



## UNIVERSAL DESTINATIONS & EXPERIENCES UK PROJECT

Former Kempston Hardwick Brickworks  
and adjoining land, Bedford

### Environmental Statement Volume 3

#### Appendix 7.1 - Technical Methodology: Photography, 3D Modelling, Accurate Visual Representations

#### Part 8/8

Report reference: 4.7.1.0

Revision number: 00

Date: June 2025



SP85  
GNSS RECEIVER

The Spectra Geospatial® SP85 is a next generation GNSS receiver that combines decades of GNSS RTK technology with revolutionary new GNSS processing. Featuring the new 600-channel “7G” chipset combined with the patented Z-Blade™ technology, the SP85 system is optimized for tracking and processing signals from all GNSS constellations in challenging environments. With unmatched connectivity in the GNSS receiver market, the SP85 offers a unique combination of integrated 3.5G cellular, WiFi and UHF communications with SMS, email and anti-theft technology. These powerful capabilities, packaged in an ultra-rugged housing and patented antenna design, make SP85 an extremely versatile turnkey solution that can be used with unlimited operation time because of the SP85’s hot-swappable, dual battery setup.



KEY FEATURES

- Patented Z-Blade™ technology
- 600-channel 7G ASIC
- Hot-swappable batteries
- Internal TxRx UHF radio
- L-band satellite capable GNSS antenna
- 3.5G cellular modem
- Built-in WiFi communication
- SMS and e-mail alerts
- Anti-theft technology
- Backup RTK
- RTK bridge
- eLevel technology
- Up to 20 Hz update rate

UNIQUE 7G GNSS-CENTRIC TECHNOLOGY

Patented Z-Blade processing technology running on a next generation Spectra Geospatial 600-channel 7G ASIC fully utilizes all 6 GNSS systems: GPS, GLONASS, BeiDou, Galileo, QZSS, IRNSS and SBAS, in addition to MSS corrections delivered via L-band. Unlike GPS-centric technology which requires a minimum number of GPS satellites for GNSS processing, Z-Blade™ unique GNSS-centric capability optimally combines GNSS signals without dependency on any specific GNSS system; this allows SP85 to operate in GPS-only, GLONASS-only, Galileo-only or BeiDou-only mode if needed. In addition, SP85 supports RTCM 3.2 Multiple Signal Messages (MSM), a standardized definition for broadcasting all GNSS signals from space, regardless of their constellation. This protects the surveyor’s investment well into the future by providing superior performance and improved productivity as new signals become available.

SMS AND EMAIL MESSAGING

SP85 has a unique combination of communication technologies including an integrated 3.5G GSM/UMTS modem, Bluetooth and WiFi connectivity, and optional internal UHF transmit radio, providing unmatched connectivity for the user. The cellular modem may be used for SMS (text message) and e-mail alerts as well as regular Internet or VRS connectivity. SMS (text messages) can be used to monitor and configure the receiver. Likewise, SP85 can use all available RTK correction sources and connect to the Internet from the field using WiFi hotspots, where available. The internal UHF transmit/receive radio allows for quick and easy setup as a local base station. This saves time and increases the surveyor’s efficiency, allowing for more productive workflows.

ANTI-THEFT PROTECTION

A unique anti-theft technology secures the SP85 receiver when installed as a field base station in remote or public areas and can detect if the receiver has been disturbed, moved, or stolen. This technology allows the surveyor to lock the device to a specific location and make it unusable if the device is moved elsewhere. In this case, the SP85 receiver will generate an audio alert and show an alert message on its display. Additionally, a SMS or e-mail will be sent to the surveyor’s mobile phone or computer and provides the receiver’s current coordinates to allow tracking of its position and follow for a quick recovery of the receiver. SP85’s anti-theft technology provides surveyors with remote security and peace of mind.

THE MOST POWERFUL TOOL FOR RELIABLE FIELD USE

The SP85’s rugged housing, created by Spectra Geospatial’s engineering design lab in France, incorporates a host of practical innovations. Dual hot-swappable batteries can be easily exchanged in the field as a one hand operation for an interruption-free working day, ensuring surveyors remain productive until the job is done. The impact-resistant fiberglass reinforced casing, designed to withstand 2 metre pole drops and waterproof to IP67, ensures that SP85 can handle the toughest outdoor conditions. The patented UHF antenna, set inside the rugged carbon fiber rod, extends the range of RTK radio performance at the same time as armoring protection. The sunlight-readable display offers instant access to key information like the number of satellites, RTK status, battery charge and available memory. With eLevel technology, the user is able to focus in one place when leveling and measuring as well as automatically store measurements when the receiver is level. These powerful design features combine to make SP85 the most capable, most reliable GNSS receiver, backed by a comprehensive standard 2 year warranty.



