APPENDIX 1: Equipment Manuals

(Also refer to manuals associated with Experiment 2 on Nuclear Physics)

HAMAMATSU

PHOTOMULTIPLIER TUBES
R1527
R1527P(For Photon Counting)

High Cathode Sensitivity with Low Noise Photocathode

FEATURES

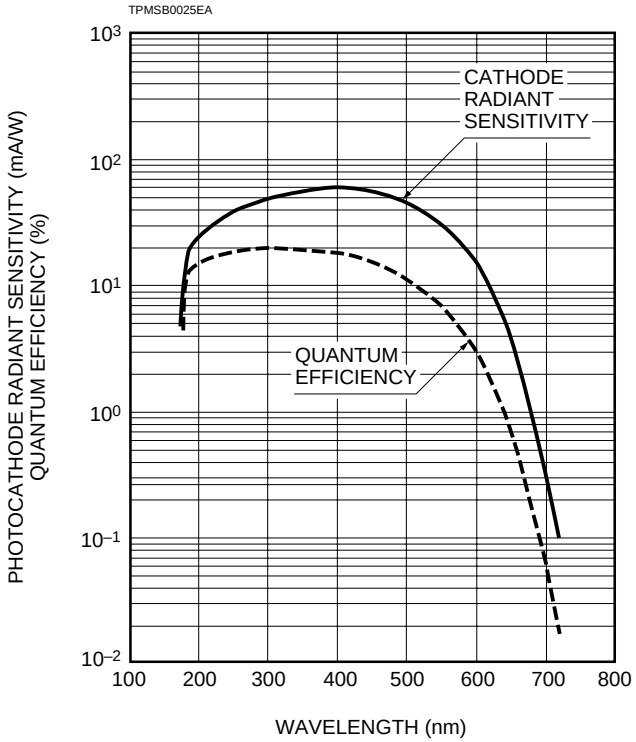
- **Spectral Response ..... 185 to 680 nm**
- **Cathode Sensitivity**
  - **Luminous ..... 60 μA/lm**
  - **Radiant at 400nm ..... 60 mA/W**
- **Anode Sensitivity (at 1000V)**
  - **Luminous ..... 400 A/lm**
  - **Radiant at 400nm ..... 4.0×10^5 A/W**
- **Low Dark Current ..... 0.1 nA**
- **Low Dark Counts (R1527P) ..... 10 cps**

Hamamatsu R1527 features high cathode sensitivity, high current amplification, and low dark current.
Variant tube (R1527P) specially selected for photon counting application is also available.
The R1527 is useful for fluorescence, chemiluminescence, Raman spectroscopy and low light level detection.

GENERAL

Parameter	Description/Vaiue	Unit
Spectral Response	185 to 680	nm
Wavelength of Maximum Response	400	nm
Photocathode		
Material	Low noise bialkali	–
Minimum Effective Area	8 × 24	mm
Window Material	UV glass	–
Dynode		
Secondary Emitting Surface	Low noise bialkali	–
Structure	Circular-cage	–
Number of Stages	9	–
Direct Interelectrode Capacitances		
Anode to Last Dynode	4	pF
Anode to All Other Electrodes	6	pF
Base	11-pin base JEDEC No. B11-88	–
Weight	45	g
Suitable Socket	E678–11A (option)	–
Suitable Socket Assembly	E717–21 (option)	–

Figure 1: Typical Spectral Response



PHOTOMULTIPLIER TUBES R1527, R1527P(For Photon Counting)

MAXIMUM RATINGS (Absolute Maximum Values)

Parameter	Value	Unit
Supply Voltage		
Between Anode and Cathode	1250	Vdc
Between Anode and Last Dynode	250	Vdc
Average Anode Current	0.1	mA
Ambient Temperature	–80 to +50	℃

CHARACTERISTICS (at 25℃)

Parameter	R1527 for General Purpose			R1527P for Photon Counting			Unit
	Min.	Typ.	Max.	Min.	Typ.	Max.	
Cathode Sensitivity							
Quantum Efficiency at 300nm (Peak)	—	19	—	—	19	—	%
Luminous[B]	40	60	—	40	60	—	μA/lm
Radiant at 400nm (Peak)	—	60	—	—	60	—	mA/W
Blue[C]	—	6.4	—	—	6.4	—	μA/lm-b
Anode Sensitivity							
Luminous[D]	200	400	—	200	400	—	A/lm
Radiant at 400nm	—	4.0×10^{5}	—	—	4.0×10^{5}	—	A/W
Gain[E]	—	6.7×10^{6}	—	—	6.7×10^{6}	—	
Anode Dark Current[E]							
After 30minute Storage in the darkness	—	0.1	2.0	—	0.1	0.5	nA
Anode Dark Counts[F]	—	—	—	—	10	50	cps
ENI(Equivalent Noise Input)[G]	—	3.7×10^{-17}	—	—	3.7×10^{-17}	—	W
Time Response[D]							
Anode Pulse Rise Time[H]	—	2.2	—	—	2.2	—	ns
Electron Transit Time[J]	—	22	—	—	22	—	ns
Transit Time Spread (TTS)[K]	—	1.2	—	—	1.2	—	ns
Anode Current Stability[L]							
Current Hysteresis	—	0.1	—	—	0.1	—	%
Voltage Hysteresis	—	1.0	—	—	1.0	—	%

NOTES

A: Averaged over any interval of 30 seconds maximum.

B: The light source is a tungsten filament lamp operated at a distribution temperature of 2856K. Supply voltage is 150 volts between the cathode and all other electrodes connected together as anode.

C: The value is cathode output current when a blue filter(Corning CS-5-58 polished to 1/2 stock thickness) is interposed between the light source and the tube under the same condition as Note B.

D: Measured with the same light source as Note B and with the anode-to-cathode supply voltage and voltage distribution ratio shown in Table 1 below.

E: Measured with the same supply voltage and voltage distribution ratio as Note D after removal of light.

F: Measured at the voltage producing the gain of 1×10^{6}.

G: ENI is an indication of the photon-limited signal-to-noise ratio. It refers to the amount of light in watts to produce a signal-to-noise ratio of unity in the output of a photomultiplier tube.

$$ENI = \frac{\sqrt{2q\cdot Idb\cdot G\cdot f}}{S}$$

where q = Electronic charge (1.60×10^{-19} coulomb).
Idb = Anode dark current(after 30 minute storage) in amperes.
G = Gain.
f = Bandwidth of the system in hertz. 1 hertz is used.
S = Anode radiant sensitivity in amperes per watt at the wavelength of peak response.

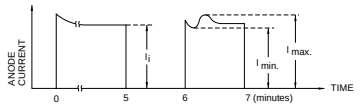
H: The rise time is the time for the output pulse to rise from 10% to 90% of the peak amplitude when the entire photocathode is illuminated by a delta function light pulse.

J: The electron transit time is the interval between the arrival of delta function light pulse at the entrance window of the tube and the time when the anode output reaches the peak amplitube. In measurement, the whole photocathode is illuminated.

K: Also called transit time jitter. This is the fluctuation in electron transit time between individual pulses in the signal photoelectron mode, and may be defined as the FWHM of the frequency distribution of electron transit times.

L: Hysteresis is temporary instability in anode current after light and voltage are applied.

$$\text{Hysteresis} = \frac{I_{max.} - I_{min.}}{I_i} \times 100(\%)$$



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(1)Current Hysteresis
The tube is operated at 750 volts with an anode current of 1 micro-ampere for 5 minutes. The light is then removed from the tube for a minute. The tube is then re-illuminated by the previous light level for a minute to measure the variation.

(2)Voltage Hysteresis
The tube is operated at 300 volts with an anode current of 0.1 micro-ampere for 5 minutes. The light is then removed from the tube and the supply voltage is quickly increased to 800 volts. After a minute, the supply voltage is then reduced to the previous value and the tube is re-illuminated for a minute to measure the variation.

Table 1:Voltage Distribution Ratio

Electrode	K	Dy1	Dy2	Dy3	Dy4	Dy5	Dy6	Dy7	Dy8	Dy9	P
Distribution Ratio	1	1	1	1	1	1	1	1	1	1	

Supply Voltage : 1000Vdc
K : Cathode, Dy : Dynode, P : Anode

Figure 2: Typical Gain and Anode Dark Current

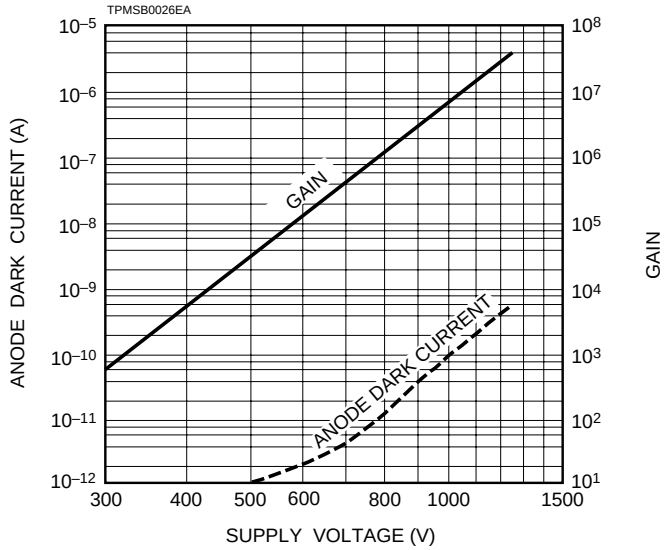


Figure 3: Typical Time Response

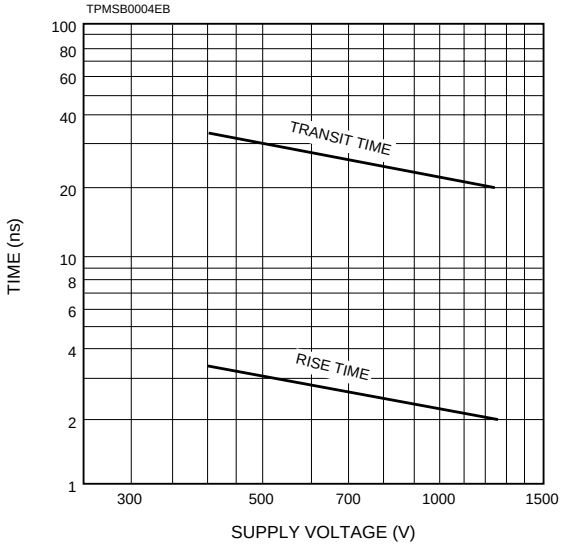


Figure 4: Typical ENI vs. Wavelength

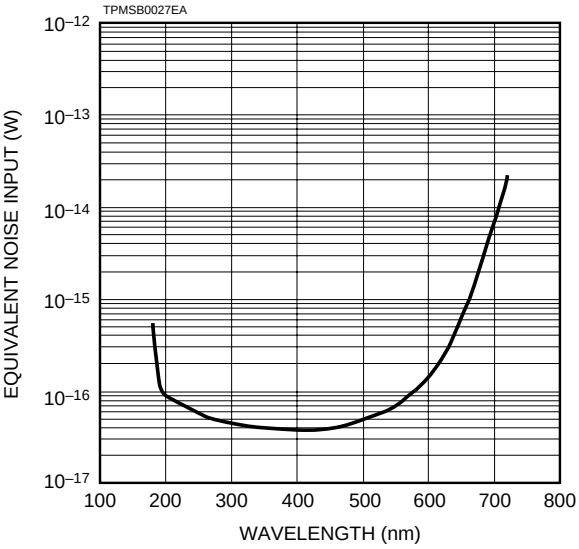
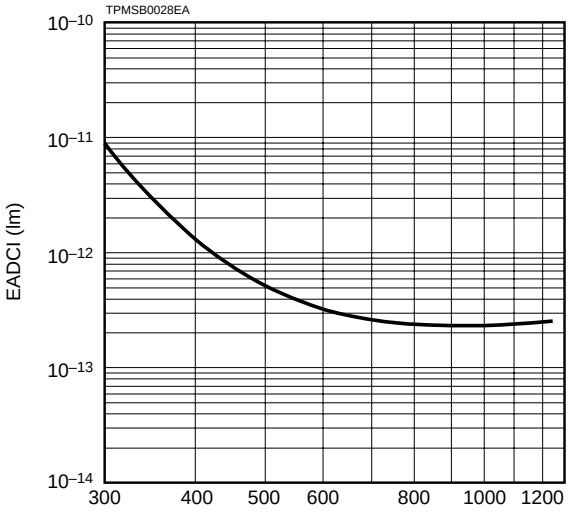


Figure 5: Typical EADCI (Equivalent Anode Dark Current Input) vs. Supply Voltage



Data shown here, which is given from a relation among supply voltage, anode sensitivity and dark current, serves as a good reference in order to determine the most suitable supply voltage or its range.

