contacts
	16	3	()	17,-17
.2	EQUAL			
	CR			
	CR-001		(OEN)	Contacts
	16			***
.3	FOURTH	16	EQUAL	
	LEVEL	BIT	CR	
	INPUT	CT	CR-001	Contacts
	0/04	CR-088	()	-5,5,-5,
		3		5,-6,6,
				-6,6,-7,
				7,-7,7,
				-8,8,-8,
				8,-9,9,
				-9,9,-10,
				10,-10,
				10,-11,
				11,-11,
				11,-12,
				12,-12,
				12,-13,
				13,-13,
				13,-14,
				14,-14,
				14,-15,
				15,-15,
				15,-16,
				16,-16,
				16,17,
				-17



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HIGH SPEED COUNTER

PROGRAMMING (con't)

	EQUAL 16 CR BIT CT	INPUTS > ST.PT. CR-002	Contacts
.4	CR-001 CR-088 16 3	()	17,-17
	EQUAL CR CR-001	(OEN)	Contacts ***
.5	16		
Rung	FIFTH 8 LEVEL BIT INPUT CR 0/03 CR-087	EQUAL CR CR-001	Contacts
15	[] [] [CMP] 3	()	-5,5,-5, 5,-6,6, -6,6,-7, 7,-7,7, -8,8,-8, 8,-9,9, -9,9,-10, 10,-10, 10,-11, 11,-11, 11,-12, 12,-12, 12,-13, 13,-13, 13,-14, 14,-14, 14,-15, 15,-15, 15,-16, 16,-16, 16,17, -17

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HIGH SPEED COUNTER

PROGRAMMING (con't)

.1	EQUAL 8	INPUTS	Contacts
	CR BIT	>	
	CR	ST.PT.	
	CR-001 CR-087	CR-002	17,-17
	+--]/[-----]/[-----]	()--	
	16 3		
.2	EQUAL		Contacts
	CR		***
	CR-001	(OEN)	
	+--] [-----]		
	16		
.3	SIXTH 4	EQUAL	Contacts
	LEVEL BIT	CR	-5,5,-5,
	INPUT CR	CR-001	5,-6,6,
	0/02 CR-086	()--	-6,6,-7,
	+--] [-----[CMP]		7,-7,7,
	3		-8,8,-8,
			8,-9,9,
			-9,9,-10,
			10,-10,
			10,-11,
			11,-11,
			11,-12,
			12,-12,
			12,-13,
			13,-13,
			13,-14,
			14,-14,
			14,-15,
			15,-15,
			15,-16,
			16,-16,
			16,17,
			-17

HIGH SPEED COUNTER

PROGRAMMING (con't)

	EQUAL 4	INPUTS	
	CR BIT	>	
	CR CR	ST.PT.	
	CR-001 CR-086	CR-002	Contacts
.4	---]/[-----]/[-----	()--	17,-17
	16 3		
	EQUAL		
	CR		
	CR-001		Contacts
.5	---] [-----	(OEN)--	***
	16		
	SEVENTH 2	EQUAL	
	LEVEL BIT	CR	
	INPUT CR		
Rung	0/01 CR-085	CR-001	Contacts
16	---] [----[CMP]	()--	-5,5,-5,
	3		5,-6,6,
			-6,6,-7,
			7,-7,7,
			-8,8,-8,
			8,-9,9,
			-9,9,-10,
			10,-10,
			10,-11,
			11,-11,
			11,-12,
			12,-12,
			12,-13,
			13,-13,
			13,-14,
			14,-14,
			14,-15,
			15,-15,
			15,-16,
			16,-16,
			16,17,
			-17

HIGH SPEED COUNTER

PROGRAMMING (con't)

	EQUAL CR	2 BIT CR		INPUTS > ST.PT. CR-002	Contacts 17,-17
.1	CR-001	CR-085	16	3	()
	EQUAL CR				Contacts ***
.2	CR-001		16		(OEN)
	EIGHTH LEVEL INPUT	1 BIT CR		EQUAL CR	Contacts
.3	0/00	CR-084		CR-001	()
		[CMP]	3		-5,5,-5, 5,-6,6, -6,6,-7, 7,-7,7, -8,8,-8, 8,-9,9, -9,9,-10, 10,-10, 10,-11, 11,-11, 11,-12, 12,-12, 12,-13, 13,-13, 13,-14, 14,-14, 14,-15, 15,-15, 15,-16, 16,-16, 16,17, -17

HIGH SPEED COUNTER

PROGRAMMING (con't)

	EQUAL 1 CR BIT CR CR	INPUTS > ST.PT. CR-002	Contacts 17,-17
.4	CR-001 CR-084] / [] / [16 3	()	
	EQUAL CR CR-001		Contacts ***
.5	] [ 16	(OEN)	
		GROUP ONE CTR. 0/00	Contacts 8,12,16
.6		()	
			Contacts ***
.7		(OEN)	
	CTR. ONE RESET	CTR. 1 RESET (LOW) 0/04	Contacts 6,10,14
Rung 17	1/12] [17	()	

HIGH SPEED COUNTER

PROGRAMMING (con't)

.1	CTR. TWO RESET 1/13	---	[	-----	( )	+	CTR. 2 RESET (LOW) 0/05	Contacts 6,10,14
.2	CTR. ONE ENABLE 1/14	---	[	-----	( )	+	CTR. 1 ENABLE (LOW) 0/06	Contacts 5,9,13
.3	CTR. TWO ENABLE 1/15	---	[	-----	( )	+	CTR. 2 ENABLE (HIGH) 0/07	Contacts 5,9,13
.4	EQUAL CR CR-001 16	---	[	-----	( )	+	CTR. EQUALS ST.PT. 1/08	Contacts ***
.5	INPUTS > ST.PT. CR-002 16	---	[-----	()	+	INPUTS > ST.PT. 1/09	Contacts ***
.6	EQUAL INPUTS CR > ST.PT. CR-001 CR-002 16 16	---]/[-----]/[+	INPUTS < ST.PT. 1/10	Contacts ***



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