

WEC200 中文使用手冊

Version 1.0

Contents

- 1. Information**
- 2. Introduction**
- 3. WEC200 本機的安裝**
- 4. Pin Assignment**
- 5. 如何搭配門禁元件**
- 6. WEC200 通訊協定**
- 7. Communication-Ethernet Module**
- 8. 規格**
- 附錄 A. LED2 的指示狀態**
- 附錄 B. Wiegand 訊號規格**

1. Information

1-A. Model Classification:

WEC 200 - 00

① ② ③

① **Model name:** WEC(Wiegand Ethernet Controller)

② **Model number:** 200

③ **type:** 00→ standard

This device complies with Part 15 of the FCC . Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

1-B. Accessories

a. WAS-1499 for LAN cable.

b. 5PIN Wiegand 輸入座(CN2-L35005-T01-G)

c. 10PIN 輸出輸入座(CN2-L35010-T01-G)

1-C. Features

- 可控制 BUZZER 的 beep 格式
- 2 組 relay 輸出,每組 relay 包含 NormalOpen(N.O.)/Normal Close(N.C.)/Common 接點
- 2 組 input 接點
- 可直接輸出 Wiegand 資料(raw data)亦可輸出 FacilityCode(Site Code)及 CardCode 的格式
- 獨一無二的 service code
- 可自行定義 machineID 及 Name
- 使用兩台 WEC200 可透過 LAN 的接線,傳送 Wiegand 訊號自一端到另一端
- 提供 RJ45 埠,可接上你公司內部的 10/100BaseT Ethernet,並支援 TCP/IP,UDP 等 protocol

2. Introduction

WEC200 都是透過 Ethernet 來對外通訊的. 所以處理 Ethernet package 是相當的重要. 但是要了解 Ethernet 進而開發 Ethernet 應用程式可不是那麼簡單. 現在 WEC200 內建一個 Ethernet Module,將來往的 Ethernet package 轉換為串列式的資料流. 這些資料流會送到 WEC200 內的 MCU 去.

在第 5 章會介紹 WEC200 的架構及基本注意事項, 第 6 章會說明 MCU 的控制命令.

我們會隨附 DS manager 及 Connection wizard 工具給你,透過這些工具,你可以很快的建立一個所謂的虛擬的 COM port. 然後,透過這個虛擬的 COM port, 你可以下命令給 WEC200 的 MCU,就像是運作在傳統的 COM port 般. 這是比較快速的方法.

另外,你也可以真的利用 winsock 來開發 Ethernet 的應用程式.那這時,你就要了解 Ethernet 封包送到 WEC200 Ethernet Module 內的格式是什麼,這部份請參考第 7 章

WEC200 提供一個 service code,這個 service code 在每台 WEC200 內是獨一無二的. 因此,在開發軟體時,可根據特定的機器內的 service code 來做檢核. 如此,就可確保軟體服務到正確的用戶.

由於 WEC200 是操作在 LAN.因此,也許你會在 LAN 放置了多台的 WEC200,這時你可以利用 machine ID 及 Name 來分辨 WEC200 的裝置.

Wiegand 界面是採用 4 條線(V/G/D0/D1)來做連線, 所以,在佈線是必須要用 4 條線的.對短距離來說是 OK 的. 但對長距離佈線則會不方便. 因此,我們也可以利用兩台 WEC200 及佈好的 LAN 網路做為 wiegand 界面的來延伸. 但這時,要將其中的一台設為 receive 的類型. 另一台則維持在 transmit 的類型.同時,兩台 WEC200 的 destination IP 要互設對方的 IP,如此設為 transmit 類型的 WEC200,就可以藉由 wiegand 的 reader 透過 LAN 到設為 receive 類型的 WEC200 去..

