**WARRANTY**

Integra warrants to the original purchaser only that each new Integra product is free from manufacturing defects in material and workmanship under normal use and service for a period of one year from the date of delivery by Integra to the first purchaser, but in no event beyond the expiration date stated on any product labeling.

- Surgical instruments are guaranteed to be free from defects in material and workmanship when maintained and cleaned properly and used normally for their intended purpose.

- Any covered product that is placed by Integra under a lease, rental or installment purchase agreement and that requires repair service during the term of such placement agreement shall be repaired in accordance with the terms of such agreement.

If any covered defect occurs during the warranty period or term of such placement agreement, the purchaser should communicate directly with Integra’s home office. If purchaser seeks to invoke the terms of this warranty, the product must be returned to Integra at its home office. The defective product should be returned promptly, properly packaged and postage prepaid. Loss or damage in return shipment to Integra shall be at Customer’s risk. Integra’s sole responsibility under this warranty shall be repair or replacement, at the sole discretion and expense of Integra, subject to the terms of this warranty and applicable agreements.

IN NO EVENT SHALL INTEGRA BE LIABLE FOR ANY INCIDENTAL, INDIRECT, CONSEQUENTIAL OR PUNITIVE DAMAGES IN CONNECTION WITH THE ACQUISITION OR USE OF ANY INTEGRA PRODUCT. Further, this warranty shall not apply to, and Integra shall not be responsible for, any loss arising in connection with the purchase or use of any Integra product that has been repaired by anyone other than an authorized Integra service representative or altered in any way so as, in Integra’s judgment, to affect its stability or reliability, or which has been subject to misuse, negligence or accident, or which has been used otherwise than in accordance with the instructions furnished by INTEGRA. THIS LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, AND OF ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF INTEGRA, AND INTEGRANEITHER ASSUMES NOR AUTHORIZES ANY REPRESENTATIVE OR OTHER PERSON TO ASSUME FOR IT ANY OTHER LIABILITY IN CONNECTION WITH INTEGRA PRODUCTS.

INTEGRA DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE OR APPLICATION OR WARRANTY OF QUALITY AS WELL AS ANY EXPRESS OR IMPLIED WARRANTY TO PATIENTS. No warranty or guarantee may be created by any act or statement nor may this Standard Warranty be modified in any way, except as a result of a writing signed by an officer of Integra. These limitations on the creation or modification of this warranty may not be waived or modified orally or by any conduct.
Definitions of Alerts Used in this Manual

**Warning:** An operation or maintenance procedure, practice, condition, statement, etc. which, if not strictly adhered to, could result in injury, long term health hazard, or death of a patient or personnel.

**Caution**  An operation or maintenance procedure, practice, condition, statement, etc. which, if not strictly adhered to, could result in damage to or destruction of part or all of the device, or could result in displaying erroneous information.

**Note**  An important point of interest or instruction which may simplify a procedure or prevent unnecessary labor.
# TABLE OF CONTENTS

## Chapter 1: About the CRW® Precision Arc Stereotactic System

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>About this User’s Manual</td>
<td>1</td>
</tr>
<tr>
<td>About CRW System Compatibility</td>
<td>1</td>
</tr>
<tr>
<td>Indications for Using the CRW System</td>
<td>1</td>
</tr>
<tr>
<td>Standard Stereotactic Procedures</td>
<td>1</td>
</tr>
<tr>
<td>Contraindications for Using the CRW System</td>
<td>2</td>
</tr>
<tr>
<td>Single Use Precautions</td>
<td>2</td>
</tr>
<tr>
<td>Accuracy of the CRW System</td>
<td>3</td>
</tr>
<tr>
<td>Using the CRW System with Electrosurgical Devices</td>
<td>3</td>
</tr>
<tr>
<td>List of Symbols</td>
<td>4</td>
</tr>
<tr>
<td>List of CRW System Components</td>
<td>6</td>
</tr>
</tbody>
</table>

## Chapter 2: Unpacking the CRW® Precision Arc Stereotactic System

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>About the Shipping Boxes</td>
<td>17</td>
</tr>
<tr>
<td>Box 1 of 2 - Components and Accessories</td>
<td>17</td>
</tr>
<tr>
<td>Box 2 of 2 - Sterilization Case</td>
<td>18</td>
</tr>
<tr>
<td>Unpacking the System</td>
<td>18</td>
</tr>
<tr>
<td>I. Unpacking Box 2 of 2 - Sterilization Case</td>
<td>18</td>
</tr>
<tr>
<td>II. Unpacking Box 1 of 2 - Components and Accessories</td>
<td>18</td>
</tr>
</tbody>
</table>

## Chapter 3: Assembling and Configuring the CRW® Precision Arc Stereotactic System

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembling the Universal Compact Head Ring (UCHR)</td>
<td>21</td>
</tr>
<tr>
<td>Attaching the Head Ring Screw Cross Bar (Optional)</td>
<td>22</td>
</tr>
<tr>
<td>Installing the Ear Bars (Optional)</td>
<td>23</td>
</tr>
<tr>
<td>Assembling the HRAIM</td>
<td>27</td>
</tr>
<tr>
<td>Assembling the Localizer Frames</td>
<td>32</td>
</tr>
<tr>
<td>Assembling the BRWLF on the UCHRA or on the HRAIM</td>
<td>32</td>
</tr>
<tr>
<td>Assembling the Luminant on the UCHRA</td>
<td>33</td>
</tr>
<tr>
<td>Assembling the CRW Arc System</td>
<td>34</td>
</tr>
<tr>
<td>Setting the Fixed Radial Distance for the Arc System Pointer</td>
<td>39</td>
</tr>
<tr>
<td>Setting the Fixed Radial Distance for an Instrument.</td>
<td>40</td>
</tr>
<tr>
<td>Selecting the Guide Tube and Reducing Tube/Bushing Combinations</td>
<td>41</td>
</tr>
<tr>
<td>Attaching the Arc System to the Phantom Base</td>
<td>42</td>
</tr>
<tr>
<td>Attaching the Head Ring to the Operating Table</td>
<td>45</td>
</tr>
</tbody>
</table>
Cleaning the BRWLF and Luminant® Localizer Frames ............................................................. 71
Cleaning the CRW Precision Arc System.................................................................................... 72
Cleaning Miscellaneous CRW Parts............................................................................................ 72
Disassembling the CRW Precision Arc System Components......................................................... 73
Packing the CRW Components........................................................................................................ 73
Sterilizing the CRW Components................................................................................................... 75
  Parameters for Sterilizing the CRW Components ...................................................................... 75
  Summary of CRW Sterilization Procedures .............................................................................. 76
  Maximum Sterilization Load (Accessories).................................................................................. 78
Maintaining the CRW System ........................................................................................................ 78
  Preventing Equipment Loss....................................................................................................... 78
  CRW System Calibration .......................................................................................................... 78
Returning the CRW System for Service or Maintenance .............................................................. 79

Index ............................................................................................................................................. 81
CHAPTER 1 ABOUT THE CRW® PRECISION ARC STEREOTACTIC SYSTEM

About this User’s Manual

This manual supports the CRW® Precision Arc Stereotactic System, and is not intended to be a clinical medical document. This publication details the mechanical/functional features of the system and describes how to properly assemble, use, sterilize and maintain the equipment in the system. Read and become familiar with these instructions before using the system in surgery.

About CRW System Compatibility

The CRW stereotactic system is a target-centered system that can be configured to be CT-only or CT/MR compatible.

Indications for Using the CRW System

Standard Stereotactic Procedures

The CRW stereotactic system is a multi-purpose system used for localizing intercranial targets for precisely directing instruments such as:

- Biopsy forceps
- RF lesioning electrodes
- Deep brain electrodes
- Recording and stimulating electrodes
- Hematoma evacuators
- Endoscopes

Note: Localization is performed using CT or MR imaging.
Contraindications for Using the CRW System

- The head ring is contraindicated for infants whose coronal sutures have not yet closed.
- The CRW system is contraindicated for patients with Creutzfeldt-Jakob disease.

Single Use Precautions

Single use devices are used with the CRW stereotactic system. The following precautions should be taken:

- **For single patient use only.** The Disposable Head Ring Screws, Long and Short (DHRSS5, DHRSL5) are designed as single-use, disposable products and should not be re-sterilized or reused.

  Re-sterilization and reuse may result in dullness of the screw, leading to potential head ring movement, and cross contamination. Any Disposable Head Ring Screw, once used, should be discarded according to hospital policy.

- **For single patient use only.** The Apuzzo Stereotactic Drapes (ASD1 and ASD1B) are designed as single-use, disposable products and should not be re-sterilized or reused.

  Reuse of this device may result in cross contamination or compromised sterility of the drape and sterile field. Any drape, once used, should be discarded according to hospital policy.

- **For single patient use only.** The Nashhold Biopsy Needle (NBND) is designed as a single-use, disposable product and should not be re-sterilized or reused.

  Re-sterilization may result in impaired function (e.g. dulling of the cutting window, loss of vacuum) and cross contamination. Any needle, once used, should be discarded according to hospital policy.

- **For single patient use only.** The CRW BiopsyPlus Kit (CRWBP) is designed as a single-use, disposable product and should not be re-sterilized or reused.

  Re-sterilization may result in impaired function (e.g. dullness of cutting window, loss of vacuum, inaccuracy of bushing) and cross contamination. Once used, the kit should be discarded according to hospital policy.
Accuracy of the CRW System

User error in the cursor placement and slice positioning contribute to the total application error. The accuracy in the lateral and AP dimension is ±2 mm. Error in the vertical direction may be as large as the thickness of the scan slice (2 or 4 mm). The intrinsic mechanical accuracy of the arc is better than 0.5 mm, as determined in bench testing.

To ensure proper accuracy and function of the CRW system, do not subject any of the CRW system's parts or accessories to any forces that may affect its use or calibration.

Always inspect the CRW system's parts and accessories prior to use. If any of the parts or accessories are damaged in a way that may potentially affect the system's accuracy or function, please return the system to Integra for service (see page 79 for packaging instructions).

The CRW system should be viewed as adjuncts to the skills of the surgeon.

Using the CRW System with Electrosurgical Devices

If the CRW system is to be used with a ground-referenced electrosurgical device (monopolar or bipolar electrode), the head ring should not contact the patient. Maintain a gap (at least 1/4 inch) between the head ring and the patient's body.

- Follow safety procedures consistent with the use of anesthetizing gases when using the arc system with electrosurgical equipment.
- Review the system and its accessories prior to surgery to ensure that all items are available and functional.
### List of Symbols

The following symbols appear on the device labeling:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Info Symbol" /></td>
<td>Consult instructions for use.</td>
</tr>
<tr>
<td><img src="image" alt="Use By Symbol" /></td>
<td>Use by</td>
</tr>
<tr>
<td><img src="image" alt="Hand Wash Symbol" /></td>
<td>Hand Wash only - Do not use automatic or power washing cycles; Hand wash to remove all debris and residue and thoroughly dry.</td>
</tr>
<tr>
<td><img src="image" alt="Lot Number Symbol" /></td>
<td>Lot number</td>
</tr>
<tr>
<td><img src="image" alt="Manufacturer Symbol" /></td>
<td>Manufacturer</td>
</tr>
<tr>
<td><img src="image" alt="EC REP Symbol" /></td>
<td>Authorized representative in the European community.</td>
</tr>
<tr>
<td><img src="image" alt="Warning/Caution Symbol" /></td>
<td>In this manual, this symbol “Warning/Caution” indicate conditions or practices that could lead to illness or injury or could damage the equipment or other property</td>
</tr>
<tr>
<td><img src="image" alt="Non-Sterile Symbol" /></td>
<td>Non-sterile</td>
</tr>
<tr>
<td><img src="image" alt="Catalog Number Symbol" /></td>
<td>Catalog number</td>
</tr>
<tr>
<td><img src="image" alt="Single Use Only Symbol" /></td>
<td>Single use only</td>
</tr>
</tbody>
</table>
### Symbol | Definition
---|---

<table>
<thead>
<tr>
<th>SN</th>
<th>Serial number</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>STERILE R</th>
<th>Sterilized using irradiation</th>
</tr>
</thead>
</table>

| --- | --- |

| --- | --- |

<table>
<thead>
<tr>
<th>Rx ONLY</th>
<th>Caution: Federal (USA) law restricts this device to sale by or on order of a physician or practitioner.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>STERILE EO</th>
<th>Sterilized using Ethylene Oxide</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>LATEX</th>
<th>This product is not manufactured with Dry Natural Rubber or Natural Rubber Latex</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Do not use if package is damaged</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>PHT</th>
<th>Contains or Presence of Phthalate</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Date of manufacture</th>
</tr>
</thead>
</table>
List of CRW System Components

CRW Arc

<table>
<thead>
<tr>
<th>System</th>
<th>Catalog #</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRW Precision Arc System</td>
<td>CRWPRECISE</td>
</tr>
</tbody>
</table>

This system includes:
- (1) CRW Precision Arc
- (2) Operator’s Manual (CRWPMAN)
- (1) Guide Block (CRWPGB)
- (1) CRW Fixed Arc System Pointer (CRWFASP)
- (1) 2.7mm x 76mm Guide Tube (GT2776)
- (1) 2.7mm x 116mm Guide Tube (GT27116)
- (1) 2.7mm Reducing Bushing (RB27)
- (1) 1.9mm x 76mm Reducing Tube (RTNBND76)
- (1) 1.9mm x 116mm Reducing Tube (RTNBND116)
- (1) 2.7mm Drill Assembly (DA27)
- (1) Keller Depth Gauge (KDG)
- (1) Steel Ruler (SR)
- (1) Sterilization Case Lid (CRWPLCASE)
- (1) Sterilization Case Accessory Tray (CRWACCASE)
- (1) Sterilization Case Arc Component Tray (CRWARCCASE)

To re-order any of the components from the above list, use the catalog numbers that appear after each respective CRW component.
## System Accessories and Components

<table>
<thead>
<tr>
<th>Accessories and Components</th>
<th>Catalog #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keller Depth Gauge</td>
<td>KDG</td>
</tr>
<tr>
<td>Guide Block</td>
<td>CRWASGB</td>
</tr>
<tr>
<td>Stainless Steel Ruler</td>
<td>SR</td>
</tr>
<tr>
<td>MAYFIELD® Adapters</td>
<td>CRWMA</td>
</tr>
<tr>
<td></td>
<td>CRWFMA</td>
</tr>
<tr>
<td>Accessories and Components</td>
<td>Catalog #</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>----------------------------------------</td>
</tr>
</tbody>
</table>
| Guide Tubes                       | • GT27160: 2.7 mm I.D. x 160 mm working length  
|                                   | • GT27116: 2.7 mm I.D. x 116 mm working length  
|                                   | • GT2776: 2.7 mm I.D. x 76 mm working length  
|                                   | • GT32116: 3.2 mm I.D. x 116 mm working length  
|                                   | • GT32160: 3.2 mm I.D. x 160 mm working length  
|                                   | • GT3276: 3.2 mm I.D. x 76 mm working length  
|                                   | • GT46116: 4.6 mm I.D. x 116 mm total length  |
| Reducing Bushings                 | • RB27: 2.7 mm I.D.                      
|                                   | • RB32: 3.2 mm I.D.                      |
| Reducing Tubes                    | • RT11116: 1.1 mm I.D. x 116 mm length    
|                                   | • RT1176: 1.1 mm I.D. x 76 mm length      
|                                   | • RT16116: 1.6 mm I.D. x 116 mm length    
|                                   | • RT1676: 1.8 mm I.D. x 76 mm length      
|                                   | • RT1876: 1.8 mm I.D. x 76 mm length      
|                                   | • RT18116: 1.8 mm I.D. x 116 mm length    
|                                   | • RT20116: 2.0 mm I.D. x 116 mm length    
|                                   | • RT20160: 2.0 mm I.D. x 160 mm length    
|                                   | • RT21116: 2.1 mm I.D. x 116 mm length    
|                                   | • RT2176: 2.1 mm I.D. x 76 mm length      
|                                   | • RTNBND160: NBND I.D. x 160 mm length    
|                                   | • RTNBND116: NBND I.D. x 116 mm length    
|                                   | • RTNBND76: NBND I.D. x 76 mm length      |
| Probe Holder (30 Degree Offset)   | CRWP30                                  |
### Head Rings and Accessories

<table>
<thead>
<tr>
<th>Head Rings and Accessories</th>
<th>Catalog #</th>
</tr>
</thead>
<tbody>
<tr>
<td>UCHRA (Universal Compact Head Ring)</td>
<td>UCHRA</td>
</tr>
<tr>
<td>UCHRAP (Adapter Plate)</td>
<td>UCHRAP</td>
</tr>
<tr>
<td>UCHRA Storage and Sterilization Case</td>
<td>UCHRCASE</td>
</tr>
<tr>
<td>UCHRHK (Hardware Kit)</td>
<td>UCHRHK</td>
</tr>
</tbody>
</table>

This kit includes:
- (4) Adapter plate attachment screws
- (2) Intubation hoop attachment screws
- (4) Head post attachment screws
- (2) Ear bar assembly attachment screws
- (2) Ear bar assembly nylon thumb screws
<table>
<thead>
<tr>
<th><strong>Head Rings and Accessories</strong></th>
<th><strong>Catalog #</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>UCHRP (Composite Post &amp; Cross Bar Kit)</td>
<td>UCHRP</td>
</tr>
<tr>
<td>UCHREBA (Head Ring Ear Bar Kit)</td>
<td>UCHREBA</td>
</tr>
<tr>
<td>UCHREB (Individual Ear Bars for UCHREBA)</td>
<td>UCHREB</td>
</tr>
<tr>
<td>HRW (Head Ring Wrench)</td>
<td>HRW</td>
</tr>
<tr>
<td>HRAIM (Intubation Head Ring Assembly)</td>
<td>HRAIM</td>
</tr>
<tr>
<td>HRD (Head Ring Drive)</td>
<td>HRD</td>
</tr>
<tr>
<td><strong>Head Rings and Accessories</strong></td>
<td><strong>Catalog #</strong></td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Head Ring Sector</td>
<td>HRIMS</td>
</tr>
<tr>
<td>HRDXS (Head Ring Drive Extender / Shortener)</td>
<td>HRDXS</td>
</tr>
<tr>
<td>HRP (Head Ring Post)</td>
<td>HRP</td>
</tr>
<tr>
<td>TAP (Cleaning Tap for HRP and UCHR)</td>
<td>TAP</td>
</tr>
<tr>
<td>HRKTP (Head Ring Positioner)</td>
<td>HRKTP</td>
</tr>
<tr>
<td><strong>Head Rings and Accessories</strong></td>
<td><strong>Catalog #</strong></td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Conical T-Bolt Screws</td>
<td>CSS</td>
</tr>
<tr>
<td>HREBA (Intubation Head Ring Ear Bar Kit)</td>
<td>HREBA</td>
</tr>
</tbody>
</table>
### Imaging Localizers

<table>
<thead>
<tr>
<th>Localizer</th>
<th>Catalog #</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRWLF (CT Localizer Frame)</td>
<td>BRWLF</td>
</tr>
<tr>
<td>Luminant® (MR/CT Localizer)</td>
<td>LL01</td>
</tr>
</tbody>
</table>

### Quality Assurance Components

<table>
<thead>
<tr>
<th>QA Component</th>
<th>Catalog #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phantom Base System</td>
<td>CRWPBS</td>
</tr>
<tr>
<td>CRW Arc System Pointer</td>
<td>CRWASP</td>
</tr>
<tr>
<td>QA Component</td>
<td>Catalog #</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>CRW Fixed Arc System Pointer</td>
<td>CRWFASP</td>
</tr>
<tr>
<td>Phantom Base Sterile Pointer</td>
<td>RLPPSP</td>
</tr>
<tr>
<td>Phantom Base Hardware Kit</td>
<td>CRWPBSHK</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>This system includes:</td>
</tr>
<tr>
<td></td>
<td>• (2) Sphere hole thumb screws</td>
</tr>
<tr>
<td></td>
<td>• (2) Thumb knobs (10-32 x 1/2&quot;)</td>
</tr>
<tr>
<td></td>
<td>• (1) LFLF T-Side sub-assembly</td>
</tr>
<tr>
<td></td>
<td>• (2) AP / VERT locking screws</td>
</tr>
<tr>
<td></td>
<td>• (1 each) Screw and cap (1/4&quot;)</td>
</tr>
<tr>
<td>Reticles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• CRWTBSS (Lateral Reticles)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• CRWAPBS (Anterior / Posterior Reticles)</td>
</tr>
</tbody>
</table>
## Sterile Devices (Single Use Only)

<table>
<thead>
<tr>
<th>Sterile Device</th>
<th>Catalog #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apuzzo Stereotactic Drape</td>
<td>• ASD1 (sterile drape)</td>
</tr>
<tr>
<td></td>
<td>• ASD1B (10 sterile drapes)</td>
</tr>
<tr>
<td>Disposable Head Ring Screws (MR/CT Compatible)</td>
<td>• DHRSL5 (48 mm / box of long screws / 5 packs, 2 screws per pack)</td>
</tr>
<tr>
<td></td>
<td>• DHRSS5 (34 mm / box of short screws / 5 packs, 2 screws per pack)</td>
</tr>
<tr>
<td>Sterile Device</td>
<td>Catalog #</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>CRW BiopsyPlus Kit</td>
<td>CRWBP</td>
</tr>
<tr>
<td></td>
<td>This kit includes:</td>
</tr>
<tr>
<td></td>
<td>• (1) Nashold Biopsy Needle with</td>
</tr>
<tr>
<td></td>
<td>depth and target markings</td>
</tr>
<tr>
<td></td>
<td>• Long biopsy bushing (90 mm)</td>
</tr>
<tr>
<td></td>
<td>• Short biopsy bushing (60 mm)</td>
</tr>
<tr>
<td></td>
<td>• (2) Nylon thumb screw for</td>
</tr>
<tr>
<td></td>
<td>securing the bushing into the</td>
</tr>
<tr>
<td></td>
<td>CRW guide block</td>
</tr>
<tr>
<td></td>
<td>• 12” Aspiration line</td>
</tr>
<tr>
<td>NBND</td>
<td>NBND (single)</td>
</tr>
<tr>
<td>Nashold Biopsy Needle, Disposable</td>
<td>NBND5 (box of 5)</td>
</tr>
</tbody>
</table>
CHAPTER 2 UNPACKING THE CRW® PRECISION ARC STEREOTACTIC SYSTEM

About the Shipping Boxes
The CRW® Precision Arc Stereotactic System is shipped in two boxes.

Box 1 of 2 - Components and Accessories
This box contains the following items:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Catalog #</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N/A</td>
<td>CRW Precision Arc</td>
</tr>
<tr>
<td>2</td>
<td>CRWPMAN</td>
<td>Operator's Manual</td>
</tr>
<tr>
<td>1</td>
<td>CRWPGB</td>
<td>Guide Block</td>
</tr>
<tr>
<td>1</td>
<td>CRWFASP</td>
<td>Arc System Pointer</td>
</tr>
<tr>
<td>1</td>
<td>GT2776</td>
<td>2.7 mm x 76 mm Guide Tube</td>
</tr>
<tr>
<td>1</td>
<td>GT27116</td>
<td>2.7 mm x 116 mm Guide Tube</td>
</tr>
<tr>
<td>1</td>
<td>RB27</td>
<td>2.7 mm Reducing Bushing</td>
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<tr>
<td>1</td>
<td>RTNBND76</td>
<td>1.9 mm x 76 mm Reducing Tube</td>
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<tr>
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<td>1</td>
<td>DA27</td>
<td>2.7 Drill Assembly</td>
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<tr>
<td>1</td>
<td>KDG</td>
<td>Keller Depth Gauge</td>
</tr>
<tr>
<td>1</td>
<td>SR</td>
<td>Steel Ruler</td>
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Box 2 of 2 - Sterilization Case

This box contains the following items:

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<td>Sterilization Case Lid</td>
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<tr>
<td>1</td>
<td>CRWACCCASE</td>
<td>Sterilization Case Accessory Tray</td>
</tr>
<tr>
<td>1</td>
<td>CRWARCCASE</td>
<td>Sterilization Case Arc Component Tray</td>
</tr>
</tbody>
</table>

Unpacking the System

I. Unpacking Box 2 of 2 - Sterilization Case

1. Remove the bagged sterilization case from the packaging and discard the bag.
2. Separate the two levels of the sterilization case by unhooking the latches found on the sides of each tray.

II. Unpacking Box 1 of 2 - Components and Accessories

1. Remove the user letter, catalog number guide, and both copies of the operator's manual from the box.
2. Remove the top layer of foam.
   a) Remove the bagged base plate from the second layer of foam and discard the bag.
   b) Set aside the base plate temporarily. In Step 5, the base plate will be placed into the CRW component tray.
   c) Remove the bagged CRW accessories from their packaging, discarding their bags.
3. Place each accessory into the CRW accessories tray as depicted within the following figure:

![CRW accessories tray filled with the supplied accessories.](image)

4. Remove the second layer of foam from the packaging.
   a) Remove the bagged CRW components from the packaging and discard their bags.
   b) Place each component into its designated location in the CRW component tray.
5. Place the base plate into the CRW component tray (see figure below).

![Arc component tray filled with components and base plate.](image)
6. Stack the sterilization case as shown:

![Fully stacked sterilization case.](image)

**Note**  Always stack the component tray on top of the accessory tray.
Assembling the Universal Compact Head Ring (UCHR)

1. Attach the 4 head ring posts onto the head ring. Use the head ring wrench to tighten the head post attachment screws.

   **Note** The anterior head ring posts are longer than the posterior posts, and are angled rather than straight.

   **Caution** *Assemble the head ring posts onto the head ring prior to installing the head ring screws. Failure to do so could potentially place increased stress on the head ring post assembly.*

2. See the picture to the right for a sample of a properly assembled head ring.

   **Note** The "lip" that goes around the head ring should be on the bottom.

   **Note** To prevent breaking the head post attachment screws, ensure that the post screws are tightened so that the post is flush with the head ring before tightening the disposable head ring screws.
Attaching the Head Ring Screw Cross Bar (Optional)

**Note** If you are not using the optional head ring screw cross bar, proceed to "Installing the Ear Bars (Optional)" on page 23.

1. Align the cross bar holes with the head ring screw holes of the anterior head ring posts.

2. Attach the cross bar with the cross bar attachment screws to the anterior head ring posts.

To avoid placement of the head ring screws into the temporalis muscle, use the head ring cross bar.
Installing the Ear Bars (Optional)

Assembling the Ear Bar

1. Loosen the nylon thumb screw on the ear bar support bracket to place the ear bar in the bracket.

2. Fit the support brackets on opposite sides of the head ring, then finger tighten the attachment thumb screws.

Note The scales on the sides of the head ring are for reference only and allow for alignment of the head ring to the patient.
Placing the Head Ring Assembly on the Patient

Note Placing the head ring assembly is easier if multiple people perform the procedure.

1. The first person should hold the head ring in the desired position over the patient’s head.

2. The second person may arrange the ear bars so that the rounded end of each bar rests comfortably in the patient’s outer ear.

Note Use the index marks on each ear bar to help center the assembly.

Note Fit the head ring to the patient’s skull while the patient is in a sitting position.

Caution To reduce patient discomfort, do not allow the weight of the head ring assembly to rest on the ear bars.

Caution Use of the Velcro strap (GTCSVS) helps position the head ring assembly and take the weight off the ear bars. For more information on this strap, see page 28.

3. Finger-tighten the nylon thumb screws on each support bracket to secure the ear bars.
Installing the Head Ring Screw

1. Cleanse the patient’s scalp and apply local anesthesia through the head ring post openings (or cross bar openings, if applicable).

2. Allow the local anesthetic to take effect.

3. Use the head ring wrench to drive the head ring screws into the patient’s skull.

**Note** Integra recommends the use of an antibacterial ointment on the tips of the screws to help avoid infection.

4. Insert and tighten two diagonally-opposed head ring screws at a time.

**Note** Using the head ring wrench, hand-tighten each screw equally and alternately.

5. After securing the first pair of screws, install the second pair.

6. Be sure that the head ring assembly is securely in place, then remove the two ear bars from the support brackets.

7. Loosen the thumb screws and remove the ear bar support brackets from the head ring assembly.

8. Remove the Velcro strap, if used.

**Caution** Overtightening of the head ring screws can cause premature failure of the head ring posts and/or the head ring screws.

The head ring is now ready for Luminant® localizer attachment. If attaching the BRWLF to the head ring, proceed to the next page for further assembly instructions.
**Attaching the Arc Adapter Plate to the UCHRA**

**Note** You must attach the arc adapter plate to the head ring before you can place the BRWLF on the head ring.

1. Position the arc adapter plate so that the open end faces the head ring assembly anterior.

**Note** The arc adapter is used to attach the BRWLF to the head ring for CT scanning, and also attach the CRW system to the head ring.

2. Use the head ring wrench to tighten the attachment screws, securing the arc adapter plate to the head ring assembly.

3. The UCHRA with the arc adapter plate in place:
Assembling the HRAIM

1. Use the head ring wrench to back the head ring drives (HRD) into the head ring.

2. The HRDs fully seated in the head ring.

The HRAIM and BRW localizer frame are CT imaging-compatible only. The HRAIM and BRW localizer frame are not indicated for use with MR imaging.
3. Position the head ring posts (HRP) onto the head ring drives.

4. Secure the head ring posts onto the head ring drives.

**Note** Ensure that the head ring posts are fully seated against the head ring drives (see the illustration at right).

5. Place the HRKTP head ring positioner onto the head ring.

**Note** Using the head ring positioner helps support the weight of the head ring assembly during placement on the patient.
6. Place the head ring over the patient’s head.

7. Rotate the posts to achieve good skull pin placement.

**Note** The head ring can be placed in any rotational orientation on the patient’s head; targeting is not affected. It should be placed on the patient’s head inferior to the target in order for the localization frame to encapsulate the target.

**Caution** *Avoid the temporalis muscle.*

8. Clean and anesthetize the skull pin sites.

9. Allow the local anesthetic to take effect.

**Note** Integra recommends the use of an antibacterial ointment on the tips of the screws to help avoid infection.
10. Using the head ring wrench, move the head ring drives to position the head ring posts to firmly touch the patient’s scalp.

11. Using the head ring wrench, insert and tighten two diagonally-opposed head ring screws.

When installing the head ring screws:

- Only use Integra disposable head ring screws.
- Select the appropriate head ring screw length so that the screws protrude at least 13 mm from the outside surface of the head ring posts.
- Use all four (4) head ring screws to attach the head ring.
Caution  To prevent torque of the head ring, tighten the intubation cam locks prior to driving the head ring screws.

12. After securing the first pair of head ring screws, install the second pair.

Note  Hand-tighten all screws with the head ring wrench.

Caution  Overtightening the head ring screws can cause premature failure of the head ring posts and/or head ring screws.

Note  Be sure that the spine of the posts do not press against the skin for patient comfort.

13. Remove the Head Ring Positioner.
Assembling the Localizer Frames

The CRW supports the BRWLF and Luminant localizer frames.

Assembling the BRWLF on the UCHRA or on the HRAIM

Note

The HRAIM and BRW localizer frame are CT imaging-compatible only. The HRAIM and BRW localizer frame are not indicated for use with MR imaging.

To ensure proper attachment of the localizer to the head ring, inspect the balls on the bottom of the localizer prior to assembly to verify that they are not damaged or loose.

1. Place the BRW localizer frame (BRWLF) onto either the UCHRA (with the arc adapter installed) or the HRAIM:

- The BRWLF on the UCHRA is shown:

- The BRWLF on the HRAIM is shown:
2. Lock the cams to fasten the localizer frame to the Adapter Plate of the UCHRA or HRAIM.

Assembling the Luminant on the UCHRA

**Note** For MR setup, do not attach the arc adapter to the UCHRA.

1. Remove the Luminant localizer posterior panel and position the localizer so that the anterior panel is above the intubation hoop on the head ring assembly (without the arc adapter installed).

**Note** The UCHRA intubation hoop must be in the down position to fit into the MR scanner head coil - the illustration at the right displays the hoop in the **Up** position. Use the head wring wrench (HRW) to loosen/tighten the intubation hoop for positioning.
2. Secure the Luminant localizer by thumb-tightening the four attachment screws into the four threaded holes on the top of the head ring.

**Note**  The Luminant localizer and UCHRA fit together in one orientation only - - all four screws will align properly. Do not attempt to assemble these parts in another orientation.

---

**Assembling the CRW Arc System**

**Note**  Each of the following sub-assemblies are labeled with a serial number specific to your CRW Precision Arc Stereotactic System. These serial-labeled sub-assemblies have been calibrated as part of this specific serialized system. Incorporating sub-assemblies from other CRW arc systems will potentially compromise the system’s accuracy.

**Step 1**

**A.** Remove the arc base plate from the sterilization tray.

- Place the arc base plate on the sterile table, sterile draped phantom base, or the sterile tray assembly platform.
Step 2

A. Remove the trunion supports from the sterilization tray.
B. Verify that the trunion supports are fully assembled with locking screws and slider bars.

Step 3

Insert the trunion supports onto the arc base plate and set each support to approximately 0 mm (setup is easier if both supports are set to the same settings).

Note  Orient the vertical thumb knobs on the trunion supports toward the posterior (for standard approach with arc system probe holder to the posterior of the patient).

Step 4

A. Remove the arc assembly from the sterilization tray.
B. Verify that the trunion rings are loose.
**Step 5**

A. Position both trunion rings at approximately 90° (setup is easier if both rings are set to the same settings).

B. Tighten the locking rings on each trunion ring by rotating clockwise.

C. Tighten the locking thumb screws on each trunion ring by rotating clockwise.

**Step 6**

Place the arc assembly on the trunion supports and set the VERT stereotactic coordinates to approximately 35 mm (setup is easier if both supports are set to the same settings).
Step 7

A. Remove the probe holder from the sterilization tray.

B. Set the lateral arc slide to approximately 100 mm in either direction.

C. Slide the probe holder onto the lateral arc.

Note Verify that the probe holder is opposite the anterior side of the frame (pointing toward the posterior).

Step 8

Set the probe holder to approximately 0°.

Step 9

Set the lateral arc slide to approximately 0 mm.
Step 10

Fully assembled CRW system.

Step 11 (Optional)

Remove the anterior base plate of the CRW system by unscrewing the thumb screws at the anterior end of the base plate.

Note  This step can be performed to increase patient comfort or provide additional airway access. This step will not compromise the rigidity or accuracy of the system. If a lateral approach is being used for the procedure, the anterior base plate must remain attached.
**Setting the Fixed Radial Distance for the Arc System Pointer**

**Note** If the fixed arc system pointer (CRWFASP) is being used, no measurements are necessary. The fixed arc system pointer is factory set to 160 mm. The following instructions apply to the arc system pointer (CRWASP).

**Note** The CRW arc has a fixed radial distance of 160 mm from the resting surface on the probe holder to the target.

1. Place the arc system pointer in the guide block, and align the edge of a millimeter scale with the resting surface of the guide block.
2. Slide the pointer in the guide block so that the tip of the pointer is at **160 mm**.
3. Use the set screw to secure the pointer in the guide block (see the picture on page 40).

**Note** When this pointer assembly is put into the guide block, the distance from the top surface of the probe holder to the tip of the pointer will be 160 mm.

4. Place the guide block and arc system pointer assembly into the probe holder.
5. Secure the pointer assembly with the probe holder thumb screw.

**Note** This prepares the setup of the arc and instrument length for testing on the Phantom Base (see page 42 for instructions). For instructions on using the Phantom Base to verify coordinate settings, see step 2 on page 44.
Setting the Fixed Radial Distance for an Instrument.

**Note** If the fixed arc system pointer (CRWFASP) is being used, no measurements are necessary. The fixed arc system pointer is already set to 160 mm. The following instructions apply to the arc system pointer (CRWASP).

With the arc system pointer or instrument set to 160 mm, and the arc set onto the CRW-PBS Phantom Base system, the arc system pointer or instrument and Phantom Base pointer will meet, if these devices have been set to the proper target coordinates.

1. Put the instrument with depth stop into an appropriate guide tube, and slide this assembly into the guide block.
2. Place the 0 mm edge of a millimeter scale against the resting surface of the guide block.
3. Loosen the depth stop set screw so that the Instrument slides freely in the guide block.
4. Adjust the length of the instrument in the Guide Tube so that its point is at 160 mm, and tighten the set screw.
5. Place the guide block, guide tube, and instrument into the probe holder and secure with the probe holder thumb screw.
Selecting the Guide Tube and Reducing Tube/Bushing Combinations

**Guide Tubes**

Guide tubes fit directly into the guide block and have a 6.35 mm outer diameter. They are specified by GT followed by inner diameter and length in mm. Guide tubes with 2.7 I.D. must be used with reducing bushing RB27 or with a compatible length reducing tube. Guide tubes with 3.2 mm I.D. must be used with RB32 to guide 3.2 mm O.D. drills. Guide tube GT46116 is used with 4.6 mm O.D. drills and does not require a reducing bushing or a reducing tube.

**Reducing Tubes and Reducing Bushings**

Reducing tubes and reducing bushings are screwed into guide tubes so that the combination has a proper inner diameter for stereotactic guidance of various electrodes, cannulae, and needles.

Reducing tubes are specified as RT followed by the nominal outer diameter of the instrument to be guided and the length of the reducing tube in mm. All reducing tubes are only compatible with guide tubes with 2.7 mm I.D. and matching length. For example, RT20(X) reducing tubes screws into GT27(X), where X=76, 116 or 160 mm, and guide 2.0 mm O.D. probes.

RB27 and RB32 reducing bushings also screw into the GT27(X) and GT32(X) guide tubes, respectively, to provide proper guidance of 2.5 to 2.7 mm probes and 3.0 to 3.2 mm probes, respectively. Reducing bushings are commonly used with drill assemblies.

**Nashold Biopsy Needle (NBND)**

To use the NBND needle:

- RTNBND76 and GT2776
- RTNBND116 and GT27116
- RTNBND160 and GT27160
Drill Assemblies

DA27 is a 2.7 mm diameter twist drill that can make a skull hole through the standard GT27(X) guide tubes. (X = 76, 116, 160). The drill is fitted with a depth stop and knurled knob. The knob facilitates gripping and twisting the drill by hand.

To use the Drill Assemblies:

- DA27 Drill Assembly: RB27 and GT27(X) (X = 76, 116, or 160)
- DA32 Drill Assembly: RB32 and GT32(X) (X = 76, 116, or 160)
- DA46 Drill Assembly: GT46116
- DA63 Drill Assembly: DA63GS and DA63GB

Attaching the Arc System to the Phantom Base

Note To ensure proper attachment of the arc to the Phantom Base, inspect the balls on the base plate prior to assembly to verify that they are not damaged or loose.

The CRW Phantom Base Assembly:
1. Adjust the AP, Lat, and Vert of the target on the Phantom Base scales.

A. AP scale adjustment thumb screw (see photo):

B. Lateral scale adjustment thumb screws (see photo):

Caution: The lateral scale adjustment screws are located on the underside of the scale. Do not remove the screws on the top of the scale; this will result in disassembly of the scale and will cause the CRW Phantom Base to be out of calibration.

C. Vertical scale adjustment thumb screw (see photo):
2. Confirm that the Phantom Base and CRW arc are both set to the same coordinates.

3. If the Phantom Base is sterilized, proceed to step 5. If not, proceed to step 4.

4. If the Phantom Base is not sterile, drape the Phantom Base with the Apuzzo stereotactic drape to ensure that the CRW arc remains sterile and is not contaminated. For instructions on using the sterile drapes, see "Creating a Sterile Field" on page 46.

5. Insert phantom sterile pointer (RLPPSP) into the vertical slide and ensure that it is fully inserted and is resting on the vertical slide. Tighten thumb screw.

6. Fit the three fixation ball feet on the bottom of the arc base into the ball sockets of the phantom base.

7. Secure the CRW arc system by tightening the screws on the left and right ball socket, and the cam lock on the posterior ball socket. Use care not to loosen the lateral scale adjustment thumb screws, or any other adjustment thumb screw.

**Note** Use the Phantom Base to check the probe depth before surgery, whenever possible.

**Note** To further check the accuracy of the coordinate settings, loosen the trunion rings and rotate the upright arc to verify that the tips of the arc system pointer and Phantom Base pointer remain in contact, or in the same relative position to each other, throughout the radii of travel.

**Note** To further check the accuracy of the coordinate settings, loosen and rotate the probe holder to verify that the tips of the arc system pointer and Phantom Base pointer remain in contact, or in the same relative position to each other, throughout the radii of travel.
Attaching the Head Ring to the Operating Table

This procedure requires the MAYFIELD® Adapter or flat MAYFIELD Adapter and the CSS bolts.

Attaching the Universal Compact Head Ring (UCHRA) or the HRAIM to the Operating Table

Note The following procedure outlines the use of the MAYFIELD Adapter; the same steps should be followed when using the flat MAYFIELD Adapter.

1. Clamp the MAYFIELD Adapter to the operating table as shown.

2. Attach the UCHRA or HRAIM to the MAYFIELD Adapter using the short T-Bolts.

Note Place the CSS T-bolts onto the head ring and guide the patient onto the head ring and guide the patient onto the CRWMA MAYFIELD Adapter to prevent the binding of the MAYFIELD Adapter to the MAYFIELD Swivel or Tri-Star Swivel Adapter.
Creating a Sterile Field

1. After the patient is secured to the OR table, place an Apuzzo sterile drape over the head ring. The drape has a centered adhesive patch for the patient's head and holes with adhesive that align with the sphere sockets on the arc adapter or the HRAIM.

   **Note**  Shave and prep the surgery area. Coat hair with lubricant to prevent the drape from sticking to the hair.

2. Remove the backing of the center adhesive area.

3. Place the drape firmly over the patient’s head at the area where the entry point will be.
4. Remove the adhesive backing from the hole areas.

5. Secure the drape to the arc adapter or HRAIM, centering the holes over the sphere sockets to minimize binding when securing the cam locks to the CRW arc system.

6. The following illustration shows the arc system being placed over the sterile drape.
Attaching the Arc to the Head Ring

**Note** To ensure proper attachment of the arc to the head ring, inspect the balls on the base plate prior to assembly to verify that they are not damaged or loose.

**Note** The arc system attaches to both the HRAIM and the UCHRA in only one orientation.

**Note** Before attaching the CRW arc to the UCHRA, make sure to assemble the UCHRA with the adapter plate.

**Note** If necessary, remove the anterior base plate to provide patient comfort or airway access.

1. Fit the three fixation ball feet on the bottom of the arc base into the ball sockets of the UCHRA arc adapter, or into the ball sockets of the HRAIM.

2. Secure the cam locks.

- The assembled CRW Precision Arc and Universal Compact Head Ring.
Scanning the Luminant® Localizer Frame

The Luminant® MR/CT localizer frame (LL01) is a universal localizer designed for use in both MR and CT imaging. The frame is designed to fit the Universal Compact Head Ring (UCHRA) during standard MR or CT imaging. The Luminant localizer can be used with StereoCalc™, NeuroSight® Arc, or other appropriate target/trajectory–calculation applications. For complete instructions on scanning the Luminant localizer, see the Luminant Localizer Instructions for Use.

**Note** After scanning the patient, prior to bringing the patient to the operating room, remove the localizer frame from the patient’s head ring to allow airway access and store to avoid accidental damage.

Manually Calculating the Luminant Target Positions

After scanning the patient in the Luminant localizer, you can manually calculate the positions of targets for axial, coronal, and sagittal scans.

**Note** These calculations are performed directly on the CT or MR console.

**Note** There is no difference between CT and MR regarding the actual calculations.

It is critical to understand which side of the scan corresponds to patient–right and patient–posterior. Pay close attention to the orientations of the images shown in the scanner; the geometry may be reversed.

Be extremely careful with negative numbers when performing hand calculations. Not all scanners discriminate between positive and negative directions.

Scans must be acquired orthogonal to the localizer for manual calculations.
The distances and coordinates correspond as follows:

- \( \text{LAT} = X \)
- \( \text{AP} = Y \)
- \( \text{VERT} = Z \)

### Calculating Target Positions for Axial Scans

**Find The Center of the AP–LAT Plane**

1. Select an axial slice that best shows the desired target.
2. Locate rod 1, on the patient’s right–posterior, and rod 7, on the patient’s left–anterior. Draw a line connecting the centers of those two rods.
3. Locate rod 3, on the patient’s right–anterior, and rod 9, on the patient’s left–posterior. Draw a line connecting the centers of those two rods.

**Note** The intersection of these two lines marks the center point \((0,0)\) of the AP–LAT plane.

**Find the AP and LAT Distances to the Target**

1. Use a scanner function to place a grid or set of axes on the screen. A point of this grid must be at the center \((0,0)\) of AP–LAT plane.
2. Measure the AP and LAT distances from the center point \((0,0)\) of the AP–LAT plane to the target.

**Note** The position of the target is relative to the origin of the AP–LAT plane. Movements from patient left–to–right or patient posterior–to–anterior produce positive numeric values, while movements from patient right–to–left or patient anterior–to–posterior produce negative numeric values.
Find the VERT Coordinates to the Target

1. Measure the distance from the center of Rod 1 to the center of Rod 2. Record this value as $Z_1$.

2. Measure the center–to–center distance between rods 7 and 8. Record this value as $Z_2$.

3. Calculate $Z$, where $Z = [Z_1 + Z_2]/2$.

4. Calculate the VERT coordinate:
   - $\text{VERT} = Z – 60\text{mm}$

Note A positive value is above the center of localizer frame (Superior); a negative value is below center (Inferior).

Calculating Target Positions for Coronal Scans

Find the Center of the LAT–VERT Plane

1. Select a coronal slice that best shows the desired target.

2. Locate rod 1, on the patient’s right–inferior, and rod 7, on the patient’s left–superior. Draw a line intersecting the centers of those two rods.

3. Locate rod 3, on the patient’s right–superior, and rod 9, on the patient’s left–inferior. Draw a line connecting the centers of those two rods.

Note The intersection of these two lines marks the center point (0,0) of the LAT–VERT plane.
Find the LAT and VERT Distances to the Target

Note Make sure that the image is not skewed or tilted.

1. Use a scanner function to place a grid or set of axes on the screen. A point of this grid must be at the center (0,0) of LAT–VERT plane.

2. Measure the LAT and VERT distances from the center point (0,0) of the LAT–VERT plane to the target. The scanner may perform a distance function from (0,0) to the target and provide x and y ordinates automatically.

Note The position of the target is relative to the origin of the LAT-VERT plane. Movements from patient left-to-right or patient inferior-to-superior produce positive numeric values, while movements from patient right-to-left or patient superior-to-inferior produce negative numeric values.

Find the AP Coordinates

1. Measure the distance from the center of rod 1 to the center of rod 2. Record this value as Y1.

2. Measure the center-to-center distance between rods 7 and 8, and record this as Y2.

3. Calculate Y, where Y = [Y1 + Y2]/2.

4. Calculate the AP coordinate:
   • AP = Y – 60mm

Note A positive value is in the anterior direction; a negative value is in the posterior direction.
Calculating Target Positions for Sagittal Scans

**Find the Center of the AP-VERT Plane**

1. Select a sagittal slice that best shows the desired target.

2. Locate rod 1, on the patient’s posterior–inferior, and rod 7, on the patient’s anterior–superior. Draw a line intersecting the centers of those two rods.

3. Draw a straight line through the centers of rods 1, 2 and 3.

4. Draw a parallel line, 112 mm towards the Anterior. The intersection point of the two lines marks the center (0,0) of the AP-VERT plane.

**Note** The origin is 112 mm from Posterior, but 105 mm from anterior.

**Find the AP and VERT Distances to the Target**

**Note** Make sure that the image is not skewed or tilted.

1. Use a scanner function to place a grid or set of axes on the screen. A point of this grid must be at the center (0,0) of AP–VERT plane.

2. Measure the AP and VERT distances from the center point (0,0) of the AP–VERT plane to the target. The scanner may perform a distance function from (0,0) to the target and provide x and y coordinates automatically.

**Note** The position of the target is relative to the origin of the AP-VERT plane. Movements from patient posterior–to–anterior or patient inferior–to–superior produce positive numeric values, while movements from patient anterior–to–posterior or patient superior–to–inferior produce negative numeric values.
Find the LAT Coordinate

1. Measure the distance from the center of Rod 1 to the center of Rod 2. Record this value as $X_1$.

2. Measure the center-to-center distance between rods 7 and 8. Record this as $X_2$.

3. Calculate $X$, where $X = \frac{X_1 + X_2}{2}$.

4. Calculate the LAT coordinate:
   - LAT = $X - 60\text{mm}$

Note: A positive value is to the patient’s right; a negative value is to the patient’s left.

Scanning the BRW Localizer Frame

The Brown, Roberts, and Wells Localizer Frame (BRWLF) is used for spatial localization of target coordinates for targets seen in a CT image. The localizer enables calculation of stereotactic targets and trajectories relative to the head ring assembly, using data taken from a scan slice. The BRW frame can be used with the StereoCalc, NeuroSight Arc, or other appropriate target approach calculation applications.

Note: Refer to the appropriate User’s Manual for complete instructions on data collection and use.

Note: After scanning the patient, prior to bringing the patient to the operating room, remove the BRW localizer frame from the patient’s head ring to allow airway access and store to avoid accidental damage.
Collecting CT Scan Rod Position Data

1. Collect CT data after the patient scan.

2. Use a scanner function to determine each of the rod position coordinates on the BRW localizer frame. Note that the number 1 rod is the largest, while the number 2 rod appears closest to the number 1 rod.

3. Record these coordinates.
About the Arc System

The coordinate scales on the CRW® Precision Arc system directly correspond to target positions relative to the head ring assembly. The arc is a target–centered system: the probe path, relative to the transverse arc, is a radius for that arc. Therefore, for any position of the probe holder, any radius corresponding to that position will pass through the target. Similarly, for any rotation angles of the arc trunion rings, the corresponding probe path will pass through the target.

The target lies on the center of the transverse arc circle and on the center line between the trunion rings.

To prevent patient injury, do not adjust the CRW arc coordinates or trajectory settings while an instrument is inserted into the patient.
To prevent user injury, inspect the CRW system for sharp edges or burrs prior to use.

**Note**  The CRW system probe holder can accommodate instruments up to 4 lbs.

**Note**  This note applies to those clinicians who, in the course of planning a stereotactic procedure, select an approach that is not parallel to the midline of the patient. The CRW Precision Arc has been designed with a slide range of +/- 55 degrees. Note the following guidelines:

For StereoCalc™ users that select an entry point, take note of the slide value that StereoCalc calculates during planning. If the value is outside the range +/- 55 degrees, it may be possible to change the probe carrier orientation for the arc and preserve the approach. The **Probe Carrier Orientation** selector is found on the tab labeled "**Arc Orientation**". Once that is done, re-enter the entry point information.

For StereoCalc users that set azimuth and declination, the user should also take note of the slide value, and attempt to change the probe carrier orientation as described above. Once that is done, re-enter the azimuth and declination.

For NeuroSight® Arc users that select an entry point, take note of the slide value that NeuroSight Arc calculates during planning. If the value is outside the range +/- 55 degrees, it may be possible to change the probe carrier orientation for the arc and preserve the approach. In NeuroSight Arc, the **Probe Carrier Orientation** selector is found at the bottom of the **Arc Setting** tab on the **Planning** panel. This is the same area of the software where the target and entry points are set.

If it is not possible to find another probe carrier orientation for that approach, a new entry point or azimuth and declination must be chosen.

**Target Position as Center of Arc**

All radii of the transverse arc always pass through the target, and the target position equals the center of the transverse arc for all arc slide and ring angles.
About the Arc System Coordinates

**AP (Anterior–Posterior) Scales**

The AP scales of the arc base are ruled in increments from 0 to 100 mm in both the anterior and posterior directions. A negative sign (–) is stamped next to posterior numbers.

**Note** The words Anterior and Posterior are engraved on the corresponding ends of the Base.

**LAT (Lateral) Scales**

The LAT scales are at the front and rear of the upright arc assembly.

- The scales run from 0 to 100 mm to the right and left sides of center.
- Negative numbers have a negative symbol (–), and are shown on the corresponding base plate scale.
- The words Right and Left are stamped on the corresponding ends on the corresponding base plate of the scale.

**Vert (Vertical) Scales**

VERT scales are engraved on the trunion slides.

- The scale ranges from 0 to 80 mm as the trunion rings are lifted, and 0 to –60 mm as the trunion rings are lowered.
Measuring Arc System Coordinates with the Vernier Scale

This topic describes how to set coordinates using a vernier scale. The following illustrations show sample vernier settings for 20.0, 24.9, and 10.1:

A simple method of setting the vernier scale:

1. To set 24.9, add 24+9=33.
2. Move the #9 mark on the vernier scale to line up with the “33” on the whole scale.
Setting the Coordinates with a Vernier Scale

Setting the AP (Anterior–Posterior) Coordinates
Loosen thumb screws and align the trunion slide scale with the appropriate AP target value on the arc base, then tighten the thumb screws.

Setting the LAT (Lateral) Coordinates
1. Loosen the thumb screw on the back of the lateral arc slide, and align the lateral arc slide scale with the appropriate value on the arc frame.
2. Tighten the thumb screw.

Caution  The upright arc assembly scale is not stamped with positive (+) or negative (-) symbols. Use the corresponding arc base scale to set the appropriate positive or negative value on the lateral arc slide.
**Setting the VERT (Vertical) Coordinates**

While supporting the arc frame, loosen the trunion slide screws and set the VERT coordinate on each vertical scale.

**Setting the Probe Holder Approach Angle**

Once the AP, LAT, and VERT coordinate settings are secure, adjust the probe holder angle.

1. Loosen probe holder thumb screw and slide the holder to the appropriate angle.
2. Tighten the thumb screw:

**Note** For users of older CRW systems, the CRW Probe Holder approach angle now ranges to 55° in either direction of zero.
Setting the Trunion Ring Approach Angle

1. Loosen each trunion ring locking thumb screw.
2. Loosen each trunion ring locking ring by rotating counter-clockwise.
3. Set the ring scale to the appropriate angle.

Transposing the Arc Rings

Trunion rings can be transposed from a left–to–right to an anterior–posterior orientation on the arc base.

Note: Before transposing the trunion rings, confirm that both trunion slide vertical scales are set to the same coordinate and that there is no tension or torque between the two trunion rings. This check will ensure that the arc assembly slides off and on the base easily.

Transpose the Trunion Rings

1. Loosen the trunion slide thumb screws and slide the arc assembly off the base.
2. Rotate the assembly 90° degrees, slide it onto the base, and tighten the thumb screws.

![Image showing the CRW® Precision Arc System]

With the arc trunion rings set along the anterior-posterior axis of the arc base, the trunion slides will move along the LAT tracks of the base plate. In this orientation, the A-P target coordinate is set on the transverse arc coordinate scale, and the LAT target coordinate is set with the trunion slide.

Note that LAT and AP target coordinates, and their positive/negative values, are always derived from the base plate no matter what the orientation of the arc.

Using Parallel Trajectories

To approach several targets via parallel tracts:

1. Set the AP, LAT, and VERT slides and arc angle slides for the first target coordinates.
2. Keeping the arc angles constant, set each additional target.

Entering Multiple Targets Through a Single Burr Hole

To approach several targets through a single burr hole:

1. Set the AP, LAT, and VERT coordinates on the arc for the first target.
2. Position the two arc angles so that the probe passes through the single burr hole.
3. Set the AP, LAT, and VERT coordinates for the next target on the arc base. The probe can then be passed through the same burr hole by adjusting the two arc angles (the transverse arc and the trunion rings).

This procedure is repeated for multiple targets.
Examples of Different Arc Orientations

**Lateral Approach**

A lateral approach is shown with the arc system rotated on the arc base.

A front view of a lateral approach is shown with the arc system rotated on the arc base over the sterile drape.
**Posterior Fossa Approach**
A posterior fossa approach is shown with the arc system rotated on the arc base.

**Transphenoidal Approach**
Transphenoidal approach shown with the anterior plate removed.

**Standard Approach**
The traditional standard approach is shown with the probe holder facing the posterior.
Tools for Calibration Guidance

The Micro Slide (CRWMS) and Probe MicroDrive (CRWPMDD) enable smooth and calibrated guidance for any fine instrument or electrode. The Micro Slide and Probe MicroDrive have a scale for measuring how far a probe is inserted in the patient.

Using the Micro Slide

1. Insert the appropriate plastic bushing into slide.
2. Insert the appropriate guide tube into the guide block portion of the Micro Slide.
3. Set slide to zero.
4. Insert instrument through the plastic bushing on the slide, then through the guide tube.
5. Measure the instrument to be 160 mm from the bottom lip of the guide block.
6. Tighten the depth stop.
7. Instrument can now be placed at any depth along the CRW® trajectory.
Using the MicroDrive

Never use the inch setting of the Digital Probe MicroDrive because all of the CRW arc system settings are in mm.

1. Set the Digital Probe MicroDrive to millimeters by pressing the in/mm button on the digital display.

Note The Digital Probe MicroDrive uses both a digital readout and a verniated scale.

Caution The digital readout will change sign when the carrier passes zero. Pay careful attention to the sign; this will identify whether the probe is above or below the target.

2. Calibrate the digital display to zero with the verniated scale set to zero.

Measuring a Relative Distance

1. Set the digital display to show absolute distances using the ZERO/ABS button.

Note When the ZERO/ABS button is pressed in firmly, the display will turn to zero and show “INC” on the display.

2. Position the instrument so that the display reads the desired value.

3. Press the ZERO/ABS button again, and the display will reset to zero. Measure the next absolute distance.

Note The Digital Probe MicroDrive must be shut off to change from Absolute measurements. When turned back on, the MicroDrive will display in Zero mode again.

4. Recalibrate zero by pressing and holding the ORIGIN button until the display changes to zero.

Be sure to recalibrate the Digital Probe MicroDrive back to the zero point of the verniated scale after completing the operation.
**Visualizing Lateral Trajectories with the Trunion Reticles**

The trunion reticles (CRWTBSS) accommodate alignment for a lateral x-ray of the target. The reticles are placed on the inside of the trunion ring and secured with a single screw. The reticles are fixed at the CRW target.

*Note*  The reticles should be inserted before attaching the CRW arc system to the head ring. While it is possible to insert them while on the patient, it may be more difficult especially when treating low targets.

---

**Visualizing Anterior-Posterior Trajectories with the AP Reticles**

The Anterior–Posterior Reticles (CRWAPBS) align with the arc to visualize the trajectory in AP view. The AP reticles accommodate alignment of an x-ray camera for an AP x-ray of the target.

1. Loosen the thumb nuts so that the sight support is loose, and slide the sight into the left/right track of the arc base.
2. Set the lateral position to coincide with the lateral target on the CRW arc system.
3. Tighten the thumb nuts when the reticle is in place.
4. Set the vertical scale to coincide with the vertical target on the CRW arc system.
5. Tighten the thumb screw to secure reticle at the VERT setting.
6. Use the vertical scale on each reticle for vertical alignment.

Clamping Patients to the CT Table

Clamping plates for CT scanners are used when there is a need to clamp the patient to the CT table in order to hold the patient’s head still. For more information, contact Integra technical support for specific information.

Using the Geometric Phantom for Qualifying Transfer Accuracy

The Geometric Phantom qualifies the transfer accuracy between the scanner and specific Integra software. It provides a full independent check that the head ring, localizer, CT or MR scan images and software all give accurate volumetric target localization.

About the Geometric Phantom

The Geometric Phantom is a plastic globe with a removable top and precisely located structures inside the globe. The Geometric Phantom attaches to various stereotactic head ring assemblies.

<table>
<thead>
<tr>
<th>GEOPH1:</th>
<th>Phantom for HRAIM</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOPH3:</td>
<td>Phantom for UCHRA</td>
</tr>
</tbody>
</table>
Cleaning the CRW® Components

Note
The use of Betadine® and other related fluids containing iodine may stain the surface of the stereotactic system. To minimize discolorization, wipe off any traces of Betadine and similar solutions as soon as possible during or following the surgery.

Cleaning the HRAIM and UCHR Components

Use the following guidelines when cleaning the Universal Compact Head Ring (UCHR) components (head ring, posts, screws, and CT intubation head ring):

Caution Do not use saline, as it will attack the metal surface. Do not use corrosive agents, such as Clorox® or Cidex®. Do not use alcohol or hydrogen peroxide on any black composite materials.

- After each procedure, clean components with de-ionized distilled water to remove any residue of Betadine, blood, CSF or other debris.
- Thoroughly dry and wrap components for sterilization.
- Remove any liquids from components as soon as possible after surgery to prevent corrosion or tarnishing of the surfaces.
- The cleaning tap (TAP) may be used to remove debris from inside the head ring post threads. Insert fully and remove the tap to cleanse the thread.

Cleaning the BRWLF and Luminant® Localizer Frames

The localizer frames are not exposed to the surgical environment and should not be sterilized. However, if grease or other dirt accumulates on the frame, wipe it down with distilled water and promptly dry.
Cleaning the CRW Precision Arc System

Prior to cleaning, remove the guide block, guide tube, and other accessories to ensure that the cleaning solution is thoroughly rinsed off.

The CRW Precision Arc system should always be HAND WASHED, RINSED and DRIED prior to sterilization. Subjecting the CRW Precision Arc system to automatic or power washing cycles or sterilizing prior to thoroughly drying the system may cause the CRW Precision Arc system to bind and potentially fail upon assembly and use.

Because the CRW Precision Arc system is exposed to blood, CSF, Betadine, and other solutions, it is mandatory to adhere to the following procedures:

- Wash the arc system with distilled, de-ionized water and mild hand cleaner after surgery to remove all traces of potentially corrosive fluids.
- Soak the CRW arc system in an enzymatic detergent solution (Metrizyme® or equivalent) for five (5) minutes.
- Rinse the CRW arc system in distilled, de-ionized water for one (1) minute.
- Soak the CRW arc system in a cleaning solution (DetergeZyme® or equivalent) and using a soft bristle brush, remove all traces of blood and debris. Pay close attention to any hard to reach areas, textured surfaces or crevices. Caution should be taken not to create an aerosol while brushing.
- Rinse the CRW arc system in distilled, de-ionized water for one (1) minute.
- Repeat the process if visible soil is observed.
- Examine the T-slots on the base of the arc and wipe off any solution residue with a cloth or a cotton swab.
- Dry the arc system promptly after washing.
- Wrap the arc in sterile drapes during storage to protect it from physical damage.

Note Moving parts of the arc system may be lubricated with a medical silicone spray lubricant.

Note Use of alcohol may remove the black engraving on the CRW Anterior-Posterior Retics (CRWAPBS), CRW Phantom Base (CRWPBS), Universal Compact Head Ring (UCHR), and CRW Micro Slide (CRWMS).

Cleaning Miscellaneous CRW Parts

If instruments are exposed to highly caustic solutions such as bleach solutions, immediately rinse the instruments with de-ionized distilled water to prevent corrosive damage to surfaces and moving parts.

Clean the MAYFIELD® Adapter, CT clamping plate, T-handle adaptor screws, head ring wrenches, tap, and drill assemblies as described above in the "Cleaning the CRW Precision Arc System" section.
Disassembling the CRW Precision Arc System Components

The CRW Precision Arc System should be disassembled prior to cleaning and sterilization to the point that the components fit into the sterilization case provided with the CRW Precision Arc System. No tools are required to disassemble the CRW Precision Arc System. Further disassembly of the components should never be performed, as it may compromise the calibration of the CRW system. Specifically, the trunion rings and vernier scales should never be fully disassembled. If the system is disassembled and the trunion rings or vernier scales are removed, the system must be returned to Integra for re-calibration.

Note All thumb-screws on this system have been captured and have been designed and validated to remain on the system during cleaning and sterilization. The CRW Precision Arc should be broken down to its component level without removing any screws from their components and placed back into the sterilization tray as shown on pages 18 and 19. While all thumb screws and moving parts should be loosened prior to cleaning and sterilization, no further disassembly is necessary and no screws should be removed. The arc shall remain on the lateral slide when placing it back into the sterilization tray. The Trunion ring locks should never be removed. The system has been validated for all of the sterilization protocols listed on page 75 of this manual with specified parameters.

Packing the CRW Components

Pack the CRW components into the sterilization trays after cleaning and before sterilization.

Placing the UCHRA in the Sterilization Case
Placing the CRW Precision Arc in the Arc Component Tray

Placing the CRW Accessories into the Accessories Tray
Sterilizing the CRW Components

Whenever virus–contact with the instrumentation is possible, proper sterilizing measures must be followed. It is the responsibility of hospital personnel to review sterilization procedures for susceptible components and to implement procedures addressing such hazards.

Do not sterilize the localizer frame. Sterilization may damage the component and render it inoperable.

Parameters for Sterilizing the CRW Components

The following tables provide recommended sterilization parameters for the CRW stereotactic system. Due to variations in sterilization chambers and load configurations, it is the responsibility of the facility to determine a sterilization protocol that ensures sterility of the device.

<table>
<thead>
<tr>
<th>EtO(100% EtO) Parameters:</th>
<th>Cycle 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration:</td>
<td>≥ 883 mg/L</td>
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<tr>
<td>Temperature:</td>
<td>≥ 131°F / 55°C</td>
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<tr>
<td>Exposure Time:</td>
<td>≥ 60 minutes</td>
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<tr>
<td>Humidity:</td>
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<table>
<thead>
<tr>
<th>Steam AutoClave (Pre-Vacuum) Parameters:</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature:</td>
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<td>275°F / 135°C</td>
<td>273°F / 134°C</td>
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<td>Exposure Time:</td>
<td>4 minutes</td>
<td>3 minutes</td>
<td>18 minutes</td>
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<td>Dry Time:</td>
<td>20 minutes</td>
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<td>20 minutes</td>
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<table>
<thead>
<tr>
<th>Sterrad® Parameters:</th>
<th>Option 1</th>
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</thead>
<tbody>
<tr>
<td>System:</td>
<td>100S</td>
</tr>
<tr>
<td>Temperature:</td>
<td>45°C to 55°C (113°F to 131°F)</td>
</tr>
<tr>
<td>Exposure Time:</td>
<td>20 minutes</td>
</tr>
<tr>
<td>Cycle Time:</td>
<td>~55 minutes (short cycle)</td>
</tr>
</tbody>
</table>
# Summary of CRW Sterilization Procedures

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>EtO</th>
<th>Steam Autoclave</th>
<th>Sterrad</th>
</tr>
</thead>
<tbody>
<tr>
<td>UCHR</td>
<td>Universal Compact Head Ring</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>UCHR, UCHRPA, UCHRPP</td>
<td>Composite head ring posts, cross bar &amp; attach screws</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>HRIM</td>
<td>Intubation head ring</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>HRP</td>
<td>Head ring posts</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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<td>HRKTP</td>
<td>Head ring positioner</td>
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<td>N/A</td>
<td>N/A</td>
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<tr>
<td>TAP</td>
<td>Post tap</td>
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<td>Yes</td>
<td>No</td>
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<tr>
<td>HREBA</td>
<td>Ear bar assembly</td>
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<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>HRW</td>
<td>Head ring wrench</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>BRWLF</td>
<td>CT localizer</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Luminant® (LLO1)</td>
<td>MR / CT localizer</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<tr>
<td>CRWPRECISE</td>
<td>CRW stereotactic system</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>CTCP</td>
<td>Clamping plate</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>CRWWMA &amp; CRWFMA</td>
<td>MAYFIELD® adapter</td>
<td>N/A</td>
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<tr>
<td>CRWPGB</td>
<td>Guide Block</td>
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<td>Yes</td>
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<tr>
<td>KDG</td>
<td>Keller Depth Gauge</td>
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<td>Yes</td>
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<tr>
<td>SR</td>
<td>Steel Ruler</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>CSS</td>
<td>Conical t-bolt screw</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
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<tr>
<td>CRWPBS</td>
<td>Phantom Base Assembly</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>CRWASP</td>
<td>Arc System Pointer</td>
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<td>Yes</td>
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<td>CRWFASP</td>
<td>Fixed Arc System Pointer</td>
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<tr>
<td>CRWTSRSS</td>
<td>Trunion Ring Reticles</td>
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<tr>
<td>CRWAPBS</td>
<td>Anterior / Posterior Reticles</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>DAXx &amp; SDK</td>
<td>Drill Assemblies</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>SDK</td>
<td>Salcman Drill Kit</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>GT2776</td>
<td>Guide Tube (2.7mm I.D. x 76mm length)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td>GT27116</td>
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<td>GT27160</td>
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<td>Yes</td>
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</tr>
</tbody>
</table>
In the "Summary of CRW Sterilization Procedures" table, the term **N/A** (not applicable) is listed next to items that should be cleaned, but are not sterilized.

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>EtO</th>
<th>Steam Autoclave</th>
<th>Sterrad</th>
</tr>
</thead>
<tbody>
<tr>
<td>GT3276</td>
<td>Guide Tube (3.2mm I.D. x 76mm length)</td>
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<td>GT32160</td>
<td>Guide Tube (3.2mm I.D. x 160mm length)</td>
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<td>Yes</td>
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<td>GT46116</td>
<td>Guide Tube (4.6mm I.D. x 116mm length)</td>
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<tr>
<td>RB27</td>
<td>Reducing Bushing (2.7mm I.D.)</td>
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<td>RB32</td>
<td>Reducing Bushing (3.2mm I.D.)</td>
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<td>Yes</td>
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<td>Reducing Tube (1.1mm I.D. x 76mm length)</td>
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<tr>
<td>RT11116</td>
<td>Reducing Tube (1.1mm I.D. x 116mm length)</td>
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<td>RT20116</td>
<td>Reducing Tube (2.0mm I.D. x 116mm length)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>RT20160</td>
<td>Reducing Tube (2.0mm I.D. x 160mm length)</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>RT2176</td>
<td>Reducing Tube (2.1mm I.D. x 76mm length)</td>
<td>Yes</td>
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<tr>
<td>RT21116</td>
<td>Reducing Tube (2.1mm I.D. x 116mm length)</td>
<td>Yes</td>
<td>Yes</td>
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</tr>
<tr>
<td>CRWP30</td>
<td>30° Offset Probe Holder</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>CRWMS</td>
<td>Probe MicroSlide</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>CRWPMDBXX</td>
<td>Probe MicroSlide Bushings</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>CRWPMDD</td>
<td>Digital Probe MicroDrive</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>DSxx</td>
<td>Depth Stop, plastic</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
Chapter 7 • Cleaning, Sterilizing, and Maintaining the CRW® Precision Arc Stereotactic System

Maximum Sterilization Load (Accessories)

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRWPGB</td>
<td>Guide Block</td>
<td>1</td>
</tr>
<tr>
<td>CRWP30</td>
<td>30° Offset Probe Holder</td>
<td>1</td>
</tr>
<tr>
<td>CRWASP</td>
<td>Arc System Pointer</td>
<td>1</td>
</tr>
<tr>
<td>CRWFASP</td>
<td>Fixed Arc System Pointer</td>
<td>1</td>
</tr>
<tr>
<td>CRWMS</td>
<td>Probe MicroSlide</td>
<td>1</td>
</tr>
<tr>
<td>CRWPMDBXX</td>
<td>Probe MicroSlide Bushings</td>
<td>3</td>
</tr>
<tr>
<td>GTXXXX + RTXXXX</td>
<td>Guide Tubes + Reducing Tubes</td>
<td>9</td>
</tr>
<tr>
<td>DAxx</td>
<td>Drill Assembly</td>
<td>1</td>
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<tr>
<td>KDG</td>
<td>Keller Depth Gauge</td>
<td>1</td>
</tr>
<tr>
<td>SR</td>
<td>Steel Ruler</td>
<td>1</td>
</tr>
<tr>
<td>CSS</td>
<td>Conical T-Bolt Screw</td>
<td>2</td>
</tr>
</tbody>
</table>

The CRW Precision sterilization trays should never be used to sterilize non-CRW system components. Doing so may compromise sterilization efficacy of the sterilized load per the validated sterilization techniques and parameters.

Maintaining the CRW System

Preventing Equipment Loss

Be sure to gather the small, miscellaneous parts (such as bushings, screws, and nuts) following surgery to prevent loss. These items can be stored with the CRW Precision Arc System in the small parts container in the sterilization tray, if applicable sterilization methods are being used for the parts and the CRW Precision Arc System.

CRW System Calibration

The CRW Precision Arc and Phantom Base are manufactured and calibrated to have an intrinsic accuracy of 0.5 mm or less, determined by bench testing. The CRW Precision Arc and Phantom Base should be returned to Integra at a minimum of once a year for inspection and calibration. If the system is subject to
damage or its accuracy is in question, the system should be returned to be inspected and calibrated immediately.

The CRW Precision Arc sterilization case is labeled with the system’s last calibration date. This information is found on the side of the sterilization case and is labeled using the following format:

**Calibration Date: YYYY-MM**

After the CRW system has been re-calibrated and returned, please remove the existing plastic calibration date tag. The CRW system will be returned with an updated calibration date tag which can then be applied to the sterilization case.

The CRW Precision Arc and the CRW Phantom Base are not serviceable by the user and only should be repaired and calibrated at the Integra factory.

---

**Returning the CRW System for Service or Maintenance**

1. Place the CRW system’s sub-assemblies into the base layer of the packaging foam as shown.

2. Insert the middle layer of CRW packaging foam.
3. Place the CRW base plate into its respective cutout in the middle layer of packaging foam as shown.

![CRW base plate in packaging foam]

4. Insert the top layer of CRW packaging foam as shown.

![Top layer of CRW packaging foam]

5. Close and seal the box.

6. Call the Integra Technical Services and Repairs Department using their 24-hour hotline at 1-888-772-7378 or +1-781-565-1401. They will provide you with a Return Authorization Number and provide further instructions on returning the CRW system.
INDEX

A
accessories, list of CRW 7
accuracy
mechanical 3
system 3
verifying target with phantom base 44
adapter plates, UCHRAP
attaching 26
picture of 9
airway access, improving 48
alcohol, effects on black engraving 71, 72
anterior base plate, removing 48
Appuzzo sterile drapes 46
arc adapter plate, attaching 26
arc base plate, using 34
arc orientations, CRW 65–66
arc system
about the CRW 57
arc system pointer, setting the 39
assembling the 34–38
cleaning the 72
disassembling the 73
pointers 39, 40
assembly
arc 34–38
BRW localizer 32
HRAIM 27–31
Luminant localizer 33
phantom base 42–44
UCHRA 21–26
autoclave, parameters for 75

B
base plates, arc 34
biopsy forceps, support for 1
bleach, preventing damage from 72
Brown, Roberts, Wells (see BRW localizer frames)
BRW localizer frames
assembling the 32
cleaning the 71
scanning the 55
burr hole, entering multiple targets through 64
burs, inspecting system for 58
bushings, selecting tubes and reducing 41

C
calibrations
arc and phantom base 78
MicroSlides and MicroDrives 67–68
calibrations, effects of force on 3
clamping plates, CT table 70
cleaning instructions, CRW 71–72
comfort, removing anterior base plate for 48
compatibility, caution about mixing parts 34
compatibility, CT and MR 1
components, list of CRW 6–15
contraindications, CRW 1
coordinates, measuring with Vernier scales 60–62
creutzfeldt–jakob, contraindications for 2
cross bars, attaching head ring 22
CRWAPBS and CRWTBSS (see reticles, trunion and AP)
CSS bolts (see T-bolt screws)
CT and MR
CT localizers (see BRW localizer)
CT/MR localizer (see Luminant localizer)
MR imaging, warnings about HRAIM and BRW 32
support for 1

d
depth gauges, Keller 7
depth stops, sterilizing 77
depth, setting instrument and probe 39–40
disassembly, CRW 73
distances, measuring radial 40
drapes, Appuzzo sterile 46
drill assemblies, using the 42
drives, head ring 27

e
ear bars, assembling the UCHRA 23
electrosurgical devices, warnings for 3
endoscopes, support for 1
EtO sterilization, parameters for 75

F
fixed arc system pointer 39, 40

G
geometric phantom, qualifying scanners with 70
guide blocks and guide tubes, using 39–41

H
hair, preparing patient’s 46
handwashing the system 72
head ring accessories, UCHRA
drives 27
ear bars 23
positioner 28
posts 21–22, 28
screws 25
wrench 10, 21–26
head rings
accessories list 9
assembling the HRAIM 27–31
assembling the UCHRA 21–26
attaching arc to 48
attaching to table 45
positioning patients in 28–31
sterilizing the radiosurgery 75
head sizes, accommodating large 48
hematoma evacuators, support for 1
HRAIM, assembling the 27–31
HRD (head ring drives) 27
HRKTP (head ring positioner) 28
HRP (head ring posts) 21–22, 28
HRW (head ring wrenches) 10

Index • 81
I
icons, list of 4
infants, contraindications for 2
inspecting parts, ensuring accuracy by 3
intubation head ring (see HRAIM, assembling the)

K
Keller depth gauge 7

L
labels, calibration 79
lateral approach, arc orientation for 65
lateral arc slide, setting coordinates on 61
localization, CT and MR 1
localizer frames
   assembling the BRW and Luminant 32–34
Luminant localizer
   assembling the 33
   cleaning the 71
   manually calculating targets 49–54
   picture of 13
   scanning the 49

M
MicroSlide and MicroDrive, calibration tools 67–68
MR and CT
   CRW support for 1
   MR imaging, warnings about HRAIM and BRW 32
   MR/CT localizer (see Luminant localizer)
multiple targets, locating 64

N
NBND needle, using the 41
NeuroSight Arc, selecting entry points 58

P
packaging CRW for shipment 79–80
packaging, removing system from 18–20
packing, CRW components 73
parallel trajactories, setting 64
parts, list of CRW 6–15
patient comfort, removing anterior base plate 48
phantom base
   assembling the 42–44
   verifying target settings 44
phantom, qualifying scanners with geometric 70
pins, skull 29
pointer, arc system 39
positioner, head ring 28
posterior fossa approach, arc orientation 66
posts, head ring 21–22, 28
probe holder
   30 degree offset 8
   adjusting angles 62
   attaching to lateral arc slide 37
   supported weight for 58

Q
Quality Assurance, phantom base 44

R
radial distances, measuring 40
radiosurgery head rings
   sterilizing 75
reducing bushings and tubes
   picture of 8
   selecting 41
removing system from packaging 18–20
reticles, trunion and AP 69
returning CRW 79–80
rulers, probe depth 7

S
scales
   AP, LAT and VERT 59
   Vernier 60–62
scanning
   BRW localizer 55
   Luminant localizer 49
   qualifying with geometric phantom 70
   verifying orientations 49
screws, head ring 25
shipping CRW 79–80
single use devices, warnings about 2
skull pins, placing 29
standard approach, arc orientation 66
steam autoclaving 75
StereoCalc
   scanning BRW localizers 54
   scanning Luminant localizers 49
   selecting entry points 58
stereotactic procedures, supported 1
sterilization
   maximum loads 78
   procedures for CRW 75–78
   sterile devices, list of 15
   sterile fields, creating 46
   tray for CRW
      packing 73
      unpacking 18–20
Sterrad, parameters for 75
storing, CRW components 73
sub-assembly parts, caution about mixing 34
surgeon skills, CRW warning about 3
symbols, list of 4

T
   tables, attaching head ring to 45
tags, calibration 79
tap, cleaning 71
targets
   about AP, LAT and VERT 61
   calculating Luminant coordinates 49–54
   locating multiple 64
   verifying with phantom base 44
   Vernier scales 60–62
T-bolt screws 12, 45
temporalis muscles, avoiding the 29
transphenoidal approaches, arc orientation 66
transverse arcs, radii of 58
trunion reticles, using 69
trunion rings, setting 36, 63–64
trunion supports, attaching 35

U
UCHRA
   assembling the 21–26
   case for 73
   cleaning the 71
UCHRAP (see adapter plates, UCHRAP)
universal compact head ring assembly (see UCHRA)
unpacking the system  18–20

V
Vernier scales  60–62

W
warnings
  about surgeon skills  3
  adjusting arc settings  57
  anesthetizing gases  3
  BRW and HRAIM, CT only  27
  CT only localizer, BRW and HRAIM 32
  deriving LAT and AP targets  64
  electrosurgical equipment  3
  ground–referenced electrosurgical device  3
  handwash only  72
  head ring screws, selecting  25, 30
  inspecting parts  3, 58
  Luminant localizer targets  49
  monopolar or bipolar electrode  3
  recalibrating the digital probe microdrive  68
  reviewing sterilization procedures  75
  scan orientations  49
  setting the digital probe microdrive  68
  single use devices  2
  sterilization tray uses  78
  temporalis muscles  22
  using force  3
  weight support, probe holder  58
wrenches
  head ring, picture of  10

X
x-ray alignments, using trunion reticles for  69