CARD READER + KEYPAD MODELS
AP620HA AND AP640HA – WIEGAND OUTPUT

speco technologies®

1.0 Introduction
This Reference Document is intended for experienced installing technicians. It is a basic reference to ensure the appropriate keypad mode is used. Models described include the AP620HA and AP640HA, as well as variants supporting several card and tag technologies.

The models AP620HA and AP640HA integrate a keypad with an RFID card reader into a single, integrated device. The keypad itself is alphanumeric and backlit. In operation the keypad and RFID card reader portions of the AP620HA and AP640HA share the same Wiegand data lines. Specifically, data from either the keypad or the RFID card reader is passed to the access control system on the same cable. Keypad data is passed according to either the 8-Bit Burst (default) or 26-Bit Wiegand data format. And as such the AP620HA and AP640HA are appropriate for use in applications requiring keypad-only, RFID card reader-only, or keypad plus RFID card reader applications (commonly known as card + PIN).

A keypad is a hardware component commonly found in use with more sophisticated, or higher security, electronic access control systems. In operation they are flexible, and can be used for arming or disarming system attributes, or for sending a PIN, or personal identification number, to the system. Typically, a PIN is a secret alphanumeric password shared between a user and the system, and is used to authenticate the user to the system. In one use scenario the user will present their access card to the reader and then enter their PIN on the keypad. Upon receiving the user's access card and PIN data, the system will look up the PIN based upon the user ID and then compares the looked-up PIN with the received PIN. In this use scenario only when the number entered on the keypad matches the number stored in the system will the user be granted access through a controlled access point, such as a locked door.

NOTES:
- The keypad is based upon non-mechanical, solid-state technology, and is optimized for use with a bare finger.
- For best keypad operation, the user's finger must be physically lifted from the keypad between key presses. Only one key can be pressed at a time.
- Upon each individual key press, the reader will respond with a beep of its audio tone and a flash of its LED.
- The keypad's blue backlighting is activated for approximately 20 seconds upon key press or card presentation.
- For user orientation in non-illuminated environments, the keypad's 5-key is always backlit.
- The AP620HA and AP640HA only support Wiegand output formats. They do not support magnetic stripe output formats.

2.0 8-Bit Burst Keypad Mode
While in the 8-Bit Burst mode each key press results in the reader transmitting 8 bits of data to the host (reference Table 1).

Table 1

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

2.1 Enable 8-Bit Burst
This procedure is only applicable if the reader is currently in 26-Bit Wiegand mode.
1. Cycle power to the reader.
2. Present the Wiegand Keypad Data Mode control card to the reader (beeps four times).
3. Press the #-key (reader beeps four times to indicate success).
4. Press *-key (should beep once to indicate 8-Bit Burst is enabled).

3.0 26-Bit Wiegand Mode

While in the 26-Bit Wiegand mode, the user's PIN is outputted as the ID Number portion of a 26-Bit Wiegand message. As such, PINs can range from 0 to 65534, with 65535 normally reserved as an error code. A facility code ranging from 0 to 255 must be programmed into the reader when converting to 26-Bit mode (parity is calculated by the reader). The #-key must be pressed to transmit the 26-Bit message to the host (reference Table 2).

PIN 65535 is normally used as an error code. The reader will transmit this code to the host when:

- The #-key is pressed without any preceding digits.
- When a PIN value of 0 is entered (cannot use 0 as a PIN)
- Entering the PIN 65535, or any PIN greater than 65535.

NOTES:

- Pressing the *-key overwrites all previous key presses (beeps four times when pressed).
- There is a five second time-out between PIN entries, or entry attempts. If a time-out occurs all previous key presses are overwritten. The reader beeps four times to indicate a time-out has occurred.

Table 2

26-Bit Wiegand Format Table	
Bit Number	Purpose
1	Even parity over bits 2 to 13
2 to 9	Facility Code (0 to 255); Bit 2 is MSB
10 to 25	ID Number/PIN (0 to 65,535); Bit 10 is MSB
26	Odd parity over bits 14 to 25

3.1 Enable 26-Bit Wiegand Mode

This procedure is only applicable if the reader is currently on 8-Bit Burst mode.

1. Cycle power to the reader.
2. Present the Wiegand Keypad Data Mode control card to the reader (beeps four times).
3. Enter the facility code to be applied to the keypad (FC = 0 to 255); default is usually set to 0. If an unacceptable facility code is entered the reader will give out one long beep.
4. Press the #-key (reader beeps four times to indicate success).
5. Press the *-key (should beep four times to indicate 26-Bit mode is enabled).

4.0 Test Keypad Mode

To verify the keypad mode of the reader press the *-Key. If the reader beeps once, the keypad mode is 8-Bit Burst. If the reader beeps 4-times, the keypad mode is 26-Bit Wiegand.

5.0 Optional 4-Bit Burst Mode[1]

Table 3

4-Bit Burst Format Table												
Keypad Entry	0	1	2	3	4	5	6	7	8	9	*	#
Binary Data	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011
Decimal Equivalent	0	1	2	3	4	5	6	7	8	9	10	11

[1] For additional information contact Speco Technologies directly.