3. WEC200 本機的安裝

Connection in LAN

- A. 將線材 WAS-1499 的一端插到 HUB/SWITCHING HUB.另一端插入 WEC200 的 RJ45
- B. 將 Wiegand 輸入裝置及輸入輸出設備連結到 WEC200 內.
- C. 將來自 DC 變壓器的 DC 電源(參考 4-C)插入 WEC200 的電源輸入端
- D. 送電給 DC 變壓器

4. Pin Assignment

4-A. RJ45

Pin#	Signal
1	TX+(Positive line of the differential output signal pair)
2	TX-(Negative line of the differential output signal pair)
3	RX+(Positive line of the differential input signal pair)
6	RX-(Negative line of the differential input signal pair)
4,5 short connection & 7,8 short connection	

4-B. LED 指示燈

LED2 是雙色 LED,各種不同的顯示方式代表著不同的狀態,詳細請參照附錄 A

LED1 為紅色,顯示目前連線的速度為 100M;否則為 10M.

LDE3 為綠色,反應 Ethernet 埠的狀況. 綠色 LED 會經常的亮著,而當 WEC200 收到一個網路封包,會暫時的滅掉.

4-C. DC JACK

Pin#	Signal
Center (D2.1mm)	+12VDC
Outer	GROUND

4-D. Wiegand 輸入

PIN#	1	2	3	4	5
Signal	+12V	+5V	GND	D0	D1

PIN#是以 CN2-L35005-T01-G 的標示為主

4-E. Relay 接點與輸入點

			input		relay#2			relay#1		
PIN#	1	2	3	4	5	6	7	8	9	10
Signal	+12V	GND	IN2	IN1	N.O.	C	N.C.	N.O.	C	N.C.

PIN#是以 CN2-L35010-T01-G 的標示為主

Relay 的 C 代表共通接點 (Common)

N.C.代表常閉接點 (Normal Close)

N.O.代表常開接點 (Normal Open)



5. 如何搭配門禁元件

選取適當的元件對安全性有很大的影響. 因此, 以下的建議事項, 相當重要.

Electric Lock(電子鎖)

WEC200 是透過 relay No.1 或 relay No.2 的端點來控制電子鎖的. 因此, 你所要使用的電子鎖也要合乎 relay 的規格. 以下, 我們列出 relay 的規格供您參考

CONTACT RATINGS

Contact Arrangement	1 Form C (SPDT)
Max. Switching Power	125VA 60W
Max. Switching Voltage	125VAC 30VDC
Max. Switching Current	2A
Contact Resistance	$\leq 100m\Omega$
Rating Load	1A/125VAC 2A/30VDC
Contact Material	AgNi10

CHARACTERISTICS

Electrical Life	1×10^5
Mechanical Life	1×10^7
Initial Insulation Resistance	Min. 100M Ω 500VDC
Contact Resistance (Initial)	$\leq 100m\Omega$
Operate Time	$\leq 6ms$
Release Time	$\leq 3ms$
Initial Dielectric Strength	50/60Hz 500VAC 1 min. (between open contact) 50/60Hz 500VAC 1 min. (between all conductors)
Vibration Resistance	Malfunction: 10 to 55Hz at Double Amplitude of 1.5mm Destructive: 10 to 55Hz at Double Amplitude of 1.5mm
Shock Resistance	Malfunction: 10G (11ms) / Destructive: 100G (6ms)
Ambient Temperature	$-20^{\circ}\text{C} \sim +40^{\circ}\text{C}$
Relative Humidity	85% at 40°C
Unit Weight	Approx. 3g

電子鎖的動作方式有分 normally-opened (N.O.) 與 normally-closed (N.C.) 兩類. 所謂 N.O. 意指不通電 (deactivation) 時, 呈現鎖開的狀態; 而通電 (activation) 時, 呈現鎖關的狀態. 所謂 N.C. 意指不通電時, 呈現鎖關的狀態; 而通電時, 呈現鎖開的狀態. WEC200 支援這兩類的電子鎖.

