Inplane Mask Head (A2034) Manual

Version 6, 14-MAR-03
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Description

The Inplane Mask Head (A2034) is a Long-Wire Data Acquisition System Device that drives one or more light-emitting diodes (LEDs) in series. The A2034A-8 has nine infra-red LEDs on the back side and three 8-mm snap-in standoffs. The '-12' has 12-mm standoffs. The A2034B has no LEDs on the back side, but in the P1 position has a two-way connector that allows you to drive nine LEDs in series somewhere off the board.

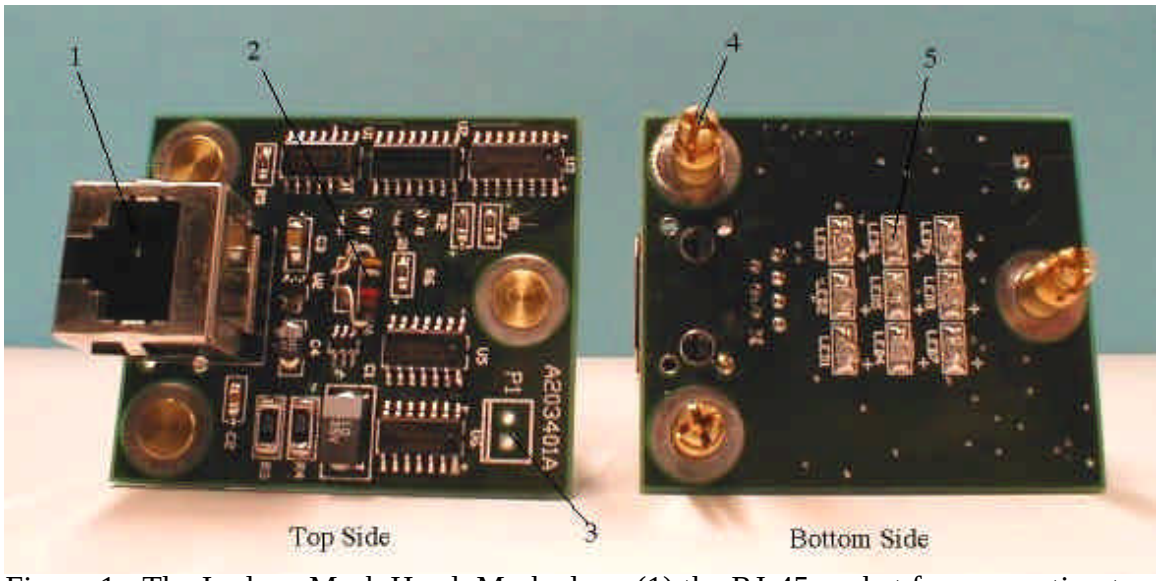

Figure 1: The Inplane Mask Head. Marked are (1) the RJ-45 socket for connection to a Long-Wire driver or multiplexer,(2) a resistor substitution present on the first six boards built, (3) location of P1 on the A2034B, (4) snap-in standoff, (5) infra-red LEDs.

The A2034A has the same connector locations, LED locations, standoff locations, and board dimensions as NIKHEF's RASLED card, so the A2029 can replace the RASLED when you upgrade to Long-Wire DAQ. The RASLED is not a Long-Wire device. One functional difference between the two boards is that the RASLED card as a green LED that turns on when the LEDs turn on.

Device in Operation

Here is an example of the A2034B in use. Suppose we want to illuminate nine LEDs in series. These nine LEDs are in an existing optical assembly. We have two wires coming out of the assembly, and the LEDs take 100 mA. The A2034B provides a two-way connector (P1) for the two wires, and will source 100 mA into them when the driver instructs it to do so. Pin one on the connector, which is uppermost in Figure 1, is the negative terminal of the LED current source, and pin two is the positive terminal.

We put a two-way socket on the two wires coming out of our instrument. We plug this into the A2034B. We connect the A2034 to a Long-Wire driver with a CAT-5 cable up to one hundred meters long. We note the device socket into which we plug the head, and determine the device address we should use with the driver to make it communicate with our device.

To flash the light emitting diodes, we tell the driver the address of the A2034, and the type, which is one (1). We specify our desired on-time for the LEDs, and instruct the driver to execute a flash_job.

We never have to worry about the A2034 being awake or asleep. It is automatically asleep when it is not driving LEDs.

Specification

The A2034 complies with the Long-Wire DAQ specification.

Device Type Number: 1 (source)
Device Element Numbers: 0 or 1 select LED array
Command Bit Allocation: 1:ON (turn on LED array), 7:LB (loop-back).

Functions

The A2034B flashes its bottom-side LEDs during a flash_job. The A2034B flashes LEDs connected to the board via P1 (item three in Figure 1). Both versions come with either 8-mm or 12-mm standoffs, and we can order other lengths as you require.

The A2034B is a 100-mA current source, connection to the current source being made through P1. If you want to reduce the current drive, you can increase the governing resistor (item two in Figure 1). The current

is inversely proportional to the resistance. The current-source transistor on the A2034B can dissipate 1 W without damage, which means that it cannot drop more than 10 V continuously at 100 mA. The power supply to the current source is 30 V in series with 100 Ohms. The voltage across the transistor is therefore, at 100 mA, 20 V minus the total LED drop. This drop must be more than 10 V for continuous operation. If you have only one LED to drive, put 100-Ohm 1-Watt resistor in series with it.

The A2034 is asleep whenever it is not driving its LEDs, so you never have to send it a sleep command. To measure the propagation delay of signals travelling from the driver to the A2029 and back again, you execute the loop_job and read the loop time out of the driver.

How to Set Up the Device

Connect the A2034 to a Long-Wire driver or multiplexer with a CAT-5 eight-way, straight-through cable. You can use shielded or unshielded. Once you are capturing images of your LEDs, you can adjust the exposure time used by the flash_job to make them brighter or darker in the image.

Power Consumption

We picked an A2034 at random and measured its power consumption in three states.

State	+15 V	-15 V	+5 V	Total Power
Off	0 µA	0 µA	3.4 mA	17 mW
On	80 mA	80 mA	3.4 mA	2.4 W

Schematic

Contact us if you would like a copy of the schematic.