Install Guide

# TGPI V2.0

## BMW K-bike Transmission Gear Indicator

Manual Number: 201409a

# SAFETY INSTRUCTIONS

Please review the following safety precautions. If this is the first time using this model, then read this manual before installing or using the product. If the product is not functioning properly, please contact your local dealer or Aurora for further instructions.

The lightning symbol in the triangle is used to alert you to the presence of dangerous voltage inside the product that may be sufficient to constitute a risk of electric shock to anyone opening the case. It is also used to indicate improper installation or handling of the product that could damage the electrical system in the product or in other equipment attached to the product.

The exclamation point in the triangle is used to alert you to important operating and maintenance instructions. Failure to follow these instructions could result in injury to you or damage to the product.

Be careful with electricity:

Also follow these precautions:

- **Ventilation**: Blocking the air flow could cause damage. Arrange components so that air can flow freely. Ensure that there is adequate ventilation if the product is placed in a stand or cabinet. Put the product in a properly ventilated area, away from direct sunlight or any source of heat.
- **Overheating**: Avoid stacking the device on top of a hot component.
- **Risk of Fire**: Do not place unit on top of any easily combustible material, such as carpet or fabric.
- **Proper Connections**: Be sure all cables and equipment are connected to the unit as described in this manual.
- **Water Exposure**: To reduce the risk of fire or electric shock, do not expose to rain or moisture.
- **Cleaning**: Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.
- **ESD**: Handle this unit with proper ESD care. Failure to do so can result in failure.

# TABLE OF CONTENTS

# PACKAGE CONTENTS

Please make sure the following items are included within your package. Contact me if any items are missing or damaged.

- TGPI v2.0 circuit board x 1
- 7-segment Display umbilical cable x 1
- Install Manual x 1

# INTRODUCTION

## About

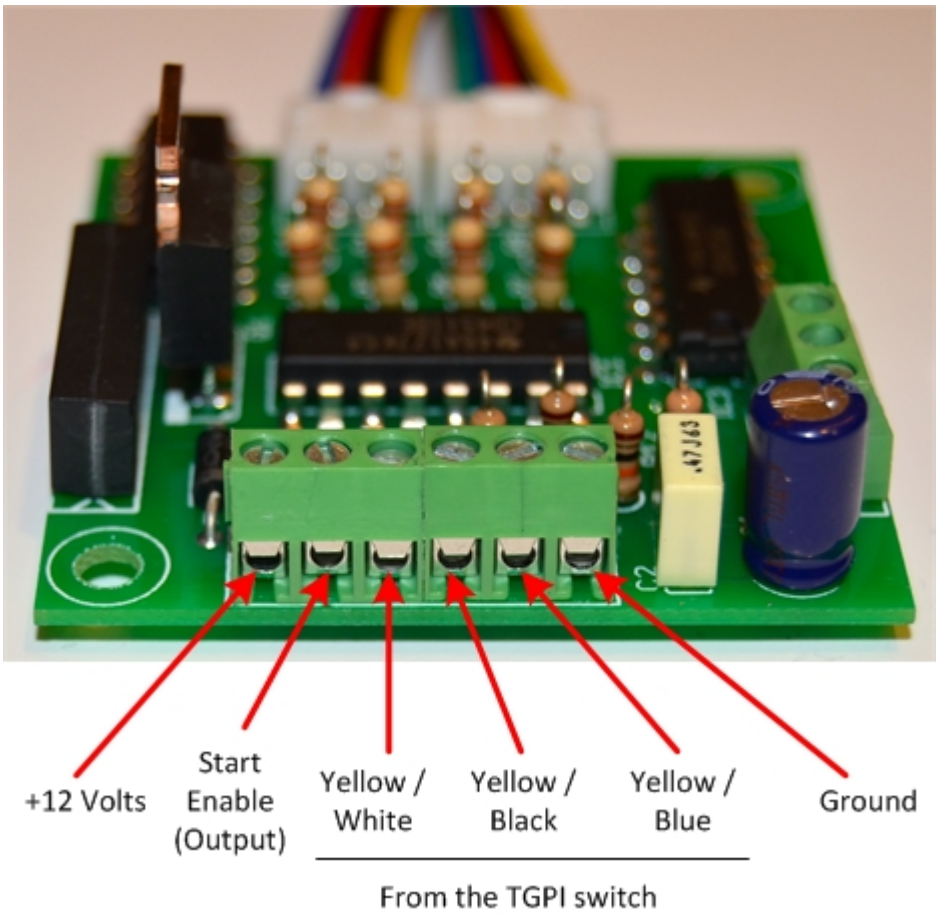
The TGPI V2.0 is an interface card used to read the transmission gear position indicator switch on the back of the BMW K-bike / R-bike transmission, and translate that reading into a digit displayed on a 7-segment LED display. The display will indicate gear numbers 1 through 6 and Neutral. In addition to this translation, the circuit detects when the transmission is in the Neutral position and enables the Start Circuit on the motorcycle as well as provides for an off-board Neutral light to be illuminated. At times, positions between gears can be accidently selected (false neutral); the display will be blanked when this condition is detected. This board is ideal a customizer who wishes to replace the BMW instrument cluster with an aftermarket gauge. This circuit works with the following BMW motorcycles:

- K1
- K75
- K100
- K1100
- K1200
- R1100
- R1150
- R1200

## Features

- Reads the Transmission Gear Position Indicator switch on the back of the transmission and displays the currently selected gear in an LED display
- Senses neutral gear and enables the start circuit
- Neutral light is switched through an on-board relay, offering flexibility - switch-to-ground for LEDs or switch-to-power for incandescent bulbs
- False neutrals between gears will blank the gear display
- Access to decimal point on the 7-segment (alarm indicator, over temp indicator, etc.)

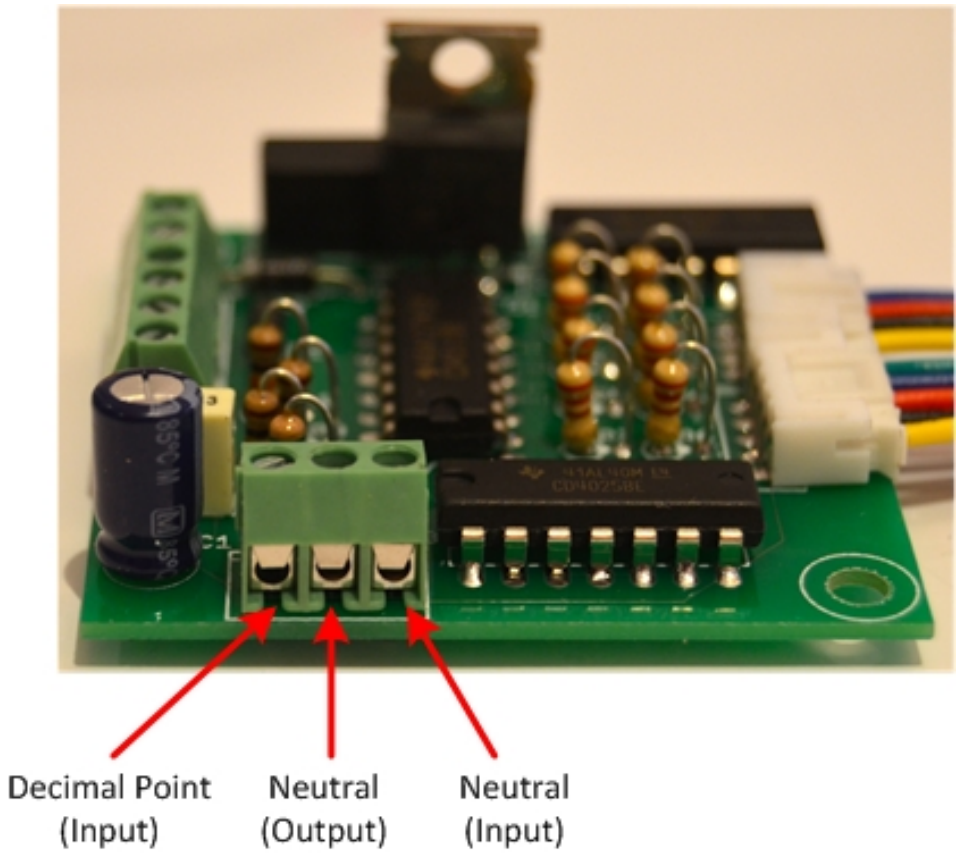
# Board Connections




- **12V DC:** Connect to the switched +12V DC power of the bike
- **Ground:** Frame ground and TGPI brown wire, Pin 13 of instrument cluster
- **Yellow/White:** Input from Yellow/White wire on Pin 2 of instrument cluster
- **Yellow/Black:** Input from Yellow/Black wire on Pin 3 of instrument cluster
- **Yellow/Blue:** Input from Yellow/Blue wire on Pin 4 of instrument cluster
- **Start Enable:** Output signal to Black/Green wire on Pin 5 of instrument cluster

Wires up to 18GA can be inserted into the terminal blocks. The TGPI switch indicates the gear by grounding each of the three wires in a pattern that creates a binary number between 0 and 7. The Yellow / White wire from the TGPI switch is the least significant bit (LSB) and the Yellow / Blue wire is the most significant bit (MSB). The operation of the switch is according to the following table (an "X" represents a contact made within the switch to ground):

| Yel / Blu | Yel / Blk | Yel / Wht | Gear |
|---|---|---|---|
| X | X | X | 0 (Neutral) |
| X | X | | 1 |
| X | | X | 2 |
| X | | | 3 |
| | X | X | 4 |
| | x | | 5 |
| | | X | 6 |
| | | | Blanks display |



