

PHOTONIC DETECTORS INC. 32 CHANNEL DETECTOR PRE-AMP BOARD ASSEMBLY Type PDB-707-100-XX

CAUTION: ESD SENSITIVE DEVICE

DESCRIPTION

PDB-707-100-XX This 32 channel Pre-Amplifier Board Assembly (PABA) is a side-by-side stackable platform with built-in voltage regulators, and eight precision CMOS quad op-amps. Low offset voltages and input bias currents, enhance operational stability at high voltage gains. Standard one meg feedback resistors produce a 1 KHz bandwidth, with optional selected resistors available. The following options can be used with this PABA.



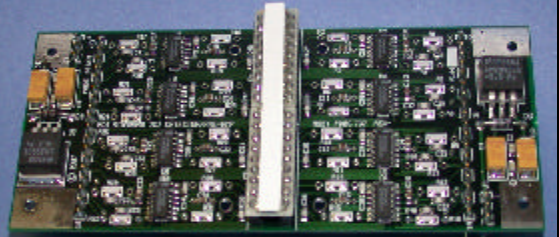
DESCRIPTION - OPTION D

PDB-707-100-D This option is designed to use two 16 element, blue enhanced silicon photodiode arrays. The arrays are on .062 [1.27] pitch with .010 [0.25] gaps. Each element is 2.51 mm² in size. The low leakage, high shunt detectors match up well with the CMOS op-amps on the PABA. This version can be used for optical color sorters, food processing, inspection equipment, optical scanners, and other multi-element photodiode array applications.



DESCRIPTION - OPTION DS

PDB-707-100-DS This option is designed to use two **PDB-C216S**, 16 element, blue enhanced silicon photodiode arrays, with X-ray fluoroscopic screens. The ZnCdS:Ag phosphorus doped screen emission spectrum is 530 nm (green). X-ray absorption is 9.66/26.7 KeV, with an effective atomic number of 38.4. This version is ideal for X-ray package inspection, diagnostic fluoroscopy and PCB examination.



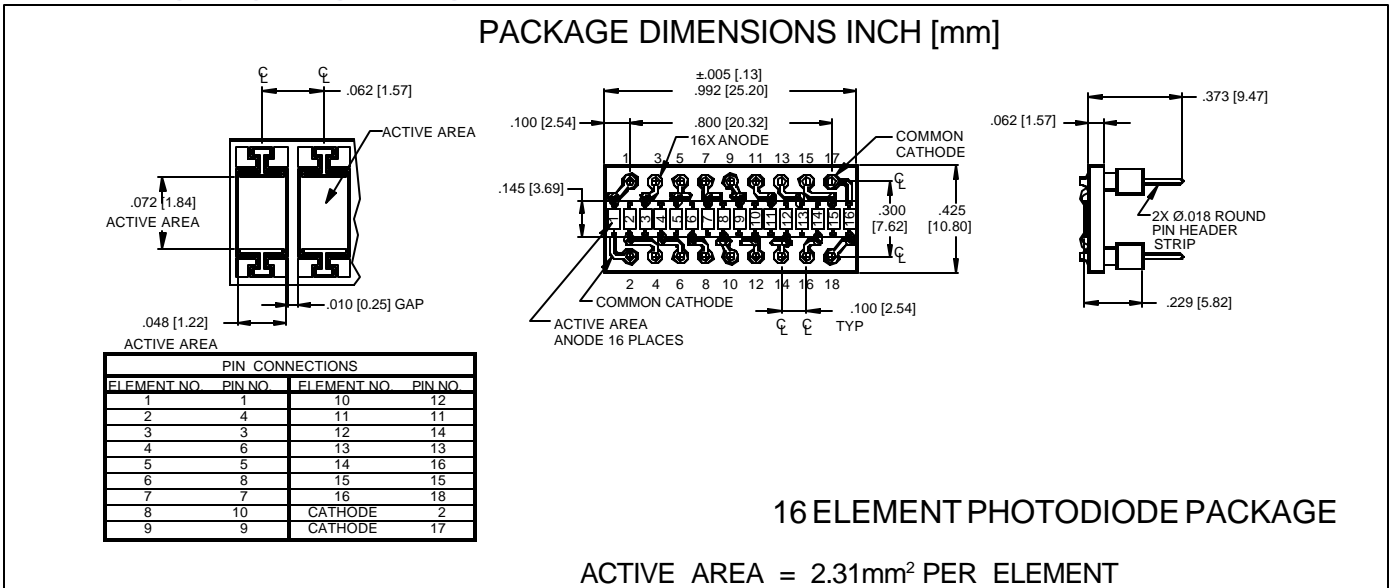
DESCRIPTION - OPTION DC

PDB-707-100-DC This option is designed to use two **PDB-C216C**, 16 element, blue enhanced silicon photodiode arrays, with cesium iodide thallium doped CsI (Ti), X-ray scintillation crystals. These arrays are used in 40 KeV to 120 KeV X-ray applications. Other uses include medical CT, baggage scanners, food processing and X-ray package inspection scanners.