Patented  
inside-the-rod  
mounted UHF  
antenna design



THE SPECTRA GEOSPATIAL EXPERIENCE

With the most advanced and rugged field data collectors from Spectra Geospatial, surveyors get maximum productivity and reliability every day. Spectra Geospatial Survey Pro software is specifically tailored for the SP85 GNSS receiver providing easy-to-use, yet powerful GNSS workflows, letting the surveyor concentrate on getting the job done. Spectra Geospatial Survey Office Software provides a complete office suite for post-processing GNSS data and adjusting survey data, as well as exporting the processed results directly back to the field or to engineering design software packages. Combined with Spectra Geospatial field and office software, SP85 is an extremely powerful and complete solution.



APPENDIX 3: SURVEY EQUIPMENT



TOUGHPAD FZ-G1

Panasonic recommends Windows.

SFTWARE	<ul style="list-style-type: none"><li>Windows 10 Pro 64 bit</li><li>Panasonic Utilities (including Dashboard), Recovery Partition</li></ul>		
DURABILITY	<ul style="list-style-type: none"><li>MIL-STD-810G certified (4' drop, shock, vibration, rain, dust, sand, altitude, freeze/thaw, high/low temperature, temperature shock, humidity, explosive atmosphere)</li><li>IP65 certified sealed all-weather design</li><li>Optional class I division 2, groups ABCD certified model</li><li>Solid state drive heater</li><li>Magnesium alloy chassis encased with ABS and elastomer corner guards</li><li>Optional hand strap or rotating hand strap</li><li>Port covers</li><li>Raised bezel for LCD impact protection</li><li>Pre-installed replaceable screen film for LCD protection</li></ul>		
CPU	<ul style="list-style-type: none"><li>Intel® Core™ i5-6300U vPro™ Processor</li><li>~ 2.4 GHz up to 3.0 GHz with Intel® Turbo Boost Technology</li><li>~ Intel Smart Cache 3MB</li></ul>		
STORAGE & MEMORY	<ul style="list-style-type: none"><li>8GB DDR3L SDRAM<sup>1,5</sup></li><li>256GB solid state drive (SSD) with heater<sup>4,5</sup></li><li>Optional 512GB</li><li>~ up to 64GB additional storage with optional microSDXC card slot</li></ul>		
DISPLAY	<ul style="list-style-type: none"><li>10.1" WUXGA 1920 x 1200 with LED backlighting</li><li>10-point capacitive multi touch + Waterproof Digitizer pen daylight-readable screen</li><li>~ 2-800 nit</li><li>IPS display with direct bonding</li><li>~ Anti-reflective and anti-glare screen treatments</li><li>~ Ambient light sensor, digital compass, gyro and acceleration sensors</li><li>~ Automatic screen rotation</li><li>~ Intel® HD Graphics 520 (Built-in CPU) video controller</li><li>~ Concealed mode (configurable)</li></ul>		
AUDIO	<ul style="list-style-type: none"><li>Integrated microphone</li><li>Realtek high-definition audio</li><li>Integrated speaker</li><li>On-screen and button volume and mute controls</li></ul>		
KEYBOARD & INPUT	<ul style="list-style-type: none"><li>10-point gloved multi touch + digitizer screen</li><li>~ Supports bare-hand touch and gestures and electronic waterproof stylus pen</li><li>~ Supports glove mode and wet-touch mode</li><li>~ 7 tablet buttons (2 user-definable)</li><li>~ Integrated stylus holder</li><li>~ On-screen QWERTY keyboard</li></ul>		
CAMERAS	<ul style="list-style-type: none"><li>720p webcam with mic</li><li>8MP rear camera with autofocus and LED light</li></ul>		
EXPANSION	<ul style="list-style-type: none"><li>Optional MicroSDXC3</li></ul>		
INTERFACE	<table><tr><td><ul style="list-style-type: none"><li>Docking connector</li><li>HDMI</li><li>Headphones/speaker</li><li>Optional Serial Dongle<sup>7</sup></li><li>USB 3.0 (x 1)<sup>7</sup></li><li>Optional second USB 2.0<sup>7</sup></li><li>Optional 10/100/1000 Ethernet<sup>7</sup></li></ul></td><td><ul style="list-style-type: none"><li>24-pin Type A</li><li>Mini-jack stereo</li><li>D-sub 9-pin</li><li>4-pin</li><li>4-pin</li><li>RJ-45</li></ul></td></tr></table>	<ul style="list-style-type: none"><li>Docking connector</li><li>HDMI</li><li>Headphones/speaker</li><li>Optional Serial Dongle<sup>7</sup></li><li>USB 3.0 (x 1)<sup>7</sup></li><li>Optional second USB 2.0<sup>7</sup></li><li>Optional 10/100/1000 Ethernet<sup>7</sup></li></ul>	<ul style="list-style-type: none"><li>24-pin Type A</li><li>Mini-jack stereo</li><li>D-sub 9-pin</li><li>4-pin</li><li>4-pin</li><li>RJ-45</li></ul>
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WIRELESS	<ul style="list-style-type: none"><li>Optional integrated 4G LTE multi carrier mobile broadband with satellite GPS</li><li>Optional GPS (u-blox NEO M8N)<sup>7</sup></li><li>Intel® Dual Band Wireless-AC 8260 (IEEE802.11 a/b/g/n/ac)</li><li>Bluetooth v4.1, Classic mode/Low Energy mode, Class 1 (Windows 10 pro 64-bit)</li><li>Security<ul style="list-style-type: none"><li>~ Authentication: LEAP, WPA, 802.1x, EAP-TLS, EAP-FAST, PEAP</li><li>~ Encryption: CKIP, TKIP, 128-bit and 64-bit WEP, Hardware AES</li></ul></li><li>Dual high-gain antenna pass-through</li></ul>		
POWER SUPPLY	<ul style="list-style-type: none"><li>Li-Ion battery pack:<ul style="list-style-type: none"><li>~ Standard battery: Li-ion 11.1 V, 4200 mAh (typ.), 4080 mAh (min.)</li><li>~ Optional long life battery<sup>7</sup>: Li-ion 10.8V, 9300mAh(typ.), 8700mAh (min.)</li></ul></li><li>Battery operation<sup>7</sup>:<ul style="list-style-type: none"><li>~ Standard battery: 14 hours</li><li>~ Optional long life battery<sup>7</sup>: 28 hours</li></ul></li><li>Battery charging time<sup>7</sup>:<ul style="list-style-type: none"><li>~ Standard battery: 2.5 hours off, 3 hours on</li><li>~ Optional long life battery<sup>7</sup>: 3 hours off, 4 hours on</li></ul></li><li>Optional bridge battery<sup>7</sup> (1 minute swap time)</li></ul>		
POWER MANAGEMENT	<ul style="list-style-type: none"><li>Suspend/Resume Function, Hibernation, Standby</li></ul>		
SECURITY FEATURES	<ul style="list-style-type: none"><li>Password Security: Supervisor, User, Hard Disk Lock</li><li>Kensington cable lock slot</li><li>Trusted platform module (TPM) security chip v2.0<sup>11</sup></li><li>Computrace® theft protection agent in BIOS<sup>8</sup></li><li>Optional Insertable SmartCard reader<sup>2,7</sup></li><li>Optional Contactless SmartCard/HF RFID reader<sup>2</sup></li><li>~ ISO 15693 and 14443 A/B compliant</li></ul>		

