

ID-3/12/20LA-ISO RFID Reader Modules for ISO11785 FDX tags
Datasheet
Advanced RFID Reader Technology
Ver 1.02

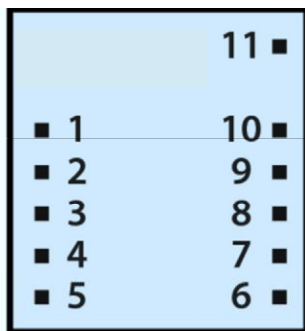


Section	Title	Page
1.	OVERVIEW	3
2.	PIN OUT ID-3LA-ISO, ID-12LA-ISO AND ID-20LA-ISO	3
3.	DEVICES OPERATIONAL AND PHYSICAL CHARACTERISTICS	4
4.	ISO11785 AND COMPATIBLE TAGS	4
5.	OUTPUT DATA FORMAT	4
6.	CRC CHECK.....	5
7.	FUNCTION DESCRIPTION	5
8.	PIN DESCRIPTION & OUTPUT DATA FORMATS	6
9.	ABSOLUTE MAXIMUM RATINGS	6
10.	CIRCUIT DIAGRAM FOR ID-3LA-ISO	7
11.	CIRCUIT DIAGRAM FOR ID-12/20LA-ISO.....	7
12.	CASE DIMENSIONS FOR ID-XXLA- ISO	8
13.	CONNECTION DIRECT TO A COMPUTER	9
13.1	CONNECTION TO A PROCESSOR UART	9
13.2	CONNECTING A READ LED	9
14.	USEFUL INFORMATION.....	9
15.	DISCLAIMER	9

1. Overview

The ID-Innovations ID-xxLA-ISO series are low cost reader RFID modules that read ISO11785 and compatible tags used for animal tagging. The ID-12LA-ISO measures just 26.5 x 25 x 6mm yet has an internal antenna and has a read range of up to 10.5cm with sensitive ear tags. The ID-xxLA-ISO modules support user external antennas. All ID-xxLA-ISO modules are low power and low emission and ideal for fixed and portable applications.

2. Pin Out ID-3LA-ISO, ID-12LA-ISO and ID-20LA-ISO



Bottom View

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



3. Devices Operational and Physical Characteristics

Parameter	Function
Read Range ID-20LA-ISO	Ear tag Up to 10.5cm with sensitive ear tag at VDD 5v
Card Formats	ISO11785
Encoding and Modulation	Bi-phase 128-bit modulus 32; AM 128bit.
Nominal Power Requirement	5 VDC @ 40mA (ID-12LA-ISO), 42mA (ID-20LA-ISO)
Communication	5v CMOS Pseudo RS232 ASCII - 9600 Baud, No Parity, 1 stop bit
Voltage Supply Range	+3.0V through +5.4V

4. ISO11785 and compatible tags

The ISO11785 tag has 128 bits. This is comprised of an 11 bit header, 64 data bits, 16 CRC16 bits, 24 Extension bits and 13 framing bits. After the header, a framing bit is sent after every 8 bits. The data is usually split up as follows,

ID	38 bits
Country Code	10 bits
Extra Application bit	1 bit
Animal / Non Animal	1 bit
Reserved B	14 bits

Recently the extension bits have also been used for various purposes giving a total of 88 usable data bits, but it should be noted that the CRC only covers the above specified data bits and not the extension bits. The tags use bi-phase encoding to enable readers to be AC coupled. Bi-phase is by nature similar to the widely used Manchester encoding. Modulus 32 division is used and this means that the data rate is about 4kbits per sec and this does limit the range by limiting the Q of the receive antenna, although the read range is still acceptable.

5. Output Data Format

STX	64 data bits sent as 16 ASCII Characters	16 bit CRC sent as 4 ASCII characters	24 extension bits sent as 6 ASCII Characters	CR	LF	ETX
-----	---	--	---	----	----	-----

The data bits are sent as they are read off the tag (less the header and the framing bits), preceded by an STX character and followed by a CR, and LF and an ETX where :-

STX	=	Start of transmission character (02h)
CR	=	Carriage return (0Dh)
LF	=	Line Feed (0Ah)

The user may check the CRC if required. Note that the 24 extension bits are not included in the checksum.

6. CRC Check

The ISO11785 tag includes a CRC check. The user may verify the CRC using the following method.

Note that the CRC is only for the first 64 data bits.

Generic Assembler Code for CRC calculation

```
;      BCCH and BCCL contain the 16 bit CRC      ; GPR is temporary storage
;      A = Accumulator                          ; BTJZ Bit Test Jump Zero
;      SETC Set Carry Flag                      ; CLRC Clear Carry Flag
;      RRC Rotate Right Through Carry
```

```
Loop_start    BTJZ    %RXDAT,DALOW
              SETC
              JMP     BCCGEN
DALOW         CLRC
BCCGEN RRC    BCCH
              RRC     BCCL
              JNC     Q1L
              XOR     %?10000000,BCCH
Q1L           MOV     BCCH,GPR
              AND     %?10000000,GPR
              JZ      D16L
              XOR     %?00001000,BCCL
              XOR     %?00000100,BCCH
D16L          REPEAT LOOP FOR 64 BITS
```

7. Function Description

The ID-Innovations ID-xxLA-ISO series modules are compact and provide a cost effective method of reading ISO11785FDX tags. The RF driver circuit is efficient and protected against instantaneous shorting although sustained short circuits for (several seconds) can damage the device through over dissipation.

In applications power where consumption is critical the reset pin can be periodically grounded and this inhibits the RF and saves power. Applications include portable and fixed equipment.

The reader data outputs use 5volt CMOS and transmit serially using 9,6000 baud, no parity and one stop bit, (9600:N,8,1).

Note that the reader does not read ISO11784 tags which use a different system and employ HDX modulation.

The modules carry both C-TICK, EC certification.

8. Pin Description & Output Data Formats

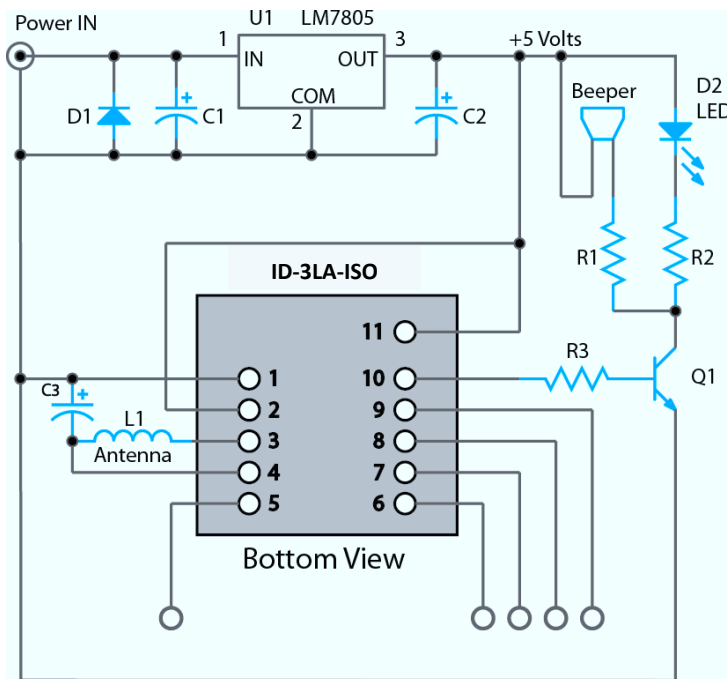
Pin #	Description	ASCII
Pin 1	Zero Volts	GND 0V
Pin 2	Strap to +5V	Reset Bar
Pin 3	DNC	Antenna
Pin 4	DNC	Antenna
Pin 5	Card Present	No function
Pin 6	Tag in Range	Tag in Range
Pin 7	Format Selector (+/-)	Strap to GND
Pin 8	Data 1	CMOS
Pin 9	Data 0	TTL Data (inverted)
Pin 10	3 kHz Logic	Beeper / LED
Pin 11	DC Voltage Supply	+5V

