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ProxPro® with Key pad

APPLICATION NOTE

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Contents

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Introduction

The HID ProxPro® proximity readers are available with an optional key pad. The key pad has twelve keys (four rows by three columns), like a common telephone key pad.

Two versions are available:

- K version key pads can send data using two different methods called Internal and External.
- S version key pads use the method External only.

The Internal method sends the key pad data on the same data lines as the card data. The ProxPro 5355 carries card and key pad data across the wiegand lines. The ProxPro 5352 carries card and key pad data across the serial lines. Set Dip Switch SW1-4 to the on position for selecting the Internal mode. This switch group is located in the lower right corner of the ProxPro circuit board. The default mode is internal. Every time a key is pressed the non-parity hexadecimal value of the key is sent via the wiegand data interface.

The External method uses a separate cable to send key pad data.

ProxPro Model 5355 Wiegand

Key Pad Message

Each key press produces 4-bits of data. In default mode, 4-bits of key data are sent over the wiegand lines each time a key is pressed. The * and # also send 4-bits in default mode.

0 = 0000	4 = 0100	8 = 1000
1 = 0001	5 = 0101	9 = 1001
2 = 0010	6 = 0110	* = 1010 = A
3 = 0011	7 = 0111	# = 1011 = B

Length

The ProxPro reader can be configured to store (buffer) key entries so all the data can be sent at once. Data transmission is triggered when the last key in the series is pressed. If the reader is set up to buffer 4 keys, for instance, the reader will not send key data until the fourth key is pressed.

The maximum number of key entries that can be buffered is 10 with parity and 11 without parity. If a buffered configuration is used, the reader will clear all entries after five seconds has expired between entries.

The length option is factory configured per the customer's order.

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Parity

The default factory configuration includes no parity in the key pad data message. When the parity option is enabled, 2-parity bits are added to the total message, independent of the length. Each parity bit covers exactly one half of the message.

P XXXXXXXX.....	XXXXXXXXP
EXXXXXXXX...	
	...XXXXXXXXO

P = Parity bit

E = Even parity

O = Odd parity

X = Bits covered by the parity

User Interface

The user may press keys at any time. Card reads and key entries are independent of each other. The user can follow any sequence specified by the system integrator. The reader beeps and the LED flashes green when a key is pressed. If 5 seconds elapses between key entries, all keys entered are cleared and the user must start the sequence from the beginning.

Key pad Message using multiple key buffering and parity options

Paaaa bbbb cccc dddd eeee ffff gggg hhhh iiii jjjjP

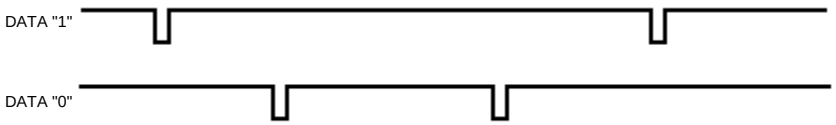
The letters a through j are the 4-bits produced with each key press. The P represents the parity for the message. Up to 10 keys can be buffered when using Parity.

Examples

Default mode without parity

The default mode sends the key pad entry every time a key is pressed. The message consists of 4-bits.

When the 9 key is pressed, 1001 is sent over the to the wiegand interface.



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Parity

There is one key pad entry with parity.

For example, when the key 9 is pressed and the following is sent over to the wiegand interface.

11 00 10.

EXX

XXO

Length

The reader can be configured to buffer up to 11 keys (4-bits per key) without parity or up to 10 keys with parity before sending the message to the host. The first key entered is the most significant 4-bit nibble, and the last key entered is the least significant nibble.

Without parity

AAAA BBBB CCCC DDDD ..... KKKK

AAAA = the first key entered.

BBBB = the second key entered.

KKKK = the eleventh key entered (maximum).

When buffering keys with the Parity option set, a four key message would look like the following.