WARRANTY	
<ul style="list-style-type: none"><li>3-year limited warranty, parts and labor</li></ul>	
DIMENSIONS & WEIGHT <sup>9</sup>	
<ul style="list-style-type: none"><li>10.6" (L) x 7.4" (W) x 0.8" (H)</li><li>2.4 lbs. (standard battery)</li><li>3.0 lbs. (optional long life battery)<sup>7</sup></li></ul>	
INTEGRATED OPTIONS <sup>10</sup>	
<ul style="list-style-type: none"><li>4G LTE multi carrier mobile broadband with satellite GPS</li><li>Choice of 10/20 barcode reader (EA11 or EA21), GPS, Serial Dongle, Ethernet, MicroSDXC or second USB 2.0 port<sup>1</sup></li><li>Choice of bridge battery, magstripe reader, insertable SmartCard reader, insertable SmartCard reader with bridge battery, contactless SmartCard/HF RFID reader or UHF 900MHz RFID reader (EPC Gen 2)<sup>12</sup></li></ul>	
ACCESSORIES <sup>10</sup>	
<ul style="list-style-type: none"><li>AC Adapter (3-prong)</li><li>Standard Battery Pack</li><li>Long Life Battery Pack<sup>7</sup></li><li>Long Life Battery Bundle (includes rotating hand strap and corner guard set)</li><li>Single Battery Charger Bundle</li><li>LIND 3-Bay Battery Charger</li><li>LIND Car Adapter 120W</li><li>LIND Car/AC Adapter 90W (with USB port)</li><li>LIND Car Adapter 90W MIL-STD</li><li>Tall Corner Guard Set</li><li>Rotating Hand Strap and Tall Corner Guard Set Bundle</li><li>ToughMate G1 Always-On Case (with hand strap)</li><li>ToughMate G1 Professional Portfolio</li><li>ToughMate G1 "X" Hand Strap</li><li>Desktop Cradle</li><li>Vehicle Docks (no pass-through)<ul style="list-style-type: none"><li>~ Gamber-Johnson</li></ul></li><li>~ Havis with LIND power supply</li><li>Vehicle Docks (dual pass-through)<ul style="list-style-type: none"><li>~ Gamber-Johnson</li></ul></li><li>~ Havis with LIND power supply</li><li>Cradlepoint Router<ul style="list-style-type: none"><li>~ Verizon</li><li>~ AT&amp;T</li></ul></li><li>Replacement Digitizer Pen Waterproof</li><li>Tether</li><li>10.1" LCD Protective Film</li></ul>	<ul style="list-style-type: none"><li>CF-AA6413CM</li><li>FZ-VZSU84ZU</li><li>FZ-VZSU88U</li><li>FZ-BNDL61LL1ST1CG4</li><li>FZ-BNDL61BATCHR9</li><li>FZ-LND3BAG1</li><li>CF-LNDDC120</li><li>CF-LNDACDC90</li><li>CF-LNDMLDC90</li><li>FZ-WCGG111</li><li>FZ-BNDL61ST1CG4</li><li>TBCG1AGNL-P</li><li>TBCG1PFLIO-BLK-P</li><li>TBCG1XSTP-P</li><li>FZ-VEBG11AU</li><li>7160-0486-00-P</li><li>CF-H-PAN-702-P</li><li>7160-0486-02-P</li><li>CF-H-PAN-702-2-P</li><li>CP-IBR1100LPE-VZ</li><li>CP-IBR1100LPE-AT</li><li>FZ-VNPG11U-S</li><li>FZ-VNTG11U</li><li>FZ-VFPG11U</li></ul>

Please consult your reseller or Panasonic representative before purchasing.

Caution: Do not expose bare skin to this product when handling this unit in extreme hot or cold environments.

<sup>1</sup> Approximate time. Battery operation and recharge times will vary based on many factors, including screen brightness, applications, features, power management, battery conditioning and other customer preferences. Battery testing results from MobileMark 2007.

<sup>2</sup> Bridge battery, magstripe reader, insertable SmartCard reader, insertable SmartCard reader with bridge battery, contactless SmartCard reader and UHF RFID reader are mutually exclusive. Please note, USB 3.0 port cannot be accessed when the unit is equipped with the magstripe reader, but optional USB 2.0 port can be accessed.

<sup>3</sup> GPS, Serial Dongle, Ethernet, MicroSDXC and second USB port are mutually exclusive options.

<sup>4</sup> 1GB = 1,000,000,000 bytes.

<sup>5</sup> Total usable memory will be less depending upon actual system configuration.

<sup>6</sup> The size of the VRAM cannot be set by the user and varies by operating system as well as the size of the RAM. Windows 7 max, VRAM is 1555MB.

<sup>7</sup> Magstripe reader, insertable SmartCard reader, insertable SmartCard reader with bridge battery and UHF RFID reader include tall corner guards and rotating hand strap. Bridge battery (without SmartCard reader) includes medium corner guards and rotating hand strap.

<sup>8</sup> Requires software and activation to enable theft protection.

<sup>9</sup> Length measurements do not include protrusions. Weight varies with options and digitizer pen.

<sup>10</sup> Accessories and Integrated Options may vary depending on your configuration. Visit the Panasonic website for more accessories and details.

<sup>11</sup> Hazardous location certifications may not apply to all configurations. Consult your Panasonic representative for availability.

<sup>12</sup> TPM 1.2 available upon request - please contact your reseller or Panasonic representative.



1.800.662.3537  
panasonic.com/toughpad/G1

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EOS 5D Mark IV



Pursue perfection



Flexibility without compromise, enabling you to pursue the perfect moment.



- A 30-megapixel sensor delivers images that are packed with detail, even in the brightest highlights and darkest shadows.
- Dual Pixel Raw is an alternative file format that lets photographers fine-tune image quality after it's been captured.
- Low-light performance is improved throughout the ISO sensitivity range, right up to the max ISO 32,000 setting (expandable to ISO 102,400).
- A Digital Lens Optimizer works together with Lens Aberration Correction to compensate for optical phenomena, including the camera's optical low-pass filter, for incredible image quality.

Product Range



EOS 5D Mark IV



EOS 5DS



EOS 5DS R

EOS 5D Mark IV  
EOS 5DS  
EOS 5DS R  
EOS-1D X Mark II





### A Art 50mm F1.4 DG HSM



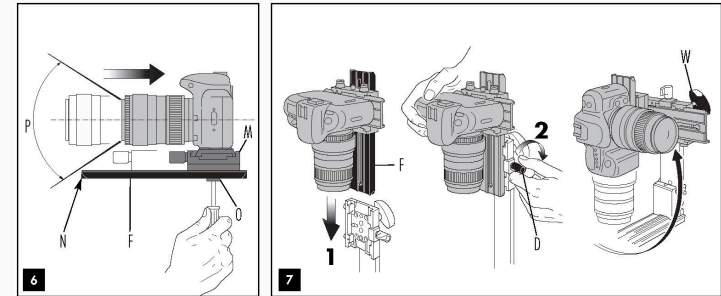
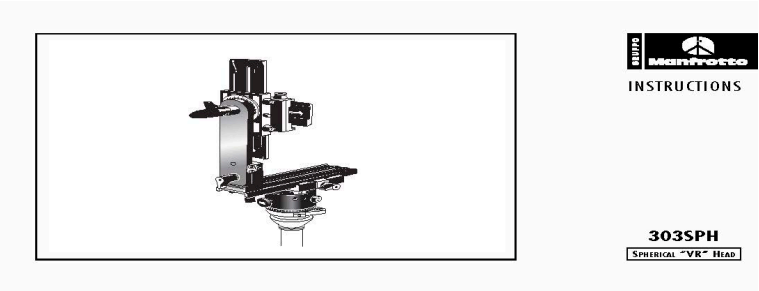
### + Design detail



Incredible resolution ideal for the high-megapixel era. Introducing the new benchmark large-aperture standard lens

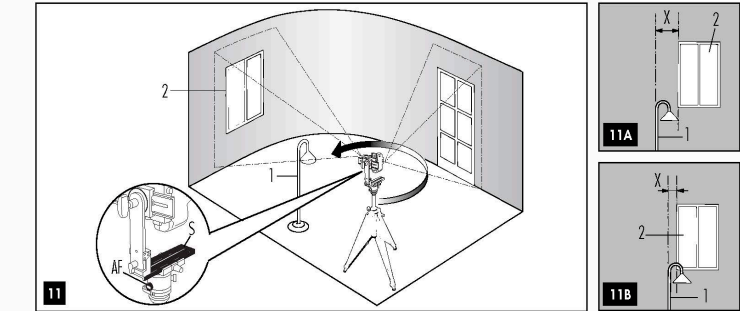
In 2008, Sigma released a large diameter standard lens designed for digital SLRs, "SIGMA 50mm F1.4 EX DG HSM". At that time, products for film cameras were prevalent, yet we spent enormous effort to set a new benchmark for the 50mm lens that optimizes the characteristics of digital cameras, such as compensating peripheral brightness, controlling the point images in the corners, and improving the image drawing, not only around the focusing point, but also other areas in the image.