9. Absolute Maximum Ratings

Maximum voltage applied to Pin 2	(Vcc)	5.7volt
Maximum voltage applied to Pin 2	(Reset)	Vcc + 0.7v, -0.7v
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

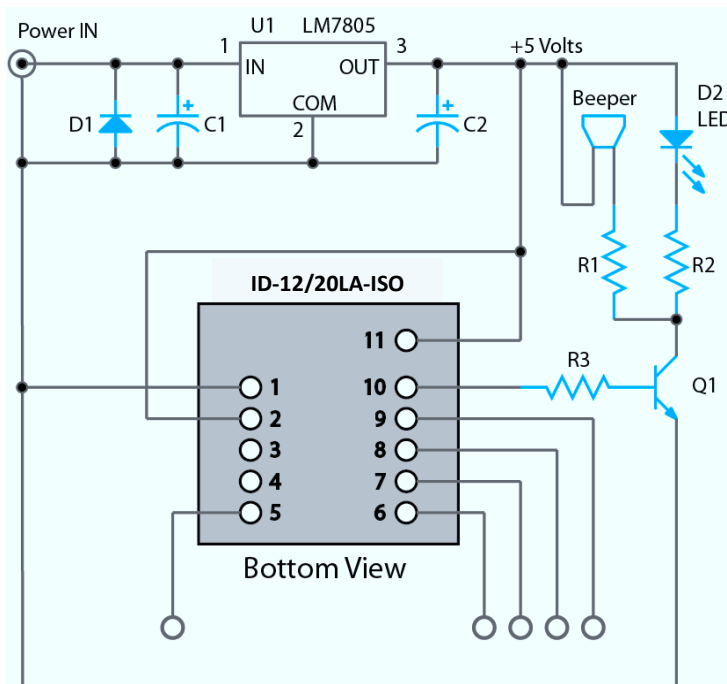
These ratings are absolute maximums and operation at or near the maximums may cause stress and eventual damage or unpredictable behaviour.

10. Circuit Diagram for ID-3LA-ISO



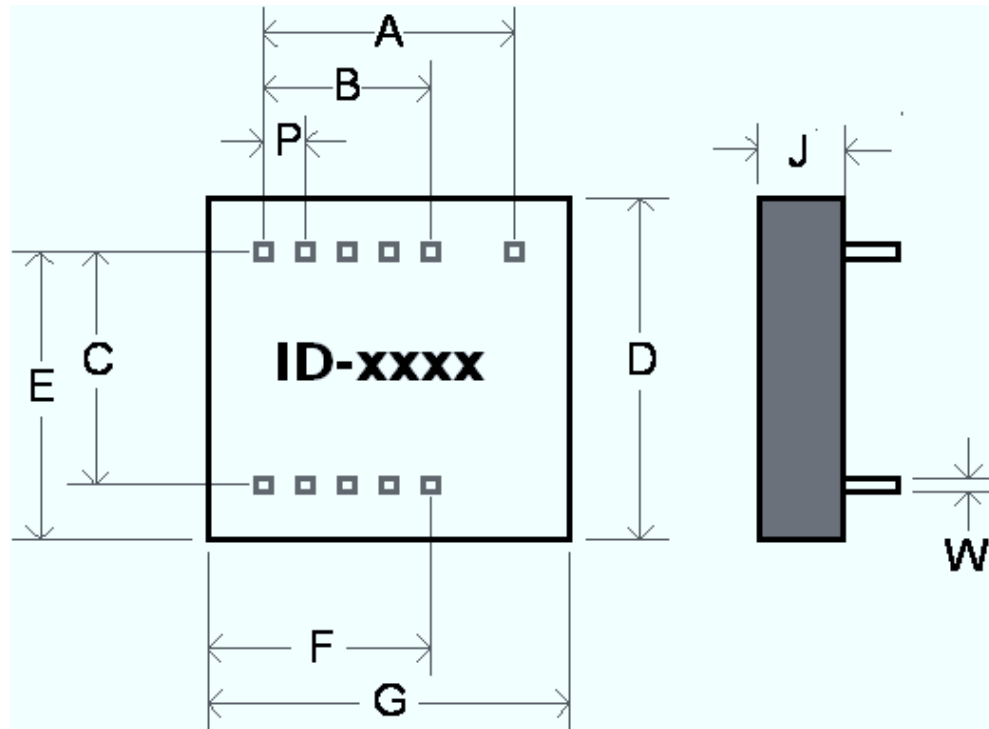
Parts List	
Part #	Value
R1	100R
R2	4K7
R3	2K2
C1	10uF 25v electrolytic
C2	1000uF 10v electrolytic
C3	Only used if L1 is not 1.07mH*
Q1	BC457 or similar
D1	1N4001
D2	Red or Green LED
L1	1.07mH
Beeper	3kHz 5v PKPK AC beeper

