FCC ID: GCD-AY-Z12 OPERATIONAL DESCRIPTION

1. Operational description

The AY-Z12 is a proximity reader intended to read ID's from 125KHz passive proximity tags (passive - tags has no battery). RF section of the reader is comprised of 125KHz oscillator with feedback input from the antenna matching section. The 125KHz oscillator output is feeded into an antenna driver and then into the antenna coil. The transmitted 125KHz carrier is the energy source powering the passive proximity tag presented by system users.
Once the presented tag is powered by the carrier signal, it will conineously load modulate the carier signal using Manchester coding at roughly 2KHz frequency. Modulation data is determined according to the tag ID. This modulated signal is detected by Signal Detector connected to the antenna coil. The filterred signal detector outpu is fed into the microcontroller which can then determine the tag ID.
The 125KHz oscillator has feedback input used to compensate for frequency drifting that can be caused by environmental causes, such as nearby metal objects. Feedback is changed by changing the antenna matching. This is done by microcontroller turnning on or off the tunning capacitors.
The reader supported tag type is EM 4001 (made by EM Microelectronic-Marin) or other compatibe tags.

2. Modulation Timing and Data.

This tag contineously "transmits" 64 bits data by load modulating the 125KHz carrier. The modulated signal frequency is roughly 2KHz, and is determined carrier frequency and tag number of bits:
Fsignal = Fcarrier/Tnb

Fsignal – modulated signal frequency
Fcarrier – carrier wave frequency
Tnb – Tag number of transmitted bits

Fsignal = 125000/64
Fsignal = 1.953KHz

The 64 bits Tag data are comrised of several fields. Only 40 bits of them are the actual tag number. The reader microcontroller read the contineously and parses it according the 64bit frame structure.:
9 Header bits (all 1's)
10 Row parity bits
4 Column parity bits
40 Data bits
1 Stop bits (0)

Figure bellow illustrates the 64 bits frame data:

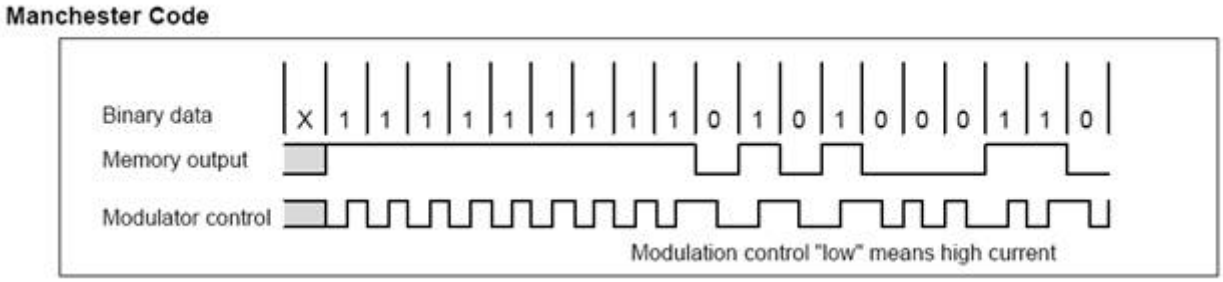
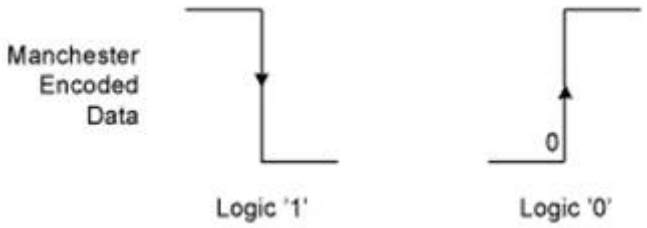


Figure bellow illustrates Manchester bits "1" and "0":



Original Data	Value sent
Logic "0"	Upward transition at bit centre
Logic "1"	Downward transition at bit centre

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