電子鎖的電源驅動, 可分為 DC 與 AC 兩種. 有些電子鎖兩種都支援, 有些則只支援 DC. 我們在這裡主力推薦用 DC12V 的類型. 因為 WEC200 也是使用 DC12V 的. 所以, DC12V 的供電就可以給 WEC200 也可以供給電子鎖, 而且都共用同一個電源. 至於電流則要注意到, 流經電子鎖的電流不可超過 3A. 如果你檢視電子鎖的規格合乎我們的建議值. 那麼你就可以直接使用它了. 假如你的電子鎖偏偏是只能用 DC24V 的話, 怎麼辦? 我們建議你的電子鎖使用獨立的 DC24V 供電, 而 WEC200 仍使用 DC12V 的供電方式. 當然, 兩個電源的 GND 要接在一起. 整個系統才會動作正確. **本章的最後範例是採用獨立的電源供應的例子.**

如果你的電子鎖是支援 AC 的, 請注意到, 我們的 relay 的接點在 AC 的電壓的額定是 1A/125VAC. 所以流經 relay 的 AC 電流不可超過 1A. 由於有些國家的電壓是使用 220VAC~240VAC 的. 在這樣的條件下, 我們建議使用外接的 relay, 並且透過 WEC200 的 relay 來控制這個外接 relay.

Power Supply(電源供給)

WEC200 的電源是採用 DC12V. 如果你只用一個電源供應 WEC200 與電子鎖的情況下. 而且電子鎖的額定電流為 I_{LOCK} , 那麼你的電源至少選擇 $2 * I_{LOCK}$. 這是由於 WEC200 本身的消耗電流在 150mA, 而市售的電子鎖都會超過這個數值不少. 多出的電源是為預防在電子鎖動作在 activation 或 deactivation 時負荷不了電力消耗, 以而導致電壓瞬間下降, 使 WEC200 重新起動. **如果你在實測時發現這樣的現象, 而且無法避免, 請採用分離的電源, 參考本章最後的範例**

以上, 是在一個電子鎖的情況下, 如果你使用了 2 個電子鎖呢!? 你的電源至少應該選擇 $4 * I_{LOCK}$ 才對. 為了安全起見, 電源供應器應該安裝在門內的一個安全的地方, 以確保不被輕易的斷電

Door Open Sensor(偵測開門的感應器)

此類感應器也有 normally-opened 與 normally-closed 兩類. 但以 N.C. 類比較常見, 且適直接到 WEC200 的 INPUT1 或 INPUT2 端點. 如此, WEC200 就可以偵測目前門的狀態了.

	Min.	Typ.	Max.
V _{IH} (邏輯 1 的輸入電壓)	7.5V	11.2V	12V
V _{IL} (邏輯 0 的輸入電壓)	0V	0.8V	7.3V

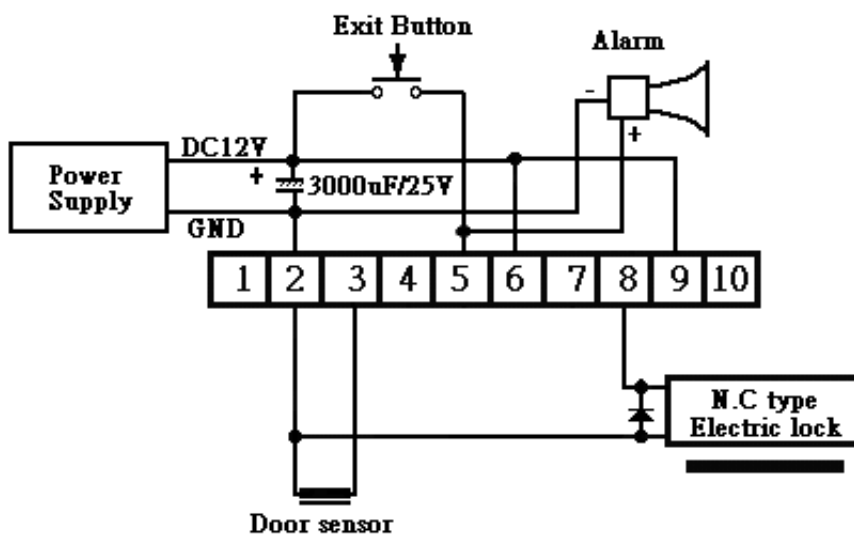
上表中, 若在 INPUT1 接點上的電壓為 0V_{DC}, 則由 6-C 命令讀取時, 會得到邏輯 0, 若大於 7.5V_{DC} 或空接時, 就會得到邏輯 1.

