



### Features

- Transimpedance Gain adjustable from  $10^3\text{V/A}$  to  $10^8\text{V/A}$
- Additional AC coupled gain stage from 1 to 1000
- Separate AC and DC coupled outputs
- Customer specified photodiode options
- Low NEP at maximum Gain
- Bandwidth from DC up to 1MHz
- CW input power 0.75pW - 2mW
- Internal rechargeable batteries for low noise and high sensitivity

### Product description

The high gain and low noise equivalent power (NEP) of the LNP2-A photoreceiver guarantees a very high sensitivity front-end for optical systems and provides separate AC and DC coupled outputs. These characteristics ensure that this photoreceiver is particularly suitable for experiments with low optical power levels, though it can be equally well employed for CW input optical powers up to 2mW. Other applications include direct detection, feedback control systems and lock-in detection.

The standard LNP2-A unit is generally combined with a panel mounted 1mm Si or 0.3mm InGaAs photodiode in an FC receptacle (we are pleased to quote for photodiodes with other sizes of active area and alternative receptacle styles). The photodiode is followed by a transimpedance amplifier.

The feedback resistance of the transimpedance amplifier can be switched over the range  $1\text{k}\Omega$  to  $100\text{M}\Omega$ , and each gain setting is optimised to provide maximum bandwidth while minimising ringing by keeping the overshoot to less than 5%. This yields a transimpedance gain which can be increased in decade increments from  $10^3\text{V/A}$  to  $10^8\text{V/A}$ . The DC output is taken immediately after the transimpedance gain stage, while the AC output can be independently boosted by the additional adjustable 1 to 1000 gain multiplier stage following the preamplifier. This can be selected in 2-5-10 steps which matches the increment between the scales of most standard oscilloscopes. The resultant DC and AC coupled outputs are available via separate front panel BNC output connectors.

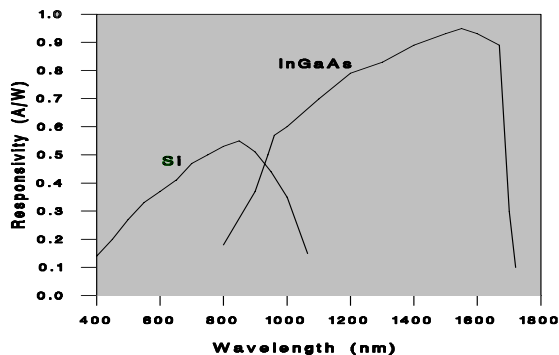
The LNP2-A may be powered by its two internal rechargeable NiCd batteries (for lowest noise operation at frequencies below 500Hz), or by an

external  $\pm 15V$  supply, via the DIN connector supplied. The internal batteries are trickle charged whenever the external supply is connected. We recommend our compact LVPSU-1  $\pm 15V$  DC Power Supply which can power up to six of the LNP2-A photoreceivers.

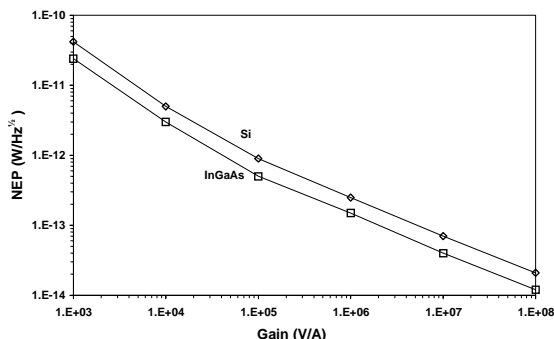
Customised versions of the LNP2-A units with a larger or smaller area photodiode, post mounted photodiode for free space systems, 19" rack mounted modules, etc. are available. Characteristic parameters of these photoreceivers (e.g. bandwidth, gain) can also be adjusted to suit your specific needs. We are also pleased to consider designing and producing OEM versions of the LNP2-series to integrate into your systems, so please contact OPTOSCI to discuss your individual requirements.

## Options

- Alternative connectorised detector mounted on the front panel: FC, SC, ST, FSMA
- Larger or smaller area photodiodes
- Post mounted photodiode
- Customised performance characteristics e.g. reduced bandwidth with no gain peaking, increased bandwidth (x2) with 16% overshoot.



Typical Responsivity Curves of  $1\text{mm}^2$  Si and  $0.5\text{mm}^2$  InGaAs Photodiodes

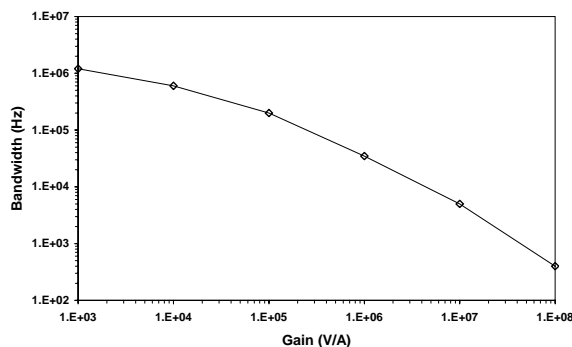


Typical Noise Equivalent Power response using  $1\text{mm}^2$  Si and  $0.5\text{mm}$  diameter InGaAs photodiode with LNP2-A Photoreceiver as the Transimpedance Gain is varied.

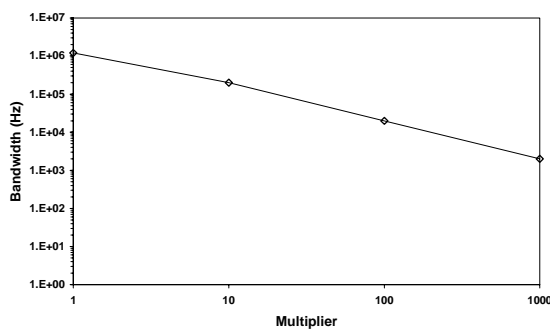
## Specifications<sup>1</sup>

Model: LNP2-A	Si10FC	IG5FC
Detector / Size	Si 1mm <sup>2</sup>	InGaAs 0.5mm dia
Responsivity	0.55A/W [ $\lambda_{\text{peak}}=850\text{nm}$ ]	0.95A/W [ $\lambda_{\text{peak}}=1550\text{nm}$ ]
Bandwidth	DC-1MHz	
Transimpedance Gain	$10^3$ to $10^8$ V/A	
Additional AC Gain	1 to 1000 [in 2-5-10 steps]	
Minimum NEP at $\lambda_{\text{peak}}$	23fW/ $\sqrt{\text{Hz}}$	15fW/ $\sqrt{\text{Hz}}$
CW Sat. Power at $\lambda_{\text{peak}}$	2mW	
O/P Voltage Swing		
External Supply	$\pm 12V$ into 2K $\Omega$	
Battery	$\pm 7.5V$ into 2K $\Omega$	
Power Requirement		
External	$\pm 15V$ DC @ 30mA [LVPSU-1 recommended]	
Battery	$\pm 8.4V$ [NiCd batteries supplied]	

<sup>1</sup> Since OPTOSCI are committed to continuously improving the design and performance characteristics of our products, these specifications are subject to change without notice.



Typical bandwidth response using  $1\text{mm}^2$  Si photodiode with LNP2-A Photoreceiver as the Transimpedance Gain is changed.

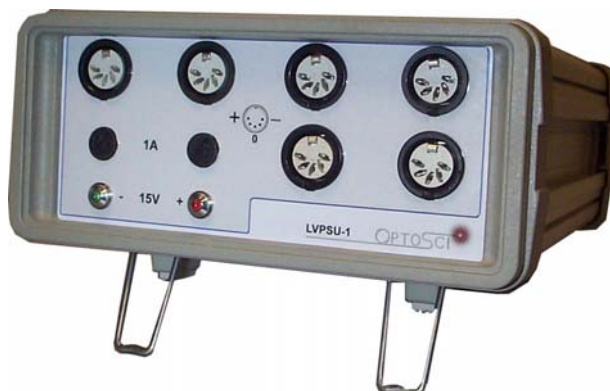


Typical bandwidth response using  $1\text{mm}^2$  Si photodiode with LNP2-A Photoreceiver as the additional gain is altered.

## Ordering information

LNP2-A	Low Noise Photoreceiver Module
-Si10FC	1mm sqr Si pin in FC housing
-IG3FC	0.3mm dia InGaAs pin in FC housing
LVPSU-1	$\pm 15V$ DC power supply

## LVPSU-1



### Features

- Six  $\pm 15V$  DC outputs from standard DIN sockets
- 1A maximum output current
- Designed for use with up to six LNP2-A photoreceivers or as a standard laboratory  $\pm 15V$  power supply.
- Compact bench top unit

### Product description

The LVPSU-1 is a mains-powered  $\pm 15V$  DC power supply intended for use with up to six of OPTOSCI's LNP2-A photoreceivers. It can also be utilised for standard laboratory applications requiring  $\pm 15V$  supply lines. The  $\pm 15V$  DC output is available from six separate front panel DIN sockets which match the DIN cables supplied with the LNP2-A photoreceivers. The maximum total output current of the unit is internally limited to 1A to prevent damage if a load draws excessive current.

The standard Power Supply is either a 120V or 240V AC mains powered unit with an IEC connector. The power supply can also be customised to allow the mains supply to be switched between 240V and 120V.

### Options

- Mains supply switchable between 240V and 120V.
- Higher output current limit.

### Specifications<sup>1</sup>

LVPSU-1	
Output Voltage	+15V : 0V : -15V
Max. Total Output Current	1A
Tolerance ( $\pm 15V$ )	3%
Residual Ripple	5mV <sub>pp</sub>
Power Supply Requirements	120 or 240V AC mains via IEC connector

### Ordering information

LVPSU-1	$\pm 15V$ DC power supply
LVPSU- <i>special</i>	Custom option

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Date: November 2010