



PKONE USER MANUAL

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1.1 Introduction / About **PKONE** Platform

Thank you for purchasing the Penny K Pinball **PKONE** Platform, a reliable commercial and homebrew platform produced under Penny K's consistently stringent quality control, delivering excellent performance with robust design conforming to a commitment to quality, endurance and the love of pinball.

The platform caters for both a backbox installation approach as well as a device under playfield with an extension designed system.

The **PKONE** system can also be used outside the scope of Pinball, offering switch / Servo / Opto / Power ON/OFF controls to build any application that requires human interaction.

Penny K Pinball was founded by some of the best minds in the entertainment industry who share a common passion for everything pinball, using their combined talented skills in engineering design and innovation, with the goal of providing a very easy to use pinball platform that serves both commercial and homebrew users alike, Penny K was born.

Our commitment to innovation will see Penny K Pinball deliver the highest and most enjoyable experience possible in the pinball industry for years to come.

Penny K Pinball - Building better world's under glass.

1.2 Package Contents

Standard Pack

1 x **PKONE** Nano or 1 x **PKONE** Extension

1 x USB 2.0 Cable – Type A Male – Type B Male 500mm

2 x Molex Connector Packs

1 x Gift / Support Pack

Pro Pack

1 x **PKONE** Nano / 2 x **PKONE** Extension / 1 x **PKONE** Lightshow / 10 x **PKONE** LED

1 x USB 2.0 Cable – Type A Male – Type B Male 500mm

1 x Molex Connector Pack

1 x Gift / Support Pack

Lightshow Pack

1 x **PKONE** Lightshow

1 x USB 2.0 Cable – Type A Male – Type B Male 500mm

1 x Molex Connector Packs

1 x Gift / Support Pack

2.1 Connecting to PKONE - Windows

Connect your **PKONE** to your PC using USB (Type A Male - B Male)

Install the COM port drivers:

PKONE uses the STM32 Virtual COM Port Driver for communication.

You will find the installation files in VCP_Windows folder in the PKP_Support folder.

1. Select your OS version and double click the .exe file.
2. Follow the prompts to install the VCP drivers.

Finding the Com port:

1. Right-click on the Start button and choose “Device Manager” from the popup menu.
2. Then expand the Ports (COM & LPT)

The COM Port will be shown as STMicroelectronics, including the COM Port number.

2.2 Connecting to PKONE - macOS

Connect your **PKONE** to your Apple PC using USB (Type A Male - B Male)

Install the COM port drivers:

macOS does not require any drivers to be installed to allow you to communicate with **PKONE**.

Finding the COM port:

1. Open terminal and type: **ls /dev/***

The controller will be identified as /dev/cu.usbmodem (Number)

2.3 Connecting to PKONE - Linux

Connect your **PKONE** to your Linux PC using USB (Type A Male - B Male)

Install the COM port drivers:

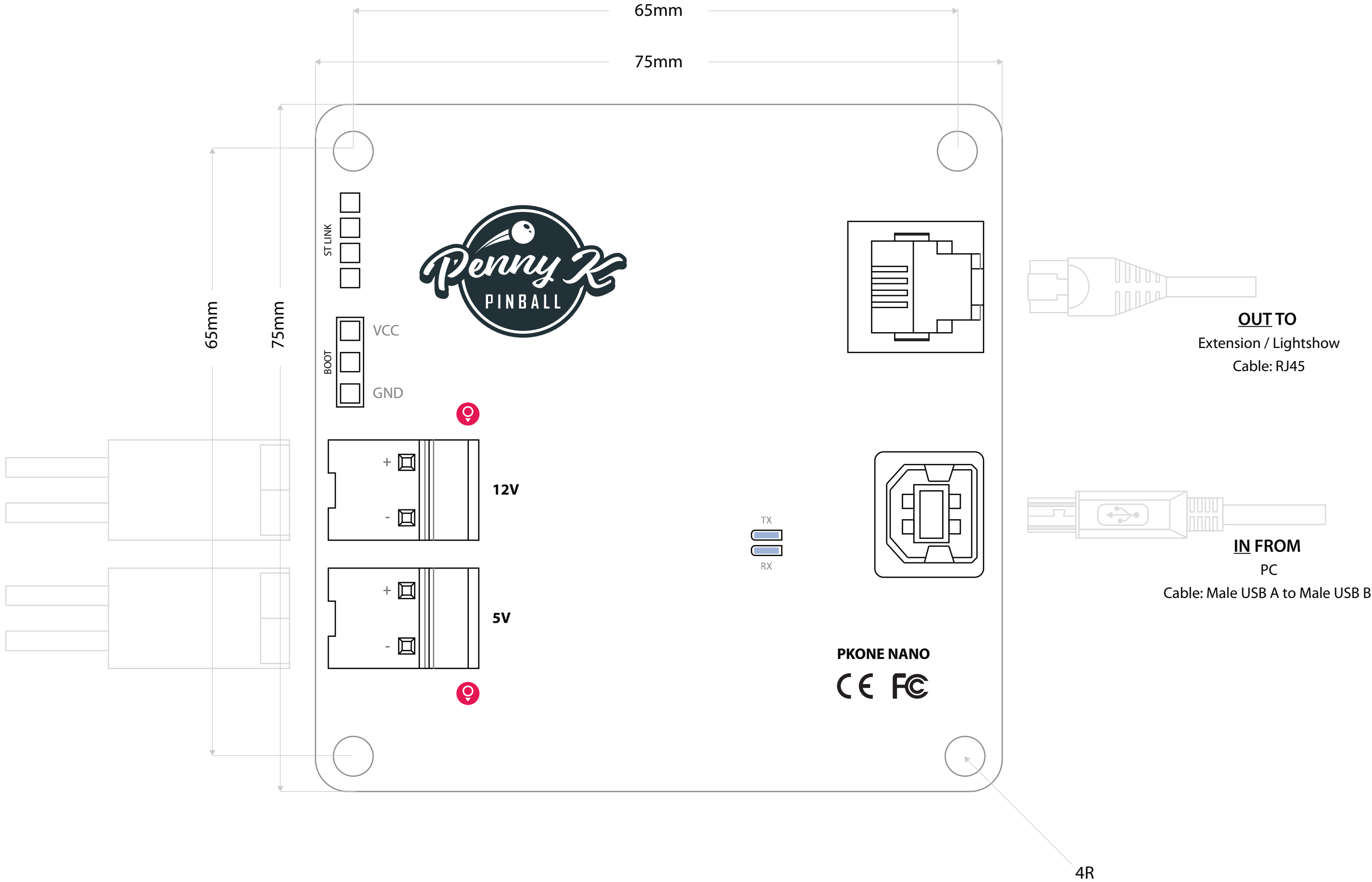
Linux does not require any drivers to be installed to allow you to communicate with **PKONE** .

Finding the COM port:

1. Open terminal and type: **ls /dev/tty***

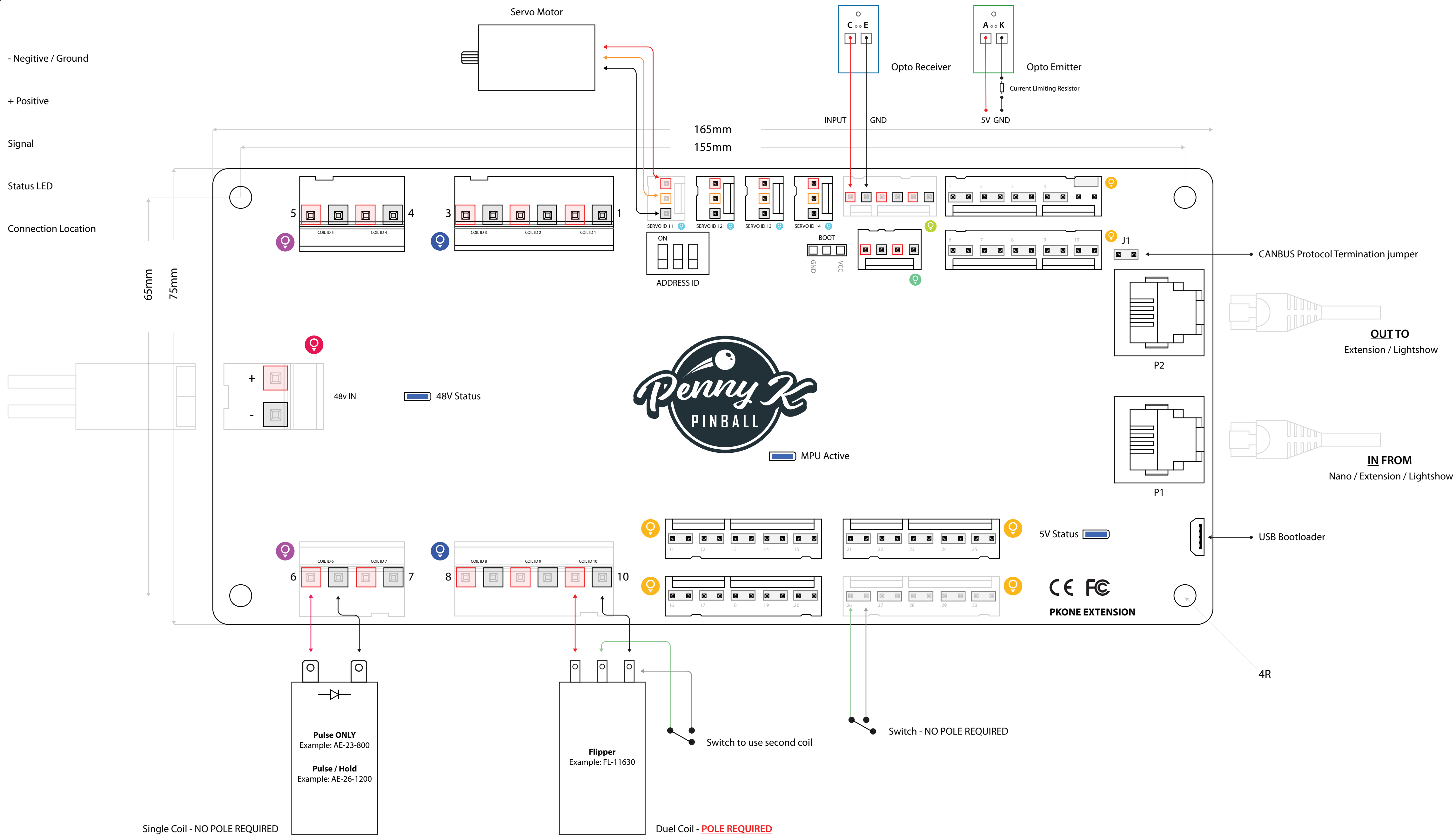
The controller will be identified as ttyACM0

- Status LED
- Connection Location



 3.2 PKONE EXTENSION MAP

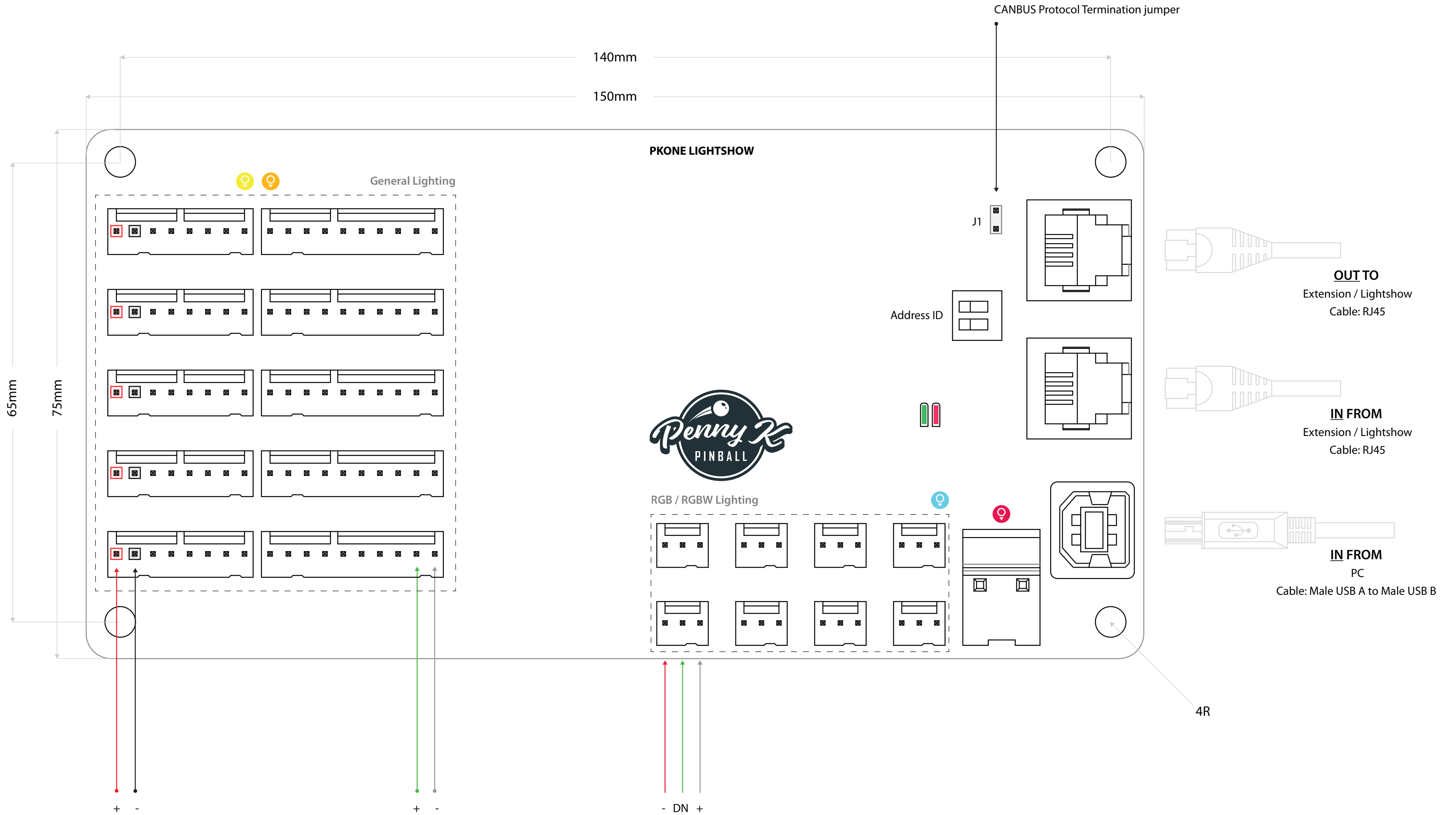
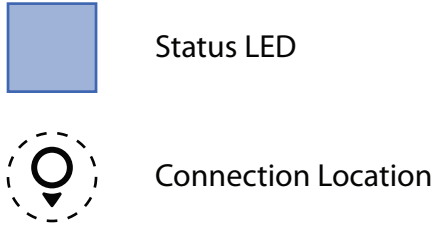
-  - Negative / Ground
-  + Positive
-  Signal
-  Status LED
-  Connection Location



Single Coil - NO POLE REQUIRED

Dual Coil - **POLE REQUIRED**

3.3 PKONE LIGHTSHOW MAP



4.1 Specifications - Nano

Form Factor:

65 mm x 65 mm / 2.55 inch x 2.55 inch

Processor System:

STMicroelectronics ARM® Cortex®-M4

Extension Protocol:

CANBUS – CAN 20A

Connectors:

N/A

Power Requirements:

5V DC Input
12V DC Input

Environment:

