Wiegand Data Format

Pyramid Series Proximity readers can communicate via Wiegand[1] or Magnetic Stripe data formats. Wiegand is a commonly used interface between readers and control panels used in access control, security, time and attendance, and other related industries. Pyramid Series readers follow the Wiegand standard specified by the Security Industry Association's (SIA) Access Control Standard Protocol for the 26-Bit Wiegand Reader Interface document. Manufacturers have adopted the Wiegand standard to establish a common Wiegand interface. This provides a level of compatibility and interoperability for readers and control panels that can be used by consultants, specifiers, and end users when setting product design or system installation criteria. To this end the Pyramid Series offers several approaches for implementing the Wiegand format.

NOTE: If you are enrolling cards for a "hybrid" site (one using both Pyramid series and HID credentials), it is possible to have duplicate card coding (i.e. identical format, facility code, and ID number).

1.0 Wiegand Connections

Pyramid Series readers can be connected to virtually any control panel that conforms to Wiegand format standards. All connections between the reader and control panel are made through the reader's cable. Consult Table 1 and Figure 1 for wiring instructions.

Table 1: Wiring Connections

Wire Color	Function
Silver	Shield
Green	Data 0
Blue	Beeper
Red	Reader Power
Black	Reader Ground
Brown	Single LED Control Line (Red LED)
Orange	Second LED Control Line (Green LED)
White	Data 1

1. The term "Wiegand™" is used throughout this document to indicate a standard data output format for the Pyramid Series Proximity Readers. This is not to be confused with Wiegand swipe readers and cards.

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Figure 1: Wiring Connections

2.0 Data Signals

Figure 2 displays the timing pattern for data bits sent by the reader to the access control panel. This timing pattern falls within the Wiegand guidelines as proscribed by the SIA's Access Control Standard Protocol for the 26-Bit Wiegand Reader Interface (a Pulse Width time between 20 uS and 100 uS, and a Pulse Interval time between 200 uS and 20 mS).

The Data 1 and Data 0 signals are held at a logic high level (above the Voh level) until the reader is ready to send a data stream. The reader places data as asynchronous low-going pulses (below the Vol level) on the Data 1 or Data 0 lines to transmit the data stream to the access control panel (the "saw-teeth" in Figure 2). The Data 1 and Data 0 pulses will not overlap or occur simultaneously. Table 2 provides the minimum and maximum allowable pulse width times (the duration of a pulse) and pulse interval times (the time between pulses) for Pyramid Series Readers.

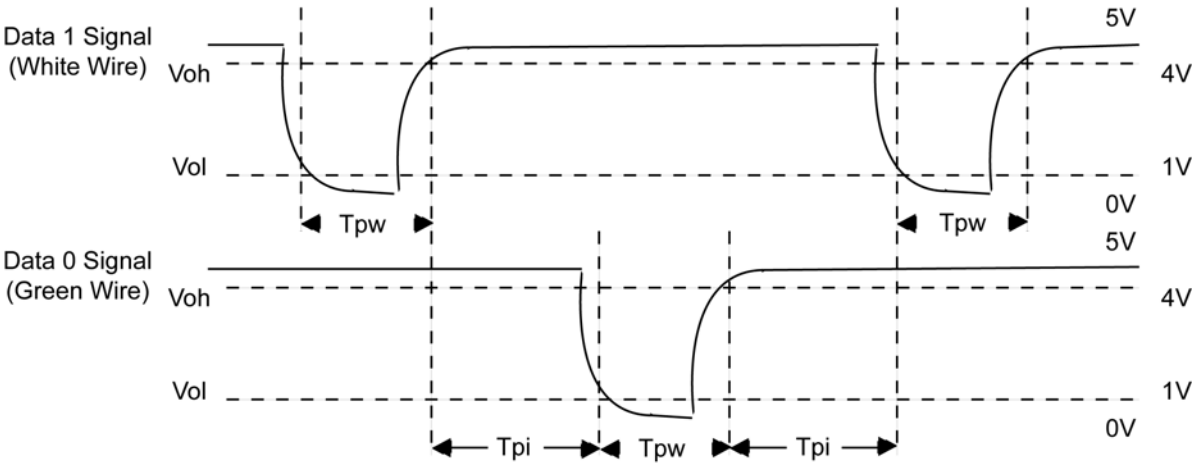

Figure 2: Data Bit Timing Pattern

Table 2: Pulse Times

Symbol	Description	Pyramid Series Reader Typical Time
Tpw	Pulse Width Time	100 µs
Tpi	Pulse Interval Time	1 ms

3.0 Wiegand Formats

Pyramid Series readers feature pass-through technology. This means that any reader will read any and all formatting data programmed to any of the Pyramid Series credentials. Pyramid Series readers can be shipped from stock because unlike other proximity manufacturers, there is no format matching between readers and credentials.

