

APOLLO
GUIDANCE AND NAVIGATION
HARDWARE DIFFERENCE SUMMARY
COMMAND MODULE AND LUNAR MODULE

15 October 1970

EP0593

DELCO ELECTRONICS

DIVISION OF GENERAL MOTORS CORPORATION

MILWAUKEE, WISCONSIN 53201

ECP



| ITEM DESCRIPTION | DIFFERENCES BETWEEN QUALIFICATION ITEMS AND FLIGHT HARDWARE | REMARKS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <p>INERTIAL MEASUREMENT UNIT (IMU)</p> <p>Qualification Item: Block II Level Vibration, 2018601-071, S/N 3</p> <p>All other Block II Environments, 2018601-051, S/N 3</p> <p>Flight Item: ECP Incorporation</p> <table border="1" data-bbox="192 347 525 502"> <thead> <tr> <th></th> <th>-051</th> <th>-071</th> <th>-191</th> <th>-201</th> <th>-211</th> <th>-221</th> <th>-231</th> </tr> </thead> <tbody> <tr> <td>306</td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td>X</td> <td>X</td> <td></td> </tr> <tr> <td>500</td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>587</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>605</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>653</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>678</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>688</td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> <td></td> </tr> </tbody> </table> | | -051 | -071 | -191 | -201 | -211 | -221 | -231 | 306 | X | X | X | | X | X | | 500 | | X | X | X | X | X | X | 587 | | | X | X | X | X | X | 605 | | | X | X | X | X | X | 653 | | | X | X | X | X | X | 678 | | | X | X | X | X | X | 688 | | | | | X | X | | <p><u>ECP 306</u> - Addition of harness cable clamp to IMU cover.</p> <p><u>ECP 500</u> - Replacement of capacitor, P/N 1010317-001, with P/N 1008848 in PIP preamplifier application, which becomes P/N 2007060-021 as a consequence. Also provides for epoxy resin conformal coating on all solder terminals.</p> <p><u>ECP 587</u> - Advancement of 25 IRIG from 2021500-051 to -071 configuration. Change incorporates new end cap - aluminum base, turret terminals, longer connector mounting screws.</p> <p><u>ECP 605</u> - Removal of insulating blankets, P/N's 2018805 and 2018806, from IMU.</p> <p><u>ECP 653</u> - Change of stable member harness wiring to reduce IRIG preamplifier oscillations.</p> <p><u>ECP 678</u> - Lockwashers and C-7 adhesive added to IRIG connector mounting hardware.</p> <p><u>ECP 688</u> - Addition of capacitor P/N 1006777 across signal microsyn output terminals. IRIG's advanced to -111 configuration.</p> | <p><u>ECP 306</u> - Qualified by test.</p> <p><u>ECP 500</u> - Capacitor P/N 1008848 qualified at part level, AP-M-14177-N426.</p> <p><u>ECP 587</u> - Qualified by test at IRIG level.</p> <p><u>ECP 605</u> - Analytical thermal analysis indicated test not required. AP-M-17974-N1596.</p> <p><u>ECP 653</u> - Qualified by similarity.</p> <p><u>ECP 678</u> - Qualified by similarity.</p> <p><u>ECP 688</u> - Capacitor, P/N 1006777, qualified at part level. AP-M-13039-N186.</p> <p>IMU coolant hoses qualified as part of IMU qualification.</p> <p>Flight item qualified by test and by similarity to qualification item.</p> |
| | -051 | -071 | -191 | -201 | -211 | -221 | -231 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 306 | X | X | X | | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 500 | | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 587 | | | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 605 | | | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 653 | | | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 678 | | | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 688 | | | | | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>25 IRIG</p> <p>Qualification Item: 2021500-051</p> <p>Qualification by System Test in 2018601-071 S/N 3</p> <p>Flight Item: ECP Incorporation</p> <table border="1" data-bbox="192 699 525 740"> <thead> <tr> <th></th> <th>-111</th> <th>-151</th> <th>-171</th> <th>-181</th> </tr> </thead> <tbody> <tr> <td>688</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> </tbody> </table> | | -111 | -151 | -171 | -181 | 688 | X | X | X | X | <p>111 - Block I float permissible, Barden (X-26) or ND