

RFID Reader



Operational Manual

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Intelitek Inc.
444 East Industrial Park Drive
Manchester, NH 03109-5317
USA
Tel: (603) 625-8600
Fax: (603) 625-2137
website: <http://www.intelitek.com>
email: info@intelitek.com

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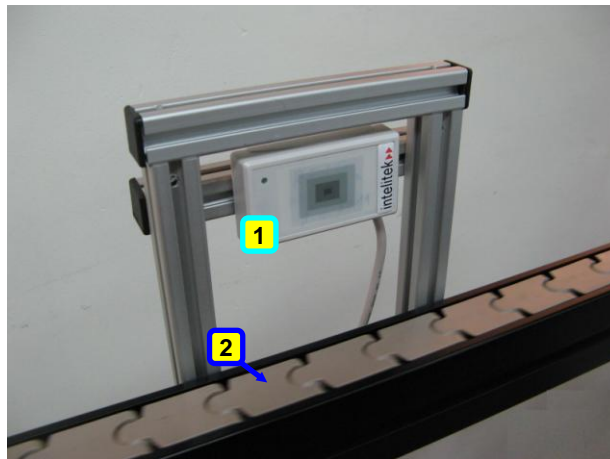
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Introduction

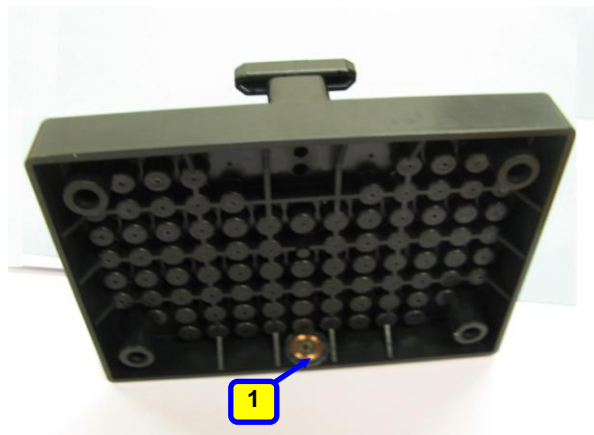
The RFID scanning system available at a specific CIM station is used for real-time identification and verification of part-carrying templates. The RFID Reader, which is supplied as an assembled product, is a high performance proximity reader. The reader runs from voltages between 5 to 12V DC.

The RFID Reader integration in a CIM system is shown as follows:



- 1. RFID Reader
- 2. Conveyor

Figure 1: RFID Reader in CIM System



- 1. RFID tag on Template

Figure 2: RFID Tag

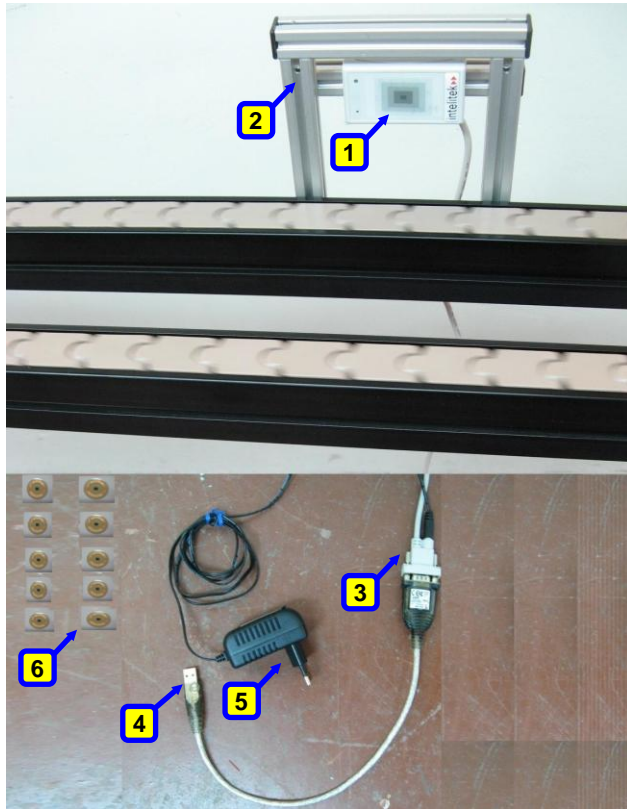
RFID Reader Components

The main RFID Reader components are described in the table below.

For a comprehensive list of components, refer to *Appendix C: Parts List*, on page 25.

Table 1: Main RFID Reader Components

Description	Part Number	Image
RFID Reader GP20, 5-12V DC with RS232 Cable	410471	
RFID Tag 125KHz	410472	
USB to 9-pin RS232 Serial Converter	411890	
Cable Communication USB Male/Female 2m	411892	
AC Adaptor 100-240V, 50/60Hz, 035A, 12V	430749	



1. RFID Reader
2. Stand
3. RS-232 Connector (to RFID)
4. USB to 9-pin RS232 Serial Converter (from Computer)
5. Power Supply
6. 10 RFID Tags

Figure 3: RFID Reader Components

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Installation

This chapter describes how to install the RFID Reader.