3.1 26-Bit Wiegand Format

The composition of the open de facto industry standard 26 Bit Wiegand format contains 8 bits for the facility code field and 16 bits for the ID number field. Mathematically these 8 facility code bits allow for a total of just 256 (0 to 255) facility codes, while the 16 ID number bits allow for a total of only 65,536 (0 to 65,535) individual ID's within each facility code. Due to the mathematical limitations of the 26-bit Wiegand format, code duplication might occur. Table 3 provides a summary the 26-bit Wiegand format.

Table 3: 26-bit Wiegand Format

Bit Number	Purpose
Bit 1	Even parity over bits 2 to 13
Bits 2 to 9	Facility code (0 to 255); Bit 2 is MSB
Bits 10 to 25	ID Number (0 to 65,535); Bit 10 is MSB
Bit 26	Odd parity over bits 14 to 25

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3.2 Pyramid Wiegand Format

Several alternatives exist for customers who require more codes. The first is to switch to Farpointe Data's standard 39 bit Pyramid format. This 39 bit Wiegand format contains 17 bits for the facility code field and 20 bits for the ID number field. Mathematically these 17 facility code bits allow for a total of 131,072 (0 to 131,071) facility codes, while the 20 ID number bits allow for a total of 1,048,576 (0 to 1,048,575) individual ID's within each facility code. Since there are so many facility codes in the Pyramid format, a new facility code may be selected for each project. Additionally the large number of ID's per facility code makes the Pyramid format ideal for very large projects. For added security, Farpointe Data tracks credential coding to ensure that no duplication occurs. Table 4 provides a summary of the Pyramid Wiegand format.

Table 4: Pyramid Wiegand Format

Bit Number	Purpose
Bit 1	Even parity over bits 2 to 19
Bits 2 to 18	Facility code (0 to 131,071); Bit 2 is MSB
Bits 19 to 38	ID Number (0 to 1,048,575); Bit 19 is MSB
Bit 39	Odd parity over bits 20 to 38

3.3 Custom Wiegand Formats

The second alternative is to create a custom Wiegand format. Typically, up to 64 bits are available for creating a custom Wiegand format. With certain limitations, formats with greater than 64 bits may be created. If a customer currently has a custom Wiegand format from Wiegand or from other proximity manufacturers, Farpointe Data can normally match that format. Although the customer is primarily responsible for custom format card coding, as an added benefit Farpointe Data tracks card coding for additional security. Table 5 provides an example of one possible custom Wiegand format.

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Table 5: Example of a Custom Wiegand Format

Bit Number	Purpose
Bit 1	Even parity over bits 2 to 22
Bits 2 to 9	OEM code (0 to 255); Bit 2 is MSB
Bits 10 to 21	Facility code (0 to 4,096); Bit 10 is MSB
Bits 22 to 43	ID Number (0 to 524,287); Bit 22 is MSB
Bit 44	Odd parity over bits 23 to 43

Wiegand Data Format

3.4 The 8-bit Burst Format of the P-600 Rocky Proximity Reader and Keypad

The P-600 reader is capable of transmitting data in the 26-bit Wiegand format described above, but its default data transmission configuration is Wiegand 8-bit burst. The timing pattern for data bits generated in the 8-bit burst format follows the pattern described in the Data Signals section beginning on page 2. In 8-bit burst mode, each keystroke prompts the reader to transmit 8 bits of data according to Table 6.

Table 6: Wiegand 8-bit Burst Data Format

Keypad Entry	Binary Data	Decimal Equivalent
0	11110000	240
1	11100001	225
2	11010010	210
3	11000011	195
4	10110100	180
5	10100101	165
6	10010110	150
7	10000111	135
8	01111000	120
9	01101001	105
*	01011010	90
#	01001011	75

For further details on the Pyramid Series product line or on creating custom Wiegand formats, please contact Farpointe Data.