P AAAA BBBB CCCC DDDD P	
E XXXX XXXX	
	XXXX XXXX O

A – 4-bits for the first key entered

B – 4-bits for the second key entered

C – 4-bits for the third key entered

D – 4-bits for the fourth key entered

P – Parity bits

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Messages

Message with 5 key entries: 0, 1, 2, 3, 4

P	AAAA	BBBB	CCCC	DDDD	EEEE	P
1	0000	0001	0010	0011	0100	1
E	XXXX	XXXX	XX			
			XX	XXXX	XXXX	O

Message with 5 key entries: 4, 5, 9, 2, *

1	0100	0101	1001	0010	1010	1
E	XXXX	XXXX	XX			
			XX	XXXX	XXXX	O

Message with 6 entries: *, 4, 9, 3, 7, 0

The * and # are sent as part of the message. This is an example of a 26-bit key pad message (Option #10 in the following example).

1	1010	0100	1001	0011	0111	0000	0
E	xxxx	xxxx	xxxx				
				xxxx	xxxx	xxxx	O

Other Key Pad Options

09	Buffer one key, add compliment, 8-bit
10	Buffer six keys and add parity (26-bit - BCD)
11	Buffer one key and add parity
14	Buffer one to five keys standard 26-bit output (binary)
20	Buffer one key, no parity

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Configuration 09 buffer one key with compliment

Configuration 09 sends 8-bits per key. The low order nybble is the binary representation of the key. The high-order nybble is the compliment of the low-order nybble. The * and # report as 10 (A hex) and 11 (B hex). No parity or key buffering is available in this option.

Host system receives 8-bit message

0 = 1111 0000	6 = 1001 0110
1 = 1110 0001	7 = 1000 0111
2 = 1101 0010	8 = 0111 1000
3 = 1100 0011	9 = 0110 1001
4 = 1011 0100	* = 0101 1010 = 10 (A hexadecimal)
5 = 1010 0101	# = 0100 1011 = 11 (B hexadecimal)

Configuration 10 - Buffer six keys with parity

Configuration 10 buffers six keys, adds parity, and sends a 26-bit (BCD) message. Each key is a 4-bit equivalent of the decimal number.

P	AAAA	BBBB	CCCC	DDDD	EEEE	P
E	XXXX	XXXX	XXXX			
				XXXX	XXXX	XXXXO

A – First key entered

B – Second key entered

C – Third key entered

D – Fourth key entered

E – Fifth key entered

F – Sixth key entered

P – Parity bits even and odd

Example: 26-bit output of keys (with #) 12345#

P	AAAA	BBBB	CCCC	DDDD	EEEE	FFFF	P
0	0001	0010	0011	0100	0101	1011	1
E	XXXX	XXXX	XXXX				
				XXXX	XXXX	XXXX	XXXXO

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Configuration 11 - Buffer one key with parity

Configuration 11 adds parity. Each key press sends 4-bits with 2-parity bits added.

Example: The nine key is pressed.

P	AAAA	P
1	1001	0
E	XX	
	XX	O

P = Parity bit

A = Key data

E = Even parity

O = Odd parity

Configuration 14 - Standard 26-bit with facility code

Configuration 14 can buffer up to five keys and outputs key pad data with a facility code like a standard 26-bit card output.

A PIN number up to 65,535 can be entered. If the number is less than five keys, the reader will increase the buffer with leading zeros. The three digit facility code is pre-set during configuration. Once the # is pressed, the data is sent across the wiegand data lines as binary data in the same format as a standard 26-bit card. The facility code can be in the range of 0 to 254 decimal.

Just like card numbers, pin numbers can range from 0 to 65,535. If a pin number greater than 65,535 is entered, the reader will clear the buffer and make the user start again. If no key is pressed within five seconds, the reader will clear the buffer. No failure message will be sent to the host system.

Example: Standard 26-bit with facility code key pad output.

Facility code = 8 (set when Reader was configured)

If the two key is pressed within five seconds and the # is pressed the reader will send the following 26-bit message:

P	AAAA	AAAA	BBBB	BBBB	BBBB	BBBB	P
1	0000	1000	0000	0100	0000	0010	0
E	XXXX	XXXX	XXXX				
				XXXX	XXXX	XXXX	O

Facility code = 254 (set during configuration)

User enters pin number = 6, 5, 5, 3, 5 then presses the # key within five seconds.

P	AAAA	AAAA	BBBB	BBBB	BBBB	BBBB	P
0	1111	1111	1111	1111	1111	1111	1
E	XXXX	XXXX	XXXX				
				XXXX	XXXX	XXXX	O

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Configuration #14 Instructions - Programming the ProxPro

Warning: Read all three steps completely before starting.

HID 5355 readers that are equipped with an optional key pad can be configured to send key pad data in the industry standard 26-bit format.

A configuration card #14 is required to make the change.

Step 1 **Turn on the reader power.** As the reader initializes, the red LED flashes and a beep sounds. The red LED will remain illuminated, unless the reader LED was previously configured to be set to off. If the configuration is the factory default the reader will beep and flash red twice, pause and beep/flash one more time and the red LED will remain illuminated.

Step 2 **Present the configuration card.** The reader will indicate that it read the configuration card with one flash/beep. The configuration card must be the first card presented to the reader after initialization.

CAUTION: The next step (Step 3) must be completed within 10 seconds…

Step 3 Enter the facility code with the key pad, and press the # key. This must be completed before 10 seconds elapses, or the facility code will be set to 0. If you entered the facility code and # key in time the reader will beep twice. If the facility code was not successfully entered within 10 seconds, present a RESET configuration card or re-initialize the reader by turning it off and on. Then complete steps 2 and 3 again.

Configuration 20 - Standard Keypad with parity, * = E & # = F

Configuration 20 adds parity. Each key press sends 4-bits with 2-parity bits added. The function keys are set to: * = E and # = F.

Example: The * key is pressed.

P	AAAA	P
0	1110	0
E	XX	
	XX	O

P = Parity bit

A = Key data

E = Even parity

O = Odd parity

Configuration 21 – Supervisor 1 second interval with default message AAh

Configuration 21 enables the supervisor output to send a default message of AAh every second. The 8 bit message is sent out MSB to LSB on the wiegand Data 0 and Data 1 lines as shown in the following table.

AA = 10101010

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ProxPro Serial Reader 5352A

Key buffering also applies to the ProxPro 5352A serial reader key pad. The reader outputs each key as an ASCII encoded hexadecimal digit. The serial reader cannot be configured for key pad parity or #09.

Serial Examples

Press key 5, and the reader sends ASCII 5

Press key 8, and the reader sends ASCII 8

Press key *, and the reader sends ASCII A

Press key #, and the reader sends ASCII B

Buffer 3 keys

Press keys 4, 5, and 6, and the reader sends ASCII characters 4, 5, 6 etc.

ProxPro K and S External Key Pad Control

There are two modes for the external key pad, 2 of 7 and the 3 by 4 matrix.

- The K version key pad is a 2 of 7 output matrix.
- The S version key pad is a 3 by 4 matrix, and is electrically independent from the ProxPro reader.

K version 2 of 7 matrix is enabled when the dip switch SW1-4 is set to off. The reader and key pad are electrically connected by a 10-pin connector. The reader provides the power to the key pad. Key pad lines should be connected from P2 to the panel. P2 is a 7 terminal connector on the key pad circuit board.

All seven terminals are normally 5 VDC until a key is pressed. When a key is pressed two of the seven terminals on P2 are pulled to ground, so the panel and reader must have the same ground at TB1 terminal 2.

The panel must be able to de-bounce the keys, decode the key pad, time key entries, and do other panel dependent functions.

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K 2 of 7 Matrix

Key	P2 Terminal Number						
	1	2	3	4	5	6	7
1	LO	HI	HI	HI	HI	HI	LO
2	LO	HI	HI	HI	HI	LO	HI
3	LO	HI	HI	HI	LO	HI	HI
4	HI	LO	HI	HI	HI	HI	LO
5	HI	LO	HI	HI	HI	LO	HI
6	HI	LO	HI	HI	LO	HI	HI
7	HI	HI	LO	HI	HI	HI	LO
8	HI	HI	LO	HI	HI	LO	HI
9	HI	HI	LO	HI	LO	HI	HI
*	HI	HI	HI	LO	HI	HI	LO
0	HI	HI	HI	LO	HI	LO	HI
#	HI	HI	HI	LO	LO	HI	HI

HI is +5 VDC in reference to the ProxPro reader's ground.

LO is the ProxPro ground.

The system requires a single point ground system.

S Version Key Pad

The S version key pad is a dry contact switch matrix and it is an external 3 by 4 output. The key pad is electrically independent of the ProxPro reader. A separate cable is required to connect the panel to the key pad at P2.

