

# Model 2058 Nanosecond Delay

---

9231712B

User's Manual



Copyright 2016, Mirion Technologies (Canberra), Inc .  
All rights reserved.

The material in this document, including all information, pictures, graphics and text, is the property of Mirion Technologies (Canberra), Inc. and is protected by U.S. copyright laws and international copyright conventions.

Mirion Technologies (Canberra) expressly grants the purchaser of this product the right to copy any material in this document for the purchaser's own use, including as part of a submission to regulatory or legal authorities pursuant to the purchaser's legitimate business needs.

No material in this document may be copied by any third party, or used for any commercial purpose or for any use other than that granted to the purchaser without the written permission of Mirion Technologies (Canberra), Inc.

Mirion Technologies (Canberra), Inc., 800 Research Parkway,  
Meriden, CT 06450  
Tel: 203-238-2351 FAX: 203-235-1347 <http://www.canberra.com/>.

The information in this document describes the product as accurately as possible, but is subject to change without notice.

Printed in the United States of America.

For technical assistance, call our Customer Service Hotline at 1-800-255-6370 or email [techsupport@canberra.com](mailto:techsupport@canberra.com).

# Table of Contents

---

<b>1. Introduction</b> .....	<b>1</b>
<b>2. Controls and Connectors</b> .....	<b>2</b>
Front and Rear Panels .....	2
<b>3. Operations</b> .....	<b>3</b>
<b>A. Specifications</b> .....	<b>5</b>
Inputs .....	5
Outputs .....	5
Controls .....	5
Performance .....	5
Connectors .....	5
Power .....	5
Physical .....	5
Environmental .....	6
<b>B. Installation Considerations</b> .....	<b>7</b>
<b>C. FCC Notice</b> .....	<b>8</b>

# Important Safety Considerations

## Read Carefully



Indicates warning of mains or high voltage present at output labeled HV.  
Risk of electrical shock if covers are removed.



Caution – risk of danger. Refer to documentation for detailed explanation of caution symbol wherever marked.



Earth symbol: indicates the connection point for the primary earth (ground) supply.



Product complies with appropriate current EU directives (Low Voltage & EMC).



Product complies with appropriate current FCC /UL /CSA 61010-1 directives (Low Voltage & EMC).

### Manufacturer's Address

Mirion Technologies (Canberra), Inc.  
800 Research Parkway  
Meriden, CT 06450 USA

# 1. Introduction

---

The Model 2058 Nanosecond Delay permits the delay of linear or logic signals up to 63.5 ns in 0.5 ns steps. Since the delays are accomplished by means of interconnected coaxial cables, no power is required for operation of the module.

Seven front panel toggle switches allow the selection of 0.5, 1, 2, 4, 8, 16 or 32 ns of delay time. These delays may be added in any combination. Delay times greater than 63.5 ns may be obtained by cascading several Nanosecond Delay units.

The Model 2058 is useful in aligning fast timing channels which operate coincidence circuits or time to amplitude converters. The high degree of accuracy in delay time selection is an aid to the calibration of such equipment.

## 2. Controls and Connectors

---

### Front and Rear Panels

This is a brief description of the 2058's front and rear panel connectors. For more detailed information, refer to Appendix A, *Specifications*



Figure 1 Front Panel Controls and Connectors

# 3. Operations

---

Though the 2058 draws no power, it is normally mounted in a NIM Bin for convenience.

To delay a signal, connect the input signal cable to one of the front panel BNC connectors and the output signal cable to the other BNC.

The input signal will be delayed by the built-in 2 ns minimum delay plus the sum of the switches which have been moved to the DELAY IN position. For example, to delay the input signal by 22 ns, move the 16 nSEC and 4 nSEC switches to DELAY IN ( $16+4+2=22$  ns).

# Notes



# A. Specifications

---

## Inputs

INPUT– Accepts positive or negative Slow/Fast NIM logic or linear pulses,  $\pm 600$  volts maximum;  $Z_{in} = 50 \Omega$ ; isolated front panel BNC connector.

## Outputs

OUTPUT– Provides delayed pulse, amount of delay being equal to sum of DELAY IN switches;  $Z_{out} = 50 \Omega$ ; isolated front panel BNC connector.

## Controls

DELAY IN/OUT– Seven front panel toggle switches to select delay of 0.5, 1, 2, 4, 8, 16 or 32 ns; may be added in any combination up to 63.5 ns beyond minimum delay of 2.0 ns.

## Performance

DELAY RANGE– 0.5 to 63.5 ns in 0.5 ns increments beyond minimum delay; switch selectable.

MINIMUM DELAY– 2.0 ns (all switches in OUT position).

DELAY ACCURACY– Typical  $\pm 20$  ps for each DELAY IN switch,  $\pm 100$  ps maximum.

## Connectors

All connectors are front panel BNC type.

## Power

No power required for operation.

## Physical

SIZE– Standard single-width NIM module 3.43 x 22.12 cm (1.35 x 8.71 in.) per DOE/ER-0457T.

NET WEIGHT– 0.8 kg (1.7 lb). SHIPPING WEIGHT– 1.8 kg (4.0 lb).

## **Environmental**

OPERATING TEMPERATURE – 0 to 50 °C (32 to 122 °F). OPERATING HUMIDITY – 0 to 80% relative, non-condensing.

Meets the environmental conditions specified by EN 61010, Installation Category I, Pollution Degree 2.

## B. Installation Considerations

---

This unit complies with all applicable requirements. Compliance testing was performed with application configurations commonly used for this device.

During design and assembly of the device, precautions were taken by the manufacturer to minimize the effects of RFI and EMC on the system. However, care should be taken to maintain full compliance. These considerations include:

- A rack or tabletop enclosure fully closed on all sides with rear door access.
- Single point external cable access.
- Blank panels to cover open front panel Bin area.
- Compliant grounding and safety precautions for any internal power distribution.
- The use of NRTL/CE compliant accessories such as fans, UPS, etc.

### **Preventive Maintenance**

This unit does not require any periodic cleaning maintenance.

Any maintenance should be performed by a qualified Mirion Technologies (Canberra) service representative.

### **Operating Protection Impairment**

Mirion Technologies (Canberra) is not liable for any operational malfunctions or personal injuries due to mishandling or unauthorized repair and maintenance not detailed in this manual.

### **Cleaning/Decontamination**



When needed, the unit may be cleaned. Remove power from the unit before cleaning. Use only a soft cloth dampened with warm water and do not allow water to enter the unit. Make sure unit is fully dry before restoring power. Because of the ventilation holes in the NIM wrap, do not use any liquids to clean the wrap, side, or rear panels.

## C. FCC Notice

---

The following paragraphs are notices required by Federal Communications Commission (FCC) rules, Part 15, Subpart A.

“The user is cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.”

This equipment has been tested and found to comply with the limits for a class A digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

# Request for Circuit Information

The Schematics and Block Diagrams may be available for this unit directly from Mirion Technologies (Canberra). Request can be made by calling, faxing, or emailing:

Training and Technical Services Department  
Mirion Technologies (Canberra), Inc.  
800 Research Parkway, Meriden, CT 06450  
Telephone: (800) 255-6370 FAX: (203) 639-2067  
Email: [techsupport@canberra.com](mailto:techsupport@canberra.com)

If you would like schematics, if available, for this unit, please provide us with the following information.

Your Name \_\_\_\_\_

Your Address \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Unit's model number \_\_\_\_\_

Unit's serial number \_\_\_\_\_

Note: Schematics and block diagrams are provided for information only; if you service or repair or try to service or repair this unit without Mirion Technologies (Canberra)'s written permission you may void your warranty.

# Notes

## Warranty

Mirion Technologies (Canberra) Inc. (we, us, our) warrants to the customer (you, your) that for a period of ninety (90) days from the date of shipment, software provided by us in connection with equipment manufactured by us shall operate in accordance with applicable specifications when used with equipment manufactured by us and that the media on which the software is provided shall be free from defects. We also warrant that (A) equipment manufactured by us shall be free from defects in materials and workmanship for a period of one (1) year from the date of shipment of such equipment, and (B) services performed by us in connection with such equipment, such as site supervision and installation services relating to the equipment, shall be free from defects for a period of one (1) year from the date of performance of such services.

If defects in materials or workmanship are discovered within the applicable warranty period as set forth above, we shall, at our option and cost (A) in the case of defective software or equipment, either repair on a return to factory basis or replace the software or equipment, or (B) in the case of defective services, reperform such services.

### LIMITATIONS

EXCEPT AS SET FORTH HEREIN, NO OTHER WARRANTIES OR REMEDIES, WHETHER STATUTORY, WRITTEN, ORAL, EXPRESSED, IMPLIED (INCLUDING WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE) OR OTHERWISE, SHALL APPLY. IN NO EVENT SHALL WE HAVE ANY LIABILITY FOR ANY SPECIAL, EXEMPLARY, PUNITIVE, INDIRECT OR CONSEQUENTIAL LOSSES OR DAMAGES OF ANY NATURE WHATSOEVER, WHETHER AS A RESULT OF BREACH OF CONTRACT, TORT LIABILITY (INCLUDING NEGLIGENCE), STRICT LIABILITY OR OTHERWISE. REPAIR OR REPLACEMENT OF THE SOFTWARE OR EQUIPMENT DURING THE APPLICABLE WARRANTY PERIOD AT OUR COST, OR, IN THE CASE OF DEFECTIVE SERVICES, REPERFORMANCE AT OUR COST, IS YOUR SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY.

### EXCLUSIONS

Our warranty does not cover damage to equipment which has been altered or modified without our written permission or damage which has been caused by abuse, misuse, accident, neglect or unusual physical or electrical stress, as determined by our Service Personnel.

We are under no obligation to provide warranty service if adjustment or repair is required because of damage caused by other than ordinary use or if the equipment is serviced or repaired, or if an attempt is made to service or repair the equipment, by other than our Service Personnel without our prior approval.

Our warranty does not cover detector damage due to neutrons or heavy charged particles. Failure of beryllium, carbon composite, or polymer windows or of windowless detectors caused by physical or chemical damage from the environment is not covered by warranty.

We are not responsible for damage sustained in transit. You should examine shipments upon receipt for evidence of damage caused in transit. If damage is found, notify us and the carrier immediately. Keep all packages, materials and documents, including the freight bill, invoice and packing list.