

**AC-1200**

**Proximity Card Reader (Wiegand)**

## **Technical Reference Manual**

**Revision C**

2005-11-04

[AC-1200 TRM Rev C ENG-US]

# Proximity Card Reader (Wiegand)

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## Introduction

The KeyMaster AC-1200 is proximity reader with a standard Wiegand interface

The AC-1200 employs very large scale integration (VLSI) surface-mount components, and utilises the I/O capability of the Wiegand host device to deliver a compact, flexible proximity solution. A single tri-color LED and an internal piezo buzzer indicate status and error information.

This document forms part of a set covering the installation of KeyMaster Systems and should be read in conjunction with the master document, entitled 'KeyMaster Systems Hardware Installation Guidelines', which is distributed as *AC-6000 HIG Rev B ENG-US.pdf*.

## Features

- Supports Hitag™ 1, Hitag™ 2 and H4102 (a.k.a. EM4102) transponder technologies
- Industry standard 125 kHz operation
- Can be mounted directly on metal surfaces
- Up to 4" read distance (transponder dependent)
- Compatible with the AC-3151 Reader Interface Module and AC-2010 Operator Station
- 26 bit Wiegand number output (24 data bits+2 parity bits)
- Tri-color LED indicator
- Piezo audio buzzer
- 12 V<sub>dc</sub> operation
- Compact size - (w) 1.77" x (h) 4.72" x (d) 0.98"
- Weather resistant housing.



*AC-1200 proximity card readers*

## Information regarding UL evaluation of this product

This product meets the UL Listing requirements for the United States of America and Canada. Please refer to the document entitled 'KeyMaster System Hardware Installation Guidelines' for detailed information on the UL Listing of KeyMaster system components.

## Tag and card technologies

The AC-1200 reader can read Hitag 1, Hitag 2, H4001 and H4102 (EM4102) proximity tags and cards. The following table lists the tag formats.

Tag formats		
Tag type	Data size	AC-1200 output
H4102 (EM4102)	34 bit	26 bit Wiegand format (34 bit data truncated to 26 bits)
H4001	34 bit	26 bit Wiegand format (34 bit data truncated to 26 bits)
Hitag 1	34 bit	34 bit Wiegand format
Hitag 2	34 bit	34 bit Wiegand format

## Installation

The AC-1200 is supplied complete with a 12" length of 8-core shielded cable that is used to connect the reader to the controlling device. The cable cores have a cross-sectional area of 0.22 mm<sup>2</sup>, which is the approximate equivalent of size 24 AWG.

Installation of the AC-1200 includes the following tasks, which are detailed in the sections to follow:

- Prepare to mount the reader
- Connect the cable to the host Wiegand interface
- Connect the power supply cabling
- Mount the reader

**Note:** To Prevent EMI between readers, ensure the readers are mounted at least 6" apart.

The cable is integrated into the AC-1200 circuitry, which is sealed in a protective resin potting. The multi-core shielded cable is connected to a terminal block on the AC-3151 door controller.

The following procedure is used when the cables are connected to the terminal block:

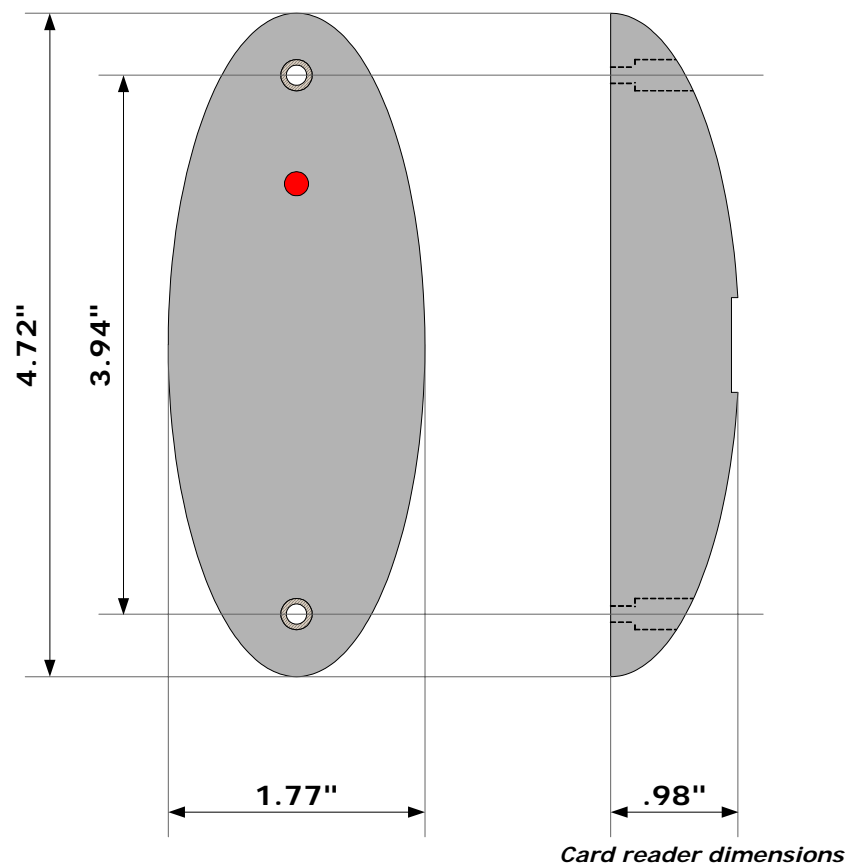
- The terminal block is removed from the controller PCB
- 1/4" of the insulation is carefully stripped from the end of each conductor
- The terminal screw is loosened
- The bare portion of the conductor is inserted into the terminal orifice
- The terminal screw is fastened

