PIRE PLUS
High-Speed Infrared Emitter with Integrated Drive Electronics

Key Features:

- Pulsable Source of Black-body Radiation
- Emulates a Black-body in Spectral Distribution
- Ultra-thin Metallic Foil Active Element
- Parabolic Reflector for Collimation and Uniformity
- Fast Pulse Rates, up to 180 Hz with 50% Modulation Depth
- Adjustable Pulse Rates with Analog Control Input
- High Output Emitter .04 Watts/cm^2
- Broadband Output with Typical 0.88 Emissivity
- Compact, Reduced Footprint Solution

The high-performance PIRE^{PLUS} solution is designed to be used as fast pulsed sources of blackbody radiation. The solution can be ordered in a 3 item kit including driver PCB assembly, emitter, and heat sink or in an easily to use evaluation module. The high-speed pulsable foil emitter with its corresponding drive electronics on a compact 14 pin circuit board are designed to maximize output power from 1 Hz to 200 Hz pulse speeds with a single analog control input. The complementary assemblies enhance signal to noise performance while minimizing the overall system footprint.

The construction and implementation of the emitter and control circuitry optimize performance by matching the drive waveform for the desired operating frequency. This ensures peak output temperatures at all pulse frequencies and promotes the highest output for any application. Combined with Opto Diode's IR detectors, the PIRE^{PLUS} solution operating with typical pulse speeds of 180 Hz and 50% modulation depth can accurately detect trace elements in concentrations in low parts per million.

The radiating element in the pulsable emitter is an ultra-thin Opto Diode specific comb metallic foil configured so that radiation from both sides of the heated foil is efficiently directed out of the package along the optic axis. The foil material has a typical emissivity of 0.88 and closely emulates a blackbody source in spectral distribution. The emitter is designed to operate at a rated maximum foil temperature of 1000˚ Kelvin. The emitter is offered in a hermetically sealed TO-5 package with integral standard parabolic reflector to provide near collimated and uniform radiation output.

The PIRE^{PLUS} sub-system is an ideal solution for a variety of applications. The control circuitry will exploit the capabilities of the high-speed source in many applications. With the emitter, heat sink, and controller set, designers can focus on maximizing the overall system performance rather than interfacing with the source.

Applications:

- Gas analysis, medical and industrial
- Environmental monitoring
- Spectroscopy
- Process control systems

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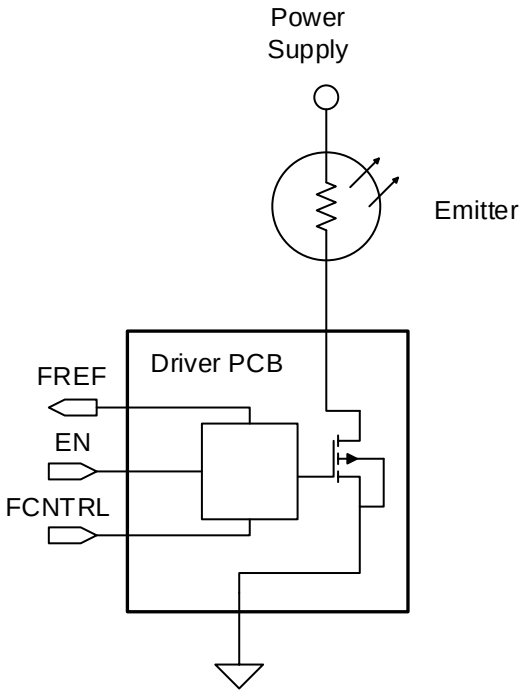
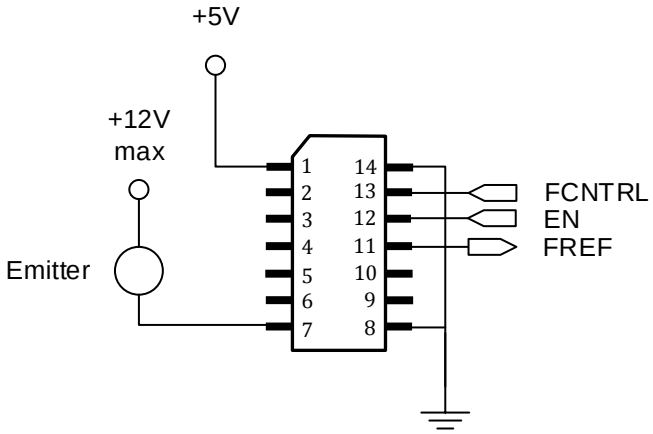
Drive Circuit Block Diagram

The driver PCB uses single N-channel MOSFET with, very low on-state resistance combined with high transconductance, superior reverse energy and diode recovery dv/dt capability to switch the emitter on and off at a frequency controlled by one of the inputs.



Typical Connection Diagram



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Driver Board Pin Description

Pin#	Pin Name	Description
1	+5V	+5V Power Supply Input
2	Reserved1	Reserved 1
3	Reserved2	Reserved 2
4	Reserved3	Reserved 3
5	NC1	No Connect
6	NC2	No Connect
7	Emitter	Infrared Emitter Source (MOSFET Drain)
8	AGND	Analog Ground (MOSFET Source)
9	NC3	No Connect
10	NC4	No Connect
11	FREF	Output Pulse Reference (MOSFET Gate)
12	EN	Enable Input (GND to Disable)
13	FCNTRL	Frequency Control Analog Input
14	DGND	+5V Digital Ground

Electrical Specifications

Specification	Min.	Typ.	Max.
Emitter Voltage	3V		12V
Pulse Frequency Range	2Hz	100Hz	200Hz
Frequency Control Voltage	0V	2.5V	5V
Emitter Resistance		2.5Ω	
Peak Emitter Current (12V)			5A
Average Emitter Current (12V)	10mA		220mA
Output Enable Voltage	0V (Disable)		5V (Enable)
Filament Temperature (12V)			1000°K
Filament Emissivity		0.88	
Operating Temperature	-30°C		+100°C
Spectral Output	0.35µm		6µm

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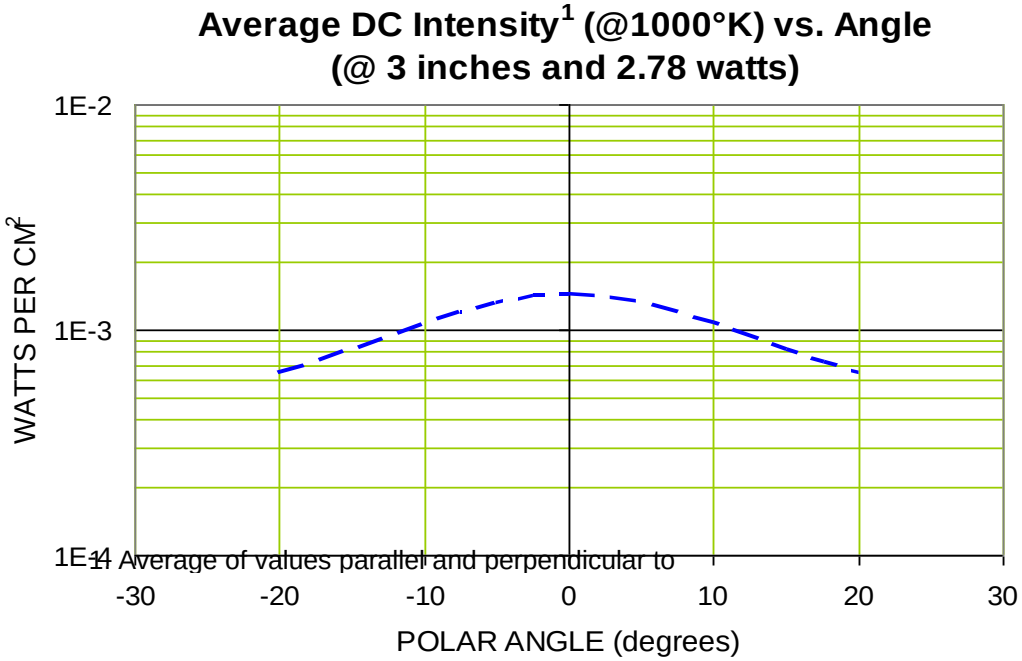
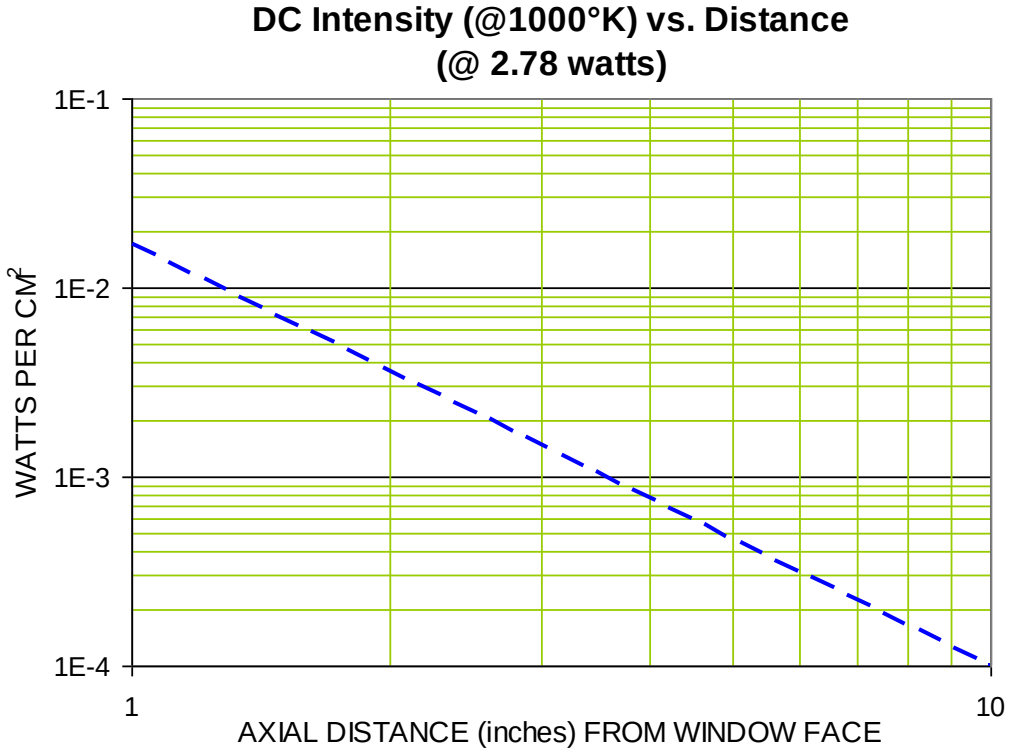
Additional Information



1/ Average of values parallel and perpendicular to



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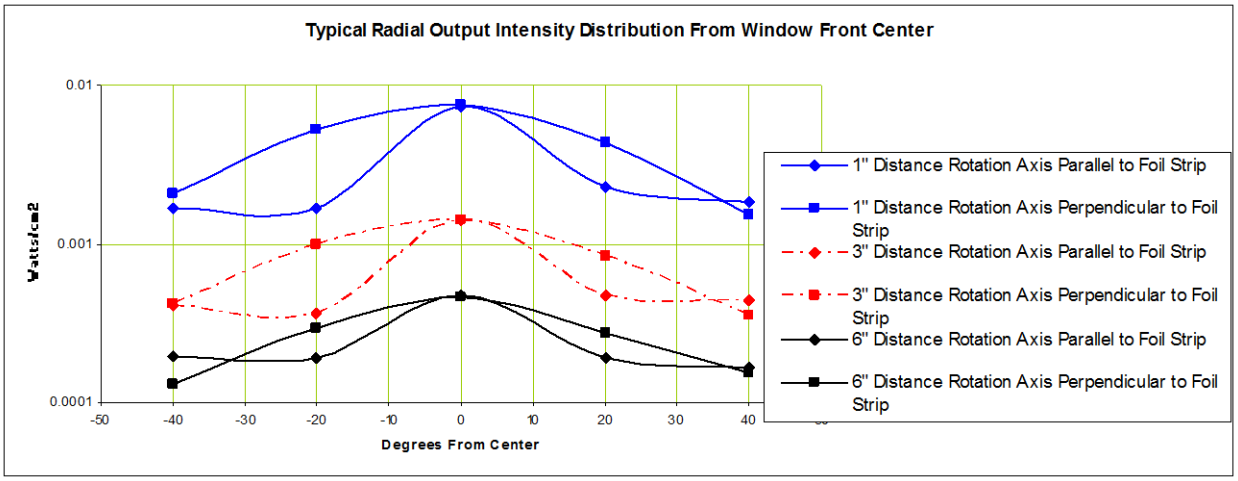

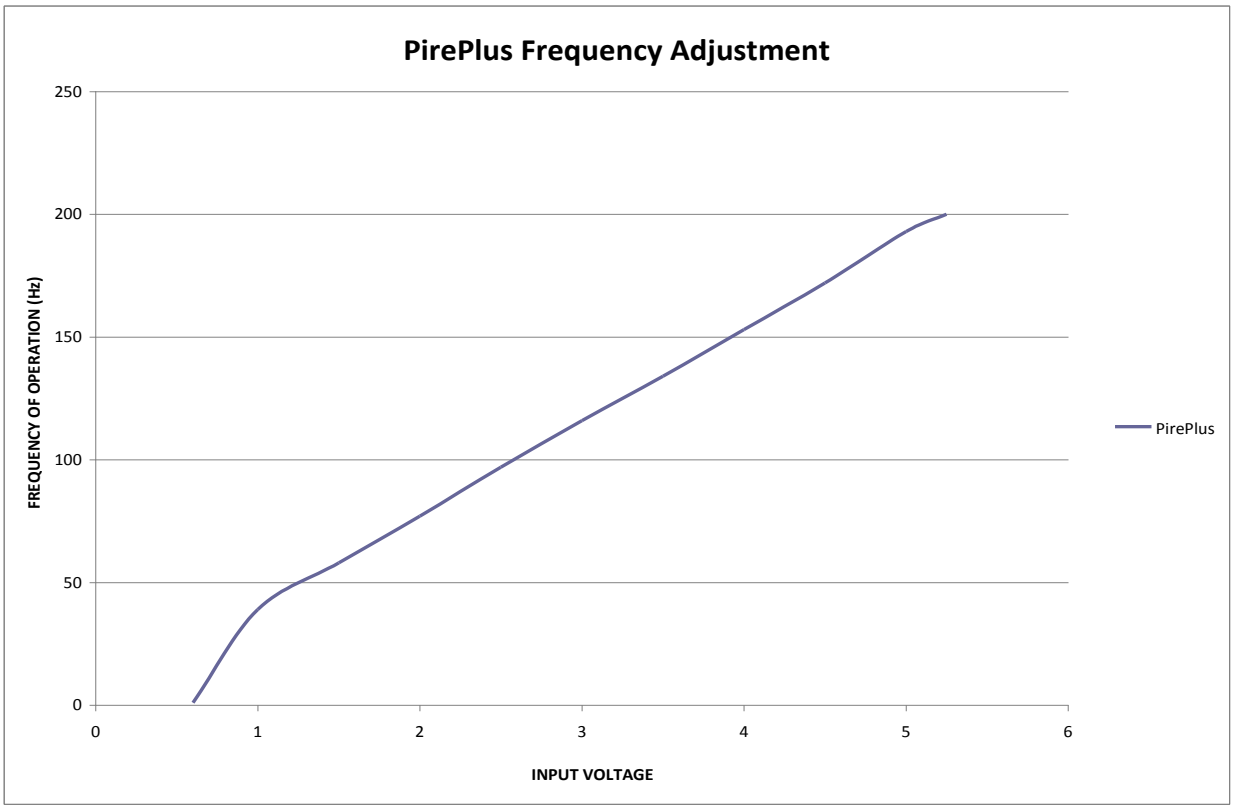

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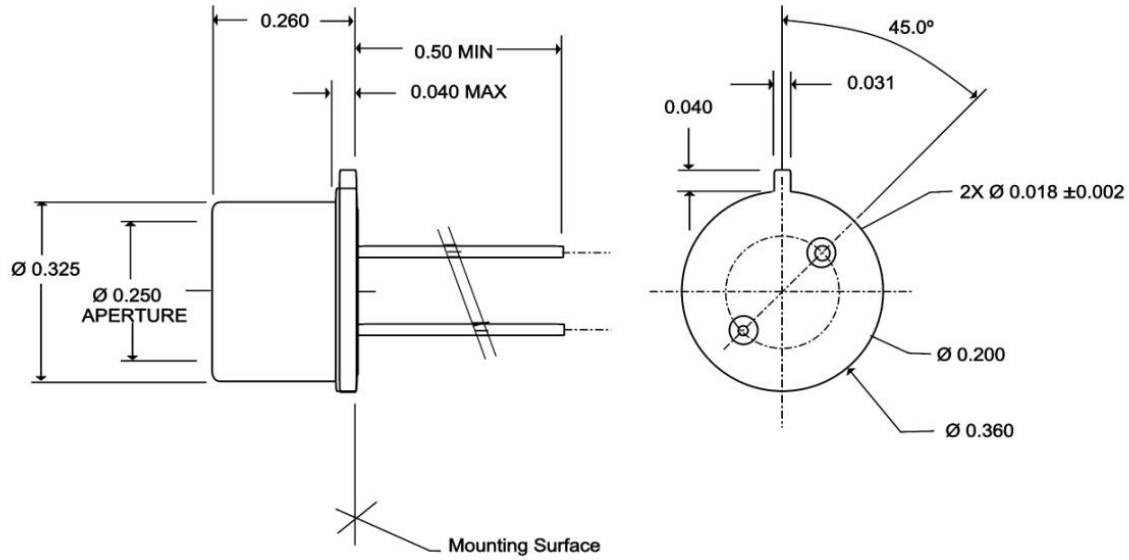
Mechanical Drawings & Package Dimensions

40101



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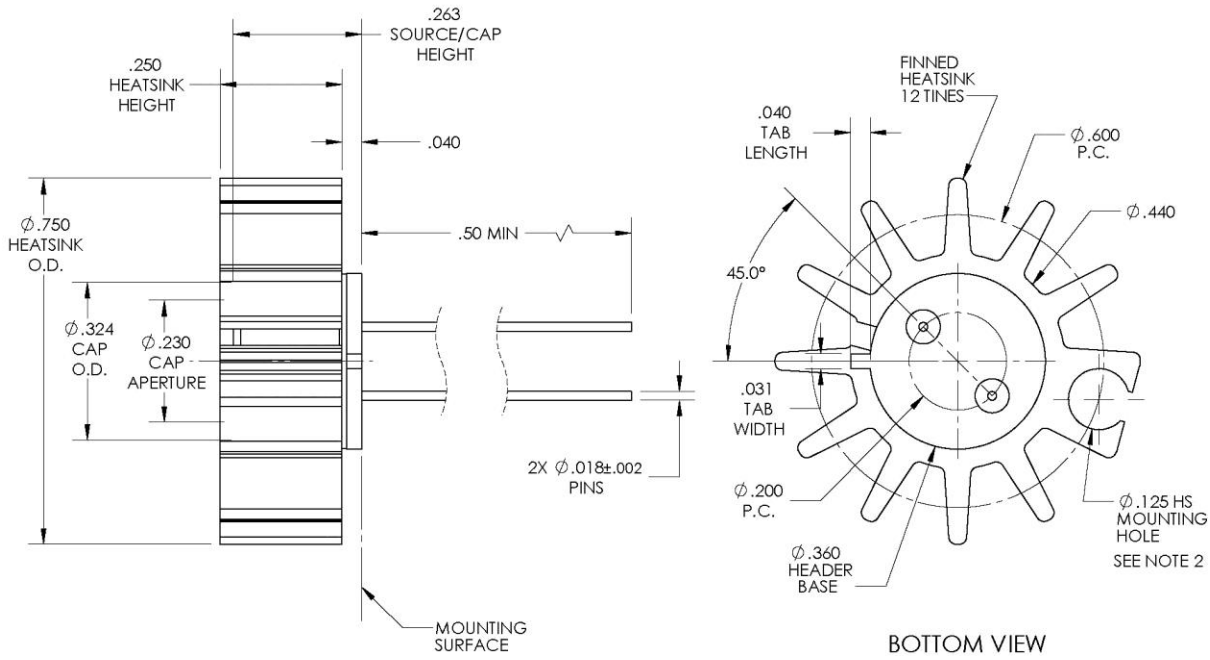

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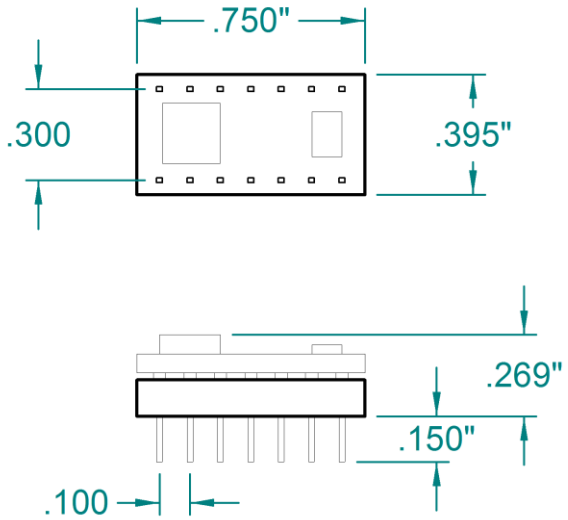
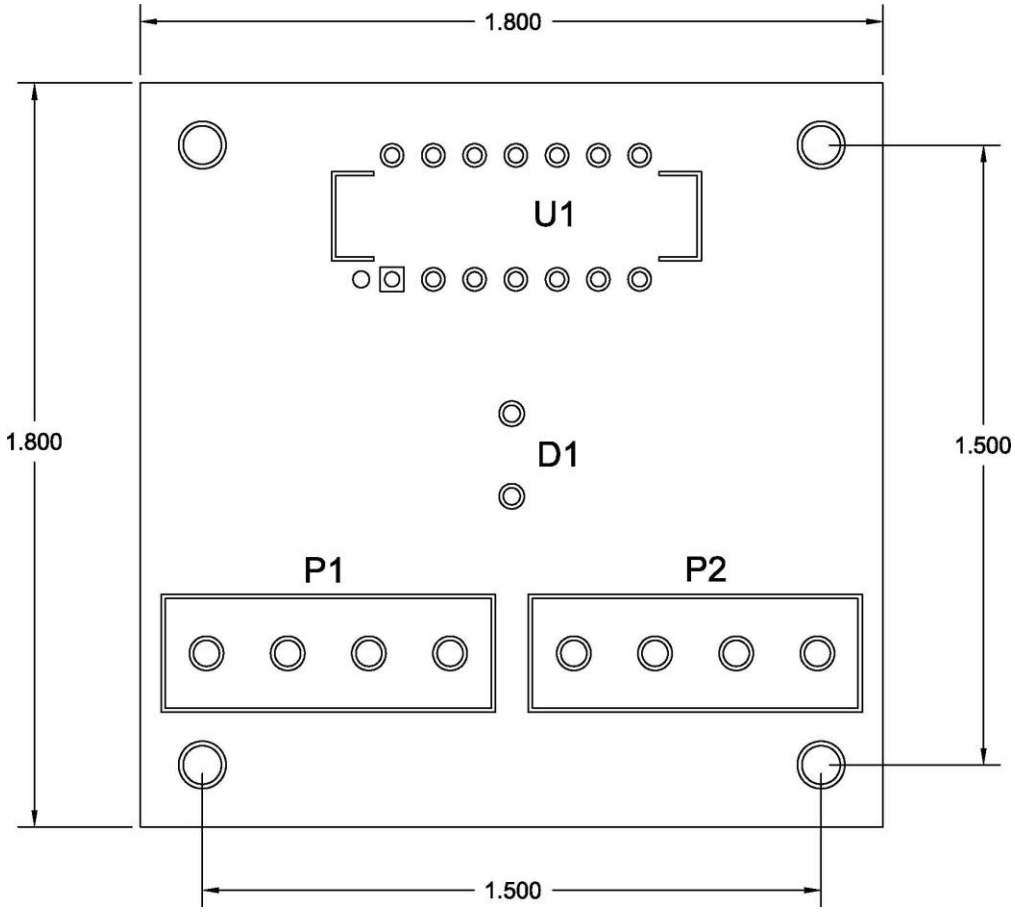
16700



40801



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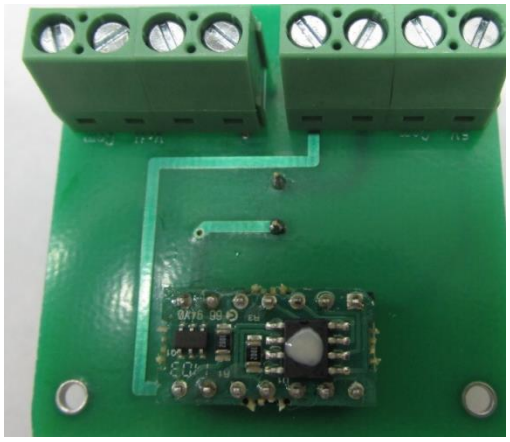
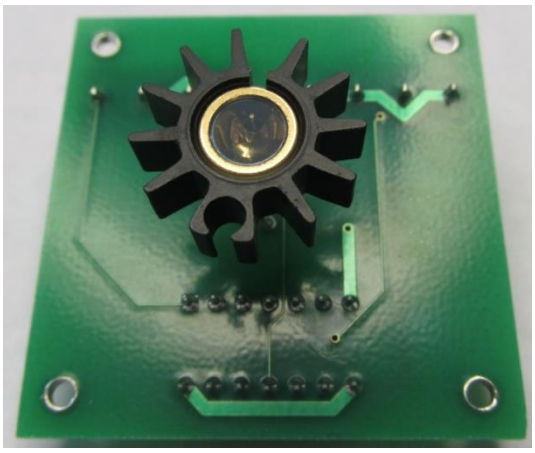
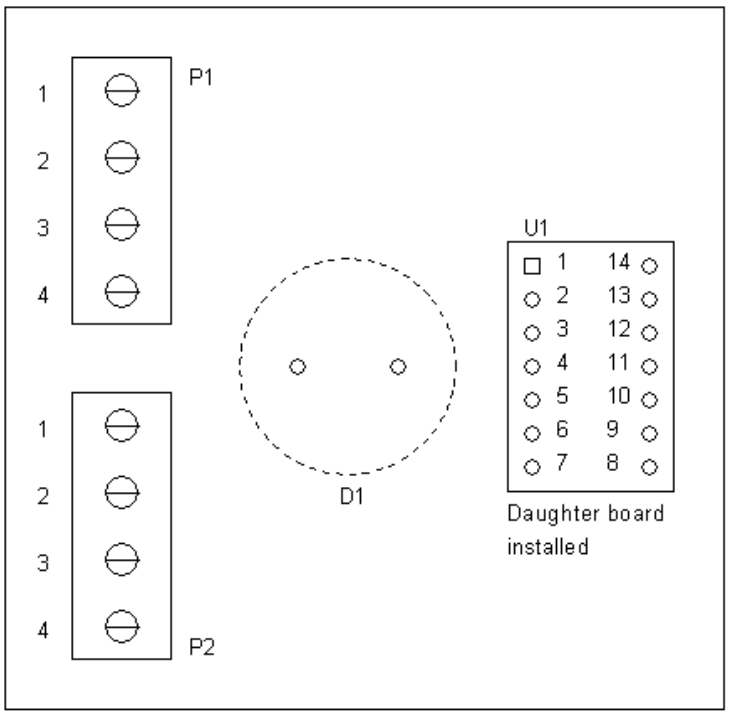
Evaluation Board Pin Out







U1 Daughter Board	
Pin#	**Description**
1	+5V
2	NC
3	NC
4	NC
5	NC
6	NC
7	LED-
8	Common
9	NC
10	NC
11	FREF (Pulse Reference)
12	NC
13	FCNTRL (frequency Control)
14	Common

P1	
Pin#	**Description**
1	+5V
2	Common
3	+12V
4	Common

P2	
Pin#	**Description**
1	FREF (Pulse Reference)
2	Common
3	FCNTRL (Frequency Control)
4	Common

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Ordering Information

Model #	Part#	Description	Part#	Description
Pire+ Kit	40800	Pire^{Plus} Kit	16700	Driver PCB Assembly
			40101	Emitter
			14407	Heat Sink

Model #	Part#	Description
Pire+ EVB	40801	Pire^{Plus} Evaluation Board

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