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PCM-D24/CTR3

ComputerBoards, Inc.

Revision 3

March 1999

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1 INTRODUCTION

The PCM-D24/CTR3 is a data acquisition and control board for IBM PC compatible computers with PCMCIA type slots. The heart of the board is an 82C55 digital I/O chip and an 82C54 counter/timer chip. Customers familiar with the CIO-DIO24/CTR3 will immediately notice the similarity in register structure and function between the PCMCIA board and the ISA bus board.

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2 WINDOWS 95, 98 INSTALLATION

2.1 INSTALL THE *Insta*Cal SOFTWARE PACKAGE

2.1.1 INTRODUCTION

*Insta*Cal is the installation, calibration and test software supplied with your data acquisition / IO hardware. The complete *Insta*Cal package is also included with the Universal Library. If you have ordered the Universal Library, use the Universal Library disk set to install *Insta*Cal. The installation will create all required files and unpack the various pieces of compressed software. To install *Insta*Cal, simply run setup.exe, and follow the on-screen instructions.

2.1.2 INSTALLATION OPTIONS

If you are installing on a Windows 95 or 98 operating system, the "Installation Options" dialog box will allow you to install the 16 bit, the 32 bit or both versions of *Insta*Cal. Select the 32 bit version unless you intend to use a 16 bit application or library to control your data acquisition hardware.

If you are installing from the Universal Library disk set, the "Installation Options" dialog box also presents options to install example programs for each language supported. Select the appropriate example programs for the language you will be using.

2.1.3 FILE DEFAULT LOCATION

*Insta*Cal will place all appropriate files in "C:\CB." If you change this default location remember where the installed files are placed as you may need to access them later.

2.1.4 INSTALLATION QUESTIONS

At the end of the installation process there will be a series of questions: unless you have knowledge to the contrary, simply accept the default when prompted.

2.1.5 INSTALLATION COMPLETION

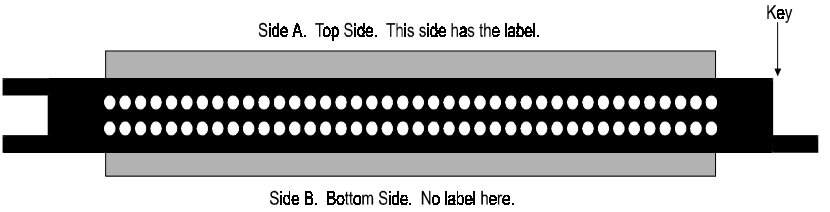
After the installation of *Insta*Cal is complete you should restart your computer to take advantage of changes made to the system.

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2.2 INSTALL THE PCMCIA CARD

Your PCM card is completely plug and play. There are no switches or jumpers to set prior to installation in your computer. Simply follow the steps shown below to install your PCM - hardware.

1. Insert the card into a free PC Card/PCMCIA type II or III slot. You do not have to turn the computer off. The system is designed for power on installation. Shown here is a PCM card case looking into the connector which is inserted into the PCMCIA slot of your computer. The KEY helps to insure that the PCM board is inserted in the correct orientation.



PCMCIA CARD ORIENTATION - View into PCMCIA connector. The end which goes into the PCMCIA slot.

2. If the appropriate drivers are already loaded on the PC, the card should be detected, recognized, and configured by Windows and you should hear an insertion beep. If the card is not detected by Windows, go to step 3. To verify the card has been recognized, go to Control Panel\System\Device Manager and the card should now appear under "DAS Component." If your card appears in the list you can now proceed to the "RUN *Insta*Cal" section of this manual.

3. If the drivers are not already loaded on the PC, you will be prompted for a driver. If you are not prompted for a driver after inserting the card, go to step 4. The appropriate driver is located on disk 1 of the installation disk set. Insert this disk. Windows should detect the driver file automatically, install it and then the card should be detected by Windows and you should hear an insertion beep. To verify the card has been recognized, go to Control Panel\System\Device Manager and the card should now appear under "DAS Component." If your card appears in the list you can now proceed to the "RUN *Insta*Cal" section of this manual.

4. If the card is not detected by Windows and you are not prompted for a driver after inserting the card, check that your computer's 32-bit PCMCIA drivers are enabled. If they are not, enable them and then restart your computer and try the above procedure again.

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2.3 RUN *Insta*Cal

Run the *Insta*Cal program in order to configure the board for run-time use. By configuring the board, you add information to the configuration file, cb.cfg, that is used by the Universal Library and other third-party data acquisition packages that use the Universal Library to access the board.

2.3.1 RUNNING THE 32 BIT VERSION

You can run the 32 bit version of *Insta*Cal by finding the file named "inscal32.exe" in your installation directory and double clicking it. You can also run *Insta*Cal by going to your Start Menu then to Programs, then to ComputerBoards, and finally choosing *Insta*Cal.

If you have a PCM board inserted in a PCM slot in your computer, *Insta*Cal displays a dialog box indicating the device has been detected. Simply click "OK" to proceed with InstaCal.

If there are no other boards currently installed by *Insta*Cal, then the PCM board will be assigned board number 0. Otherwise it will be assigned the next available board number.

You can now view and change the board configuration by clicking the properties icon or selecting the Install\Configure menu.

2.3.2 RUNNING THE 16 BIT VERSION

You can run the 16 bit version of *Insta*Cal by finding the file named "instacal.exe" in your installation directory and double clicking it. You can also run *Insta*Cal by going to your Start Menu then to Programs, then to ComputerBoards, and finally choosing "InstaCal 16."

If you have a PCM board inserted in a PCM slot in your computer, *Insta*Cal displays a dialog box titled "Add PCM Card." Select "Yes." The next dialog box allows you to select a board number. Choose the default (0 if no other cards are already installed) or select a board number.

You can now select the Install menu (using the mouse or the letter "I" on the keyboard) to view or change the configuration of the board.

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2.4 TESTING THE INSTALLATION

After you have run the install program, it is time to test the installation. The following section describes the *Insta*Cal procedure to test that your board is properly installed.

With *Insta*Cal running:

1. Select the board you just installed.

2. Select the "Test" function.

Follow the instructions provided to test for proper board operation.

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3 WINDOWS 3.X OR DOS INSTALLATION

3.1 INSTALL THE *Insta*Cal SOFTWARE PACKAGE

*Insta*Cal is the installation, calibration and test software supplied with your data acquisition / IO hardware. The complete *Insta*Cal package is also included with the Universal Library. If you have ordered the Universal Library, use the Universal Library disk set to install Instacal. The installation will create all required files and unpack the various pieces of compressed software. To install *Insta*Cal, simply run setup.exe, and follow the on-screen instructions.

3.1.1 INSTALLATION OPTIONS

If you are installing from the Universal Library disk set, the "Installation Options" dialog box presents options to install libraries and example programs for each language supported. Select the appropriate library version and example programs for the language you will be using.

If your computer does not have the Windows operating system installed (only the DOS operating system is available), install the separate DOS-only InstaCal package called "InstaCal for DOS, Universal Library for DOS" available from your vendor.

Computers running Windows 3.x and/or DOS need to use the DOS based Card & Socket Services (CSS) drivers. CSS is included with most newer computers, but if you need to purchase these drivers, they are available from your vendor (order PCM CSS). During the InstaCal installation, you will be prompted to indicate whether or not to install CBCLIENT. Respond "Yes." CBCLIENT is used by CSS to configure the PCMCIA data acquisition cards. Remember, if you do not have CSS loaded, install it before attempting to use the PCMCIA card. More information about CSS is available in section 3.5 titled "About DOS Card & Socket Services."

*Insta*Cal will place all appropriate files in "C:\CB." If you change this default location remember where the installed files are placed as you may need to access them later. At the end of the installation process there will be a series of questions: unless you have knowledge to the contrary, simply accept the default when prompted.

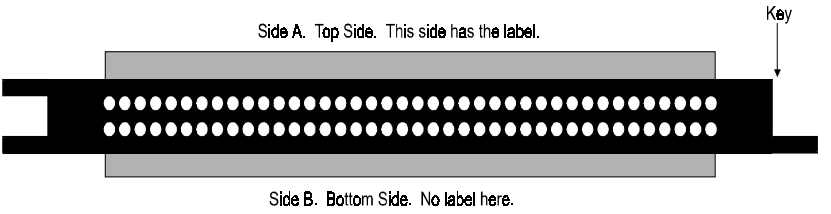
After the installation of *Insta*Cal is complete you should restart your computer to take advantage of changes made to the system.

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3.2 INSTALL THE PCMCIA CARD

Insert the card into a free PCM card slot and wait for the insertion tone (a double beep).

Shown here is a PCM card case looking into the connector which is inserted into the PCMCIA slot of your computer. The KEY helps to insure that the PCM board is inserted in the correct orientation.



PCMCIA CARD ORIENTATION - View into PCMCIA connector. The end which goes into the PCMCIA slot.

3.3 RUN *Insta*Cal

Run the *Insta*Cal program in order to configure the board for run-time use. By configuring the board, you add information to the configuration file, cb.cfg, that is used by the Universal Library and other third-party data acquisition packages that use the Universal Library to access the board.

To run *Insta*Cal in Windows 3.x, find the file named InstaCal.exe in your installation directory or simply double click the InstaCal.exe icon.

From DOS, jsut type "Instacal" at the DOS prompt and hit "Enter."

If you have a PCM board inserted in a PCM slot in your computer, *Insta*Cal displays a dialog box titled "Add PCM Card." Select "Yes." The next dialog box allows you to select a board number. Choose the default (0 if no other cards are already installed) or select a board number.

You can now select the install menu (using the mouse or the letter "I" on the keyboard) to view or change the configuration of the board.

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3.4 TESTING THE INSTALLATION

After you have run the install program and set your base address with *Insta*Cal, it is time to test the installation. The following section describes the *Insta*Cal procedure to test that your board is properly installed.

With *Insta*Cal running, choose the TEST item on the main menu.

a. Select the board you just installed

b. If the choice “Internal Test” is available, then select Internal Test. If not, proceed to "e." below.

c. The internal control registers of the board will then be tested. If this test is successful, your board is installed correctly.

d. If the Internal Test is completed successfully, you may want to check that the I/O pins are working correctly. To check this select External Test and follow the instruction provided. This will require you to use the shorting wires supplied with the board to connect inputs to outputs for I/O testing. Some external tests may require an external voltage source and ohmmeter. All required equipment and connections will be listed by *Insta*Cal.

e. If the “I/O Test Menu” lists the option “Plot”, the select it and make the connections as shown to test your card.

3.5 ABOUT DOS CARD & SOCKET SERVICES

The following section describes Card & Socket Services and should help you determine whether or not you need to install CSS.

Some operating systems, such as Windows 95, include an integrated version of CSS. If you are running such an operating system, do not install DOS CSS unless you have a specific reason to do so.

Card and socket services for your PCM card are on a disk labeled "DOS Card & Socket Services." The software from that disk should be installed if you do not already have CSS support on your PC.

3.5.1 WHAT IS CSS?

CSS is a program that communicates with your computers PCMCIA interface controller and configures it. The PCMCIA interface is configurable, unlike the standard ISA

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bus you may be familiar with. If you plug a PCMCIA board into a PCMCIA slot and have not yet run CSS, you will have no access to the functions of that PCMCIA board.

3.5.2 DOES CSS USE SYSTEM RESOURCES?

Yes. The CardSoft Card and Socket Services device drivers which are installed in your CONFIG.SYS use about 61K of memory. These files can be installed DEVICE-HIGH.

The CBCLIENT.EXE installed in your AUTOEXEC.BAT uses about 10K of memory. The CBCLIENT.EXE program is a TSR (Terminate and Stay Resident). You may modify the program line to LOADHIGH the TSR. We have tested it both high and low with and without Windows and a variety of other applications. We believe it is a safe TSR that will not cause any system problems.

3.5.3 HOW DO I KNOW CSS IS INSTALLED AND RUNNING?

There is a simple test. Just plug in your PCM-card. If CSS is installed and working the computer will beep. You can remove and replace your PCM-card as often as you like and need not power down to do so. The computer should beep each time you insert the PCM-card.

3.5.4 WHAT ABOUT CSS FOR MULTIPLE PCM BOARDS?

Once the current version of CSS is installed, CSS is installed for all PCM boards included in that version of CSS. As new PCM boards become available, they will be added to the CSS and you will want to always have the most recent version of CBCLIENT.EXE installed in the C:\CB directory. Let the installation software do this for you.

You can run multiple PCMCIA boards with the CBCLIENT.EXE CSS, and, if you have another CLIENT program running for other PCMCIA boards, it will not interfere.

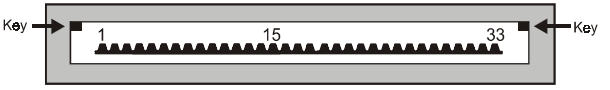
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4 INTERFACING

The PCM-D24/CTR3 has 24 digital input/output and 3 counters. Because of constraints imposed by the number of pins on a 33 pin connector, the access to the counters is limited. A digital ground is provided on pin 33 and in the cable shield clips to either side of the 33 pins of the connector.

4.1 PCM-D24/CTR3 CONNECTOR

Shown here is a PCM-D24/CTR3 case looking into the connector. The KEY helps to insure that the cable is inserted in the correct orientation.



Chassis Ground & Digital Ground on Connector Housing & Shield

1	Port A0	16	Port B7
2	Port A1	17	Port C0
3	Port A2	18	Port C1
4	Port A3	19	Port C2
5	Port A4	20	Port C3
6	Port A5	21	Port C4
7	Port A6	22	Port C5
8	Port A7	23	Port C6
9	Port B0	24	Port C7
10	Port B1	25	GND
11	Port B2	26	CTR 1 Out
12	Port B3	27	CTR 1 Gate
13	Port B4	28	CTR 1 CLK
14	Port B5	29	CTR3 Out
15	Port B6	30	CTR3 Gate
		31	CTR3 CLK
		32	EXT-INT
		33	GND

33 PIN I/O CONNECTOR - View into PCM-D24/CTR3.

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5 PROGRAMMING & APPLICATIONS

5.1 PROGRAMMING LANGUAGES

UniversalLibrary provides complete access to the PCM-D24/CTR3 functions from a range of programmaing languages; both DOS and Windows. If you are planning to write programs, or would like to run the example programs for Visual Basic or any other language, please turn now to the UniversalLibrary manual.

5.2 PACKAGED APPLICATIONS PROGRAMS

Many packaged application programs, such as Labtech Notebook now have drivers for the PCM-D24/CTR3. If the package you own does not appear to have drivers for the PCM-D24/CTR3 please fax the package name and the revision number from the install disks. We will research the package for you and advise by return fax how to obtain PCM-D24/CTR3 drivers.

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6 CALIBRATION & SERVICES

There is no calibration required. The case may not be opened and there are no parts inside which you can service. There are no socketed components.

Opening the PCM-D24/CTR3 case will void your warranty! If you PCM-D24/CTR3 requires service, please contact the factory for an RMA# and return it.

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7 I/O ADDRESS MAP & REGISTER FUNCTIONS

A base address register controls the beginning, or 'Base Address' of the I/O addresses occupied by the control registers of the PCM-D24/CTR3. In all, 9 addresses are occupied. The base address assigned by CSS is stored in the CB.CBG file by InstaCAL and read by Universal Library. Please read about installing and using InstaCal.

7.1 CONTROL REGISTERS

Once CSS is installed and a base address has been established, the PCM-D24/CTR3 may be controlled by writing to and reading from the control registers. While it is possible to write your own control routines for the PCM-D24/CTR3, routines have been written and are available in Universal Library for DOS and Windows programming languages.

NOTE ON REGISTER PROGRAMMING SUPPORT

While the complete register map is explained here, only very limited support for assembly language or direct register programming is available. Register level programming should only be attempted by experienced programmers. We support the use of the PCM-D24/CTR3 through high level languages using UniversalLibrary and the example programs provided.

7.2 PORT ADDRESSES & FUNCTIONS

ADDRESS	WRITE	READ
Base + 0	82C55 Port A Set	Port A Input, Read back output
Base + 1	82C55 Port B Set	Port B Input, Read back output
Base + 2	82C55 Port C Set	Port C Input, Read back output
Base + 3	82C55 Control	None
Base + 4	82C54 Counter 0 Load	Counter 0 read count data
Base + 5	82C54 Counter 1 Load	Counter 1 read count data
Base + 6	82C54 Counter 2 Load	Counter 2 read count data
Base + 7	82C54 Control	None
Base + 8	Interrupt & Clock Source Control	Read back of control

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NOTE ON 82C55 ** PLEASE READ **

The 82C55 when powered up or reset, defaults all data lines to the input mode. This presents a high impedence. With some TTL input chips, the 82C55 high impedence input can cause the input to float high and turn the device on. If you are using the PCM-D24/CTR3 to control a digital device and it is critical that it remain off (inputs at ground) on power up or reset, please attach 2.2K Ohm pull down resistors to each output line.

Remember, if you have the 82C55 interfaced to an input chip, when the computer is powered up you have an input connected to an input. This is an undefined connection.

BASE + 0 82C55 Port A

The direction of this port is set by writing a control word to BASE + 3. The port is byte wide only and must be set as 8 in or 8 out. Data is written to and read from this port in bytes.

If programmed for output, a write to this register will update the outputs. A 0 sets the output to TTL Low. A 1 sets the output to TTL High. NOTE: TTL High is not necessarily 5V. The current high/low bit settings may be read back from the port by reading it.

If programmed for input, a read will capture the current state of all 8 input lines (8 bits) of the port. Writing to an input port has no function.

7	6	5	4	3	2	1	0
A7	A6	A5	A4	A3	A2	A1	A0

BASE + 1 82C55 Port B

The direction of this port is set by writing a control word to BASE + 3. The port is byte wide only and must be set as 8 in or 8 out. Data is written to and read from this port in bytes.

If programmed for output, a write to this register will update the outputs. A 0 sets the output to TTL Low. A 1 sets the output to TTL High. NOTE: TTL High is not necessarily 5V. The current high/low bit settings may be read back from the port by reading it.

If programmed for input, a read will capture the current state of all 8 input lines (8 bits) of the port. Writing to an input port has no function.

7	6	5	4	3	2	1	0
B7	B6	B5	B4	B3	B2	B1	B0

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BASE + 2 82C55 Port C

The direction of this port is set by writing a control word to BASE + 3. The port is byte wide but may be configured in 4 bit nibbles. It may be set as 8 in, 8 out, or split to 4 in and 4 out. Data is written to and read from this port in bytes even when split as 4&4. The rules for writing and reading data apply regardless of 8 or 4&4 operation.

If programmed for output, a write to this register will update the outputs. A 0 sets the output to TTL Low. A 1 sets the output to TTL High. NOTE: TTL High is not necessarily 5V. The current high/low bit settings may be read back from the port by reading it.

If programmed for input, a read will capture the current state of all 8 input lines (8 bits) of the port. Writing to an input port has no function.

7	6	5	4	3	2	1	0
CH7	CH6	CH5	CH4	CL3	CL2	CL1	CL0

BASE ADDRESS + 3 82C55 CONTROL REGISTER

7	6	5	4	3	2	1	0
MS	M3	M2	A	CU	M1	B	CL
Group A				Group B			

The 82C55 may be programmed to operate in Input/ Output (mode 0), Strobed Input/ Output (mode 1) or Bi-Directional Bus (mode 2).

Included here is information on programming the 82C55 in mode 0. Those wishing to use the 82C55 in modes 1 or 2, or who wish to program the 82C54 counter on the PCM-D24/CTR3, must procure a data book from Intel Corporation Literature Department. Please check Intel's web site at www.intel.com for more information.

When the PC is powered up or RESET, the 82C55 is reset. This places all 24 lines in Input mode and no further programming is needed to use the 24 lines as TTL inputs.To program the 82C55 for other modes, the following control code byte must be assembled into an 8 bit byte.

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MS = Mode Set. 1 = mode set active

M3	M2	Group A Function
0	0	Mode 0 Input / Output
0	1	Mode 1 Strobed Input / Output
1	X	Mode 2 Bi-Directional Bus

A	B	CL	CH	Independent Function
1	1	1	1	Input
0	0	0	0	Output

M1 = 0 is mode 0 for group B. Input / Output
M1 = 1 is mode 1 for group B. Strobed Input / Output

The Ports A, B, C High and C Low may be independently programmed for input or output.

The two groups of ports, group A and group B, may be independently programmed in one of several modes. The most commonly used mode is mode 0, input / output mode. The codes for programming the 82C55 in this mode are shown below. D7 is always 1 and D6, D5 & D2 are always 0.

D4	D3	D1	D0	HEX	DEC	A	CU	B	CL
0	0	0	0	80	128	OUT	OUT	OUT	OUT
0	0	0	1	81	129	OUT	OUT	OUT	IN
0	0	1	0	82	130	OUT	OUT	IN	OUT
0	0	1	1	83	131	OUT	OUT	IN	IN
0	1	0	0	88	136	OUT	IN	OUT	OUT
0	1	0	1	89	137	OUT	IN	OUT	IN
0	1	1	0	8A	138	OUT	IN	IN	OUT
0	1	1	1	8B	139	OUT	IN	IN	IN
1	0	0	0	90	144	IN	OUT	OUT	OUT
1	0	0	1	91	145	IN	OUT	OUT	IN
1	0	1	0	92	146	IN	OUT	IN	OUT
1	0	1	1	93	147	IN	OUT	IN	IN
1	1	0	0	98	152	IN	IN	OUT	OUT
1	1	0	1	99	153	IN	IN	OUT	IN
1	1	1	0	9A	154	IN	IN	IN	OUT
1	1	1	1	9B	155	IN	IN	IN	IN

BASE +4, 5, 6, and 7

The 82C54 counter chip is quite complex. The data sheet for the part contains programming information, input and output timing diagrams and interfacing specifications. We are sorry, but it is beyond the scope of this manual to reproduce the

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information, all of which is contained in the chip manufacturers data sheet. If you would like more information, please visit Intel's web site at www.intel.com.

BASE + 8 Interrupt and Clock Source Control

Write control - Read back status

7	6	5	4	3	2	1	0
INT2	INT1	INT0	CKSEL2	CKSEL1	CKSEL0	CLK1	CLK0

Interrupt Source Control

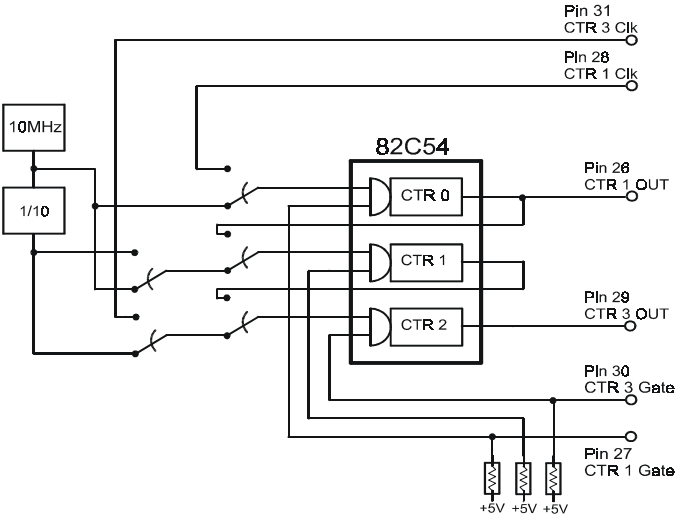
INT2	**INT1**	**INT0**	**Interrupt source**
0	0	0	No Interrupts
0	0	1	External Interrupt
0	1	0	Digital I/O Interrupt from 82C55. PC0 or PC3. See below.
0	1	1	Counter 0
1	0	0	Counter 1
1	0	1	Counter 2

PC0 and PC3 are the outputs of an 82C55 programmed in Mode 1 or Mode 2. These two modes provide an interrupt output for use in closely coupled parallel interfaces. To program an 82C55 for Mode 1 or 2 you will need an 82C55 data book. The ComputerBoards Universal Library supports Mode 0 only.

The counters on the PCM-D24/CTR3 have quite a bit of programmability. Due to the architecture of the board, there is additional counter source and chaining flexibility beyond the standard functions of an 82C54 .

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This diagram shows schematically the programmable options.



82C54 COUNTER INPUT SOURCE CONTROL - All switches are shown in the power on default position. The switches are programmable. Options are: External Input or 10MHz to CLK0, OUT 0 or 10MHz or 1MHz to CLK1, External input or OUT 1 or 1MHZ to CLK2. All Gates pulled high (enabled) via 10K resistor. Pull to GND to disable CLK Input.

Because of the limited number of pins on the 33 pin connector, all signals from all three counters are not available externally. This is compensated for by the ability to chain counters and control the count source.

Clock Source Select

The source for count pulses to the inputs of the clocks may be controlled via software. The counter source will be overidden by counter linking (see below).

CKSEL0	**Clock Source Counter 0**
0	10MHz Clock
1	External Clock 0 - supplied at pin 28
CHSEL1	**Clock Source Counter 1**
0	10 MHz Clock
1	1 MHz Clock
CKSEL2	**Clock Scource Counter 2**
0	1 MHz Clock
1	External Clock 2 - Supplied at pin 31

Counter Linking

Counters may be linked into 32 or 48 bit depth. Note that counter linking overrides counter source select for counters 1 and 2.

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CK1	CK0	Counter Linking
0	0	3, 16 bit counters
0	1	1, 16 bit counter (counter 0), AND 1, 32 bit counter (counter 1 cascaded into counter 2)
1	0	1, 48 bit counter (counter 0 to counter 1 to counter 2)
1	1	Not defined

Counter Gates

The counter gates are tied high through a 10K resistor. In this manner the gates are always enabled; counting is always enabled. Counters 0 and 2 may be disabled by bringing the gates to ground at pin 27 (CTR1 Gate) and pin 30 (CTR3 Gate). Counter 1 has no external access to the gate so counter 1 is always enabled.

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8 SPECIFICATIONS

Typical for 25°C unless otherwise specified.

8.1 POWER CONSUMPTION

+5V (normal operation)	47mA typical, 65mA max
+5V (during CIS read)	62 mA typical, 80 mA max

8.2 DIGITAL I/O

Digital Type	MSM82C55
Configuration	2 banks of 8, 2 banks of 4, programmable by bank as input or output
Number of channels	24 I/O
Output High	3.7 volts min @ -2.5mA
Output Low	0.4 volts max @ 2.5mA
Input High	2.2 volts min, 5.5 volts absolute max
Input Low	0.8 volts max, -0.5 volts absolute min
Power-up / reset state	Input mode (high impedance)
Interrupts	Programmable levels 2 - 15
Interrupt enable	Programmable
Interrupt sources	Programmable: external (Ext Int) or internal (counter 0 output, counter 1 output, counter 2 output, 8255 port C0 or 8255 port C3)

8.3 COUNTERS

Counter type 82C54

Configuration 3 down counters, 16 bits each

Counter 0 - Independent user counter 1

- Source: Programmable internal 10MHz or external (CTR 1 Clk)
- Gate: External (CTR 1 Gate), pulled high (enabled) by 10k resistor

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Output: Available at user connector (CTR 1 Out), may also be programmed to connect to counter 1 clock

Counter 1 - Independent user counter 2

Source: Programmable internal 10MHz or 1MHz or counter 0 output

Gate: Internal, pulled high (enabled) by 10k resistor

Output: May be programmed to connect to counter 2 clock

Counter 2 - Independent user counter 3

Source: Programmable internal 1MHz, counter 1 output or external (CTR 3 Clk)

Gate: External (CTR 3 Gate), pulled high (enabled) by 10k resistor

Output: User connector (CTR 3 Out)

Clock input frequency	10Mhz max
High pulse width (clock input)	30ns min
Low pulse width (clock input)	50ns min
Gate width high	50ns min
Gate width low	50ns min
Input low voltage	0.8V max
Input high voltage	2.0V min
Output low voltage	0.4V max
Output high voltage	3.0V min

8.4 ENVIRONMENTAL

Operating temperature range	0 to 70°C
Storage temperature range	-40 to 100°C
Humidity	0 to 90% non-condensing

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EC Declaration of Conformity

We, ComputerBoards, Inc., declare under sole responsibility that the product:

PCM-D24/CTR3	PCMCIA Digital I/O Board
Part Number	Description

to which this declaration relates, meets the essential requirements, is in conformity with, and CE marking has been applied according to the relevant EC Directives listed below using the relevant section of the following EC standards and other normative documents:

EU EMC Directive 89/336/EEC: Essential requirements relating to electromagnetic compatibility.

EU 55022 Class B: Limits and methods of measurements of radio interference characteristics of information technology equipment.

EN 50082-1: EC generic immunity requirements.

IEC 801-2: Electrostatic discharge requirements for industrial process measurement and control equipment.

IEC 801-3: Radiated electromagnetic field requirements for industrial process measurements and control equipment.

IEC 801-4: Electrically fast transients for industrial process measurement and control equipment.

Carl Haapaoja, Director of Quality Assurance

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ComputerBoards
16 Commerce Blvd.
Middleboro, MA 02346
T: (508) 946-5100
F: (508) 946-9500
E-mail: info@computerboards.com
www.computerboards.com

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