ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Princeton Applied Research / EG&G 162* at our website: *Click HERE*

PRELIMINARY INSTRUCTION MANUAL

BOXCAR INTEGRATOR

Model 162

PLEASE READ IMPORTANT NOTICE ON THIS PAGE

Repair 30

NOTICE: THIS IS ONLY A PRELIMINARY MANUAL. A FINAL MANUAL NOW BEING PREPARED WILL CONTAIN ALL OF THE INFORMATION CONTAINED IN THIS PRELIMINARY MANUAL, IN ADDITION TO MUCH INFORMATION NOT YET AVAILABLE. EXPERIENCE SHOWS THAT IT IS FREQUENTLY DIFFICULT TO IDENTIFY THE END USER OF A PURCHASED INSTRUMENT, THUS MAKING IT DIFFICULT TO BE SURE THE END USER RECEIVES HIS FINAL MANUAL. CONSEQUENTLY, TO BE ABSOLUTELY SURE THAT YOU RECEIVE A COPY OF THE MODEL 162 FINAL MANUAL AS SOON AS IT IS READY, PLEASE FILL OUT AND RETURN IMMEDIATELY THE POSTAGE-FREE REPLY LETTER ON THE FOLLOWING PAGE. THANK YOU!

IF YOU WOULD LIKE TO RECEIVE APPLICATION NOTES OR INFORMATION ON ANY OF OUR OTHER PRODUCTS, OR IF WE CAN BE OF SERVICE IN ANY WAY, PLEASE SO INDICATE.

Copyright © Princeton Applied Research Corp. 1974
All rights reserved.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

WHEN YOUR EQUIPMENT REQUIRES SERVICE

A. Contact the factory (609-452-2111) or your local factory representative (see list at rear of manual) to discuss the problem. In many cases it will be possible to expedite servicing by localizing the problem to a particular plug-in circuit board.

B. If it is necessary to send any equipment back to the factory, we need the following information.

(1) Model # and serial #.

(2) Your name (instrument user).

(3) Your address.

(4) Address to which instrument should be returned.

(5) Your telephone number and extension.

(6) Symptoms (in detail, including control settings).

(7) Your purchase order number for repair charges (does not apply to repairs in warranty).

(8) Shipping instructions (if you wish to authorize shipment by any method other than normal surface transportation).

C. U.S. CUSTOMERS - Ship the equipment being returned to:

Princeton Applied Research Corporation
7 Roszel Road
(Off Alexander Road, East of Route 1)
Princeton, New Jersey

D. CUSTOMERS OUTSIDE OF U.S.A. - To avoid delay in customs clearance of equipment being returned, please contact the factory or the nearest factory distributor for complete shipping information. A list of factory distributors is provided at the rear of this manual.

E. Address correspondence to:

Princeton Applied Research Corp.
P. O. Box 2565
Princeton, New Jersey 08540

Phone: (609) 452-2111
TELEX: 84-3409

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

First Class
Permit No. 285
Princeton, New Jersey

BUSINESS REPLY CARD
No postage stamp necessary if mailed in the United States

Postage will be paid by

PRINCETON APPLIED RESEARCH CORPORATION

POST OFFICE BOX 2565

PRINCETON, NEW JERSEY 08540

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

PLEASE RETURN THIS REPLY LETTER

TO ASSURE RECEIPT OF TROUBLESHOOTING

INSTRUCTIONS AND OTHER HELPFUL LITERATURE.

I will be responsible for a PAR:

N-10347-31

Model # _____, Serial # _____

Name _____, Title _____

Company _____

Address _____

_____

_____

Telephone _____

I plan to use the unit in the following application area:

_____

_____

_____

_____

_____

Was unit received in good condition? ☐ Yes ☐ No

How can we be of additional assistance?

_____

THANK YOU FOR YOUR COOPERATION

FOLD INWARD ON DOTTED LINES. POSTAGE WILL BE PAID BY P.A.R.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

TABLE OF CONTENTS

Section			Page
I	CONDENSED OPERATING INSTRUCTIONS		I-1
II	CHARACTERISTICS		II-1
	2.1	INTRODUCTION	II-1
	2.2	DESCRIPTION	II-2
		2.2A INTRODUCTION	II-2
		2.2B BLOCK DIAGRAM DISCUSSION	II-2
	2.3	APPLICATIONS	II-5
		2.3A PICOSECOND DOMAIN FLUORESCENCE STUDIES	II-5
		2.3B FLUORESCENCE AND PHOSPHORESCENCE DECAY STUDIES	II-6
		2.3C PULSED ULTRASONICS	II-6
		2.3D PULSED RESONANCE EXPERIMENTS	II-6
		2.3E LASER DEVELOPMENT	II-6
		2.3F OPTICAL ABSORPTION STUDIES	II-7
		2.3G SAMPLING SCOPE	II-7
		2.3H OTHER APPLICATIONS	II-7
	2.4	SPECIFICATIONS	II-7
		2.4A MODEL 162 BOXCAR AVERAGER	II-7
		2.4B MODEL 163 SAMPLED INTEGRATOR	II-12
		2.4C MODEL 164 GATED INTEGRATOR	II-15
III	INITIAL CHECKS		III-1
	3.1	INTRODUCTION	III-1
	3.2	EQUIPMENT NEEDED	III-1
	3.3	PRELIMINARY STEPS	III-2
	3.4	PROCEDURE IF PROCESSOR MODULE IS MODEL 163	III-2
	3.5	PROCEDURE IF PROCESSOR MODULE IS MODEL 164	III-5
		3.5A CHECKS IN THE EXTERNAL TRIGGER MODE	III-5
		3.5B INTERNAL TRIGGER MODE CHECKS	III-7
		3.5C HOLD CHECKS	III-8
	3.6	DUAL-CHANNEL OPERATION	III-8
IV	OPERATING INSTRUCTIONS		IV-1
	4.1	INTRODUCTION	IV-1
	4.2	PRELIMINARY CONSIDERATIONS	IV-1
		4.2A INSTALLATION	IV-1
		4.2B POWER REQUIREMENTS	IV-1
		4.2C FUSING	IV-1
		4.2D GROUNDING	IV-1
		4.2E COOLING	IV-2
	4.3	CONTROLS, CONNECTORS, AND INDICATOR LAMPS	IV-2
		4.3A MAIN FRAME FRONT PANEL	IV-2
		4.3B MODEL 163 PROCESSOR MODULE	IV-5
		4.3C MODEL 164 PROCESSOR MODULE	IV-6
		4.3D REAR PANEL	IV-7
	4.4	DETAILED OPERATING CONSIDERATIONS	IV-11

