Advantech Expansion Board Help, V3.0+

The Advantech DLL driver V3.0+ allows for connection of multiple expansion/daughter board types to any Advantech Multi-I/O card. Expansion boards may be mixed and matched and arranged in many combinations.

For example, you can connect a PCLD-789 to channel zero with gain of 100, a PCLD-779 to channel one with gain of 50, and up to sixteen PCLD-788s to channel five with gain of 1 (one).

Software configuration is very straight forward. All that must be done:

1) Choose the **Expansion Board Type**.
2) Choose the **A/D channel** to which the expansion/daughter board is connected. When connecting multiple PCLD-788s, the **# of PCLD-788s ,** ie. how many PCLD-788s (maximum of sixteen) connected to that A/D channel,   must be entered.
3) Choose the **Gain** for the selected expansion/daughterboard. The gain should correspond with the gain set on the expansion board dip switch.
4) When satisfied with selections, press the **ADD** button. The current settings will be added to the list box at the bottom of the dialog box. This list box reflects all expansion boards connected to the I/O card with respect to its A/D channels. List box selections may be deleted by highlighting them and then pressing the **DELETE** button.
5) Choose the **CJC channel**.
6) After all desired expansion boards have been connected to A/D channels, pressing **OK**. will store the configuration(s) to disk. Pressing **Cancel** will merely exit the dialog box without saving.

Configuring the PCLD-779, PCLD-770, and PCLD-789/889 Amplifier/Multiplexer boards
The PCLD-789 Amplifier/Multiplexer allows up to 16 differential analog input channels to be multiplexed into one analog input (A/D) channel of a DAS card such as the PCL-711, PCL-812, PCL-812PG, PCL-718, or PCL-818 series. The PCLD-779 and PCLD-770 allow for total isolation of up to eight multiplexed channels.   When used with multiplexer boards, the first four D/O channels of the DAS card are used for scanning/selecting analog input channels of the PCLD-770, PCLD-779 or PCLD-789 one channel at a time. Because of the digital output allocation when using these daughterboards, the first byte of D/O channels (0-7) on the DAS card are no longer available for standard digital output. Each PCLD-770/779/789/889 must occupy its own A/D channel.

When using mux cards, the input range of the PCL-711A/S, PCL-812, PCL-718, or PCL-818 (local mode) should be set for **-5 to +5V by DIP switches**.   For the PCL-711B, PCL-812PG, or PCL-818 series in remote (programmable gain) mode, the input range will be set   (-5   to +5V) by the application program.   You should select the desired gain that is suitable for your signals on the PCLD-779 or PCLD-789 .

Cascading PCLD-770s, PCLD-779's or PCLD-789's for expansion
You may use just one PCLD-770, PCLD-779 or PCLD-789 in a stand-alone configuration, or you can cascade up to 8 PCLD-789's (for 128 channels), 8 PCLD-770's (for 64 channels),   or Y connect up to four PCLD-779's (for 32 channels, using the optional PCLD-774 Analog Expansion Board), in a system.   Jumpers are used on the multiplexer boards to identify the DAS interface card channel to which they will be connected.   Each multiplexer in the cascade or Y connection must be routed (jumpered) to a different channel on the DAS card. Further, the gain selector switch on each multiplexer should be positioned to select the

desired input range.

Using the PCLD-770, PCLD-779 or PCLD-789 for Thermocouple Measurement
Thermocouple linearization is provided by the ADVANTECH DLL driver automatically if a temperature measurement operation is chosen in the application program. The linearization is performed, and the temperature acquired by the thermocouple/mux card is available for control strategy use or display in DEGREES CENTIGRADE. The conversion to   units other than degrees C (Fahrenheight, Kelvin, etc.) can be accomplished by use of a calculation scaling factor.   To perform thermocouple measurement:

- Properly configure the DAS card to be used
- Connect the thermocouple(s) to the terminals on the PCLD-770/779/789/889
- Use a shielded ribbon cable to connect CN1 of the PCLD-770/779/789/889 to the analog input port on the DAS card in use such as PCL-711, 812, 718, etc.
- Use a ribbon cable to connect CN2 of the PCLD-770/779/789 to the digital output port on the DAS card in use
- Select a proper input range or gain on the PCLD-770/779/789 for the type of thermocouple used, as described in the PCLD-770/779/789 hardware manual:

> -- K type = 50
> -- J type = 100
> -- T type = 200
> -- E type = 50
> -- R type = 200
> -- S type = 200
> -- B type = 200

- Select the desired input channel on the DAS card to correspond with each PCLD-770/779/789 by setting jumper block JP1 (PCLD-770), JP16 (PCLD-789) or JP2 (PCLD-779) to a proper position.   Positions 0..9 correspond to analog inputs 0..9 of the DAS card in use.

- Select the desired input channel   on the DAS card for the CJC (cold junction compensation) circuit on the PCLD-770 by hard wiring the CJC output directly to an A/D channel.   On the PCLD-779/789 select the CJC channel by setting the jumper block JP17 (PCLD-789) or JP3 (PCLD-779). Positions 0..9 correspond to analog inputs 0..9 of the DAS card in use.   Of course, the CJC channel selected cannot be set at any analog channel used for another purpose.

- If you are cascading or Y connecting more than one PCLD-779/789 for thermocouple measurement, normally **only one CJC input is required** - i.e. only one of the PCLD-770/779/789's has to connect its CJC to the DAS card.

- Make sure jumper blocks JP16 and JP17 or JP2 and JP3 are not at the same position.   They must be set to different input channels on the DAS card.

- Select the appropriate configuration in the DLL driver dialog box - DAS card, expansion/daughter board, and base address, etc..

- When the THERMOCOUPLE TYPE in the application software is selected, the driver will perform the appropriate linearization only if the DAS card's A/D range switch is set to +/- 5 volts. If using a card with   programmable gain, the bipolar 5 volt range should be set in the application program.

Configuring the PCLD-8115 CJC/Terminal boards
The PCLD-8115 is used as a terminal board to allow the user to connect differential or single-ended signals to a PCL-818HG.   The PCLD-8115 includes a Cold Junction Compensation (CJC) circuit that can be enabled or disabled. Because the PCL-818HG provides amplification (to gain of 1000) of its own, the PCLD-8115 itself requires no gain settings. If temperature measurement is to be performed, the CJC (channel 0) must be enabled. The PCLD-8115 must always be connected to the first eight A/D channels (0-7) of the Multi-I/O card.

Using the PCLD-8115 for Thermocouple Measurement
Thermocouple linearization is provided by the ADVANTECH DLL driver automatically if a temperature measurement operation is chosen in the application program. The linearization is performed, and the temperature acquired by the thermocouple/mux card is available for control strategy use or display in DEGREES CENTIGRADE. The conversion to   units other than degrees C (Fahrenheight, Kelvin, etc.) can be accomplished by use of a calculation scaling factor.   To perform thermocouple measurement:

- Properly configure the DAS card to be used
- Connect the thermocouple(s) to the PCLD-8115 terminals
- Enable thee CJC (cold junction compensation) circuit, always at channel zero (0) on the PCLD-8115. Of course, the CJC channel cannot be used for any other purpose during temperature measurement.
- Select the appropriate configuration in the DLL driver dialog box -- base address, etc..
- Select a proper input range or gain in the application software for the type of thermocouple used:

> -- K type = +/- 0.05 volt range
> -- J type = +/- 0.05 volt range
> -- T type = +/- 0.05 volt range
> -- E type = +/- 0.05 volt range
> -- R type = +/- 0.05 volt range
> -- S type = +/- 0.05 volt range
> -- B type = +/- 0.05 volt range

- When the THERMOCOUPLE TYPE in the application software is selected, the driver will perform the appropriate linearization for the selected thermocouple type with respect to *any* selected A/D range. However, the *optimum* range, that is the A/D range that can handle the entire temperature range for each supported thermocouple type,   is listed above.

Configuring the PCLD-788 Relay Multiplexer boards
The PCLD-788 Relay Multiplexer allows up to 256 analog input channels to be multiplexed into one analog input (A/D) channel of a DAS card.   The first eight D/O channels of the DAS card are used for addressing each PCLD-788 (high nibble) and for scanning/selecting channels (lower nibble) of the PCLD-788 one at a time. Because of the digital output allocation when using these daughterboards, the first byte of D/O channels (0-7) on the DAS card are no longer available for standard digital output. Because of its unique addressing method and very high impedance when not selected, multiple PCLD-788s (up to 16) can be connected to a single analog input (A/D) channel. Therefore, up to 256 channels may be connected to each A/D channel of the I/O card.

When using the PCLD-788, the input range of the PCL-711A/S, PCL-812, PCL-718, or PCL-818 (local mode) should be set for any desired range by DIP switches.   For the PCL-711B, PCL-812PG, or PCL-818 series in remote (programmable gain) mode, the input range should be set through the application program.

Using the PCLD-788 for Thermocouple Measurement
Thermocouple linearization is provided by the ADVANTECH DLL driver automatically if a temperature measurement operation is chosen in the application program. The linearization is performed, and the temperature acquired by the thermocouple/mux card is available for control strategy use or display in DEGREES CENTIGRADE. The conversion to   units other than degrees C (Fahrenheight, Kelvin, etc.) can be accomplished by use of a calculation scaling factor.   To perform thermocouple measurement:

- Properly configure the DAS card to be used
- Connect the thermocouple(s) to the PCLD-788 terminals
- Select the desired input channel on the A/D I/O card to connect to the CJC (cold junction compensation) circuit and connect a jumper from the CJC output to the input channel. Select the same CJC channel during software configuration of the driver. Of course, the CJC channel selected cannot be set at any analog channel used for another purpose.
- Select the appropriate configuration in the DLL driver dialog box -- base address, etc..
- Select a proper input range or gain in the application software for the type of thermocouple used:

> -- K type = +/- 0.05 volt range
> -- J type = +/- 0.05 volt range
> -- T type = +/- 0.05 volt range
> -- E type = +/- 0.05 volt range
> -- R type = +/- 0.05 volt range
> -- S type = +/- 0.05 volt range
> -- B type = +/- 0.05 volt range

- When the THERMOCOUPLE TYPE in the application software is selected, the driver will perform the appropriate linearization for the selected thermocouple type with respect to *any* selected A/D range. However, the *optimum* range, that is the A/D range that can handle the entire temperature range for each supported thermocouple type,   is listed above.