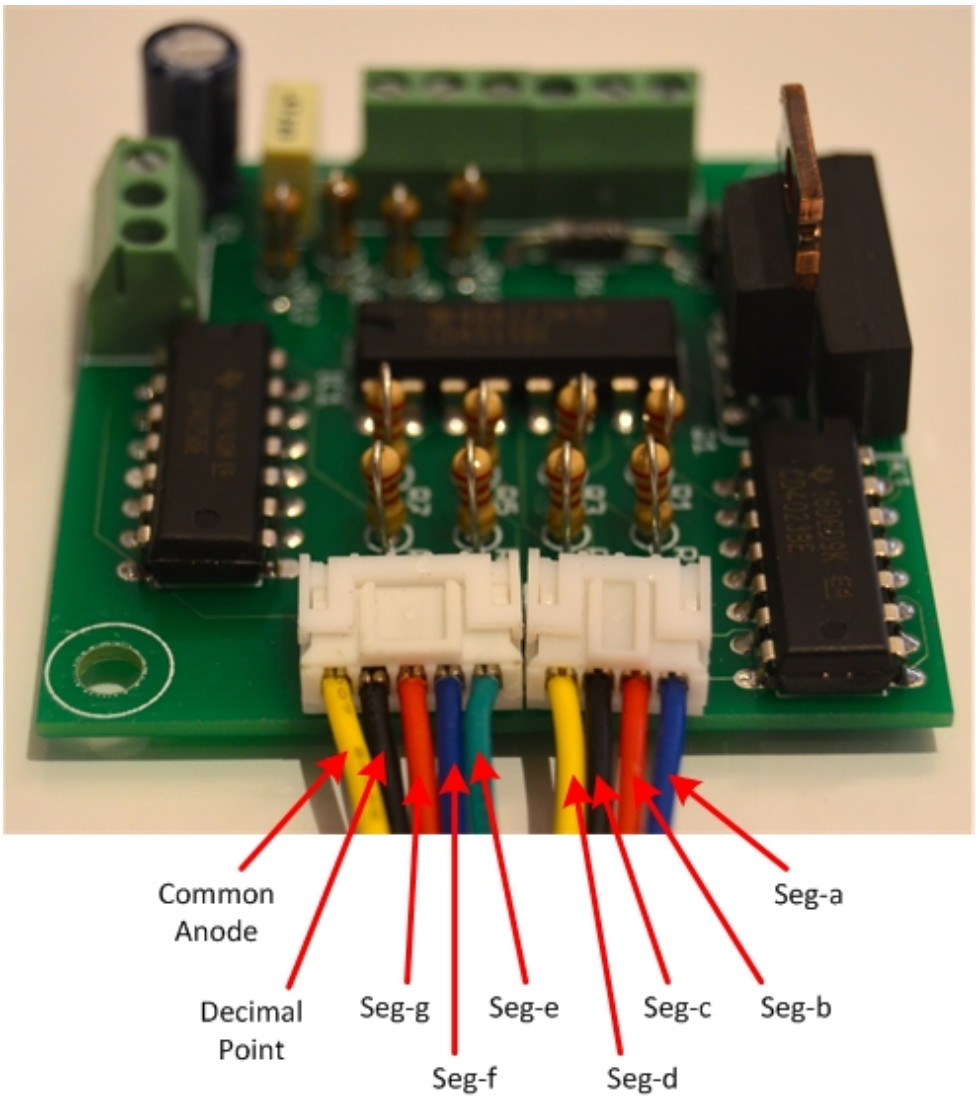

- **Decimal Point:** Connect to any +12V signal which will illuminate the decimal point on the 7-Segment display
- **Neutral input:** Power or ground connection depending on requirements (see

text)

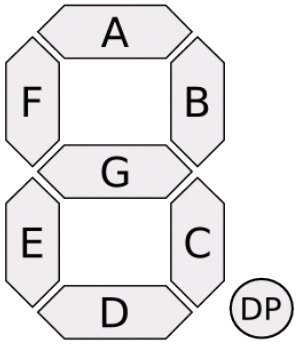
- **Neutral output:** LED or bulb depending on requirements (see text)

The two Neutral connections are actually relay contacts. Although they are labeled input and output, there is no polarity involved. Generally, LEDs require a ground connection to be switched by the relay so one terminal will be connected to ground and the other terminal to the cathode of the LED. If you are using incandescent bulbs, generally one terminal will be connected to +12V and the other terminal to the bulb, which is eventually connected to ground.

The Decimal point input will take a switched +12V signal. When voltage is present, the DP LED on the display will illuminate.



- **Seg-a:** Connect to Segment a pin on display
- **Seg-b:** Connect to Segment b pin on display
- **Seg-c:** Connect to Segment c pin on display
- **Seg-d:** Connect to Segment d pin on display
- **Seg-e:** Connect to Segment e pin on display
- **Seg-f:** Connect to Segment f pin on display
- **Seg-g:** Connect to Segment g pin on display
- **Decimal point:** Connect to DP pin on display
- **Common anode:** Connect to common pin on display




The two connectors on the end of the umbilical cable are designed in a way to prevent them being mixed up. One is a 4-pin JST female and the other is a 5-pin JST female. Each has a corresponding header on the circuit board into which they fit and they are polarized so that they cannot cross signals. Be sure to seat the connectors fully to prevent connection problems.

See Appendix 1 and Appendix 2 for a description of which wire attaches to which pin on the display.

## Connection Explanation

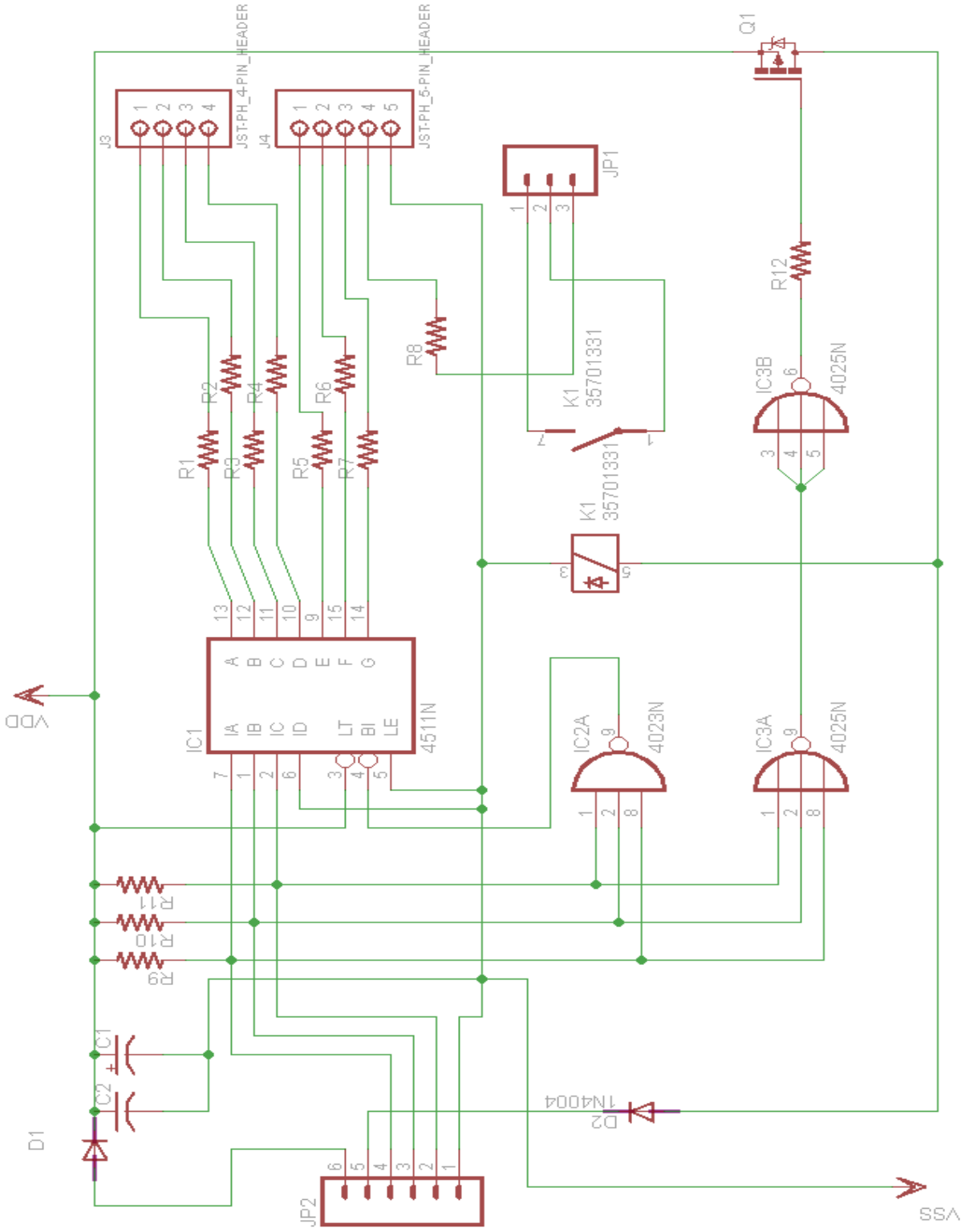
Step 1: Locate the TGPI switch wires and Start Enable wires on the K-bike's instrument cluster connector. Connect each lead to its respective terminal on the board. Locate the Neutral indicator and connect it to the Neutral relay terminals.

Step 2: Install the display. It should be protected from the elements by locating it in an enclosure, even though it is sealed. If the umbilical was shipped to you with no conformant material encasing the pins, it would be a good idea to use epoxy or silicon sealant to encase the pins and add rigidity to the wires where they are soldered to the display. Route the supplied umbilical cable through the motorcycle and connect the JST connectors to the circuit card.

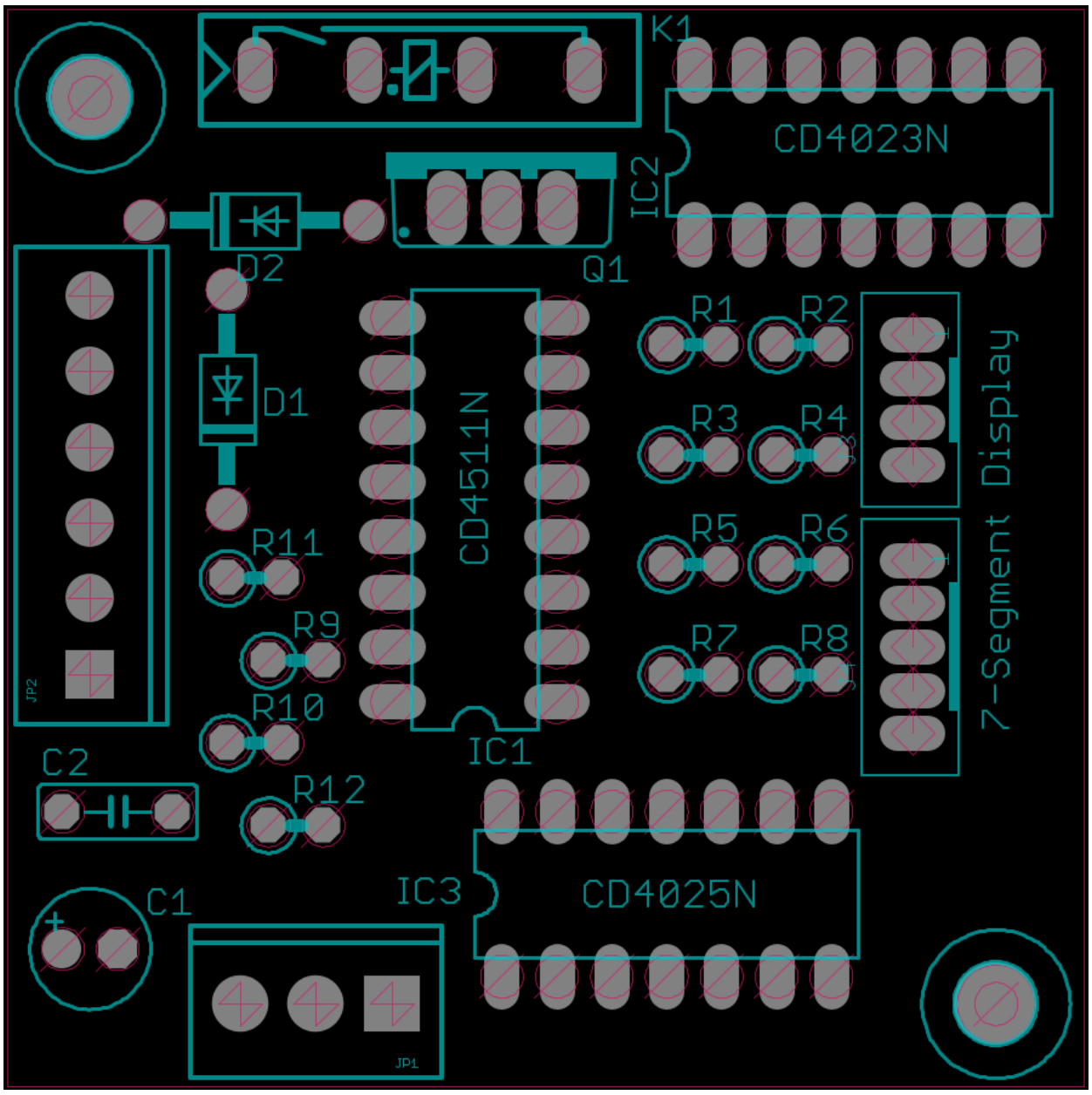
Step 3: If you have chosen to use the display's decimal point to indicate something, locate the signal wire on the motorcycle and connect it to the Decimal Point terminal. Bear in mind that the signal should go HIGH (i.e. output 12 volts) to illuminate the decimal point.