11. Circuit Diagram for ID-12/20LA-ISO



Parts List	
Part	Value
R1	100R
R2	4K7
R3	2K2
C1	10uF 25v electrolytic
C2	1000uF 10v electrolytic
Q1	BC457 or similar
D1	1N4001
D2	Red or Green LED
Beeper	3kHz 5v PKPK AC beeper

12. Case Dimensions for ID-xxLA- ISO



	ID-2-LAISO			ID-12LA-ISO			ID-20LA-ISO		
	Nom	Min	Max	Nom	Min	Max	Nom	Min	Max
A	12.0	11.6	12.4	12.0	11.6	12.4	12.0	11.6	12.4
B	8.0	7.6	8.4	8.0	7.6	8.4	8.0	7.6	8.4
C	15.0	14.6	15.4	15.0	14.6	15.4	15.0	14.6	15.4
D	20.5	20.0	21.5	25.3	24.9	25.9	40.3	40.0	41.0
E	18.5	18.0	19.2	20.3	19.8	20.9	27.8	27.5	28.5
F	14.0	13.0	14.8	16.3	15.8	16.9	22.2	21.9	23.1
G	22.0	21.6	22.4	26.4	26.1	27.1	38.5	38.2	39.2
P	2.0	1.8	2.2	2.0	1.8	2.2	2.0	1.8	2.2
H	5.92	5.85	6.6	6.0	5.8	6.6	6.8	6.7	7.0
J	9.85	9.0	10.5	9.9	9.40	10.5	9.85	9.4	10.6
W	0.66	0.62	0.67	0.66	0.62	0.67	0.66	0.62	0.67

All Dimensions in mm

13. 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 the output of the ID-xx via the series 1k to pin 2 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.

13.1 Connection to a Processor UART

Direct connection can be made to a UART RX input from Pin9 of the ID-xx module. There is no need for a 1k protection resistor, but a 1k resistor will make the circuit safer for testing and reduce EM noise.

13.2 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.

14. 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

15. Disclaimer

The information in this document is provided solely for the use of ID Innovations' products. There are no express or implied copyright licenses or intellectual property rights granted to design or fabricate any of ID Innovations' products based on the information provided in this document.

ID Innovations reserves the right to make changes to specifications and product descriptions at any time without notice. The specifications provided in ID Innovations' datasheets can and do vary in different applications and actual performance may vary over time.

ID Innovations' products are not intended for and will not be used in life support systems, human implantation, nuclear facilities or systems or any other application where product failure could lead to loss of life or catastrophic property damage.

ID Innovations makes no warranty, representation or guarantee regarding the suitability of its products for any purpose, and it assumes no liability, whether claim, loss, damage or expense of any kind caused in whole or in part, directly or indirectly by the inadequacy of any products for any purpose, any infringement, deficiency or defect in



any products whether or not covered by any manufacturer's warranty, the use or performance of any products, any interruption or loss of service, or any special, direct, indirect, incidental or consequential damage, including, without limitation, personal injury or loss of business or profit, or other damage, whether or not ID Innovations has been informed of the possibility or likelihood of such or any other damages, arising out of the application or use of any product and information provided.