

# Bad ASS Controller Datasheet



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## Overview

The [Bad ASS Controller \(BAC\)](#) from Escape Room Techs is the latest in turn-key electronics for your escape room. It incorporates many game types and expansion capacities for many common, and not so common, game types. It features a web browser interface (no, the Internet is not required except for updates) for easy configuration and game selection.

Note: items marked as \*Future\* may not be available at this time. If you specifically desire these features, please contact us for details on the capability and status.



## Quick Startup

1. Use an Ethernet patch cable to connect the Ethernet port to your network. The device expects to be on a network with DHCP. Most networks with a router have this.
2. Apply power. Use the wall adapter purchased with the product or wire in other 12V or 24V at the green headers.
3. Start the Bad ASS Manager. Hit discover. ([Download here](#))
4. Select your Bad ASS Controller and Configure.
5. Wire up your prop and run your game! (Turn off power while wiring the BAC.)

## Device Overview

### Lights

#### Power

This light should be on when operating and lets the operator know the device is on and powered.

#### Status

This light may be on or flash during game operation. The status of this light is game dependent.

### Connectors

There are 4 main connectors on the Bad ASS Controller.

Each header is pluggable for easy wiring and flexibility.

#### Power Input

The power input is a standard 5mm barrel, 2.1mm pin connector. The controller will operate from 12V to 24V. The controller uses approximately 100mA at 12V and 50mA at 24V. Depending on the supply used, the balance of the current may be used for other devices.

Each green connector has a power in and ground connection. These are available for external use (inputs and outputs) or can be used to provide power to the device. All VIN and GND connections are connected internally.

#### Input Header

There are 8 input signals available on this header. The inputs are capable of switch (digital on/off) inputs and analog inputs. Each is wired based on the particular game. The input voltage range is 0V to 26V. The switch point (what voltage on is detected) is about 5V. An input can be configured as a reset input. Apply a voltage to these pins to turn them on.

#### Output Header

There are 6 output signals available on this header. The outputs are capable of switch (digital on/off) outputs. They are sinking outputs which means they connect the load (lights, maglock, etc.) to ground. They are limited to 500mA each, 2500mA total for all 6. They can with up to the maximum voltage of the BAC power supply.

#### Relay Header

There are 2 relay outputs suitable for higher current devices like motors or larger maglocks. The configuration of the relays is game dependent. Each relay can handle 10A each. In most cases, they will switch 12V or 24V. This is acceptable with the standard, exposed case. In cases where a qualified user wishes to switch 110V AC, the relays are suitable for this application and Escape Room Techs recommends using a DIN rack mounting kit in a proper wiring cabinet or the dedicated enclosure which is a proper, small wiring cabinet for such applications. Consult Escape Room Techs if you have further questions.



## Ethernet

It is arguable that the greatest feature of the Bad ASS Controller is the Ethernet connection. This connection allows for the web browser interface to configure the game from your phone or game master room. It also allows game control software like Mythic Mystery Master (M3), Escape Room Master, Clue Control, or Houdini to monitor and control room. Additionally, open protocols like HTTP/JSON and MQTT are supported. Connect the Ethernet port into your network and the BAC will use DHCP, DNS and mDNS to find itself on the network (don't worry about the acronyms, 99% of all networks support these protocols). This supports the 'Just Works' mentality of the system.



## Web Configuration

Download the Bad ASS Manager [here](#). It is a self-contained executable (Windows only) which will discover and manage the configuration of all the BAC devices found on the network.

The first screen you are presented with options for System, Network, and Game configuration. The System screen allows for

## Network Configuration

### System Configuration

General Game Settings

## Game Configuration Overview

Below is a brief overview of each game included in the BAC. If you see a game or option which does not exist in your BAC, you may have an older BAC which needs a firmware update, or the feature may not be implemented yet. Please see this section up updates.

### Input Sequence

Common escape room puzzle where a sequence of inputs must be entered to solve the puzzle. It may be a set of buttons, switches, proximity sensors, hall sensors, or any other simple switch input. Up to 8 inputs can be used in this puzzle.

### Simon Says

A puzzle where a set of lights (or other indicator) are triggered in a pattern which prompt the player to repeat the sequence. Up to 6 inputs and outputs can be used for this game.