Temperature	0°C - 60°C
Storage Temperature	-40°C - 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%

4.2 Specifications - Extension

Form Factor:

165 mm x 75 mm / 6.5 inch x 2.95 inch

Processor System:

STMicroelectronics ARM® Cortex®-M4

Extension Protocol:

CANBUS – CAN 20A

Connectors:

30 x Switch Inputs

5 x Optical Receiver Inputs

10 x Coil Outputs

4 x Servo Outputs

Power Requirements:

5V DC	(Supplied via RJ45)
12V DC	(Supplied via RJ45)
48V – 50V DC	(Coils)

Environment:

Temperature	0°C - 60°C
Storage Temperature	-40°C - 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%

4.3 Specifications - Lightshow

Form Factor:

150 mm x 75 mm / 5.90 inch x 2.95 inch

Processor System:

STMicroelectronics ARM® Cortex®-M4

Extension Protocol:

CANBUS – CAN 20A

Connectors:

8 x RGB Channels - 64 LED's Per Channel - Total 512 RGB LED's

45 x General Lighting Channels

Power Requirements:

5V DC Input (Supplied via RJ45)

Environment:

Temperature	0°C - 60°C
Storage Temperature	-40°C - 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%

4.4 Recommended Coils

The listed coils are recommended and have been tested with the **PKONE** Platform

Flippers

PKONE has been designed to use dual wound coils **ONLY** for flippers.

FL-11629

FL-11630

FL-11722

FL-11753

FL-15411

FL-17636

FL-11629

General Coils

Coils that require to be held on:

Used by: Up Post / Gates etc

26-1200

27-1500

23-800

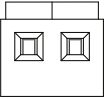
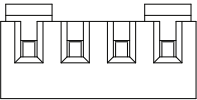
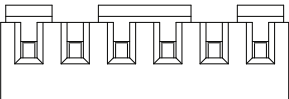
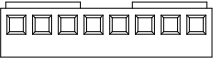
Coils used for pulse only:

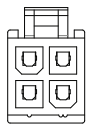
Used by: Pop Bumper etc

23-800

4.5 Connectors

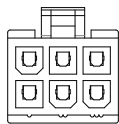
All commands are sent as ASCII encoded strings

Device Location		Molex Housing KK 254 Series 41695	
		KK 3.96mm Crimp Terminal Housing, Friction Ramp, 2 Circuits, Natural Usage: 5v, 12v and 48v INPUT	PN# 09508021
		KK 3.96mm Crimp Terminal Housing, Friction Ramp, 4 Circuits, Natural Usage: COIL INPUT	PN# 09508041
		KK 3.96mm Crimp Terminal Housing, Friction Ramp, 6 Circuits, Natural Usage: COIL INPUT	PN# 09508061
		KK 396 Crimp Terminal 2478, 18-24 AWG Usage: Series 41695 connector pin - TOOL # 638279500	PN# 08500106
Device Location		Molex Housing KK 254 Series 2695	
		KK 254 Crimp Housing, Friction Ramp, 3 Circuits, Natural Usage: Servo's / LED's	PN# 22012037
		KK 254 Crimp Housing, Friction Ramp, 4 Circuits, Natural Usage: Opto	PN# 09508021
		KK 254 Crimp Housing, Friction Ramp, 6 Circuits, Natural Usage: Opto	PN# 09508021
		KK 254 Crimp Housing, Friction Ramp, 8 Circuits, Natural Usage: LED's	PN# 09508021
		KK 254 Crimp Housing, Friction Ramp, 10 Circuits, Natural Usage: Switch's / LED's	PN# 09508021
		KK 254 Crimp Terminal, 22-30 AWG Usage: Series 2695 connector pin - TOOL # 638118200	PN# 08550102



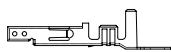
Mini-Fit Jr. Receptacle Housing, Dual Row, 4 Circuits, UL 94V-2, Natural
Usage: 5v, 12v INPUT / OUTPUT - PKONE Power PCB

