PLCDK-P13-01

PLC on a Chip Development Kit with PLCMOD-P13-512210 Module

Rev. 2 - 6/19/2020

DATA SHEET

Divelbiss CORPORATION

Datasheet Contents

WARNING!!

The PLC on a Chip Technology must not be used alone in applications which could be hazardous to personnel in the event of failure of this device. Precautions must be taken by the user to provide mechanical and/or electrical safeguards external to PLC on a Chip devices. This device is **NOT APPROVED** for domestic or human medical use. All PLC on a Chip Specifications and Requirements subject to change without notice.

All information in the document is subject to change without notice.

1. Getting Started

1.1 What is Included

The P-Series PLC on a Chip™ Development Kit is a design tool used for product development, implementation and testing of P-Series PLC on a Chip Technology (Integrated Circuit and Module).

Each development kit includes:

Qty	Description	Model / Part Number
1	Main development board	BM-1070401-02
1	PLC on a Chip Module	PLCMOD-P13-512220
1	P-Series PLC on a Devkit Flash Drive (Design Documents and EZ LADDER Toolkit)	PLCDKCD-P13-01
1	Wall Mount Power Supply	PLCDKPS
1	Null Modem Cable	126-102860
1	USB-Serial Adapter	138-106865

Additional products may be ordered to supplement these basic items.

The PLC on a Chip Module must be installed on the main Development Board and EZ LADDER Toolkit will require installation on a computer. A Null-modem cable (supplied) will be required for the EZ LADDER Tookit to Development kit connection.

1.2 Required Steps

1. The PLC on a Chip Module must be installed on the main Development Board using the P1-P3 connectors.

2. EZ LADDER Toolkit will require installation on a computer. The Null-modem cable is required for the EZ LADDER Tookit to Development kit connection.

3. Before a program can be downloaded to the PLC on a Chip Module, the PLC on a Chip Module must have its kernel installed. When connecting to the Module for the first time (using EZ LADDER Toolkit, having a program loaded, being in the RUN mode and hitting the connect button); the bootloader screen will automatically open, providing the options to load the kernel.

   Refer to the PLC on a Chip Module Datasheet and EZ LADDER Toolkit Manual for details regarding selecting and installing kernels.

2. Main Development Board Features

The main development board provides a simple plug-in platform for the PLC on a Chip Module that allows access to many of the Module's (PLC on a Chip) features. The development board provides the P1, P2 and P3 interface connectors for module installation.
The following items are standard features on the Main Development board. See Figure 2-1.

P1	Interface Connector for PLC on a Chip P-Series Module (connects to Module P1)
P2	Interface Connector for PLC on a Chip P-Series Module (connects to Module P2)
P3	Interface Connector for PLC on a Chip P-Series Module (connects to Module P3)
P4	Solder Pads only. Breakout for easy access to P1 Connections.
P5	Solder Pads only. Breakout for easy access to P2 Connections.
P6	Solder Pads only. Breakout for easy access to P3 Connections.
COM1	Programming Port, RS232. Requires Null-modem connection to EZ LADDER Toolkit.
COM2	Header for COM 2 serial port module. Requires purchase and installation of serial port module.
COM3	Header for COM 3 serial port module. Requires purchase and installation of serial port module.
COM4	Header for COM 4 serial port module. Requires purchase and installation of serial port module.
PWR	Input Power terminal block. Accepts +12VDC power, ground and chassis (earth).
J1	Barrel Power Connector (in parallel with PWR connector). Works with wall mount power supplies.
J2	KERNEL PLC on a Chp Watchdog / Status LED. Indicates status of PLC on a Chip Module.

POWER IN

SERIAL PORT
MODULE PORTS

CUSTOM
CIRCUIT SECTION

PROGRAM
PORT

MODULE
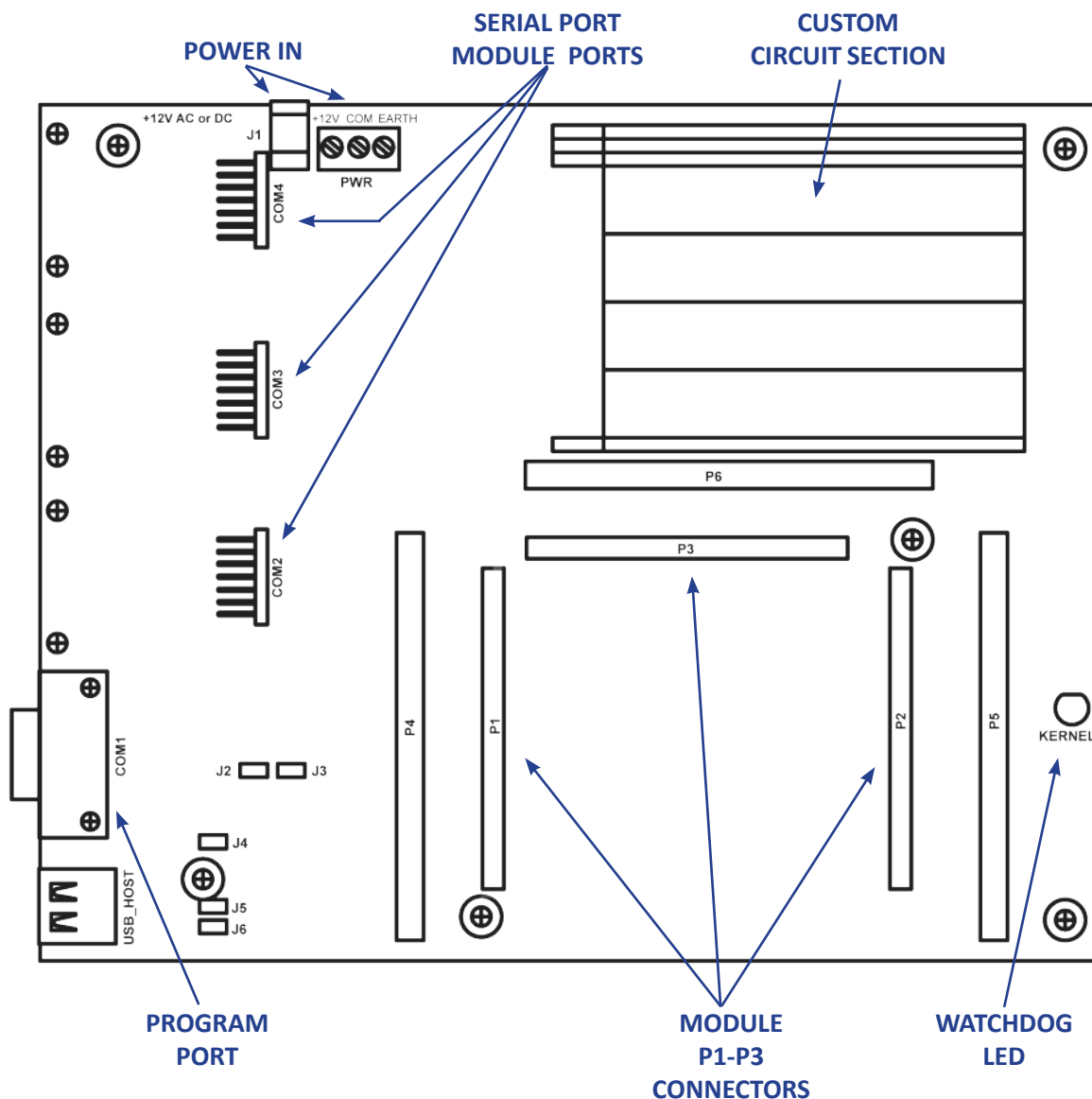P1-P3
CONNECTORS

WATCHDOG
LED

FIGURE 2-1 - Main Development Board Features

2.1 Input Power

The development kit main board will operate on either 12VDC or 12VAC. A wall-mount plug type power supply is included in the development kit. Power is applied using the provided power supply using the J1 connector or is connected using a different supply at the PWR connector.

When using an alternative power supply, the +12V and COM connections are required. The Earth connection is optional but recommended.

2.2 Program Port - COM 1

With the PLC on a Chip Module installed and power applied, the PLC on a Chip Module's program-ming port is accessed via the COM 1 connector. A null-modem cable (swaps RX/TX and RTS/CTS) is required for the communications link from the host computer with EZ LADDER Toolkit to the PLC on a Chip Module (through COM1 of the development board. Refer to Figure 2-1 and Figure 2-2.
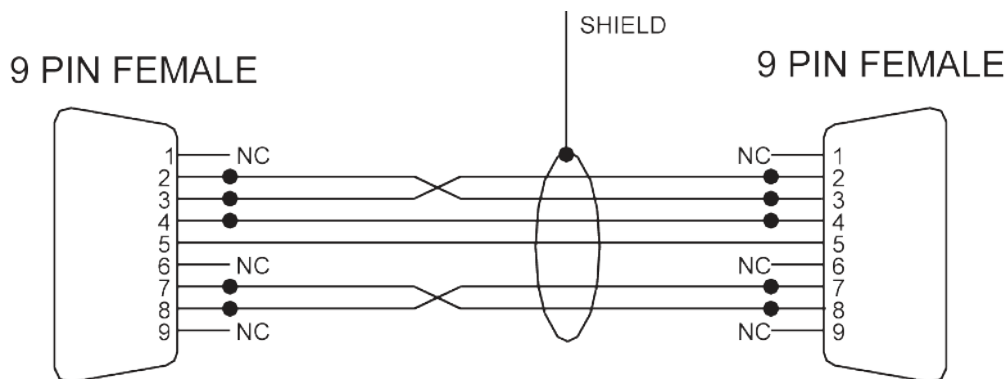

FIGURE 2-2 - Null Modem Cable

2.3 Module Connections P1-P3

The PLC on a Chip Module connects to the main development board using the P1, P2 and P3 connectors. These connectors provide access to the features and functions of the PLC on a Chip Module.

The recommended mating connector for the PLC on a Chip Module P1, P2 and P3 connectors is a SAMTEC SQW-130-01-F-D. One connector is required per 'P' connector.

The P1, P2 and P3 connector pin-outs are silk-screened on the main development board (showing the locations of all even pins).

For actual PLC on a Chip Module pin-out showing pin assignments and features, refer to the PLC on a Chip Module Datasheet.

2.4 Module Breakout Connections P4-P6

Additional solder pads shaped as dual row connectors and identified as P4, P5 and P6 are provided for additional access to the PLC on a Chip Module's 'P' connectors. These connectors are larger, solderable pads that duplicate the exact pin-out and feature of each 'P' connector.

These pads are used to connect circuitry in the main development board's circuitry section to the PLC on a Chip Module's functionality. Wires may be soldered to these pads and to any of the sol-derable pads where the circuits are 'breadboarded'.

- P4 is a larger duplicate of P1 and has the exact same pin-out and assigned pin features.
- P5 is a larger duplicate of P2 and has the exact same pin-out and assigned pin features.
- P6 is a larger duplicate of P3 and has the exact same pin-out and assigned pin features.

2.5 Watchdog / Status LED Indictator

The KERNEL LED indicator on the main development board provides a visual status of the PLC on a Chip Module operation.

- If the LED is flickering very quickly, no kernel has been installed.

- If the LED is flashing slowly, the kernel has been installed, but no ladder diagram is running. The ladder diagram is either not running (stopped) or has not been downloaded.

- If the LED is flashing quickly, the ladder diagram is operating.

2.6 COM Port Serial Modules

Three additional COM port connectors are provided on the main development board. These connectors provide a quick way to add serial communications for development purposes. Each of the COM2, COM3 and COM4 connectors will interface to a serial port module (sold seperately).

The modules are:

PLCDK-RS232   RS232 Serial Port Module with 9 Pin D-sub connector.
PLCDK-RS422   RS422 Serial Port Module with 9 Pin D-sub connector.
PLCDK-RS485   RS485 Serial Port Module with 9 Pin D-sub connector.

These modules simple plug into the connecto and they provide all the interface circuitry needed for the serial port type installed.

The COM 2 Port uses UART 1 and pins: GPIO64/TXD1, GPIO65/RXD1 and GPIO71/RTS1. GPIO71/RTS1 is used for modules that require controlling the transmit / receive direction such as RS485. Only the COM2 port will operate a serial port module that requires direction control without additional wiring.

The COM 3 Port uses UART 2 and pins: GPIO72/TXD2 and GPIO73/RXD2. The COM3 port will not provide functionality for any serial port module that requires direction control lines unless the line is wired to a General Purpose I/O (GPIO) line and assigned in EZ LADDER Toolkit.

The COM 4 Port uses UART 3 and pins: GPIO156/TXD3 and GPIO157/RXD3 The COM4 port will not provide functionality for any serial port module that requires direction control lines unless the line is wired to a General Purpose I/O (GPIO) line and assigned in EZ LADDER Toolkit.

COM Port Module Pin-Outs

RS232			RS422			RS485		
Pin	ID	Description	Pin	ID	Description	Pin	ID	Description
1	--	No Connect	1	TX-	Transmit Data (-)	1	TX-	Transmit Data (-)
2	RX	Receive Data	2	--	No Connect	2	--	No Connect
3	TX	Transmit Data	3	--	No Connect	3	--	No Connect
4	--	No Connect	4	RX-	Receive Data (-)	4	--	No Connect
5	GND	Signal Ground	5	GND	Signal Ground	5	GND	Signal Ground
6	--	No Connect	6	RX+	Receive Data (+)	6	--	No Connect
7	--	No Connect	7	--	No Connect	7	--	No Connect
8	--	No Connect	8	--	No Connect	8	--	No Connect
9	--	No Connect	9	TX+	Transmit Data (+)	9	TX+	Transmit Data (+)

2.7 On-Board Power Supplies

There are three individual power supplies located on the main development board. These power supplies provide power for the PLC on a Chip Module, circuits on the main development board and for custom circuits wired in the Custom Circuit Section.

The main development board provides +12VDC, +5VDC and +3.3VDC. The PLC on a Chip Module itself requires 3.3VDC to operate.

These power supplies may be accessed and wiring soldered to in the Custom Circuit Section.

2.8 Custom Circuit Section

The Custom Circuit Section is approximately a 2" x 3" area of the main development board. This section contains multiple rows and columns of solderable pads, arranged in a grid (just as a breadboard). This section is suited for creating interface circuits to the PLC on a Chip / PLC on a Chip Module.

The first three rows and last row are identified as power supply rows.

• The entire row 1 solder pads, labled +12V are all electricly connected.
• The entire row 2 solder pads, labled +5V are all electricly connected.
• The entire row 3 solder pads, labled +3.3V are all electricly connected.
• The entire last row solder pads, labled GND are all electricly connected.

All the remaining (not power supply) solder pads are individual pads and do not connect to any other location.

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