Figure 6: Typical Single Photon Height Distribution for R1527P

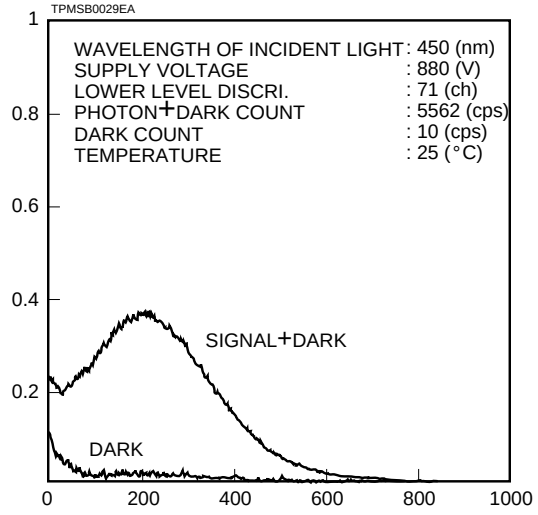


Figure 7: Typical Temperature Characteristics of Dark Count for R1527P

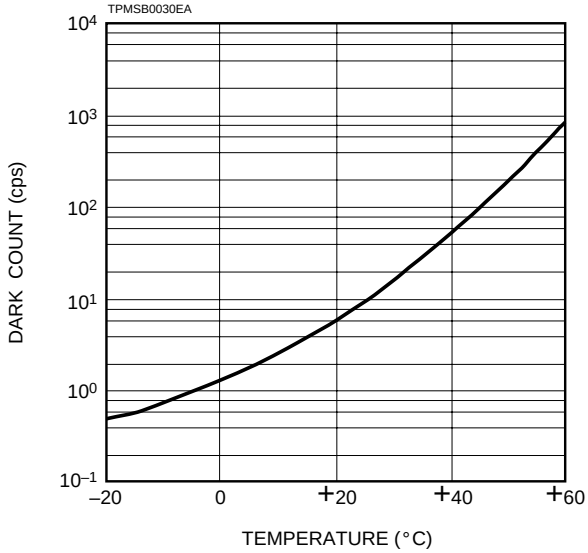


Figure 8: Dimensional Outline and Basing Diagram(Unit: mm)

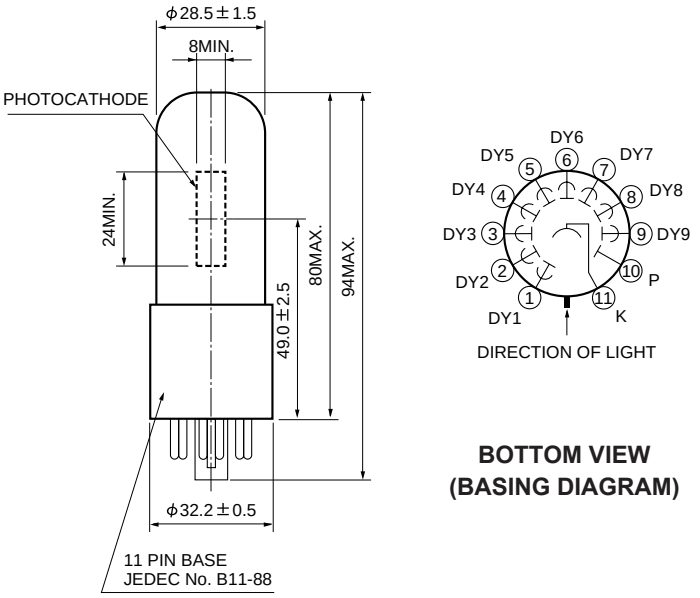


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Figure 10: Socket E678-11A (Optional)

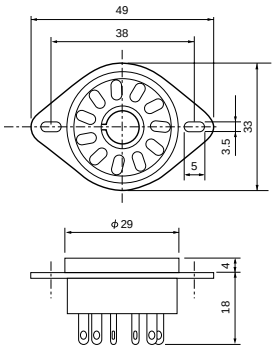

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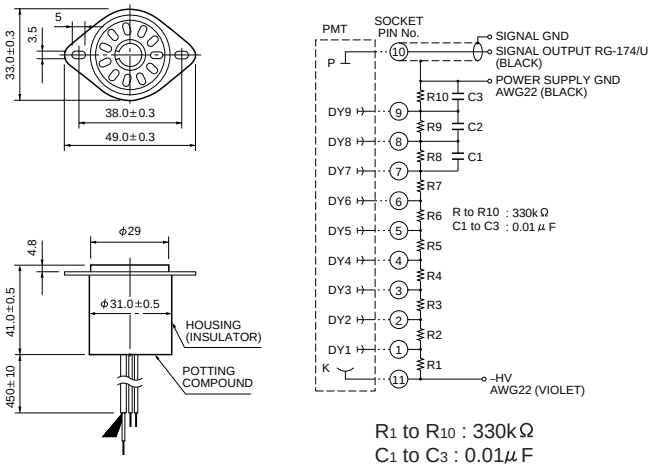
Figure 9: D Type Socket Assembly E717-21 (Optional)



R_1 to R_{10} : 330kΩ
C_1 to C_3 : 0.01μF

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※Hamamatsu also provides C4900 series compact high voltage power supplies and C6270 series DP type socket assemblies which incorporate a DC to DC converter type high voltage power supply.

Warning–Personal Safety Hazards

Electrical Shock–Operating voltages applied to this device present a shock hazard.

HAMAMATSU

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Gesamtübersicht: Laser Diode Modules (LDM) & HeNe Lasers

COHERENT®
Coherent GmbH

RADIUS 375

Item Number	Description	Extended Description	Module size	Power (mW)	Spot Size (mm)	Divergence (mrad)	Lead Length (mm)	Connector
1053595	**Radius 375-8 375nm 8mW CDRH**	Radius 375nm, 8mW, CDRH, 44.5mm Diameter x 218mm Length	44,5 mm dia x218 mm	8	1 x 3	0.6 x 1	1000	5-Pin DIN
1053594	**Radius 375-8 375nm 8mW OEM**	Radius 375nm, 8mW, OEM, 44.5mm Diameter x 218mm Length	44,5 mm dia x218 mm	8	1 x 3	0.6 x 1	1000	5-Pin DIN

RADIUS 405

Item Number	Description	Extended Description	Module size	Power (mW)	Spot Size (mm)	Divergence (mrad)	Lead Length (mm)	Connector
1053310	**Radius 405-4 405nm 4mW OEM**	Radius 405nm, 4mW, Adjustable Focus, OEM, (Vioflame), 44.5mm Diameter x 218mm Length	44,5 mm dia x218 mm	4,2	4.7 x 1.6	0.2 x 0.3	1000	5-Pin DIN
1051390	**Radius 405-25 405nm 25mW CDRH**	Radius 405nm, 25mW, Adjustable Focus, with CDRH Control Box, 44.5mm Diameter x 218mm Length	44,5 mm dia x218 mm	25	4.7 x 1.6	0.2 x 0.3	1000	5-Pin DIN
1043000	**Radius 405-25 405nm 25mW OEM**	Radius 405nm, 25mW, Adjustable Focus, OEM, 44.5mm Diameter x 218mm Length	44,5 mm dia x218 mm	25	4.7 x 1.6	0.2 x 0.3	1000	5-Pin DIN
0223-023-00	**Radius 405-25CC 405nm 25mW CC**	Radius 405nm, 25mW Constant Current, Adjustable Focus, OEM, (Vioflame), 44.5mm Diameter x 218mm Length	44,5 mm dia x218 mm	25	4.7 x 1.6	0.2 x 0.3	1000	5-Pin DIN
1051505	**Radius 405-30EP 405nm 30mW CDR**	Radius 405nm, 30mW, Extra Photodiode for power stability and low noise, with CDRH Control Box	44,5 mm dia x218 mm	30	2.9 x 1.0	0.2 x 0.4	1000	5-Pin DIN
1008553	**Radius 405-30EP 405nm 30mW OEM**	Radius 405nm, 30mW, Extra Photodiode for power stability and low noise, OEM, 44.5mm Diameter x 218mm Length	44,5 mm dia x218 mm	30	2.9 x 1.0	0.2 x 0.4	1000	5-Pin DIN

RADIUS 635

Item Number	Description	Extended Description	Module size	Power (mW)	Spot Size (mm)	Divergence (mrad)	Lead Length (mm)	Connector
1056830	**Radius 635-25 635nm 25mW Adj**	Radius 635nm, 25mW, OEM, Adjustable Focus, Beam Size ~2mm, Laser Size 44.5mm Diameter x 218mm Length	44,5 mm dia x218 mm	25	1	1,3	1000	5-Pin DIN
1051385	**Radius 635-25 635nm 25mW CDRH**	Radius 635nm, 25mW with CDRH Control Box, 44.5mm Diameter x 218mm Length	44,5 mm dia x218 mm	25	1	1,3	1000	5-Pin DIN
1058455	**Radius 635-25 635nm 25mW MVP**	Radius 635nm, 25mW, OEM, 44.5mm Diameter x 218mm Length, Modulation and Variable Power Option	44,5 mm dia x218 mm	25	1	1,3	1000	5-Pin DIN
1008053	**Radius 635-25 635nm 25mW OEM**	Radius 635nm, 25mW, OEM, 44.5mm Diameter x 218mm Length	44,5 mm dia x218 mm	25	1	1,3	1000	5-Pin DIN

Miniature Laser Modules **Circular Beam**

Item Number	Description	Extended Description	Module Size	Power (mW)	Spot Size (mm)	Divergence (mrad)	Lead Length (mm)	Connector
0221-698-01	**Sys,VHK2.3-1 635nm 1mW 1mm C**	VLM2, 635nm, 0.95mW, Circular Beam ~1mm	14,7 mm dia x34,3 mm	0,95	1,1	0,7	914	none
31-0441-000	**Sys,VLM2.3-1 635nm 1mW 3mm C**	VLM2, 635nm, 0.95mW, Circular Beam ~3mm, with Phono Plug Connector	14,7 mm dia x34,3 mm	0,95	3	0,4	990	Phono-Mono
0222-458-00	**Sys,VLM3.3-1 635nm 1mW C Adj**	VLM3, 635nm, 1mW, Beam Size ~3mm, ~Circular, Miniature OEM package, Adjustable Focus with port to add thread lock, No leads - use Power Pins. Label shipped loose.	9,53 mm dia	1	3	0,4	6	none
0222-200-00	**Sys,VMB2.3-5 635nm 4.2mW C CW**	VLM2, 635nm, 4.2mW, Circular Beam ~1mm	14,7 mm dia	4,2	1,2	0,7	914	none
0221-700-01	**Sys,VHK2.3-5 635nm 5mW C CW**	VLM2, 635nm, 5mW, Circular Beam ~1.1mm	14,7 mm dia	5	1,1	0,7	914	none
0222-021-01	**Sys,VMB2.3-11 635nm 10mW C CW**	VLM2, 635nm, 10.5mW, Circular Beam ~1mm	14,7 mm dia	10,5	1,3	0,7	914	none
0222-002-01	**Sys,VLM3.5-2 650nm 1.6mW C SPC**	VLM3, 650nm, 1.6mW, Circular Beam ~1.3mm, Kapton Tape on body for electrica isolation, Epoxy Back Strain Relief, Internal 3.3 volt regulator for protection and stability. Operates at 4.5-6 VDC	9,53 mm dia	1,7	1,3	0,8	914	none
0220-999-00	**Sys,VLM2-1 670nm 1mW 3mm C**	VLM2, 670nm, 1mW, Circular 3mm Beam	14,7 mm dia	0,95	3	0,4	914	none
0221-460-00	**Sys,VLM2-1 670nm 1mW 3mm C MVP**	VLM2, 670nm, 0.95mW, Circular Beam 3mm, Modulation and Variable Power Control on third lead, Recommend 6VDC Operatio	14,7 mm dia	0,95	3	0,4	914	none
31-0425-000	**Sys,VLM2-1 670nm 1mW 3mm C Plg**	VLM2, 670nm, 0.9mW, Circular Beam 3mm, with Phono Plug Connector	14,7 mm dia	0,95	3	0,4	990	Phono-Mono
0222-881-00	**Sys,VLM3-1 670nm 1mW C Conn**	VLM3, 670nm, 0.9mW, Circular Beam ~1mm, 3" leads with connector Molex 39-01-3029	9,53 mm dia	0,95	1.1 x 1	1 x 0.7	76,2	Molex 39-01-3029
0221-005-00	**Sys,VLM2-3 670nm 2.3mW Circ**	VLM2, 670nm, 2.3mW, Circular Beam 3mm	14,7 mm dia	2,3	3	0,4	914	none
0221-831-00	**Sys,VHK2-5 670nm 4.9mW C**	VLM2, 670nm, 4.9mW, Circular Beam ~1.1mm	14,7 mm dia	4,9	1,1	0,7	914	none

Miniature Laser Modules — Elliptical Beam

Item Number	Description	Extended Description	Module Size	Power (mW)	Spot Size (mm)	Divergence (mrad)	Lead Length (mm)	Connector
0221-814-00	**Sys,VLM3.3-3 635nm 2.5mW E CW**	VLM3, 635nm, 2.5mW, Elliptical Beam ~4.6 x 1.3 mm	9,53 mm dia	2,5	4.6 x 1.3	0.2 x 0.7	914	none
0221-534-00	**Sys,VLM2.3-5 635nm 4.2mW E CW**	VLM2, 635nm, 4.2mW, Elliptical Beam ~5.8 x 1.7mm	14,7 mm dia	4,2	5.8 x 1.7	0.2 x 0.6	914	none
0221-895-01	**Sys,VLM2.3-11 635nm 10mW E CW**	VLM2, 635nm, 10.5mW, Elliptical Beam ~5.8 x 1.7mm	14,7 mm dia	10,5	5.8 x 1.7	0.2 x 0.6	914	none
1051904	**Sys,VLM2.3-21 635nm 21mW E CW**	VLM2, 635nm, 21mW, Elliptical Beam ~5.8 x 1.7mm	14,7 mm dia	21	5.8 x 1.7	0.2 x 0.6	914	none
31-0607-000	**Sys,VLM3.5-4 650nm 4mW E CW**	VLM3, 650nm, 4mW, CW, Elliptical ~4 x 1 mm beam, with phono connector	9,53 mm dia	4	4 x 1.1	0.3 x 1.0	990	Phono-Mono
0222-580-01	**Sys,VLM3.5-1 650nm 1mW E Reg**	VLM3, 650nm, 0.9mW, Elliptical Beam, Internal 3.3 volt regulator for protection and stability. Case at 3.3Volts. Operates at 4.5 - 6 VDC	9,53 mm dia	0.95	1 x 3.7	0.3 x 1.0	914	none
0222-764-00	**Sys,VLM2.6-25L 660nm 25mW E CW**	VLM2, 660nm, 25mW, Elliptical Beam ~0.5 x 1.3mm, Laser Case at Ground Potential	14,7 mm dia	25	0.5 x 1.3	1.7 x 0.7	914	none
0221-023-00	**Sys,VLM2-1 670nm 1mW Ellip**	VLM2, 670nm, 0.9mW, Elliptical Beam ~3.3 x 1mm	14,7 mm dia	0,95	3.3 x 1	0.3 x 1.0	914	none
0220-970-00	**Sys,VLM3-1 670nm 1mW Ellip**	VLM3, 670nm, 0.9mW, Elliptical Beam ~4.6 x 1.3mm	9,53 mm dia	0,95	4.6 x 1.3	0.2 x 0.7	914	none
0221-202-00	**Sys,VLM2-5 670nm 4.2mW E MVP**	VLM2, 670nm, 4.2mW, Elliptical Beam ~4 x 1.2mm, Modulation and Variable Power Contr on third lead, Recommend 6VDC	14,7 mm dia	4,2	4 x 1.2	0.3 x 0.8	914	none
0220-986-00	**Sys,VLM2-5 670nm 4.2mW Ellip**	VLM2, 670nm, 4.2mW, Elliptical Beam ~1 x 3mm	14,7 mm dia	4,2	3 x 1	0.3 x 1.0	914	none
0220-968-00	**Sys,VLM3-3 670nm 2.5mW E**	VLM3, 670nm, 2.5mW, Elliptical Beam ~1 x 4mm	9,53 mm dia	4,2	4 x 1	0.2 x 0.7	914	none
0223-038-00	**Sys,VLM2-8 670nm 7.5mW SPC**	VLM2, 670nm, 7.5mW, Elliptical Beam ~1 x 3mm , Shielded Cable	14,7 mm dia	7,5	3.4 x 1.3	0.3 x 0.8	305	none
0222-929-00	**Sys,VLM2 785nm 15mW Ellip**	VLM2, 785nm, 15mW, Elliptical Beam ~2.7 x 1.2mm, CW	14,7 mm dia	15	2.7 x 1.2	0.4 x 0.9	914	none
1006427	**Sys,VLM2 785nm 40mW ADJ Power**	VLM2, 785nm, 40mW, Adjustable Power with back panel potentiometer, special focu 4.5mm X 1.5mm at 965mm distance, Third wire for laser current sense with 10mV equals ~1ma of laser drive	14,7 mm dia	40	4.5 x 1.5 @ 965mm	Special	267	none

Adjustable Focus Laser Modules

Item Number	Description	Extended Description	Module Size	Power (mW)	Spot Size (mm)	Divergence (mrad)	Lead Length (mm)	Connector
31-0458-000	**Sys,FVLM2 635nm 1mW C CW Adj**	VLM2, 635nm, 0.95mW, Adjustable Focus, Circular Beam 3mm, Phono Plug Connector	8 (14,7 mm dia x max 51	0,95	3	0,4	990	Phono-Mono
0220-862-00	**Sys,FVLM2 670nm 1mW C Adj**	VLM2, 670nm, 0.9mW, Adjustable Focus, Circular Beam ~3mm	8 (14,7 mm dia x max 51	0,95	3	0,4	914	none
0222-287-01	**Sys,FVLM3 650nm 1mW C Adj OEM**	VLM3, 650nm, 1mW, Circular Beam ~3 mm, Adjustable Focus, Miniature OEM style with exposed PCBA	8 (14,7 mm dia x max 51	1	3	Adjustable	114	none
0223-132-00	**Sys,FVMB4 670nm 1mW E VP Adj**	VLM4, 670nm, 1mW, Adjustable Focus, Elliptical Beam ~1.3 x 4.2mm, Variable Power Control on Third Wire, Operates from 4.6-5.6 VDC	8 (14,7 mm dia x max 51	1	1.3 x 4.2	Adjustable	914	none
0222-494-00	**Sys,FVLM-11mm 670nm 4mW E Adj**	VLM, 11mm diameter package, 670nm, 4.2mW, Internal 3.3V Regulator, Elliptical Beam ~1.7 x 5.6 mm, Operates at 4.5-6 VDC. Adj Tool included to change focus, Black Anodized case.	17,78 (14,7 mm) dia	4,2	1.7 x 5.6	0.6 x 0.2	152	Switchcr aft 3558-2 RCA, Center +
0220-857-00	**Sys,FVLM2 670nm 4mW E Adj**	VLM2, 670nm, 4.2mW, Adjustable Focus, Elliptical Beam ~4 x 1mm	8 (14,7 mm dia x max 51	4,2	4 x 1	0.3 x 1.2	609	none
0223-103-00	**Sys,FVLM2 670nm 1mW MVP Adj**	VLM2, 670nm, 0.95mW, Adjustable Focus, Elliptical Beam ~4 x 1mm, Modulation and Variable Power Control on third wire	8 (14,7 mm dia x max 51	0,95	4 x 1	Adjustable	609	none
1008538	**Sys,FVLM2 635nm 10mW E VP Adj**	VLM2, 635nm, 10.5mW, Adjustable Focus, Elliptical Beam ~4.5 x 1.2mm, Variable Power Control on third wire	8 (14,7 mm dia x max 51	10	4.5 x 1.2	Adjustable	588	none
31-0532-000	**Sys,FVLM2 635nm 4mW E CW Adj**	VLM2, 635nm, 4mW, Adjustable Focus, Elliptical Beam ~4.7 x 1.3mm, Phono Plug Connector	8 (14,7 mm dia x max 51	4,2	4.7 x 1.3	0.2 x 0.8	990	Phono-Mono

Line Generator Modules

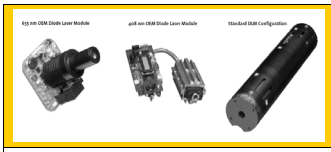
Item Number	Description	Extended Description	Module Size	Power (mW)	Spot Size (mm)	Divergence (mrad)	Lead Length (mm)	Connector
0221-145-00	**Sys,LG2-30Deg 670nm 1.8mW**	VLM2 Line Generator, 670nm, 1.8mW, 30 Degree Fan Angle	14,7 mm dia	1,8	1	1mrad x 30deg	914	none
0221-155-00	**Sys,LG3-30Deg 670nm 2.5mW**	VLM3, Line Generator, 670nm, 2.5mW, 30 Degree Fan Angle	9,5 mm	2,5	1	1mrad x 30deg	914	none
0222-037-00	**Sys,LG3.3-40Deg 635nm 1.5mW**	VLM3, Line Generator, 635nm, 1.5mW, 40 Degree Fan Angle	9,5 mm	1,5	1	1mrad x 40deg	914	none
0220-936-00	**Sys,Indust LG 60Deg 635nm 2mW**	Industrial Line Generator, 635nm, 2mW, 60 Degree Fan Angle, Bright Line	9,5 mm	2	1	1mrad x 60deg	304	none
0220-934-00	**Sys,LG2.3-60Deg 635nm 2mW**	VLM2, Line Generator, 635nm, 2.5mW, 60 Degree Fan Angle	14,7 mm dia	2,5	1	1mrad x 60deg	914	none
0220-972-00	**Sys,LG2.3-60Deg 635nm 2mW**	VLM2 Line Generator, 635nm, 1.8mW, 60 Degree Fan Angle	14,7 mm dia	1,8	1	1mrad x 60deg	914	none
0221-144-00	**Sys,LG2-60Deg 670nm 4mW**	VLM2 Line Generator, 670nm, 4.2mW, 60 Degree Fan Angle	14,7 mm dia	4,2	1	1mrad x 60deg	914	none
0222-603-00	**Sys,LG3.3-60Deg 635nm 1mW Spc**	VLM3 Line Generator, 635nm, 0.8mW, 60 Degree Fan Angle, Connector AMP 87175-6	9,5 mm	0,95	1	1mrad x 60deg	1000	AMP 87175-6
0222-206-00	**Sys,LG3-60Deg 670nm 1.8mW**	VLM3, Line Generator, 670nm, 1.8mW, 60 Degree Fan Angle	9,5 mm	1,8	1	1mrad x 60deg	914	none
0221-154-00	**Sys,LG3-60Deg 670nm 3.5mW**	VLM3 Line Generator, 670nm, 3.5mW, 60 Degree Fan Angle	9,5 mm	3,5	1	1mrad x 60deg	914	none
1038903	**Sys,FLG3-80Deg 650nm 1mW Adj**	VLM3 Line Generator, 650nm, 1.1mW, 80deg Fan Angle, Adjustable Focus Line Width, custom connector, loose label	9,5 mm	1,1	1	80deg x Adjustable		special
31-0631-000	**Sys,Dual X Line 635nm 12mW CW**	Dual Line Generator, Cross Hair, 635nm, 12mW	19 (22) mm dia x142 mm	12	1	1mrad x 85deg	990	Phono-Mono
0220-566-00	**Sys,Indust LG 85Deg 635nm 9mW**	Industrial Laser Diode Module Line Generator, 635nm, 9.2mW, 85 Degree Fan Angle	19 (22) mm dia x142 mm	9,2	1	1mrad x 85deg	304	none
31-0268-000	**Sys,LabLaser 85 Deg 635nm 6mW**	LabLaser, 635nm, 6mW, Line Generator, 85 Degree Fan Angle, CW, Phono Plug Connector	19 (22) mm dia x142 mm	6	1	1mrad x 85deg	990	Phono-Stereo
0220-971-00	**Sys,LG2.3-85Deg 635nm 2mW**	VLM2 Line Generator, 635nm, 2.5mW, 85 Degree Fan Angle	9,5 mm	2,5	1	1mrad x 85deg	914	none
0220-866-00	**Sys,LG2-85deg 670nm 2mW**	VLM2 Line Generator, 670nm, 2.5mW, 85 Degree Fan Angle	9,5 mm	2,5	1	1mrad x 85deg	914	none
0223-062-00	**Sys,LG3.3-85deg 635nm 3mW EPX**	VLM3 Line Generator, 635nm, 3mW, 85 Degree Fan Angle, Epoxy Wire Strain Relief	9,5 mm	3	1	1mrad x 85deg	914	none
31-0615-000	**Sys,LG3.5-85deg 650nm 3.7mW**	VLM3, Line Generator, 650nm, 3.7mW, 85 Degree Fan Angle, with Phono Connector	9,5 mm	3	1	1mrad X 85deg	990	Phono-Mono
0221-153-00	**Sys,LG3-85D 670nm 3.8mW 85deg**	VLM3, Line Generator, 670nm, 3.8mW, 85 Degree Fan Angle	9,5 mm	3,8	1	1mrad x 85deg	914	none
0222-337-00	**Sys,LG3 X Line 635nm 2mW Cross**	VLM3 Line Generator, Diffractive Cross Hair, 635nm, 2mW, 25deg Fan Angle	9,5 mm	2	1	25deg	914	none
0222-210-00	**Sys,LG2 X Line 635nm 1mW Adj**	VLM2, Line Generator, Diffractive Cross Hair, 635nm, 1mW, Adjustable Focus Line Width, 25 Degree Fan Angle	14,7 mm dia	0,95	1	25deg x Adjustable	610	none
0222-209-00	**Sys,LG2 X Line 635nm 2mW Adj**	VLM2, Line Generator, Diffractive Cross Hair, 635nm, 2mW, Adjustable Focus Line Width, 25 Degree Fan Angle	17,8 mm (14.5 mm) dia	2	1	25deg x Adjustable	588	none
0220-845-00	**Sys,FLG2.3-30Deg 635nm 1mW Adj**	VLM2 Line Generator, 635nm, 1.2mW, Adjustable Focus Line Width, 30 Degree Fan Angle, Label on module body	17,8 mm (14.5 mm) dia	1,2	1	30deg x Adjustable	609	none
0220-846-00	**Sys,FLG2.3-60Deg 635nm 2mW Adj**	VLM2 Line Generator, 635nm, 1.8mW, Adjustable Focus Line Width, 60 Degree Fan Angle, Label on module body.	17,8 mm (14.5 mm) dia	1,8	1	60deg x Adjustable	609	none

LabLaser and Industrial

Item Number	Description	Extended Description	Module Size	Power (mW)	Spot Size (mm)	Divergence (mrad)	Lead Length (mm)	Connector
1062083	**Sys,LabLaser 830nm 25mW E MVP**	LabLaser, 830nm, 25mW, Elliptical Beam ~5.2 x 2.1mm, CW, Phono Plug Connector	19 (22) mm dia x142 mm	25	5.2 x 2.1	0.2 x 0.6	1140	Phono-Stereo
0221-159-00	**Sys,Indust 670nm 4mW E CW**	Industrial Laser Diode Module, 670nm, 4.2mW, Elliptical Beam ~3x1mm	19 (22) mm dia x142 mm	4,2	3 x 1	0.3 x 1.0	304	none
0221-173-00	**Sys,Indust 670nm 2.5mW E CW**	Industrial Laser Diode Module, 670nm, 2.5mW, Elliptical Beam ~3.2 x 1.0mm	19 (22) mm dia x142 mm	2,5	3.2 x 1.0	0.3 x 1.0	173	none
31-0102-000	**Sys,LabLaser 635nm 4mW E CW**	LabLaser, 635nm, 4mW, Elliptical Beam ~5.6 x 1.5mm, CW, Phono Plug Connector	19 (22) mm dia x142 mm	4,2	5.6 x 1.5	0.2 x 0.7	990	Phono-Stereo
31-0110-000	**Sys,LabLaser 635nm 4mW E MVP**	LabLaser, 635nm, 4mW, Elliptical Beam ~5.6 x 1.5mm, Modulation and Variable Power Control, Phono Plug Connector	19 (22) mm dia x142 mm	4,2	5.6 x 1.5	0.2 x 0.7	990	Phono-Stereo
31-0201-000	**Sys,LabLaser 635nm 7mW E CW**	LabLaser, 635nm, 7mW, Elliptical Beam ~5.6 x 1.5mm, CW, Phono Plug Connector	19 (22) mm dia x142 mm	7	5.6 x 1.5	0.2 x 0.7	990	Phono-Stereo
31-0219-000	**Sys,LabLaser 635nm 7mW E MVP**	LabLaser, 635nm, 7mW, Elliptical Beam ~5.6 x 1.5mm, Modulation and Variable Power Control, Phono Plug Connector	19 (22) mm dia x142 mm	7	5.6 x 1.5	0.2 x 0.7	990	Phono-Stereo
31-0300-000	**Sys,LabLaser 635nm 10mW E CW**	LabLaser, 635nm, 10.5mW, Elliptical Beam ~5.8 x 1.8mm, CW, Phono Plug Connector	19 (22) mm dia x142 mm	10,5	5.8 x 1.8	0.2 x 0.6	990	Phono-Stereo
31-0315-00	**Sys,LabLaser 635nm 10mW E MVP**	LabLaser, 635nm, 10.5mW, Elliptical Beam ~5.8 x 1.8mm, Modulation and Variable Power Control Phono Plug Connector	19 (22) mm dia x142 mm	10,5	5.8 x 1.8	0.2 x 0.6	990	Phono-Stereo
0221-164-00	**Sys,Indust 670nm 1mW 3mm C CW**	Industrial Laser Diode Module, 670nm, 0.95mW, Circular Beam 3mm	19 (22) mm dia x142 mm	0,95	3	0,4	304	none
0221-699-02	**Sys,Indust 635nm 3mW C CW**	Industrial Laser Diode Module, 635nm, 2.9mW, Circular Beam ~1.1 mm	19 (22) mm dia x142 mm	2,9	1,1	0,7	304	none
31-0128-000	**Sys,LabLaser 635nm 4mW C CW**	LabLaser, 635nm, 4.9mW, Circular Beam ~1.3mm, CW, Phono Plug Connector	19 (22) mm dia x142 mm	4,9	1,3	0,7	990	Phono-Stereo
31-0136-000	**Sys,LabLaser 635nm 4mW C MVP**	LabLaser, 635nm, 4.9mW, Circular Beam ~1.2mm, Modulation and Variable Power Control, Phono Plug Connector	19 (22) mm dia x142 mm	4,9	1,2	0,8	990	Phono-Stereo
31-0144-000	**Sys,LabLaser ULN 635nm 5mW C**	LabLaser, ULN, Ultra-Low Noise ~0.05% RMS, 635nm, 5mW, Circular Beam ~1.3mm	19 (22) mm dia x142 mm	5	1,3	0,8	990	Phono-Stereo
31-0227-000	**Sys,LabLaser 635nm 7mW C CW**	LabLaser, 635nm, 7mW, Circular Beam ~1.3mm, CW, Phono Plug Connector	19 (22) mm dia x142 mm	7	1,3	0,8	990	Phono-Stereo
31-0235-000	**Sys,LabLaser 635nm 7mW C MVP**	LabLaser, 635nm, 7mW, Circular Beam ~1.3mm, Modulation and Variable Power Control, Phono Plug Connector	19 (22) mm dia x142 mm	7	1,3	0,8	990	Phono-Stereo
31-0326-000	**Sys,LabLaser 635nm 10mW C CW**	LabLaser, 635nm, 10.5mW, Circular Beam ~1.3mm, CW, Phono Plug Connector	19 (22) mm dia x142 mm	10,5	1,3	0,8	990	Phono-Stereo
31-0334-000	**Sys,LabLaser 635nm 10mW C MVP**	LabLaser, 635nm, 10.5mW, Circular Beam ~1.3mm, Modulation and Variable Power Control, Phono Plug Connector	19 (22) mm dia x142 mm	10,5	1,3	0,8	990	Phono-Stereo

Accessories Laserdiodemodules

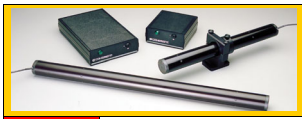
Item Number	Description	Extended Description
0221-437-00	**Sys,AM-2 Adj Mount, VLM2 15mm**	Mount, Laser Diode Module, Adjustable for VLM2 Modules, 14.8mm, 37.5 x 12.5 x 48.3mm
0221-448-00	**Sys,AM-3 Adj Mount, VLM3 9mm**	Mount, Laser Diode Module, Adjustable for VLM3, 9.5mm, 37.5 x 12.5 x 48.3mm
0221-449-00	**Sys,AM-1 Adj Mount, Lab 19mm**	Mount, Laser Diode Module, Adjustable for LabLaser or Industrial Modules, 19mm, 37.5 x 12.5 x 48.3mm
31-1605-000	**Mount,4 Axis LabLaser(53-1939)**	Mount, Laser Diode Module, LabLaser, 4-axis fine adjust, +-2deg angle adj, +-3.5mm X-Y adjustment, universal. Recommend also buy 53-1962 Adaptor.
31-1613-000	**Mount,9mm,ADJ,metric,(53-1855)**	Mount, Laser Diode Module, Adjustable for VLM3, 9.5mm, 37.5 x 12.5 x 48.3mm, thumbscrews, M4 hole pattern. Old Catalog Part #53-1855
31-1621-000	**Mount,15mm ADJ metric(53-1871)**	Mount, Laser Diode Module, VLM, 14.8mm, M4 metric hole pattern, adjustable tip-tilt 15deg, Thumbscrews, Size 37.5 x 12.5 x 48.3 mm, Old Catalog Part#53-1871
31-1639-000	**Mount,19mm LabLaser, (53-1897)**	Mount, Laser Diode Module, Adjustable for LabLaser, 19mm, 37.5 x 12.5 x 48.3mm, thumbscrews M4 hole pattern. Old Catalog Part #53-1897
31-1644-000	**Mount,9mm,ADJ, 8-32 (61-1855)**	Mount, Laser Diode Module, Adjustable for VLM3, 9.5mm, 37.5 x 12.5 x 48.3mm, thumbscrews, 8-32 hole pattern. Old Catalog Part #61-1855
31-1654-000	**Mount,19mm LabLsr US(61-1897)**	Mount, Laser Diode Module, LabLaser 19mm, 8-32 inch hole pattern, adjustable tip-tilt 15deg, Thumbscrews, Size 37.5 x 12.5 x 48.3 mm, Old Catalog Part#61-1897
31-1662-000	**Mount,15mm VLM2 US (61-1871)**	Mount, Laser Diode Module, VLM, 14.8mm, 8-32 inch hole pattern, adjustable tip-tilt 15deg, Thumbscrews, Size 37.5 x 12.5 x 48.3 mm, Old Catalog Part#61-1871
31-1670-000	**Mount Base 8-32, M4 (53-1913)**	Mounting Base, Universal, M4/8-32, 68 x 50.8 x 9.5 mm.
31-1712-000	**Adaptor,LabLaser 19mm(53-1962)**	Adaptor for 19mm LabLaser for Mount 53-1939. Old Catalog Part#53-1962
31-1001-000	**Sys,LDM Power Supply 5 VDC**	Power Supply, Laser Diode Module, Desk Top, Mount, 5VDC , 1.5amp
31-1050-000	**Sys,LabLaser Power Supply 6VDC**	Power Supply, LabLaser, 6VDC, 250ma, Adjustable Power Control for MVP lasers, Key Switch, 5-Second Delay, Emission Indicator, Interlock, 180-260VAC, 120x76x48 mm
2109-0119	**Plug,3.5mm Stereo**	Phono Plug to take Laser Diode Module with leads and add the connector to work with the LabLaser 31-1001 or 31-1050 power supplies.
31-1068-000	**Cable,Modulation,LabLaser, BNC**	Modulation Cable to connect LabLaser Laser Diode Module (with installed Modulation Option) to the 31-1050-000 Power Supply. The power supply front panel knob will not control the laser power. Laser is controlled via BNC input on Modulation Cable.



OEM Laserdiodenmodule für spezielle Anforderungen

Neben einer Auswahl von standardisierten Laserdiodenmodulen im violetten und roten Bereich bietet COHERENT auch kundenspezifische Lösungen für Ihre OEM Anwendung. Die typischen Wellenlängen im roten und nahen infraroten sowie auch im violetten Bereich können mit verschiedenen Strahlprofilen, Gehäusen und Verkabelungen kombiniert werden. Die jeweiligen Module sind CE-zertifiziert und den entsprechenden Laserklassen zugeordnet .
Auch bei den OEM-Modulen setzen wir unsere patentierte Microblaze Technologie ein, um runde Strahlprofile mit einem M2 = 1,1 zu erzeugen. Eine einstellbare Fokussier-Optik kann ebenfalls in die Module integriert werden. In vielen Fällen kann so der bisher eingesetzte HeNe Laser durch ein kostengünstiges, kompaktes Diodenmodul ersetzt werden.
Um Ihren speziellen Anforderungen im industriellen aber auch im wissenschaftlichen Bereich gerecht zu werden, sind folgende Eckdaten wichtig, um eine optimal angepasste Lösung zu finden:

Leistung und Strahlprofil (Rund, Elliptisch, Linie)
Divergenz bzw. benötigter Fokus
Gehäuseform und Abmaße
Kabelanschluss und Steckerform
Netzteil
Sprechen Sie uns an. Wir finden für fast jede Laseranwendung die geeignete Strahlquelle.



Helium Neon Lasers

31-2009-000	**LSR,Red HeNe 0.8mW, 7" Linear**	Helium Neon Laser, Red 632.8nm, 0.8mW, Linear, 0.46mm Beam, Length 178mm, Diameter 31.75mmr use PSU 31-2470
31-2470-000	**Power Supply, HeNe 115/230VAC**	HeNe Power Supply with Key Switch, Interlock, and Emission Indicator, 115/230 VAC
31-2017-000	**LSR,Red HeNe 0.8mW, 7" Random**	Helium Neon Laser, Red 632.8nm, 0.8mW, Random, 0.46mm Beam, Length 178mm, Diameter 31.75mm use PSU 31-2470
31-2470-000	**Power Supply, HeNe 115/230VAC**	HeNe Power Supply with Key Switch, Interlock, and Emission Indicator, 115/230 VAC
31-2025-000	**LSR,Red HeNe 2mW, 12.5" Linear**	Helium Neon Laser, Red 632.8nm, 2mW, Linear, 0.79mm Beam, Length 315mm, Diameter 31.75mm use PSU 31-2462
31-2462-000	**Power Supply, HeNe 115/230VAC**	HeNe Power Supply with Key Switch, Interlock, and Emission Indicator, 115/230 VAC
31-2033-000	**LSR,Red HeNe 2mW, 12.5" Random**	Helium Neon Laser, Red 632.8nm, 2mW, Random, 0.79mm Beam, Length 315mm, Diameter 31.75mm use PSU 31-2462
31-2462-000	**Power Supply, HeNe 115/230VAC**	HeNe Power Supply with Key Switch, Interlock, and Emission Indicator, 115/230 VAC
31-2041-000	**LSR,Red HeNe 4mW, 15.5" Linear**	Helium Neon Laser, Red 632.8nm, 4mW, Linear, 0.80mm Beam, Length 396mm, Diameter 31.75mm use PSU 31-2405
31-2405-000	**Power Supply, HeNe 115/230VAC**	HeNe Power Supply with Key Switch, Interlock, and Emission Indicator, 115/230 VAC
31-2058-000	**LSR,Red HeNe 4mW, 15.5" Random**	Helium Neon Laser, Red 632.8nm, 4mW, Random, 0.80mm Beam, Length 396mm, Diameter 31.75mm use PSU 31-2405
31-2405-000	**Power Supply, HeNe 115/230VAC**	HeNe Power Supply with Key Switch, Interlock, and Emission Indicator, 115/230 VAC
31-2066-000	**LSR,Red HeNe 7mW, 18" Linear**	Helium Neon Laser, Red 632.8nm, 7mW, Linear, 1.02mm Beam, Length 456mm, Diameter 31.75mm use PSU 31-2454
31-2454-000	**Power Supply, HeNe 115/230VAC**	HeNe Power Supply with Key Switch, Interlock, and Emission Indicator, 115/230 VAC
31-2074-000	**LSR,Red HeNe 7mW, 18" Random**	Helium Neon Laser, Red 632.8nm, 7mW, Random, 1.02mm Beam, Length 456mm, Diameter 31.75mm use PSU 31-2454
31-2454-000	**Power Supply, HeNe 115/230VAC**	HeNe Power Supply with Key Switch, Interlock, and Emission Indicator, 115/230 VAC
31-2082-000	**LSR,Red HeNe 10mW, 19" Linear**	Helium Neon Laser, Red 632.8nm, 10mW, Linear, 0.46mm Beam, Length 484mm, Diameter 31.75mm use PSU 31-2439
31-2439-000	**Power Supply, HeNe 115/230VAC**	HeNe Power Supply with Key Switch, Interlock, and Emission Indicator, 115/230 VAC
31-2090-000	**LSR,Red HeNe 10mW, 19" Random**	Helium Neon Laser, Red 632.8nm, 10mW, Random, 0.46mm Beam, Length 484mm, Diameter 31.75mm use PSU 31-2439
31-2439-000	**Power Supply, HeNe 115/230VAC**	HeNe Power Supply with Key Switch, Interlock, and Emission Indicator, 115/230 VAC
31-2108-000	**LSR,Red HeNe 17mW, 25" Linear**	Helium Neon Laser, Red 632.8nm, 17mW, Linear, 0.95mm Beam, Length 637mm, Diameter 31.75mm use PSU 31-2447
31-2447-000	**Power Supply, HeNe 115/230VAC**	HeNe Power Supply with Key Switch, Interlock, and Emission Indicator, 115/230 VAC
31-2140-000	**LSR,Red HeNe 35mW, 40.6" Lin**	Helium Neon Laser, Red 632.8nm, 35mW, Linear, 1.25mm Beam, Size 1030 x 79 x 66mm use PSU 31-2488
31-2488-000	**Power Supply, HeNe 115/230VAC**	HeNe Power Supply with Key Switch, Interlock, and Emission Indicator, 115/230 VAC
31-2196-000	**LSR,Red HeNe 17mW, 25" Random**	Helium Neon Laser, Red 632.8nm, 17mW, Random, 0.95mm Beam, Length 637mm, Diameter 31.75mm use PSU 31-2447
31-2447-000	**Power Supply, HeNe 115/230VAC**	HeNe Power Supply with Key Switch, Interlock, and Emission Indicator, 115/230 VAC
31-2207-000	**LSR,Orange HeNe 2mW 15.5" Rdm**	Helium Neon Laser, Orange 612.0nm, 2mW, Random, 0.80mm Beam, Length 396mm, 44.5mm Diameter use PSU 31-2405
31-2405-000	**Power Supply, HeNe 115/230VAC**	HeNe Power Supply with Key Switch, Interlock, and Emission Indicator, 115/230 VAC
31-2230-000	**LSR,Yellow HeNe 2mW 18" Random**	Helium Neon Laser, Yellow 594.1nm, Random, 0.75mm Beam, Length 456mm use PSU 31-2413
31-2413-000	**Power Supply, HeNe 115/230VAC**	HeNe Power Supply with Key Switch, Interlock, and Emission Indicator, 115/230 VAC
31-2264-000	**LSR,Green HeNe 0.3mW 15.5" Rdm**	Helium Neon Laser, Green 543.5nm, 0.3mW, Random, 0.66mm Beam, Length 315mm, 44.5mm Diameter use PSU 31-2421
31-2421-000	**Power Supply, HeNe 115/230VAC**	HeNe Power Supply with Key Switch, Interlock, and Emission Indicator, 115/230 VAC for HeNe Green 543.5nm, 0.3mW, Random
31-2298-000	**LSR,Green HeNe 1mW 20" Linear**	Helium Neon Laser, Green 543.4nm, 1mW, Linear, 0.86mm Beam, Length 510mm, 44.5mm Diameter use PSU 31-2439
31-2439-000	**Power Supply, HeNe 115/230VAC**	HeNe Power Supply with Key Switch, Interlock, and Emission Indicator, 115/230 VAC, for
31-2772-000	**LSR,Green HeNe 2mW 20" Random**	Helium Neon Laser, Green 543.5nm, 2mW, Random, 0.88mm Beam, Length 510mm, 44.5mm Diameter use PSU 31-2439
31-2439-000	**Power Supply, HeNe 115/230VAC**	HeNe Power Supply with Key Switch, Interlock, and Emission Indicator, 115/230 VAC

Helium Neon Laser Accessories

31-1688-000	**Mount,HeNe,Tilt (53-1491)**	Mount, HeNe, 32-51mm, 1/4-20 hole pattern, adjustable tip-tilt, Size 190 x 80 OD mm, Old Catalog Part#53-1491
31-1720-000	**Mount,HeNe,Var,US (61-2937)**	Mount, HeNe, 44mm, 8-32 inch hole pattern, adjustable tip-tilt 17deg, Thumbscrews, Size 80 x 20 x 88 mm, Old Catalog Part#61-2937
31-1738-000	**Mount,HeNe,Var,metric(53-2937)**	Mount, HeNe, 44mm, M4 metric hole pattern, adjustable tip-tilt 17deg, Thumbscrews, Size 80 x 20 x 88 mm, Old Catalog Part#53-2937
31-1746-000	**Mount,HeNe,Adj,8-32 (61-1483)**	Mount, HeNe, 32-51mm, 8-32 hole pattern, adjustable tip-tilt, Size 100 x 60 x 61 mm, Old Catalog Part#61-1483
31-2538-000	**Adapter,C Ring with screws**	Adaptor for front of HeNe or Radius System
31-2505-000	**Beam Expander, HeNe, Zoom**	Beam Expander, Zoom 1X to 8X, Adj Focus, 3mm input
31-2512-000	**Beam Expander, HeNe (x10)**	Beam Expander, Adj Focus, 2mm input
31-2520-000	**Beam Expander, HeNe (x5)**	Beam Expander, Adj Focus, 4mm input

Kontakt:

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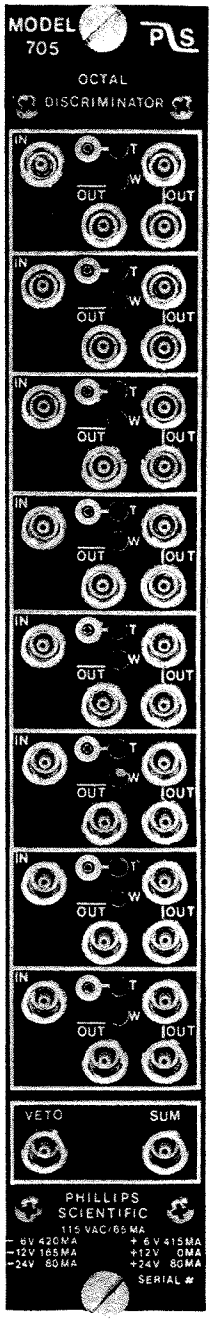
Phillips Scientific

Octal Discriminator

NIM MODEL 705

FEATURES

- INDIVIDUAL THRESHOLD AND WIDTH CONTROLS
- LINEAR SUMMED OUTPUT
- BOTH FAST VETO AND BIN GATE
- LOW COST
- EIGHT (8) CHANNELS IN A SINGLE WIDTH NIM MODULE



DESCRIPTION

The Model 705 was specifically designed for modern experiments with large counter arrays, offering high performance and reliability at a reasonable cost. The 705 features eight (8) totally independent channels with individual threshold and width controls. In addition, a fast veto input and a summed output are common to all channels.

Each channel has a threshold adjustment continuously variable from -10 mV to −1 Volt with a front panel test point providing a DC voltage ten (10) times the actual threshold setting. Likewise, each channel has a non-updating regeneration circuit for adjustable output widths from 6 nSEC to 150 nSEC.

A unique summed output is common to all eight channels providing −1 mA of current for each activated channel, thus allowing a fast decision to be made on the number of channels simultaneously hit. Up to 16 channels can be "OR'D" directly by cable to other summed outputs allowing a versatile scheme to form a trigger.

A fast veto input allows simultaneous inhibiting of all channels to reject unwanted events early in the system. Similarly, a bin gate will inhibit the entire module when applied via the rear connector.

The outputs are the current source type with one pair of negative bridged outputs and one complement for each channel. When only one output of the bridged pair is used, a double-amplitude NIM pulse (-32mA) is generated, when both connectors are used normal NIM levels (-16mA) are produced. The outputs have crisp, clean transitions, and their shapes are unaffected by the loading conditions of the other outputs.

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INPUT CHARACTERISTICS

General:

One LEMO connector input per channel; 50 ohms, ±1%, DC coupled; less than ±2% input reflection for a 2.0 nSEC input risetime. Input protection clamps at +.7 Volts and −5 Volts and can withstand ±2 amps for 1 μSEC with no damage to the input.

Threshold:

-10 mV to −1 Volt; 15-turn screwdriver adjustment; better than ±0.2%/°C stability; front panel test point provides a DC voltage ten (10) times the actual threshold setting.

Fast Veto:

One LEMO connector input common to all eight (8) channels; accepts normal NIM level pulse (−500 mV), 50 ohms, direct coupled; must precede the negative edge of input pulse by 5 nSEC; 5 nSEC minimum input width.

Bin Gate:

Rear panel slide switch enables or disables slow bin gate in accordance with TID-20893.

OUTPUT CHARACTERISTICS

General:

Three LEMO connector outputs per channel; One negative bridged pair and one complementary output; The bridged outputs deliver -32mA into a single 50 ohm load (-1.6 volts), or -16mA (-800mV) when both outputs 50 ohm terminated. The complement is quiescently -16mA (-800mV) and goes to 0mA during output. The output rise and fall times are less than 1.5 nSEC from 10% to 90% levels.

Width Control:

One control per channel; 15-turn screwdriver adjustment; outputs continuously variable from 6 nSEC to 150 nSEC non-updating ±.2%/°C stability.

Summed Output:

One LEMO connector output common to all eight (8) channels; −1 mA output pulse (−50 mV into 50 ohms) for each channel fired. Output duration is equal to the output width setting of the respective channel. Output rise and fall times less than 2.5 nSEC into 50 ohms. Up to 16 channels can be directly "OR'D" by cable.

GENERAL PERFORMANCE

Continuous Repetition Rate:

Greater than 75 MHz, with output width set at minimum.

Pulse-Pair Resolution:

Better than 12 nSEC, with output width set at minimum.

Input to Output Delay:

Less than 9 nSEC.

Multiple Pulsing:

One and only one output pulse regardless of input pulse amplitude or duration.

Power Supply Requirements:

− 6 Volts @ 420 mA	+ 6 Volts @ 415 mA
−12 Volts @ 165 mA	+12 Volts @ 0 mA
−24 Volts @ 80 mA	+24 Volts @ 80 mA
115 Volts AC @ 65 mA	

NOTE: All currents are within NIM specification limits permitting a full powered bin to be operated without overloading.

Operating Temperature:

0°C to 70°C ambient.

Packaging:

Standard single width NIM module in accordance with TID-20893 and section ND-524.

Quality Control:

Standard 36-hour, cycled burn-in with switched power cycles.

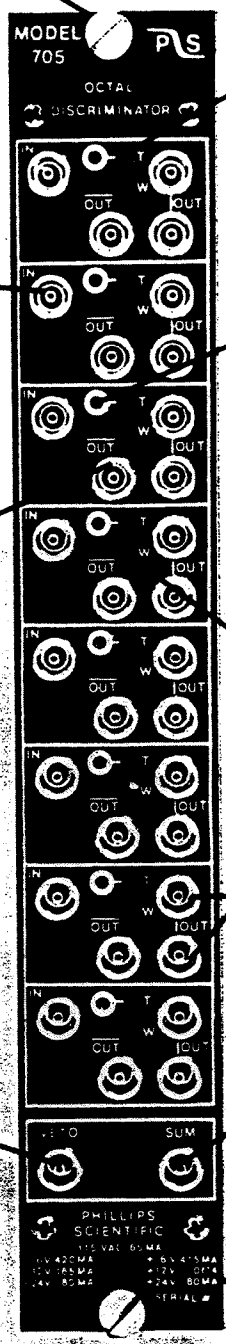
Options:

Call Phillips Scientific to find out about available options.

MODEL 705 OCTAL DISCRIMINATOR

(FRONT PANEL DESCRIPTION)

Standard #1 NIM Packaging in accordance with TID-20893



Threshold Control; 15-turn Screwdriver Adjustment, Variable from -25 mV to -1 Volt

50 Ohm Input

Threshold Monitor; Test Point provides a DC Voltage 10 times the actual Threshold Setting (-250 mV to -10 V)

One Complemented NIM Output. Quiescently -16 mA (-800 mV) Goes to 0 mA (0 Volts) during output.

Output Width Control; 15-turn Screwdriver Adjustment, Variable from 6 nSec to 150 nSec.

Double amplitude bridged output; -32 mA (-1.6 Volts across 50 ohms, -.8 Volt with two 50 ohm terminations)

Fast Inhibit Input accepts normal NIM logic (-500 mV) 50 Ohm Impedance

Linear summed output; -1 mA/step. (-50 mV across 50 ohms)

Voltage and Current Requirements

NOTE: Bin Gate Enable/ Disable Switch on Rear Panel permits Inhibiting via Bin Connector.

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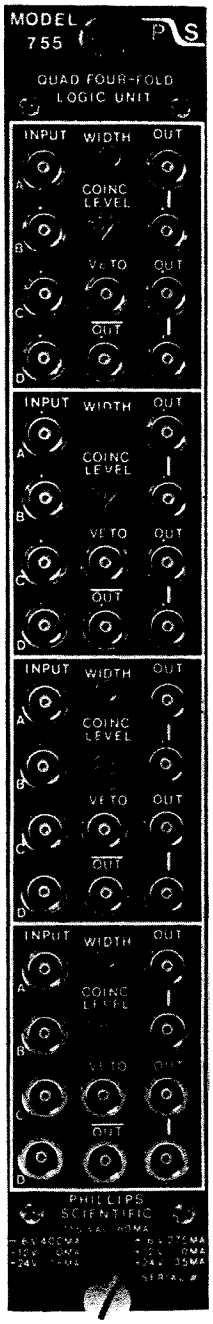
Phillips Scientific

Logic Unit

NIM MODEL 755

FEATURES

- VERSATILE LOGIC MODULE WITH MAJORITY LEVEL SELECTION
- FOUR INDEPENDENT CHANNELS
- 125 MHz RATE CAPABILITY
- DEADTIMELESS UPDATING OUTPUTS
- FAST ANTI-COINCIDENCE CAPABILITY



DESCRIPTION

The model 755 logic unit contains four channels of four input logic with veto in a single width NIM module. Logic AND, OR majority logic, fan-in/fan-out, and anti-coincidence functions can be performed with this versatile module. All functions are direct coupled and operate to over 125 MHz with input overlap times as narrow as 1 nSEC.

Each channel has four logic inputs, an anti-coincidence input, a coincidence level switch, and five outputs with common width control. The inputs are enabled by connecting the input cable to the desired input, eliminating errors often occuring with switched inputs. The setting of the coincidence level switch then determines whether a logic OR, AND, or majority logic function will produce an output.

After the inputs have satisfied the logic function desired, triggering of an updating regenerative stage produces a standardized output pulse, variable from 4 nSEC to 1 uSEC, independent of the input pulse shapes or overlap times. The updating feature ensures deadtimeless operation, while the double-pulse resolution is 7.5 nSEC for fast counting applications.

The outputs are the current source type with two pairs of negative bridged outputs and one complement for each channel. When only one output of a bridged pair is used, a double-amplitude NIM pulse (-32 mA) is generated for driving long cables with narrow pulse widths. The outputs have transition times of typically 1.0 nSEC, and their shapes are virtually unaffected by the loading conditions of the other outputs.

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INPUT CHARACTERISTICS

A, B, C, D:

Four inputs per section, LEMO connectors; accepts NIM level logic signals (-500 mV); 50 ohm input impedance direct coupled; input reflections are less than ±5% for a 1 nSEC rise-time. Inputs are protected against damage from ±50 volt input transients. Inputs respond to a 1 nSEC or greater input width.

Fast Veto:

One input per section, LEMO connector; accepts NIM level logic signal (-500 mV); 50 ohm input impedance, direct coupled; less than ±5% input reflection for a 1 nSEC risetime, protected against damage ±50 volt input transients. Requires a 3.5 nSEC minimum input width in time with the input pulse leading edge to inhibit.

Bin Gate:

Rear-panel slide switch enables or disables the slow bin gate via the rear connector. Signal levels are in accordance with the TID-20893 standard.

OUTPUT CHARACTERISTICS

General:

Five outputs per section, two pairs of negative bridged and one complemented NIM. The two pairs of bridged outputs are quiescently 0 mA and -32 mA during output. (-1.6 V into 50 ohms or -.8 V into 25 ohms). The complemented output is quiescently -16 mA and 0 mA during output. Risetimes and falltimes are less than 1.5 nSEC, and the output pulse shapes are optimized when the bridged outputs are 50 ohm terminated.

Width Control:

One control per section; 15-turn screwdriver adjustment. Outputs are continuously variable from 4 nSEC to 1 uSEC; better than 0.15%/°C.

Updating Operation:

The output pulse will be extended if a new input pulse occurs while the output is active. This provides deadtimeless operation and 100% duty cycle can be achieved.

GENERAL PERFORMANCE

Functions:

Logic AND, OR, majority logic, and logic fan-in/fan-out. All functions have leading edge inhibit with standardized outputs.

Rate:

150 MHz minimum, input to output. Typically 160 MHz.

Double-Pulse Resolution:

Less than 6.5 nSEC; Typically 6 nSEC with output width set at minimum.

Input to Output Delay:

Less than 8 nSEC.

Multiple Pulsing:

One and only one output pulse regardless of input pulse amplitude or duration.

Power Supply Requirements:

-6 V @ 400 mA	+6 V @ 250 mA
-12 V @ 165 mA	+12 V @ 0 mA
-24 V @ 60 mA	+24 V @ 35 mA
115 VAC @ 60 mA	

Note: All currents within NIM specifications limits allowing a full-powered bin to be operated without overloading.

Operating Temperature:

0°C to 70°C ambient.

Packaging:

Standard single width NIM module in accordance with TID-20893 and Section 524.

Options:

Call Phillips Scientific to find out about available options.

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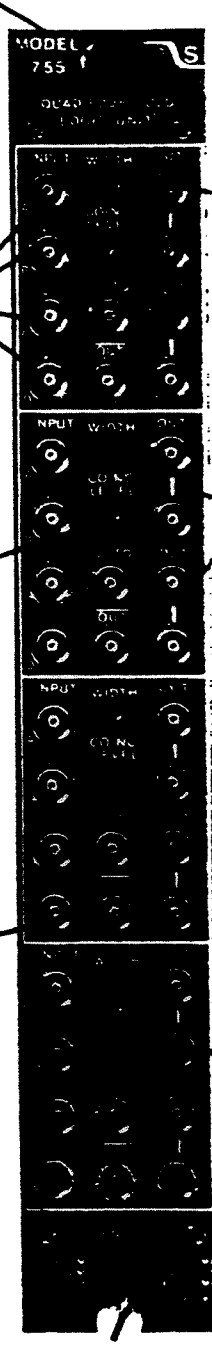
MODEL 755 QUAD FOUR-FOLD MAJORITY LOGIC UNIT

(FRONT PANEL DESCRIPTION)

Standard #1 NIM Packaging in accordance with TID-20893



Output Width Control; 15-turn Screwdriver Adjustment, Variable from 4 nSec to 1 μSec.

Four Logic Inputs; Accepts Normal NIM Logic (-500 mV) 50 ohm Impedance

Two pairs of bridged outputs; each pair delivers -32 mA (-1.6 Volts across 50 ohms, -.8 Volt with both outputs 50 ohm terminated).

Four Position Coincidence Level Switch; Selects Logical "OR", "AND", or Majority Logic Functions.

One Complemented NIM Output. Quiescently -16 mA (-800 mV). Goes to 0 mA (0 Volts) during output.

Fast Inhibit Input accepts normal NIM Logic (-500 mV) 50 ohm Impedance

Voltage and Current Requirements

NOTE: Bin Gate Enable/ Disable Switch on Rear Panel permits Inhibiting via Bin Connector.

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ORTEC®

550A
Single-Channel Analyzer

- **Ideal for selecting a range of pulse amplitudes from a spectroscopy amplifier for counting on a ratemeter or counter/timer**
- **Provides the excellent stability, resolution, and dynamic range demanded by high-resolution detectors**
- **Four operating modes:**
  - **Integral**
  - **Normal (independent upper and lower levels)**
  - **Asymmetric window**
  - **Symmetric window**
- **DC-coupled for high counting rates**
- **SCA output generated when the input signal falls below the lower level**

The ORTEC Model 550A Single-Channel Analyzer is ideally suited for selecting a range of output pulse amplitudes from a spectroscopy amplifier for subsequent counting on a ratemeter or a counter/timer. It provides the excellent stability, resolution, and dynamic range needed for measurements with high-resolution germanium and silicon detectors. These same features provide more than adequate performance with scintillation counters, proportional counters, and ionization chambers. The entire instrument is dc-coupled to ensure that the discriminator levels are not affected by changes in the counting rate, even at very high counting rates.

The versatility of the Model 550A is enhanced by four basic operating modes. In the INTEGRAL mode, all input pulse amplitudes above the lower level produce an SCA output logic pulse. This mode is useful for counting all pulses above the noise level, or above a well-defined lower amplitude limit. The INTEGRAL mode can also be used for leading edge timing, or pulse routing logic. In the NORMAL mode, the upper- and lower-level discriminators are independently variable over the full +20 mV to +10 V range. The SCA output is generated only for pulse amplitudes that occur between the upper and lower levels. This mode is useful when a wide range of pulse heights must be selected for counting. In the ASYMMETRIC WINDOW mode, the upper-level dial becomes a window width control with a 0 to +1 V range. The lower-level dial controls the lower limit of the window over a +20 mV to +10 V range. Pulse amplitudes between the upper and lower limits of the window produce an SCA output. This mode is useful when a narrow range of pulse heights must be selected. In the SYMMETRIC WINDOW mode, the upper-level dial still controls the window width over the range of 0 to +1 V, but the lower-level dial sets the position of the center of the window over a range of +20 mV to +10 V. The SYMMETRIC WINDOW mode is useful when the window has been centered on a peak in the spectrum and it is desirable to widen (or narrow) the window to accept more (or less) of the peak width.

Rear-panel connectors provide separate outputs for the upper- and lower-level discriminators. These logic outputs are generated at the instant the input signal exceeds the corresponding discriminator level. The SCA output logic pulse is generated when the input signal falls through the lower-level threshold.

An external input for the lower-level setting is switch selectable to allow recording the entire pulse-height spectrum utilizing a scanning technique. A narrow window is selected, and an external voltage source is employed to slowly scan the lower level through the 0 to 10 V range. A ratemeter counts the SCA output and draws the spectrum on a strip chart recorder.

550A
Single-Channel Analyzer

Specifications

PERFORMANCE

DYNAMIC RANGE 500:1.

PULSE-PAIR RESOLVING TIME 100 ns plus output pulse width.

THRESHOLD TEMPERATURE SENSITIVITY <0.01% of full scale per °C, from 0 to 50°C, using a NIM Class A power supply (referenced to –12 V).

WINDOW WIDTH CONSTANCY Variation <±0.1% of full-scale window width over the +20 mV to +10 V linear input range.

DISCRIMINATOR NONLINEARITY <±0.25% of full scale for both discriminators.

INDICATORS

SCA OUT LED Front-panel LED flashes whenever an SCA output pulse is generated.

CONTROLS

WINDOW OR UPPER LEVEL Front-panel, 10-turn, locking dial determines the window width (0 to 1 V) in the WINDOW modes, or the upper-level threshold (0 to +10 V) in the NORMAL and INTEGRAL modes.

LOWER LEVEL Front-panel, 10-turn, locking dial determines the threshold setting (+20 mV to +10 V) for the lower-level discriminator when the rear-panel LL REF switch is in the INT position. The LOWER-LEVEL control is disabled when the EXT position is selected on the rear-panel LL REF switch.

INT, ASYM WINDOW, SYM WINDOW, NORM Front-panel, four-position rotary switch selects one of four operating modes:
INT In the INTEGRAL mode, the lower level and upper level are independently adjustable from +20 mV to +10 V. The SCA OUT is generated for all pulse amplitudes exceeding the lower-level threshold.
NORM In the NORMAL mode, the lower level and upper level are independently adjustable from +20 mV to +10 V. The SCA OUT is generated for pulse amplitudes that exceed the lower-level threshold, but do not exceed the upper-level threshold.

ASYM WINDOW In the ASYMMETRIC WINDOW mode, the **lower limit** of the window is adjustable from +20 mV to +10 V using the LOWER LEVEL dial. The WINDOW dial adjusts the width of the window from 0 to 1 V. The SCA OUT is generated for pulse amplitudes between the upper and lower limits of the window.
SYM WINDOW In the SYMMETRIC WINDOW mode, the **center** of the window is adjustable from +20 mV to +10 V using the LOWER LEVEL dial. The WINDOW dial adjusts the width of the window from 0 to 1 V. The SCA OUT is generated for pulse amplitudes between the upper and lower limits of the window.

INT/EXT LL REF A rear-panel locking toggle switch selects either the front-panel LOWER LEVEL dial (INT position), or the rear-panel LL REF input (EXT position) for controlling the lower-level threshold.

INPUTS

INPUT Front-panel BNC connector accepts unipolar or bipolar linear signals for pulse amplitude selection in the range of +20 mV to +10 V (dc-coupled). The minimum input pulse width is 100 ns. The maximum amplitude of signal plus dc offset is ±12 V. Input impedance is approximately 1000 Ω. Front-panel test point wired to the INPUT connector through a 470-Ω resistor.

IN Rear-panel BNC connector identical to INPUT connector.

LL REF Rear-panel BNC connector accepts a dc voltage from an external source for controlling the lower-level threshold when the INT/EXT LL REF switch is in the EXT position. The input range of –20 mV to –10 V corresponds to a lower-level threshold range of +20 mV to +10 V. The input is overload protected to ±15 V.

OUTPUTS

SCA OUT Front- and rear-panel BNC connectors provide a NIM-standard, positive logic pulse output: nominally +5 V amplitude and 500-ns width. Output impedance <15 Ω. Front- and rear-panel outputs have separate output drivers. The output pulse occurs when the trailing edge of the linear input pulse crosses the lower-level threshold. See description under CONTROLS for output logic modes. Front-panel test point wired to the SCA OUT connector through a 470-Ω resistor.

LL OUT Rear-panel BNC connector provides a NIM-standard, positive logic pulse output: nominally +5 V amplitude and 500-ns width. Output impedance <15 Ω. The output pulse occurs when the leading edge of the linear input pulse crosses the lower-level threshold (INT or NORMAL modes), or the lower limit of the window (WINDOW modes).

UL OUT Rear-panel BNC connector provides a NIM-standard, positive logic pulse output: nominally +5 V amplitude and 500-ns width. Output impedance <15 Ω. The output pulse occurs when the leading-edge of the linear input pulse crosses the upper-level threshold (INT or NORMAL modes), or the upper limit of the window (WINDOW modes).

ELECTRICAL AND MECHANICAL

POWER REQUIRED +12 V at 75 mA, –12 V at 35 mA.

WEIGHT
Net 0.9 kg (2.0 lb)
Shipping 2.3 kg (5.0 lb)

DIMENSIONS NIM-standard single-width module 3.43 X 22.13 cm (1.35 X 4.714 in.) front panel per DOE/ER-0457T.

Ordering Information

To order, specify:

Model	Description
550A	Single-Channel Analyzer

Specifications subject to change
011008

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572A Amplifier

Specifications

PERFORMANCE

Gain Range Continuously adjustable from 1 to 1500.

Pulse Shape Semi-Gaussian on all ranges with peaking time equal to 2.2τ and pulse width at 0.1% level equal to 2.9 times the peaking time.

Integral Nonlinearity For 2-μs shaping time, <±0.05%.

Noise Typically <5 μV for unipolar output referred to the input, using 2-μs shaping and Coarse Gain ³100.

Temperature Instability
Gain £±0.0075%/°C, 0 to 50°C.
DC Level £±50 μV/°C, 0 to 50°C.

Bipolar Crossover Walk £±3 ns at 0.5 μs for 50:1 dynamic range, including contribution of an ORTEC Model 552 Single-Channel Analyzer.

Overload Recovery Recovers to within 2% of rated output from X300 overload in 2.5 nonoverloaded pulse widths using maximum gain for Unipolar Output. Same recovery from X1000 overload for bipolar.

Spectrum Broadening Typically <16% FWHM for a ^{60}Co 1.33 MeV gamma line at 85% of full scale for an incoming count rate of 1 to 100,000 counts/s (Unipolar Output, 2-μs shaping).

Spectrum Shift Peak position shifts typically <0.024% for a ^{60}Co 1.33-MeV gamma line at 85% of full scale measured from 1 to 100,000 counts/s (Unipolar Output, 2-μs shaping).

ELECTRICAL AND MECHANICAL

Power Required +12 V, 85 mA; -12 V, 50 mA; +24 V, 100 mA; -24 V, 105 mA.

Weight
Net 1.5 kg (3.3 lb.)
Shipping 3.1 kg (7.0 lb.)

Dimensions Standard single-width NIM module 3.43 x 22.13 cm (1.35 x 8.714 in.) per DOE/ER-0457T.

CONTROLS

FINE GAIN 10-turn precision potentiometer with graduated dial for continuously variable direct-reading gain factor of X0.5 to X1.5.

COARSE GAIN 6-position switch selects feedback resistors for gain factors of 20, 50, 100, 200, 500, and 1k. Jumper on the printed wiring board (PWB) selects X0.1 attenuation.

INPUT Locking toggle switch selects either Pos or Neg input pulse

polarity.

SHAPING TIME 6-position switch selects time constants for active pulse-shaping filter network from 0.5, 1, 2, 3, 6, and 10 µs.

PZ ADJ Screwdriver adjustable potentiometer to set the pole-zero cancellation to compensate input decay times from 40 µs to infinity.

BLR 3-position locking toggle switch selects the source of control for the gated baseline restorer discriminator threshold from:
Auto The BLR threshold is automatically set to an optimum level, as a function of the signal noise, by an internal circuit.
PZ Adj The BLR threshold is determined by the threshold potentiometer. The BLR time constant is also greatly increased to facilitate pz adjustment; this position may give the lowest noise for count rates under 5000 counts/s and/or longer shaping times.
Threshold The BLR threshold is manually set by the threshold potentiometer.

DC Screwdriver adjustable potentiometer to set the Unipolar Output dc level; range ±100 mV

INPUTS

BNC front- and rear-panel connectors accept either positive or negative pulses with rise times of 10 to 650 ns and decay times of 40 µs to infinity, $Z_{in} \cong 1000\ \Omega$ dc-coupled; linear maximum 10 V; absolute maximum 20 V.

OUTPUTS

UNI Front-panel BNC connector with $Z_o < 1\ \Omega$ and rear-panel connector with $Z_o = 93\ \Omega$, short-circuit proof; with full-scale linear range of 0 to +10 V; active filter shaped; dc-restored; dc-level adjustable to ±100 mV.

BI Front-panel BNC connector with $Z_o < 1\ \Omega$ and rear-panel connector with $Z_o = 93\ \Omega$, short circuit proof; prompt output with positive lobe leading and linear range of ±10 V; active filter shaped.

CRM Rear-panel BNC connector with $Z_o < 10\ \Omega$ provides a nominally +5 V, 300 ns logic pulse every time the input signal exceeds the baseline restorer discriminator threshold.

INH Rear-panel BNC connector with $Z_o < 10\ \Omega$ provides a nominally +5 V logic pulse (width equal to 6X shaping time) when the internal pile-up rejection logic detects a distortion of the input signal due to pile-up.

BUSY Rear-panel BNC connector with $Z_o < 10\ \Omega$ provides a +5 V logic pulse for the duration that the input pulse exceeds the baseline restorer discriminator.

PREAMP POWER Rear-panel standard ORTEC power connector. Amphenol 17-10090, mates with captive and noncaptive power cords on all ORTEC preamplifiers.

Preamplifier Power Rear-panel standard ORTEC power connector, Amphenol 17-10090.

ORDERING INFORMATION

Model	Description
572A	Amplifier

Download PDF

Order Online

575A Amplifier

Specifications

PERFORMANCE

Gain Range Continuously adjustable from 5 to 1250.

Pulse Shape Semi-Gaussian on all ranges with peaking time equal to 2.2τ, 50% pulse width equal to 3.3τ, and pulse width at 0.1% level equal to 4.0 times the peaking time. Bipolar crossover = 1.5 τ

Integral Nonlinearity For 1.5-µs shaping time, <±0.05%.

Noise <5 µV rms referred to the input using 3-µs unipolar shaping; <7 µV using 1.5-µs shaping; both for a gain ³100.

Temperature Instability
Gain £±0.0075%/°C, 0 to 50°C.
DC Level £±30 µV/°C, 0 to 50°C.

Bipolar Crossover Walk £±5 ns at 0.5 µs for 50:1 dynamic range, including contribution of an ORTEC Model 552 Single-Channel Analyzer.

Overload Recovery Recovers to within 2% of rated output from X300 overload in 2.5 nonoverloaded pulse widths using maximum gain for unipolar output. Same recovery from X500 overload for bipolar.

Restorer Gated active baseline stabilizer with automatic threshold circuit to provide the threshold level as a function of signal noise to the baseline restorer discriminator.

Spectrum Broadening Typically <10% FWHM for a ^{60}Co 1.33-MeV gamma line at 85% of full scale for an incoming count rate of 1,000 to 50,000 counts/s (Unipolar output, 1.5-µs shaping).

Spectrum Shift* Peak position shifts typically <0.02% for a ^{60}Co 1.33-MeV gamma line at 85% of full scale measured from 1,000 to 50,000 counts/s (Unipolar output, 1.5-µs shaping).
***These count-rate specifications were measured with a 10% HPGe detector. Detectors with a large number of slow rise-time signals will most likely give poorer results.

ELECTRICAL AND MECHANICAL

Power Required +12 V, 55 mA; -24 V, 40 mA; +12 V, 70 mA; -12 V, 75 mA.

Weight
Net 1.5 kg (3.3 lb.)
Shipping 3.1 kg (7.0 lb.)

Dimensions Standard single-width NIM module 3.43 x 22.13 cm (1.35 x 8.714 in.) per DOE/ER-0457T.

CONTROLS

FINE GAIN 10-turn precision potentiometer with graduated dial for

continuously variable direct-reading gain factor of X2.5 to X12.5.

COARSE GAIN 6-position switch selects feedback resistors for gain factors of 2, 4, 10, 20, 40, and 100.

SHAPING TIME 3-position printed wiring board (PWB) jumpers, easily accessible through side panel, select time constants for active pulse-shaping filter network from 0.5, 1.5, and 3 µs.

POS/NEG Toggle switch selects either Pos or Neg input pulse polarity.

PZ ADJ Screwdriver adjustable potentiometer to set the pole-zero cancellation to compensate input decay times from 30 µs to infinity.

INPUTS

BNC front- and rear-panel connectors accept either positive or negative pulses with rise times of 10 to 650 ns and decay times of 30 µs to infinity, $Z_{in} \cong 1000\ \Omega$ dc-coupled; linear maximum 2 V; absolute maximum 20 V.

OUTPUTS

UNI Front-panel BNC connector with $Z_o < 1\ \Omega$ and rear-panel connector with $Z_o = 93\ \Omega$, short-circuit proof; full-scale linear range of 0 to +10 V; active filter shaped; dc-restored; dc-level adjustable to ±15 mV.

BI Front-panel BNC connector with $Z_o < 1\ \Omega$ and rear-panel connector with $Z_o = 93\ \Omega$, short circuit proof; positive lobe leading and full-scale linear range of 0 to +10 V; active filter shaped.

PREAMP POWER Rear-panel standard ORTEC power connector. Amphenol 17-10090, mates with captive and noncaptive power cords on all ORTEC preamplifiers

ORDERING INFORMATION

Model	Description
575A	Amplifier