APPENDIX 4: CAMERA EQUIPMENT (MANFROTTO 303 SPH)



NOTE 6  
The position of the housing "M" relative to the long plate "F" will need to be adjusted: loosen screw "O" to slide the housing. The ideal position is with the camera body as far back on the plate as it can go before the front edge "N" of the long plate "F" becomes visible in the camera's field of view "P".

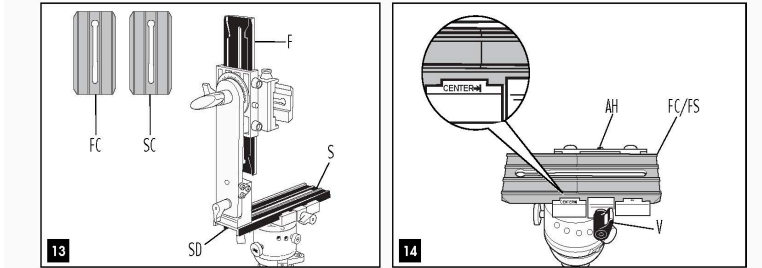
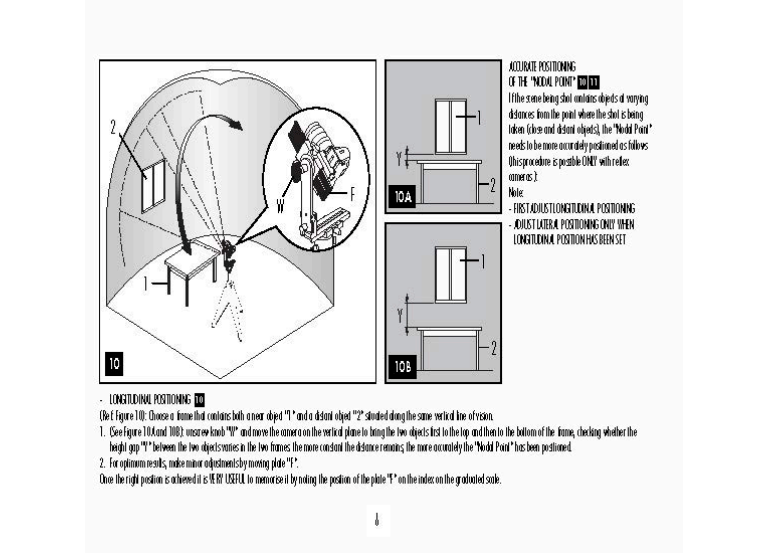
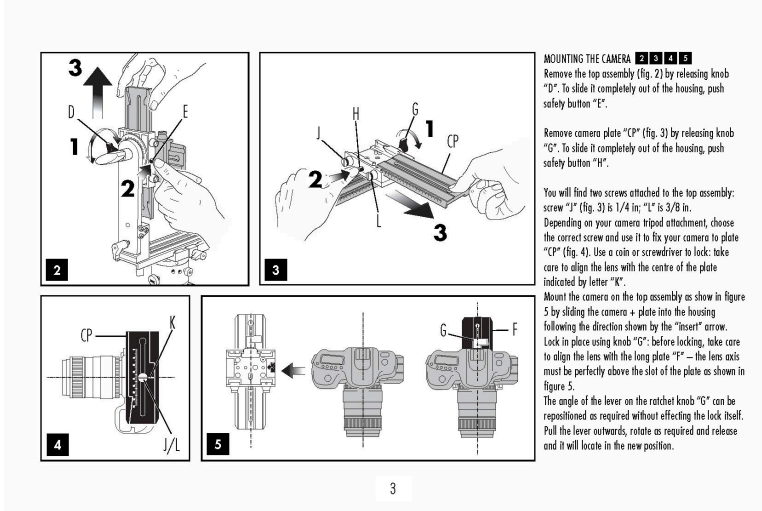
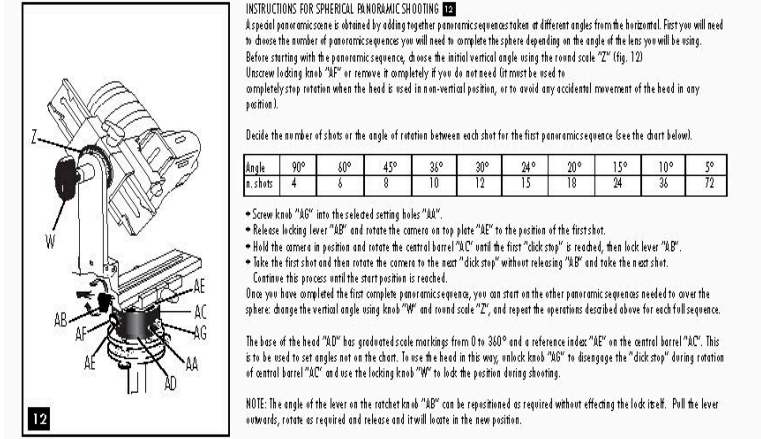
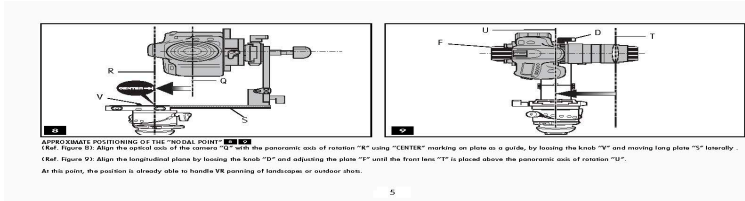
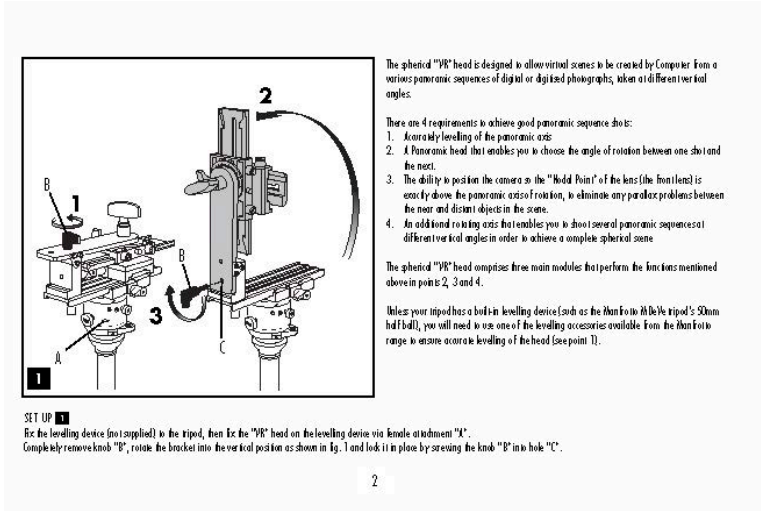
4



