ID-innovations
Advanced RFID design

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ID-2, ID-12LA

Low Voltage Series

RFID reader Modules

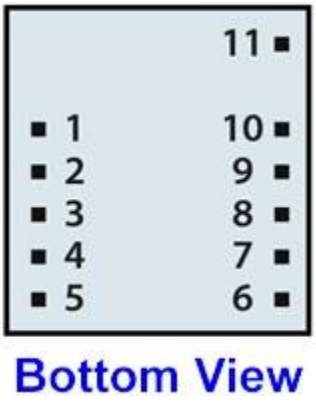
Datasheet Version1.0 Date 09/01/13

1. Overview

ID2 series are small footprint 2.8-5.0volt reader modules that support ASCII, Wiegand26 and Magnetic ABA Track2 data formats. The modules are pin and function compatible with the ID2/12/20 series.

2. Pin Out for ID-2

ID-2



1. GND
2. RES (Reset Bar)
3. Do not connect
4. Do not connect
5. CP
6. Tag in Range
7. Format Selector
8. D1 (Data Pin 1)
9. D0 (Data Pin 0)
10. Read (LED / Beeper)
11. +2.8V thru +5.0V

3. Device Operational Characteristics

Parameter	ID-2
Frequency	125 kHz nominal
Card Format	EM 4001 or compatible
Read Range ID-2	Up to 30 using suitable antenna using ID-Innovations clamshell card
Encoding	Manchester 64-bit, modulus 64
Power Requirement	+2.8 VDC thru +5 VDC @ 35mA ID-2
RF I/O Output Current	+/- 200mA PKPK

4. Data Formats

Output Data Structure - ASCII - 9600 Baud, No Parity, 1 stop bit.

Output = CMOS (Push Pull) 0-Vdd

STX (02h)	DATA (10 ASCII)	CHECK SUM (2 ASCII)	CR	LF	ETX (03h)

Example for Calculation of Checksum for ASCII

Suppose the output Data is 0C000621A58E

Here the actual data is 0C,00,00,06,21,A5 and the checksum is 6E

Using binary we Exclusive OR the bit columns

0C = 00001100

00 = 00000000

06 = 00000110

21 = 00100001

A5 = 10100101

CHECKSUM 10001110 (8E)

Output Data Structure - Wiegand26 – 1mS repeat, 50uS pulse. Open Drain

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
P	E	E	E	E	E	E	E	E	E	E	E	E	O	O	O	O	O	O	O	O	O	O	O	O	P
Even parity (E)													Odd parity (O)												

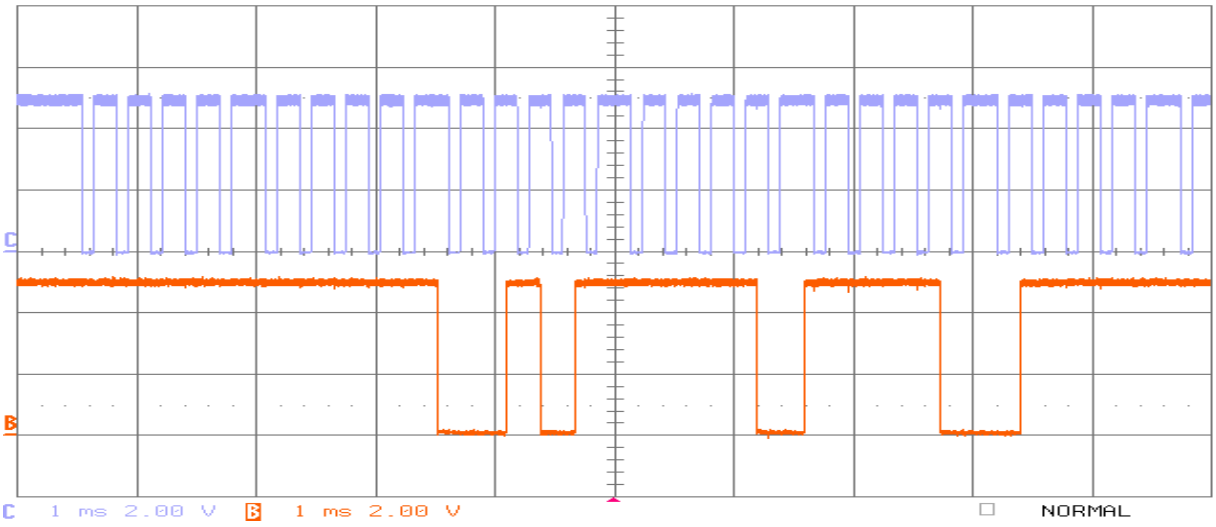
P = Parity start bit and stop bit

Output Data Magnetic ABA Track2 – At Approx. 80cm/sec. Open Drain

10 Leading Zeros	SS	Data	ES	LCR	10 Ending Zeros

[SS is the Start Character of 11010, ES is the end character of 11111, and LRC is the Longitudinal Redundancy Check.]