The recommended screwdriver is a slot-head type screwdriver suitable for size 0 or size 1 screws (3/32" wide blade). The screws should not be over-tightened as this may damage the conductor.

## Mounting

The AC-1200 proximity card reader can be mounted against most surfaces, including metal. Two, 0.2" diameter mounting holes are countersunk into the front of the housing.

Screws and wall anchors are provided with the unit.



When mounting the AC-1200 proximity reader, the following procedure is used:

- Position the reader where it is to be mounted
- Mark the positions of the mounting holes on the mounting surface
- Drill holes in the mounting surface using a suitable drill bit of the correct gauge
- Drill a hole for the cable feed if necessary
- Feed the cable through the mounting surface to the door controller
- Connect the cable to the terminal block of the door controller, as detailed in the following section
- Insert wall anchors into the holes if necessary
- Align the reader with the holes and fasten the mounting screws

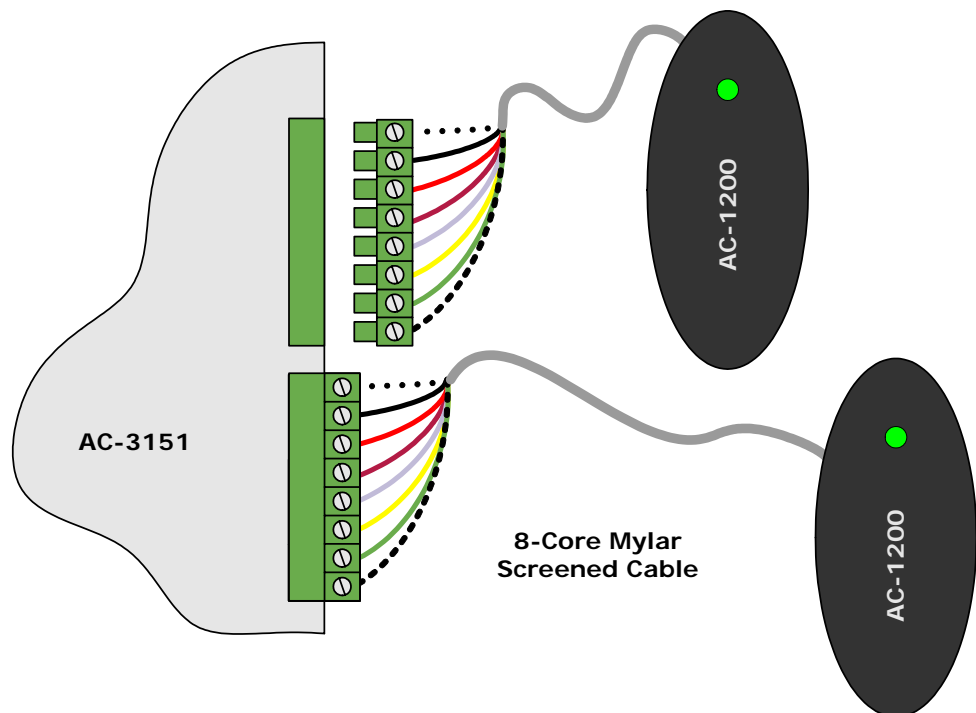
For proper operation, it is best not to subject the AC-1200 proximity card reader to excessive heat, moisture, vibration or electrical interference.

For back-to-back operation (opposite sides of a door) always maintain a minimum distance of 6" between the two card readers. A suitably grounded metal shield may be inserted between the back-to-back readers to reduce undesirable crosstalk.