- LATERAL POSITIONING 11  
(Ref. Figure 11): Choose a frame that contains both a near object "1" and a distant object "2" situated along the same horizontal line of vision.  
1. (See Figure 11A and 11B): unscrew knob "AF" and move the camera around the panoramic axis so that the two objects are first on the left hand side of the frame, then on the right. Check whether the horizontal gap "X" between the two objects varies in the two frames: the more constant the distance remains, the more accurately the "Nodal Point" has been positioned.  
2. For optimum results, make minor adjustments by moving plate "S".

Once the right position is achieved it is VERY USEFUL to memorise it by noting the position of the plate "S" on the index on the graduated scale.

7



ADDITIONAL PLATES 13  
If you have a very compact camera we suggest you to use the short plates "SC" (Fig. 13) and "FC" (supplied with the head) instead of the two long plates "F" and "S" in order to reduce space and weight of the system.  
To replace the plate "S" unscrew screw "SD" (Fig. 13)  
To replace the plate "F", please refer to Fig. 6 and unscrew screw "O"

USE OF THE KIT AS AN OBJECT PANORAMA TURNTABLE 14  
The head can also be used as a turntable, useful for shooting object panoramas. For this use, loosen knob "V" and push button "AH" to slide the lower plate "S" out of the housing on the panoramic rotation base unit. In place of the long plate and top assembly, mount one of the two shorter plates supplied as a base for your object. The plate housing has a "center" mark to help you position your object accurately above the center of panoramic rotation.

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WSP House  
70 Chancery Lane  
London  
WC2A 1AF

**wsp.com**

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