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

TABLE OF CONTENTS (Continued)

Section			Page
	4.4A	INTRODUCTION	IV-11
	4.4B	SYNCHRONIZATION	IV-12
	4.4C	INPUT SIGNAL PROCESSING	IV-15
		MODEL 164	IV-15
		MODEL 163	IV-28
	4.4D	APERTURE DELAY RANGE	IV-33
	4.4E	APERTURE POSITION	IV-34
	4.4F	EXTERNAL SCAN	IV-37
	4.4G	REAR-PANEL SCAN FUNCTIONS	IV-38
	4.4H	SCAN TIME AND RESOLUTION	IV-38
	4.4I	SIGNAL PROCESSING	IV-40
		INTRODUCTION	IV-40
		STANDARD FUNCTIONS	IV-40
		OPTIONAL FUNCTIONS	IV-40
		OUTPUTS	IV-42
		SIGNAL-TO-NOISE AND MAIN-FRAME TIME TIME CONSTANT	IV-43
		DIGITAL STORAGE OPTION	IV-44
		DIGITAL STORAGE INSTALLATION	IV-48
		DIGITAL STORAGE ZERO AND GAIN ADJUSTMENTS	IV-50
	4.4J	READOUT AND RECORDING	IV-53

Figures

Number	Title	Page
II-1	SIMPLIFIED BLOCK DIAGRAM OF THE MODEL 162 WITH ONE M163 SAMPLED INTEGRATOR AND ONE M164 GATED INTEGRATOR INSTALLED	II-3
II-2	TIME RELATIONSHIPS BETWEEN APERTURE DELAY RANGE, TIME BASE RAMPS, SCAN RAMP, AND APERTURE POSITION	II-4
IV-1	MAIN FRAME FRONT PANEL	IV-2
IV-2	MODEL 163 PROCESSOR MODULE	IV-6
IV-3	MODEL 164 PROCESSOR MODULE	IV-7
IV-4	BASIC MODEL 162 TIMING RELATIONSHIPS	IV-12
IV-5	TRIGGERING AS A FUNCTION OF SLOPE AND TRIGGER LEVEL	IV-13
IV-6	INTERNAL COUPLING CONNECTIONS AS A FUNCTION OF SELECTED INPUT IMPEDANCE IN AC COUPLED OPERATION	IV-17
IV-7	OUTPUT RESPONSE AS A FUNCTION OF ANALYSIS TIME FOR BOTH EXPONENTIAL AND SUMMATION AVERAGING	IV-20
IV-8	TIME CONSTANT SWITCH TERMINALS TO BE USED FOR INSTALLATION OF "SPECIAL" TIME CONSTANT CAPACITOR	IV-22
IV-9	RELATIVE DISTORTION OF PROCESSED PULSE AS A FUNCTION OF APERTURE DURATION	IV-24

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

TABLE OF CONTENTS (Continued)

Number	Title	Page
IV-10	EFFECT OF SAMPLING ON INSSTRUMENT RESPONSE	IV-26
IV-11	BASIC TIMING RELATIONSHIP IN MODEL 163	IV-31
IV-12	EXAMPLE OF DISTORTION CAUSED BY BASELINE DRIFT AND ITS ELIMINATION THROUGH USE OF BASELINE SAMPLING	IV-32
IV-13	SPECIAL RANGE TERMINALS OF APERTURE DELAY RANGE SWITCH	IV-33
IV-14	INCREASE IN APERTURE DELAY WITH SCAN RAMP	IV-36
IV-15	MODEL 162 EQUIPPED WITH LOG-RATIO OPTION	IV-41
IV-16	DIGITAL STORAGE OPTION TIMING	IV-47
IV-17	MODEL 162 UPPER CIRCUIT BOARD SHOWING DIGITAL STORAGE OPTION MOUNTING HOLES	IV-49
IV-18	DIGITAL STORAGE ZERO AND GAIN ADJUSTMENTS	IV-52

Tables

Number	Title	Page
II-1	SAMPLING HEAD PARAMETERS	II-13
IV-1	P101 INTERFACE (REAR PANEL)	IV-8 & IV-9
IV-2	DIGITAL OUTPUT CONNECTOR (REAR PANEL)	IV-9 & IV-10
IV-3	M163 PROCESSOR MODULE INTERFACE (REAR PANEL)	IV-10 & IV-11

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

SECTION I
CONDENSED OPERATING INSTRUCTIONS

The Condensed Operating Instructions on the next page are provided as an assistance in placing the Model 162 Boxcar Integrator into operation as quickly as possible, or as a handy 'refresher' if the unit has not been operated in some time. Generally speaking, these condensed instructions will allow good results to be obtained in most instances. However, because of the brevity of these instructions, many considerations having importance in particular applications have been foregone. In particular, operation of the options is not discussed. For this reason, it is advisable to read Section IV, the complete Operating Instructions, to be assured of achieving optimum performance.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP