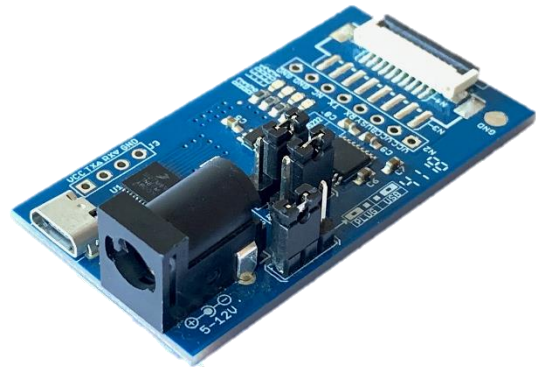


# PAB\_02V01

## USB Communication Adaptor



### Description

**Proculus Accessory Board Model 02** (PAB\_02) is a USB↔UART converter. It's used to connect a Proculus LCM into a computer, primarily for development and debugging purposes.

PAB\_02 is provided in different variants, each with the adequate connectors for your application.

Note: PAB\_02 must be used with **UnicView Terminal** software provided by Proculus Technologies.

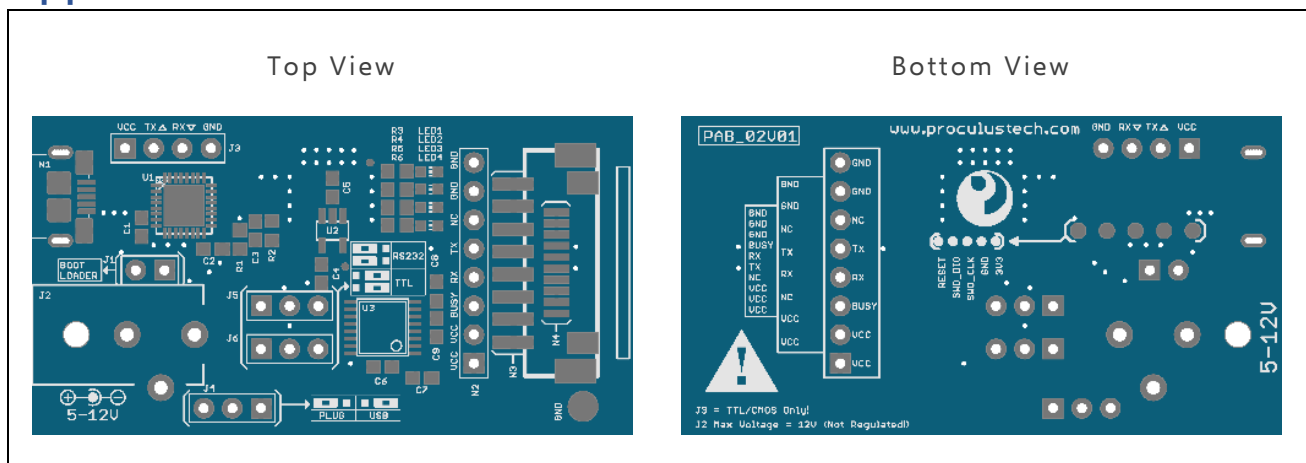
### Features

- Selectable LCM power supply.
- Compatible with RS232 and TTL/CMOS levels.
- Updateable firmware.
- Fully compatible with UnicView Terminal software.
- Orderable in several different connector options.
- Uses USB HID (not a virtual COM).

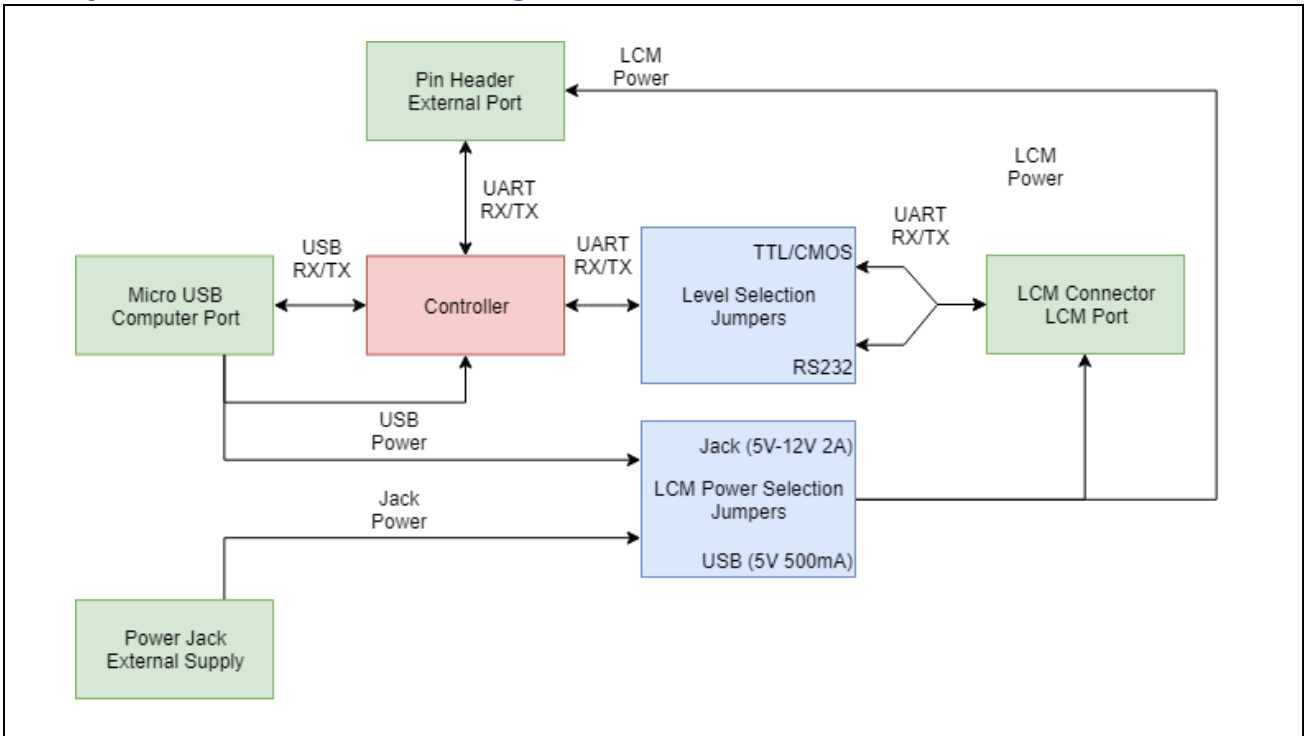
### Applications

- Prototyping and testing.
- Development.

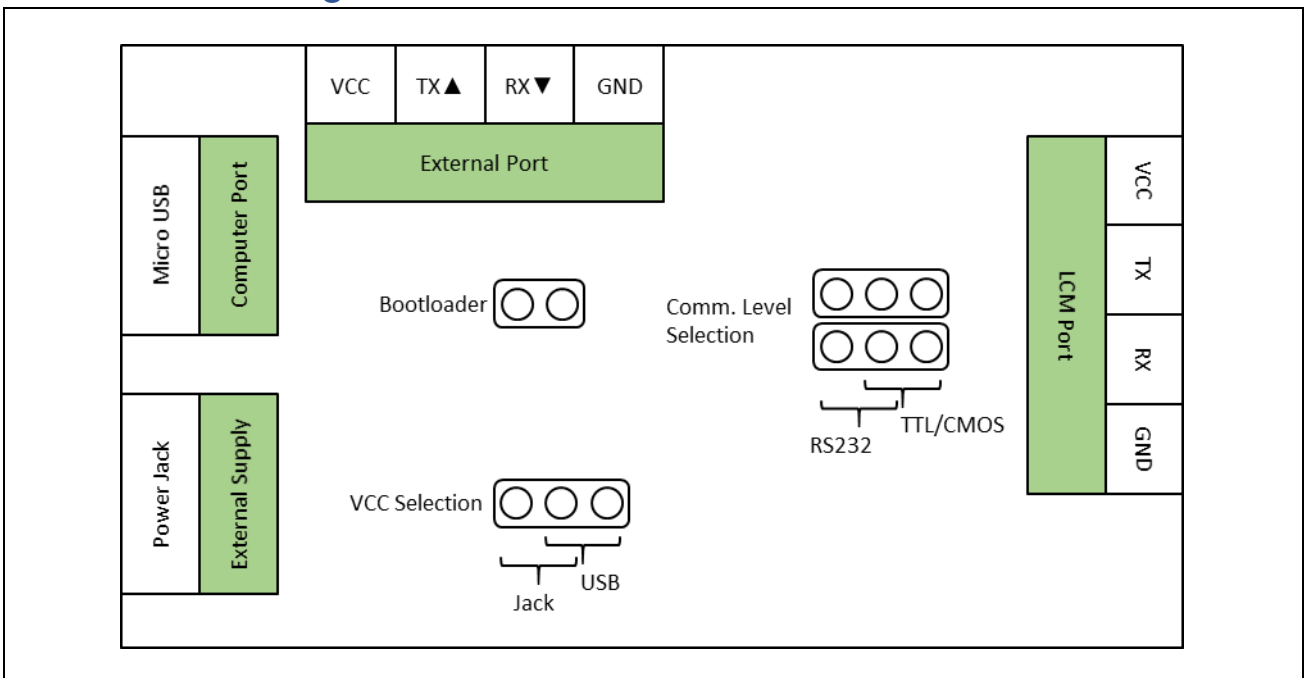
### Appearance



### Simplified Electrical Diagram



### Connection Diagram



## Pinout

### N2, N3 and N4 Connectors Signal Description

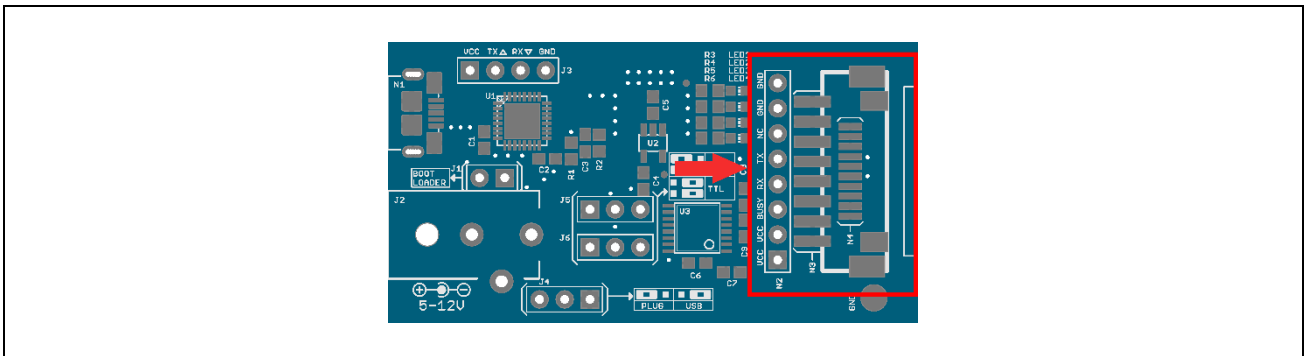
These connectors compose the **LCM Port**. Only one type of connector is usually soldered.

Signal	Details
<b>VCC<sup>(1)</sup></b>	LCM Supply Voltage
<b>GND</b>	Common Supply Ground
<b>TX<sup>(2)(3)</sup></b>	TX (from the board). Connects to the LCM's RX
<b>RX<sup>(2)(3)</sup></b>	RX (from the board). Connects to the LCM's TX
<b>NC</b>	Not Connected. Do not use this pin
<b>BUSY</b>	Not used on AD LCMs. Do not use this pin

**Note 1:** From USB (5V) or external power supply (5V - 12V). See section "Power Supply" for more information.

**Note 2:** Supports **RS232** or **TTL/CMOS** levels. See section "Jumper Description" for more information.

**Note 3:** See section "Serial Communication" for more information on UART connections.



### N4 - FFC (Flat Flexible Cable) Connector

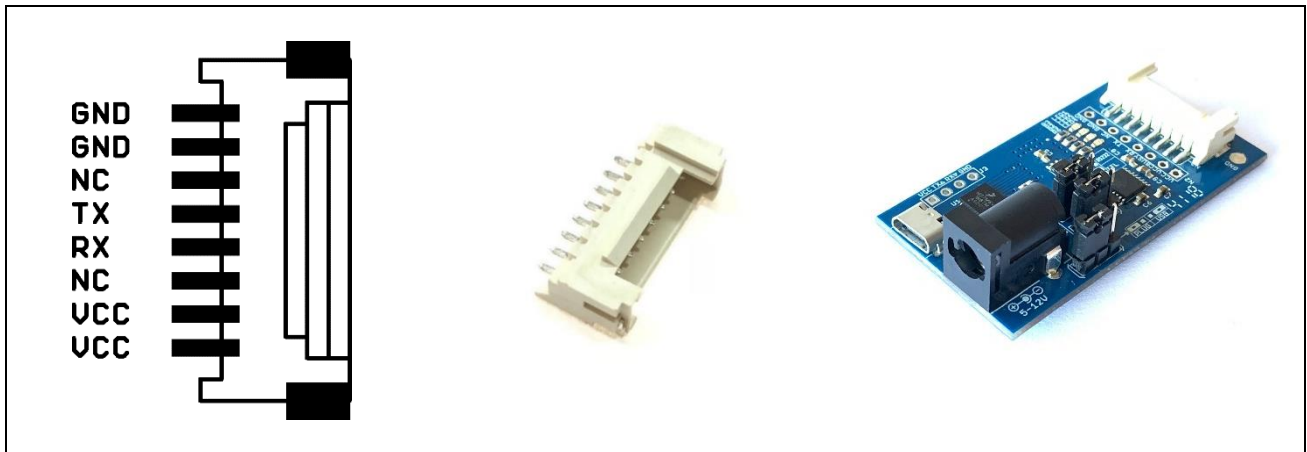


Caution

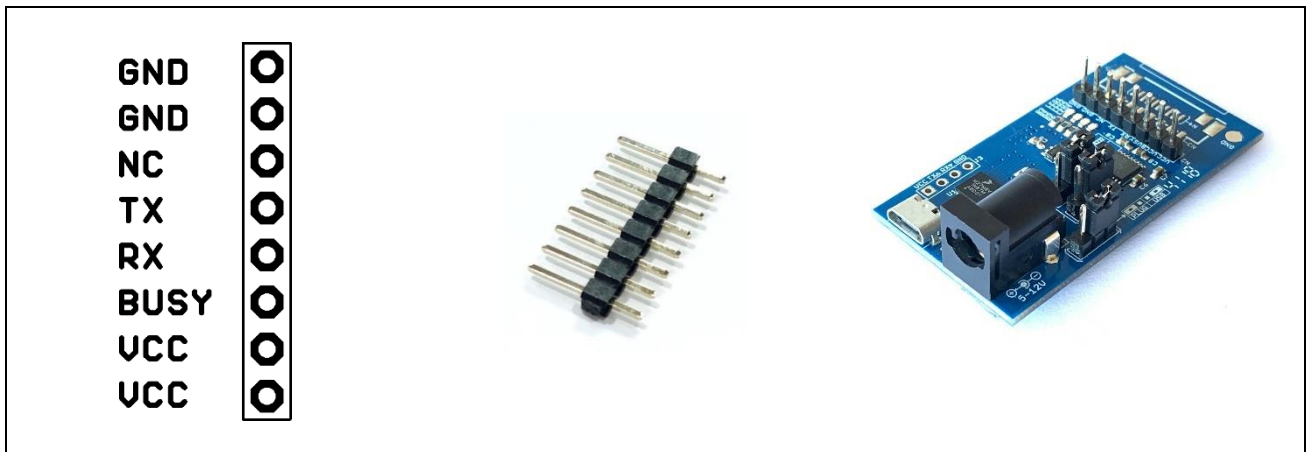
The FFC Cable contacts should be facing down (towards the board), with the blue tape facing up (away from the board).



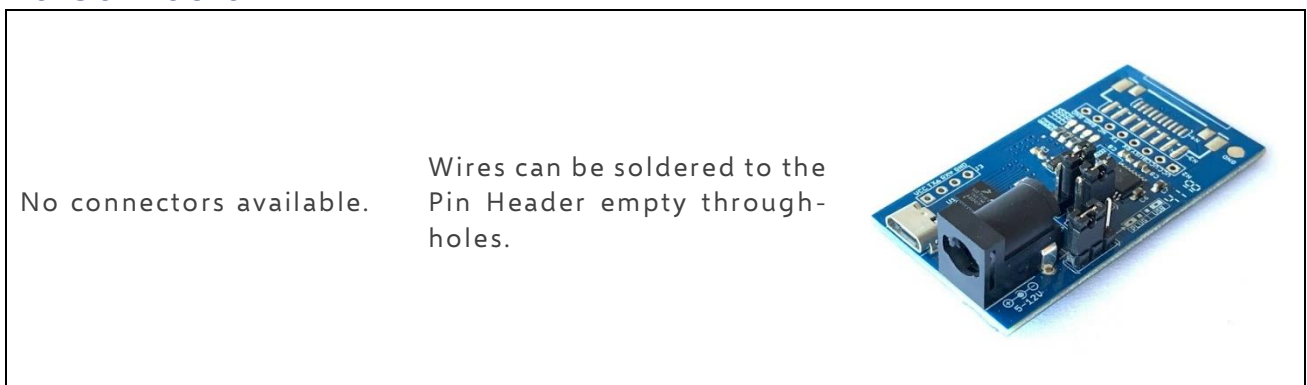
## N3 - Ribbon Connector



## N2 - Pin Header Connector



## No Connector



### J3 Header Signal Description

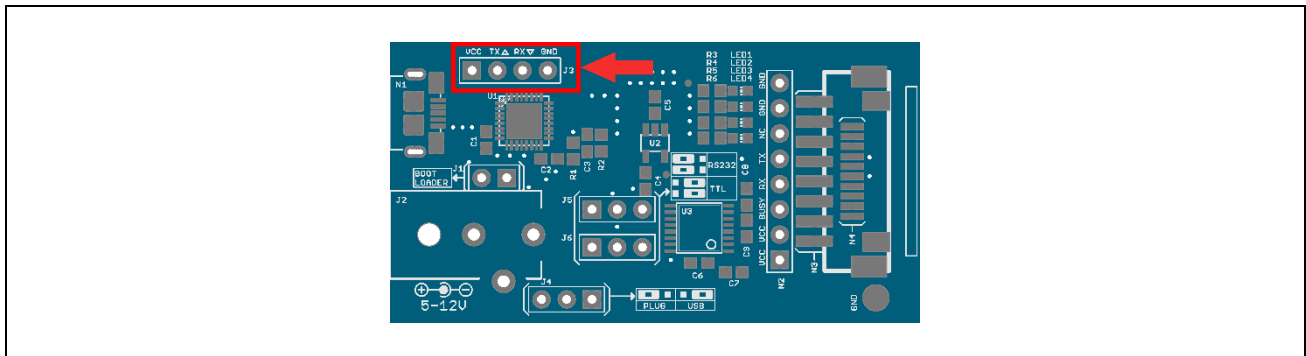
This connector is the **External Port**. You can solder wires or pin headers and connect an external circuit to the PAB\_02 board.

Signal	Details
<b>VCC</b> <sup>(4)</sup>	LCM Supply Voltage
<b>GND</b>	Common Supply Ground
<b>TX▲</b> <sup>(5)(6)</sup>	TX (from the board). Connects to external circuit RX
<b>RX▼</b> <sup>(5)(6)</sup>	RX (from the board). Connects to external circuit TX

**Note 4:** From USB (5V) or external power supply (5V - 12V). See section "Power Supply" for more information.

**Note 5:** Supports **TTL/CMOS** levels only.

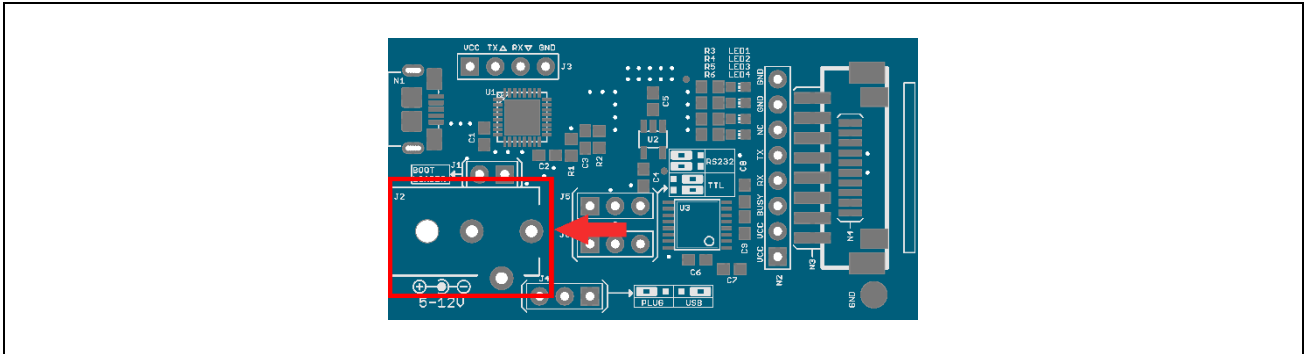
**Note 6:** See section "Serial Communication" for more information on UART connections.



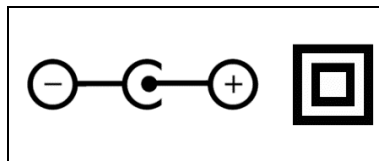
### Power Jack

External power supply plug for the LCM. Used to supply voltage to the LCM when **more than 5V or 200mA** is required to power the LCM.

Voltage range: 5V to 12V (please verify your LCM's supply voltage before connecting the power).



This connector is a center positive J4 Jack. Please only use insulated and center positive power supplies, identified by these symbols:

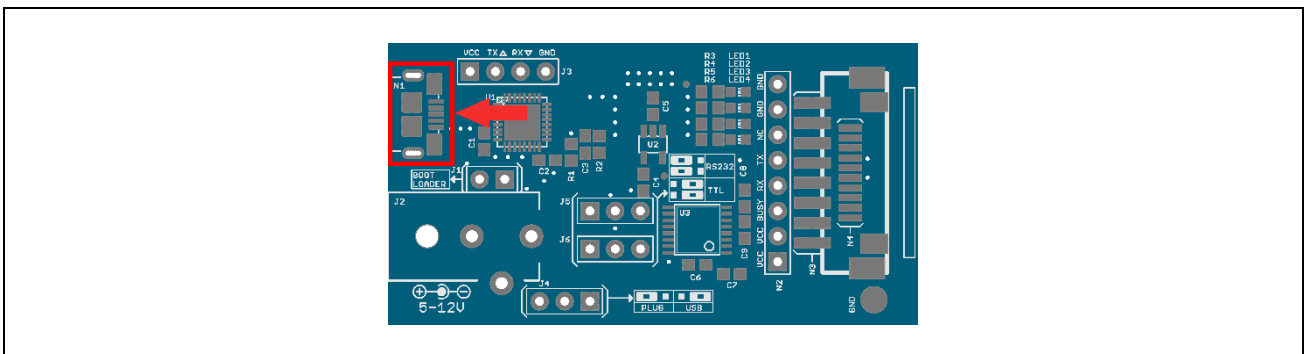


Warning

Verify the correct LCM power supply voltage before turning the power on.

### Micro USB

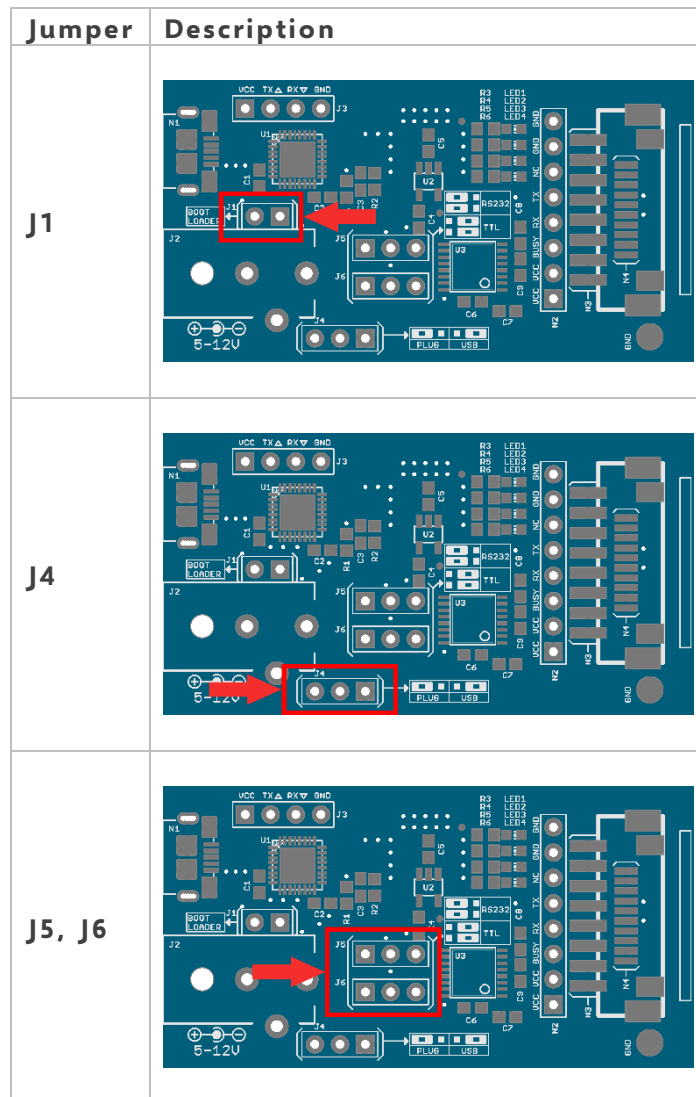
This is the **Computer Port**. It is a client USB port for connection to a computer. Can supply power to the LCM when **5V and less than 200mA** are required to power the LCM. Please use only certified USB cables.



Jumper Description

This table describes all the jumper selectors on the PAB\_02:

Jumper	Description	Usage
J1	Bootloader enable	Short-circuit its two pins before powering PAB_02 to enter Bootloader mode
J4	LCM Power Supply selection ( <b>VCC signal</b> ). See section "Power Supply" for more information.	<b>Left position:</b> LCM is powered from the external power supply (plug) <b>Right position:</b> LCM is powered from the Micro USB port
J5, J6	LCM Communication Electrical Level selection ( <b>TX and RX signals</b> )	<b>Left position:</b> LCM communication level is RS232 <b>Right position:</b> LCM communication level is TTL/CMOS



## Serial Communication

The PAB\_02 board has 3 connection points, called **Ports**. Each Port has different communication and power supply capabilities:

Port	Description	Details
<b>Computer Port</b>	<b>HID USB</b> communications with the computer	<b>UnicView Terminal</b> software needed for USB communication
<b>LCM Port</b>	<b>UART</b> communications with the LCM	<ul style="list-style-type: none"> <li>• TTL/CMOS or RS232 (selectable).</li> <li>• The communication level and power supply should match the LCM connected to this Port.</li> </ul>
<b>External Port</b>	<b>UART</b> communications with external circuitry	<ul style="list-style-type: none"> <li>• TTL/CMOS only.</li> <li>• Commonly used for debugging and sniffing purposes.</li> </ul>

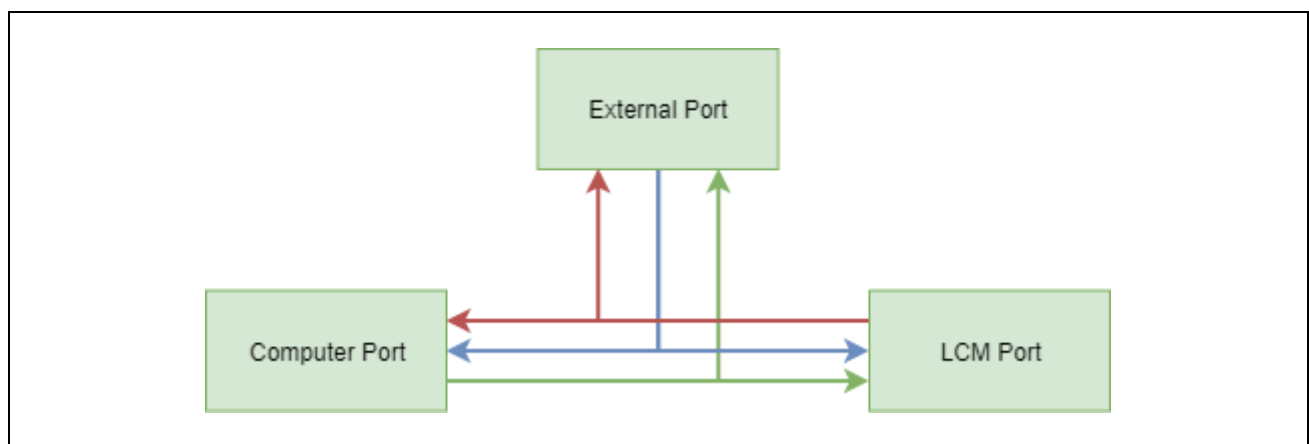
Info Maximum baudrate: **921600**bps.



For baudrates greater than 500kbps, **receiving** data in LCM Port and Computer Port uninterruptedly may cause data loss.

Both the LCM Port and the External Port operate at the same baudrate.

When a Port receives a new serial message, it always sends it to the other two Ports, as illustrated in the following diagram:



For example, if the computer sends a message to the board (through the **Computer Port**), the message is sent to the **External Port** and to the **LCM Port**.



## Power Supply

The PAB\_02 board is powered from the Micro USB port (5V). The LCM connected to PAB\_02 can be powered either from the Micro USB port or from the Power Jack (using an external power supply).



Caution

Never connect the **VCC signal** on the **Header J3** if the **jumper J4** is in the **USB** (right) position.

Jumper J4 Position	VCC Signal	Voltage Range	Max Current
<b>USB (right)</b>	Connected USB 5V voltage	5V	200mA
<b>PLUG (left)</b>	Connected to external power supply from Jack	5V to 12V	2000mA



Warning

Verify the correct LCM power supply voltage before turning the power on.

## LED Indicators

PAB\_02 has 4 LED status indicators:

LED	Function
<b>1</b>	<b>Blinking red</b> when PAB_02 is powered-on
<b>2</b>	<b>Toggles</b> when a message is received (RX) from external circuitry (J3)
<b>3</b>	<b>Toggles</b> when a message is received (RX) from the LCM (N2, N3 or N4)
<b>4</b>	<b>Toggles</b> when a message is sent from the PC (TX)

## Updating the firmware (Bootloader mode)

UnicView Terminal can update PAB\_02 in a fully automated mode. If, however, the PAB\_02 firmware is corrupt and UnicView Terminal can't update the board, you can force it to enter Bootloader mode to flash the firmware manually.

To enter Bootloader mode:

1. Power PAB\_02 **off**.
2. Short-circuit **J1** (using tweezers, for example).
3. Power PAB\_02 **on**.

PAB\_02 will remain in Bootloader mode until a new firmware is flashed or until it resets. The board will reset 5 seconds after a successful firmware update.

## Typical Applications

PAB\_02 is commonly used to:

- Connect an LCM to a computer for development and debugging.
- Provide power to an LCM without a controlling board.
- RS232 to TTL/CMOS converter between the External Port (TTL/CMOS) and the LCM Port (RS232).

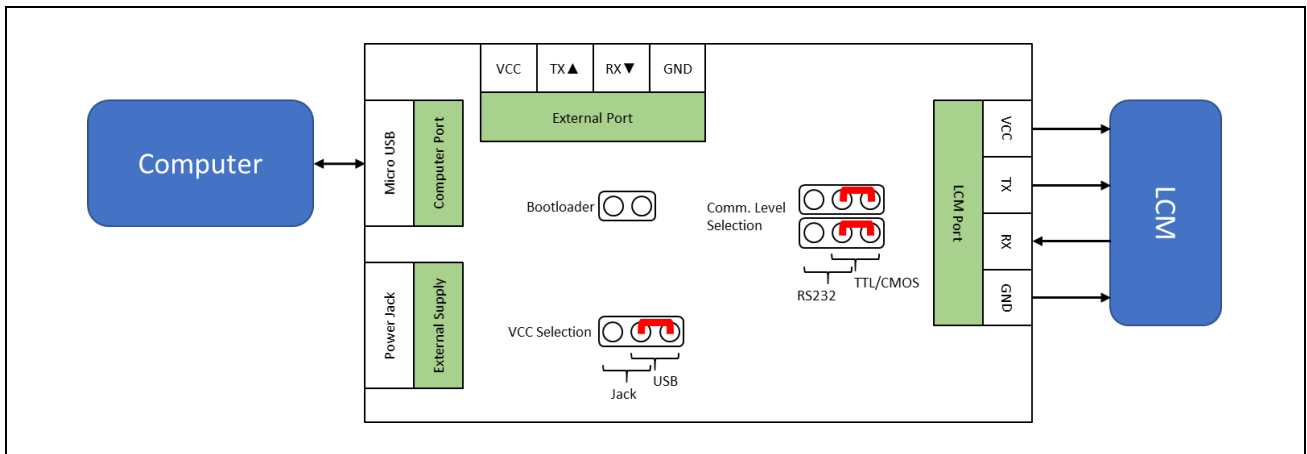
### Note

PAB\_02 is provided *as is* and doesn't necessarily comply to any certifications or standards. As such, we recommend PAB\_02 to be used **only for development purposes**.

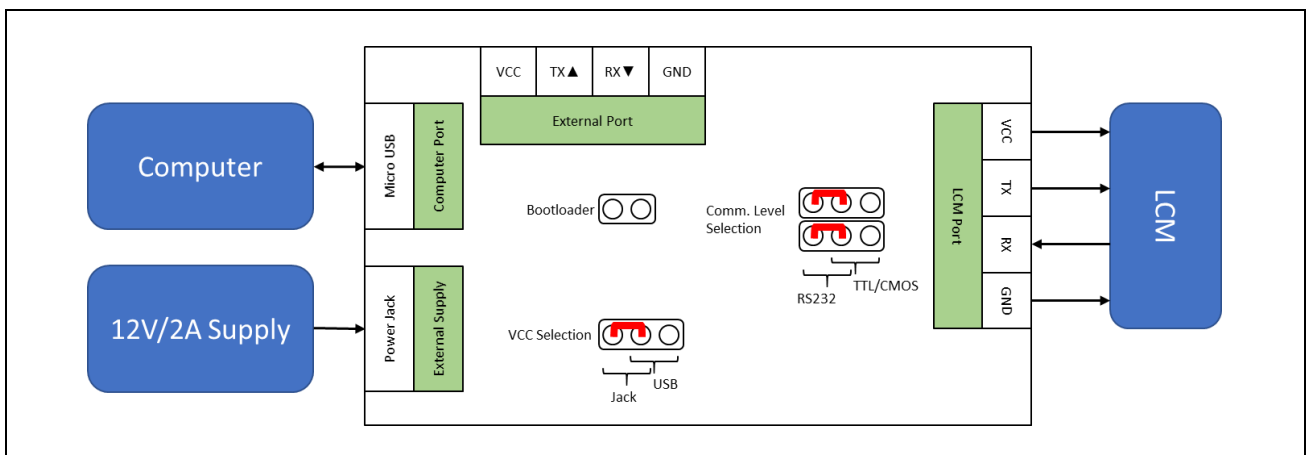
## Examples

Using as PC to LCM communication tool

LCM specifications: 5V, 200mA, TTL/CMOS.

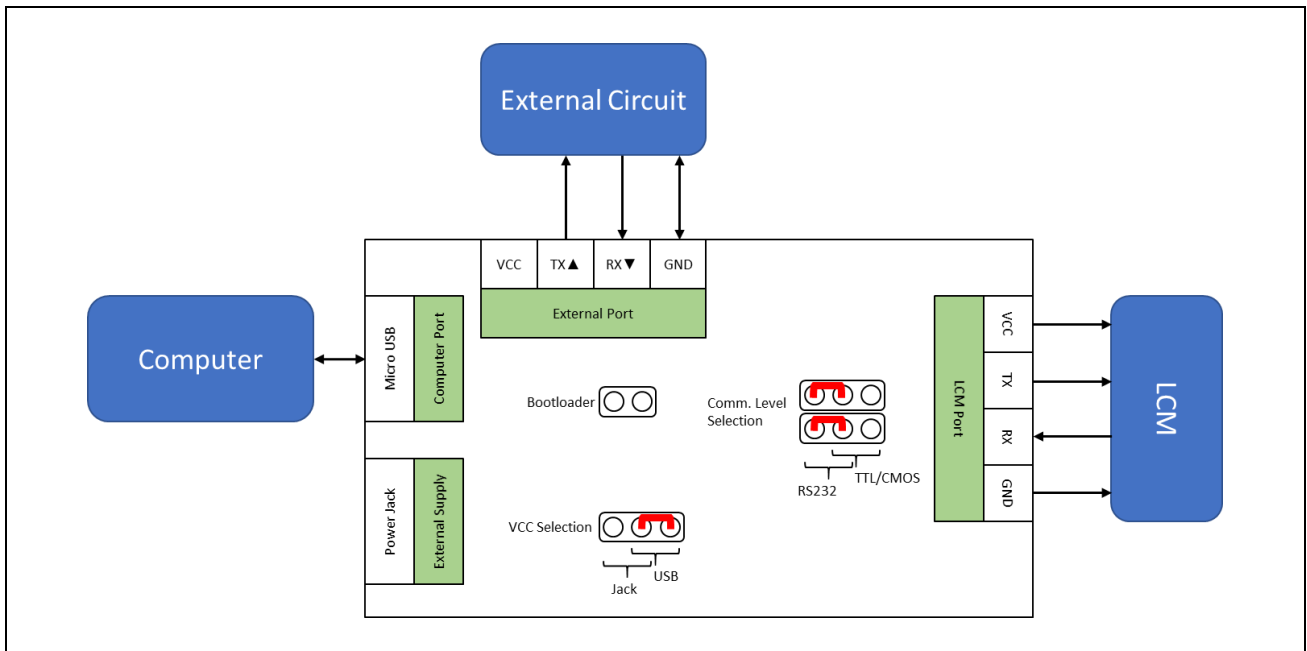


LCM specifications: 12V, 700mA, RS232.



Using as RS232 to TTL/CMOS converter

LCM specifications: 5V, 200mA, RS232.



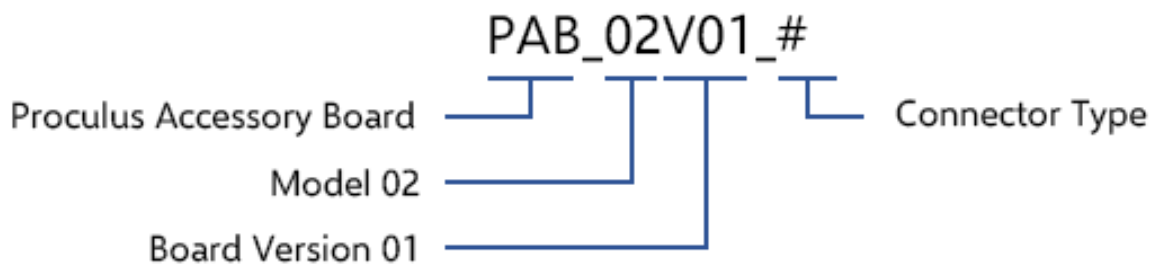
## Ordering Information

### Connector Types

The following table describes the available connectors and their respective symbols.

Connector	Symbol	Details
<b>FFC (Flat Flexible Cable) Connector</b>	F	10-pin, 1.0 mm pitch, Dual contact
<b>Ribbon Cable Connector</b>	R	8-pin, 2.0 mm pitch
<b>Pin Header</b>	P	8-pin, 2.56 mm pitch, Straight, upwards
<b>No Connector</b>	N	None

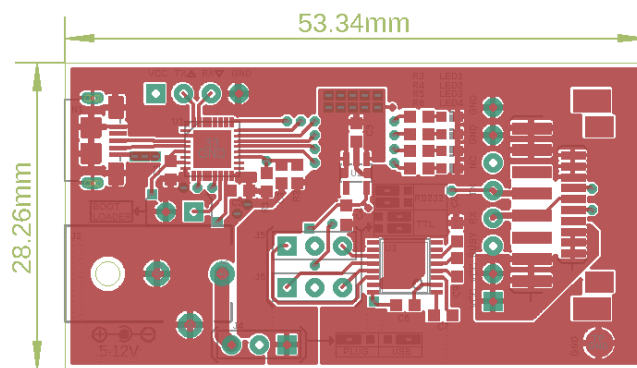
### Part Number Selection



You can order PAB\_02 in any configuration of pre-assembled connector types. The following table lists part numbers all available configurations:

Connector Type	Connector
<b>PAB_02V01_F</b>	FFC
<b>PAB_02V01_FP</b>	FFC and Pin Header
<b>PAB_02V01_R</b>	Ribbon
<b>PAB_02V01_RP</b>	Ribbon and Pin Header
<b>PAB_02V01_P</b>	Pin Header
<b>PAB_02V01_N</b>	No Connector

## Mechanical Information



Dimensions are given in millimeters.

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## Revision History

Revision Number	Revision Date	Description	Pages Changed
1	July 2019	Initial release.	-
2	October 2019	PAB_02V01_FP and PAB_02V01_RP variants added. Orientation of the Pin Header connector added.	12

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