

Pepper C1 Lite User Manual

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21/09/2026

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1. Introduction

1.1 Device Overview

Features

- Low cost RFID Reader with MIFARE® Classic® in 1K, 4K memory, ICODE, MIFARE Ultralight®, MIFARE DESFire® EV1/EV2, MIFARE Plus® support
- lifetime firmware updates
- Command interface via UART
- UART baud rate up to 921600 bps
- High speed USB-UART emulated interface
- HID keyboard emulation
- Configurable RGB LED indicator for RFID events
- 6 configurable GPIOs
- Stand-alone mode (polling)
- High transponder read and write speed
- -25°C to 85°C operating range
- Multiple internal reference voltages
- RoHS compliant
- CE (RED) and UKCA compliant. FCC/ISED/PSE and other approvals easily obtained

Applications

- Access control
- Monitoring goods
- Approval and monitoring consumables
- Pre-payment systems
- Managing resources
- Contact-less data storage systems
- Evaluation and development of RFID systems



Description

The Pepper C1 Lite RFID reader is the advanced successor to the Pepper C1, maintaining full compatibility with all tag types and protocols supported by its predecessor. It offers lifetime firmware updates, ensuring continuous improvements and security. The device features a configurable USB interface, capable of emulating either a UART interface or functioning as a HID profile, such as keyboard emulation. Additionally, the Pepper C1 Lite is cost-optimized compared to previous C1 Lite modules, providing enhanced functionality at a competitive price point.

2. Electrical specification

2.1 Absolute maximum ratings

Stresses beyond the absolute maximum ratings listed in the table below may cause permanent damage to the device. These are stress ratings only, and do not refer to the functional operation of the device that should follow the recommended operating conditions.

Symbol	Parameter	Min	Max	Unit
T_S	Storage temperature	-40	+125	°C
T_A	Ambient temperature	-40	+85	°C
V_{DDMAX}	Supply voltage (USB or J4 header)	3	5.5	V

Table 2-1. Absolute maximum ratings

2.2 Operating conditions

Symbol	Parameter	Min	Typ.	Max	Unit
T_S	Operating temperature	-25	25	+85	°C
H	Humidity	5	60	95	%
V_{DD}	Supply voltage (USB or J4 header)	3	5	5.5	V

Table 2-2. Operating conditions

2.3 DC characteristics ($V_{DD} = 5\text{ V}$, $T_S = 25\text{ °C}$)

Symbol	Parameter	Min	Typ.	Max	Unit
V_{OUT}	Output voltage (regulator output, 3V3 pin on the J1 header)	3.23	3.3	3.37	V
V_{IH}	High-level input voltage (J1 header)	$0.75 \times V_{OUT}$	-	$V_{OUT} + 0.3$	V
V_{IL}	Low-level input voltage (J1 header)	0	-	$0.3 \times V_{OUT}$	V
V_{OH}	High-level output voltage (J1 header)	$0.8 \times V_{OUT}$	-	-	V
V_{OL}	Low-level output voltage (J1 header)	-	-	$0.3 \times V_{OUT}$	V
V_{ORS232}	V output RS232 (J2 header, RS232_TX pin)	-	5	-	V
V_{IRS232}	V input RS232 (J2 header, RS232_RX pin)	-25	-	+25	V

Table 2-3. DC characteristics

2.4 Current consumption ($V_{DD} = \text{USB 5V}$)

Symbol	Parameter	Typ.	Max	Unit
I_{PN_RFOFF}	RF field off	17	25	mA
I_{PN_RFON}	RF field on (tag on the antenna)	210	230	mA

Table 2-4. Current consumption

3. Getting started

3.1 IO and peripherals

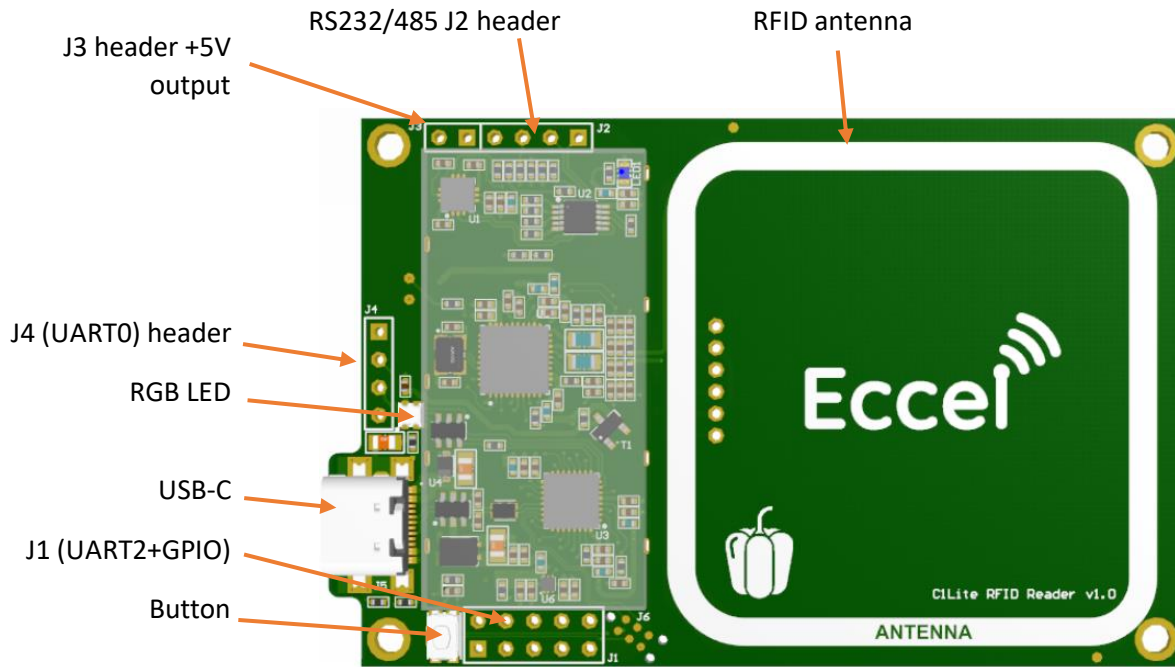
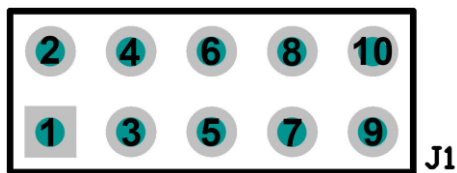


Figure 3-1. Pepper C1 RFID Reader

RS232/485 header – this connection is for optional built in RS232/485 converter.

3.1.1 J1 header description



Pepper C1 Lite v1.0	
1	UART2 TX
2	UART2 RX
3	GPIO 01
4	GPIO 02
5	GPIO 03
6	GPIO 04
7	GND
8	3.3V Output
9	GPIO 05
10	GPIO 06

3.1.2 J2 header description (RS232 version only)



1. **Not connected**
2. **Not connected**
3. **RS232 RX** (from host to the C1 Lite, max input voltage level $\pm 25V$)
4. **RS232 TX** (from the C1 Lite to host, max output voltage level $\pm 5V$)

3.1.3 J2 header description (RS485 version only)

By default, the Pepper C1 Lite reader is working in full duplex mode using all four wires for RS485 communication. For half duplex communication pins A+Y and B+Z should be connected together.



1. **A** Noninverting Receiver Input
2. **B** Inverting Receiver Input
3. **Z** Inverting Driver Output
4. **Y** Noninverting Driver Output

3.1.4 J3 header description

The J3 header is an additional power supply output socket.



1. **+5V output** (100mA)
2. **GND**

3.1.5 J4 UART0 header

This is the UART0 header in the TTL standard with 3.3V levels. This is the same UART as it is available on the USB port.



1. **Vin** – Power supply, 3-5.5 V
2. **UART0 TX** – UART TX data from the module
3. **UART0 RX** – UART RX data to the module
4. **GND**

3.2 Typical connection

The Pepper C1 Lite device can be connected to a host computer using a standard USB-C cable. It can also be powered as a standalone device using an external power source, such as a USB charger or a power bank.

When connected to a computer, the operating system should recognize the device as a USB-to-UART bridge (or USB-to-Serial port converter). In Windows, it will appear in Device Manager as a COM port. By default, this COM port is used for communication via the binary protocol described below.

Additionally, the reader features a UART2 interface (J1 header), which allows users to view console logs containing details about currently executing commands. The default configuration: baud: 115200, Data: 8 bit, Parity: none, Stop bits: 1 bit, Flow Control: none.

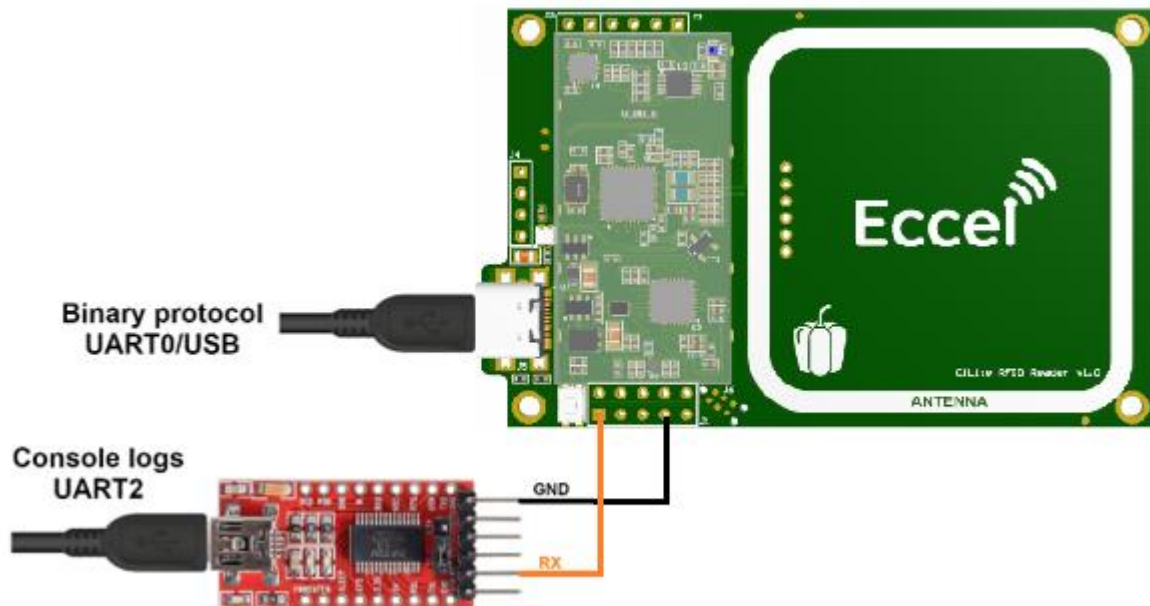


Figure 3-2. Typical connection to see the console logs on UART2

Hint – If you don't have a USB-UART converter to view logs via the UART2 (J1 header), you can temporarily change the default log interface from UART2 to UART0 using the UART configuration button in Cx-client. The logs will then be available through the USB port

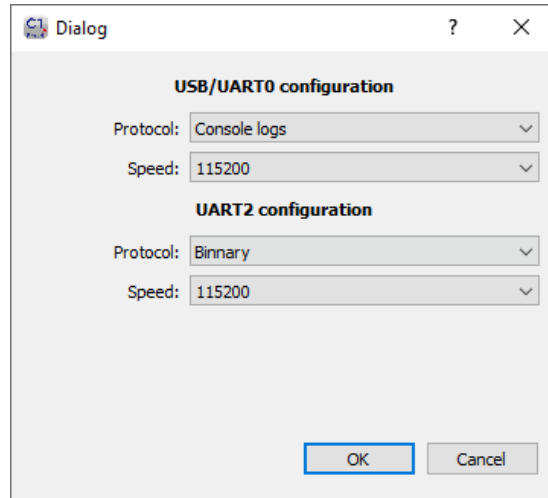


Figure 3-3. Console logs on the UART0/USB

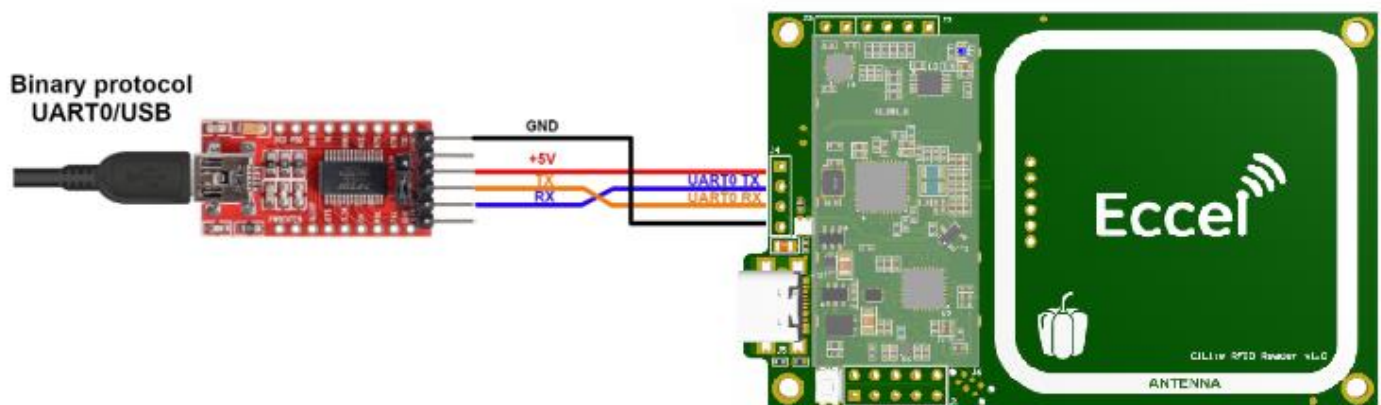


Figure 3-4. Pepper C1 Lite UART0 - typical connection with the USB-UART converter
*do not use UART0 TTL connection at the same time with USB connection

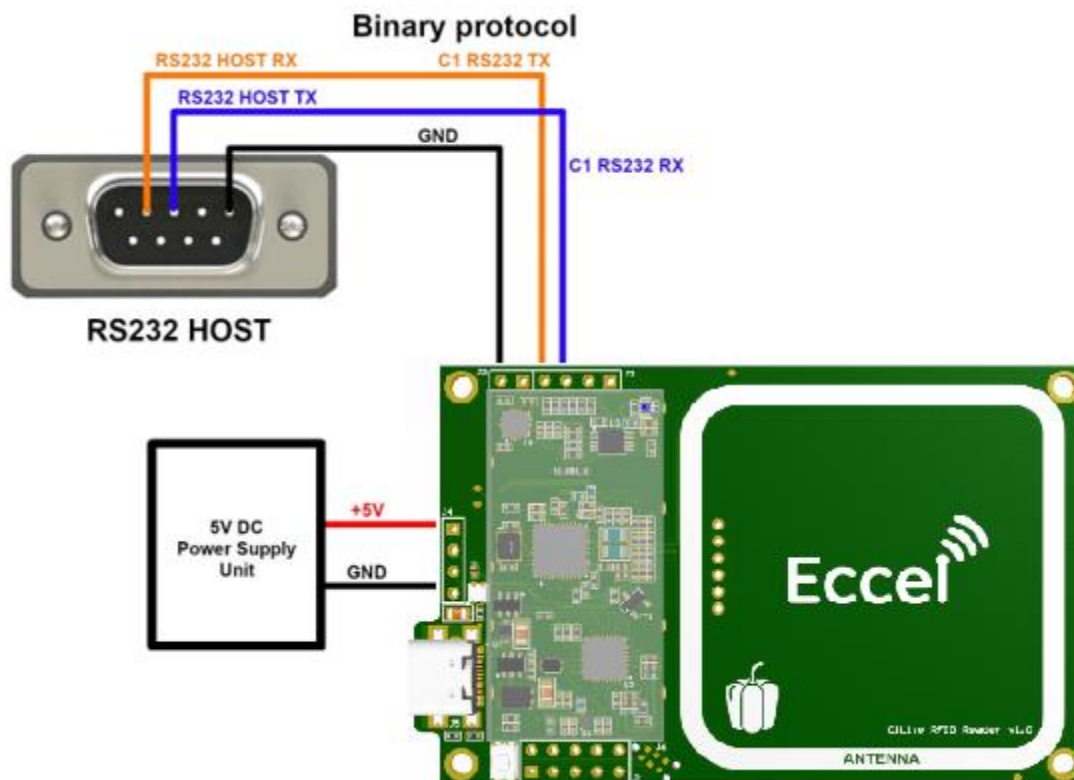


Figure 3-5. Pepper C1 Lite RS232 - typical connection with the RS232 host device

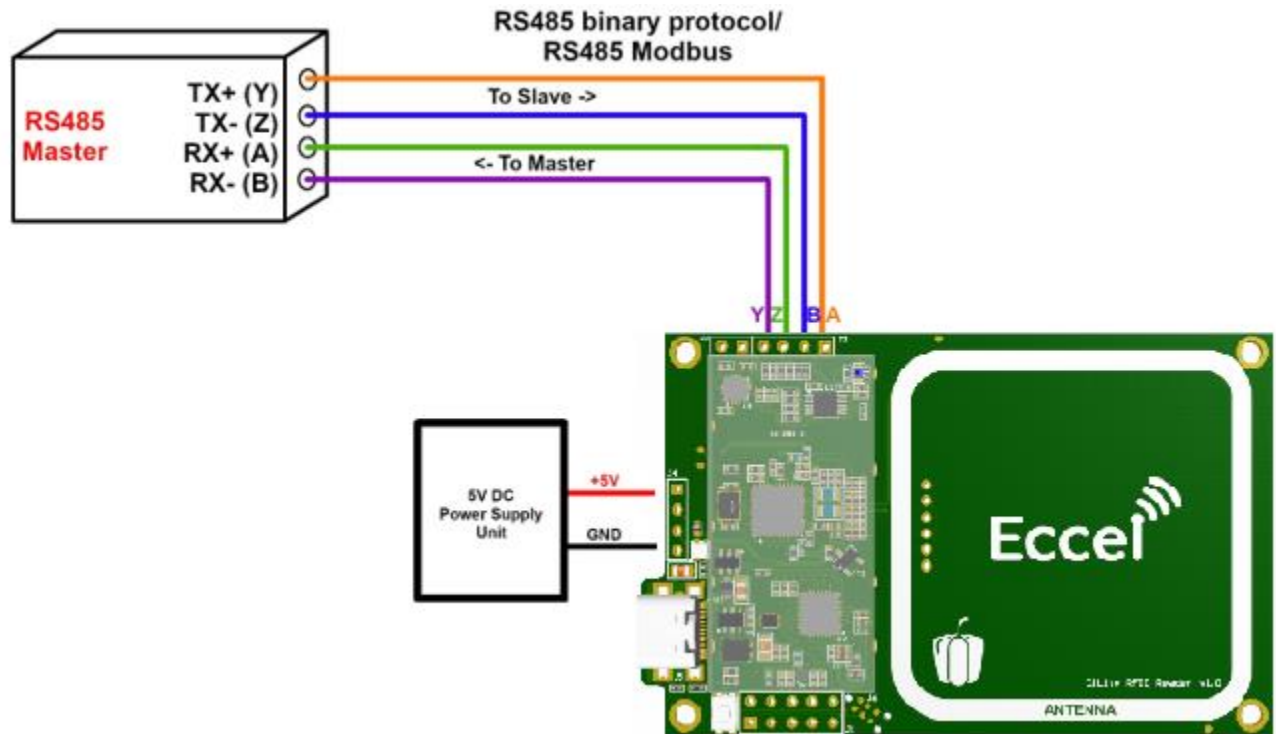


Figure 3-6. Pepper C1 Lite RS485 - Full duplex connection with the RS485 Master device

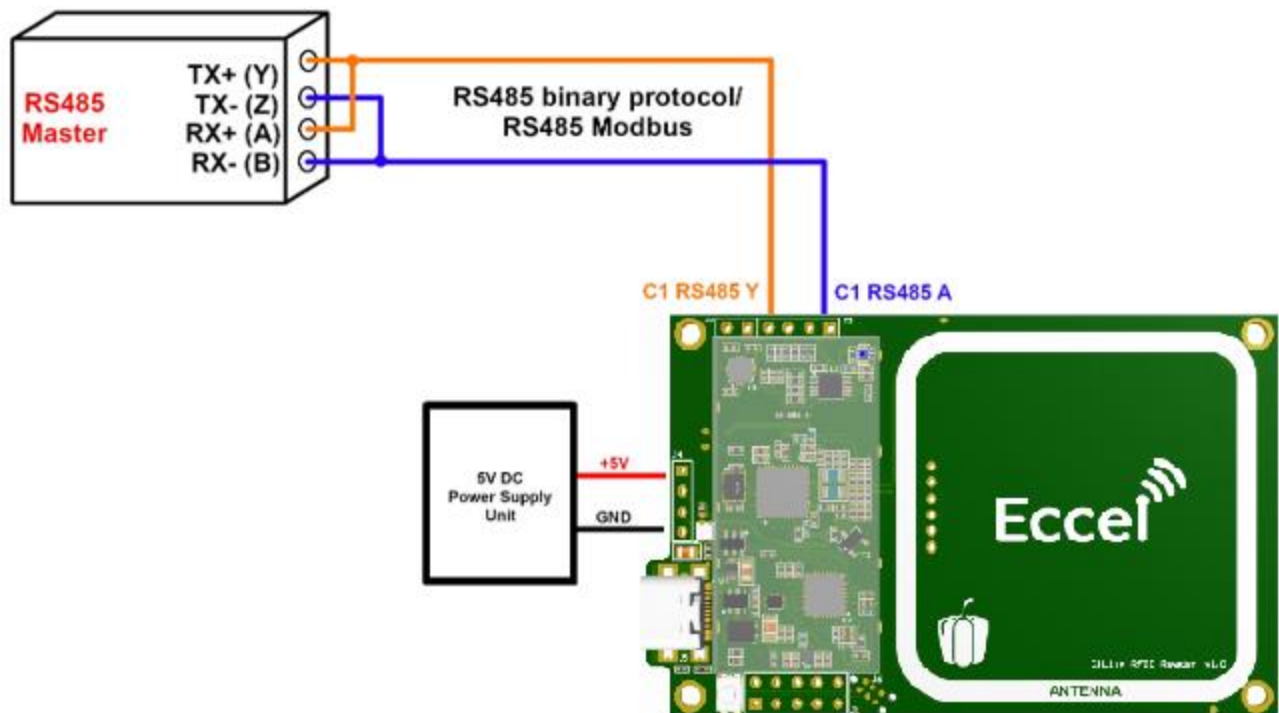


Figure 3-7. Pepper C1 Lite RS485 - half duplex connection with the RS485 Master device

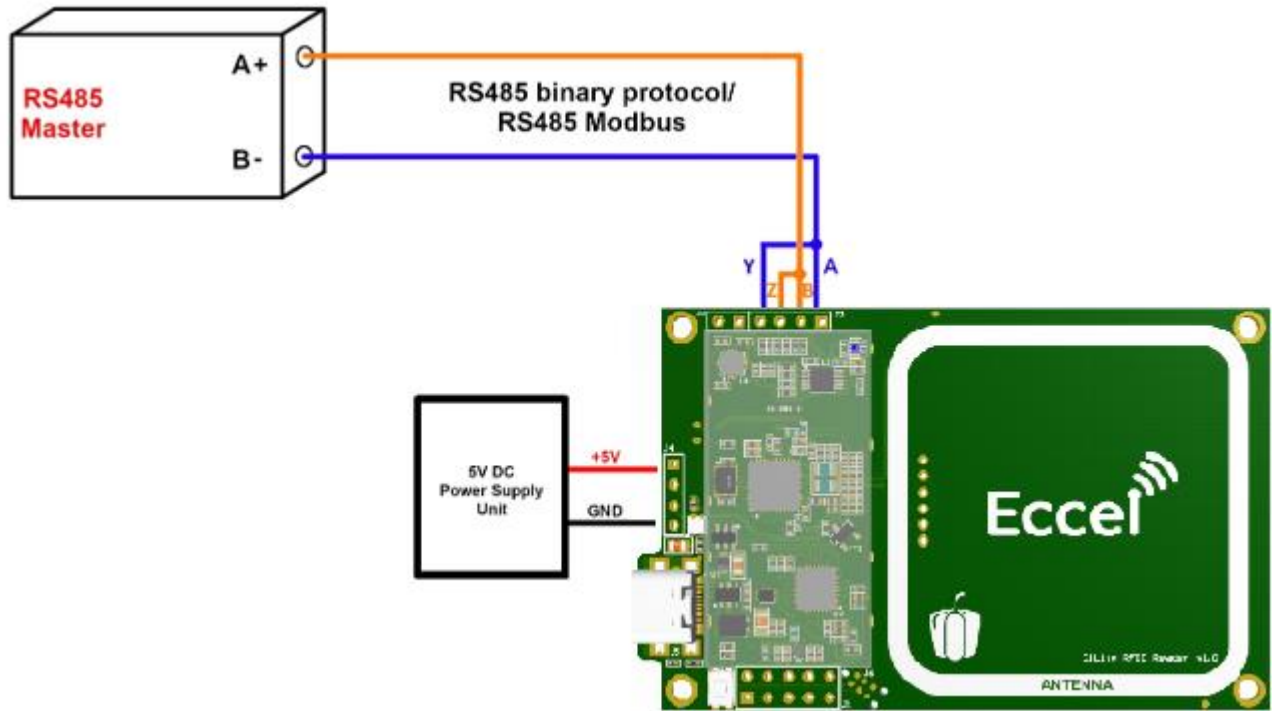


Figure 3-8. Pepper C1 Lite RS485 - half duplex example

The user can make jumpers between A – Y and B – Z pins by placing two 0R resistors here:

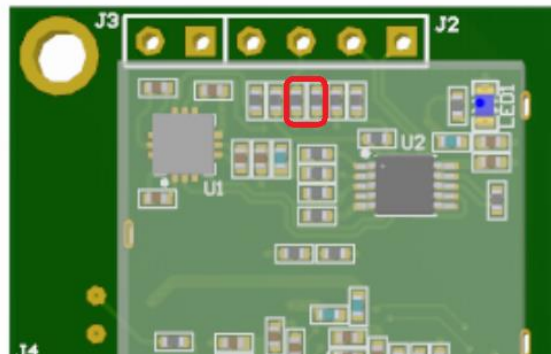


Figure 3-9. Pepper C1 Lite RS485 - jumpers between A-Y and B-Z pins

3.3 HID keyboard emulation

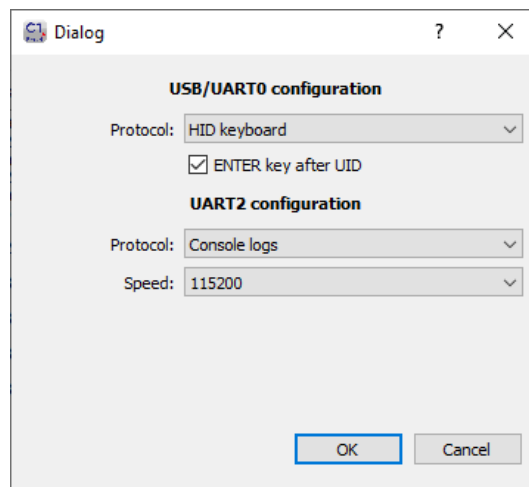
The RFID reader can be configured to emulate a USBHID keyboard. With this feature enabled, the UIDs of tags read during polling are transmitted as keyboard input to any host device supporting USB keyboards. To activate this profile, use the Cx-client application to select the HID Keyboard option for the USB port within the USB/UART configuration menu.

IMPORTANT: Once the device is configured in HID keyboard mode via the USB/UART0 interface, it can no longer connect to the Cx-Client application through this port.

To temporarily restore the binary protocol:

1. Press and hold the button on the reader for 3 seconds
2. The device's RGB LED will blink once per second during the hold
3. The RGB LED will flash red once the default UART emulation profile has been temporarily restored.

Additionally, the configuration settings allow automatic transmission of the ENTER keypress after each UID.



3.4 Factory reset

To restore the device to its factory default settings, the button on the device must be pressed and held for 10 seconds. The device will indicate the completion of the factory reset process by flashing the RGB LED in white.

4. Mechanical dimension

All dimensions are in mm.

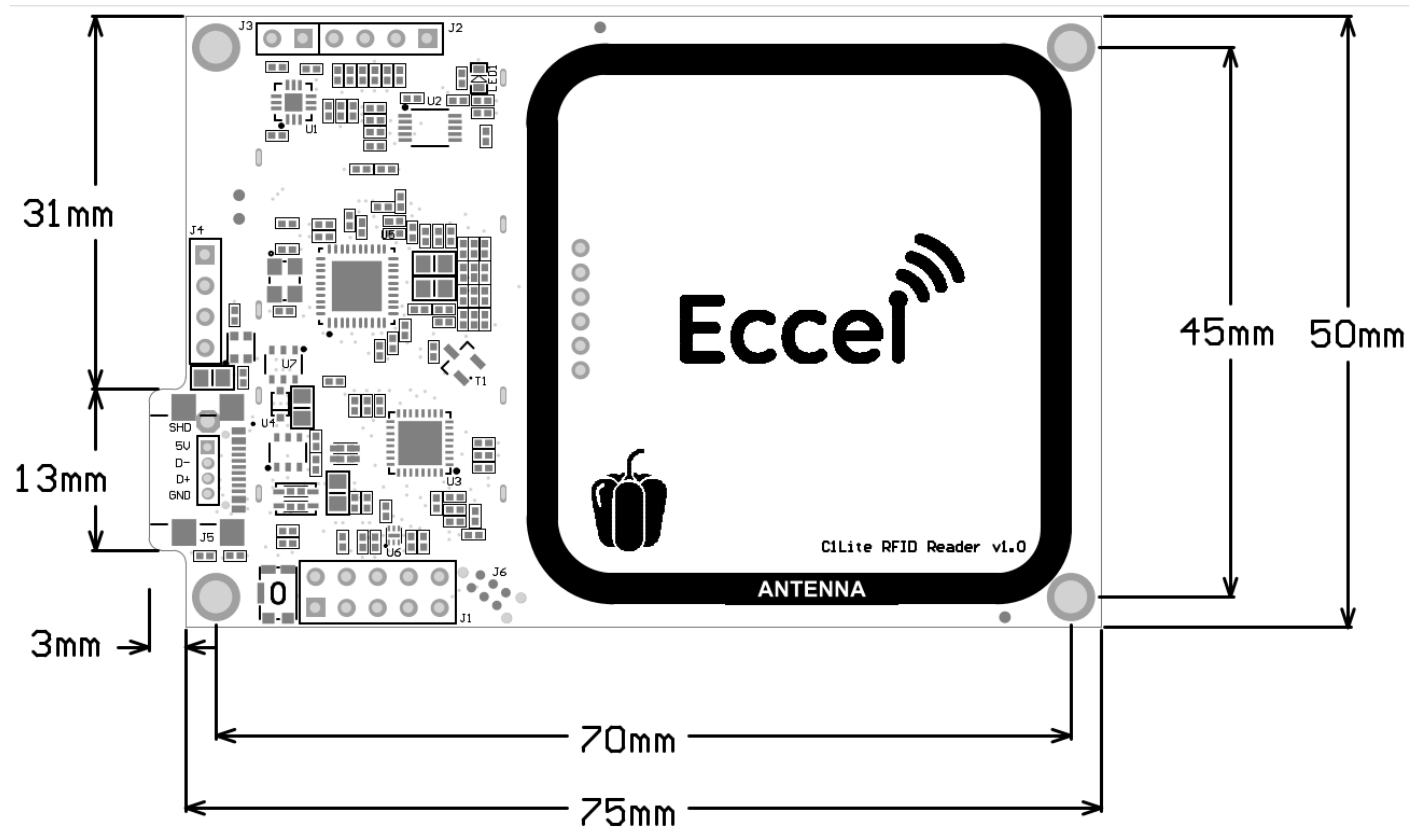


Figure 4-1

5. RF Emissions and Susceptibility Approvals

Eccel have tested and declare that this product meets all the requirements of the relevant RF directives (RED) to be declared CE (European Union) and UKCA (United Kingdom) compliant. Please see our declaration of conformity for this on the downloads tab of the product webpage.

This product is designed to be incorporated into products easily and quickly such that those products can pass any national or regional statutory RF requirements and certifications such as FCC (USA), ISED (Canada) and PSE (Japan) for example.

This product is designed to meet all statutory RF requirements applicable worldwide using the most cost effective but robust design methodology.

Eccel is pleased to offer customers very cost-effective certification for their end equipment that incorporate this product. Prices start from £3K per approval/ certification. Please contact us for more details at sales@eccel.co.uk.

6. Revision history

Revision	Date	Changes
1.1	21-Sep-2026	Product photo update
1.0	01-Sep-2026	Initial release

MIFARE, MIFARE Ultralight, MIFARE Plus, MIFARE Classic, and MIFARE DESFire are trademarks of NXP B.V.

No responsibility is taken for the method of integration or final use of the Pepper C1 Lite readers.

More information about the Pepper C1 Lite reader and other products can be found at the Internet site:

www.eccel.co.uk

or alternatively contact ECCEL Technology by e-mail at:

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