5. Magnetic Emulation Waveforms



Blue = Clock, Brown = Data

Fig. 3

Start and End Sequences for Magnetic Timing

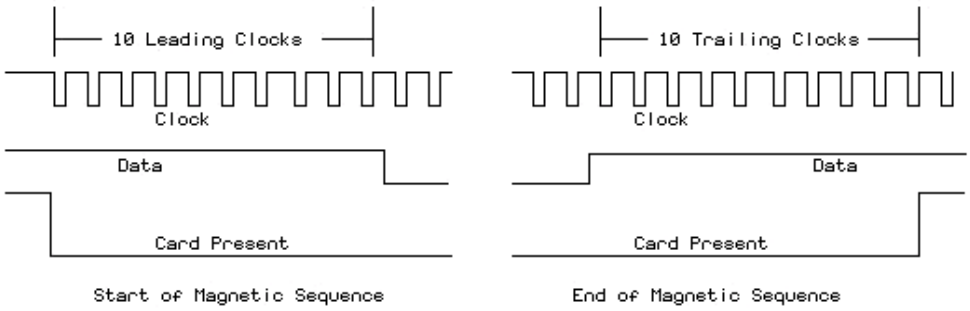


Fig. 4

Data Timings for Magnetic Emulation

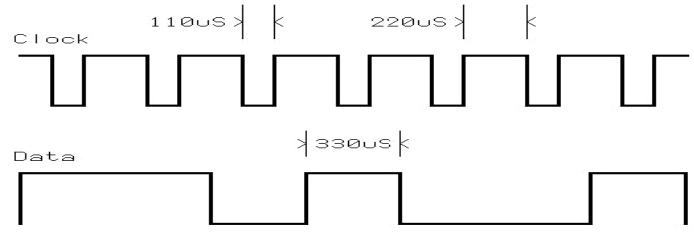


Fig. 5

The magnetic Emulation Sequence starts with the Card Present Line going active (down). There next follows 10 clocks with Zero '0' data. At the end of the 10 leading clocks the start character (11010) is sent and this is followed by the data. At the end of the data the end character is sent followed by the LCR. Finally 10 trailing clocks are sent and the card present line is raised.

The data bit duration is approximately 330uS. The approximate clock duration is 110uS. Because of the symmetry data can be clocked off either the rising or falling edge of the clock.

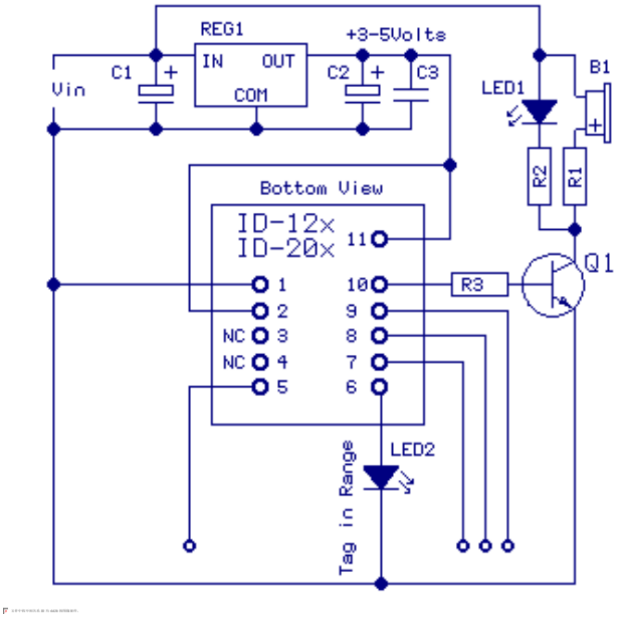
7.