forward production bearings, ORR synthane retainer, V78 oil, 3 lb preload</p> <p>151 - ND, old Barden (X-26) and Polaris bearing hardware, ORR nylasint retainer, V78 oil, 3 lb preload</p> <p>171 - Refurbished Barden (X-44) bearings, IRR nylasint retainer, SRG 160 oil, .8 lb preload</p> <p>181 - Refurbished ND bearing hardware, IRR nylasint retainer, N3 oil, .8 lb preload</p> | <p>151 - S/N 8A101 through 8A199</p> <p>171 - S/N 9A7, 9A8 MIT built 9A41, 9A42 S/N 9A11 through 9A40 Bendix built</p> <p>181 - S/N 8A201 and up</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | -111 | -151 | -171 | -181 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 688 | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| <p>ELECTRONIC DATA COUPLING UNIT (ECDU)</p> <p>Qualification Item: Block II Vibration only, 2007222-121</p> <p>Other Environments, 2007222-081, S/N 19</p> <p>Flight Item: ECP Incorporation</p> <table border="1" data-bbox="134 336 475 492"> <thead> <tr> <th></th> <th>-081</th> <th>-121</th> <th>-181</th> <th>-191</th> <th>-221</th> <th>-231</th> <th>-241</th> </tr> </thead> <tbody> <tr> <td>336</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> </tr> <tr> <td>398</td> <td></td> <td></td> <td>X</td> <td></td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>499</td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>515</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>564</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> </tr> <tr> <td>603</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>609</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> </tbody> </table> | | -081 | -121 | -181 | -191 | -221 | -231 | -241 | 336 | X | X | | | | X | X | 398 | | | X | | | | X | 499 | | X | X | X | X | X | X | 515 | | | X | X | X | X | X | 564 | | | | | | X | X | 603 | | | X | X | X | X | X | 609 | | | X | X | X | X | X | <p><u>ECP 336</u> - Changes potting material of LM ECDU trays from solid PR 1538 to a combination of PR 1538 and polyurethane foam for weight reduction.</p> <p><u>ECP 398</u> - Changes potting material of CM ECDU trays from solid PR 1538 to a combination of PR and polyurethane foam for weight reduction. Also incorporates improved bonding of ECDU EMI covers.</p> <p><u>ECP 499</u> - Incorporation of module vibration damper plate between trays S and X.</p> <p><u>ECP 515</u> - Provides for individual selection of optimum resistance value in circuit position R-73, system coarse module; module part number advanced from 2007236-011 to -031.</p> <p><u>ECP 564</u> - Implementation of flight processing specifications, ND 1002359A and ND 1002358B, for logic integrated circuits.</p> <p><u>ECP 603</u> - Replacement of P/N 1010317-004 capacitors with P/N 1008900-24 counterpart in MSA and Quad Reject Module.</p> <p><u>ECP 609</u> - Circuit redesign of MSA and Quad Reject Module.</p> <ol style="list-style-type: none"> Diodes, CR 10, 11; P/N 1010385 removed. Resistor, R 140; P/N 1006750-12 added. Diode CR 13, P/N 1008815, replaced by P/N 1010372. Value of Resistor R-76, P/N 1006750, changed. <p><u>ECP 714</u> - Reduction of ECDU noise susceptibility by rerouting 1x resolver winding, read counter logic interconnect, and CDU reset lead in headers.</p> <p><u>ECP 714</u> has an in-line effectivity of ECDU-40 and subsequent. Retrofit has been accomplished on S/N 14, 16, 17, 20, 23, 29, 30, 33, 36, and 39.</p> | <p><u>ECP 336</u> - Qualified by test.</p> <p><u>ECP 398</u> - Qualified by similarity.</p> <p><u>ECP 499</u> - Qualified by test. AP-M-16622-N1120.</p> <p><u>ECP 515</u> - Qualified by similarity.</p> <p><u>ECP 564</u> - Qualified by part test.</p> <p><u>ECP 603</u> - Capacitor, P/N 1008900, qualified at part level, based on results of evaluation test, 20-P-400.</p> <p><u>ECP 609</u> - Qualified by part test.</p> <p><u>ECP 714</u> - Qualified by similarity.</p> <p>Flight item qualified by test and by similarity to qualification item.</p> |
| | -081 | -121 | -181 | -191 | -221 | -231 | -241 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 336 | X | X | | | | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 398 | | | X | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 499 | | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 515 | | | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 564 | | | | | | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 603 | | | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 609 | | | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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|---|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----|---|---|---|---|---|---|---|-----|---|---|---|---|---|---|---|-----|--|--|--|--|--|--|--|-----|--|---|---|---|---|---|---|---------|--|---|---|---|---|---|---|-----|--|---|---|---|---|---|---|-----|--|--|---|---|---|---|---|-----|--|--|--|---|--|--|---|-----|--|--|---|---|--|---|---|-----|--|--|--|--|--|---|---|--|-------------|-------------|-------------|-------------|-----|---|---|---|---|-----|---|---|---|---|-----|--|--|--|--|-----|---|---|---|---|---------|---|---|---|---|-----|---|---|---|---|-----|---|---|---|---|-----|--|--|--|---|-----|---|---|---|---|-----|--|--|---|---|-----|---|---|---|---|---|---|
| <p>GUIDANCE COMPUTER (CGC)</p> <p>Qualification Item: 2003200-021, S/N RAY 16 (C1)</p> <p>Flight Item: ECP Incorporation 2003200 2003993</p> <table border="1" data-bbox="196 225 566 445"> <tr> <td></td> <td><u>-021</u></td> <td><u>-011</u></td> <td><u>-021</u></td> <td><u>-031</u></td> <td><u>-041</u></td> <td><u>-051</u></td> <td><u>-061</u></td> </tr> <tr> <td>452</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>474</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>483</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>485</td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>501/505</td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>511</td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>518</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>564</td> <td></td> <td></td> <td></td> <td>X</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>604</td> <td></td> <td></td> <td>X</td> <td>X</td> <td></td> <td>X</td> <td>X</td> </tr> <tr> <td>719</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> </tr> </table> <table border="1" data-bbox="196 455 566 699"> <tr> <td></td> <td><u>-071</u></td> <td><u>-081</u></td> <td><u>-091</u></td> <td><u>-111</u></td> </tr> <tr> <td>452</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>474</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>483</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>485</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>501/505</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>511</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>518</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>564</td> <td></td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>604</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>719</td> <td></td> <td></td> <td>X</td> <td>X</td> </tr> <tr> <td>815</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> </table> | | <u>-021</u> | <u>-011</u> | <u>-021</u> | <u>-031</u> | <u>-041</u> | <u>-051</u> | <u>-061</u> | 452 | X | X | X | X | X | X | X | 474 | X | X | X | X | X | X | X | 483 | | | | | | | | 485 | | X | X | X | X | X | X | 501/505 | | X | X | X | X | X | X | 511 | | X | X | X | X | X | X | 518 | | | X | X | X | X | X | 564 | | | | X | | | X | 604 | | | X | X | | X | X | 719 | | | | | | X | X | | <u>-071</u> | <u>-081</u> | <u>-091</u> | <u>-111</u> | 452 | X | X | X | X | 474 | X | X | X | X | 483 | | | | | 485 | X | X | X | X | 501/505 | X | X | X | X | 511 | X | X | X | X | 518 | X | X | X | X | 564 | | | | X | 604 | X | X | X | X | 719 | | | X | X | 815 | X | X | X | X | <p><u>ECP 452</u> - Replacement of Tray A Assembly, P/N 2003092-011, with -031 configuration. Wiring changes to permit operation with Auxiliary Computer Memory (ACM) and reduce noise signals.</p> <p><u>ECP 474</u> - Replacement of Test Connector Cover, P/N 2004115, with 2003099-011. New connector eliminates noise problems when GSE is not connected to the AGC.</p> <p><u>ECP 483</u> - Replacement of R36 with P/N 1008815 Zener diode to preclude induced breakdown of sense amplifier devices. P/N 2003981 and 2003982-021 changed to -031.</p> <p><u>ECP 485</u> - Replacement of Power Supply Module, P/N 2008953-011, with P/N 2003887-011 configuration. Modified screening characteristics to better assure suitability of P/N 1006310 transistors for certain tight applications; eliminated of DSKY 28 V Regulator, and reduced value of R 43 from 5.1 K to 2.2 K ohms.</p> <p><u>ECP's 501 and 505</u> - Change of several modules via implementation of Flight Processing Specification ND 1002313 for transistors, P/N 1006323 (ECP 501), and ND 1002314 for diodes, and new diode P/N 1006399 (ECP 505). ECP 505 also includes replacement of P/N 1006751 diodes with P/N 1006399 because of channeling and surface instabilities.</p> <p><u>ECP 511</u> - Replacement of Tray B Assembly, P/N 2003093-011 with -021 configuration. Wiring changes to reduce cross-coupling between Rope Inhibit wires and logic signal SCAFAL.</p> <p><u>ECP 518</u> - Tied 28 V ground to Power Supply Module header to reduce noise on 28 V COM line. Added circuit elements R48, R49, R50, C25, Q17 to Standby circuitry to obtain signal delays. Changed Power Supply Module P/N from 2003887 to 2003892-011.</p> <p><u>ECP 564</u> - Implementation of flight processing specifications - ND 1002358B - for logic integrated circuits, 1006321, 1006394. Only partially incorporated per waiver C-1089.</p> <p><u>ECP 604</u> - Incorporation of vibration damping paid in area of erasable memory module.</p> <p><u>ECP 719</u> - Changed the alarm module V-Fail level from 28 Vdc to 20 Vdc through nominal selection of resistor R3, P/N 1006750.</p> <p><u>ECP 815</u> - Replacement of Connector Assembly, P/N 2003099-011, with Restart Monitor Module, P/N 2003310 to facilitate analysis of computer restarts after Spacecraft installation.</p> <p>There are no configuration differences between qualification item and flight item.</p> <p>External dust covers qualified as part of the APTPS.</p> | <p><u>ECP 452</u> - Qualified by similarity.</p> <p><u>ECP 474</u> - Qualified by evaluation test.</p> <p><u>ECP 483</u> - Diode, P/N 1008815 qualified at part level by evaluation test.</p> <p><u>ECP 485</u> - Qualified by similarity.</p> <p><u>ECP 501/505</u> - Qualified by part test.</p> <p><u>ECP 511</u> - Qualified by evaluation test.</p> <p><u>ECP 518</u> - Qualified by evaluation test.</p> <p><u>ECP 564</u> - Qualified by part test.</p> <p><u>ECP 604</u> - Qualified by test. AP-M-20010-N3323.</p> <p><u>ECP 719</u> - Qualified by similarity.</p> <p><u>ECP 815</u> - Qualified by test.</p> <p>Flight item qualified by test and by similarity to qualification item.</p> <p>AP-M-17481-N144 Flight item qualified by test.</p> |
| | <u>-021</u> | <u>-011</u> | <u>-021</u> | <u>-031</u> | <u>-041</u> | <u>-051</u> | <u>-061</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | <u>-071</u> | <u>-081</u> | <u>-091</u> | <u>-111</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <p>ASTROEXTANT PASSIVE THERMAL PROTECTION SYSTEM (APTPS)</p> <p>Qualification Item: P/N 1021373-051</p> <p>Flight Item: P/N 1021373-051</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| ITEM DESCRIPTION | DIFFERENCES BETWEEN QUALIFICATION ITEMS AND FLIGHT HARDWARE | REMARKS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <p>DISPLAY AND KEYBOARD (DSKY)</p> <p>Qualification Item: 2003950-011, S/N 30</p> <p>Flight Items: ECP Incorporation 2003950 2003994</p> <table border="1"> <thead> <tr> <th></th> <th>-011</th> <th>-011</th> <th>-021</th> <th>-031</th> <th>-041</th> <th>-051</th> </tr> </thead> <tbody> <tr><td>419</td><td></td><td>X</td><td>X</td><td></td><td>X</td><td>X</td></tr> <tr><td>476</td><td></td><td>X</td><td>X</td><td></td><td>X</td><td>X</td></tr> <tr><td>479</td><td></td><td>X</td><td>X</td><td></td><td>X</td><td>X</td></tr> <tr><td>493</td><td></td><td>X</td><td>X</td><td></td><td>X</td><td>X</td></tr> <tr><td>494</td><td></td><td>X</td><td>X</td><td></td><td>X</td><td>X</td></tr> <tr><td>501</td><td></td><td>X</td><td>X</td><td></td><td>X</td><td>X</td></tr> <tr><td>504</td><td></td><td>X</td><td>X</td><td></td><td>X</td><td>X</td></tr> <tr><td>505</td><td></td><td>X</td><td>X</td><td></td><td>X</td><td>X</td></tr> <tr><td>641</td><td></td><td></td><td>X</td><td></td><td></td><td>X</td></tr> <tr><td>673</td><td></td><td></td><td>X</td><td></td><td></td><td>X</td></tr> <tr><td>735</td><td></td><td></td><td></td><td>X</td><td></td><td>X</td></tr> <tr><td>739</td><td></td><td></td><td></td><td></td><td>X</td><td>X</td></tr> <tr><td>768</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table> <p>2003994 (Continued)</p> <table border="1"> <thead> <tr> <th></th> <th>-061</th> <th>-071</th> <th>-081</th> <th>-091</th> <th>-111</th> <th>-121</th> </tr> </thead> <tbody> <tr><td>419</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>476</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>479</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>493</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>494</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>501</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>504</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>505</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>641</td><td></td><td>X</td><td></td><td>X</td><td></td><td>X</td></tr> <tr><td>673</td><td></td><td>X</td><td></td><td>X</td><td></td><td>X</td></tr> <tr><td>735</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>739</td><td>X</td><td>X</td><td>X</td><td>X</td><td></td><td>X</td></tr> <tr><td>768</td><td></td><td></td><td>X</td><td>X</td><td>X</td><td>X</td></tr> </tbody> </table> | | -011 | -011 | -021 | -031 | -041 | -051 | 419 | | X | X | | X | X | 476 | | X | X | | X | X | 479 | | X | X | | X | X | 493 | | X | X | | X | X | 494 | | X | X | | X | X | 501 | | X | X | | X | X | 504 | | X | X | | X | X | 505 | | X | X | | X | X | 641 | | | X | | | X | 673 | | | X | | | X | 735 | | | | X | | X | 739 | | | | | X | X | 768 | | | | | | | | -061 | -071 | -081 | -091 | -111 | -121 | 419 | X | X | X | X | X | X | 476 | X | X | X | X | X | X | 479 | X | X | X | X | X | X | 493 | X | X | X | X | X | X | 494 | X | X | X | X | X | X | 501 | X | X | X | X | X | X | 504 | X | X | X | X | X | X | 505 | X | X | X | X | X | X | 641 | | X | | X | | X | 673 | | X | | X | | X | 735 | X | X | X | X | X | X | 739 | X | X | X | X | | X | 768 | | | X | X | X | X | <p><u>ECP 419 and 493</u> - Replacement of IDM modules, P/N 2003950-021, with -031 configuration, which incorporates P/N 1005001-2 and P/N 1005003-2 Filters Relays, and change of resistors R13 and R17.</p> <p><u>ECP 476</u> - Change Alarm Indicator Module, P/N 1006387-001 to -002, application of light diffusing paint to alarm indicator face to prevent outgassing.</p> <p><u>ECP 479</u> - Application of polytetrafluoroethylene coating to shaft of DSKY Pushbutton Switch Assembly.</p> <p><u>ECP 494</u> - Replacement of Front Housing Assembly, P/N 2003885-011, with P/N 2003949-021, product improvement change for ease of manufacturing.</p> <p><u>ECP's 501 and 505</u> - Change of several modules via implementation of Flight Processing Specification ND 1002313 for transistors, P/N 1006323 (ECP 501), and ND 1002314 for diodes, and new diode P/N 1006399 (ECP 505). ECP 505 also includes replacement of P/N 1006751 diodes with P/N 1006399 because of channeling and surface instabilities.</p> <p><u>ECP 504</u> - Implementation of FPS ND 1002341 for P/N's 1005001 and 1005003 relays.</p> <p><u>ECP 641</u> - Incorporation of aluminum pushbutton caps, glass overlays of Indicator Alarm Face (Fire Fix).</p> <p><u>ECP 673</u> - Incorporation of redesigned leaf spring in pushbutton cap housings.</p> <p><u>ECP 735</u> - Incorporates safety glass over I/L and E/L panels.</p> <p><u>ECP 739</u> - Incorporates additional legends in I/L panel.</p> <p><u>ECP 768</u> - Incorporates design change to increase safety margin of E/L displays.</p> | <p><u>ECP 419</u> - Qualified by test. Change was incorporated in Qualification Item via Raytheon Waiver C-888.</p> <p><u>ECP 476</u> - Qualified by evaluation test.</p> <p><u>ECP 479</u> - Qualified by evaluation test.</p> <p><u>ECP 494</u> - Qualified by similarity.</p> <p><u>ECP 501/505</u> - Qualified by part test.</p> <p><u>ECP 504</u> - Qualified by similarity.</p> <p><u>ECP 641</u> - Qualified by test. AP-M-19631-N3162.</p> <p><u>ECP 673</u> - Qualified by test. AP-M-19631-N3162.</p> <p><u>ECP 735</u> - Qualified by test. AP-M-19631-N3162.</p> <p><u>ECP 739</u> - Qualified by similarity.</p> <p><u>ECP 768</u> - Qualified by test.</p> <p>Flight item is qualified by test and by similarity to qualification item.</p> |