PHOTONIC DETECTORS INC. 32 CHANNEL DETECTOR PRE-AMP BOARD ASSEMBLY

Type PDB-C216-SP Used on PDB-707-100-D



FEATURES

- .062 inch centers
- Stackable
- Blue enhanced
- Low capacitance

DESCRIPTION

The **PDB-C216-SP** is a common cathode, monolithic silicon PIN photodiode 16 element array. Designed to be stacked end to end to form a line of optical pixels.

APPLICATIONS

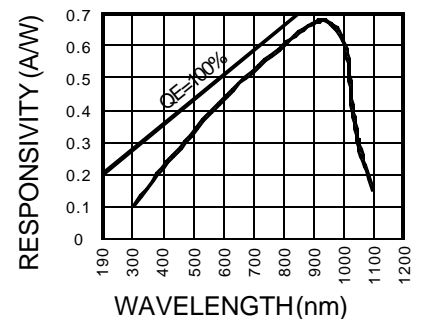
- Cardreader
- Scanners
- Characterrecognition

ABSOLUTE MAXIMUM RATING (TA=25°C unless otherwise noted)

SYMBOL	PARAMETER	MIN	MAX	UNITS
V _{BR}	Reverse Voltage		50	V
T _{STG}	Storage Temperature	-40	+100	°C
T _O	Operating Temperature Range	-20	+75	°C
T _S	Soldering Temperature*		+265	°C
I _L	Light Current		500	mA

*1/16 inch from case for 3 secs max

SPECTRAL RESPONSE

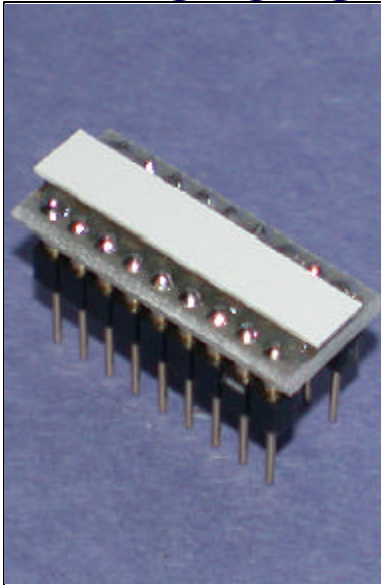


ELECTRO-OPTICAL CHARACTERISTICS (TA=25°C unless otherwise noted, without scintillator)

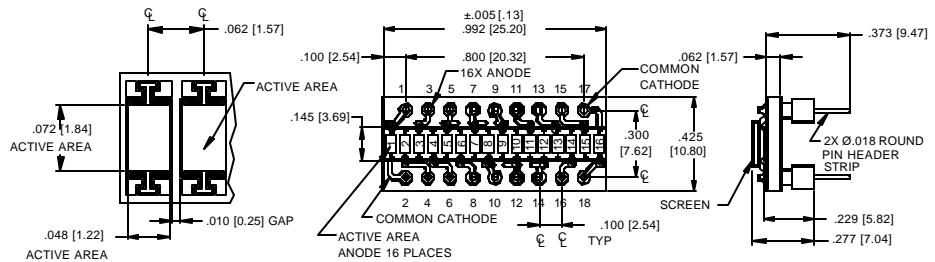
SYMBOL	CHARACTERISTIC	TEST CONDITIONS	MIN	TYP	MAX	UNITS
I _{SC}	Short Circuit Current	H = 100 fc, 2850 K	18	28		μA
I _D	Dark Current	H = 0, V _R = 5 V		5	50	nA
R _{SH}	Shunt Resistance	H = 0, V _R = 10 mV	100	200		MΩ
TCR _{SH}	RSH Temp. Coefficient	H = 0, V _R = 10 mV		-8		% / °C
C _J	Junction Capacitance	H = 0, V _R = 0 V**		40	60	pF
λ _{range}	Spectral Application Range	Spot Scan	350		1100	nm
λ _p	Spectral Response - Peak	Spot Scan		950		nm
V _{BR}	Breakdown Voltage	I = 10 μA	15	30		V
NEP	Noise Equivalent Power	V _R = 10 V @ Peak		2x10 ⁻¹⁴		W/√Hz
tr	Response Time	RL = 50 Ω V _R = 10 V		15		nS

PHOTONIC DETECTORS INC. 32 CHANNEL DETECTOR PRE-AMP BOARD ASSEMBLY

Type PDB-C216-S Used on PDB-707-100-DS



PACKAGE DIMENSIONS INCH [mm]



PIN CONNECTIONS			
ELEMENT NO.	PIN NO.	ELEMENT NO.	PIN NO.
1	1	10	12
2	4	11	11
3	3	12	14
4	6	13	13
5	5	14	16
6	8	15	15
7	7	16	18
8	10	CATHODE	2
9	9	CATHODE	17

FLUOROSCOPIC X-RAY SCREEN IS A 19.0% EFFICIENT, ZnCdS:Ag PHOSPHORUS DOPED SCREEN WITH A 530 nm (GREEN) EMISSION FOR 9.66/26.7 KeV X-RAY ABSORPTION APPLICATIONS.

16 ELEMENT X-RAY PHOTODIODE PACKAGE WITH SCINTILLATION SCREEN

ACTIVE AREA = 2.31mm² PER ELEMENT

FEATURES

- .062 inch centers
- Stackable
- Scintillation screen
- Low capacitance

DESCRIPTION

The **PDB-C216-S** is a common cathode, monolithic silicon PIN photodiode 16 element array. Designed to be stacked end to end to form a line of pixels. Supplied with a fluoroscopic X-ray scintillation screen.

APPLICATIONS

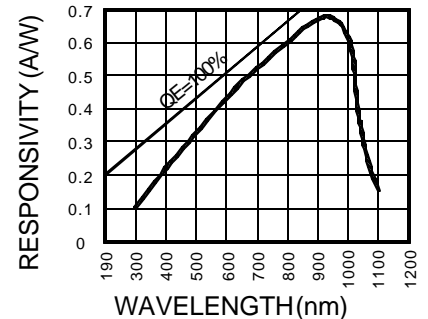
- Luggage X-ray
- X-Ray scanner
- X-Ray inspection

ABSOLUTE MAXIMUM RATING (TA=25°C unless otherwise noted)

SYMBOL	PARAMETER	MIN	MAX	UNITS
V _{BR}	Reverse Voltage		50	V
T _{STG}	Storage Temperature	-40	+100	°C
T _O	Operating Temperature Range	-20	+75	°C
T _S	Soldering Temperature*		+265	°C
I _L	Light Current		500	µA

*1/16 inch from case for 3 secs max

SPECTRAL RESPONSE

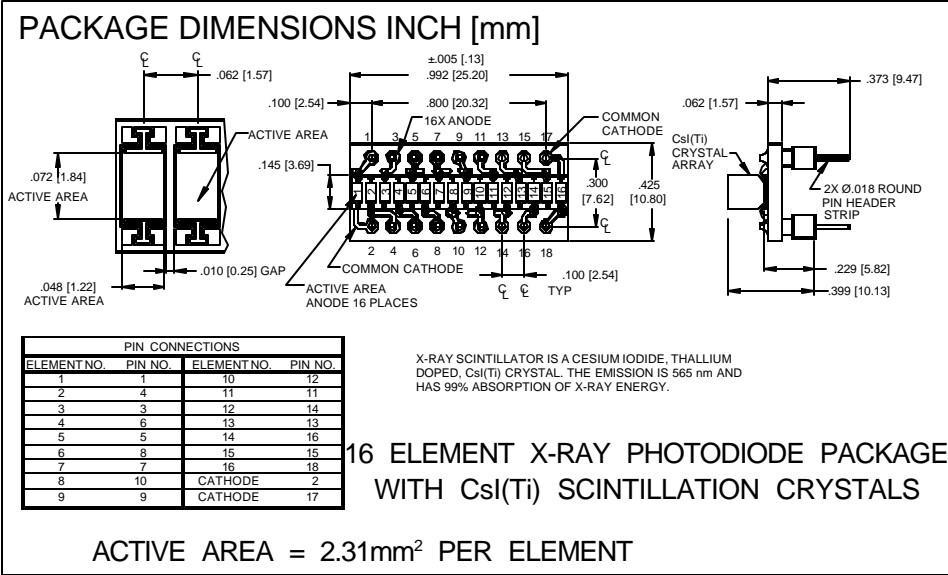
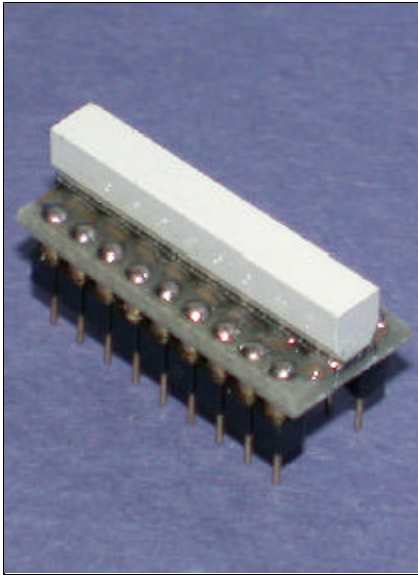


ELECTRO-OPTICAL CHARACTERISTICS (TA=25°C unless otherwise noted, without scintillator)

SYMBOL	CHARACTERISTIC	TEST CONDITIONS	MIN	TYP	MAX	UNITS
I _{SC}	Short Circuit Current	H = 100 fc, 2850 K	18	28		µA
I _D	Dark Current	H = 0, V _R = 5 V		5	50	nA
R _{SH}	Shunt Resistance	H = 0, V _R = 10 mV	100	200		MΩ
TCR _{SH}	RSH Temp. Coefficient	H = 0, V _R = 10 mV		-8		% / °C
C _J	Junction Capacitance	H = 0, V _R = 0 V**		40	60	pF
λ _{range}	Spectral Application Range	Spot Scan	350		1100	nm
λ _p	Spectral Response - Peak	Spot Scan		950		nm
V _{BR}	Breakdown Voltage	I = 10 µA	15	30		V
NEP	Noise Equivalent Power	V _R = 10 V @ Peak		2x10 ⁻¹⁴		W/√Hz
tr	Response Time	RL = 50 Ω V _R = 10 V		15		nS

PHOTONIC 32 CHANNEL DETECTOR PRE-AMP BOARD ASSEMBLY

DETECTORS INC. Type PDB-C216-C Used on PDB-707-100-DC



FEATURES

- .062 inch centers
- Stackable
- Csl(Ti) crystals
- Low capacitance

DESCRIPTION

The **PDB-C216-C** is a common cathode, monolithic silicon PIN photodiode 16 element array. Designed to be stacked end to end to form a line of pixels. Supplied with X-Ray Csl(Ti) scintillation crystals.

APPLICATIONS

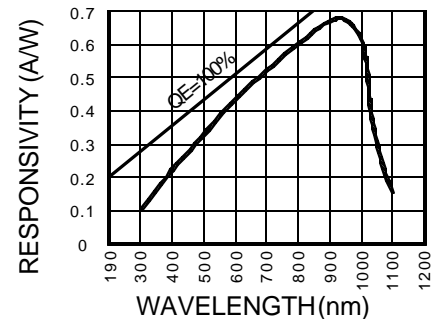
- Luggage X-ray
- X-Ray scanner
- X-Ray inspection

ABSOLUTE MAXIMUM RATING (TA=25°C unless otherwise noted)

SYMBOL	PARAMETER	MIN	MAX	UNITS
V _{BR}	Reverse Voltage		50	V
T _{STG}	Storage Temperature	-40	+100	°C
T _O	Operating Temperature Range	-20	+75	°C
T _S	Soldering Temperature*		+265	°C
I _L	Light Current		500	mA

*1/16 inch from case for 3 secs max

SPECTRAL RESPONSE



ELECTRO-OPTICAL CHARACTERISTICS (TA=25°C unless otherwise noted, without scintillator)

SYMBOL	CHARACTERISTIC	TEST CONDITIONS	MIN	TYP	MAX	UNITS
I _{SC}	Short Circuit Current	H = 100 fc, 2850 K	18	28		μA
I _D	Dark Current	H = 0, V _R = 5 V		5	50	nA
R _{SH}	Shunt Resistance	H = 0, V _R = 10 mV	100	200		MΩ
TCR _{SH}	RSH Temp. Coefficient	H = 0, V _R = 10 mV		-8		% / °C
C _J	Junction Capacitance	H = 0, V _R = 0 V**		40	60	pF
λ _{range}	Spectral Application Range	Spot Scan	350		1100	nm
λ _p	Spectral Response - Peak	Spot Scan		950		nm
V _{BR}	Breakdown Voltage	I = 10 μA	15	30		V
NEP	Noise Equivalent Power	V _R = 10 V @ Peak		2x10 ⁻¹⁴		W/√Hz
tr	Response Time	RL = 50 Ω V _R = 10 V		15		nS

Information in this technical data sheet is believed to be correct and reliable. However, no responsibility is assumed for possible inaccuracies or omission. Specifications are subject to change without notice. **f = 1 MHz

PHOTONIC DETECTORS INC. 32 CHANNEL DETECTOR PRE-AMP BOARD ASSEMBLY

Type PDB-707-100-XX

AMPLIFIER SPECIFICATION PER CHANNEL TA=25°C, V+ = 5V, V- = 0V, VCM = 1.5V, VO = 2.5V and RL > 1M UNLESS OTHERWISE NOTED

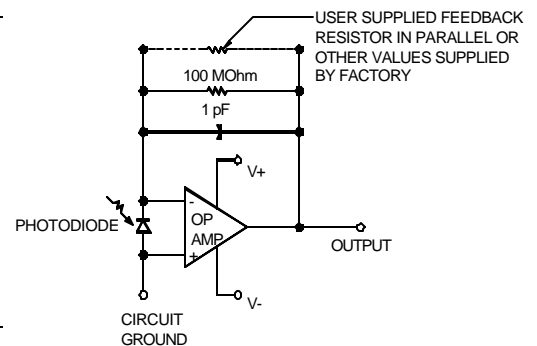
CHARACTERISTIC	TEST CONDITIONS	MIN	TYP	MAX	UNITS
INPUT OFFSET VOLTAGE (Vos)	INITIAL OFFSET		350	1000	μV
	LONG TERM OFFSET STABILITY		15		μV/MONTH
AVERAGE INPUT OFFSET DRIFT (TCVos)	RL = 100 KΩ		1		μV/°C
INPUT BIAS CURRENT (Ib)	OFFSET CURRENT, VCM=0			100	pA
INPUT OFFSET CURRENT (Ios)				100	pA
INPUT VOLTAGE RANGE (IVR)	COMMON MODE REJECTION VCM ±10V	±11	±12		V
INPUT VOLTAGE NOISE (en)	VOLTAGE 0, f=100 Hz		40		nV/√Hz
	VOLTAGE 0, f=1 KHz		30		nV/√Hz
INPUT CURRENT NOISE (in)	TYP f=1 KHz		1.8		fA/√Hz
FREQUENCY RESPONSE	UNITY GAIN, SMALL SIGNAL	0.8	1.0		MHz
	SLEW RATE, UNITY GAIN	1.0	1.8		V/μs
CLOSED LOOP GAIN (CLBW)	AVCL=+5 V		9		Mhz
SUPPLY CURRENT (ISV)*	V = +15 V, VO = 7.5 V		27.2	32	mA
SHORT CIRCUIT CURRENT			15		mA
POWER SUPPLY	OPERATING VOLTAGE	±4.5		±15.5	V

NOTE: 8 EACH NATIONAL P/N: LMC6084, CMOS QUAD OPERATIONAL AMPLIFIER USED IN ASSEMBLY. * TOTAL ASSEMBLY SUPPLY CURRENT

AMPLIFIER ABSOLUTE MAXIMUM RATING (TA=25°C UNLESS OTHERWISE NOTED)

PARAMETER	MIN	MAX	UNITS
SUPPLY VOLTAGE		16	±V
DIFFERENTIAL INPUT VOLTAGE		±16	V
STORAGE TEMPERATURE	-55	+125	°C
OPERATING TEMPERATURE	0	+70	°C

CAUTION: ESD SENSITIVE DEVICE

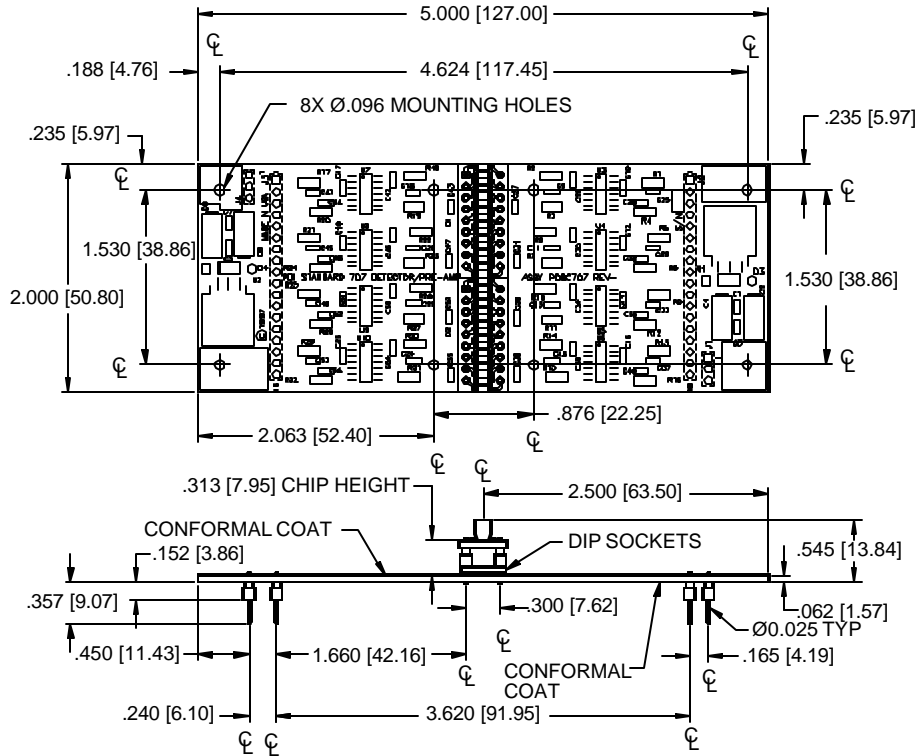


PHOTONIC 32 CHANNEL DETECTOR PRE-AMP BOARD ASSEMBLY

DETECTORS INC. Type PDB-707-100-XX

MECHANICAL DIMENSIONS

PACKAGE DIMENSIONS INCH [mm]



ASSEMBLY SHOWN WITH PDB-C216-C IN THIS VIEW

ELECTRICAL CONNECTIONS

32 ELEMENT AMPLIFIER CONNECTIONS

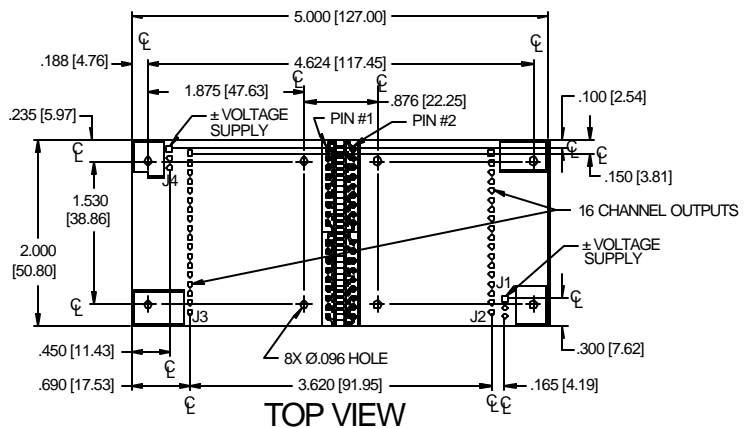
J3	PIN	DETECTOR CHANNEL
1	GND	
2	U7-1	2
3	U7-14	4
4	U7-8	6
5	U7-7	8
6	U8-1	10
7	U8-14	12
8	U8-7	14
9	U8-8	16
10	U9-1	18
11	U9-14	20
12	U9-8	22
13	U9-7	24
14	U10-1	26
15	U10-14	28
16	U10-8	30
17	U10-7	32
18	GND	

J2	PIN	DETECTOR CHANNEL
1	GND	
2	U3-14	1
3	U3-1	3
4	U3-7	5
5	U3-8	7
6	U4-14	9
7	U4-1	11
8	U4-7	13
9	U4-8	15
10	U5-14	17
11	U5-1	19
12	U5-7	21
13	U5-8	23
14	U6-14	25
15	U6-1	27
16	U6-7	29
17	U6-8	31
18	GND	

POWER CONNECTIONS

J4 PIN 1 +4.5 TO +15V
PIN 2 COMMON
PIN 3 -4.5 TO -15V

J1 PIN 1 +4.5 TO +15V
PIN 2 COMMON
PIN 3 -4.5 TO -15V



NOTE: THE SUPPLY VOLTAGE & OUTPUT TERMINALS ARE Ø.025 [Ø.064] ON .100 [25.4] CENTERS

CAUTION: ESD SENSITIVE DEVICE