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NITRO Expansion Card

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NITRO Expansion Card

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(Shifter Display)   Output Port

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DC Power
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(Gauges Output)

ACE Port   LCD
Contrast

Connecting the NITRO Card

IMPORTANT: DO NOT PLUG the NITRO card into any port while the USB module is powered. Turn off power to the module and disconnect from the USB port before installing the NITRO card.
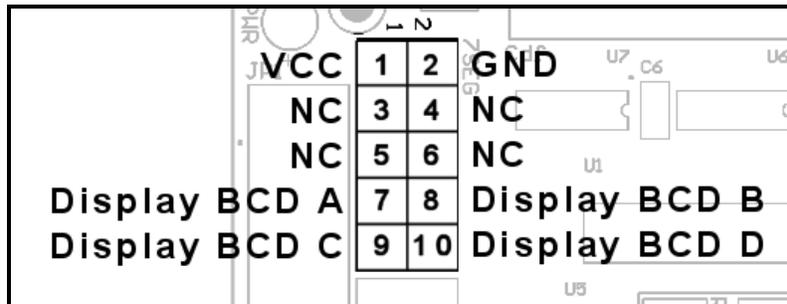
The ACE port of the NITRO card must be connected to the Plasma-Lite using the cable provided or the NITRO card will not function. The NITRO card is a passive device and will not be automatically detected by your USB module. You will need to activate the various ports of your module and set them to the desired modes in the Device Manager utility in order to use the NITRO features.

Refer to the Device Manager utility help file for details on activating port features on your USB module.

1. Connect **JP2** on the NITRO to the ACE port on the Plasma-Lite (**JP2**) using keyed ribbon cable.

2. **(Optional)** Connect **JP1A** on the NITRO to the HAT port on the Plasma-Lite (**JP1**) using keyed ribbon cable only if you intend to connect a shifter display (SD9 or 7-Segment display), gauges or output indicators to the NITRO card.

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Connecting a Shifter Display

1. Configure the HAT port (both channels) on the Plasma-Lite for *NITRO* support. Refer to device manger help file for details.

2. If you have purchased an SD9 display, simply plug it into the **7SEG** port on the NITRO card using a keyed ribbon cable. For standard 7-segment displays, use the following pinout:

VCC	1	2	GND
NC	3	4	NC
NC	5	6	NC
Display BCD A	7	8	Display BCD B
Display BCD C	9	10	Display BCD D

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## Connecting an LCD Display

1. Configure the ACE port on the Plasma-Lite for *Character LCD 20 x 4* support. Refer to device manger help file for details.

2. If you have purchased an LCD with attached ribbon cable, simply plug it into the **20x4 LCD** port on the NITRO card using a keyed ribbon cable. For standard 20x4 LCD displays, use the following pinout:

Vss	1	2	VCC
VLc	3	4	RS
R/W	5	6	EN
NC	7	8	NC
NC	9	10	NC
D4	11	12	D5
D6	13	14	D7
VB+	15	16	VB-

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Connecting Air-Core Movements

1. Configure the HAT port (both channels) on the Plasma-Lite for *NITRO* support. Refer to device manger help file for details.

2. Connect a suitable 12VDC @ 1A adapter (2.1mm plug) to **J1** on the NITRO card.

3. If you have purchased any of the AC3XXX series air-core movements, plug them into any of the DAC output connectors on the NITRO card using the cables provided or use the following pinout for your connections:
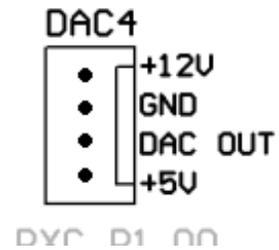
Follow the air-core calibration procedures as defined in the documentation provided with your air-core movement circuits.

```
DAC4
 •   +12U
 •   GND
 •   DAC OUT
 •   +5U
DXC  D1  nn
```

305 Degree Air-Core Movement

The schematic below may be used to control the meter movement through 305 degrees from a 0V–5V analog input source.

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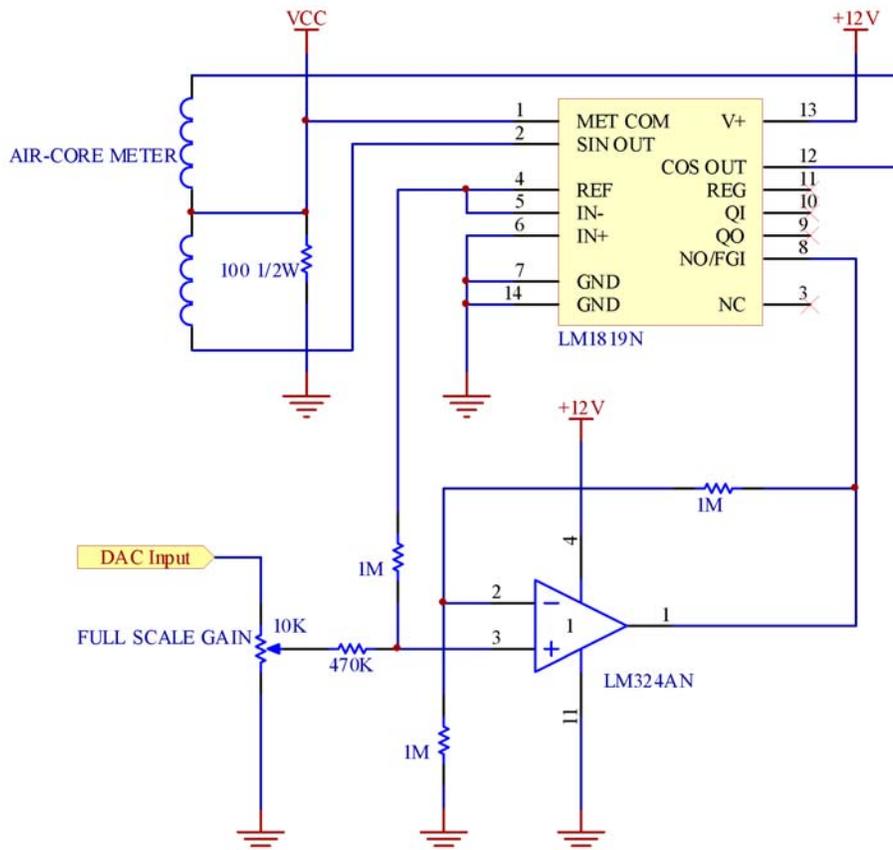
Calibration Procedure

The DACs produce a 0 to 5V output. In order to calibrate the driver circuit, use the USBDACS.exe test utility provided with the toolkit for the following procedure:

1. Set the output to 0V. Press the needle onto the Air-Core shaft at the minimum position on the gauge.

2. Set the output to 5V. Adjust the FULL SCALE GAIN trimpot so that the needle moves to the maximum position on the gauge.


The Air Core driver circuit is now calibrated and will not need to be adjusted unless the physical meter range is changed. Additional in software calibration may be required depending on the intended application. Refer to accompanying software help file for details.

Connecting Shift Light Indicator

The Shift Indicator connector *RPM LIMIT* is shared with DAC1 output. As such, DAC1 must be used in conjunction with RPM data output through RSIM or other interface utility. The POT is used to set the RPM threshold for the LED indictor.

1. Connect any suitable 100K pot to the VCC, POT and GND pins as illustrated below.

2. Connect any suitable LED through a current limiting resistor R to the LED pin on the RPM LIMIT connector.
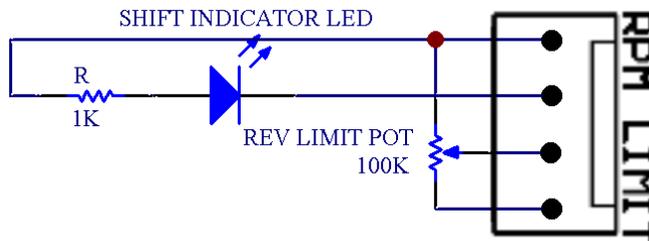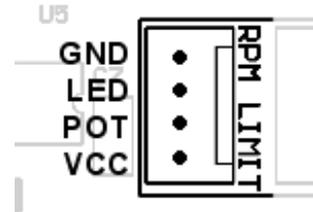

Adjusting the Shift Light Indicator

Use the USB12BITDAC.exe test utility provided with the toolkit for the following procedure:

1. Set the output of DAC1 to the desired RPM limit. If you have an RPM gauge already connected to the DAC1 output, move the pointer to the desired RPM limit.

2. Adjust the RPM LIMIT POT until the LED indicator turns on.

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Connecting Output Indicators

The NITRO card provides up 12 individually controlled output pins on **JP3** capable of sourcing/sinking up to 35 mA each suitable for controlling LED indicators or TTL compatible circuitry.
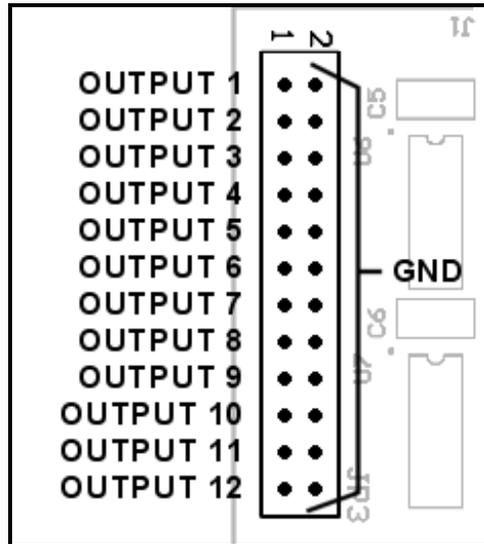
Connecting LED Indicators

Up to 12 LEDs can be connected as follows to *JP3* through current limiting resistors *R*. Adjust the value of *R* for desired brightness. Do not exceed LED manufacturer's recommend current limit when selecting the value of resistor *R*.
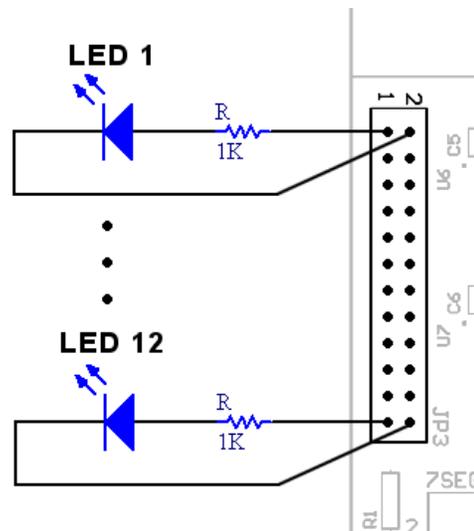
$$R = (VCC - V_{led})/ I_{led}$$

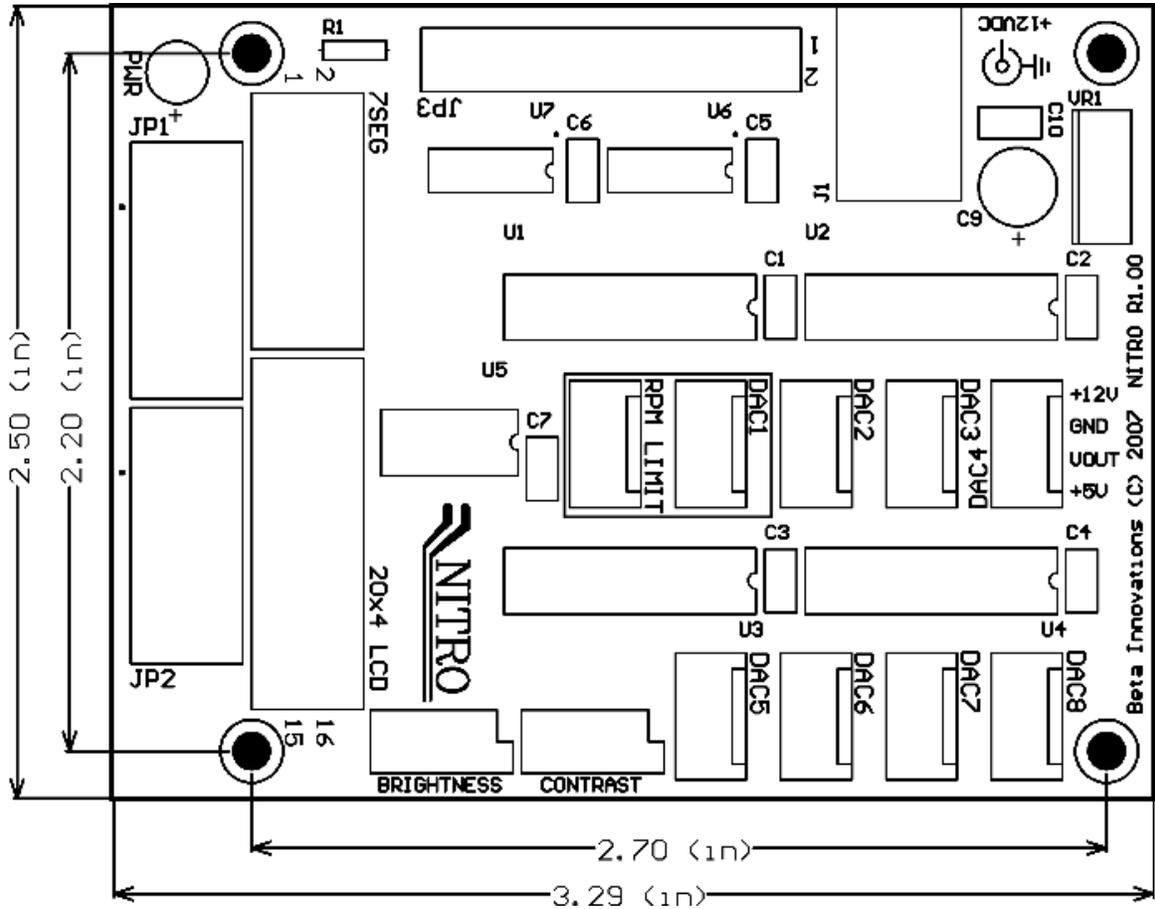**R** current limiting resistor (Ohms)
VCC supply voltage (5VDC)
V$_{led}$ Max rated LED voltage (2 - 3.4V typ.)
I$_{led}$ Max rated LED current (15 - 25mA typ.)

IMPORTANT: DO NOT exceed 35mA current.

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Mechanical Specifications

Visit www.betainnovations.com for the availability of expansion modules and accessories.