

PLCTM *on a chip* Technology

DEVELOPMENT PACKAGE DATA SHEET



PLC on a Chip Patent 7,299,099

PLCDK-03



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Getting Started

What's Included in the Development Package

The PLC on a Chip Development Package provides all the basic components needed to begin to use a PLC on a Chip product in your design. This package includes the necessary hardware and software. Two CDs are included. The first is the EZ LADDER software and the second is the Development Package CD. Included on this CD is the a complete library of documents including circuit design guidelines and PCB layout guidelines.

What's in the Box:

Qty	Description	Part Number	Located Where
1	PLC on a Chip Module	PLCMOD-M2-25631	Installed on PLCDKMB
1	Development Kit Main Board	PLCDKMB(U)	Loose Packed In Box
4	110VAC Input Module	BM-0470048-2AC	Installed on PLCDKMB
4	12-24VDC Input Module	BM-0470048-2DC	Installed on PLCDKMB
4	12-24VDC Output Module	BM-0470048-3	Installed on PLCDKMB
4	110VAC Output Module	BM-0470048-4	Installed on PLCDKMB
2	Relay Output Module	BM-0470048-5	Loose Packed In Box
1	Development Package CD	PLCDKCD-01	Loose Packed in Box
1	EZ Ladder CD	EZLDCD-01	Loose Packed in Box
1	Power Pack	PLCDKPS	Loose Packed in Box
1	PLC on a Chip DevKit Datasheet	2005002.X	Loose Packed in Box
Optional (1 of the following):			
1	2x20 LCD Display with Keypad	PLCDK-OI-2x20	Loose Packed in Separate Box
1	2x40 LCD Display with Keypad	PLCDK-OI-2x40	Loose Packed in Separate Box
1	4x20 LCD Display with Keypad	PLCDK-OI-4x20	Loose Packed in Separate Box

Enabling the Battery

The PLC on a Chip Development Package includes a battery to support the real time clock. Prior to use the battery must be enabled. Pull the "Battery Saver" tag from the battery socket to enable the battery operation.

Other Support Information

Other documents are available on the Development Package CD for additional PLC on a Chip support.

-For Circuit Design, refer to the Divelbiss *PLC on a Chip Circuit Design Guidelines* document.