Alarm(警報器)

一般市售的 Alarm, 通常也有 N.O. 及 N.C. 的類型. 若你有需要要安裝 Alarm, WEC200 的 relay1 或 relay2 也可以用來安裝 Alarm. 方法也類似電子鎖, 不再贅述.

接線範例

此範例使用獨立電源供應器, DC12V 輸出, 以供應 Lock 及 Alarm 的出力. 我們用 relay#2 連接鎖的控制, 而門偵測器連接到 IN2; Alarm 連接到 relay#1;



6. WEC200 通訊協定

Command symbols definitions are as below:

STX 02H
CR 0DH
ACK 41H
NACK 4EH
m 1 byte parameter
n 1 byte parameter
<Data...> contents of data

6-A. Get device firmware version

HOST to DEVICE (4 bytes)	STX	G	R	CR
	02H	47H	52H	0DH
DEVICE to HOST (11 bytes)	STX "ROMXXXXVY" CR			

You can get device information and status by this command.

XXXX: Firmware Number

V: Version

Y: Revision

For example: STX-"ROM0722A2"-CR

6-B. Get service code

HOST to DEVICE (4 bytes)	STX	G	S	CR
	02H	47H	53H	0DH
DEVICE to HOST (12 bytes)	STX "XXXXXXXXXX" CR			

You can get the unique **service** code by this command.

XXXX: service code

For example: STX-"0000000000"-CR

6-C. Get input status

HOST to DEVICE (4 bytes)	STX	G	I	CR
	02H	47H	49H	0DH
DEVICE to HOST (4 bytes)	STX "XY" CR			

You can get the 2 input status by this command.

X: INPUT1 status (0: Low/1:High)

Y: INPUT2 status (0: Low/1:High)

For example: STX-"11"-CR. that means input1&2 all high.

6-D. Get machine ID

HOST to DEVICE (4 bytes)	STX	G	M	CR
	02H	47H	4DH	0DH

DEVICE to HOST (6 bytes)	STX "XXXX" CR
--------------------------	----------------------

You can get the machine ID by this command.

XXXX: machine ID

6-E. Get Name

HOST to DEVICE (4 bytes)	STX	G	N	CR
	02H	47H	4EH	0DH
DEVICE to HOST (18 bytes max)	STX "XXXX" CR			

You can get the Name by this command.

XXXX: Name(16 bytes max)

6-F. Get Type

HOST to DEVICE (4 bytes)	STX	G	T	CR
	02H	47H	54H	0DH
DEVICE to HOST (3 bytes)	STX "X" CR			

You can get the type by this command.

X: 0—receive only/1—transmit only(default)

6-G. Get format status

HOST to DEVICE (4 bytes)	STX	G	F	CR
	02H	47H	46H	0DH
DEVICE to HOST (3 bytes)	STX "X" CR			

You can get the format status by this command.

X: 0—RAW data format/1—SITE data +CARD data format

6-H. Control beep

HOST to DEVICE (12 bytes)	STX	S	B	"XXXXXXXX"	CR
	02H	53H	42H	8 bytes	0DH
DEVICE to HOST (3 bytes)	STX ACK/NACK CR				

XXXXXXXX: beep string, composed of 0 and 1. Each 1 will activate buzzer, 0 will stop buzzer. Each bit control buzzer 0.1 sec.

For example, **XXXXXXXX="11110101"**, it sounds like "BBBB-B-B".

6-I. Set format status

HOST to DEVICE (5 bytes)	STX	S	F	0/1	CR
	02H	53H	46H	30H/31H	0DH
DEVICE to HOST (3 bytes)	STX ACK/NACK CR				

You can set the format status by this command

0(RAW format)/1(SITE+CARD code)

Default: 0(RAW data)

6-J. Set relay1 output status

HOST to DEVICE (5 bytes)	STX	S	D	n	CR
	02H	53H	44H	byte	0DH
DEVICE to HOST (3 bytes)	STX ACK/NACK CR				

You can activate relay1 (n*0.1s) status by this command

6-K. Set relay2 output status

HOST to DEVICE (5 bytes)	STX	S	A	n	CR
	02H	53H	41H	byte	0DH
DEVICE to HOST (3 bytes)	STX ACK/NACK CR				

You can activate relay2 (n*0.1s) status by this command

6-L. Set machine ID

HOST to DEVICE (8 bytes)	STX	S	M	“XXXX”	CR
	02H	53H	4DH	4 bytes	0DH
DEVICE to HOST (3 bytes)	STX ACK/NACK CR				

You can set machineID by this command

Default: “0000”

6-M. Set Name

HOST to DEVICE (20 bytes max)	STX	S	N	“XXXX”	CR
	02H	53H	4EH	16 bytes max	0DH
DEVICE to HOST (3 bytes)	STX ACK/NACK CR				

You can set Name by this command

Default: none

6-N. Set Type

HOST to DEVICE (5 bytes)	STX	S	T	0/1	CR
	02H	53H	54H	30H/31H	0DH
DEVICE to HOST (3 bytes)	STX ACK/NACK CR				

You can set the type 0(receive)/1(transmit) by this command

The WEC200 will reboot after you execute this command.

Default: 1(transmit)

6-O. Notice Message

Notice Message is Device to send a notice to host automatically.

Events	Message
Card read OK	<STX>+<W>+<data bytes>+<CR>

7. Communication-Ethernet Module

7-A. EM module (DS - Device Server) commands

EM contains a lot of commands, but just only 4 of EM commands are needed to utilize the WEC200 terminal. The default protocol that WEC200 uses is TCP. Below are the details.

- **Get available IP of connected WEC200 on LAN command**

Command format:	A. X
Possible replies (network):	<i>A</i>nnn.nnn.nnn.nnn.nnn.nnn/ppppp/mseic/ES/oo...o/dd...d , where <i>nnn.nnn.nnn.nnn.nnn.nnn</i> - MAC-address of the DS <i>ppppp</i> - data port number of the DS <i>m</i> - fixed to 'N' (means that the application firmware, not the NetLoader is running) <i>s</i> - programming mode: '*' (none), 'S' (serial), 'U' (out-of-band UDP), 'T' (inband TCP or command-phase TCP); <i>e</i> - error status: '*' (no errors detected), 'E' (running in the error mode); <i>i</i> - IP-address status: '*' (not obtained yet), 'I' (obtained via DHCP), 'M' (fixed, set manually); <i>c</i> - data connection status: '*' (closed), 'A' (sending ARP), 'O' (being established), 'C' (TCP connection established or being closed), 'U' (UDP connection established), 'R' (reset by remote host); <i>E</i> - Ethernet-to-serial buffer overflow: '*' (no overflow), 'E' (overflow detected); <i>S</i> - serial-to-Ethernet buffer overflow: '*' (no overflow), 'S' (overflow detected); <i>oo...o</i> - owner name; <i>dd...d</i> - device name.
Example (VB6 Code)	Winsock1.RemoteHost = "255.255.255.255" Winsock1.SendData = "X"

Note:

1. This is a broadcasts command, so the remote host IP needs to be set to "255.255.255.255".
2. For more details, please refer to the on-line help file of DS Manager tibbo_docs.chm on [Echo (X) command] section.

- **Assign new IP-address command**

Command format:	B. A mmm.mmm.mmm.mmm.mmm.mmm/pp...p/iii.iii.iii.ii
-----------------	-----------------------------------------------------------

	<p>Where</p> <p><i>mmm.mmm.mmm.mmm.mmm.mmm</i>- MAC-address of the target DS</p> <p><i>pp...p</i>- password (defined by the Password (PW) setting)</p> <p><i>m</i>- fixed to 'N' (means that the application firmware, not the NetLoader is running)</p> <p><i>iii.iii.iii.iii</i>- new IP-address to be assigned to the DS</p>
Possible replies:	A, D, C, F (see Reply Code section)
Example (VB6 Code): Change the IP of MAC (0.2.3.5.0.62) to 192.168.100.216	Winsock1.RemoteHost = "255.255.255.255" Winsock1.SendData = _ "A0.2.3.5.0.62//192.168.100.216"

Note:

1. This is a broadcasts command, so the remote host IP needs to be set to "255.255.255.255".
2. The default password is blank.
3. For more details, please refer to the on-line help file of DS Manager tibbo_docs.chm on [Assign IP-address (A) command] section.

● Get I/O Pin Status command

Command format:	PGx , where x is the I/O line number
Possible replies:	As, C, D, R , where s is the state of I/O line (0 or 1)
Example (VB6 Code): Get the Status of Pin 0, which the WEC200 IP is 192.168.100.216	Winsock1.RemoteHost = "192.168.100.216" Winsock1.SendData = "PG0"

Note:

1. For more details, please refer to the on-line help file of DS Manager tibbo_docs.chm on [Get I/O Pin Status (Gx) instruction] section.

● Set I/O Pin Status command

Command format:	PSxs , where x is the I/O line number and s is the desired status of the I/O line (0 or 1)
Possible replies:	A, C, D, R
Example (VB6 Code): Set the Status of Pin 0 to Low, which the WEC200 IP is 192.168.100.216	Winsock1.RemoteHost = "192.168.100.216" Winsock1.SendData = "PS01"

Note:

1. For more details, please refer to the on-line help file of DS Manager tibbo_docs.chm on [Set I/O Pin Status (Sx) instruction] section.

7-B. Reply Codes

Listed below are all available reply codes:

C. RC	Description
A	OK (command completed successfully)
C	Error (incorrect command was issued)
R	Rejected (command was rejected by the DS)
D	Denied (access was denied by the DS)
F	Failed (command execution failed)


8. 規格

Communication	One Wiegand port One 10/100 BaseT Ethernet Port Network: Ethernet RJ45
Available Wiegand format	26, 30, 34, 35, 37, 38, 42 bits
Power consumption	140mA 12VDC
Protocols	Communicates with server on the networking using TCP or UDP protocols
Indication type	Three LEDs display status information, One built in buzzer 2 sets of input, 2 sets relay output (including N.C/ N O, Common)
Dimension	100 x 96.8 x 24.35 mm
Environment	Operating Temp: 0-55 Deg.C Storage Temp: -10 – 55 Deg C Humidity: 10-90% relative

附錄 A. LED2 的指示狀態


底下,我們以下列的圖示來代表 LED 的指示;如,


 代表綠色與紅色的會同時的閃爍三次.然而因為 LED2 是雙色的 LED 結構,因此,看起來會橙色閃爍三次.

 red LED makes one long blink followed by two short ones


DS 是針對 WEC200 內的 EM module 所指.

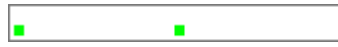
依此法則,我們列出如下:


 **Powerup pattern.** This pattern is played once when the DS is switched on.


 **Buzz pattern.** Both LEDs blink fast. this pattern is played when the DS receives the **Buzz (B) command**. This is used to identify a particular DS.請注意到,這是 DS 在收到屬於 DS 的命令,所要做的動作與 6-E 所提的命令(要控制 WEC200 的 BUZZER)無關.


 **Error mode.**


 **Ethernet port failure.** Indicates that the Ethernet port hardware is malfunctioning and network communications with the DS is not possible.


 **IP-address not obtained.** Means that the **DHCP (DH) setting** is 1 (enabled) and the DS has not yet obtained its IP-address from the DHCP server.


 **Data connection is closed.** This pattern means that no data connection (TCP or UDP) with any network host is currently established.

 **Sending ARP.** Displayed when the DS is sending ARP requests to find out the MAC-address of the destination network host with which the DS is about to establish a connection.


 **TCP connection is being opened.** Indicates that TCP connection (either incoming or outgoing) is being established (i.e. SYN-SYN-ACK exchange is in progress).

 **Data connection is established (or being closed).** Means that data UDP "connection" or TCP connection is currently established or that TCP connection is being closed (i.e. FIN-ACK-FIN-ACK exchange is in progress).

 **Data is being routed.** This pattern is played when the data connection is established and the data is being routed through the DS

 **Buffer overrun (and no data routing).** This pattern is displayed when the data connection is established and the routing buffer overrun has been detected (within the present data connection).

 **Buffer overrun + data routing.** Data routing and overrun can be displayed at the same time.

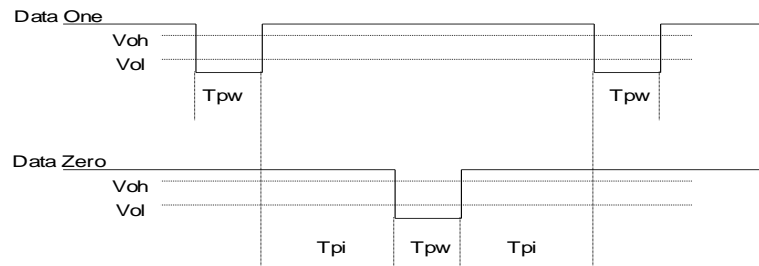
 **TCP connection reset by the network host.** Means that the TCP connection has been reset (using RST packet) by the network host (not by the DS itself).

以上列出較常見的狀態,詳細請見 Tibbo 的說明 at <http://www.tibbo.com>

附錄 C. Wiegand 訊號規格

Data Pulses

The Data One and Data Zero signals are normally held at a logic high level until the data is ready to be sent. Data is sent as below on Data1 or Data0 lines. The following timing parameters shall be observed:



Tpw Pulse Width Time -- 20µSec (minimum) to 100µSec (maximum)
Tpi Pulse Interval Time -- 200µSec (minimum) to 20mSec (maximum)

Wiegand interface (26-bit format):

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
P	S	S	S	S	S	S	S	S	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	P
P	E	E	E	E	E	E	E	E	E	E	E	E	E												
														O	O	O	O	O	O	O	O	O	O	O	P
Summed for even parity (E)													Summed for odd parity (O)												

Wiegand interface (30-bit format):

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
P	S	S	S	S	S	S	S	S	S	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	P
P	E	E	E	E	E	E	E	E	E	E	E	E	E	E															
															O	O	O	O	O	O	O	O	O	O	O	O	O	O	P
Summed for even parity (E)															Summed for odd parity (O)														

Wiegand interface (34-bit format):

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	P
P	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E																	
																	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	P
Summed for even parity (E)																	Summed for odd parity (O)																

Wiegand interface (35-bit format):

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

P	P	S	S	S	S	S	S	S	S	S	S	S	S	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	P
	P	E	E		E	E		E	E		E	E		E	E		E	E		E	E		E	E		E	E		E	E			
	O	O		O	O		O	O		O	O		O	O		O	O		O	O		O	O		O	O		O	O		O	O	P
P	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O

Wiegand interface (37-bit format):

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	P
P	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E																		
																		O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	P
Summed for even parity (E)																		Summed for odd parity (O)																		

Wiegand interface (38-bit format):

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
P	S	S	S	S	S	S	S	S	S	S	S	S	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	P
P	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E																			
																			O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	P	
Summed for even parity (E)																			Summed for odd parity (O)																		

Wiegand interface (42-bit format):

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	
P	S	S	S	S	S	S	S	S	S	S	S	S	S	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	P
P	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E																							
																				O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	P	
Summed for even parity (E)																				Summed for odd parity (O)																						

P- parity (Even/Odd), S- facility bits, C- card data