*\*Future\** – A progressive style Simon Says, more like the class game could also be available.

### RFID Match

A RFID game where all the RFID readers must read a preconfigured solution set. Additionally, a setting *\*Future\** setting called most match assists with large RFID installations (>20) where there may be positioning issues and you want to allow a solve before all the readers find their corresponding RFID tag.

### RFID Sequence *\*Future\**

A RFID game where one or more RFID tags are presented to one or more RFID readers in a sequence. An example is approaching 3 hats (readers) with 3 magic wands (tags) in sequence. Or 1 hat (reader) with 3 magic wands (tags) in a sequence.

### RFID Tag \*Future\*

A RFID game where one or more RFID tags are presented to one or more RFID readers without a sequence. This is similar to a RFID Match Game except the tag does not need to stay in place. An example is one wand (tag) 'tagging' 4 different hats in the room. A audio/visual clue should accompany each successful tag.

### Patch Game

Classic put all the wires in the right spots game. Up to 6 connections can be directly monitored and more can be monitored with a little wring creativity.

### Room Controller

Ok, this isn't really a game, but a controller for up to 6 simple games. Each input/output pair represent a single puzzle where the input triggers the solve state and the output triggers the solution. This facilitates each puzzle being monitored and force solving each output. Additionally, the puzzle solve logic can be configured (as in high or low) and the output mode can be configured (high, low, pulse, etc).

### Knock-Knock

Classic knocking pattern game to release a maglock.

### 'Valve' Game

Turn the 'valves' to a specific position to solve the puzzle. Each valve is an indestructible knob (rotary knob) which when turned is used to select a digit in the solve solution. This game currently works with serial LEDs where each knob controls 10 LEDs in the strip.

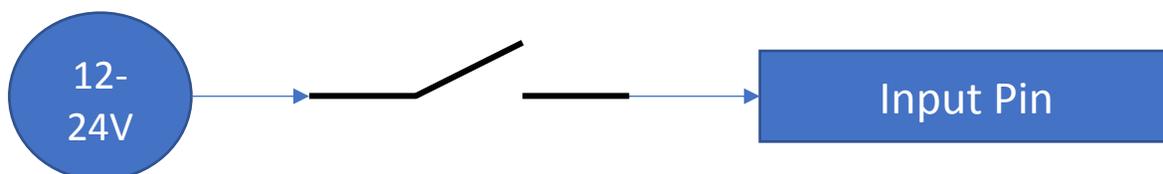
## Wiring

All 3 main green headers, input, output, and relay have a power connection available on them. The header can be used to power your external circuitry like lights and buttons and maglocks. Alternatively, the board may be powered via these pins if the user has their own power supply.

### Input Wiring

The input header supports 8 inputs. The number of inputs required and used depends on the game configuration. Most games can be configured to leave at least one input free, which can be used as a Reset input if needed.

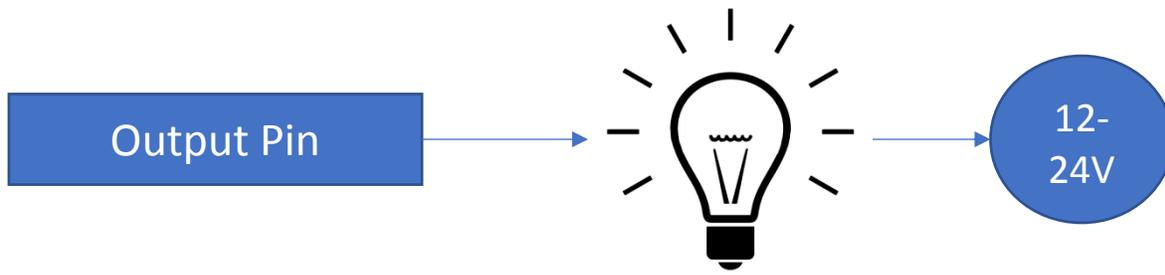
This is how you wire an input pin:



## Output Wiring

The output header supports 6 outputs. The number of outputs required and used depends on the game configuration. Most games can be configured to leave at least one output free, which can be used as a Solve output if needed. Additionally, the relays can be used as outputs, typically a solve output.

This is how you wire an output pin:



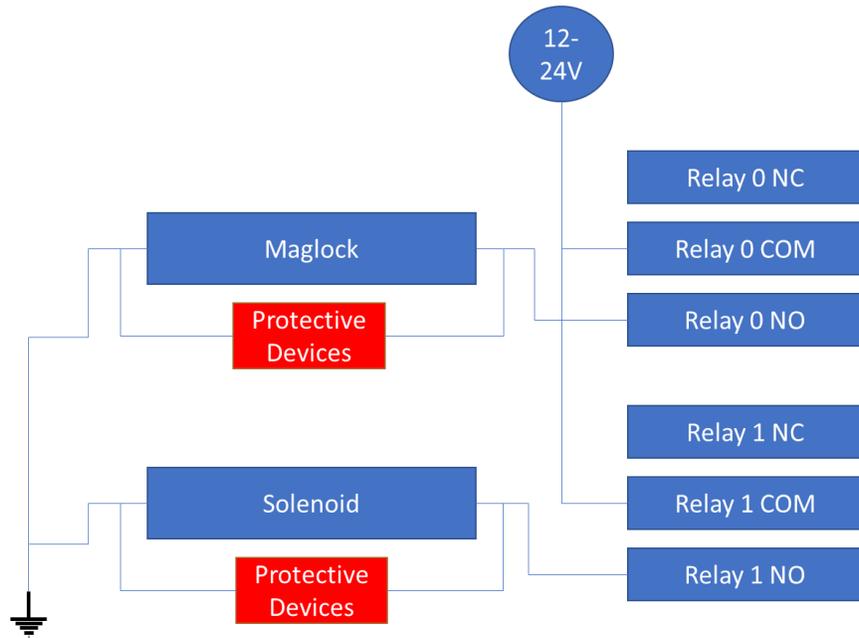
## Relay Wiring

The relay header supports 2 Form-C relays. Form-C means they have a common (COM), normally open (NO), and a normally closed (NC). Relays are not typically part of the game logic and are typically used for the final solve action to power a maglock, solenoid, linear actuator, or large LED.

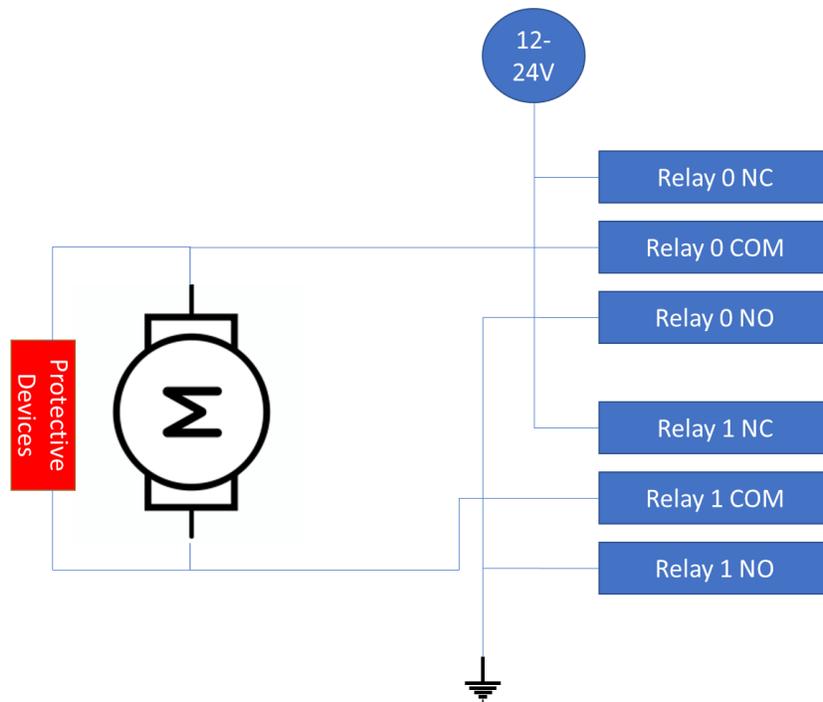
Large outputs devices like motors, linear actuators, large maglocks, LEDs, etc., anything over 1A or inductive or noisy, should have a separate power supply.

Be aware that large inductive loads (anything that uses magnetism like motors and maglocks) create electrical noise and back EMF. While the BAC is built with industrial I/O protection, it cannot protect against everything in all situations, as it is unknown exactly how the end user will use the device. It is the responsibility of the user to protect against these types of interferences. Typically, this involves diodes, MOVs, and capacitors. Please consult Escape Room Techs if you have issues with stability or resets.

This is how you wire a relay to control a maglock or solenoid:



Alternatively, a linear actuator can be wired like this (the kind that turn themselves off at the limits automatically):



## RFID Wiring

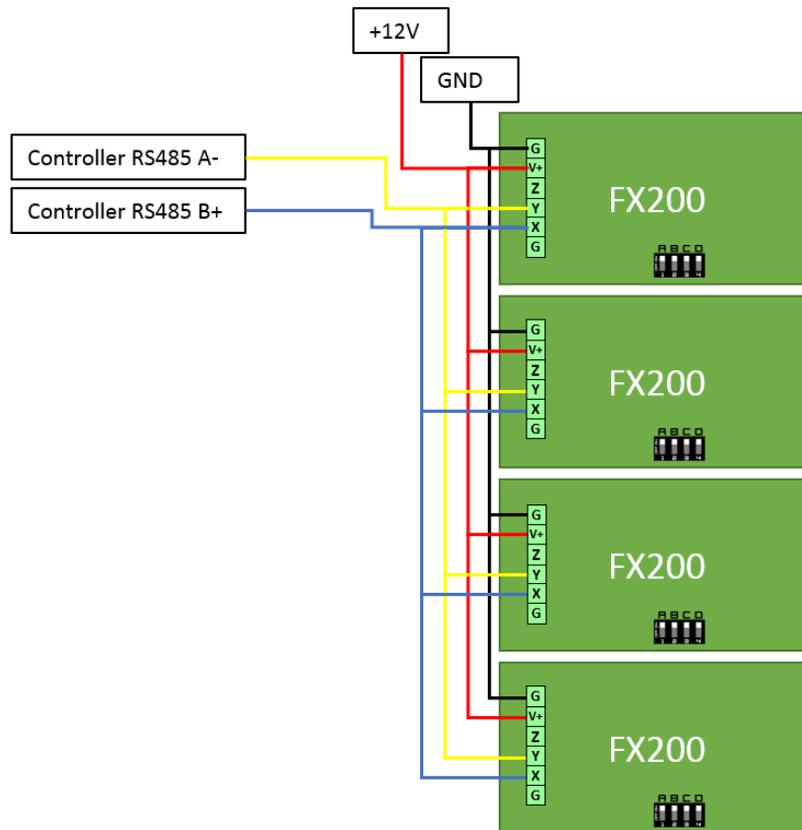
For the RFID based games, the FX200 is used. The FX200 is a networkable (not Ethernet network) reader which can be placed far distances (>100ft) around a room for optimal placement. The connection to the readers is located INSIDE the BAC. This connection and wiring are done for you when you purchase readers with the BAC from Escape Room Techs. If you are modifying or piecing together a system, please consult Escape Room Techs for the procedure to wire the readers into the BAC.

When placing your readers around the room, keep the reader with address 0 (all switches down) at the end of the line. It has a special hardware configuration and will work best at the end.

Multiple FX200s are to be wired in parallel.

Some users may wish to use CAT5/6 wiring for their RFID readers. In this case, wire like this:

CAT5/6 or other 4x Twisted Pair Wiring	Signal	BAC/FX450 Connection	FX200 Connection
Orange Pair (both wires)	V+ (12V to 24V)	V+	V+
Green Solid	RS-485 A-	A	Y
Green Strip	RS-485 B+	B	X
Brown Pair (both wires)	Ground	G	G
Blue Pair	Not used	-	-





## Serial LED / Neopixel

Serial LEDs come in a variety of configurations. Some types of Serial LEDs require external resistors to run properly and some need an internal modification. Please consult Escape Room Techs for more information. Currently, only the 'Valve' game is configured for these types of LEDs. \*Future\*. These

Audio/Video Player (Sprite) \*Future\*

## Contact

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## References