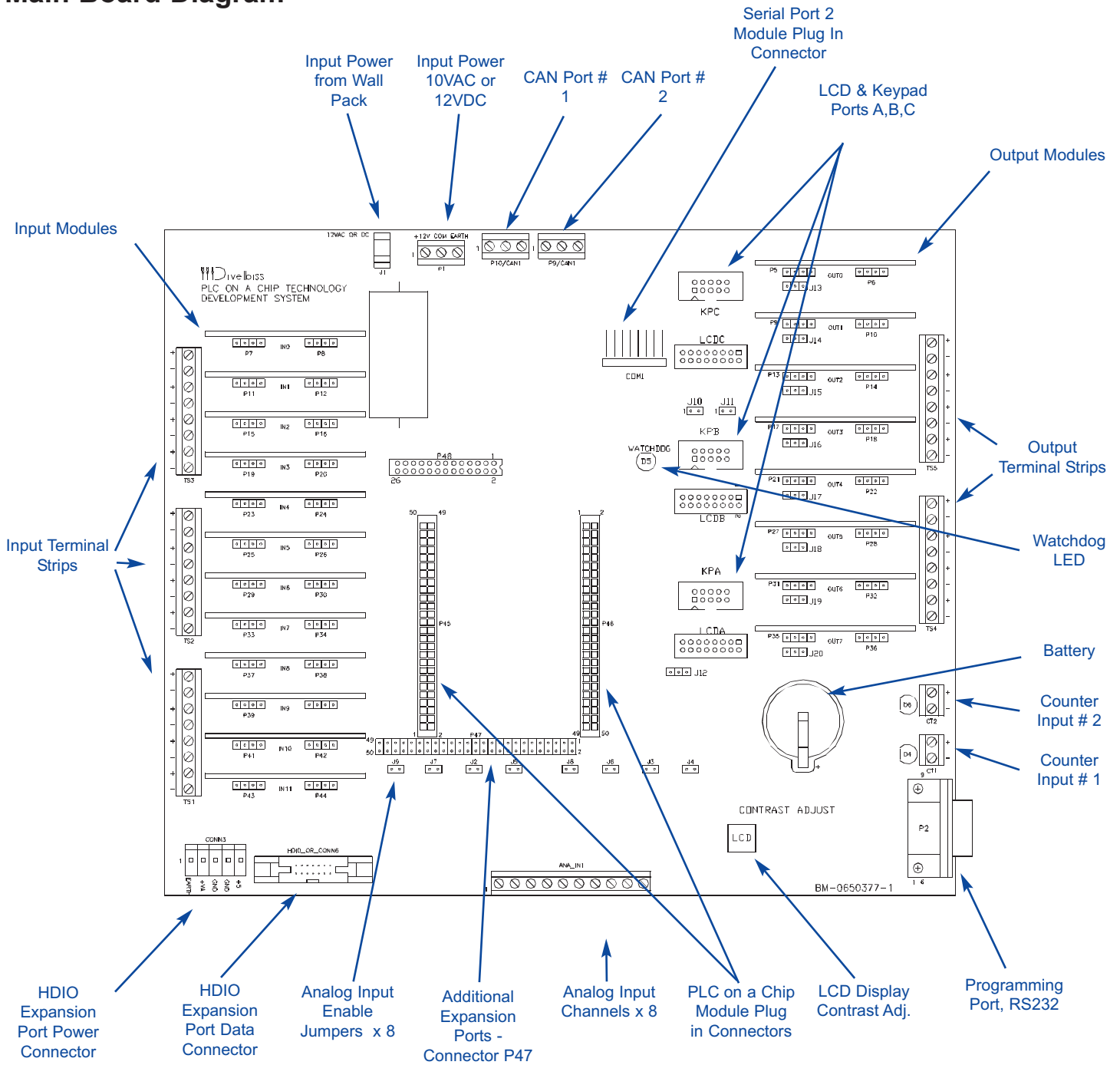
-For PLC on a Chip and PLC on a Chip Module EZ LADDER Configuration, refer to the Divelbiss *PLC on a Chip EZ LADDER Configuration* document

-For information of EZ LADDER installation and use, refer to the Divelbiss *EZ LADDER User's Manual*.

-For technical information regarding the PLC on a Chip, refer to the Divelbiss *PLC on a Chip Technical Data Sheet*.

-For technical information regarding the PLC on a Chip Module, refer to the Divelbiss *PLC on a Chip Module Technical Data Sheet*.

Main Board Diagram



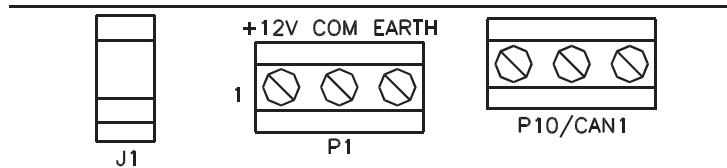
Main Board Features

Input Power

The PLC on a Chip Development Package main board is powered by using the provided plug in wall power pack (PLCDKPS). The wall power pack (PLCDKPS) connects to J1 on the main board (PLCDKMB(U)). Additionally, P1 is provided to apply power from a different source. 10 VAC or +12 VDC may be connected to P1. J1 is not to be used when P1 is used.