Maximum voltage applied to Pin 2	(Vcc)	5.5volt
Maximum voltage applied to Pin 2	(Reset)	Vcc + 0.7v, -0.7v
Maximum current drawn from Pin 3	(Antenna)	+/- 75mA
Maximum 125 KHz RF Voltage at Pin 4	(Antenna)	+/- 80volt Peak
Maximum current drawn from Pin 5	(Card Present)	+/- 5mA
Maximum current drawn from Pin 6	(Tag in Range)	+/- 5mA
Maximum Voltage at Pin 7	(Format Selector)	Vcc + 0.7v, -0.7v
Maximum current drawn from Pin 8	(Data1)	+/- 5mA
Maximum current drawn from Pin 9	(Data0)	+/- 5mA
Maximum current drawn from Pin 10	(Beeper)	+/- 10mA
Additionally, Pins 5, 6, 7, 8, 9 & 10 may not have a voltage exceeding		Vcc + 0.7v, -0.7v

These ratings are absolute maximums and operation at or near the maximums may cause stress and eventual damage or unpredictable behaviour.

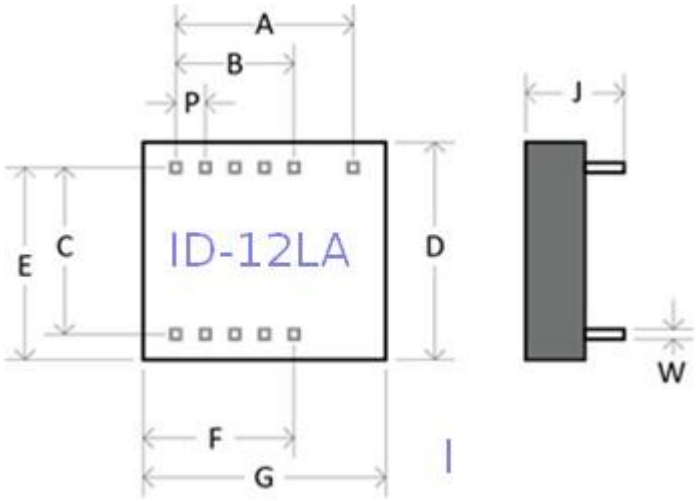
8. Circuit Diagram

8.1 Circuit Diagram for ID-2



Parts List	
Part #	**Value**
R1	100R
R2	4K7
R3	2K2
C1	10uF 25v electrolytic
C2	1000uF 10v electrolytic
C3	100nF
Q1	BC457 or similar
LED1	Read LED
LED2	Tag In Range LED
B1	2.7khz – 3kHz 5v PKPK AC

	ID-12LA		
	Nom.	Min.	Max.
A	12.0	11.6	12.4
B	8.0	7.6	8.4
C	15.0	14.6	15.4
D	25.3	24.9	25.9
E	20.3	19.8	20.9
F	16.3	15.8	16.9
G	26.4	26.1	27.1
P	2.0	1.8	2.2
H	6.0	5.8	6.6
J	9.9	9.40	10.5
W	0.66	0.62	0.67



10. Connection direct to a computer

Direct connection to a computer RS232 can be made by connecting Pin8 to a 1k series resistor and connecting the other end of the resistor to the computer RS232 input. The mode is called pseudo RS232. On a standard D9 socket, connect module Pin8 via the series 1k to pin2 of the D-type. Connect the ground to Pin5 on the D-type. Leave the TX pin3 open. See "Useful Information" below for free terminal download information.

Note that a +2.8v rail will result in the data outputs having a lower swing and may not be suitable for all computers.

10.1 Connection to a Processor UART

Direct connection to UART is made by connecting Pin9 to the UART Rx in pin

10.2 Connecting a Read LED

Sometimes the user may not want to drive a beeper but may still need to drive an LED. In this case a driver transistor may not be necessary because the Beeper Output Pin can supply 5mA continuously. Connect a 1k5 resistor to the Beeper Pin. This will limit the current. Connect the other end of the resistor to the LED anode and connect the cathode to ground.

11. Useful information

For general testing we suggest the user downloads a terminal program free from the internet. Here is one particularly good one to consider:

http://braypp.googlepages.com/terminal - Truly an excellent piece of software, the best terminal we have ever seen.

If you have any technical queries please contact your local distributor, they have all the technical resources to help you and support you. Where no local distributor exists, our technical helpline may be contacted by writing to **help@ID-Innovations.com**

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This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: “Contains Transmitter Module FCC ID: 2ADZBID-2 Or Contains FCC ID: 2ADZBID-2”

When the module is installed inside another device, the user manual of this device must contain below warning statements;
1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference.
(2) This device must accept any interference received, including interference that may cause undesired operation.
2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.