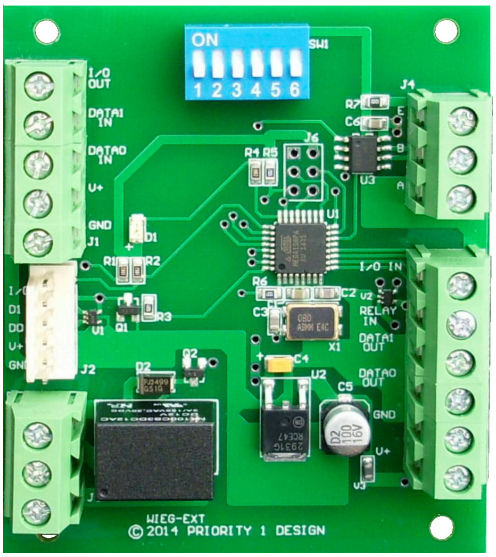
WIEG-EXT

Wiegand to RS485 extender module.

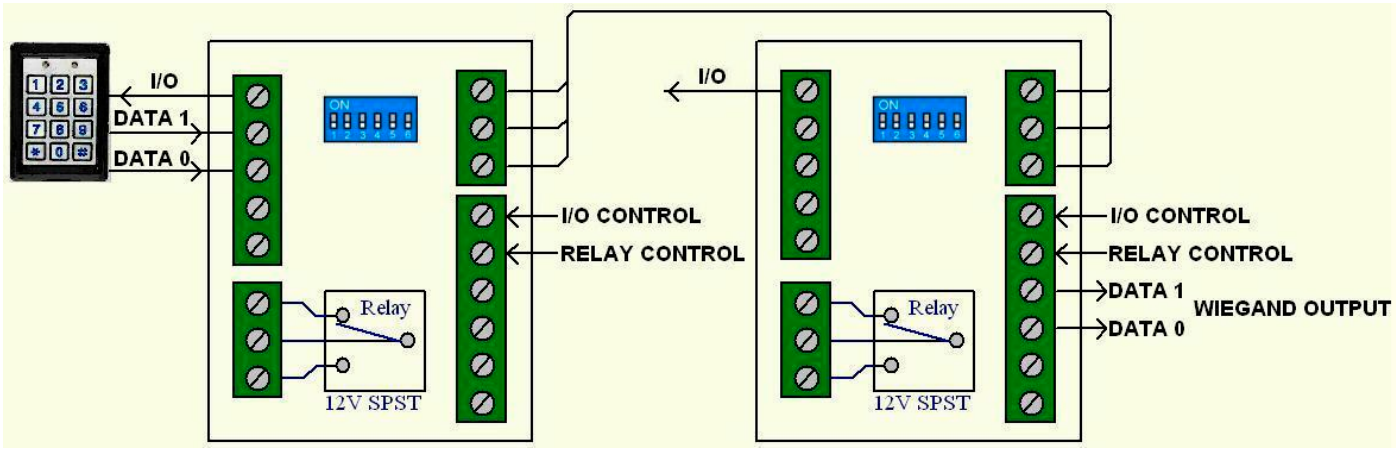
Designed for embedding into products manufactured by third-parties, this Wiegand to RS485 extender is designed to transfer wiegand data from Access Control Card Readers, keypads, and other remote devices which support the Wiegand protocol to a twin module located remotely. Communications between Sender and Remote units are via a RS485 communication line of up to 4000 feet (1,219.2meters).
Two units are required for minimum operation with a maximum number of 16 pairs of units allowed in a single network.

Each unit consists of:

- **Input connector for Wiegand signal, with an additional I/O output line.**
- **On board SPDT relay for control of external devices.**
- **6 way Dip switch selector for selecting unit address and control functions.**
- **12V dc operation.**
- **Small unit size of 66 x 75mm**
- **4 mounting holes**



Typical connection example:



WIEG-EXT configured as a Remote unit.
Selector switch = 000000

WIEG-EXT configured as a Master/Sender unit.
Selector switch = 100000

Priority 1 Design
Suite 6, 250 Gore Street
Fitzroy, 3065
Melbourne, Australia.

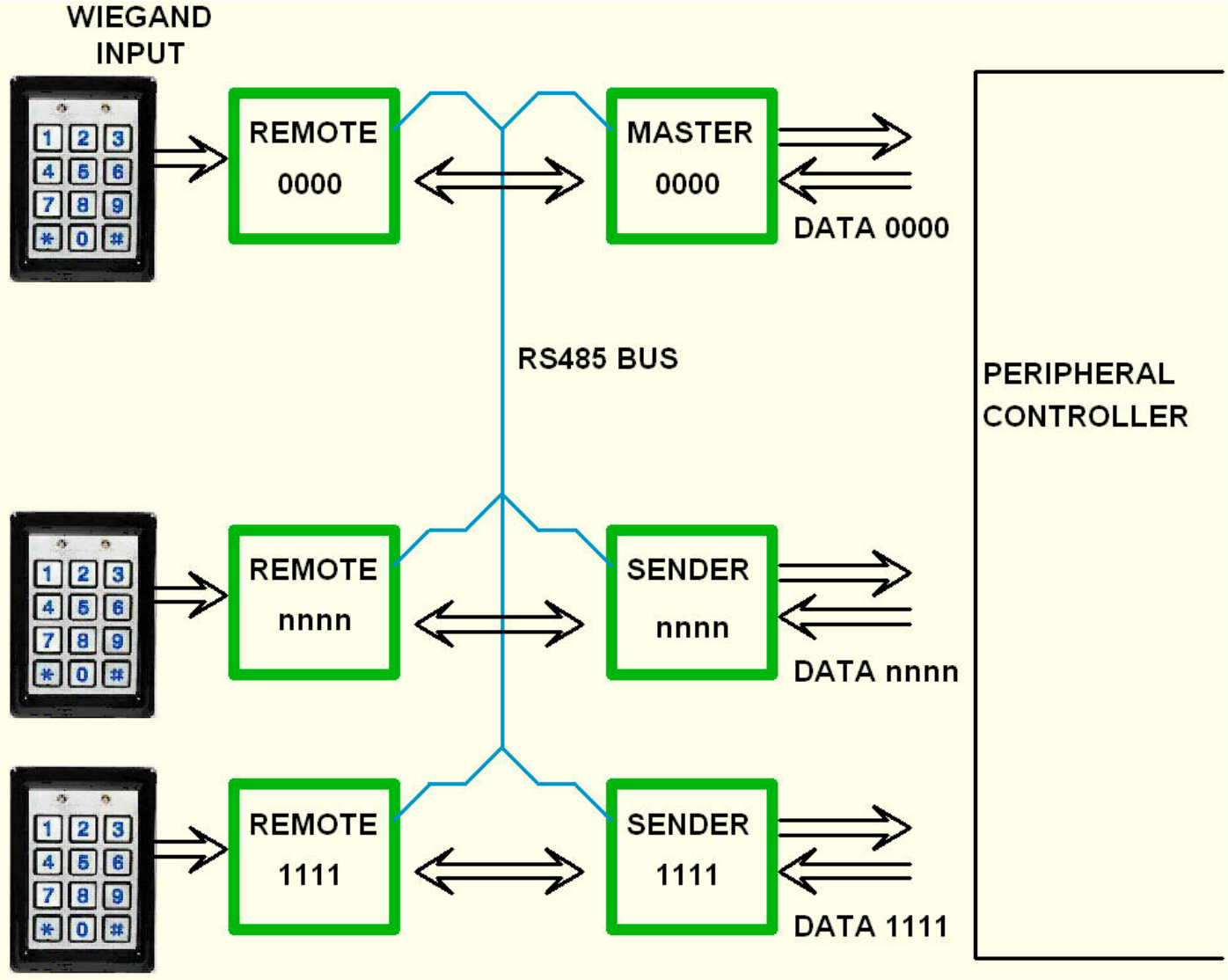
Document No: MAN_WIEGEXT
Revision: A
Modified: March 5, 2015

Wiegand Extender Operation:

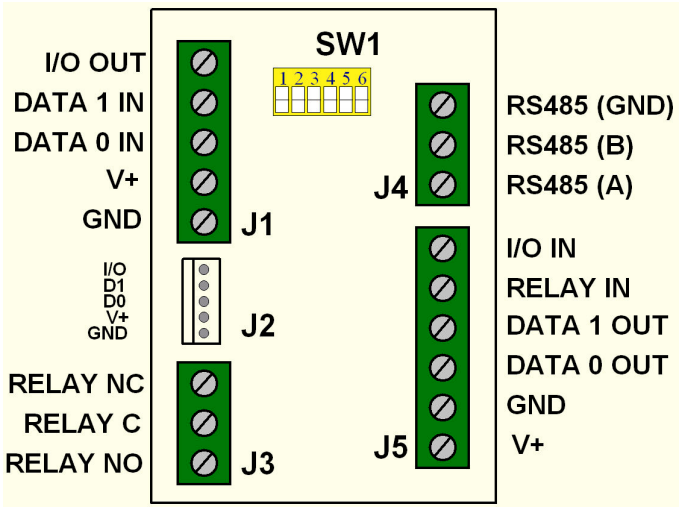
Each WIEG-EXT module is electrically identical but its function inside a network of units is defined by the settings on the selector switch on each unit. This 6 way switch defines the unit pair address (0-15), and whether the unit is a Sender, a Remote, or a Master unit.

In any network of units one unit must always be configured as a Master unit. When acting as a Master unit it will behave as a Sender unit, but will also coordinate the communications between all the extender modules connected to the RS485 bus. To define a WIEG-EXT module as a Master switch 1 on the selector switch is set ON.

Typical multi-point connection example:



Electrical Connections:



J1 Connections

I/O OUT	Led signal output or I/O.
Data 1 IN	Wiegand Data 1 Input.
Data 0 IN	Wiegand Data 0 Input.
V+	Power Out +
GND	Wiegand Ground.

J2 Connections **

NC	No Connection.
I/O OUT	Open Collector Led output or I/O.
Data 1 IN	Wiegand Data 1 Input.
Data 0 IN	Wiegand Data 0 Input.
V+	Power Out +
GND	Wiegand Ground.

J3 Connections

Relay NC	Relay Connection Normally Closed
Relay C	Relay Connection Common
Relay NO	Relay Connection Normally Open

J4 Connections

RS485(GND)	RS485 Common connection.
RS485(B)	RS485 Input B line (-).
RS485(A)	RS485 Input A line (+).

J5 Connections

I/O IN	I/O control Input.
RELAY IN	Relay Control Input ***
Data 1 OUT	Wiegand Data 1 Output.
Data 0 OUT	Wiegand Data 0 Output.
GND	Power in negative
V+	Power in positive (12V dc.)

** connector J2 signals are a replica of connector J1 signals. Two connector types are provided for convenience.

*** The Relay Control Input activates the relay located on the paired unit.

Selector switch settings:

The function and address of the WIEG-EXT module is selected via the Selector switch SW1.
When Switch 1 is set ON it defines the unit as being a master unit with address 0000. There must always be one unit set as a master unit in any network of units. Other than having control functions the Master unit will behave as a Sender unit at address 0000.

When switch 2 is set ON it defines the unit as being a Sender unit of which the address is defined by the switch setting at positions 3 to 6. Sender units output the wiegand data received from the Remote units, as well as controlling the I/O lines and on board Relay of the Remote units.

When switch 2 is set OFF it defines the unit as being a Remote unit of which the address is defined by the switch setting on positions 3 to 6. Remote units collect wiegand data and send the information to their matching Sender units. Additionally the on board relay on the Sender units may be controlled via the Relay control line on the Remote unit. Similarly the on board relay of the Remote unit is controlled by the Relay control line on the Sender unit.

Table 1 describes the available settings and functions.

1	2	3	4	5	6	Description
On	x	x	x	x	x	Master Unit: Address 0000
Off	Off	Off	Off	Off	Off	Remote Unit: Address 0000
Off	On	Off	Off	Off	On	Sender Unit: Address 0001
Off	Off	Off	Off	Off	On	Remote Unit: Address 0001
Off	On	Off	Off	On	Off	Sender Unit: Address 0010
Off	Off	Off	Off	On	Off	Remote Unit: Address 0010
Off	On	Off	Off	On	On	Sender Unit: Address 0011
Off	Off	Off	Off	On	On	Remote Unit: Address 0011
Off	On	Off	On	Off	Off	Sender Unit: Address 0100
Off	Off	Off	On	Off	Off	Remote Unit: Address 0100
Off	On	Off	On	Off	On	Sender Unit: Address 0101
Off	Off	Off	On	Off	On	Remote Unit: Address 0101
Off	On	Off	On	On	Off	Sender Unit: Address 0110
Off	Off	Off	On	On	Off	Remote Unit: Address 0110
Off	On	Off	On	On	On	Sender Unit: Address 0111
Off	Off	Off	On	On	On	Remote Unit: Address 0111
Off	On	On	Off	Off	Off	Sender Unit: Address 1000
Off	Off	On	Off	Off	Off	Remote Unit: Address 1000
Off	On	On	Off	Off	On	Sender Unit: Address 1001
Off	Off	On	Off	Off	On	Remote Unit: Address 1001
Off	On	On	Off	On	Off	Sender Unit: Address 1010
Off	Off	On	Off	On	Off	Remote Unit: Address 1010
Off	On	On	Off	On	On	Sender Unit: Address 1011
Off	Off	On	Off	On	On	Remote Unit: Address 1011
Off	On	On	On	Off	Off	Sender Unit: Address 1100
Off	Off	On	On	Off	Off	Remote Unit: Address 1100
Off	On	On	On	Off	On	Sender Unit: Address 1101
Off	Off	On	On	Off	On	Remote Unit: Address 1101
Off	On	On	On	On	Off	Sender Unit: Address 1110
Off	Off	On	On	On	Off	Remote Unit: Address 1110
Off	On	On	On	On	On	Sender Unit: Address 1111
Off	Off	On	On	On	On	Remote Unit: Address 1111

Table 1. SW1 protocol select.

General Operation:

Master Units:
A single pair of cable using RS485 protocol communications is only capable of using half duplex protocol for all data transfer on the line. For this reason a Master unit is required to coordinate data transfer between all units on the bus. Setting switch 1 on the Switch selector will designate a unit as the Master.

On power up the Master unit will scan the RS485 bus to determine which Sender and Remote units are connected. This allows it to build up an image of the complete network so that time is not wasted polling units that are not connected. Up to 16 Remote units, 15 Sender units, and the Master can exist on a single RS485 bus network. The Master unit also operates as a Sender unit with the address 0000.
The minimum size network that can exist comprises of one Master unit and one Remote unit at address 0000.

Every 20 seconds the Master unit will rescan the network to see if any new units have been added or removed from the network.

Remote Units:
The remote units allow a keypad, card Readers, or any wiegand device to be connected. Wiegand data streams are collected of any length up to 45 bits. When a delay is encountered after the data stream is received the unit assumes that the wiegand data is complete and signals the network that data is ready to be transmitted. The on board led will illuminate to indicate that data is waiting to be sent.
When the RS485 bus is free of traffic the Master unit will signal the Remote unit to send its data to the corresponding Sender unit with the same switch address. When the Sender receives the data it then recreates the wiegand stream as detected by the Remote unit and outputs it in standard wiegand format for the access control system to receive. At this point the on board LED on the Remote unit will de-activate to indicate that data has been sent.

Each Remote unit has a relay for external control of peripherals. It can be activated with an active low signal at the RELAY IN input located on the matching Sender unit. Similarly the Relay located on the matching Sender unit can be activated with an active low signal to the RELAY IN input of the Remote unit.
Connectors J1 and J2 include an I/O OUT output. This is an open collector output commonly used to activate a LED on a keypad, or give some other feedback response. This output activates when the I/O IN signal located on the matching Sender unit becomes active low. Similarly the I/O OUT on the matching Sender unit can be activated with an active low signal to the I/O IN input on the Remote unit.

