B&W TEK INC.
Your Photonics Partner

Sol 1.7 & 2.2

BTC261E / BTC262E
TE Cooled Linear InGaAs Array Spectrometer
User Manual

19 Shea Way, Newark, DE 19713, USA ·Web: www.bwtek.com
Tel: (302) 368-7824 · Fax: (302) 368-7830 · E-mail: info@bwtek.com

Doc#-Rev: 290020041-C-01

Sol 1.7 & 2.2

Introduction

The Sol spectrometer series delivers high performance at a low cost. Featuring a standard USB 2.0 interface with easy plug-and-play setup and an optional RS232 interface.

Sol InGaAs Array Spectrometer

The Sol can be equipped with 256, 512 or 1024 element thermoelectric (TE) cooled and a temperature regulated linear InGaAs array. Standard models consist of the BTC261E-512, and the BTC262-256. All other elements are optional upgrades. They will deliver highly optimized throughput spectrographs, fiber coupled input capability, and a built-in 16 bit digitizer.

The Sol spectrometer is ideal for NIR applications because it can function in either high dynamic range or high sensitivity modes. The Sol exhibits low dark counts and precise temperature regulations which makes the data stable over long term operation. As with most of our products, we can provide custom configurations and custom application support.

	Sol 1.7	**Sol 2.2**
Power Input	100-240 VAC 50/60 Hz	100-240 VAC, 50/60 Hz
Detector Type	Linear InGaAs Array Detector	Extended wavelength InGaAs linear array
Detector Pixel Format	256 / 512 /1024 x 1 elements @ 14µm x 200µm per element	256 / 512 / 1024 @ 25mm x 500mm
Spectrograph F#	3.5	3.5
Optical Design	Crossed Czerny-Turner	Crossed Czerny-Turner
Dynamic Range	High Dynamic Mode: 5,000:1; High Sensitivity Mode 2,400:1	High dynamic range mode 13,000:1, High sensitivity mode 6,250:1
Digitizer Resolution	16-bit or 65,535:1	16-bit or 65,535 to 1
Readout Speed	1 MHz	1 MHz
Data Transfer Speed	> 180 spectra per second via USB 2.0	3ms per spectrum in fast acquisition mode
Integration Time	1ms - 65,535ms	10µs to > 30ms
External Trigger	Aux Port	Aux Port
Operating Temperature	0°C - 35°C	0°C - 35°C
TE Cooling	Single-Stage: 5°C to -5°C, Two-Stage -10°C	1-Stage 0°C; 2-Stage -5°C
Relative Humidity		
Weight	Spectrometer: ~1.4kg (~3.1lbs)	Spectrometer: 1.4kg,
	Power Supply: ~0.9kg (~2.0lbs)	Power Supply: 0.9kg
Dimension	Spectrometer: 180.34 x 109.22 x 73.66mm	Spectrometer unit: 192mm x 109mm x 68mm
	Power Supply: 189.4 x 169.5 x 759.96mm	Power supply unit: 189.4 x 169.5 x 759.96mm
Computer Interface	USB 2.0	USB 2.0; RS-232C option
Operating Systems	Windows XP, Vista	Windows XP, Vista

Installation

Check Contents

Before installation please check your order's contents for these items: Sol spectrometer unit, external power supply unit, Power Supply-to-Spectrometer connection cable, AC power cord, USB cable, BWSpec software CD, a Final Configuration Report and this Sol user manual.

Sol Spectrometer, Power Supply and Cables

Sol 1.7 & 2.2

Operating Software Installation

1. Insert the BWSpec CD into the CD-ROM. Locate and double click the setup file and follow the onscreen instructions

BWSpec Installation CD

Spectrometer Installation

1. On the Software CD, follow the instructions in the *Software & Spectrometer Installation Guide* for installing the drivers for your spectrometer.

2. Connect the 15 pin to 15 pin cable between the spectrometer and the power supply and make sure all connectors are securely fastened. Connect the AC cord to the power supply. You may turn on the power for the power supply now. The power indicator should be lit.

Power Cable Connections

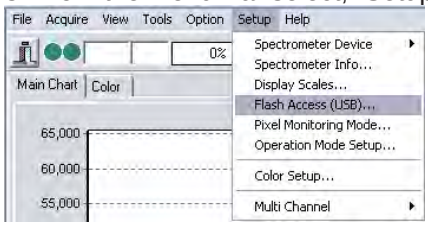
3. Connect USB cable between the spectrometer and the PC. Refer to the *Software & Spectrometer Installation Guide* for installing the necessary drivers.

Software Quick Start Guide

1. Launch BWSpec from your Windows Desktop

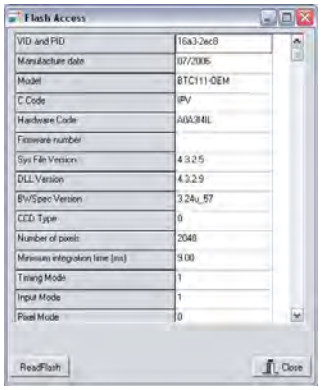
2. A dialog box will appear asking you to import the unit's parameter file contained on the supplied disk. Click "Cancel"

3. From the Menu Bar select, "Setup" --> "Flash Access (USB)..."



Connection AC Cord

4. Click the "Read Flash" button in the Flash Access window.



USB Cable Connection

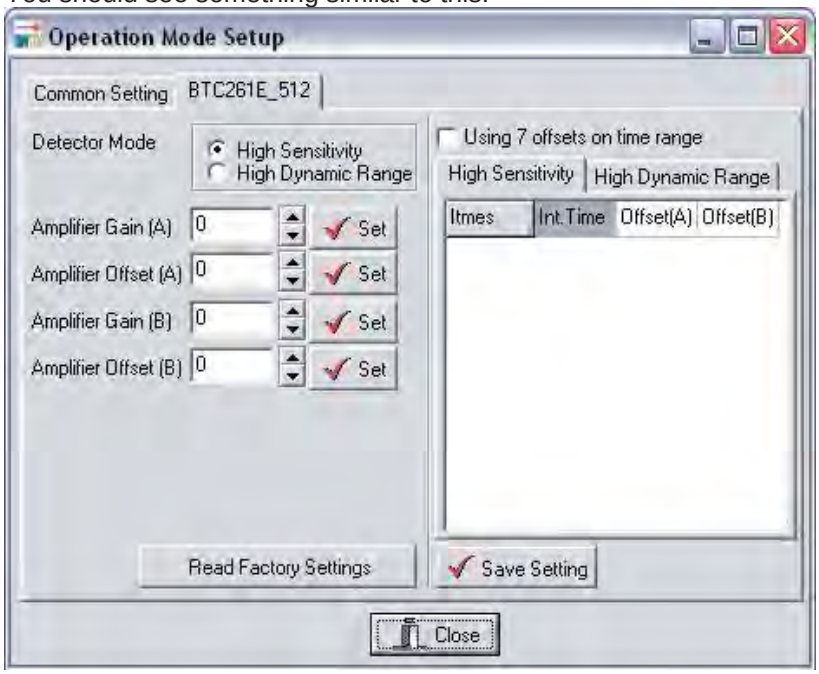
5. Once the "Flash" has been read into BWSpec it will say "Update is Completed". You are now ready to use the spectrometer with BWSpec.

Detector Modes

The Sol Detector has two mode settings, High Dynamic and High Sensitivity.
You can change these modes in the software.

1. From the Menu Bar select: “Setup” --> “Operation Mode Setup...”
This will open an “Operation Mode Setup” window

2. Next to the “Common” tab you should see the model of the spectrometer you have.
Click this tab to activate it.
You should see something similar to this:



For BTC26xE-256 models there will be no Gain (B) or Offset (B) option available.

3. The Gain and Offset values will have come preset by B&WTek, Inc. To change modes select either High Sensitivity or High Dynamic Range. The values for (A) and (B) should change. *(NOTE - in some case these values are the same for High Sensitivity or High Dynamic Range. It’s not the numbers that change the mode setting, it’s the Detector Mode selection.)*

4. Click the “Set” button next to each Number and then click the “Close” button.

5. When you run your spectrometer you should see a significant difference in sensitivity when acquiring data in each of the modes.

6. If you do happen to change the Gain and Offset values you can click the “Read Factory Settings” button to restore them back to their defaults. Then click the “Set” button next to each number.

TERMS AND CONDITIONS

Prices and Quotations

All quotations written or verbal are valid for 30 days from the date of quotation unless stated otherwise. Prices are based on your requested specifications and quantities, and are subject to change if any changes are made from the original request. Unless otherwise specifi cally stated, all prices are quoted in U.S. Dollars and are based on delivery of the Diodes EXWORKS (INCOTERMS 1990) B&W TEK'S place of business in Newark, Delaware. Prices do not include applicable Federal, State or local excise, sales, use or other taxes. Special items will be individually priced per provided specifications. All published prices are subject to change without notice. An extra 20% handling fee on each item is applied to international orders.

Purchase Orders and Payment Methods

Purchase orders are accepted by mail, e-mail or fax. Verbal orders are generally not encouraged. Hard copies of the purchase orders are required. To minimize errors, please reference the B&W TEK quotation numbers. Provide the item model number, item description, purchase order number, ship-to address, bill-to address and shipping method desired. Open accounts of net 30 are granted upon approval of credit limit. Contact B&W TEK for further information. Orders placed with MasterCard or VISA card may be accepted. Please provide the type of card, account number, name, and expiration date that appears on the card. Orders may be shipped via UPS or Federal Express on a COD basis. Cash, money order or a bank or company check is required at the time of delivery. Prepayment by money order, wire transfers, bank check, company check or personal check may be accepted. In case a letter of credit (L/C) is required. The customer will be responsible for the charges incurred by the L/C.

Overdue Payments

It is the purchaser's responsibility for making the payments according to the terms agreed at the time of purchase. Penalty and interest resulted from the overdue payments will be charged to the purchaser. CUSTOMER shall pay B&W TEK interest on the overdue amount at the rate of one percent (1%) per month (12.68%) compounded annually), or the maximum rate allowed by law, whichever is less, for each month, or part month, calculated from the date of invoice. Outstanding balances aging over 15 days may be turned to collection agent and/or for further actions. All incurred cost will be the sole responsibilities of the purchasing party.

Delivery and Shipping

Rush orders placed by phone (for items in stock at time of order) will be shipped within 2 working days. Most other standard items can be shipped within 4 weeks. Delivery times for special orders will be established per quotation. Airborne express is our default-shipping carrier although FedEx, UPS and airfreight are available. If not specified clearly on the purchase order at the time of ordering Airborne express will be used by B&W TEK at the time of shipping. Upon requested the tracking numbers may be provided.

Returns and Cancellation Fee

Returns for reasons other than quality issues may be subject to restocking charges determined by B&W Tek. A Return Material Authorization number (RMA) is required for any returned goods. Original purchase order number, date of shipment and serial number must be provided before the RMA can be issued. All the returns should be shipped with the original packaging materials with the assigned RMA number(s) clearly marked. The restocking fee will be determined after the items are inspected at B&W TEK. No product(s) will be accepted for restocking after 45 days. A cost estimate will be provided by B&W TEK for out of warranty items. Custom designed items and products damaged by the customers may not be returned. Should it become necessary to cancel or modify orders prior to shipment, a restocking fee of 15 to 50% of the total order amount will be charged by B&W TEK for returns to stock. Custom designed products damaged by the customer may not be returned. Custom designed items and product are all those that are not standard.

INSPECTION AND ACCEPTANCE OF PRODUCTS

Within thirty (30) days of delivery of products, CUSTOMER may return to B&W TEK, any damaged or defective products. CUSTOMER shall return the damaged or defective product in its original packaging, and shall include with the returned products, the purchase order number, the approximate date on which the Diodes were delivered to CUSTOMER and any other information, including part numbers, as B&W TEK may reasonably require. B&W TEK shall, within ten (10) days of receipt of damaged or defective products report to customer the inspection result and return to CUSTOMER replacement products within thirty (30) days for each damaged or defective product which B&W TEK has, through its own inspection, determined to be damaged or defective, and shall provide CUSTOMER with a written report on those which it has determined are not damaged or defective. After expiration of 30 days, the product will be under normal warranty terms. The returned products will be, at B&W TEK's option, repaired, replaced or credited.

International Customers

Please make payment in United States dollars to be drawn on a United States Bank. Certain items may be subject to export control and require a validated export license.

Warranty Terms and Conditions

B&W TEK's end user products, OEM modules, and components are warranted to be free from defects in materials and workmanship for a period of 12 months, 6 months, and 90 days, respectively, from the date of initial shipment. B&W TEK'S liability under this warranty is limited to replacing any defective Diodes at its expense. B&W TEK shall warrant the replacement products for the remainder of the original warranty period. This warranty will not apply to those products which have been:
(i) repaired or altered other than in accordance with the terms of this Agreement

(ii) abused, misused, improper handling in use, or storage, or used in an unauthorized or improper manner or without following written procedures supplied by B&W TEK
(iii) original identification markings or labels have been removed, defaced or altered
(iv) any other claims not arising directly from material defects in material or workmanship

Special contracts or contracts for nonstandard products may have modified terms of warranty and, in such cases, the terms as stated in the individual contract must be signed by the duly authorized officer of B&W TEK and will supersede the standard terms. B&W TEK will make final determination as to cause or existence of defect and, at its option repair or replace the products, which prove to be defective during the warranty period. Products replaced under warranty will be warranted only for the balance of the warranty period from the original supplied equipment. This warranty extends only to the original purchaser of the equipment from B&W TEK. The purchaser must notify B&W TEK within 15 days of first noticing the defect and promptly return the defective product upon receipt of RMA number(s) before expiration of the warranty period. Products believed by purchaser to be defective shall be returned to B&W TEK transportation and insurance prepaid by purchaser. Repaired or replaced products will be returned to purchaser by B&W TEK, FOB city destination within the Continental United States, Transportation beyond these limits will be charged to purchaser. The warranty set out in above paragraph is the exclusive warranty made by B&W TEK and is in lieu of all other warranties (except for specific product performance warranties), whether written, oral, or implied, including any warranty of merchantability or fitness for a particular purpose, and shall be CUSTOMER'S sole remedy and B&W TEK'S sole liability on contract or warranty of otherwise for the Products. This warranty shall not be modified or amended without the written approval of an officer of B&W TEK. IN NO EVENT SHALL B&W TEK BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM THE FAILURE TO PERFORM UNDER THIS AGREEMENT OR THE FURNISHING, PERFORMANCE OR USE OF ANY GOODS OR SERVICES SOLD PURSUANT HERETO, WHETHER DUE TO BREACH OF CONTRACT, BREACH OF WARRANTY, NEGLIGENCE OR OTHERWISE.

Warranty Return Procedure

Review terms of purchase and date of shipment to determine validity of warranty claim. Warranty claim should only be made for products within terms of warranty policy. To request an RMA (Return material authorization) number customers are encouraged to use or website: http://bwtek.com/rma.htm Numbers may also be requested VIA E-mail at Info@bwtek.com Be prepared to furnish:
1. Product Model number and serial number
2. Date of shipment/purchase
3. Brief description of the problems encountered
4. Name of contact person and phone number(s) at your organization for further communication

Obtain B&W TEK's instructions for transportation and packaging and ship the product (freight and insurance prepaid) with the proper documentation containing the RMA number and the information specifi ed above. B&W TEK will advise the purchaser of its determination of warranty at the earliest possible time. Providing complete information as requested will expedite the procedure.

U.S. EXPORT AND RE-EXPORT CONTROL REGULATIONS

CUSTOMER warrants that it shall not sell or otherwise transfer any products, or any technology contained in the products, to, or for the use of, any ultimate purchaser with which B&W TEK could not do business under the laws or regulations of the United States, including, without limitation, the regulations of the U.S. Departments of Commerce, Energy, State and Treasury. CUSTOMER shall also comply with all other laws and regulations of the United States relating to the sale or transfer of the Diodes or any technology contained in the products, including, without limitation, the laser safety guidelines defined by the Center for Devices and Radiological Health. CUSTOMER warrants that it will not sell, divert, transfer or disclose Diodes or any technology contained in the products to a country or countries embargoed by the United States or any prohibited entities unless authorized by the United States Government, and CUSTOMER acknowledges that willful violation of such regulations shall be considered just cause for the immediate and unqualified cancellation of this Terms & Conditions by B&W TEK without any liability of B&W TEK. CUSTOMER shall promptly provide B&W TEK with any information that may come to CUSTOMER'S attention concerning violations of such regulations by CUSTOMER'S customers.

Safety Warnings

The laser products described in this catalog emit visible or invisible radiation power. They are safe to operate only when the users follow all safety measures:

1. Post warnings in the area where the laser's beam passes to alert those present.
2. Keep all unauthorized personnel out of the area where the laser is operated.
3. Whenever the laser is running and the beam is not in use, it is a good practice to mechanically block the radiation path.
4. Never look directly into the laser beam path or scattered laser light from any reflective surfaces,
5. Never look directly into the laser source.
6. Maintain experimental setup at lower level to prevent inadvertent beam-eye contact.
7. As a precaution against accidental exposures to the laser beam or its reflection, operators should wear laser safety glasses with sufficient attenuation at the laser emission wavelength.

For further information regarding laser safety issues, contact the following organizations:

Center for Device and Radiological
Office of compliance
2098 Gaither Rd.
Rockville, MD 20850
Tel: 301 594 4654
Fax: 3013 594-4672

Health Laser Institute of America
12424 Research Parkway, Suite 125
Orlando, FL 32826
Tel: 407 380 1553
Fax: 407 380 5588