

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Advantech PCLD-779* at our website: *Click HERE*

PCLD-779

MULTIPLEXER AND AMPLIFIER BOARD

USER'S MANUAL

COPYRIGHT NOTICE

This document is copyrighted 1992 by Advantech Co.,Ltd. All rights are reserved. Advantech Co., Ltd. reserves the right to make improvements in the products described in this manual at any time without notice.

No part of this manual may be reproduced, copied, translated or transmitted, in any form or by any means without the prior written permission of Advantech Co., Ltd. Information provided in this manual is intended to be accurate and reliable. However, Advantech Co., Ltd. assumes no responsibility for its use, nor for any infringements of rights of third parties which may result from its use.

PC-LabCard is a trademark of Advantech Co., Ltd. IBM PC, PC/XT and PC/AT are trademarks of International Business Machines Corporation.

研華股份有限公司
正式承認
84.3.03
工程課

BE-PS0154

Part No. 2003779000 Rev. A1
Printed in Taiwan May, 1992

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.c

TABLE OF CONTENTS

CHAPTER 1. INTRODUCTION 1
1.1. Initial Inspection 1
1.2. Specifications 2

CHAPTER 2. CONFIGURING THE PCLD-779 7
2.1. Amplification Gain Setting 7
2.2. Amplification Output Channel Setting 8
2.3. CJC Output Channel Setting 9
2.4. Open Thermocouple Detection 9
2.5. Power Source Selection 11
2.6. DAS Card Connections 11
2.6.1. Using the PCL-711 12
2.6.2. Using the PCL-718/PCL-818 12
2.6.3. Using the PCL-812/PCL-812PG 12
2.7. Signal Connection 13

CHAPTER 3. PROGRAMMING 15
3.1. Single and Multiple Channel Scanning 15
3.2. Using the PCL-711 17
3.3. Using the PCL-718 19
3.4. Using with the PCL-812 21
3.5. Thermocouple Measurements (DEMO779.EXE) 22
3.5.1. Single Channel 23
3.5.2. Multi-Channel Scan 24
3.5.3. AMP OUTPUT Channel 24
3.5.4. CJC Channel 24
3.5.5. Display Data 24
3.5.6. Read File 24
3.5.7. Write File 25
3.5.8. Therm. Type 25
3.5.9. Gain Setting 25
3.5.10. Quit 25

APPENDIX A. CALIBRATION 27
A.1. Calibrating the CJC Output 27
A.2. Calibrating the Amplifier Offset 28
A.3. Calibrating the Amplifier Gains 28

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.c

CHAPTER 1. INTRODUCTION

The PCLD-779 is an 8-channel, isolated multiplexer and amplifier board, which can be used with a variety of PC-LabCard DAS cards. Use it in applications where isolation in harsh environments is required, such as low level signal and thermocouple measurements, and signal amplification and conditioning.

This daughter board measures low level signals accurately when used in conjunction with your DAS card's A/D converter. It is equipped with a high-quality amplifier which provides six hardware selectable gain settings: x1, x10, x50, x100, x200, and x1000. Other features include cold-junction compensation circuitry for direct thermocouple measurements, a break-before-make relay multiplexer, terminal blocks for reliable signal connections, and a +5V/+12V external power supply connector with an LED status indicator.

1.1. Initial Inspection

Before you proceed any further, please inspect the contents of this package to ensure that everything has been included, and that the product not is defective or damaged. The PCLD-779 has been thoroughly inspected before shipment, and should be in perfect working order. If the daughter board has been damaged, contact your local dealer immediately.

This package should contain the following items:

- 1 PCLD-779 Multiplexer and Amplifier Board
- 1 User's Manual
- 1 Utility Diskette
- 2 one-meter ribbon cables

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.c

1.2. Specifications

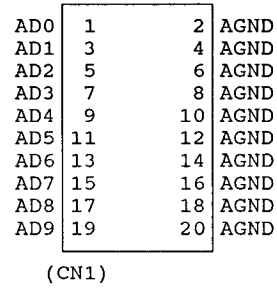
- **Input channels**: Eight isolated differential inputs
- **Input range**: -2V to +5V
- **Amplifier characteristics:**

Gain	CMRR	Nonlinearity
1000	125db	0.005%
100	125db	0.005%
10	110db	0.007%
1	90db	0.015%

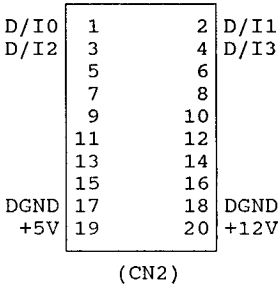
- **Input bandwidth**: 4 Hz max.
- **Input impedance**: 10MΩ
- **Input overvoltage protection**: -5V and +35V max. continuous
- **Output range:** ±10V max.
- **Output current**: 20 mA max.
- **Min. channel switching time**: 10ms with break-before-make
- **Max. channel scanning rate**:
  100 readings/second (multi-channel), 50 readings/second (single channel)
- **Isolation voltage**: >1000 Vdc channel-to-channel and from input-to-output
- **Relay**: Life expectancy: > 10^8 times
  Contact resistance: < 30 mΩ
- **CJC output** : +24.4mV/°C (0.0V @ 0.0°C)
- **Power consumption**: 65mA max. @+5V; 120mA max. @+12V
- **Digital input**: D0 to D3, TTL level compatible, to select start/stop channel
- **Connector**: 20-pin flat cable connectors

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.c

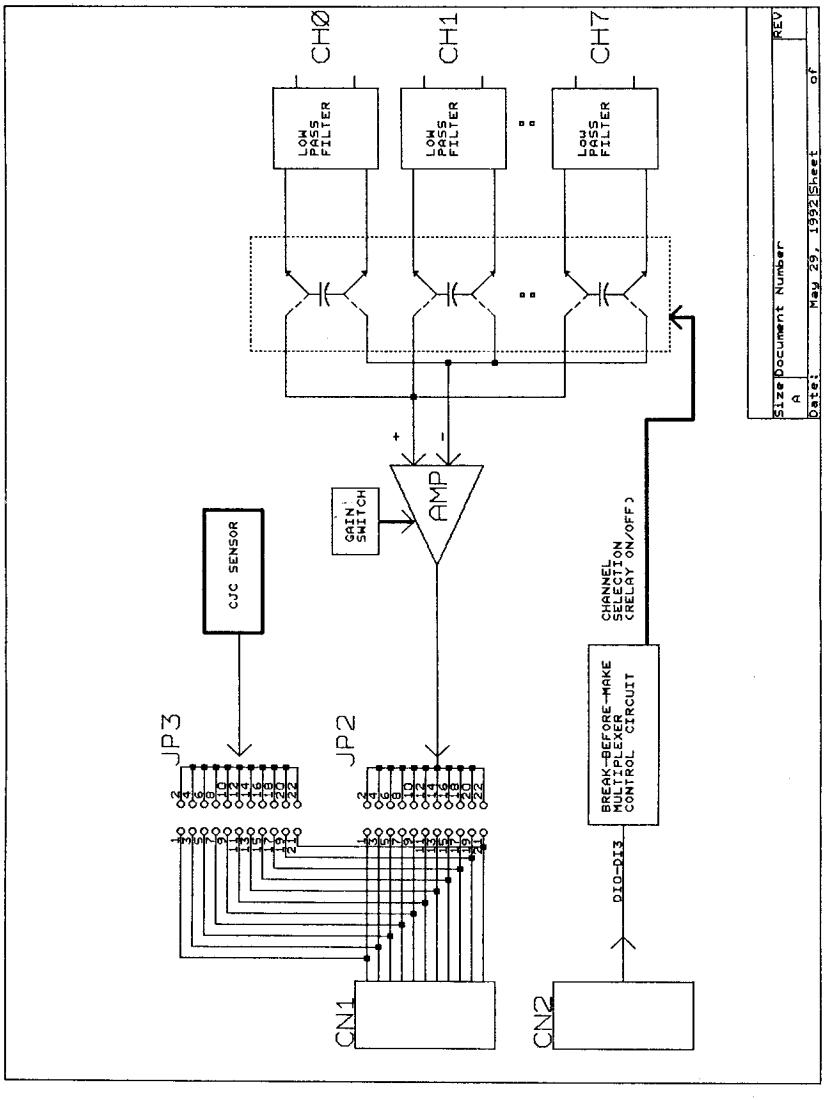
ANALOG OUTPUT



DIGITAL INPUT

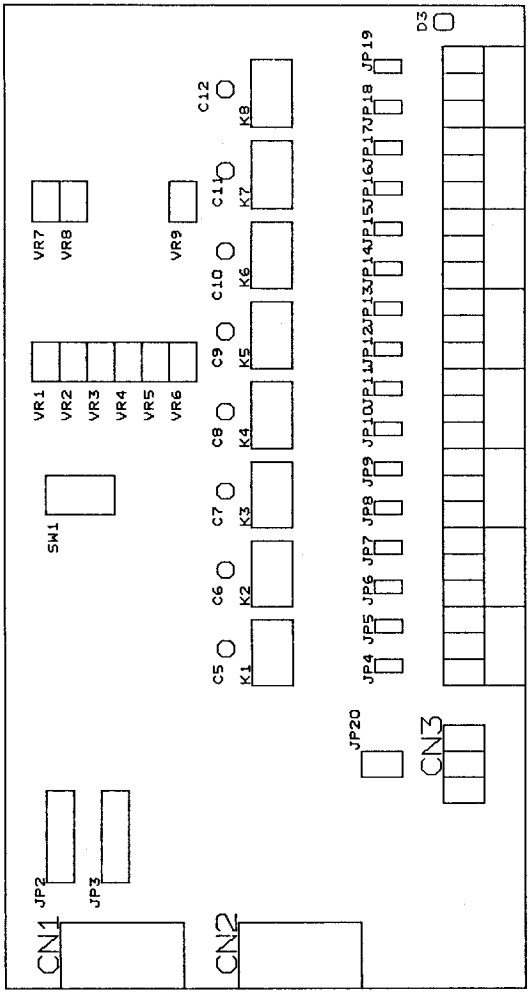


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.c



PCLD-779 Block Diagram

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.c



PCLD-779 Board Layout

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.c

CHAPTER 2. CONFIGURING THE PCLD-779

The PCLD-779 uses a series of jumper and DIP switch settings to configure it to your application requirements. The following sections show you how to configure it.

2.1. Amplification Gain Setting

The PCLD-779 uses a high grade instrumentation amplifier to provide selectable gains of x1, x10, x50, x100, x200 and x1000. Use DIP switch, SW1, to set the board to either one of these gains by setting SW1's switch positions according to the table below:

GAIN	Switch position (SW1)					
	1	2	3	4	5	6
x1	ON	OFF	OFF	OFF	OFF	OFF
x10	OFF	ON	OFF	OFF	OFF	OFF
x50	OFF	OFF	ON	OFF	OFF	OFF
x100	OFF	OFF	OFF	ON	OFF	OFF
x200	OFF	OFF	OFF	OFF	ON	OFF
x1000	OFF	OFF	OFF	OFF	OFF	ON

If several input signals are connected to the PCLD-779 simultaneously, you can avoid amplification output saturation by selecting a gain based on the largest input signal's value. To ensure that your system acquires an accurate temperature measurement, do not connect thermocouples which require different amplification gains from the PCLD-779. A list of various thermocouple types and their suitable gains are given below:

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.c

Thermocouple	Temperature Degrees C	Output Range (mV)	Suitable Gain
T	-200 to +200	-10 to +10	200
J	-200 to +600	+10 to +35	100
E	0 to +700	-5 to +55	50
K	-200 to +1200	-10 to +55	50
R	0 to +1769	0 to +25	200
S	0 to +1769	0 to +20	200

2.2. Amplification Output Channel Setting

The PCLD-779 provides up to ten jumper selectable amplification output channels (JP2). You may choose to use any one of these channels to output your signal. To select a specific output channel, simply close the jumper position which corresponds to the desired channel.

To use JP2 (AMP OUTPUT), close the appropriate jumper which corresponds to your DAS card's active channel. If you are not using the PCLD-779's amplification output feature, close Position X on JP2, and leave all the other positions on the jumper open. The following diagram illustrates JP2's layout.

AMP OUTPUT



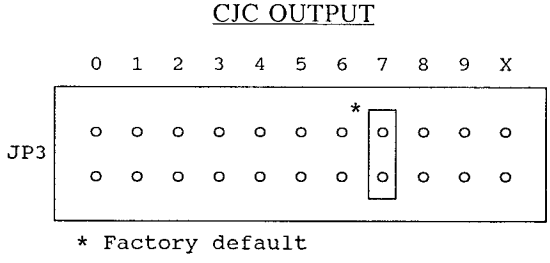
* Factory default

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.c

2.3. CJC Output Channel Setting

The PCLD-779 provides on-board cold junction compensation for thermocouple measurements. It generates a +24.4 mV/°C compensation signal with a 0.0 volt output at 0°C. The CJC output channel is selected via JP3 (CJC OUTPUT). Set the CJC OUTPUT (JP3) to your DAS card's active channel. You may choose to use any one of the PCLD-779's ten CJC output channels by closing the desired channel.

If your application does not require CJC output, then close Position X on JP3, and leave the other positions open. The following diagram illustrates JP3's layout.



NOTE: Since both the PCLD-779's CJC OUTPUT (JP3) and AMP OUTPUT (JP2) are parallel circuits, be sure that they are both set to different channels.

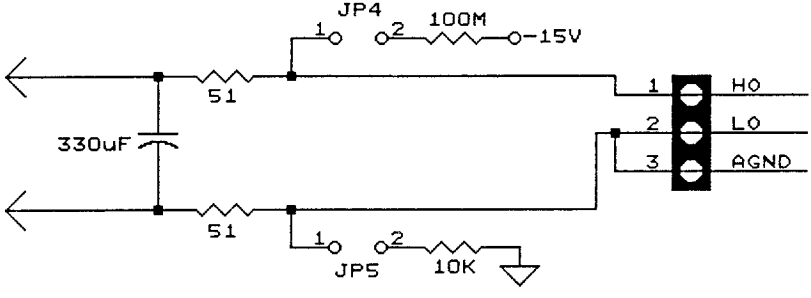
2.4. Open Thermocouple Detection

The PCLD-779 provides a thermocouple open detection feature. On the PCLD-779, you will find that each input channel has two pairs of soldering holes (JP4 through JP19). For example, JP4 and JP5 are used in conjunction with input Channel 0. If thermocouple open detection is required by your application, simply short these holes.

Under normal conditions, the input voltage generated by a thermocouple is very small. If a thermocouple opens, and have employed the above thermocouple

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.c

open detection procedure, the PCLD-779's output voltage will jump to -15V. This voltage change indicates that a thermocouple is open. The following diagram illustrates the PCLD-779's thermocouple open detection circuitry.

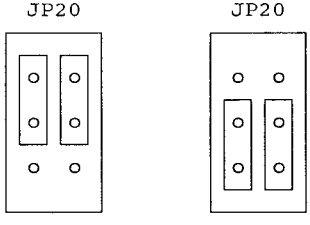


Open Thermocouple Detection Circuitry

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.c

2.5. Power Source Selection

This daughter board can be powered directly from your PC's power supply by connecting it to your PC-LabCard. Set this jumper accordingly (see the figure below). You can also connect an external power supply to the PCLD-779 at connector CN3. Set JP20 as shown in the illustration below:



* Factory default

2.6. DAS Card Connections

The PCLD-779 is equipped with two 20-pin connectors located at CN1 and CN2. CN1 is used as an analog output connector which must be connected to your DAS card's analog input connector. CN2 is used as a digital input connector which must be connected to your DAS card's digital output connector. Refer to the connector diagrams which are illustrated in Section 1.2 for their pin assignments.

Since analog input channel compatibilities are different among the PCL-711, PCL-718, PCL-812, PCL-812PG, and the PCL-818, the details for connecting the PCLD-779's outputs to these cards are discussed in the following sections. Similar data acquisition cards follow the same rules which will allow you to easily determine where to make signal connection by checking their pin assignments.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.c

2.6.1. Using the PCL-711

The PCL-711 supports up to eight single-ended input channels. You can make your analog output signal connection from the PCLD-779 (CN1) to the PCL-711 (CN1). For a digital input connection connect CN2 on the PCLD-779 to CN3 on the PCL-711.

2.6.2. Using the PCL-718/PCL-818

The PCL-718/PCL-818 supports up to 16 single-ended or eight differential input channels. Due to connector pin assignment limitations on the PCLD-779, only eight differential input channels can be used (please refer to the PCL-718/PCL-818 for the correct differential input mode setting). You can make your analog output signal connection from the PCLD-779 at CN1 to CN1 on the PCL-718/PCL-818. For a digital input connection connect CN2 on the PCLD-779 to CN3 on the PCL-718/PCL-818.

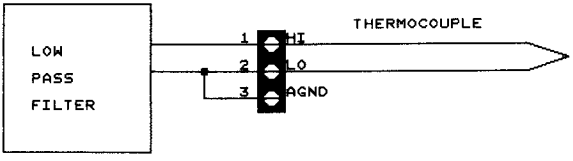
2.6.3. Using the PCL-812/PCL-812PG

The PCL-812/PCL-812PG supports up to 16 signal ended input channels. All of the PCLD-779's output channels can be supported by the PCL-812/PCL-812PG's analog input channels. You can make your analog output signal connection from the PCLD-779 at CN1 to CN1 on the PCL-812/PCL-812PG. For a digital input connection connect CN2 on the PCLD-779 to CN3 on the PCL-812/PCL-812PG.

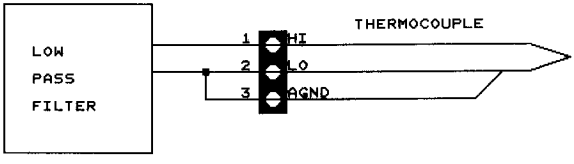
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.c

2.7. Signal Connection

For signal connections, use the PCL-779's terminal block's HI, LO, and AGND connection points (see the diagram illustrated below). Each channel's AGND and LO are internally shorted. For three-wire devices or sensors, connect the devices ground wire to AGND.



Two-wire device connection



Three-wire device connection

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.c

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP