



## **FingerScan Wiegand Interface User Guide**

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## Introduction

This document describes the Wiegand interface features of Fingerscan, as well as a PC-based configuration utility. The Wiegand interface may be configured for either output only, or for input and output. The Wiegand output sends a Wiegand-format string to an external system upon a successful verification, and the Wiegand input will accept a Wiegand-format string from a card reader to eliminate the requirement for the user to enter an ID number (the number is taken from the string from the card). The keypad may also be used as normal for the entry of ID numbers, and SYSTEM entries **must** be made through the keypad.

## Interface Hardware

The Wiegand interface is a dual-line system using the TTL-level serial interface connector (8-way 0.1" SIL connector J4). The pin connections and jumper settings are as follows:

### Output-Only Configuration:

In this configuration a subset of the Aux. serial port (Tx,Rx,RTS) is still available for connection of additional external devices (e.g., smart-card reader).

#### (a) Pin Connections:

Function	J4 Pin
Gnd	1
Aux. Tx	2
Aux. Rx	3
Aux. RTS	4
Data 1 out	5
Data 0 out	6
Gnd	7
+12v	8

#### (b) Jumper Settings:

- (i) HOST=RS232; AUX=TTL + Wiegand; LK1 to LK6 = 1-2.
- (ii) HOST=RS485; AUX=RS232 + Wiegand; LK1 to LK4 = 2-3; LK5 & LK6 = open.
- (iii) HOST=RS485; AUX=TTL + Wiegand; LK1 = 2-3; LK2 to LK6 = open.

## Input & Output Configuration:

In this configuration the Aux. serial port is not available.

### (a) Pin Connections:

Function	J4 Pin
Gnd	1
Data 1 out	2
Data 0 out	3
-	4
Data 1 in	5
Data 0 in	6
Gnd	7
+12v	8

### (b) Jumper Settings:

- |      |                          |                               |
|------|--------------------------|-------------------------------|
| (i)  | HOST=RS232; AUX=Wiegand; | LK1 to LK6 = 1-2.             |
| (ii) | HOST=RS485; AUX=Wiegand; | LK1 = 2-3; LK2 to LK6 = open. |

## Electrical Characteristics:

- Input HIGH voltage = +2.0 to +5.0 V
- Input LOW voltage = -0.3 to +0.8 V
- Input current (max) = 20uA
- Output HIGH voltage = 4.0 to 5.0 V
- Output LOW voltage = 0 to 0.5 V
- Max output current = 10 mA (estimated)
- Max capacitive load = 50nF

N.B: No isolation or ESD protection is provided on the Wiegand interface: if required (especially for long lines), it should be added externally.

## Wiegand Test Cables:

### (a) Loopback Test Connector:

An 8-way 0.1" SIL connector may be wired as follows in order to perform a loopback test on the Wiegand interface: link pins 2 to 5 and 3 to 6. Configure Fingerscan for INPUT & OUTPUT (see sections 2.2(b) and 3), and plug the loopback connector onto the Aux. serial connector J4 on the Fingerscan board. If the Wiegand interface is working correctly, upon performing a successful verification Fingerscan will immediately prompt the user to again place their finger for another verification. This occurs because the Wiegand interface provides an output upon successful verification: this is then connected directly back to the Wiegand input which provides the user ID for the next verification. The cycle will continue until either an unsuccessful verification or until verification is aborted by pressing the CLEAR key.

### (b) Two-Unit Test Cable:

A pair of 8-way 0.1" SIL connectors (named C1 and C2 in the connection table) may be interconnected with a length of cable as follows:

C1	C2
1 -----	1
2 -----	5
3 -----	6
4	4 (not connected)
5 -----	2 (do not connect if only 1-way communications required)
6 -----	3 (do not connect if only 1-way communications required)
7 -----	7
8	8 (not connected)

Each end of this cable may then be plugged onto connector J4 of a couple of Fingerscan units, and both units configured for INPUT & OUTPUT with the same data format (see sections 2.2(b) and 3). Now whenever a successful verification is performed on one Fingerscan, the other unit will immediately prompt the user to place their finger for verification (assuming the required template is also found by that machine). The first Fingerscan sends a Wiegand output to the second unit, which then takes the user ID to request a verification.

## Wiegand Configuration by keypad

A limited form of Wiegand configuration may be performed through the Fingerscan keypad. However, it is not possible to enter features such as facility codes into the Wiegand format through the keypad: it is therefore generally recommended that the WIEGAND PC-based configuration utility be used (see section 4).

When the WIEGAND option in the Fingerscan COMMS menu is selected, either 'WIEGAND DISABLED' or the current number of bits in the Wiegand configuration is displayed. If the option to change this setting is selected by pressing 'YES', either the Wiegand interface is enabled or the number of bits is incremented up to maximum of 40, after which the setting returns to 'DISABLED'. By default, 18 bits are allocated for the user ID number. After the number of Wiegand bits is accepted, the current configuration is displayed as either 'INPUT & OUTPUT' or 'OUTPUT ONLY' and the option to change this is provided.

## Wiegand Configuration by PC software

### Introduction

A software utility named WIEGAND.EXE is available to allow the configuration of a Fingerscan unit's Wiegand interface from an IBM PC compatible computer running under DOS (or as a DOS program under Windows 3.1, provided that a PIF file is set up for it, and that the Execution: Exclusive option is selected in the PIF editor). The Fingerscan unit should be connected to the PC by means of either the RS232 or RS485 interface, and the node number and host baud rate of Fingerscan should be checked (defaults of 9600 baud and node 5 will apply if it is a completely new unit).

The command-line format of WIEGAND.EXE is:

WIEGAND [baud rate] [com#]

where

baud rate = optional communications speed (default=9600)

com# = optional PC COM port to use (default=1)

e.g., WIEGAND 19200 2 for 19200 baud on COM2

or just WIEGAND for 9600 baud on COM1

The main screen of the program displays a tabular representation of the Wiegand configuration with a menu across the bottom of the screen. Above the table the current COM port and baud rate are also displayed.

The top row of the table shows the numbers of the bits currently available in the Wiegand data format, bit 1 being the first transmitted. The middle row shows the current function of each bit of the format, the options being:

PRTY = Parity bit.

C = Constant bit: the state is always that shown in the bottom row.

IDnn = ID number bit (nn is the bit number).

The bottom row shows the state of each bit, the options being:

E = Even parity bit.

O = Odd parity bit.

x = State of corresponding bit of user ID.

1 = (bit=1).

0 = (bit=0).

The menu options will now be described.

### Load from disk

This will load a previously saved Wiegand configuration from the disk file 'WIEGAND.DTA'. This is convenient if many Fingerscan units are to be given similar configurations over several sessions. A brief message confirms the successful completion of this operation.

### Save to disk

This will save the current Wiegand configuration to the disk file 'WIEGAND.DTA'. A brief message confirms the successful completion of this operation.

### Get from F/S

This will upload the current Wiegand interface configuration from a Fingerscan unit for display and/or modification. A brief message confirms the successful completion of this operation.

### Update F/S

This will download the current Wiegand configuration as displayed on the PC to a Fingerscan unit. A brief message confirms the successful completion of this operation.

### NODE=

This option displays the current Fingerscan network node number (default=5), and allows this number to be changed to match that of a specific Fingerscan unit, with valid numbers being in the range 5 to 255. This is useful if several Fingerscan units are connected via an RS485 network.

### WIEGAND LENGTH =

This option displays the current length of the Wiegand format (bits) and allows this to be changed in the range of 20 to 40 bits. Fingerscan can handle Wiegand configurations of up to 48 bits, but only up to 40 can be set by the current PC software. The current bit order ('LSB' if least-significant bit first, or 'MSB' if most-significant bit first) is then displayed and may be changed if required. Finally, the current interface type, 'OUTPUT ONLY' or 'INPUT & OUTPUT' is displayed and may also be changed if required (see section 2).

## ID settings

This displays and allows editing of the number of the first bit of the user ID field, and the number of bits in the field. The numbers entered are checked for validity, the valid ranges depending upon the configuration. Note that bit 0 of the ID (ID0) is the least-significant bit, which will be sent last if the MSB option is selected (see section 4.7).

## CONST SETTINGS.

This allows fields containing constants (numbers) to be entered into specific locations in the Wiegand format. The user is prompted to enter the position of the start of the number (starting bit number), the length of the number (bits), and the required numeric value. The binary equivalent of the number is then shown on the bottom row of the table, the bit order being as for the ID number (see section 4.7). Note that the actual numeric value entered is not retained, only the corresponding bit pattern in the constant bit fields.

## Bit Toggle

This allows the state of a single bit of the Wiegand format to be toggled (i.e., changed from 0 to 1, or 1 to 0). The user is prompted for the number of the bit to be changed, and while any bit can be selected, parity bits and ID number bits should normally be avoided (but can be used for special purposes).

## Quit

This terminates the program and returns to the DOS prompt.