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<td>Section 3.4: 3mm Pupil Software Release 3.1.00.00 and associated SWF# Section 4.2: clarified that this the tool contains the manufacturing test software. Section 7.18.8 Updated home screen to reflect new age selections on the user interface (that don’t overlap ages) and changed 6-20 age range to 6-19 or 6-20 years as shown in the user interface for software (dependent upon software version). Label the figure with the appropriate device software versions. Section 7.18.23 Noted the age range as 6-20 or 6-19 for running the final range finder model eye screening test.</td>
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<td>Corrected typo on Pg 7 &amp; photo on 7.18.8. Add steps for device to meet IEC 60601-1-2 4th Edition, where applicable: Section 5.3.6.3: Updated the removal of LCD-GND Harness connector. Section 5.3.6.6: Updated the removal of LCD-GND Harness connector with Figure 15 and updated the figures numbering after 16. Section 6.10.2.2: Updated the assembly step to include insert the LCD-GND harness on top right of the screw. Deleted one picture and added 2 picture showing top right screw with LCD-GND Harness</td>
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<td>Ref</td>
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<th>Procedure Updates:</th>
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<td>3.4 Update minimum SW HW Table.</td>
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<td>3.5 Updated Reference Equipment.</td>
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<td>3.6 Updated Reference Documents.</td>
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<td>6.10.2.2 step 6a Update to add illustration for New 728252 eSOM board antenna attachment.</td>
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<td>7.9 Added wireless test for new ECON board.</td>
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See SAP for Change Number, Approver(s) Name, and Date(s) of Approval.
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<td>ADDITIONAL INSTRUCTIONS FOR CHINA REPAIR LINE</td>
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<td>APPENDIX A</td>
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1 PURPOSE
This Work Instruction details how to perform evaluation and repairs of the SPOT VS-100 CR version units.

2 SCOPE
The steps and procedures in this work instruction apply to VS100 CR version Vision Screeners (S/N 15000 and above).

3 General Notes and References
The notes below leverage the MPS for China and Skaneateles (70027862 and WA-WI-MFG-025). Additional reference documents are also included.

3.1 Special Environment Conditions:
3.1.1 There are no special environmental conditions required for this repair line.

3.2 Special Handling Requirements:
3.2.1 ESD wrist straps shall be check in accordance with the Testing Instruction for wrist strap.
3.2.2 Gloves of finger coats shall be worn during the assembly of any optical assemblies.

3.3 Criteria for workmanship:
3.3.1 There are no special workmanship requirements beyond the standard workmanship procedure unless otherwise noted.

3.4 Minimum Hardware Software Table
The following table is used for reference only. Please refer to the appropriate SRN and / or TSB indicating the software upgrade and deployment process.

<table>
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<tr>
<th>Production Device Software Version</th>
<th>Device Software Dir (SWF DIR)</th>
<th>Manufacturing Test Software Version</th>
<th>Manufacturing Test Software Dir (SWF DIR)</th>
<th>LED F/W</th>
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Note 1 To create the VS100CR Micro SD SW tool P/N 20021360 for V 3.1.00.00-A0004, use directions from Dir 70028217.
Note 2 To create the VS100CR USB SW tool P/N 20022324 for V 3.1.00.00-A0004, use directions from Dir 70028218.
Note 3 To create the Mfg USB Test SW tool Dir 50011577 for Mfg VSD_3.0.02.32-mfg, use directions from Dir 70028218.

For IEC 60601-1-2 4th Edition compliance – reference TSB 20014996. If device was manufactured prior to 4th Edition, do not apply LCD-GND Harness in section 6.10.2.2. Devices built with these serial numbers and later are 4th Edition compliant: Plant 1000 - Serial number 34000 and later, Plant 1620 – Serial number 51155 and later

### 3.5 Reference Equipment

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<td>40004</td>
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<td>40024</td>
<td>Rangefinder Fixture</td>
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<tr>
<td>40058</td>
<td>Background Signal Fixture Assembly</td>
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<tr>
<td>40094</td>
<td>Lens Focus Fixture-E-Con (Cr)</td>
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<td>20023615</td>
<td>Tool Dual Band Wireless</td>
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<td>20023643</td>
<td>Tool VS100 Wireless Report Printer</td>
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### 3.6 Reference Documents

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<td>SOP-0341</td>
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<td>70027862</td>
<td>HOW2_VS100 Assembly (MPS For VS100CR In Skaneateles)</td>
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<tr>
<td>70027864</td>
<td>Vx100 IPA Guide</td>
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<td>7030620</td>
<td>Setup VS100 Dual Band Wireless</td>
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<td>Seek Current P/N</td>
<td>Spot Vision Screener Directions For Use</td>
</tr>
<tr>
<td>Dir 80024004 / P/N 728906</td>
<td>Spot Vision Screener Quick Reference Guide</td>
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Ref Blank Template DIR: 80010684 Ver. H
4 EVALUATE

4.1 Incoming Product
Review history and reason for return (allegation) information.
Check for any special instructions: rush, warranty, etc.
Confirm item matches traveler.
Verify SW version is current.
Verify
• RMA #
• Serial number
• Received date.
• Accessories received

| Pediavision Device – 30028,30028-EX 411370, 411477, 411187 | Microfiber Lens Cloth – 20063 |
| Wall Charger | VS100 Carrying Case – 20104 |
| Hospital Cord | USB Cover – 20064 |
| Spot IFU | Wrist Strap - 20077 |

4.2 Incoming inspection

4.2.1 Examine the device and accessories for:
4.2.2 Damaged housing.
4.2.3 Scratched or cracked display,
4.2.4 Charging port:
• Damaged,
• Misaligned
4.2.5 Damaged or missing Range Finder cover,
4.2.6 Front Window Condition Dirty/Loose/Damaged
4.2.7 Rattling inside unit
4.2.8 Damaged Power On/Off switch
4.2.9 Verify the device performs a screening using Rangefinder fixture.

4.2.9.1 Spherical Equivalent – OD (Spec: -0.75 to -1.75).
4.2.9.2 Verify device connects to available wireless network and obtains an IP address.
4.2.9.3 Verify all LEDs are present in capture mode.
4.2.9.4 Verify sound is functioning in capture mode.
4.2.9.5 Verify charging indicator is present when plugged in.
4.2.9.6 Test Print Function Connect the device to the test wireless network
   a. From the home screen, select Tools, network
   b. Enter the network name
   c. Check WPA/2 PSK
   d. Enter the network password
   e. Select OK. Exit [X] after successful connection
   f. Visually verify that the device is connected or repeat.

4.2.9.7 Connect to a printer
   a. From the home screen select Tools => Printer => + (Add)
   b. Locate and select your printer (HP Office Pro 6970 or equivalent).
   c. Select Continue => Edit Driver or locate and select your printer (HP Office Pro 6970 or equivalent).
   d. Select OK
   e. Select Save.
   f. After Save is complete select “Print Test page”

4.2.9.8 Verify device recognizes inserted USB flash drive (20021342 containing the manufacturing test software).

4.2.9.9 Record your findings on the form found in appendix A
## 4.3 Troubleshooting

<table>
<thead>
<tr>
<th>Reported or Observed Problem</th>
<th>Probable Cause</th>
<th>Remedy</th>
<th>Step Reference</th>
</tr>
</thead>
</table>
| Yellow screen in capture mode | Missing Range Finder cap  
Range Finder cap loose  
Bad Range Finder to Main PC Board connection | Replace Range Finder  
Re-seat cap (Replace Range Finder if necessary)  
Re-seat connection | Disassembly: 5.3.3  
Reassembly: 6.10.4 |
| No charging light present when device is plugged into wall power | Check connection between Wall Charger & Hospital Cord  
Check for loose/damaged charging port on Main PC Board  
Test with known good Wall Charger | Re-seat connection  
Replace Main PC Board  
Replace Wall Charger if necessary | Disassembly: 5.3.7  
Reassembly: 6.4 |
| Battery not holding a charge | Battery end of life if over 2.5 years  
Possible cell failure | Replace Battery  
Replace Battery | Disassembly: 5.3.2  
Reassembly: 6.11.1 step 3 and 4 |
| Battery charging light blink pattern inconsistent | Battery Pack chip failure | Replace Battery | Disassembly: 5.3.2  
Reassembly: 6.11.1 step 3 and 4 |
| Error message in capture mode: “Sorry for the inconvenience we need to reboot the device” | Check Camera Cable connection  
E-CON Board Problem | Replace Camera Cable  
If problem persists, replace camera board | Disassembly: 5.3.6  
Figure 11, 5.3.9  
Reassembly: 6.9, 6.10 |
| Error message: Screening system not initialized | E-CON Board Problem  
LED Board Problem | Replace E-CON board  
Replace LED Board | Disassembly: 5.3.7, 5.3.4  
Reassembly: 6.4, 6.5 |
| System message: Uncalibrated device | Can’t read manufacturing results file (corrupt SD card)  
E-CON Board Problem | Re-flash Device and format SD card (Replace SD card if necessary) | Disassembly: 5.3.7  
Reassembly: 6.4 |
| Device won’t connect to wireless signal | Problem with wireless router  
Antenna not connected  
E-CON Board Problem | Restart router  
Check antenna connection (replace if necessary)  
Replace E-CON Board | Disassembly: 5.3.8, 5.3.7  
Reassembly: 6.10.1, 6.4 |
| Device freezing while navigating in app | E-CON Board Problem | Replace E-CON board | Disassembly: 5.3.7  
Reassembly: 6.4 |
| Device charged but won’t power on | E-CON Board separation from Main PC Board  
Software corruption | Re-seat and install E-CON Hardware  
Re-flash device and format SD card | Disassembly: 5.3.7  
Reassembly: 6.4 |
| Device freezes on boot up | Software corruption  
E-CON Board Problem | Re-flash device and format SD card  
Replace E-CON board | Disassembly: 5.3.7  
Reassembly: 6.4 |
| Device does not load SW (Red or green LED’s do not light or Red LED blinks) | Defective Main PCA or E-CON board | Re-flash device and format SD card  
Replace E-CON board or Main PCA | Disassembly: 5.3.7  
Reassembly: 6.4 |
| Upside down image on display | Main PC Board failure  
LCD Screen | Replace Main PC Board | Disassembly: 5.3.6  
Reassembly: 6.4 |
4.1 Additional Troubleshooting

4.1.1 Remove the Spot housing.
4.1.2 Inspect the internal components for the following:
4.1.3 Check main battery performance. If performance is low replace battery.
4.1.4 Perform functional troubleshooting as required to identify damaged components.
4.1.5 Inspect and functionally test the returned power adapter if applicable.
4.1.6 Verify when connected to power that the device Battery indicator is lit.
4.1.7 Check for damage to male end of Wall Charger, if applicable.
4.1.8 Place unit in the appropriate repair area.
4.1.9 If applicable, print 4 each, Bottom Label VS100CR with device’s serial number for packaging materials.
4.1.10 If applicable, print and place one, Bottom Label VS100CR on the repair traveler and the additional labels with the device accessories and traveler. Only used if the housing replaced.
5 DISASSEMBLY

Elements of this procedure should be followed to perform identified disassembly and component removal to repair and service the Spot VS100 CR device as defined in the diagram below:

VS100CR Service Instructions
Disassembly – Component Removal Process Steps

Note that not all steps are required, only the ones necessary to remove the desired component.
<table>
<thead>
<tr>
<th>Bubble</th>
<th>Description</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FRAME TO PCBs ASSEMBLY (CR)</td>
<td>1</td>
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<tr>
<td>2</td>
<td>DOWEL, WRIST STRAP .125 X .625</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>FRONT FOAM MOUNT</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>REAR FOAM MOUNTS</td>
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<tr>
<td>5</td>
<td>GASKET, FRONT WINDOW</td>
<td>1</td>
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<tr>
<td>6</td>
<td>DISPLAY, FOAM GASKET</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>SCREW, HOUSING DISPLAY 4-40 X .875 (20019)</td>
<td>4</td>
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<tr>
<td>8</td>
<td>SCREW, HOUSING NOSE CAP 4-40 X .5 (20050)</td>
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<td>9</td>
<td>HOUSING, NOSE CAP, MOLDED</td>
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<tr>
<td>10</td>
<td>BOTTOM HOUSING</td>
<td>1</td>
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<tr>
<td>11</td>
<td>TOP HOUSING, MOLDED</td>
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<tr>
<td>12</td>
<td>HANDLE, MOLDED</td>
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<tr>
<td>13</td>
<td>BATTERY PACK TENERGY (CR)</td>
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<tr>
<td>14</td>
<td>MOUNT TRIPOD</td>
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<tr>
<td>15</td>
<td>HOOK, NECK STRAP</td>
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</tr>
<tr>
<td>16</td>
<td>LABEL HOUSING DISPLAY WELCH ALYN</td>
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<tr>
<td>17</td>
<td>FOAM PAD, BATTERY</td>
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<tr>
<td>18</td>
<td>STRAP, WRIST, BLACK</td>
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<td>19</td>
<td>LABEL, POWER INPUT MARK (CR)</td>
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<td>20</td>
<td>FERRITE, BROAD BAND 28, SNAPON, BATTERY CBL</td>
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<td>21</td>
<td>VS100 Device Software</td>
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<td>22</td>
<td>VS100CR BOTTOM LABEL</td>
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<tr>
<td>23</td>
<td>GTIN LABEL, VS100</td>
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<tr>
<td>24</td>
<td>VS100 DEVICE LABEL WITH REF</td>
<td>1</td>
</tr>
</tbody>
</table>

Ref Blank Template DIR: 80010684 Ver. H
5.1 Recommended Tools
   5.1.1 Screwdriver with Phillips head
   5.1.2 Rubber Tipped Tweezers
   5.1.3 2.5mm Nut Driver
   5.1.4 Jewelers Screwdriver
   5.1.5 Needle Nose Pliers

5.2 Consumables
   5.2.1 Alcohol Isopropyl (70 %)– As needed – used as Lens Cleaner
   5.2.2 Lint Free Wipes – As needed
   5.2.3 Compressed Air – As needed

5.3 Procedure
   5.3.1 Housing Removal
      5.3.1.1 Remove USB cover from USB port, if applicable.
      5.3.1.2 Peel back and remove WA housing display label from upper housing and discard.
      5.3.1.3 Remove the 4 screws securing the Upper molded housing to bottom molded housing (See illustration).
      5.3.1.4 Pull up and away on top housing to remove.
      5.3.1.5 Remove housing handle (Battery Cover).
         NOTE: Care should be taken to not break the mounting tabs!
      5.3.1.6 Remove the 2 screws securing the nose cap to the bottom housing and remove nose cap. Note to deflect the tabs at the top of the nose cap upward to properly remove (See illustrations)
      5.3.1.7 Lift out PCB assembly from lower housing.
         NOTE: Be careful not to lose the front and rear foam mounts on the frame to PCB assembly.
5.3.2 Battery Removal

5.3.2.1 Perform 5.3.1 Housing Removal
5.3.2.2 Disconnect battery pack from main PCB board (Figure 3). Push and pull in tab on connector.
5.3.2.3 Remove battery pack from device.

![Battery connector](image1.jpg)

**Figure 3**

5.3.3 Range Finder Removal

5.3.3.1 Perform 5.3.1 Housing Removal and 5.3.2 Battery Removal

![Figure 4](image2.jpg)

**Figure 4**
5.3.3.2 Remove 2 screws from the range finder assembly (Figure 4)
5.3.3.3 Disconnect the Rangefinder cable from the Main PCB.
5.3.3.4 Thread the range finder cable through the hole in the range finder mount.
5.3.3.5 Remove the range finder assembly from the device.

5.3.4 LED Upper and Lower Board Assembly Removal

5.3.4.1 Perform 5.3.1 Housing Removal and 5.3.2 Battery Removal

5.3.4.2 Remove the 4 screws securing the LOWER LED BOARD to the UPPER LED BOARD assembly (Figure 6).
5.3.4.3 Gently pull the LED LOWER BOARD away from the assembly.

**NOTE:** Be careful not to damage the 5-prong connector (refer to Figure 7) when pulling the LED board away from the subassembly.

5.3.4.4 Remove the LED to Main PCB cable from the LED Board (Figure 7).
5.3.4.5 Disconnect the speaker cable assembly from Main PCB board (Figure 8) and remove 4 screws securing the UPPER LED BOARD assembly to the camera mount (Figure 9).

5.3.4.6 Remove the subassembly from the device.
5.3.5 Speaker Removal

5.3.5.1 Perform 5.3.4 LED Upper and Lower Board Assembly Removal
5.3.5.2 Remove the 4 screws securing the speaker cable assembly to the LED board subassembly. (Figure 10).

![Figure 10](image)

5.3.5.3 Remove the Speaker cable assembly from the device.

5.3.6 LCD Display Assembly and Main PC Board Removal

5.3.6.1 Perform 5.3.1 Housing Removal and 5.3.2 Battery Removal
5.3.6.2 Using a plastic tool, release the locking tab and remove the camera cable from the camera board.

![Camera Cable](image)

5.3.6.3 Remove battery pack (A), range finder (B), speaker cables (C) and if device is 4th edition compliant, also remove LCD-GND Harness (D) from main PCB assembly (Refer to Figure 12).
5.3.6.4 Remove the Antenna cable from the E-CON COM Board (Figure 13).
5.3.6.5 Remove 4 screws securing the PCB and LCD assembly to the frame assembly (Figure 14).

Figure 14

5.3.6.6 If device is 4th Edition compliant, remove the LCD-GND Harness from the screw (Figure 15)

Figure 15
5.3.6.7 Disconnect the LED to main PCB cable from the main PCB (Figure 16).

![Figure 16]

5.3.6.8 Disconnect the small and large LCD display cables from main PCB (Figure 17).  
NOTE: Using tweezers insure cable-locking tabs are in the up direction before removal.

![Figure 17]

5.3.6.9 On the large cable carefully slide the Ferrite off the cable prior to next step.
5.3.6.10 Pull cables through main PCB board and remove LCD assembly.
5.3.7 E-CON eSOM Board Removal

5.3.7.1 Perform 5.3.6 LCD Display Assembly and Main PC Board Removal
5.3.7.2 Using 2.5mm socket. Remove the nut and bolt fasteners securing the E-CON COM board to the man PCB board (Figure 18).

NOTE: Be careful not to lose the spacers found between the E-CON COM board and the main PCB board.

Figure 18

5.3.7.3 Gently pull E-CON COM board away from main PCB board.

5.3.8 Wireless Antenna Removal

5.3.8.1 Perform 5.3.6 LCD Display Assembly and Main PC Board Removal
5.3.8.2 Un-clip the antenna from the antenna clamp.

5.3.8.3 Remove washer and then squeeze the antenna mount and pull antenna away from main PCB frame (Figure 20).

Figure 20
5.3.9 Camera Mount into Frame Assembly Removal

5.3.9.1 Perform 5.3.6 LCD Display Assembly and Main PC Board Removal
5.3.9.2 Remove 4 screws securing upper lens support to the optics assembly (Figure 21).

5.3.9.3 Pull upper lens support up and away from optics assembly.
5.3.9.4 Remove 4 screws securing the camera assembly to the optics assembly (Figure 22).

5.3.9.5 Pull camera assembly out and away from optics assembly.
6 REASSEMBLE

The purpose of this section is to define the service re-assembly process for the VS 100 CR Vision screener

6.1 Recommended Tools

6.1.1 Screwdriver with Phillips head
6.1.2 Rubber Tipped Tweezers
6.1.3 2.5mm Nut Driver
6.1.4 Jewelers Screwdriver
6.1.5 Needle Nose Pliers

6.2 Consumables

6.2.1 Alcohol Isopropyl (70 %) – As Required – Used as lens cleaner
6.2.2 Lint Free Wipes – As Required
6.2.3 Compressed Air – As Required

6.3 Procedure

The following are the re-assembly steps to be followed during repair/component replacement of the device.

Re-assembly reference steps

<table>
<thead>
<tr>
<th>Item</th>
<th>Replacement Unit</th>
<th>Steps to Follow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Battery Installation</td>
<td>6.11.1 step 3 and 4</td>
</tr>
<tr>
<td>2</td>
<td>Range finder Installation</td>
<td>6.10.4</td>
</tr>
<tr>
<td>3</td>
<td>Beam Dump, Front Window, and Beam Splitter installation</td>
<td>6.8</td>
</tr>
<tr>
<td>4</td>
<td>Speaker installation and LED Board Assembly Installation</td>
<td>6.10.3</td>
</tr>
<tr>
<td>5</td>
<td>LCD Display Assembly</td>
<td>6.5</td>
</tr>
<tr>
<td>6</td>
<td>Main PCB installation</td>
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<tr>
<td>7</td>
<td>E-CON SOM board Installation and MFG SWF Flash</td>
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<tr>
<td>8</td>
<td>Wireless Antenna Installation</td>
<td>6.10.1</td>
</tr>
<tr>
<td>9</td>
<td>Camera Mount Installation</td>
<td>6.9</td>
</tr>
<tr>
<td>10</td>
<td>For all repair devices</td>
<td>7</td>
</tr>
</tbody>
</table>

6.4 Main PCB E-CON Assembly

6.4.1 Get:

(1) Main PCB (Main PC Board)
(1) E-CON eSOM Board
(1) WIFI Module Label
(1) Blank MICRO-SD Card
(4) SCREW, M2 X 10, FLAT (p/o 20139 or 723329)
(4) M2 SPACER 3MM
(4) NUT HEX M2 X 1.6MM
(1) Micro SD card with Manufacturing Test Software (20021360)
(1) Blank Micro SD card
6.4.2 Assemble:

6.4.2.1 Place the WIFI Module Label onto the E-CON SOM Board (20139 or new 728251) as shown below, if applicable.

6.4.2.2 Place the E-CON eSOM Board on to the Main PC Board and ensure the power button on the Main PC Board actuates correctly (plunger should depress straight with noticeable clicking action and then return to original position).

6.4.2.3 Place the (4) spacers (E-CON SOM Board) between the Main PCB and the E-CON SOM Board then install 4 screws (E-CON SOM board) through the E-CON SOM Board (20139) first as shown below. NOTE: Insert screws through E-CON SOM Board side first to avoid damaging E-CON SOM board when tightening

6.4.2.4 Attach the (4) nuts (SOM Board) to the screws (provided with E-CON SOM Board) and tighten using the Jewelers Screwdriver and 4.0 mm Nut Driver until nut is flush to Main PC Board. NOTE: DO NOT OVER TIGHTEN! Turn until the nut is flush against board. Loctite will prevent nut from coming loose.

Inspect the E-CON SOM and Main PC Boards around the screw head and nut
for damage due to tightening - magnification may be necessary to see this area. No Damage Is Allowed.

6.4.2.5 Place a drop of Loctite 220 where the screw and nut are mated.

6.4.3 Flash the E-CON-eSOM. Flash the E-CON eSOM PCBA with SPOT Manufacturing Software as indicated in the notes following Section 3.4 Minimum Hardware Software Table. Note that the E-CON-eSOM flashing step can also be performed after the frame assembly has been populate (Prior to the assembly of the housings). The main board red LED can be observed by looking past the display at the reflection in the optics.

6.4.3.1 Connect the power adapter to the Main PCB Board and connect to AC power source (DO NOT POWER ON), see picture. Remove the customers SD card and insert the micro-SD card containing the Manufacturing Software Suite into the SD card slot on the Main PCB. Be sure to follow all ESD precautions.
6.4.3.2 Press the power button on the Main PC Board. The **red LED** on the E-CON SOM board and the **green LED** on the Main PC Board should be illuminated.

6.4.3.4 The lights indicate the following:
- **Red LED** indicates power to the E-CON SOM.
- **GREEN LED** indicates power to the Main Board.
- **Red LED** will remain lit until the E-CON SOM completes the flashing cycle.

6.4.3.5 Flashing the E-CON-SOM will take approximately 30 to 90 seconds to complete.
- If an error occurred during flashing, the **Red LED** will repeatedly blink several times with a 1 second pause between blink sequences.
  i. Attempt reflash, replace E-CON and / or Main PCA boards

6.4.3.6 Upon successful completion, the Main PCB and E-CON SOM will power itself off.

6.4.2.7 Remove the power adapter cable from the Main PCB.

6.4.2.8 Remove the micro-SD card from the Main PCB board.

6.4.2.9 Record the Micro SD Card lot number on the Service Traveler, if it is a new SD card.

6.4.2.10 Insert the blank Micro SD card into the Main PCBA SD card slot. Ensure correct orientation (pads facing downwards).

6.5 **LCD Display Assembly**

6.5.1 Get:
- LCD Display LCD Display Assy.
- Display Bracket
- Bond Tape
6.5.2 Assemble:

1. Clean the inside of the display bracket using 70/30 Alcohol/Deionized Water and lint free cloth and allow to dry.
2. Remove one strip of bond tape from the backing paper and place the tape on the left inside edge of the display bracket. Align with the edge as shown.
3. Remove a second strip of bond tape from the backing paper and place the tape on the right inside edge of the display bracket. Align with the edge as shown.
4. Remove the last strip of bond tape from the backing paper and place the tape close to the top inside edge of the display bracket while ensuring the tape is not touching the display bracket. Align with the edge as shown.

5. Remove all the bond tape backing.
   NOTE: Verify LCD screen being installed does not have any scratches prior to installation.
6. Remove tape holding down cable on backside of LCD.
7. Clean the backside of the LCD display using 70/30 Alcohol/Deionized water and lint free cloth.
8. Flip the LCD over with the screen down on a piece of foam.
   NOTE: Make sure the foam surface is clean and there are no objects that could cause damage to the screen.
9. Remove protective plastic from front of LCD.
10. Ensure the LCD is aligned correctly with the display bracket.
11. Attach the LCD to the display bracket, ensuring cables are sticking out of the backside of the display bracket and the LCD is bonded to the bond tape.
12. The black flex board will overlap on the outside of the frame. (Do not tuck into the frame due to size).

6.5.3 Check:
- Correct alignment between LCD display and display bracket.
- The cables are correctly sticking out of display bracket.
- The LCD is securely bonded to the display bracket.

6.6 LCD to Main PC Board

6.6.1 Get:
(1) Main PCB Board
(1) E-CON COM Board
(1) Camera Cable
(1) SD Card
(1) LCD Display Assembly
(1) LED to Main PCB Cable
(4) Plastite 4-20 x .5” Screw (20011)
(1) Ferrite broad band 28 for LCD

6.6.2 Assemble:
1. Make slight bends in the small and large cables on the LCD assembly
   NOTE: DO NOT BEND sharply, this will damage cable!

   NOTE: Do not touch the end of the cable with bare hands!

2. Align the LCD Display Assembly with the Main PCB with the LCD cables sticking through the PCB.
3. Before attaching the large ribbon cable, apply Kapton tape to one side of the Ferrite (10080) for the LCD Cable as shown below.

4. Cut roughly 3 inches of electrical tape.
5. Take a third of the tape and fold it over on itself.

6. Stick the electrical tape onto the cable as shown.
7. Slide ferrite over LCD cable before inserting into Main PC Board connector. Refer to next page.
   NOTE: Do not touch end of connector with bare hands.

8. Make sure cable is fully seated and locked in the connector. Ensure that the ferrite is attached to Main PC Board as shown below.
9. Attach the small cable by ensuring locking tab in up direction, slide small cable into connection, and pushing locking tab down to lock small cable in place.

6.7 **Lens PCB Camera Assembly**

6.7.1 Get:

(1) Lens
(1) IR Filter
(1) Lens Mount
(1) Kapton Spacer
(1) Camera Board
(4) M2x0.4x6 Screws (20021)
Loctite Threadlocker 220

**NOTE:** Ensure the lens optics and IR filter remain clean. Use lens cleaner, lint free wipes, and canned air as necessary to remove contamination and do not touch or contaminate the camera sensor on the camera board. Refer to DIR #50062 for software version.

6.7.2 Assemble:

1. Tightly screw the IR filter onto the lens as shown below.
2. Screw the lens and IR filter onto the lens mount as shown below.

3. Using tweezers carefully remove the protective tape covering the image sensor on the camera board.

   **NOTE:** Do not breathe on or speak in the direction of the image sensor while handling after removing the protective tape, it can become contaminated.

4. Ensure the Kapton spacer is between the lens mount and the camera board as shown below.

5. Attach the lens mount and Kapton spacer to the camera board using the 4 screws (20021) so that the focus adjustment screws are facing to the left or right.
6. Place lens and camera board assembly into the LENS FOCUS FIXTURE-E-CON (CR). Make sure that the lens is clean.

7. Attach LENS FOCUS FIXTURE-E-CON (CR) Cable to the camera board.
8. LENS FOCUS FIXTURE-E-CON (CR) procedure:
   a) Turn lens aperture to wide open position and apply 1 drop of Blue Loctite 220 onto the threads and tighten screw.
   b) Rotate the lens focus to obtain the peak focus for the lens assembly. Peak focus is achieved when the green area is maximized as much as possible.
c) Verify peak focus is still obtained.

d) Neatly apply 1 drop of Blue Loctite 220 onto threads and tighten screw.

NOTE: Do not get Loctite on lens assembly

e) Remove Focusing Fixture Cable from the camera board.

f) Carefully remove lens and camera board assembly from the test fixture lens mount without disrupting focus.

g) Apply Kapton tape to one side of the ELC3498-X Ferrite.
h) Apply one piece of double sided foam tape to the camera board in the area outlined in the image below (be sure not to cover any of the components on the pcb).

i) Attached Ferrite to the camera board with the taped side down, making sure it is in line with the camera cable connector, as shown below:

6.7.3 Check:
- The lens is tightly screwed into the lens mount.
- The IR filter is tightly screwed into the lens.
- The filter and lens optics are clean.
- The 4 screws are snug and all 4 are present.
- The Kapton spacer is present between camera board and lens mount.
- The lens mount is on the correct side of the board (must cover sensor).
- Verify that the lens is optically clear, with no fingerprints, scratches or gouges.
- Inspect so that no black specks or dust particles of any kind are on the lens.
- Hold the part at an angle so you have a clear and focused view of the lens.
- Rotate the part around slowly, inspecting for fingerprints, scratches, and gouges.
- Inspect the side walls of the lens to ensure that it meets quality specifications.
- All Optics shall be handled with care and wiped clean.

6.8 OPTICAL Frame Assembly

NOTE: Ensure the IR diffuser, bean splitter, and front window remain clean. Use lens cleaner, lint free wipes, and canned air as necessary to remove contamination.

6.8.1 IR Diffuser and Bond Tape Preparation

6.8.1.1 Get:
(1) Bond Tape for Diffuser
(2) IR Diffuser

6.8.1.2 Assembly:
1. Clean the two tabs on the shiny side of the IR diffuser using 70/30 Alcohol/Deionized water and a lint free cloth.
2. Remove one bond tape from the backing paper and place the tape on one of the tabs of the IR diffuser.
3. Remove the remaining bond tape from the backing paper and place the tape on the remaining tab.

6.8.1.3 Check
- Tape is only on the tabs.
- Correct tape used.
- There are two pieces of tape.
- The tape is on the glossy side.
- Beam Splitter and Bond Tape

6.8.2 Beam Splitter and Bond Tape Preparation

6.8.2.1 Get:
(1) Beam Splitter
(2) Bond Tape for Beam Splitter

6.8.2.2 Assemble:

NOTE: The reflective/transmissive coated side has an etched “V” pointing toward it.
1. If needed, clean the two edges of the reflective/transmissive coated side of the beam splitter using lens cleaner and lint free cloth.
2. Remove one bond tape from the backing paper.
3. Orient beam splitter so that the etched arrow is pointing upwards.
4. Place the tape on one side (left or right) of the beam splitter. Align with the edge.
5. Remove the remaining bond tape from the backing paper.
6. Place the tape on the remaining side of the beam splitter. Align with the edge.

Check:
- Tape is only on the sides and aligned with the edges.
- Correct tape used.
- There are two pieces of tape.
- The tape is on the reflective/transmissive coated side.

6.8.3 Front Window and Bond Tape Preparation

6.8.3.1 Get:
(1) Front Window
(2) Bond Tape for Front Window

6.8.3.2 Assemble:
1. Clean the front window using lens cleaner, lint free cloth, and canned air. Handle with care to avoid scratches.
2. Remove one bond tape from the backing paper.
3. Place the tape on the one side of the front window. Align with the edge.
4. Remove the remaining bond tape from the backing paper.
5. Place the tape on the other side of the front window. Align with the edge.
6.8.3.3  Check

- Tape is only on the sides and aligned with the edges.
- Correct tape used.
- The tape is on the opposing sides. One right and one left.

6.8.4  Frame Assembly

6.8.4.1  Get:

1. Molded Frame
2. IR Diffuser and Bond Tape Assembly
3. Beam Splitter and Bond Tape Assembly
4. Front Window and Bond Tape Assembly
5. Beam Dump Assembly

6.8.4.2  Frame Assembly Preparation (Old style):

1. For older version optical frame assembly (20111), remove the “support bracket” from the front of the molded frame with cutters. This bracket is only for support until assembly can be accomplished. The support bracket will not be present on later versions.

2. Transfer the device serial number label here.
6.8.4.3 Beam Dump Application

1. Clean the surfaces shown using Alcohol and cotton free lint cloth.

2. Clean then Apply (2) pieces of Beam Dump Bond Tape (Cut length to fit area shown in picture) to the underside of the frame assembly as shown. Remove the backing on one side of the tape and adhere the Beam Dump flush to the right side as indicated on the Frame Assembly.

6.8.4.4 IR Diffuser Application

1. Remove the backing from the bond tape on the IR diffuser and install.
### 6.8.4.5 Beam Splitter Application

1. Remove the backing from the bond tape on the beam splitter.
2. Carefully slide the beam splitter through the slot in the side of the frame assembly with tape facing forward (The “V” must be facing towards the front window of the device) and secure to the frame. Ensure the top of the beam splitter is flush against top of slot.

![Beam Splitter Application Image]

### 6.8.4.6 Window Application

1. Remove the backing from the bond tape on the front window and install.

![Window Application Image]
6.8.4.7 Final Check:
- All items are securely attached to the frame.
- All items are aligned with the frame edges.
- The IR filter shiny side is facing inwards.
- The beam splitter coated side is facing towards the front window.
- Verify that the window is optically clear, with no fingerprints, scratches or gouges.
- Hold the part at an angle so you have a clear and focused view of the window.
- Rotate the part around slowly, inspecting for fingerprints, scratches, and gouges.
- Inspect the side walls of the window to ensure that it meets quality specifications.

6.9 Camera Mount into Frame Assembly

6.9.1 Get:
- Optical Assembly
- Camera Lens Assembly
- Lens Support
- Plastite 4-20 x .5” Screw (20011)

6.9.2 Assemble:
1. Install the lens support into the top of the optics assembly using four screws.
2. Ensure the cut out is facing downwards, placed between the camera focusing screws, and supports the lens. Ensure the lens support screws are aligned with the lower molded support.
6.9.3 Check:
- All 4 screws are present and snug.
- The lens is supported by both lens supports.
- The orientation of the board is correct.

6.10 Frame to PCB Assembly (30016)

6.10.1 Wireless Antenna Assembly

6.10.1.1 Get:
- Camera Mount onto Frame Assembly
- Wireless Antenna
- Washer, Antenna Clamp
- Cable Holder
6.10.1.2 Assemble:

1. Fold the wireless antenna and place the shortest end (with cable) through the hole in the truss as shown. Use the washer to hold it in place.

2. Clean the surface of the truss where the antenna clamp will be affixed, Using -70/30 Alcohol/Deionized Water and lint free cloth.
3. Clip the antenna into the antenna clamp.
4. Remove the backing from the antenna clamp and attach it to the truss as shown. Keep it clipped to the antenna while attaching it to the truss to avoid twisting of the clamp.

6.10.1.3 Check:
- Washer is present and Antenna is clipped.

6.10.2 LCD/Main PC Board Assembly to Frame

6.10.2.1 Get:

SCREW, PLASTITE 4-20 X .5 IN LONG
6.10.2.2 Assemble:
1. Align the PCB and LCD assembly with the Frame assembly.
2. Use 4 Screws (20011) to attach the PCB/LCD to the frame. Install the top screws first starting with the ground screw on the top right.
3. Attach LCD-GND Harness … Reference TSB 20014996: For device which was manufactured to IEC 60601-1-2 4th edition compliance (Plant 1000 – SN 34000 and later; Plant 1620 – SN 51155 and later), take note when inserting the top right screw, the screw must insert through LCD-GND Harness screw slot and then through the LCD metal screw slot.

**Note:** For devices manufactured before ICE 60601-1-2 4th Edition compliance, there is no need to apply LCD-GND Harness. Skip the next steps 3 and 4 of 6.10.2.2

4. Insert the connector end of the LCD-GND harness to the mainboard after all screws are tightened.

**NOTE:** DO NOT move legs around against Main PC Board. It will potentially damage components on the board. USE HAND SCREW DRIVER ONLY. Be careful not to damage LCD.

5. Attach the camera cable to the Main PC Board. The black side of the cable should face away from the board (facing out) Push the locking tab down to secure the camera cable.

**NOTE:** Make sure not to kink cable. Make sure cable is seated completely in connect and not at an angle.
6. Attach Antenna Cable to Main PC Board so that the wire is parallel with frame as shown below.

   ![Antenna Cable Attached](image1.jpg)

   ![Antenna Cable Attached](image2.jpg)

   a. For new 728251 eSOM board, attach antenna per pictures below.

   ![Antenna Attachment](image3.jpg)

   ![Antenna Attachment](image4.jpg)

   **Note:** The new 728251 eSOM board has 2 antenna attachment locations, make sure it is attached to the location in the picture above (CN4) and is not pinched under the frame.

6.10.2.3 Check:

- Correct orientation of camera cable.
- SD Card installed.
- LCD cables are correctly inserted.
- Camera cable is correctly inserted (both ends)
- The antenna cable is connected to the correct terminal on the E-CON SOM board.
- PCB/LCD board is the correct orientation with respect to the frame.
- 4 screws are present and snug

6.10.3 LED Board and Speaker Assembly

6.10.3.1 Get:

1. LED PCB and 10078 LED Alignment board
2. (4) Plastite 4-20 x .38” Screw (20022)
3. (1) Speaker Cable Assembly
4. (4) Plastite 2-28 x .25” Screw (20024)
5. (8) SCREW, 18-8 SS, 4-40 X 1/8”
6. (1) Ferrite Broad band 28 for Speaker Cable
6.10.3.2 Assemble:

1. Align the speaker cable assembly with the LED board opening. Using four screws 20024 attach the speaker cable assembly to the LED board as shown. Ensure the screws are snug.

2. Attach the LED board subassembly onto the frame assembly using the four screws (20022), as shown below. Ensure the screws are snug.

3. Route the speaker cable along the side of the led board, through the truss hole, back out and around the antenna as shown.
4. Attached 20176 Ferrite to the speaker cable so that the ferrite about 1.5” from end of cable. The ferrite should sit on top of the antenna, and then attach the cable to the PCB connector.

5. Attach the LED Cable to the Main PC Board

6.10.3.3 Check:
- LED cable is connected to the LED board.
- Speaker cable assembly is connected to the main PCB.
- Speaker cable assembly is present and attached with 4 screws which are snug.
- 4 screws holding the LED board to the Frame assembly are present and snug.
6.10.4 Range Finder Assembly

6.10.4.1 Get:

(2) Plastite 2-28 x .25” Screw (20024)
(1) Range Finder Cable Assembly

6.10.4.2 Assemble:

1. Fold the range finder cable through the cutout in the range finder mount. Attach the range finder cable assembly to the range finder mount using 2 screws (20024). Ensure the screws are snug and the cable is within the cutout.
   
   NOTE: Do not over tighten. Stop when screw is snug.

2. Attach the range finder cable to the main PCB board connector. Ensure the cable routes over the top of the beam dump portion of the frame and that the ferrite is close to the Rangefinder.

6.10.4.3 Check

- Rangefinder cable assembly is attached with 2 screws which are snug.
- Routing of the rangefinder cable is over the beam dump portion of frame.
- Rangefinder cable assembly is connected securely to the main PCB.

   NOTE: Attach the Battery pack to complete this step.
3. Depress the Power switch to power on the PCB to Frame Assembly.
4. The Operator will be prompted whether or not to format the micro SD card.
5. Select Format, the device power cycles and comes to an operator interaction screen that asks if they want to “Reformat” or “Cancel”.
6. Select “Cancel”. The device will load and display the Manufacturing Test Screen.
7. Perform “Spot Manufacturing Test #9 Attention LEDs” to verify the functionality of the LEDs on the LED Board.
   - The 1st circle should be 6 Attention LEDs.
   - The 2nd circle should be 6 Attention LEDs.
   - The 3rd circle should be 12 Attention LEDs
8. Power the device off by depressing the “Power Button” for 2 seconds, select “Confirm”.
9. Disconnect Battery and place in the ESD bag with the Frame to PCB assembly.

6.11  **Optics to Housing Assembly**

   NOTE: Follow steps starting at 6.3.8 to flash the device before continuing to the next step.

   6.11.1  **Foam and Power Button Assembly**

   6.11.1.1  Get:
   (1) Frame to PCBs Assembly
   (1) Battery Pack, Tenergy
   (2) Front Foam Mounts
   (2) Rear Foam Mounts
   (1) Power Button
   Loctite 403

   6.11.1.2  Assemble:
   1. Install the **front** and **rear** foam mounts onto the Frame to PCB assembly.

   ![Image of device with foam mounts highlighted]

   NOTE: A small drop of Loctite 403 may be added to the front foam mounts to hold them in place.
2. Install the power button on the Main PCB above the green LED.

3. Connect battery to the Main PCB.

**NOTE:** Battery pack cable needs a small twist near the installation into the board connector.

4. Record the Battery Pack Lot number on the Repair traveler.

6.11.1.3 Check
- Front and 2 Rear foam mounts are installed on frame to PCB assembly
- The power button is installed on the Main PCB.

**NOTE:** Some steps in the next section will only need to be completed if you’re replacing unit housing.

6.11.2 Top Housing Assembly

6.11.2.1 Get:
- (1) Top, Housing
- (2) Hook, Neck Strap
- (1) Foam Gasket, Display
6.11.2.2 Assemble
   1. Remove backing from display gasket.
   2. Install display gasket inside top housing.
      NOTE: Ensure no gasket material visible from outside top housing.
   3. Slide the two neck strap hooks over the posts. Neck straps are keyed and can only be installed one way.

6.11.2.3 Check:
   • Display gasket installed inside top housing with no gasket visible from outside.
   • Neck strap hooks are installed over posts

6.11.3 Bottom Housing Assembly

6.11.3.1 Get:
   (1) Bottom Shell, Housing
   (1) Foam Pad, Battery
   (1) Bottom Label
   (1) Dowel, Wrists Strap .125 x .625

6.11.3.2 Assemble:
   • If applicable, apply the label as shown to bottom housing in orientation shown below with top of label facing away from handle
- If applicable, cut battery foam pad (approximately 1”). Remove backing from battery foam pad.
- If applicable, install battery foam pad to the bottom housing shell as shown.

- Insert wrist strap dowel into bottom housing.
6.11.3.3  Check:
   - Battery foam pad is installed on bottom housing.
   - Wrist strap dowel is installed in bottom housing.
   - Bottom label is installed on bottom of bottom housing.

6.11.4  Nose Cap Assembly

6.11.4.1  Get:
   (1) Gasket, Front Window (20036)
   (1) Nose Cap, Housing (10038)

6.11.4.2  Assemble:
   1. Remove the backing from the front window gasket.
   **NOTE:** Ensure “notch” on gasket is towards top when installing.
   2. Install front window gasket on inside of nose cap housing as shown on the next page.

6.11.5  Final Housing Assembly

6.11.5.1  Get:
   (1) Frame to PCBs Assembly
   (1) Top, Housing
   (1) Bottom Shell, Housing
   (1) Housing, Handle PV100
   (1) Nose Cap, Housing
   (4) Screw, Pan 4-40x.875 20049)
   (2) Screw, Pan 4-40x.5 (20050)
   (1) Wrist Strap
   (1) USB Cover
   (1) Power Label
   (1) Ferrite Broad Band 28 for Battery Cable
6.11.5.2 Assemble:
1. Disconnect the AC power source from the Frame to PCB assembly.
2. Place the Frame to PCBs assembly into bottom shell housing at an angle perpendicular to the face where the power button will protrude thru the bottom housing and the LED is lined up with the opening below it. Slightly rotate to nest the front foam mounts into their cradles.
3. Attach the Ferrite to the battery cable. Ensure you wrap the battery cable around the ferrite once. Be sure to place the ferrite so that it is close to the battery cable to Main PC Board connector.

4. Connect the battery to the Main PCB.

5. Record the Battery pack lot number on the Service traveler.
6. Depress the Power switch to power on the PCB to Frame Assembly.
7. The device will then display “Format” or “Cancel” on the screen when booting up for the first time or if the microSD card has not been formatted. Select “Format.” This will format the microSD card.
8. Once device completes formatting microSD card, the device will reboot and display “Reformat” or “Cancel” on the screen.
9. Select “Cancel”. The device will load and display the Manufacturing Test Screen.
6.12 Manufacturing Tests Before Housing

If the E-CON Board was replaced or flashed the following tests before assembling the housing, see section 7. If any tests fail refer to section 7.14 for troubleshooting.

- 7.3 LCD Pattern Test
- 7.4 LCD Backlight Test
- 7.5 Sound Test
- 7.6 Ambient Light Sensor Test
- 7.7 Power Button Test
- 7.8 Wireless Connection Test
- 7.9 USB & SD Media Test
- 7.10 Attention LEDs Test
- 7.13 Battery Test

6.13 Assembling Housings to Frame

6.13.1 Get:

<table>
<thead>
<tr>
<th>Bubble</th>
<th>P/N</th>
<th>Description</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>20019</td>
<td>SCREW, HOUSING DISPLAY 4-40 X .875</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>20050</td>
<td>SCREW, HOUSING NOSE CAP 4-40 X .5</td>
<td>2</td>
</tr>
<tr>
<td>22</td>
<td>NA</td>
<td>VS100CR BOTTOM LABEL</td>
<td>1</td>
</tr>
<tr>
<td>23</td>
<td>NA</td>
<td>GTIN LABEL, VS100</td>
<td>1</td>
</tr>
<tr>
<td>24</td>
<td></td>
<td>VS100 DEVICE LABEL WITH REF</td>
<td>1</td>
</tr>
</tbody>
</table>
6.13.2 Assemble:

1. Ensure battery is resting correctly on battery pad inside bottom housing with the ferrite located as shown.

2. Place housing handle on bottom housing.
3. Place top housing over bottom and handle housings.
4. Using 4 screws (housing screws 4-40x.875) 20049, secure top housing to bottom housing.

NOTE: Wiggle the strap mounts to keep them aligned while tightening the screws.
5. Place nose cap into housing assembly.
6. Using 2 screws 20050, secure the nose cap to the housing assembly.
7. Install wrist strap on housing.
8. If applicable, remove backing from Power label and install power label below USB connection point.
9. If applicable, remove backing from Bottom Label and install bottom label in the recessed area on the bottom of the housing.

NOTE: Ensure the Bottom label is centered and neatly applied.
10. Power on the assembly by pressing the power button.
11. The Operator will be prompted whether-or-not to format the micro SD card. The options are Cancel or format. Select Cancel.
12. The device power cycles and comes to an operator interaction screen that asks if they want to Re-format or Cancel. Select Cancel. The device will load and display the Manufacturing Test Screen.
7 SPOT MANUFACTURING TESTS

NOTE: All devices must pass all manufacturing tests

NOTE: Tests that have already been passed will have green icons and do not need to be run. Red, yellow, or gray icons must be run and passed for the device to be complete

7.1 Loading Manufacturing Test Software

NOTE: If the E-CON Board was flashed or the software is already loaded it does not need to be loaded again

7.1.1 Ensure unit is powered down and plugged into an outlet source with the transformer.
7.1.2 Plug the manufacturing test software thumb drive (See Section 3.4 Minimum Hardware Software Table) into the USB socket on the front of the unit.
7.1.3 Press down the power button and hold (approximately 45 seconds) until the screen goes blank then release the button. The unit will go through a procedure booting from the USB test drive for a few minutes.

7.1.4 The unit will auto reboot and power down and then backup. A format internal data screen will appear select "format" wait for the home screen with the girl.

NOTE: If “Cancel” button does not work, Press and hold power button on device to turn device off. (Remove silver Thumb drive). Then turn device on to get to image below. Then continue with process.
7.1.5 The unit will run through a routine and return to the “Spot Manufacturing Tests” screen as shown below.

7.2 **IR LED Dot Correction Test**

7.2.1 Connect and plug in the AC Adapter
7.2.2 Place the assembly into Test Fixture 40004.
7.2.3 Close the hood on the fixture
7.2.4 Initiate Test #1 – IR LED Dot Correction
7.2.5 Once initiated, the IR LED Dot Correction Test screen will appear.
7.2.6 The IR LED Dot Correction test is completely automated and does not require any input from the operator.

7.2.7 Note: Please be patient and allow the test to complete

7.2.8 Once the Dot Correction Test finishes, the device will instruct the operator to move the device to the Background Signal Test Cell (40058) and select continue to begin the background signal measure.

---

**IR LED Test**

Please place the device in the background signal test fixture and press <Continue> to proceed...

---

**IR LED Background Signal Test**

Record the background signal measure below and press <Continue>...

38.8

---

7.2.9 Once completed, it will display a value on the screen, the value represented below is only should have a value less than 50. Record this value on the traveler. It will also be printed on the Test Report.
7.3 LCD Pattern

7.3.1 Initiate Test # 2 – LCD Pattern.
7.3.2 Once initiated, the LCD Pattern screen will appear for 2 seconds.

7.3.3 The LCD Pattern Test response screen will appear after the 2-second period.
7.3.4 The possible actions from the response screen are as follows (once a selection is made, the operator will be returned to the Spot Manufacturing Test screen):
   Yes – Test Passed (Main Screen button will turn Green).
   No – Test Failed (Main Screen button will turn Red).

7.3.5 If the operator sees the Pattern Test screen as shown above, then select “Yes” and continue.

7.4 LCD Backlight

7.4.1 Initiate Test # 3 – LCD Backlight test.
7.4.2 Once initiated, the LCD Backlight Test response screen will appear.
7.4.2.1 This test will adjust the LCD backlight levels to 20, 40, 60, 80, and 100%. This pattern will be repeated until a selection is made.

7.4.2.2 The possible actions from the response screen are as follows (once a selection is made, the operator will be returned to the Spot Manufacturing Test screen):

- Yes – Test Passed (Main Screen button will turn Green).
- No – Test Failed (Main Screen button will turn Red).

7.4.2.3 “X” in upper right corner – Test Incomplete (Main Screen button will turn Yellow).

7.4.2.4 The operator confirms the LCD Backlight is successfully adjusting by selecting “Yes”.

7.5 **Sound**

7.5.1 Initiate Test # 4 – Sound test.

7.5.2 Once initiated, the Sound Test response screen will appear.

7.5.3 This test will emit the “birds” wave file, adjusting the volume from 0, 20, 40, 60, 80, and 100% of maximum volume. This pattern will be repeated until a selection is made.

7.5.4 The possible actions from the response screen are as follows (once a selection is made, the operator will be returned to the Spot Manufacturing Test screen):

- Yes – Test Passed (Main Screen button will turn Green).
- No – Test Failed (Main Screen button will turn Red).

7.5.5 “X” in upper right corner – Test Incomplete (Main Screen button will turn Yellow).

7.5.6 The operator will confirm that the sound levels are adjusting by selecting “Yes”.
7.6 Ambient Light Sensor

7.6.1 Initiate Test # 5 – Ambient Light Sensor.

7.6.2 Once initiated, the Ambient Light Sensor Test response screen will appear.

The operator will need to repeatedly cover and uncover the Ambient Light Sensor, which will move the meter back and forth from Dark to Light.

The possible actions from the response screen are as follows (once a selection is made, the operator will be returned to the Spot Manufacturing Test screen):

- **Yes** – Test Passed (Main Screen button will turn Green).
- **No** – Test Failed (Main Screen button will turn Red).
- “X” in upper right corner – Test Incomplete (Main Screen button will turn Yellow).

7.6.5 The operator will confirm that the meter reading was synchronized with the sensor actions as by selecting “Yes.

7.7 Power Button

7.7.1 Initiate Test # 6 – Power Button.

7.7.2 Once initiated, the Power Button Test response screen will appear.
7.7.3 The operator will be required to press and hold the Power button for one (1) second to verify the button functions.
7.7.4 If button press is detected properly, the operator will be returned to the Main Manufacturing Test screen. The #6 Power Button should be green.

7.8 Wireless Connection (Older version 2.4G ECON eSOM Board 20139 only)

7.8.1 Initiate Test #7 – Wireless Connection.
7.8.2 Once initiated, the Wireless Test response screen will appear.

If the wireless network test is successful, the operator will be returned to the Main Manufacturing Test screen. The #7 Wireless Connection Button should be green.

7.9 Wireless Connection (New 5G ECON eSOM Board 728251 and new Test SW 3.1.01.00-A0001)

7.9.1 Within a distance of approximately 10 to 15 feet, initiate Test #7 – Wireless Connection.
7.9.2 Once initiated, the Wireless Test response screen will appear.
7.9.3 A signal strength RSSI value will be displayed. The Yes/No answers will be inoperable for a couple of seconds to let the signal strength value stabilize.
7.9.4 The possible actions from the response screen are as follows (once a selection is made, the operator will be returned to the Spot Manufacturing Test screen)
7.9.5 Yes – Test Passed (Main Screen button will turn Green).
7.9.6 No – Test Failed (Main Screen button will turn Red).
7.9.7 “X” in upper right corner – Test Incomplete (Main Screen button will turn Yellow)

7.9.8 Select “Yes” If the signal value is 50db or less and record the RSSI value. Select no if higher than 50 db, check / adjust antenna connection and Econ board and retest. Record the final value.
7.10 USB & SD Media

7.10.1 Insert the USB Drive, wait 5-10 seconds before proceeding to the next step.
7.10.2 Initiate Test #8 – USB & SD Media.
7.10.3 Once initiated, the test will auto-run the USB & SD Media test which tries to read and write to both the internal Micro SD card and the removable USB drive.
7.10.4 If the USB & SD Media test is successful, the operator will be returned to the Main Manufacturing Test screen. The #8 USB & SD Media Button should be green.
7.10.5 Remove the USB Drive.

7.11 Attention LEDs

7.11.1 Initiate Test #9 – Attention LEDs.
7.11.2 Once initiated, the Attention LEDs Response screen will appear.
7.11.3 This test will initiate the visible LEDs will have a circular pattern, which will change every 0.5 seconds and will be visible by looking in the front/nose of the assembly.
   - The 1st circle should be 6 Attention LEDs.
   - The 2nd circle should be 6 Attention LEDs.
   - The 3rd circle should be 12 Attention LEDs.

7.11.4 The possible actions from the response screen are as follows (once a selection is made, the operator will be returned to the Spot Manufacturing Test screen):
   - Yes – Test Passed (Main Screen button will turn Green).
   - No – Test Failed (Main Screen button will turn Red).
   - “X” in upper right corner – Test Incomplete (Main Screen button will turn Yellow).
7.11.5 The operator will confirm that the LED patterns are changing by selecting “Yes”. The #9 Attention LEDs Button should be green.
7.12 **Focus – Range Calibration Test:**

7.12.1 Ensure the assembly is starting on the “one meter mark” position as marked by the 1-meter mark on the Test fixture (40024).

7.12.2 Initiate Test # 10 - Focus-Range Calibration.

7.12.3 Once initiated, the Rangefinder test screen will appear. The value displayed should be 1.000.

7.12.4 Click “OK”.

7.12.5 If the value is in the acceptable range, then the Focus-Range Calibration test screen will come up.

7.12.6 The operator will be required to slowly slide the assembly from one extreme to the other (forward and back). As the unit is moved, the vertical range line moves to reflect the position. As the unit moves and the number of focus and range measurements at each
distance increases, the horizontal green line will raise and the red line will reveal the range associated with the best focus.

7.12.7 Pressing the “X” in the top right corner at any time will stop the test and return the operator to the Main Manufacturing Menu screen.
7.12.8 The test is complete once the “Play” button is visible in the top left corner. The operator will confirm completion of the test by selecting the “Play” button.
7.12.9 The #10 Focus-Range Calibration Button should be green.

7.13 Screening Test

7.13.1 Ensure the assembly is on the “one meter mark” position as marked on the Test Fixture (40024).
7.13.2 Initiate Test #11 - Screening Test. Once initiated, the Screening Test screen will appear.

7.13.3 The System will run through the screening exam protocol.
7.13.4 If the Screening Test is successful, the operator will be returned to the main Manufacturing Test screen.
7.13.5 The #11 Screening Test should be green.
7.13.6 Note: The remaining tests cannot be completed until tests #1-#12 have successfully passed (all buttons highlighted green).
7.14 **Battery**

7.14.1 Remove the Power Adapter from the Assembly.
7.14.2 Initiate Test # 12 – Battery.
7.14.3 Once initiated, the Battery Response screen will appear.

![Battery Test](image)

7.14.4 The operator will be required to connect and disconnect the AC Power Adapter from the assembly and verify the following:
7.14.5 AC Adapter Disconnected – Battery is green, AC Adaptor is red.
7.14.6 AC Adapted Connected – AC Adapter is green, Battery is red.
7.14.7 The possible actions from the response screen are as follows (once a selection is made, the operator will be returned to the Spot Manufacturing Test screen):
   - Yes – Test Passed (Main Screen button will turn Green).
   - No – Test Failed (Main Screen button will turn Red).
   - “X” in upper right corner – Test Incomplete (Main Screen button will turn Yellow).

7.14.8 The operator will confirm that the AC Adapter/Battery buttons are changing by selecting “Yes”.

Ref Blank Template DIR: 80010684 Ver. H
### 7.15 Failed Test Troubleshooting

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<th>Step Reference</th>
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<td>Replace LED Board</td>
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<td>Dirty/scratched Front Window, Bad beam splitter</td>
<td>Replace Front window and beam splitter</td>
<td>Disassembly: 6.8.2, 6.8.3</td>
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<tr>
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<td>Bad LCD Touch Screen</td>
<td>Replace LCD Touch Screen</td>
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<td>Speaker Cable disconnected, Bad speaker</td>
<td>Re-seat speaker cable</td>
<td>Disassembly: 5.3.5, Reassembly: 6.10.3</td>
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<tr>
<td>Failed Power Button Test</td>
<td>Bad Power button connection</td>
<td>Replace Main PC Board</td>
<td>Disassembly: 5.3.7, Reassembly: 6.4</td>
</tr>
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<td>Wireless internet is down, Wireless router configured improperly, Device antenna is not connected properly Bad E-CON Board</td>
<td>Restart router, Check antenna connection Replace E-CON Board</td>
<td>Disassembly: 5.3.8, 5.3.7, Reassembly: 6.10.1, 6.4</td>
</tr>
<tr>
<td>Failed USB &amp; Media Test</td>
<td>Bad SD card, Main PC Board Failure</td>
<td>Re-flash Device and format SD card (Replace SD card if necessary)</td>
<td>Disassembly: 5.3.7, Reassembly: 6.4</td>
</tr>
<tr>
<td>Failed Attention LEDs test</td>
<td>Corrupted software, Bad LED Board</td>
<td>Re-flash Device and format SD card (Replace SD card if necessary) Replace LED Board</td>
<td>Disassembly: 5.3.7, Reassembly: 6.4</td>
</tr>
<tr>
<td>Failed Focus – Range Calibration Test</td>
<td>Bad range finder, Camera assembly out of focus</td>
<td>Replace Range Finder Refocus Camera assembly</td>
<td>Disassembly: 5.3.3, 5.3.9, Reassembly: 6.10.4, 6.7.2 steps 6 and 7</td>
</tr>
<tr>
<td>Failed Screening Test</td>
<td>Test fixture interference, Dirty Front window, E-CON Board</td>
<td>Move Test Fixture, Clean Front window Replace E-CON Board</td>
<td>Disassembly: 5.3.7, Reassembly: 6.4</td>
</tr>
<tr>
<td>Failed Battery Test</td>
<td>Possible cell failure, Battery Pack chip failure, Check connection between Wall Charger &amp; Hospital Cord Check for loose/damaged charging port on Main PC Board Test with known good Wall Charger</td>
<td>Re-seat connection, Replace Main PC Board, Replace Wall Charger if necessary</td>
<td>Disassembly: 5.3.7, Reassembly: 6.4</td>
</tr>
</tbody>
</table>
7.16 S/N Entry:

7.16.1 Initiate Test # 13 - Serial Number.
7.16.2 Once initiated, the Serial Number Input screen will appear.

7.16.3 Enter the serial number that is on the device and select “Enter”.
7.16.4 The operator will be returned to the Main Manufacturing Test screen.

Note: Test # 14 is not selectable until completion of Test # 13.

7.17 Print Report:

7.17.1 Initiate Test # 14 - Print Report.
7.17.2 Once initiated, the Serial Number Confirmation response screen will appear.

7.17.3 The possible actions from the response screen are as follows:
   Yes – Serial Number is correct (Redirected to the Print Confirmation Screen).
   No – Serial Number is incorrect (Main Screen button will turn Red).
   Quit – Test Incomplete (Main Screen button will turn Yellow).

7.17.4 The operator will confirm that the Serial Number is correct by selecting “Yes”.
7.17.5 The Print Confirmation response screen will appear.
7.17.6 The devices will auto-print the Test Report to the networked Printer.

7.17.7 The possible actions from the response screen are as follows (once a selection is made, the operator will be returned to the Spot Manufacturing Test screen):

- **Yes** – Report printed correctly (Main Screen button will turn green).
- **No** – Report failed to print (Main Screen button will turn Red).
- **Quit** – Test incomplete (Main Screen button will turn Yellow).

7.17.8 The operator will confirm that the Product Test Summary report has printed by selecting “Yes”.

7.17.9 Attach all copies of the test report to the traveler.

### 7.18 Remove Print Configuration:

7.18.1 Initiate Test #15 - Remove Print Config.

7.18.2 Once initiated, the Remove Manufacturing Print Configuration response screen will appear.

7.18.3 The operator will select “Yes”, which will remove the printer setting that was used for the Manufacturing test.
7.19 Safe Mode Boot:

7.19.1 Insert the USB drive containing the desired device software as indicated in Section 3.4 Minimum Hardware software Table into the USB slot on the VS-100 device, waiting 10 seconds before initiating the test. Create the USB drive with the software using instructions indicated after the minimum hardware SW table.

7.19.2 Initiate Test # 16 – Safe Mode Boot.
7.19.3 Once prompted, press the “Yes” icon to initiate Safe Mode Boot.
7.19.4 The system will now verify all Manufacturing test information, and then reboot into safe mode. Once safe mode loads, the update process will automatically begin.
7.19.5 The upload process will take anywhere from 2-4 minutes to complete. When it has finished, the system will auto reboot, and boot to the language screen as shown below.

Remove the USB drive from the device.
7.19.7 Select the Continue icon and the Date / Time screen will appear. Set the current date and time, then select the continue icon.

7.19.8 Once the VS100 has fully rebooted, from the Main Screen, select the “Tools” menu.
Screen for 3.1.00.00 Software and Above:

![Screen for 3.1.00.00 Software and Above](image)

Screen for software versions lower than 3.1.00.00. Notice the age ranges overlap at the upper and lower limits.

![Screen for software versions lower than 3.1.00.00](image)

7.19.9  From the tools menu, select the “Network” button.
7.19.10 Once in the network menu, select the appropriate network type for the local wireless connection then click the “EDIT” button in the next field labeled “SSID” name and enter the name of the wireless network. Press the “OK” button.
7.19.11 If the network has a password click the button labeled “Passphrase” and enter the password in the field and press the “OK” button. Press the “OK” button again. Make sure that “OK” is hit that second time.
7.19.12 Press the “X” button in the top left of the “Network Configuration” screen.
7.19.13 From the printer screen select the green “+” button to add printer.

7.19.14 Verify the correct printer is displayed and set as the default printer.
7.19.15 Once the printer is selected and installation is complete, select the printer icon on the bottom center of the LCD to print the Screening Summary report.

NOTE: If the Printer icon is not available on the screen, this means there isn’t a Printer selected. You will need to select a printer from the Tools menu and rerun the Screening. Verify the “SCREENING” shows the correct date and time and that the Device serial number is present in the lower left corner of the Screening Summary Report.
7.19.16 Select the “X” button to return to the Tools Menu.

7.19.17 From the Tools Menu, select the “About” Button

7.19.18 Verify the “Firmware”, “Software”, and “Serial #” Document the Firmware and Software on the traveler. Below is an example. For current versions refer to the traveler.

7.19.19 Once documented, hit the “X” in the top left corner to be returned to the “Tools” menu.

7.19.20 Verify that the Time and Date are correct by checking against the date and time on the laptop in the Service & Repair room. If not, select the “EDIT” button and use the keypad to update the date and/or time field.

7.19.21 Once the Time and Date are verified correct, select the “X” button twice to be returned to the Main Menu.

7.19.22 Place the device in the Rangefinder Test fixture cradle and position the cradle with the “one meter marks” aligned.

7.19.23 Select the **6-19 or 6-20 Years** button to start a screening of the Rangefinder model eyes. *(Age range will show 6-20 years for device software versions prior to 3.1.00.00 as shown in Section 7.18.8)*

7.19.24 Wait until the capture process begins and screening is captured, you may have to move the device forward and backwards to accomplish the screening.

7.19.25 When the screening is captured, record the SE (Spherical Equivalent) result for both eyes (OD) into the traveler and ensure that it falls within the given range of -0.75 to -1.75. *(Record Results on Form found in Appendix A.)*

Needs to show Extended Storage. If Extended Storage is not listed, then Micro SD Card could be faulty.
7.20 **Factory Reset**

7.20.1 Press the power button until the “Power Off” window appears.
7.20.2 Press and hold your finger in the bottom right corner of the screen for 15-20 seconds.

![Power Off Window](image)

7.20.3 The Factory Reset screen will appear. Select “Confirm” to clear all data and installed printers from the device.

![Factory Reset Screen](image)

7.20.4 The device will power cycle itself once all data has been deleted.
7.20.5 When the “Please Choose a Language” screen re-appears press the power button and power the device off following the prompts.
7.20.6 Press the power button until the “Power Off” window appears.

8 **Additional Instructions for China Repair Line**

Please refer to the instructions for obtaining the Chinese language and license, Chinese labeling and other end of line tests required for China found in WA-WI-MFG-025 VS100 Build Assembly Instructions VS100 组装作业指导书 (China MPS).
## Appendix A

MODEL / SERIAL: __________________________

### INITIAL CHECK (circle or record value below as applicable):

<table>
<thead>
<tr>
<th>Software Rev (As Received)</th>
<th>Firmware Rev (As Received)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAMAGED HOUSING:</td>
<td></td>
</tr>
<tr>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>DISPLAY CRACKED / SCRATCHED</td>
<td>YES</td>
</tr>
<tr>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>CHARGING PORT DAMAGED</td>
<td>YES</td>
</tr>
<tr>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>CHARGING PORT MISALIGNED</td>
<td>YES</td>
</tr>
<tr>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>RANGER FINDER COVER DAMAGED</td>
<td>YES</td>
</tr>
<tr>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>RANGER FINDER COVER MISSING</td>
<td>YES</td>
</tr>
<tr>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>FRONT WINDOW DIRTY / LOOSE OR DAMAGED</td>
<td>YES</td>
</tr>
<tr>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>RATTLEING INSIDE UNIT</td>
<td>YES</td>
</tr>
<tr>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>POWER SWITCH DAMAGED</td>
<td>YES</td>
</tr>
<tr>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>

### FINAL CHECK:

**SPHERICAL EQUIVALENT READING**
(Spec: -0.75 to -1.75):

<table>
<thead>
<tr>
<th>Left Eye</th>
<th>Right Eye</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Print:   Sign:   Date:

Ref Blank Template DIR: 80010684 Ver. H