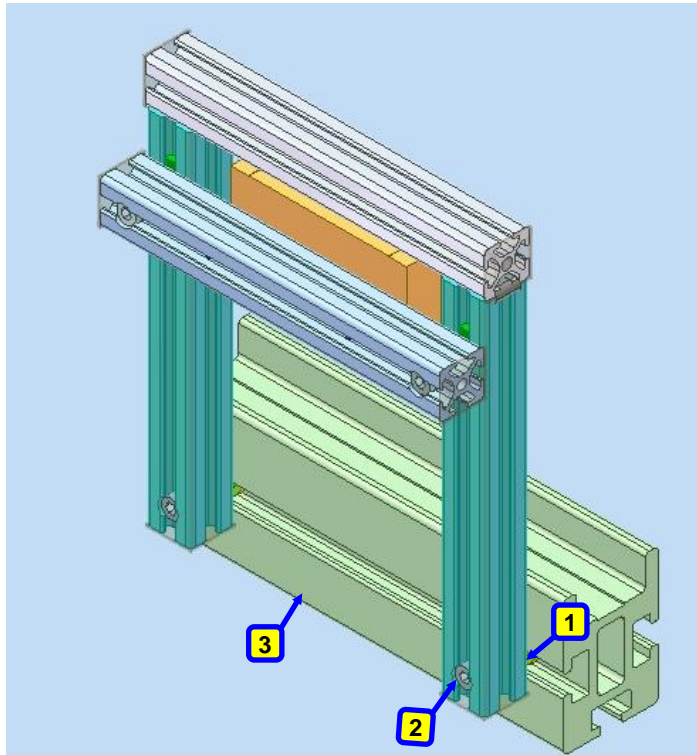
The installation process of the RFID Reader includes:

- assembling the RFID stand,
- assembling the RFID Reader on the stand,
- attaching the stand to the conveyor profile,
- and connecting the communication cable and power supply,

as described in the following procedure.

To install the RFID Reader:

1. Unpack and identify all the components that are provided with the RFID Reader, as described in *Table 1: Main RFID Reader Components*, on page 2.
2. If the stand has not been preassembled, assemble the RFID Stand as shown in *Drawing A: RFID Reader on Stand – Front View* on page 17, and *Drawing B: RFID Reader – Back View* on page 18.
3. Assemble the RFID Reader on the stand as shown in the drawings listed above.
4. Attach the RFID stand to the conveyor profile, using the T-Slot Zn M5 nuts (312009) and Allen M5x20 screws (301205) as shown in *Figure 4*, below.



1. T-Slot Zn M5 nuts
2. Allen M5x20 screws
3. CIM Conveyor

Figure 4: RFID Reader Stand Mounted on CIM Conveyor

5. Connect the RFID Reader's RS232 communication connector in one of the following two ways:
 - Directly to the computer's RS232 port
 - To the USB to 9-pin RS232 Serial Converter (411890) and the converter's USB plug in turn to the computer's USB port
6. Connect the power supply cable (430749) to the power supply inlet on the RFID Reader's RS-232 communication connector.
7. Connect the power supply (*Figure 5: Power Supply*) to a 100 -240 VAC source (depending on the specifications on the power supply).



Note: An adapter is provided for American customers.



Figure 5: Power Supply

8. Install the UC-232A driver for Microsoft Windows from the accompanying CD in the USB to 9-pin RS232 Serial Converter package.

The driver is also available from the [manufacturer's website](#).

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Testing & Operation

After installing the RFID Reader and software in the CIM system, the next step is to verify that the reader is working properly. There are three checks that can be done:

- **Testing the RFID Reader**, a basic initial check to ensure that the reader recognizes when a tag is passed in front of it.
- **Testing the RFID Reader Using the RFID Device Driver**, a test to check that the reader recognizes RFID tag IDs. This check can be done using the OpenCIM RFID device driver only if you have purchased the OpenCIM software.
- **Testing the RFID Reader Using a Communications Terminal**, an alternative check that can be done using a communications terminal if you have not purchased the OpenCIM software.

Testing the RFID Reader

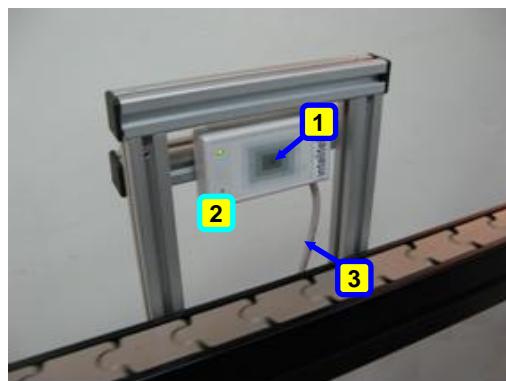
You can verify that the RFID Reader is working properly by connecting it to the power supply and holding an RFID tag in front of the RFID Reader.



Note: For further details on the RFID Reader components refer to Main RFID Reader Components, on page 2.

To test the RFID Reader:

1. Connect the RFID Reader to the power supply.



1. Green LED
2. RFID Reader
3. RS-232 Cable

Figure 6: RFID Reader Connected (Green Led) - Front View

2. Pass an RFID tag in front of the reader and verify that the reader sounds a beep and that the green LED flashes (see Figure 6, above.)


Testing the RFID Reader Using the RFID Device Driver

You can verify that the RFID Reader is working properly using the OpenCIM RFID device driver, as described in the procedure below.



Note: The OpenCIM device driver is part of the OpenCIM software version 4.6 and above.

To test the RFID Reader using the RFID device driver:

1. Install the OpenCIM software on the PC if it is not already installed. For further details on the installation procedure, refer to the *OpenCIM User Manual*.
2. From the Virtual CIM Setup application in the OpenCIM software, create a project where you use a RFID Device Driver in the Storage Station (WS1).
3. In the Virtual CIM Setup application, create the loader files and workgroup. For further details refer to the *OpenCIM User Manual*.
4. Locate and double click the Loader  icon for the relevant workstation for the project. Verify that it displays the RFIDDriver, as shown in *Figure 7: CIM DD Loader Window*, below.

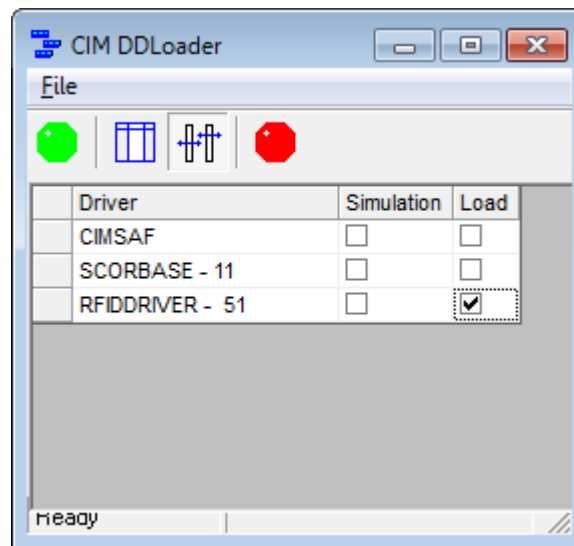



Figure 7: CIM DD Loader Window

5. Ensure that the **Load** column of the RFIDDRIVER is selected , and click the green **Load Selected Drivers**  button. The RFID Device Driver window is displayed.

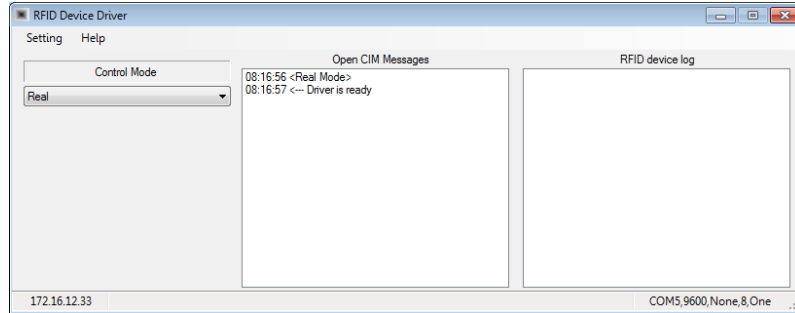
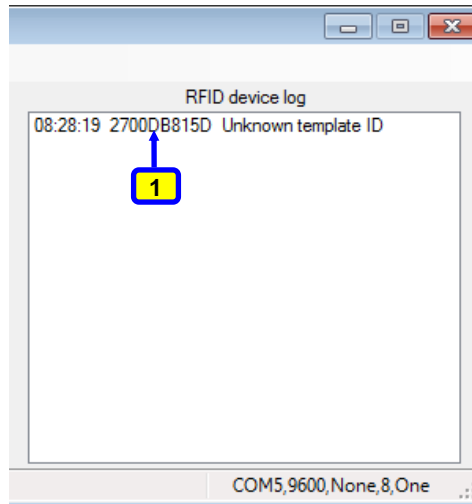


Figure 8: RFID Device Driver Window

6. Pass an RFID tag in front of the reader and verify that an entry for the RFID tag is added to the RFID device log.



1. RFID Tag ID number

Figure 9: RFID Device Driver



Note: The RFID device driver refers to an LUT file to check if a template ID has been assigned to the RFID tag ID. If no template ID has been assigned, the following will appear in the RFID device log entry: Unknown template ID. For further details on working with the RFID device driver, refer to the OpenCIM User Manual.

Testing the RFID Reader Using a Communications Terminal

You can check that the RFID Reader recognizes RFID tag IDs using a communications terminal. The terminal used in these instructions is the HyperTerminal software that is bundled with Microsoft Windows XP. If you are using a newer version of Microsoft Windows, you can find a downloadable version of HyperTerminal on the Internet that is free for personal use.

To test the RFID Reader using HyperTerminal:

1. Open HyperTerminal.

The Connection Description window is displayed.

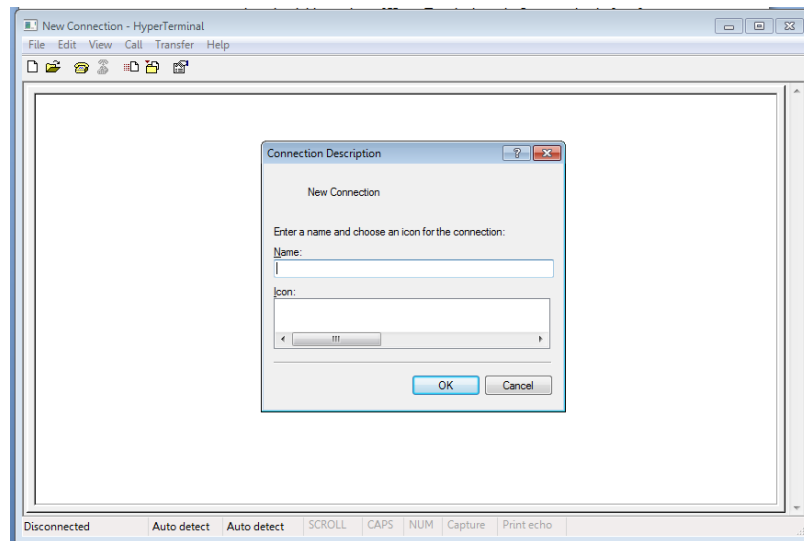


Figure 10: Creating a New Connection in HyperTerminal

2. Enter a name for the connection (for example, *RFID*) and click **OK**.
The Connect To window is displayed.

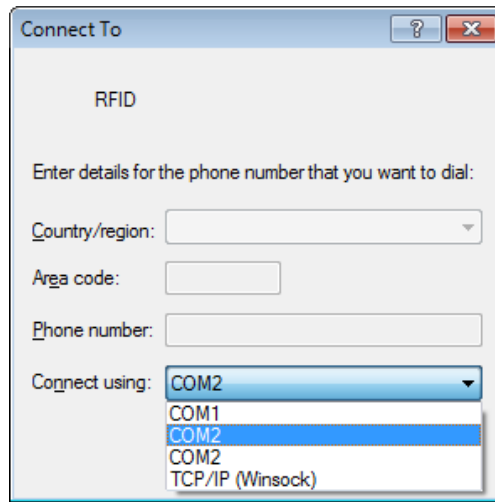


Figure 11: Connect To Window

3. Select the computer COM port that the RFID Reader is connected to and click **OK**.



Note: If the RFID Reader is connected to the computer via the RS232A USB/Serial communication cable, check which COM port the USB port is assigned to in the Microsoft Windows Device Manager (see Figure 12 below.)

To access the Device Manager:

- a. Click **Start | Run**.
- b. Type “*mmc devmgmt.msc*” in the Open field and click **OK**.

The Device Manager is displayed.

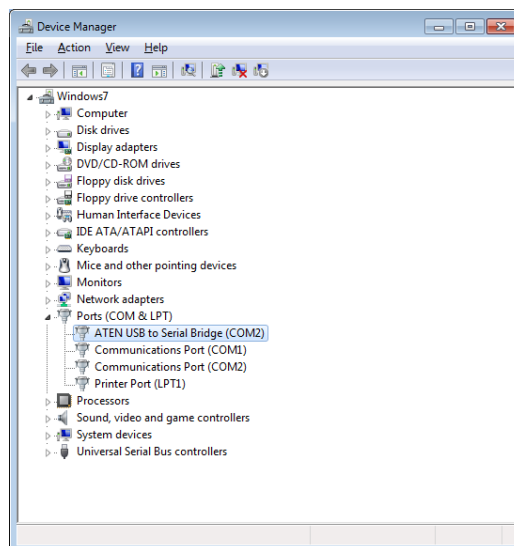


Figure 12: Device Manager

The COM Properties window is displayed.

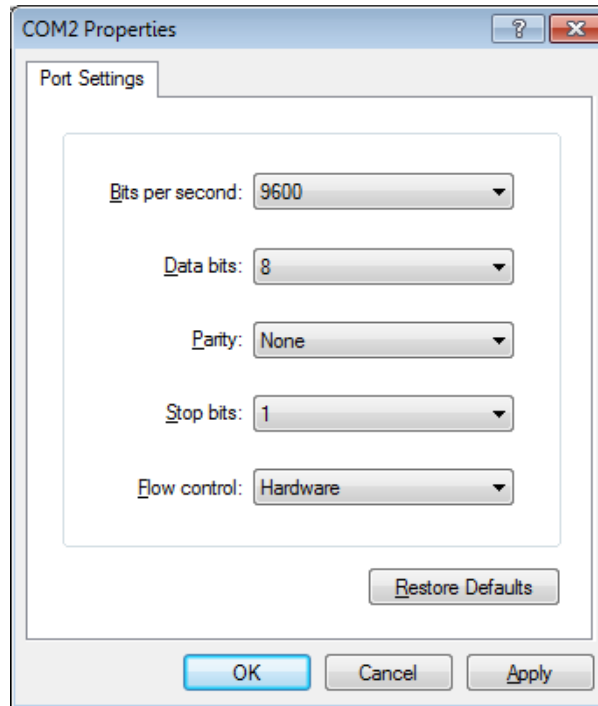


Figure 13: COM Properties Window

4. Configure the COM properties as in **Figure 13** above and click **OK**.
5. Pass an RFID tag in front of the reader and verify that an entry for the RFID tag is added.

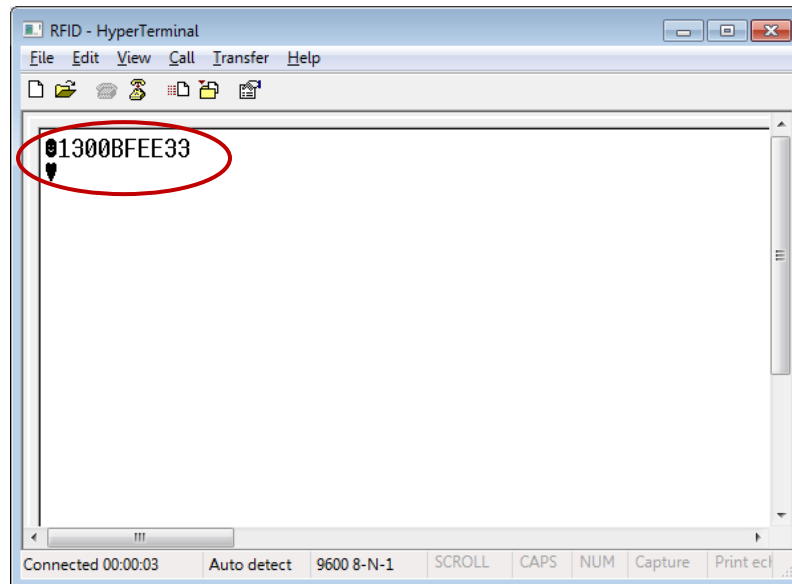


Figure 14: HyperTerminal with RFID tag ID

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Troubleshooting

Problem: The green LED does not light up even though the power supply is plugged in and the RFID Reader is ON.

Solution: Check the cable connections, and whether the power supply is providing the correct voltage. In addition verify that the power supply is providing the correct current.

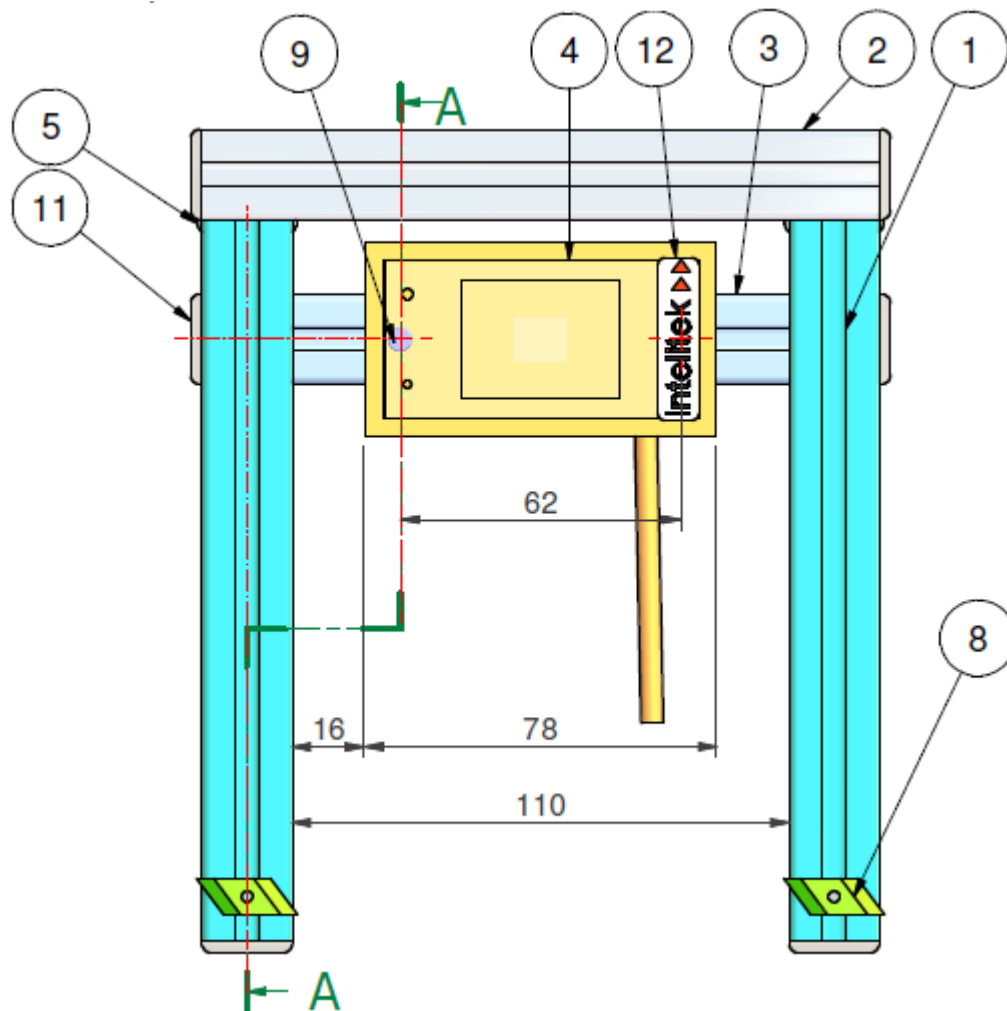
5

Appendices

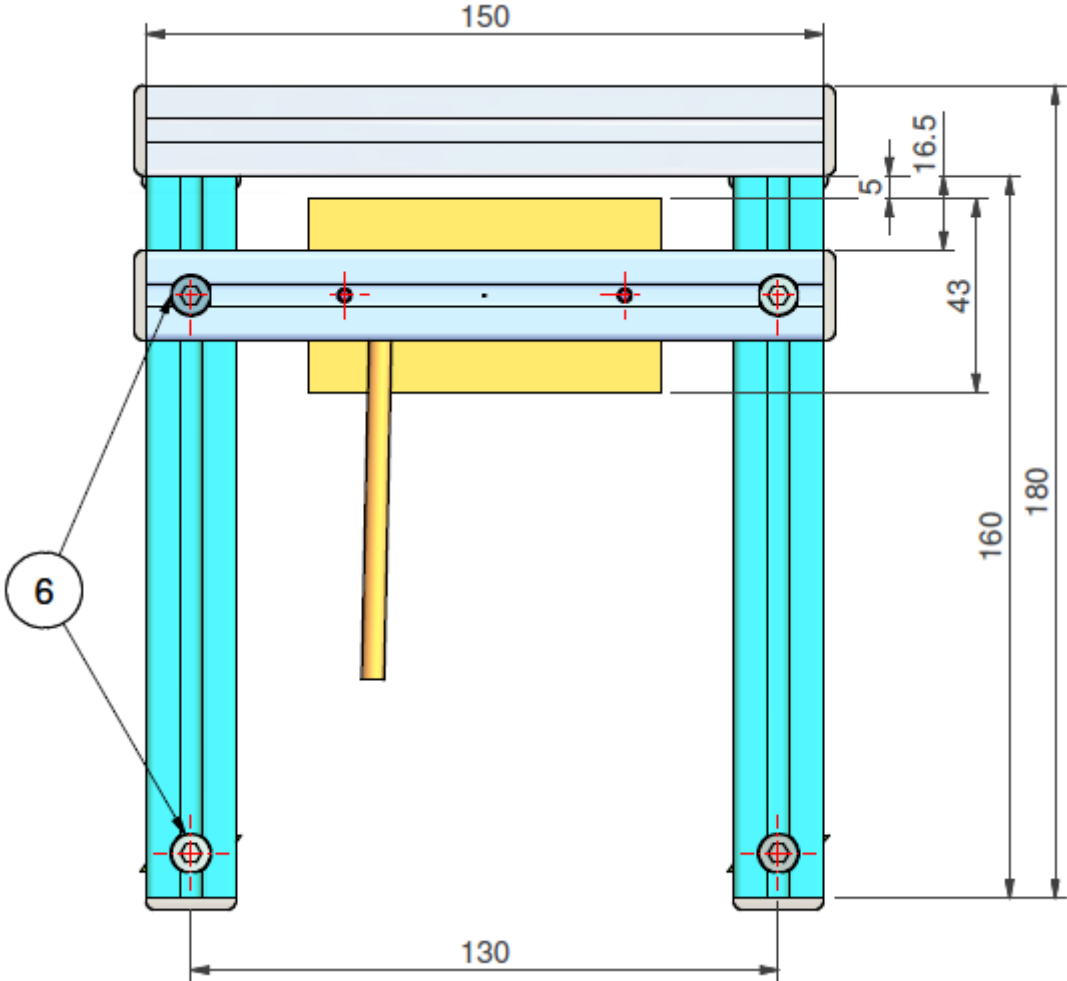
Appendix A: Schematic Drawings

Schematic drawings of different views of the RFID Reader are included below. The numbered callouts in Drawings A, B and D correspond to the numbers in *Appendix C: Parts List*, on page 25.

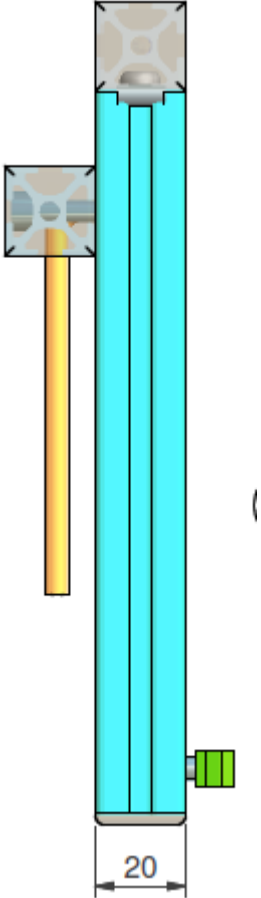
Drawing A: RFID Reader on Stand – Front View



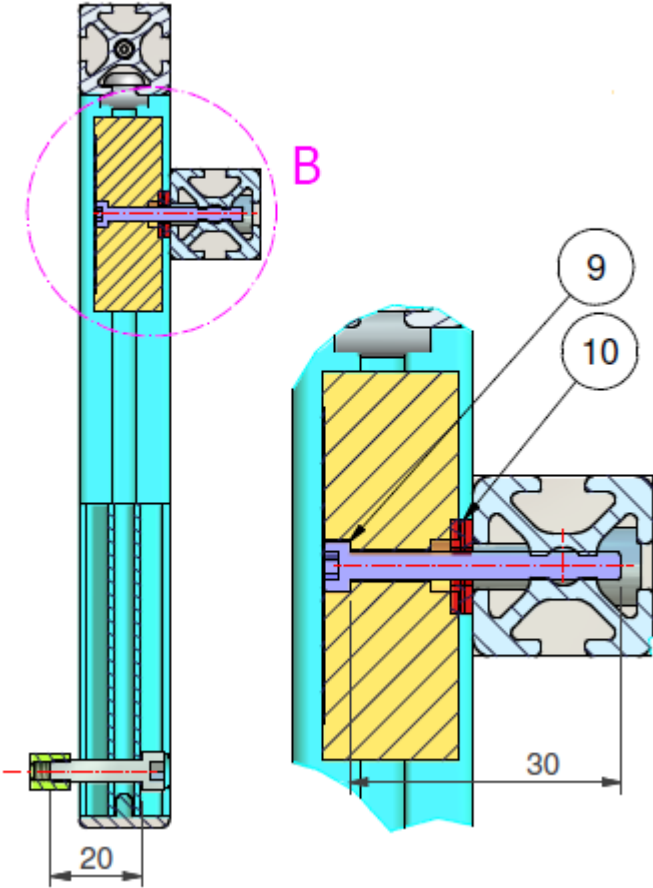
Drawing B: RFID Reader – Back View



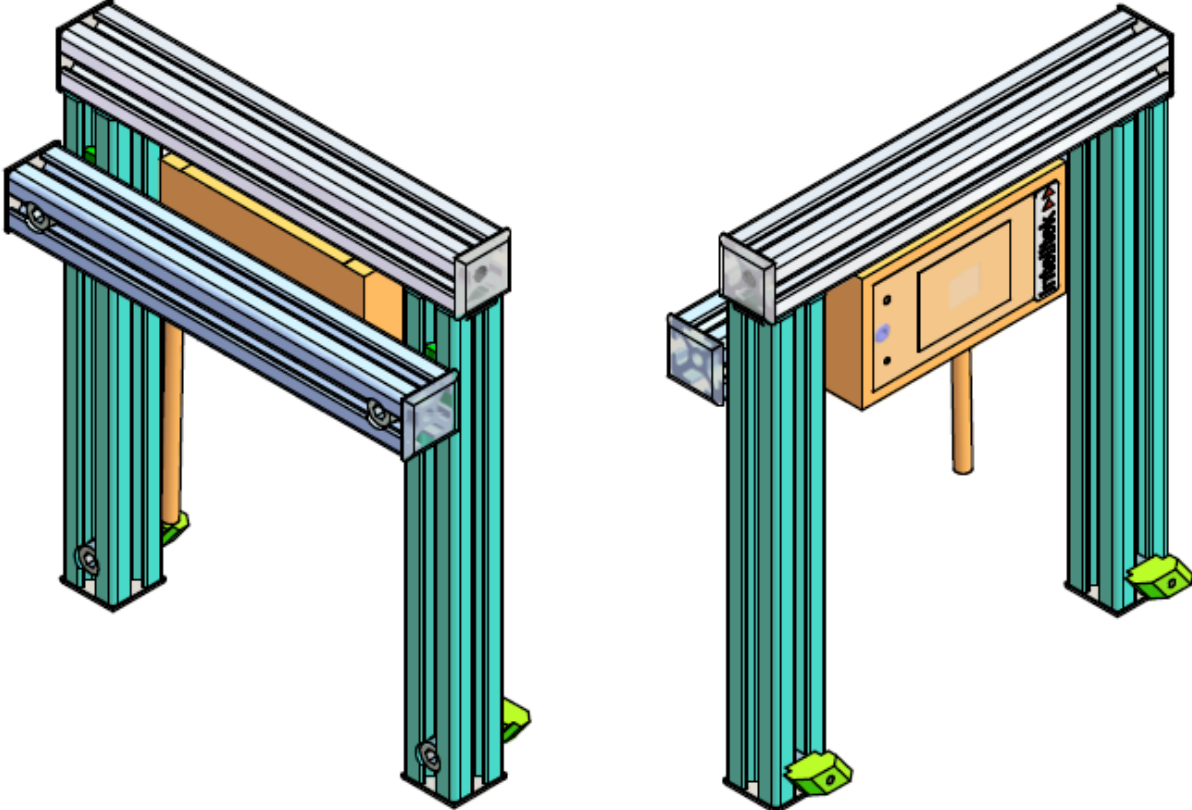
Drawing C: RFID Reader – Side View



Drawing D: RFID Reader – Side View – Cross Section

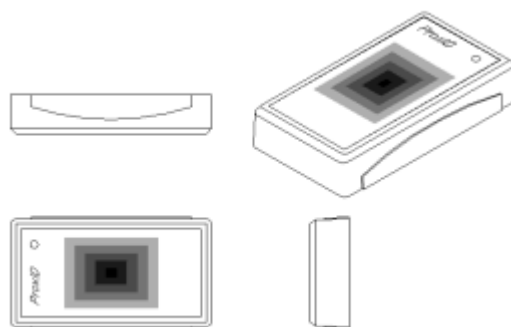


Drawing E: RFID Reader – Front and Back Profiles



Appendix B: Specifications

Power Requirements	5-13.5 volt regulated DC. at 65 mA typical with a 12v supply. A linear regulator is recommended.
Interface	Wiegand, Magstripe, 9.6K Baud Serial ASCII (RS232) or special to customer specifications
Typical Maximum Read in Ideal Conditions	Range 22cm at 13.5v and 13 cm at 5v with ISO card
Frequency	125KHz standard or 134.2KHz to special order
Transponder	Read Only
Audio/Visual Indication	Internal LED and Buzzer
Dimensions	7.8 x 4.3 x 1.5 cm
Temperature Range	-10 to 60 Deg C
Interface Cable	90cm



Output Assignment

Red	Power 5 - 13.5 Volt
Black	Power 0 Volt
White	Clock Output (Magstripe , Wiegand1) 4K7 pull up
Green	Data Output (RS232, Magstripe & Wiegand0) 4K7 pull up

Orange	Card Present Output 4K7 pull up
Yellow	Program Input 4K7 pull up
Blue	NC
Brown	NC

Output Format

The output format can be customer programmed. The available formats are Wiegand, Magnetic Emulation, Clock Data and Serial ASCII (RS232).

Wiegand Magstripe	
Red	Power +V
Black	Ground 0v
White	Data1
Green	Data0
Yellow	Connect to White (Data0, Clock output)

Magstripe	
Red	Power +V
Black	Ground 0v
Green	Data
White	Clock (Strobe)
Orange	Card Present
Yellow	Connect to Orange

Serial ASCII (RS232)	
Red	Power +V
Black	Ground 0v
Green	Tx Data
Yellow	No connection

Data Structure (Serial ASCII)

Baud Rate: 9600, N, 8,1

STX(02 HEX)	DATA	CR	LF	ETX (03 HEX)
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The start character is factory defined as an 'STX' (02 HEX). The CR\LF characters serve to bring the received screen text back to the left hand side and on the line below after the data bytes have been sent. The 'ETX' (03 HEX) character denotes the end of the current transmission.

Data Structure (Magstripe Emulation, ABA Track 2)

Speed: Simulated to 40 IPS (Inches per second)

10 LEADING ZEROS	SS	DATA	ES	LRC	10 TRAILING ZEROS
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The leading zeros prepare the receiving unit to accept the data. SS is the Start Sentinel consisting of 11010. ES is the End Sentinel consisting of 11111. LRC is the Longitudinal Redundancy Check character. Lastly there follow trailing zeros.

Appendix C: Parts List

Item Number	Description	Part Number
1	Profile ITEM, IT0037003, 20x20, L=160mm	114056
2	Profile machining IT037.003, 20x20, L=150mm	114126
3	Profile machining IT037.003, 20x20, L=150mm	114145
4	RFID Reader GP20, 5-12V DC with RS232 Cable	410471
5	Fastening Standard Set 5, ITEM 0370.08	312020
6	Allen screw M5x20 (x2)	301205
7	Allen Screw Socket Head Cap -Blk. M5 x 25	301206
8	Nut T-slot 5 M5 ITEM IT0037001	312007
9	T-Slot Zn M5 nuts (x2)	312009
10	Allen Screw Socket Head Cap -Blk. M3 x 25	301007
11	Allen Screw Socket Head Cap -Blk. M3x30	301023
12	Nut Self Clinching M4 PEM A=1.37	312004
13	Washer - Flat Fiber M4, D10.5xd4.3x1.5	313009
14	Cap for Profile 5, 20x20 IT00370.09	113114
15	Cristaldom, 9x35 Black-Red, White back	102188
16	Label No.1 (Silver) Polyester 64x42	102477
17	Carton Sgl. Wall 245x155x90 (mm)	103007
18	Socket from 2 for 3	410021
19	RFID Tag 125KHz	410472
20	USB to 9-pin RS232 Serial Converter	411890
21	Cable Communication USB Male/Female 2m	411892
22	AC Adaptor 100-240V, 50/60Hz, 035A, 12V	430749
23	2 Prong European to American Outlet Plug Adapter	410021