## Wiegand interface

The AC-1200 reader is connected to one of the two Wiegand interfaces on the AC-3151 reader interface module or the single Wiegand interface on the AC-2010 operator station.

The AC-3151 Wiegand interfaces consist of eight-way, press-in terminal blocks which are easily removed and connected to the cores of the reader cable, as shown in the diagram below.



*Typical card reader wiring to AC-3151 Reader Interface Module*

The cabling route between the AC-1200 reader and the host device shall not exceed 25 yards when powered by the host device. The recommended cabling type for the Wiegand interface is an 8-core, Mylar screened cable with size 24 AWG conductors.

In cases where the supplied cable needs to be extended up to 25 yards, Belden P/N 9538 or equivalent 24AWG 4-pair, shielded cable may be used. Cable junctions shall be performed in accordance with the National Electrical Code and must not bear tension.

*Recommended cable guidelines for distances greater than 25 yards:*

From 75 ft. up to 200 ft.    22AWG 4-pair shielded

From 200 ft. up to 300 ft.    20AWG 4-pair shielded

From 300 ft. up to 500 ft.    18AWG 4-pair shielded

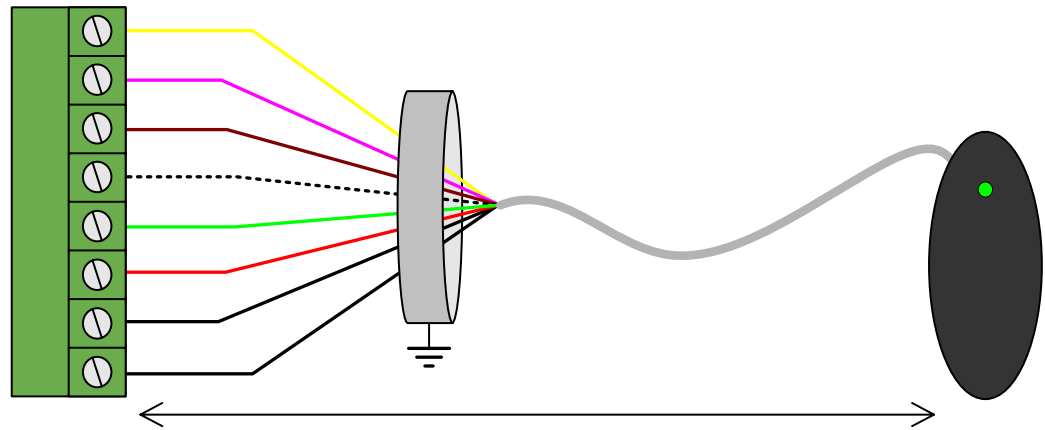
Interference is reduced by connecting the cable shield to the 'Gnd' terminal of the Wiegand interface on the host.

The following table describes the signals carried between the door controller and the AC-1200.

AC-1200 wire colors			
Color	Wiegand signal description	AC-3151 PCB label	Signal direction
Yellow	Buzzer control (optional)	BUZ	From AC-3151
Purple	Green LED control (optional)	GL	From AC-3151
Brown	Red LED control (optional)	RL	From AC-3151
White	Data 1	S1	To AC-3151
Green	Data 0	S0	To AC-3151
Red	Power supply	+V0	From AC-3151
Black	Ground	GND	Common
Drain	Ground	GND	Common



The following diagram indicates how the AC-1200 cable is connected to the Wiegand interface on the host device.



