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OCT-Proven Balanced Detectors (Page 1 of 2)

NEW
design

PDB420C

Image quality in an OCT system can be improved by utilizing a balanced detection scheme, which improves the signal-to-noise ratio by common-mode rejection and autocorrelated noise suppression. Thorlabs offers a broad range of balanced detectors to cover different bandwidth and wavelengths from 320 – 1700 nm. All the detectors are optimized for low DC offset and high transimpedance gain. The active low-pass anti-aliasing filter helps to remove the frequency aliasing effect associated with high-frequency signal digitization processes. These balanced detectors are widely used in Thorlabs' Swept Source OCT imaging systems.

Noise Reduction

The detectors consist of two balanced photodetectors and an ultra-low noise, high-speed transimpedance amplifier. The two photodetectors are matched to achieve an excellent common mode rejection ratio, leading to better noise reduction.

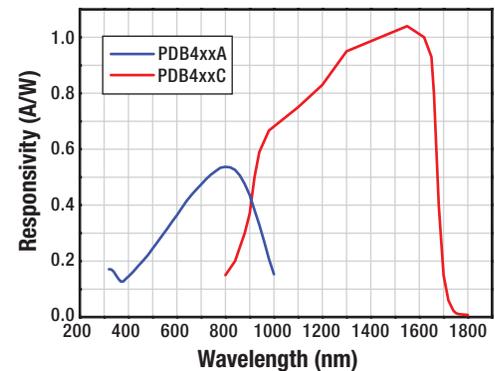
Operation

Thorlabs' Balanced Amplified Photodetectors consist of two well-matched photodiodes and an ultra-low noise, high-speed transimpedance amplifier (TIA) that generates an output voltage (RF OUTPUT) proportional to the difference between the photocurrents in the two photodiodes (i.e., the two optical input signals). Additionally, the unit has two fast monitor outputs (MONITOR+ and MONITOR-) to observe the optical input power levels on each photodiode separately.

Features

- Improves SNR in SS-OCT Set Ups
- Operating Wavelength
 - 320 – 1000 nm (Si)
 - 800 – 1700 nm (InGaAs)
- Bandwidth
 - DC to 15 MHz (PDB440)
 - DC to 75 MHz (PDB420)
 - DC to 100 MHz (PDB410)
 - DC to 200 MHz (PDB460)
- High Transimpedance Gain
 - 250×10^3 V/A (PDB420)
 - 51×10^3 V/A (PDB440)
- Less than ± 2 mV of DC Offset
- Excellent Common Mode Rejection (See Specs Table)
- Ultra Low Noise
- Free Space & Fiber Input Options
- Switchable Power Supply Included

PDB4 Series Responsivity

Have you
seen our...Full Range
of Balanced
Detectors,
Including
AC-Coupled
VersionsSee page
1582

PDB440C

Connectors

These balanced detectors come with two removable FC input connectors (please note that for PDB460C the FC adapter is not removable). Three SMA electrical connectors provide the balanced output signal plus a fast power monitor for each of the two input signals. These two monitors enable the control of the input power levels.

Packaging/Power Supply

Housed in a shielded aluminum enclosure measuring 85 mm x 80 mm x 30 mm (3.3" x 3.1" x 1.2"), these detectors are post mountable using the included adapter plate, which can be attached to the bottom or side of the housing with the included 8-32 (M4) screws. The unit is powered with the provided ± 12 V DC power supply. The input voltage of 110 V or 230 V can be manually selected by a switch.

OCT-Proven Balanced Detectors (Page 2 of 2)

ITEM #	PDB440A	PDB420A	PDB440C	PDB420C
Detector Type	Si/PIN	Si/PIN	InGaAs/PIN	InGaAs/PIN
Wavelength Range	320 – 1000 nm	320 – 1000 nm	800 – 1700 nm	800 – 1700 nm
Bandwidth (3 dB)	DC – 15 MHz	DC – 75 MHz	DC – 15 MHz	DC – 75 MHz
Peak Responsivity	0.53 A/W	0.53 A/W	1.0 A/W	1.0 A/W
Active Detector Diameter	0.8 mm	0.8 mm	0.3 mm	0.3 mm
Common Mode Rejection Ratio	>35 dB			
Transimpedance Gain*	51 x 10 ³ V/A	250 x 10 ³ V/A	51 x 10 ³ V/A	250 x 10 ³ V/A
Conversion Gain RF-Output	27 x 10 ³ V/W	133 x 10 ³ V/W	51 x 10 ³ V/W	250 x 10 ³ V/W
Conversion Gain Monitor Output	10 V/mW @ 820 nm	10 V/mW @ 820 nm	10 V/mW @ 1550 nm	10 V/mW @ 1300 nm
CW Saturation Power RF-Output	130 μW @ 820 nm	27 μW @ 820 nm	70 μW @ 1550 nm	15 μW @ 1300 nm
NEP DC - 10 MHz (Min)	6.4 pW / √Hz	6.5 pW / √Hz	3.3 pW / √Hz	3.5 pW / √Hz
Optical Inputs	FC/PC or FC/APC (Removable)			
Photodiode Damage Threshold	20 mW			
RF Output Impedance	50 Ω			

* Transimpedance Gain is reduced by a factor of two for 50 Ohm loads

ITEM #	PDB410A	PDB460A	PDB410C	PDB460C
Detector Type	Si/PIN	Si/PIN	InGaAs/PIN	InGaAs/PIN
Wavelength Range	320 – 1000 nm	320 – 1000 nm	800 – 1700 nm	800 – 1700 nm
Bandwidth (3 dB)	DC – 100 MHz	DC – 200 MHz	DC – 100 MHz	DC – 200 MHz
Peak Responsivity	0.53 A/W	0.50 A/W	1.0 A/W	1.0 A/W
Active Detector Diameter	0.8 mm	0.4 mm	0.3 mm	0.15 mm
Common Mode Rejection Ratio	>25 dB (>35 dB Typical)			
Transimpedance Gain*	50 x 10 ³ V/A	30 x 10 ³ V/A	50 x 10 ³ V/A	30 x 10 ³ V/A
Conversion Gain RF-Output	26.5 x 10 ³ V/W	16 x 10 ³ V/W	50 x 10 ³ V/W	30 x 10 ³ V/W
Conversion Gain Monitor Output	10 V/mW @ 820 nm	10 V/mW @ 820 nm	10 V/mW @ 1550 nm	10 V/mW @ 1550 nm
CW Saturation Power RF-Output	130 μW @ 820 nm	225 μW @ 820 nm	70 μW @ 1550 nm	120 μW @ 1550 nm
NEP DC - 10 MHz (Min)	7 pW / √Hz	13.2 pW / √Hz	3.8 pW / √Hz	6.0 pW / √Hz
Optical Inputs**	FC/PC or FC/APC (Removable)			FC/PC or FC/APC (Not Removable)
Photodiode Damage Threshold	20 mW			
RF Output Impedance	50 Ω			

* Transimpedance Gain is reduced by a factor of two for 50 Ohm loads ** For Model PDB460C the FC adapter is not removable

ITEM #*	\$	£	€	RMB	DESCRIPTION
PDB440A	\$ 1,325.00	£ 954.00	€ 1,152.75	¥ 10,560.25	Balanced Amplified Photodetector, Fixed Gain, Si, 15 MHz
PDB440C	\$ 1,410.00	£ 1,015.20	€ 1,226.70	¥ 11,237.70	Balanced Amplified Photodetector, Fixed Gain, InGaAs, 15 MHz
PDB420A	\$ 1,225.30	£ 882.22	€ 1,066.01	¥ 9,765.64	Balanced Amplified Photodetector, Fixed Gain, Si, 75 MHz
PDB420C	\$ 1,310.00	£ 943.20	€ 1,139.70	¥ 10,440.70	Balanced Amplified Photodetector, Fixed Gain, InGaAs, 75 MHz
PDB410A	\$ 1,100.00	£ 792.00	€ 957.00	¥ 8,767.00	Balanced Amplified Photodetector, Fixed Gain, Si, 100 MHz
PDB410C	\$ 1,150.00	£ 828.00	€ 1,000.50	¥ 9,165.50	Balanced Amplified Photodetector, Fixed Gain, InGaAs, 100 MHz
PDB460A	\$ 1,345.00	£ 968.40	€ 1,170.15	¥ 10,719.65	Balanced Amplified Photodetector, Fixed Gain, Si, 200 MHz
PDB460C	\$ 1,332.65	£ 959.51	€ 1,159.41	¥ 10,621.22	Balanced Amplified Photodetector, Fixed Gain, InGaAs, 200 MHz

* Add -AC to the item number for a version with AC-Coupling