P1 Power Connector Pin-out

- Pin 1 : + 12 VDC or 10 VAC
- Pin 2 : Common
- Pin 3 : Earth Ground



Serial Ports

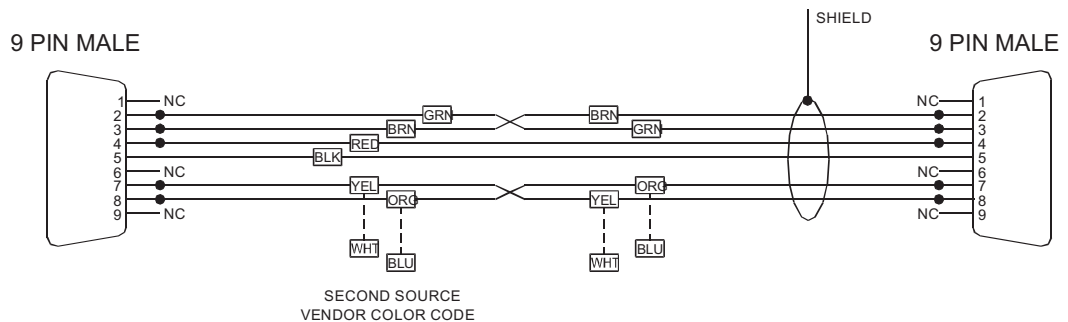
Programming Port - COM 0

P2 (COM 0) is the programming port for the PLC on a Chip Development main board (PLCDKMB(U)). This port should only be used for connecting to the EZ LADDER development platform software. A null modem cable and a PC serial port capable of 57.6K serial communication is required.

P2 Serial Port Connector Pin-out

- Pin 1 : NC
- Pin 2 : RX
- Pin 3 : TX
- Pin 4 : NC
- Pin 5 : GND
- Pin 6 : NC
- Pin 7 : RTS
- Pin 8 : CTS
- Pin 9 : NC

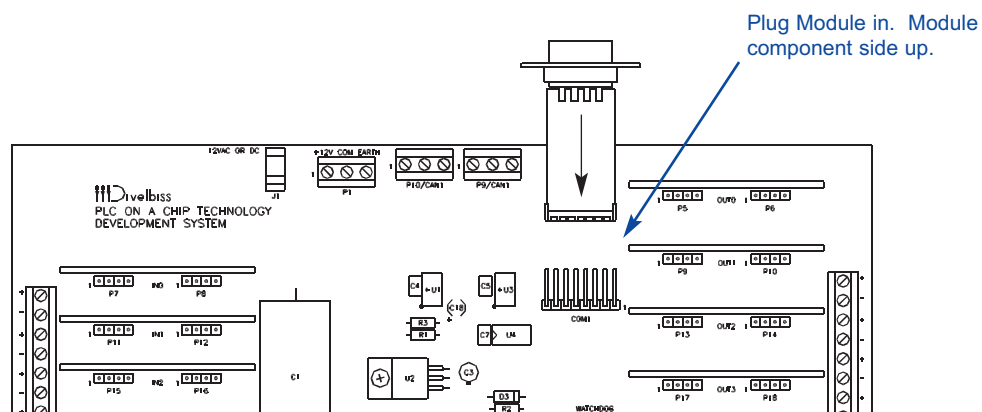
NULL MODEM CABLE



2nd Serial Port - COM 1

COM 1 is an expansion connector that accepts plug-in serial port modules. These modules may be purchased as RS232, RS422 or RS485. The plug-in modules plug into COM 1 as shown.

COM 1 Plug-in Modules



COM 1 is capable of baud rates to 115.2K. This port supports Modbus Slave (256K or higher Memory Models only).

RS232 Plug In Module Pin-out

- Pin 1 : NC
- Pin 2 : RX
- Pin 3 : TX
- Pin 4 : NC
- Pin 5 : GND
- Pin 6 : NC
- Pin 7 : RTS
- Pin 8 : CTS
- Pin 9 : NC

RS422 Plug In Module Pin-out

- Pin 1 : TX-
- Pin 2 : NC
- Pin 3 : NC
- Pin 4 : RX-
- Pin 5 : GND
- Pin 6 : RX+
- Pin 7 : NC
- Pin 8 : NC
- Pin 9 : TX+

RS485 Plug In Module Pin-out

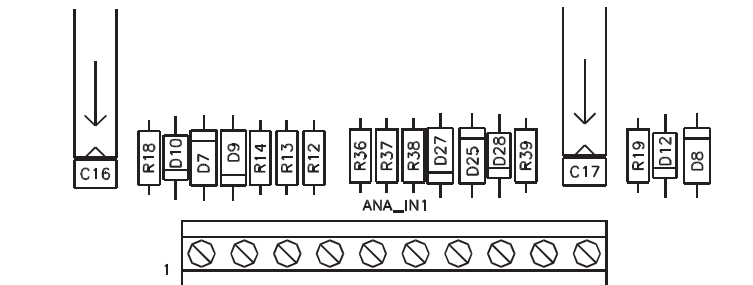
- Pin 1 : TX-
- Pin 2 : NC
- Pin 3 : NC
- Pin 4 : NC
- Pin 5 : GND
- Pin 6 : NC
- Pin 7 : NC
- Pin 8 : NC
- Pin 9 : TX+

Analog Inputs

The PLC on a Chip main board (PLCDKMB(U)) includes eight single ended analog input channels (10 bit) using connector ANA_IN1. These eight channels can accept signals of 0-5 VDC or 0-20m ADC.

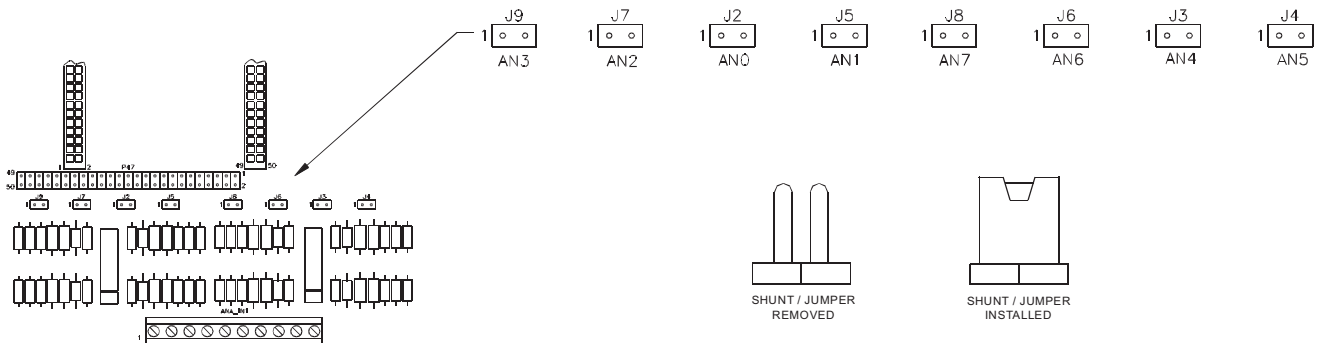
The analog input connector ANA_IN1 has the following pin-out.

- Pin 1 : GND
- Pin 2 : A/D Channel 0
- Pin 3 : A/D Channel 1
- Pin 4 : A/D Channel 2
- Pin 5 : A/D Channel 3
- Pin 6 : A/D Channel 4
- Pin 7 : A/D Channel 5
- Pin 8 : A/D Channel 6
- Pin 9 : A/D Channel 7
- Pin 10 : GND

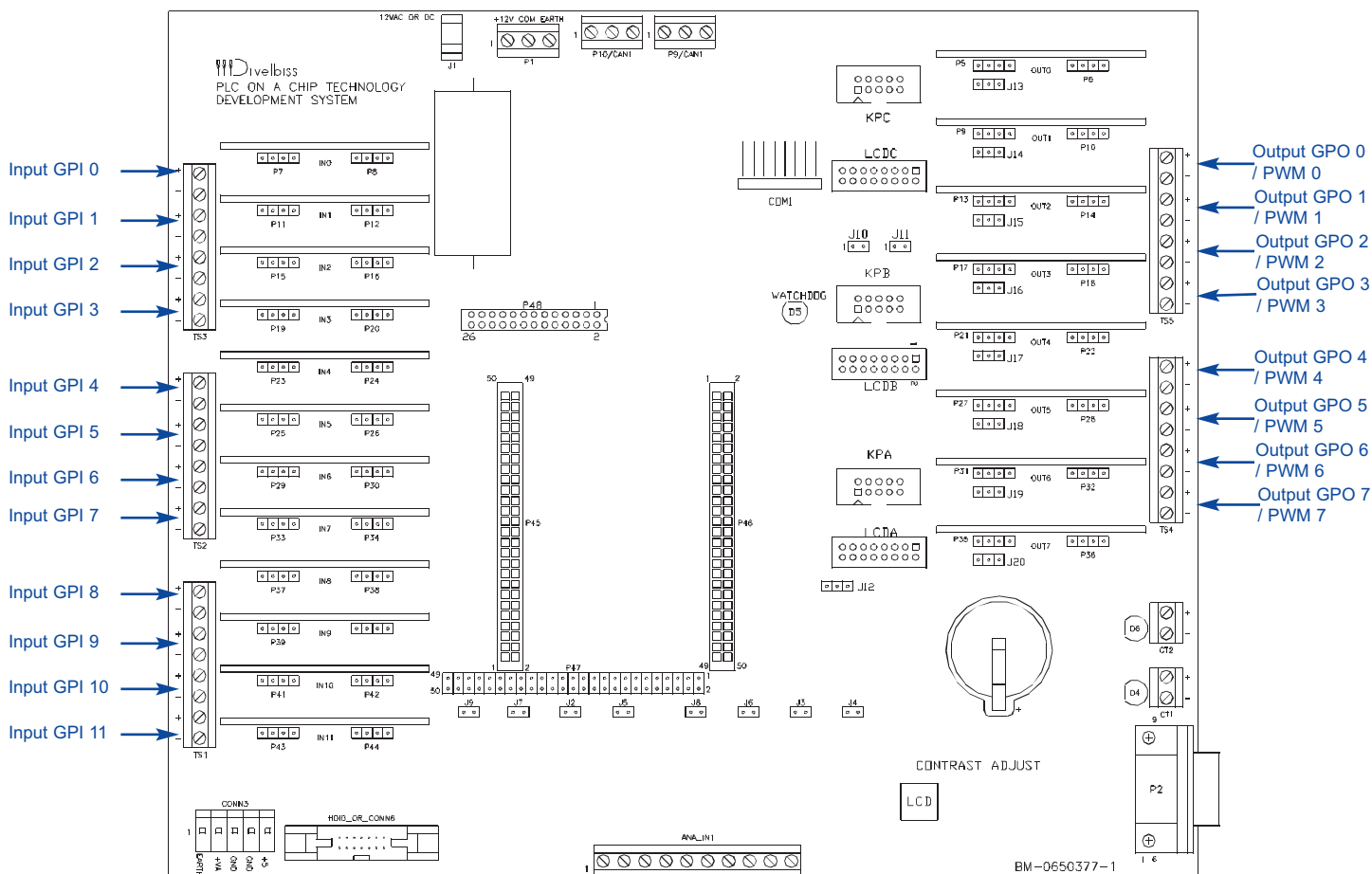


Each channel has an enable jumper (J2-J9). This jumper connects the channel's input circuitry to the PLC on a Chip analog input. Each channel is independent of all other analog input channels.

When the 'shunt' or 'jumper' is installed, the analog input circuit is connected to the PLC on a Chip's analog on-board input. When the 'shunt' or 'jumper' is removed, the PLC on a Chip's analog on-board input is disconnected from the circuitry and connector P47 may be used as an analog input source. A Channel should be disabled when using connector P47 to apply different signal conditioning for the analog input.



The I/O assignments are as shown:

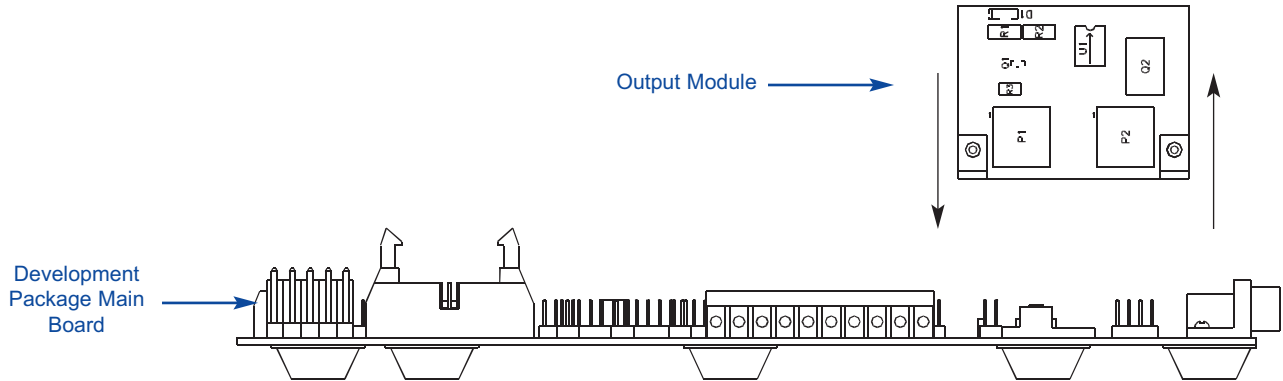


Installing & Removing I/O Modules

Each I/O point on the main board (PLCDKMB) is based on plug-in I/O modules. Any input module will operate in any of the main board input module positions. Any output module will operate in any of the main board output module positions.

To remove a module, make sure the power to the I/O and main board is off. Gently pull the module upward off of the board. It is held in place by two connections. There is an optional screw mount for each of the I/O modules which will need to be removed if installed prior to removing the module.

To install a module, make sure the power to the I/O and main board is off. Carefully align the module over its position. Gently plug in the module to the main board being careful that both connections align and plug-in properly. There is an optional screw mount for each of the I/O modules. These holes will align when the module is installed properly.

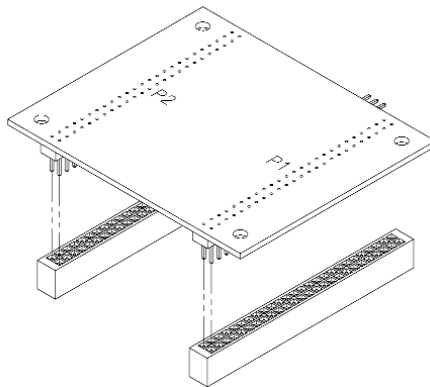


Installing & Removing PLC on a Chip Module

The PLC on a Chip Module is installed at the factory. Should the need arise, it may be removed and re-installed on the main board.

To remove the module, make sure the power to the I/O and main board is off. Grip the PLC on a Chip Module on opposite sides and gently rock the module back and forth while gently trying to pull the module. The module will loosen and become free from the main board after several rocking motions.

To insert the module, align the module over the connectors and gently press into place. Ensure the module is completely inserted.

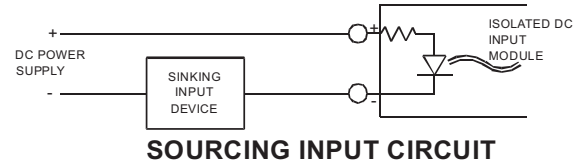
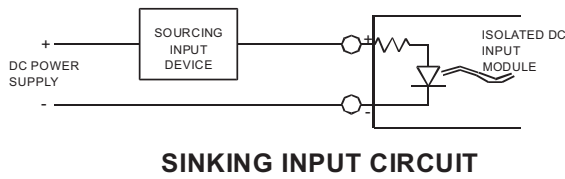


Connecting I/O

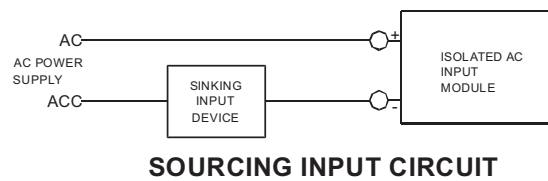
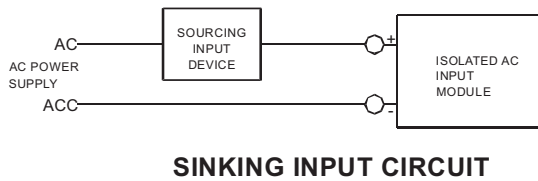
Each I/O point on the main board (PLCDKMB(U)) is based on plug-in I/O modules. Any input module will operate in any of the main board input module positions. Any output module will operate in any of the main board output module positions.

INPUT CONNECTIONS

12-24VDC Input Module Connections

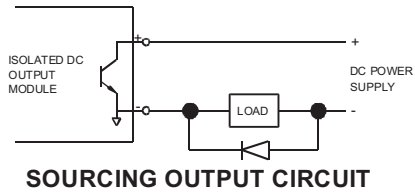
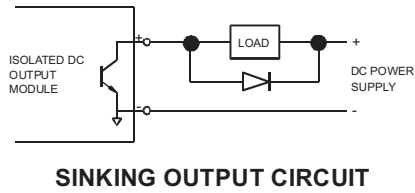


110VAC Input Module Connections

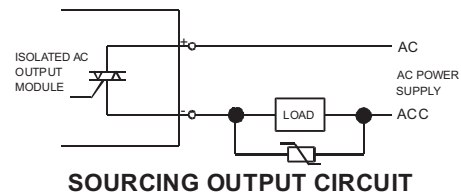
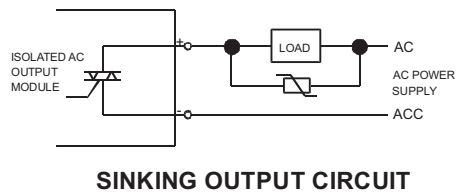


OUTPUT CONNECTIONS

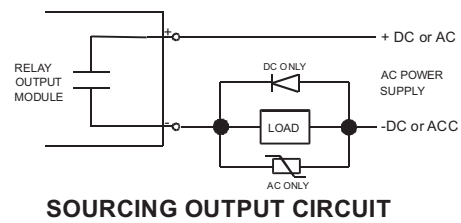
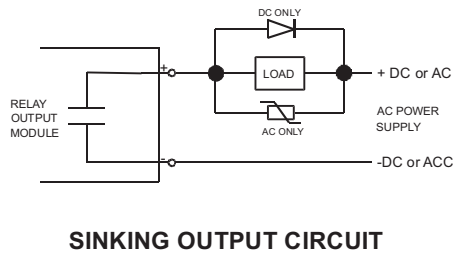
12-24VDC Output Module Connections



110VAC Output Module Connections

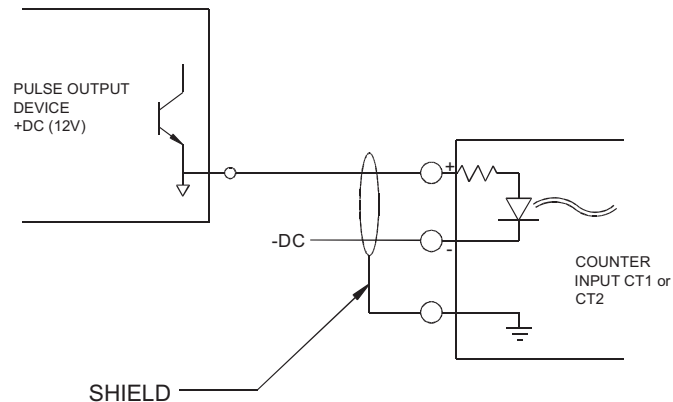


RELAY Output Module Connections



Counter Inputs

The main board provides two on-board counter inputs. These up counter inputs are capable of rates to 500 KHz. Connect the CT1 and CT2 inputs as shown. The counter is optically isolated to provide immunity from noise and interference.



High Density I/O Interface

For addition I/O requirements. Connector 3 and Connector 6 are provided to interface directly to Divelbiss High Density I/O expansion boards (ICM-HDIO-XX). HDIO expansion boards are available in a variety of types and voltage levels. Simply address the HDIO board and connect it to the development main board using CONN 3 and CONN 6.

The I/O addressing for the ICM-HDIO-XX are as follows:

Digital Inputs: DI0.0 - DI7.15

Digital Outputs: DO0.0 - DO7.15

Real Time Clock

The PLC on a Chip Module includes a Real Time Clock. The real time clock (after set) provides Month, Day, Day of the Week, Year, Hour, Minute and Second. The real time clock maintains time when power is lost via lithium battery.

The life of the battery for the real time clock generally has years of life before replacement is needed. Should the battery need to be replaced, replace the battery with the same type and size as the original. The battery is a Lithium Coin Cell, Type BR2325.

LCD Display & Keypad

The PLC on a Chip has the ability to display data to an LCD display and monitor a keypad. The PLCDK-03 comes with 1 of 3 possible display / keypad options. The displays are available as 2x20, 2x40 and 4x20 LCD displays. The keypad is always 20 programmable buttons.

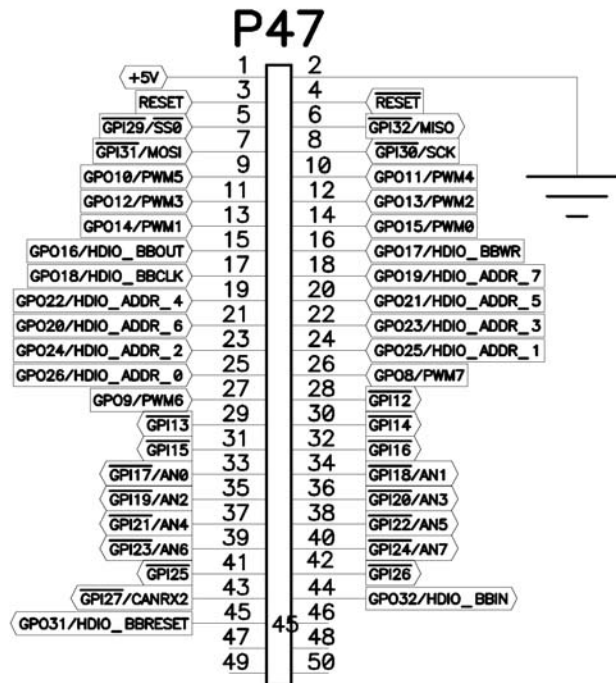
When connecting the display & keypad, they are connected to 'ports' on the main board. There are 3 ports located on the main board, Ports A, B and C. Each port has a KP (keypad) and LCD(display) connector (KPA, KPB, KPC, LCDA, LCDB & LCDC). The display must be connected to a different port than the keypad. Only one display and one keypad may be connected and cannot share the same port.

To connect the keypad, connect the keypad cable to one of the keypad ports (KPA, KPB, KPC). To connect the display, connect the display cable to one of the display ports (LCDA, LCDB, LCDC).

NOTE: When using LCDB port (LCD display on port B) or KPB port (Keypad on port B), you must remove jumpers J10 and J11. on the main board. The display and keypad must be installed in the EZ LADDER target configuration before they can be used. See the EZ LADDER Manual.

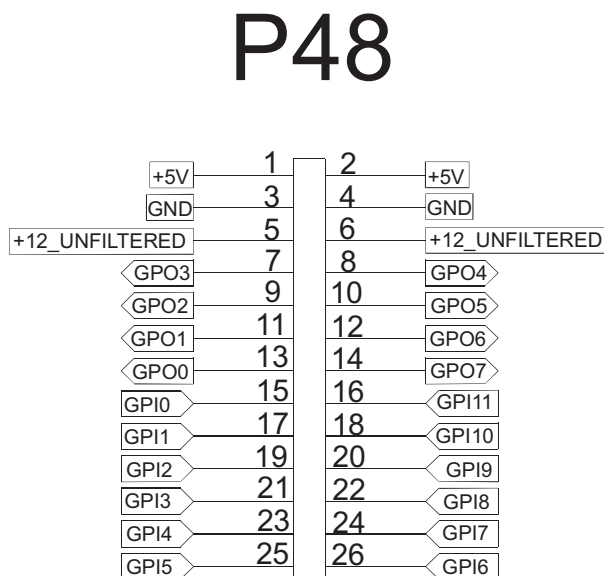
Additional Expansion Ports - P47

The main board includes an additional expansion connector - P47. This connector allows access to additional PLC on a Chip pins as well as some of the circuitry on the main board.



Additional Expansion Ports - P48

The main board includes an additional auxiliary I/O connector - P48. This connector allows access to additional access to the digital I/O pins from the PLC on a Chip (GPI / GPO)..



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