*Connecting AC-1200 Wiegand proximity reader to host device*

**Buzzer**

**Green LED**

**Red LED**

**Data1/Data**

**Data0/Clock**

**+V<sub>0</sub> (Power)**

**Ground**

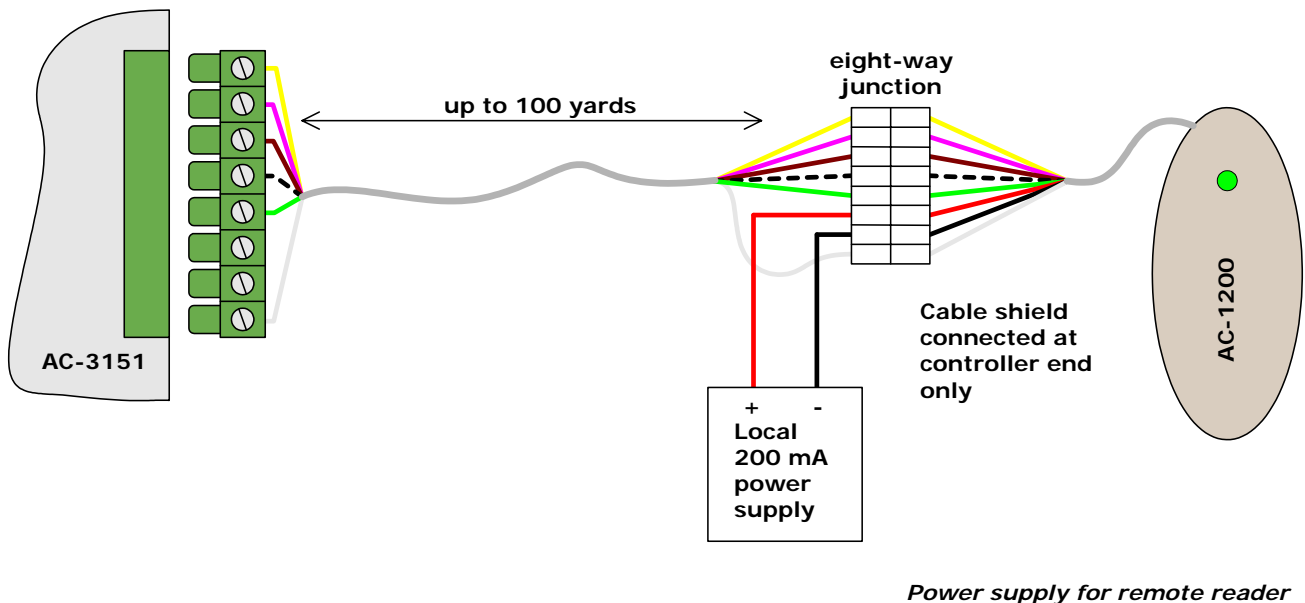
## DC power supply

For installations where the AC-1200 is in close proximity to the door controller (< 25 yards), it is recommended that the DC power for the AC-1200 unit be taken directly from the host device Wiegand port.

For longer distances, use a separate dc power supply. **The UL294 Listed, power-limited power supply must be able to deliver a minimum current of 200 mA at 12 V<sub>dc</sub> under all conditions.**

When using separate power supplies, **the negative or ground rail of all the power supplies must be referenced to the ground of one of the supplies to ensure common ground reference.**

Refer to the following diagram when connecting a dedicated power supply for the AC-1200.



## Diagnostic Status Indicators

The AC-1200 card reader includes a tri-color LED indicator that can emit red, green or amber light. The reader also has a piezo buzzer set in the resin at the rear of the unit.

When 12 V<sub>dc</sub> power is applied to the AC-1200 reader, the LED flashes amber and the buzzer emits a short tone. When successful communication with the controller is established, the LED continuously flashes green at one-second intervals.

When a proximity card is successfully read by the AC-1200, the buzzer sounds.

The LED and buzzer are under the control of the host device and are used to indicate normal access control events and to diagnose card reader malfunction.

The status of an access control transaction is indicated by the LED; green for access allowed and red for access denied.

The following table describes the various states of the LED and buzzer for assistance in the diagnosis of typical reader behaviour:

AC-1200 diagnostics	
<b>Condition:</b>	<b>LED on Amber and buzzer on permanently</b>
<b>Description:</b>	<i>Some form of power or CPU problem exists.</i>
<b>Possible causes:</b>	The AC-1200 reader is experiencing operational problems which could be a result of inadequate dc power.  This condition may also arise if the AC-1200 electronic circuitry is physically damaged.
<b>Condition:</b>	<b>LED flashing Green</b>
<b>Description:</b>	<i>The AC-1200 reader is operating normally.</i>

## Product Specifications

AC-1200 specifications	
Power requirement	
Operating voltage (dc)	12 V <sub>dc</sub>
Maximum current	200 mA
Operating parameters	
Excitation frequency	125 kHz
Typical reading distance	0" to 4" (dependent on transponder type)
Environmental characteristics	
Operating temperature	32°F to 158°F
Storage temperature	14°F to 176°F
Operating humidity range	5% to 95% non-condensing
Enclosure	Nylon
Wiegand interface	
Transient protection	Yes
Maximum cable length	500 feet (depending on cable size)
Data output format	26 bit Wiegand (24 data bits and 2 parity bits)

## FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a Residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the Instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: Re-orient or relocate the receiving antenna. Increase the separation between the equipment and receiver. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. Consult the dealer or an experienced radio/TV technician for help.

- Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
- The unit is intended to be powered by a UL294 Listed, power-limited power supply.