Two terminals of P2 make temporary electrical contact during the time a key is pressed. The following table shows which terminals will be shorted for a particular key. For example, if the three key is pressed P2-5 will be connected (shorted) to P2-1.

S 3 by 4 Matrix

Columns

	P2-7	P2-6	P2-5
P2-1	1	2	3
P2-2	4	5	6
P2-3	7	8	9
P2-4	*	0	#

The Host must provide a resistor capacitor matrix, power, ground, de-bouncing of switches and decoding of signals.

The reader and key pad do not need to have a common ground as they are electrically separate.

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How to Identify the Key Pad Version

The key pad model number is printed on the back of the reader.

Example:

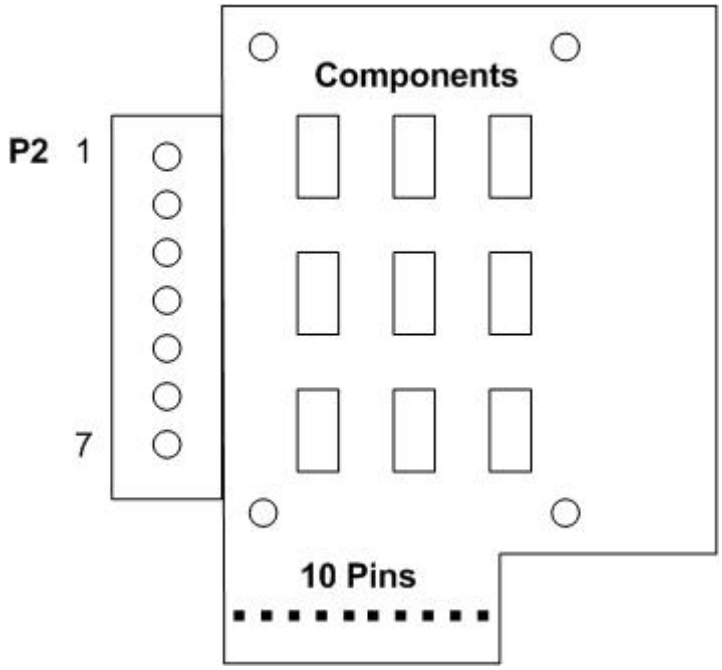
5355AGK00 - The K indicates the K version key pad.

5355AGS00 - The S indicates the S version.

When the ProxPro cover is removed, the key pad circuit board can be seen mounted to the cover. If the surface-mount components and a 10-pin connector are visible on the key pad circuit board, it is a K version.

The circuit boards of both K and S versions are the same, except for the presence of components on the K version.

K Version Circuit Board



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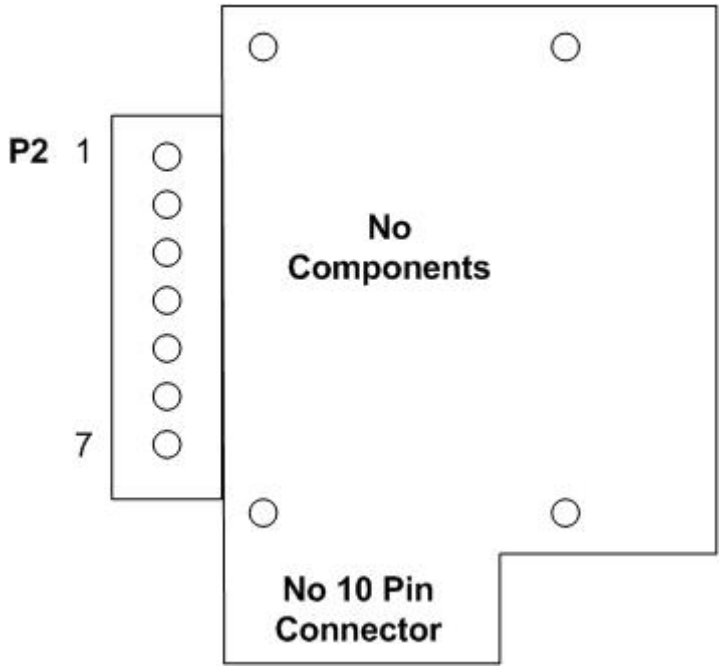
S Version Circuit Board

The S version key pad does not have surface-mount components or a 10 pin connector.



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