ProxID Micro Reader GP8
Instruction Manual

Contents

Rev 1.46 Jan 26, 2000

1. Introduction

The GP-8 is a low cost high performance OEM proximity reader module for use with a simple external antenna. The module features medium read range and small dimensions. The GP-8 also has good read range at 5 Volts, making it ideally suited to a wide variety of applications, particularly access control. The same basic unit can be configured to most of the common output formats, including Wiegand and Magstripe, making it easy to upgrade existing installations.

2. Features

* **Low cost**
* **Medium read range**
* **Small outline**
* **Wide Voltage range**
* **Potted for environmental protection**
* **Externally programmable interface**
* **Plug-in fitting**
* **Reading speed 2x faster than GP8 1v45**

3. Theory

The reader generates a 125KHz inductive field that extends some way beyond the reader module. When a transponder is placed within the vicinity of the reader module, it draws power from this field and providing the field is of sufficient strength the internal microcircuits contained in the transponder begin to function. Data is transferred from the transponder by means of amplitude modulation in such a manner that the transponder varies the rate at which it draws power from the field in a way that corresponds to the internal identity code programmed in this internal memory. These changes in field power can be detected by the reader and converted back into a copy of the original data.

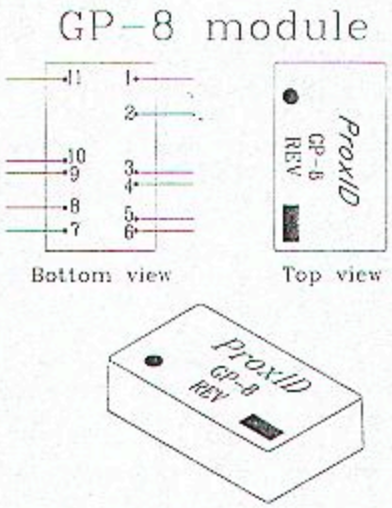
4. Specifications

Power Requirements	5-13.5 Volts regulated DC at 55 mA typical with a 12V supply. A linear regulator is recommended.
Interface	Wiegand, Magstripe, 9.6 K Baud Serial ASCII (RS232) or special to customer specifications.
Read Range	Production Pass range is 5.0cm @ 12V with ISO card
Typical Maximum Read - in ideal conditions	Range 7.0 cm at 12.0V with ISO card.
Frequency	125KHz standard or 134.2KHz to special order.
Transponder	Read Only.
Audio/visual Indication	LED output and Buzzer
Dimensions	41 x 24 x 10mm
Weight	<50gm
Magstripe Speed	Simulated to 56 inches/sec

5. Pin Assignment

Pin1)	Power 0 Volt
Pin2)	Power 5.0-13.5 Volts
Pin3)	Program Input
Pin4)	Card Present Output with internal 4K7 pull-up
Pin5)	Data Output RS232, Magstripe data & Wiegand0, with internal 4K7 pull-up (pull up only for Wiegand and Magstripe)
Pin6)	Magstripe clock & Wiegand1, with internal 4K7 pull-up
Pin7)	External Beep control input *
Pin8)	LED Drive (use 470-1K series resistor)
Pin9)	Buzzer pre-driver (requires driver transistor)
Pin10)	External Antenna Ground
Pin11)	External Antenna Drive

Note * Connect Pin1 to Pin7 if external beeper control is not required



6. Programming

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

Wiegand		Magstripe	
Pin 1	Ground 0V	Pin 1	Ground 0V
Pin 2	Power +V	Pin 2	Power +V
Pin 5	Data0	Pin 6	Clock (Strobe)
Pin 6	Data1	Pin 5	Data
Pin 3	Connect to Pin 6	Pin 4	Card Present
Pin 4	No Connection	Pin 3	Connect to Pin 4

Serial ASCII (RS232)

Pin 1	Ground 0V
Pin 2	Power +V
Pin 5	Data
Pin 3	No Connection
Pin 4	No Connection
Pin 6	No Connection

7. Data Structure

7-1. Data Structure (ASCII)
BAUD RATE : 9600,N,8,1

STX(02 HEX)	DATA (10 HEX)	CR	LF	ETX (03 HEX)

The start character is factory defined as an 'STX' (02 HEX). This is followed by 10 Hex characters of data. 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.

7-2. Data Structure (Magstripe)

10 LEADING ZEROS	SS	DATA (14 DIGITS)	ES	LRC	10 TRAILING ZEROS

The 10 leading zeros prepare the receiving unit to accept the data. The data is 14 digits long. 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 are 10 trailing zeros. Magstripe 8 digits and 6 digits are available for special request.

The hexadecimal data from the card is first converted to a denary string before transmission. For example, a card containing the hexadecimal data (0411115EA6) , will be converted to denary and sent as denary **00017466220198** (14 digits)

The calculation is performed as follows.

$(6 * 16^0 + 10 * 16^1 + 14 * 16^2 + 5 * 16^3 + 1 * 16^4 + 1 * 16^5 + 1 * 16^6 + 1 * 16^7 + 4 * 16^8)$
= 00017466220198

7-3 Data Structure (Wiegand Format-26 Bit)

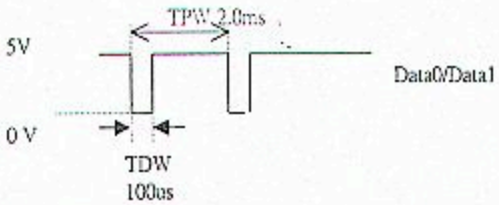
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
P	S	S	S	S	S	S	S	S	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	P
P	E	E	E	E	E	E	E	E	E	E	E	E													
													O	O	O	O	O	O	O	O	O	O	O	O	P
SUMMED FOR EVEN PARITY (E)													SUMMED FOR ODD PARITY (O)												

Note:

P	Parity (Even or Odd) Start Bit and Stop Bit
S	Site Bits from Card or Reader
C	Card Number Bits from Card
SYRDSSW1-W26	Site bits from Card (24 bits Card Data)
MSB	Normal 01
LSB	Normal 24

Data Timing Specification

Pulse Interval(TPW)	2.0mS +/- 3%
Pulse Width (TDW)	100uS +/- 3%



8. Trouble Shooting

In case of problems the following procedure should be followed.

Failure to read

1) Turn off the power to the GP8.
2) Check the power input connections making sure that they are not reversed.
3) Check the programming pin is correctly connected.
4) Measure the supply voltage and confirm it is in the range 5-13.5V.
5) If the supply has a current limit, set this to 100mA.
6) Turn on the power.
7) Ensure the current is below 100mA, if there is no current being drawn or the current is in excess of 100mA, then the unit has possibly sustained damage.
8) Check that the LED drive goes high immediately upon switch on. This will indicate that the processor is functioning.
9) Ensure the external buzzer (pin7) is at logic '0'(off) or logic '1'(on)
10) Ensure the power supply output is free from ripple and noise.

9. External Antenna

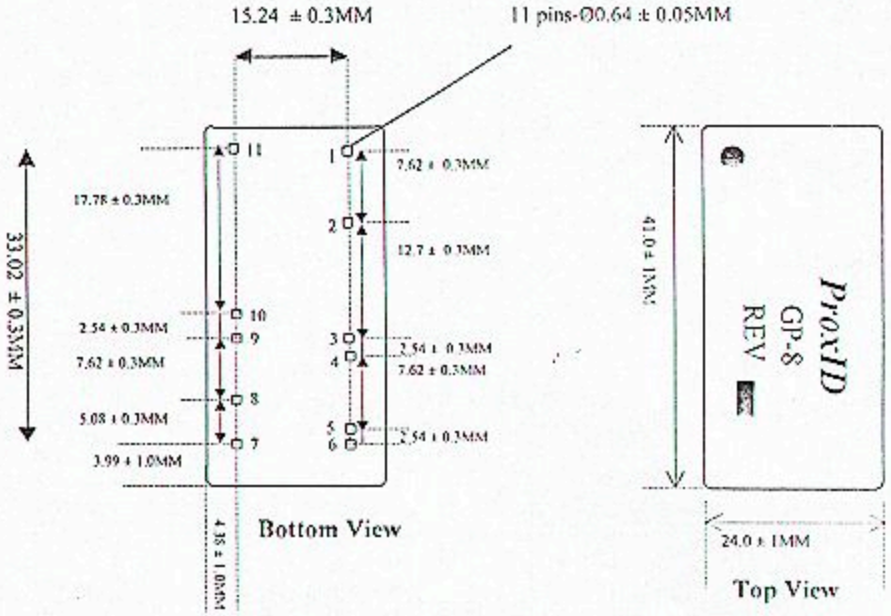
A simple experimental antennae consisting of 8 turns of 0.8mm diameter copper wire loosely wound on a 10x10 cm former and measuring 16uH will give a range of approximately 30cm when tuned with a 0.1uF capacitor. Ranges in excess of 40cm can be obtained with a suitable antennae and capacitor. The required inductance will differ if the GP8 is placed within the coil and required values can vary from 16-17.1uH depending on the exact position. For example a small antenna wound around the GP8 will need to be about 17uH however a 10cm radius coil will require a value of about 16uH.

Note that the best read ranges are found when the inductance is made slightly more than that required for resonance. Polypropylene, Polycarbonate or Polyphenylene-Sulphide capacitors are recommended. Ensure the tuning capacitors are capable of working continuously at 125KHz at the measured AC voltage present on the coil (6-18vRMS) depending on coil Q. Use only low loss capacitors.

Suitable tuning capacitors include:

Wima MKP 2 0.1/100 VDC	*15 VRMS max @ 80 °C*	*(PP)*
Wima MKI 2 0.1/100 VDC	*12 VRMS max @80 °C*	*(PPS)*
Wima SMR 100nF100VDC		*(PPS)*
Panasonic ECHU1H104	*7 VRMS*	*(PPS)*
Evox Rifa PMR15 104K250L4	*32VRMS max @ 80 °C*	*(PP) (0.2m/s air flow)*
Evox Rifa PHE427FB6100J	*43VRMS max @ 80 °C*	*(PP) (0.2m/s air flow)*

GP8 MODULE



Note: PCB length (37.0±1.0 MM) and Width (20.0±1.0 MM)
Case length(41.0±1.0 MM) and Width (24.0±1.0MM)
PCB holes is 1.1MM in diameter
11 pins of diameter 0.64±0.05MM

Title	GP-8 Module Case and PCB Dimension	Date	4-Dec-09
Product	GP-8 Module		
Prepared by : Mr Alex Tan		Verified b	Mr G.Powell

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