Step 4: Locate a switched power wire on the motorcycle and a suitable ground wire. Connect the power to +12V terminal and ground to Ground terminal on the board.

# Schematic Diagram

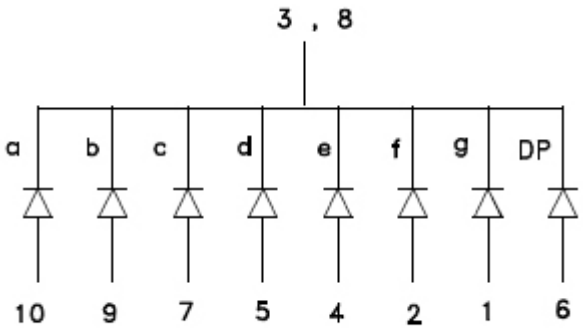


## PCB Layout


K1
CD4023N
IC2
Q1
D2
D1
R1
R2
R3
R4
R5
R6
R7
R8
7-Segment Display
CD4511N
IC1
R11
R9
R10
R12
C2
C1
IC3
CD4025N
JP2
JP1

# APPENDIX 1 SC39-11SRWA Display Connections

The standard 7-segment display is a Kingbright RED that has the following electrical pinout:

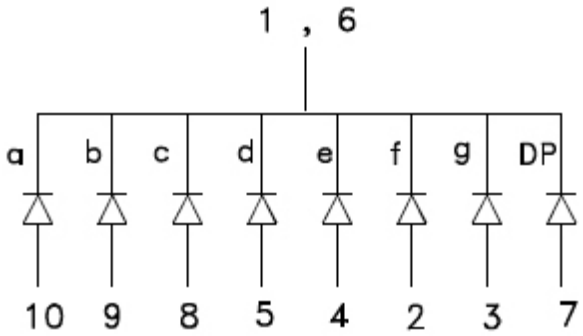



The standard umbilical cable is 6” in length and has premade 4-pin and 5-pin JST connectors on the end. The table below shows which colour wire is connected to which pin on the display. When a custom cable length is ordered, Ethernet wire is used to extend the standard cable. The colours on the Ethernet cable differs and this table also shows which colour wire is connected to which pin on the display with a custom cable.

| Display Pin | Conn | 6” Cable Colour | Custom Cable Colour |
|---|---|---|---|
| 1 | 5-pin | Red | Brown |
| 2 | 5-pin | Blue | Green/White |
| 3 | 5-pin | Yellow | Yellow |
| 4 | 5-pin | Green | Green |
| 5 | 4-pin | Yellow | Orange/White |
| 6 | 5-pin | Black | Brown/White |
| 7 | 4-pin | Black | Orange |
| 8 | --- | (bare wire) | --- |
| 9 | 4-pin | Red | Blue/white |
| 10 | 4-pin | Blue | Blue |

# APPENDIX 2 SC39-12GWA Display Connections

An optional 7-segment display is a Kingbright GREEN that has the following electrical pinout:




The standard umbilical cable is 6” in length and has premade 4-pin and 5-pin JST connectors on the end. The table below shows which colour wire is connected to which pin on the display. When a custom cable length is ordered, Ethernet wire is used to extend the standard cable. The colours on the Ethernet cable differs and this table also shows which colour wire is connected to which pin on the display with a custom cable.

| Display Pin | Conn | 6” Cable Colour | Custom Cable Colour |
|---|---|---|---|
| 1 | --- | (bare wire) | --- |
| 2 | 5-pin | Blue | Green/White |
| 3 | 5-pin | Red | Brown |
| 4 | 5-pin | Green | Green |
| 5 | 4-pin | Yellow | Orange/White |
| 6 | 5-pin | Yellow | Yellow |
| 7 | 5-pin | Black | Brown/White |
| 8 | 4-pin | Black | Orange |
| 9 | 4-pin | Red | Blue/white |
| 10 | 4-pin | Blue | Blue |

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