PN# 39012040



Mini-Fit Jr. Receptacle Housing, Dual Row, 6 Circuits, UL 94V-2, Natural
Usage: 48v INPUT / OUTPUT - PKONE Power PCB

PN# 39012060



Mini-Fit Female Crimp Terminal, 18-24 AWG
Usage: Series 5557 connector pin - TOOL # 638190901

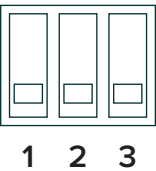
PN# 39000039

4.6 Addressing Switches

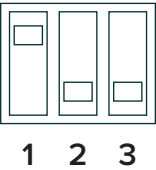
The **PKONE** address needs to be set appropriately to receive commands from the Nano device.

NOTE: You must terminate the jumper on the last device in the chain, this tells the **CAMBUS** protocol to end and return the data back to the Nano.

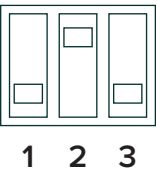
Extension



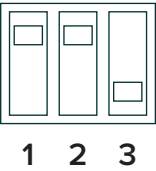
Device ID 0



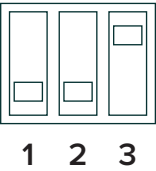
Device ID 1



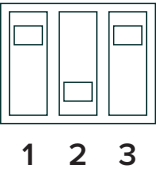
Device ID 2



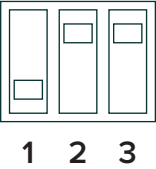
Device ID 3



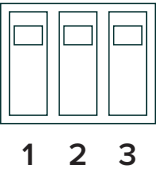
Device ID 4



Device ID 5

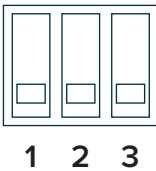


Device ID 6

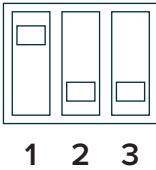


Device ID 7

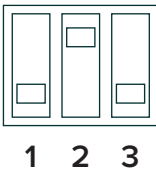
Lightshow



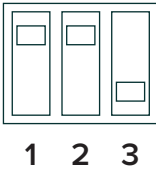
Device ID 0



Device ID 1

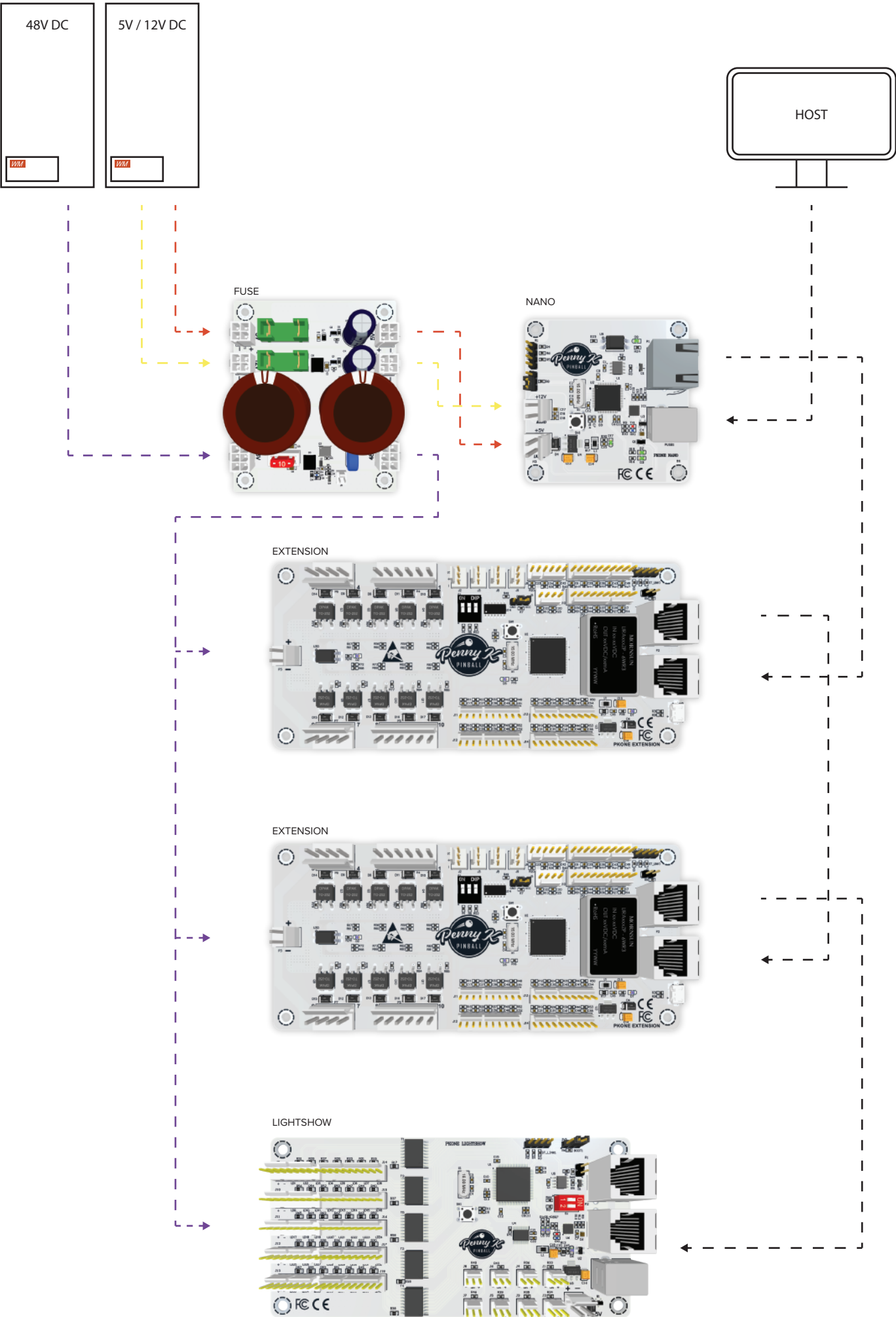


Device ID 2



Device ID 3

4.7 System Mapping



5.1 Command Protocol Tables

Please refer to the Command Protocol User Manual.

Website

www.pennykpinball.com/support

5.3 Sending and Receiving Data

Sending:

You can send commands directly to the controller using your program language of choice or use one of TCP Bridge applications provided. If you are new to programming, we recommend using a pinball framework to get you up and running faster.

NOTE: The string needs to be encoded using ASCII before sending.

Examples:

C# - Pulsing Coil 1

```
Socket soc = new Socket(AddressFamily.InterNetwork, SocketType.Stream, ProtocolType.Tcp);
System.Net.IPAddress ipAdd = System.Net.IPAddress.Parse(server);
System.Net.IPEndPoint remoteEP = new IPEndPoint(ipAdd, 8085);
soc.Connect(remoteEP);
```

```
byte[] byData = System.Text.Encoding.ASCII.GetBytes("PLA03000255255E");
soc.Send(byData);
```

```
byte[] buffer = new byte[1024];
int iRx = soc.Receive(buffer);
char[] chars = new char[iRx];
```

```
System.Text.Decoder d = System.Text.Encoding.UTF8.GetDecoder();
int charLen = d.GetChars(buffer, 0, iRx, chars, 0);
System.String recv = new System.String(chars);
```

ActionScript - Pulsing Coil 1

```
PKsocket = new Socket();
PKsocket.connect("localhost", 8085);
PKsocket.writeMultiByte("PLA03000255255E","US-ASCII");
PKsocket.flush();
```

Python - Pulsing Coil 1

```
import socket
```

```
sock = socket.socket(socket.AF_INET, socket.SOCK_STREAM)  
sock.connect(("localhost", 8085))
```

```
commandStr = "PLA03000255255E"  
commandStr.encode(encoding="ascii"))
```

```
sock.send(commandStr)
```

Receiving:

All data is received as a string.

Examples:

Switch 17 is active/closed on board 0 – data received will be PSW0171E

Switch 17 is inactive/open on board 0 – data received will be PSW0170E

5.4 USB Firmware Bootloader

To update the firmware on a device - use STM32CubeProgrammer-2.5.0

Using ST-Link (Optional)

1. Select ST-LINK (Top right, Blue Button)
2. Click on Open File
3. Select the Extension .hex file
4. Click on Download

On successful download, you will receive the message - File download complete

Bootloader UART - USB Connection

1. Select UART (Top right, Blue Button)
2. Select COM port
3. Click Connect
4. Click on Open File
5. Select the device .hex file
6. Click on Download

On successful download, you will receive the message - File download complete

6.1 Supported Pinball Frameworks



The **Mission Pinball Framework** (“MPF”) is a free Python-based pinball software framework that’s used to run real pinball machines. It allows both casual builders and hard-core programmers to create the software to run their pinball machines—whether it’s new game code for an existing pinball machine, a “re-theme” of an old machine, or totally custom pinball or any homebrew pinball machine built from scratch. MPF is cross-platform and runs on Windows, Mac, Linux, and the Raspberry Pi. It’s available in 32-bit and 64-bit versions and can be installed in minutes.

About The Mission Pinball

The Mission Pinball Framework is being built by pinball-loving volunteers who are building, maintaining, and supporting MPF in their spare time. Everything we build is completely free & open source, even for commercial use.

We do it for the love of pinball!

MPF intergation and command protocol by Quinn Capen

7 **Warranty**

60 DAY LIMITED WARRANTY

Penny K Pinball Ltd warrants to the original consumer purchaser of any of this merchandise that product will be free of defects in material or workmanship for 60 days from the date of purchase.

This warranty does not apply to any parts damaged during shipment or due to improper handling, improper installation, improper usage, or alteration, nor does it apply to damage caused by external factors, such as, but not limited to, excessive electrical surges, liquids, fire, acts of God, and/or excessive externally applied forces.

This warranty does not cover damage, wear, and/or breakage not caused by defective materials or workmanship in regards to function and cosmetics.

During the 60-day warranty period the unit will either be repaired, or it will be replaced (at our option) without charge to the purchaser when returned prepaid and insured, with proof of the date-of-purchase to Penny K Pinball Ltd, 41A Thatcher Crescent, Crofton Downs, Wellington 6035, NEW ZEALAND.

Units returned without proof of the date-of-purchase, or units returned after the 60-day warranty period has expired, may be repaired. You will be notified of the repair cost after inspection of the merchandise. Repair service will be rendered after we receive your payment. This non-warranty service will only be available for one year from the date of purchase. All non-warranty units must be returned, postage prepaid and insured to

Penny K Pinball Ltd, 41A Thatcher Crescent, Crofton Downs, Wellington 6035, NEW ZEALAND.

Penny K Pinball Ltd will not be liable for loss of use of the product or other incidental or consequential costs, expenses or damages incurred by purchaser. Any implied warranties are limited in duration to the 60-day period from the original date-of-purchase.

PACK UNIT CAREFULLY IN THE ORIGINAL UNIT BOX, INSIDE AN ANTI-STATIC BAG. IF THE UNIT BOX IS NOT AVAILABLE, USE A STRONG CARTON WITH PLENTY OF NEWSPAPER, STYROFOAM OR OTHER PADDING, TIE SECURELY.

8.1 Support Software Download

The Support Software folder contains drivers, TCP Bridge software and the **PKONE** Connect application.

These applications and drivers are used to communicate with the **PKONE** Pinball Platform Controller.

Please visit the below website for all your support needs.

Support Website - Click on Support Tab

www.pennykpinball.com

8.2 Penny K Pinball Contact

Have an idea?

Email hello@pennykpinball.com

Support Email

Email support@pennykpinball.com

Company office

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41A Thatcher Crescent
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Wellington 6035
New Zealand
0064 04 974 4323

Website

www.pennykpinball.com