Introduction

Located in Durham, North Carolina, 4pi Analysis sells x-ray microanalysis systems, components, and software and digital imaging systems for electron microscopes. 4pi is dedicated to meeting the needs of its customer base by providing high-quality customer support and developing and marketing innovative high-performance products.

Through managed planning and a well-received product line, 4pi Analysis has grown consistently since its incorporation in 1990. The company's goals are simple and clear — to apply its resources to the challenge of developing unique and affordable products for research and industrial users.

Contacting 4pi Analysis

Mailing Address:
3500 Westgate Drive
Suite 403
Durham NC 27707
United States of America

Phone Contact:
919.489.1757 (tel)
919.489.1487 (fax)

Business Hours:
9-5 Eastern
Monday-Friday

E-mail Contact:
Sales and Information: sales
Technical Support: support

Web Access:
www.4pi.com
24 hours a day, 7 days a week

Warranty. 4pi Analysis warrants that its hardware, including all associated cables, are free of defects in material or workmanship, and will be replaced or repaired at no charge to the customer if any defects are found within the warranty period. Contact 4pi sales for detailed warranty terms. X-ray detectors sold by 4pi are warranted for a period of one (1) year. Computers sold by 4pi as part of a system are warranted by their respective manufacturers. No returns will be accepted without prior return authorization from 4pi Analysis. Consult with 4pi for out-of-warranty repair estimates.

Technical Support. 4pi Analysis provides telephone support for the life of our product. However, faster response can often be obtained by e-mailing our support group. We also maintain technical support web pages accessible 24 hours a day, 7 days a week (from our homepage, follow the "support" link). The tech support pages include schematic and connector information, a troubleshooting guide, and other relevant tips for using 4pi hardware and Revolution. The support pages are continually updated, so check the web site frequently for updates and new information. If you do not have web access, please contact 4pi by phone or e-mail and we will make the procedures and information available by other means.

Hardware Description. The 4pi hardware system provides SEM digital scan control and image acquisition, x-ray spectrum acquisition, combined x-ray spectral mapping, linescan capabilities, and WDS map acquisition. A standard full 4pi SEM/EDX system consists of the following hardware items (depending on the capability ordered, not all items may be included):

Computer →	*Dell (or equivalent) tower or laptop running Windows XP* ***[1,2,3,4]*** *or* *Apple G5 or Intel tower, mini or laptop, running OSX* ***[1,2,3,4]*** *Monitor and Cables* *Keyboard and Mouse* *Power Cord* *Accessories (if ordered)* *4pi Software CD-ROM* *Hasp* ***[5]***
Universal Spectral Engine →	*SEM Scan Control Outputs (X and Y)* ***[6]*** *SEM Image Acquisition (4-channel analog)* ***[6]*** *EDX X-ray Spectrum Acquisition (1-channel MCA)* ***[6]*** *EDX X-ray Mapping Acquisition* ***[6]*** *WDS x-ray Acquisition (4-channel TTL)* ***[6]*** *Single-Channel Analyzer Outputs (4-channel)* ***[6]*** *SEM Scan Control Gain/Offset/Buffering and Connectivity* ***[7]*** *SEM Image Acquisition Gain/Offset/Buffering and Connectivity* ***[7]*** *EDX x-ray MCA Gain/Offset/Buffering and Connectivity* ***[7]*** *WDS x-ray Passthru and Connectivity* ***[7]*** *Potentiometer trimmer tool* ***[7]*** *Power Cord*
Connection cabling →	*37-pin shielded cable (computer to SIU)* ***[7]*** *SEM cable (USE to microscope)* *EDX cable (USE to detector preamp)* *WDS cable (USE to crystal spectrometer)*
Manual →	*Up-to-date version accessible 24/7 via web browser* *Latest Internet version on CD* *Printed version on Request*

Notes:

1. **Computer Hardware Requirements**. 4pi systems sold before Mar 1 2005 required the installation of the Spectral Engine II (SEII) PCI card in the computer. Systems sold after Mar 1 2005 are based on the Universal Spectral Engine (USE) and do not require any hardware to be installed in the computer, other than an optional (but recommended) gigabit ethernet card. SEII systems require Macintosh (G3 or G4) or Windows (Pentium or Athlon) computers with at least one slot free for a (full-size) 12" PCI card, and at least 512MB of physical RAM. USE systems require only a ethernet connection and are generally compatible with all computers (see speed and system requirements below). Revolution's memory requirements are modest for simple x-ray spectrum acquisition, but jump exponentially when manipulating images or x-ray maps. Therefore, 4pi recommends at least 500MB to 1GB of RAM for smooth operation. Similarly, disk space is determined by archival needs. Revolution itself and an entire local copy of the manual (*sans* multimedia documentation) only take about 10MB of hard drive space, if that; however, digital images and/or x-ray maps can easily take hundreds of GB to store. 4pi recommends the use of large fast hard drives for image storage and CD-ROM or DVD capabilities for archiving.

2. **Computer Speed Requirements**. Processors below 1GHz will likely be sluggish. 4pi recommends processors well above 1GHz for best performance, or dual-core multi-GHz systems if 3rd party image programs like Adobe Photoshop are also used. Also see note [4].

3. **Operating System Requirements**. Although we provide complete support for our products, we do not in general support learning the Macintosh or Windows platforms, or help with computer troubleshooting. Please familiarize yourself with the operation of your computer before installing or using our product. We support the following operating systems:

    - MacOSX: 10.2.8 (Jaguar) and higher, including 10.3.x (Panther) and 10.4.x (Tiger).

    - Windows: NT4 (ServPk6a), 2000 (ServPk4), and XP (ServPk2).

    - Note: MacOS 8.6, 9.x, and Windows 98SE, are no longer supported because of significant multithreading demands that are part of Revolution 1.6.0 and above. However, they may still work, or work with reduced functionality, Please contact 4pi support if this is an issue for you. Also note that Windows NT4 does not support USB devices.

4. **USE-specific notes**. Since no PCI hardware is installed in a computer for the Universal Spectral Engine, Macintosh G5 (including iMac) and Intel-based Macs, and Macintosh or Windows laptops, are acceptable computers for running Revolution. Since laptops often use slower RAM and hard drives to lower heat dissipation, we recommend processor speeds well over 1 GHz. *In addition, we strongly recommend a gigabit ethernet connection*.

5. **Hasp**. Some older 4pi systems on Windows used a parallel hasp. All 4pi systems currently use a USB hasp, so one free USB port on the computer is required.

6. **SEII Obsolete**. On systems sold before Mar 1 2005, these functions were handled by the Spectral Engine II PCI card. The SEII has been replaced by the Universal Spectral Engine. TEM systems consist only of the CCD camera, optical and mounting components, and USB cable; no USE is required.

7. **SIU Obsolete**. On systems sold before Mar 1 2005, these functions were handled by the Scanning Interface Unit. The SIU has been replaced by the Universal Spectral Engine. TEM systems consist only of the CCD camera, optical and mounting components, and USB cable; no USE is required.

Release Notes. Please consult the latest Release Notes for important information not found in this manual, such as latest version numbers, electronic download information, update information, specifications, and any special or new operating information. The Release Notes can be found on your distribution disk; the latest version can be found on our web site.

Notes About Reading and Printing This Document. This Manual and Revolution User Guide are hyperlinked html (web browser) documents. As such, they are not referenced by page numbers. Hyperlinking allows one to find information quickly and reliably; however, it makes the presentation of a properly-indexed printed version difficult. 4pi is working to create PDF documents of the manual sections, suitable for printing. If a PDF version of a chapter or page is available, a download link will appear on the page. The use of colors on the web pages may slightly obscure the readability of PDF documents printed on monochrome printers. The screen shots in this manual are a mix of Macintosh and Windows; however, the look of the program is identical across operating systems, and there should be no confusion as a result.