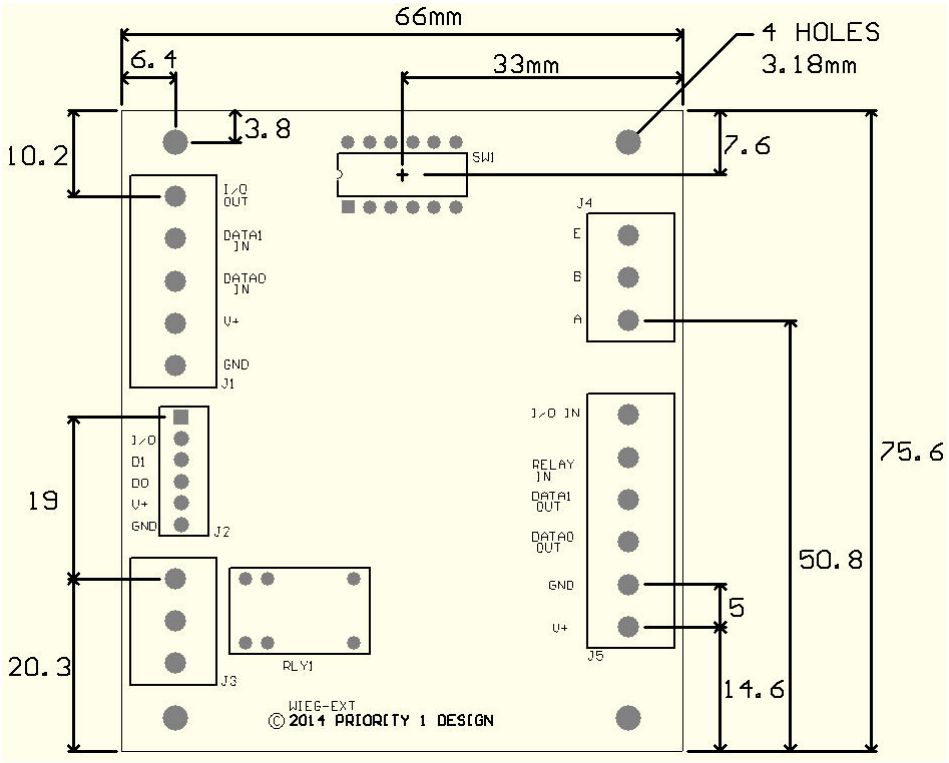
Sender Units:
Sender units are used to collect wiegand data sent by the Remote units and to output it in standard wiegand format to the receiving access controller. Wiegand data streams are sent in exact format as received. Parity bits are not checked and are transmitted as received.

Each Sender unit has a relay for external control of peripherals. It can be activated with an active low signal at the RELAY IN input located on the matching Remote unit. Similarly the Relay located on the matching Remote unit can be activated with an active low signal to the RELAY IN input of the Sender unit.
Connectors J1 and J2 include an I/O OUT output. This is an open collector output commonly used to activate a LED on a keypad, or give some other feedback response. This output activates when the I/O IN signal located on the matching Remote unit becomes active low. Similarly the I/O OUT on the matching Remote unit can be activated with an active low signal to the I/O IN input on the Sender unit.

Specifications:

Supply Voltage:	Nominal 12 Vdc. Maximum 15 Vdc. Minimum 9 Vdc required for relay activation. Minimum 5.6 Vdc required without relay activation.
Supply Current:	8mA without relay activation. 38mA with relay activation.
Cable Maximums:	4000 ft. (1220m) (2 wire 22 AWG UTP-Unshielded Twisted Pair)
Unit weight:	44g
Operating Temperature:	-0°C to +70°C (32°F to +158°F)
Relay Specifications:	Max voltage: 220V AC, 60V DC Max current: 3A Max VA (Watts): 625VA (90W) Insulation resistance: >1000MΩ @ 500V DC Dielectric strength (for 1 min): 500V AC between open contacts 500V AC between coil & contact life: 100,000 operations
Wiegand Format:	Accepts any number of bits in wiegand format up to 45 bits. Wiegand data streams input to the Remote units are sent to Sender units for transmission in exact format as received. Parity bits are not checked and are transmitted as received.

Dimensions:



All dimensions in mm.

Disclaimers.

Priority 1 Design reserves the right to change specifications and prices at any time and without notice. Priority 1 Design shall not be liable to recipients or any third party for any damages, including but not limited to personal injury, property damage, loss of profits, loss of use, interrupt of business or indirect, special incidental or consequential damages, of any kind, in connection with or arising out of the furnishing, performance or use of products supplied, or the technical data herein. No obligation or liability to recipient or any third party shall arise or flow out of Priority 1 Design rendering of technical or other services.

Life support — This product is not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Priority 1 Design customers using or selling this product for use in such applications do so at their own risk and agree to fully indemnify Priority 1 Design for any damages resulting from such application.