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| 494 | | X | X | | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 505 | | X | X | | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 641 | | | X | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 673 | | | X | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 735 | | | | X | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 739 | | | | | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 768 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | -061 | -071 | -081 | -091 | -111 | -121 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 476 | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 479 | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 493 | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 494 | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 504 | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 641 | | X | | X | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 673 | | X | | X | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 735 | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 739 | X | X | X | X | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 768 | | | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| ITEM DESCRIPTION | DIFFERENCES BETWEEN QUALIFICATION ITEMS AND FLIGHT HARDWARE | REMARKS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <p>PIPA ELECTRONICS ASSEMBLY (PEA)</p> <p>Qualification Item: 2007201-021, S/N 3</p> <p>Flight Item: ECP Incorporation</p> <table border="0" data-bbox="274 256 456 291"> <tr> <td></td> <td><u>-021</u></td> <td><u>-031</u></td> </tr> <tr> <td>620</td> <td></td> <td>X</td> </tr> </table> | | <u>-021</u> | <u>-031</u> | 620 | | X | <p><u>ECP 620</u> - Application of foil over exposed connector surfaces.</p> | <p><u>ECP 620</u> - Flammability test. AP-M-18508. Flight item qualified by test.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <u>-021</u> | <u>-031</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 620 | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>POWER AND SERVO ASSEMBLY (PSA)</p> <p>Qualification Item: Humidity, 2007200-111, S/N 3 EMI, 2007200-081</p> <p>All other environments, 2007200-061, S/N 3</p> <p>Flight Item: ECP Incorporation</p> <table border="0" data-bbox="202 526 456 674"> <tr> <td></td> <td><u>-061</u></td> <td><u>-081</u></td> <td><u>-111</u></td> <td><u>-151</u></td> <td><u>-161</u></td> </tr> <tr> <td>248</td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>461</td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>529</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>572</td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> </tr> <tr> <td>590</td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> </tr> <tr> <td>621</td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> </tr> <tr> <td>796</td> <td></td> <td></td> <td></td> <td></td> <td>X</td> </tr> </table> | | <u>-061</u> | <u>-081</u> | <u>-111</u> | <u>-151</u> | <u>-161</u> | 248 | | X | X | X | X | 461 | | X | X | X | X | 529 | | | X | X | X | 572 | | | | X | X | 590 | | | | X | X | 621 | | | | X | X | 796 | | | | | X | <p><u>ECP 248</u> - Replacement of Pulse Torque Power Amplifier, P/N 2007106, with redesigned P/N 2007166.</p> <p><u>ECP 461</u> - Modification of module 2007114 to -021 configuration; two P/N 1010392 diodes replaced by two P/N 1010370 devices.</p> <p><u>ECP 529</u> - Application of RTV 102 or RTV 109 about periphery of connector plates. Application of DC-4 grease about periphery and on top surface of connector arrays. Holes filled with RTV-11 moisture proofing.</p> <p><u>ECP 572</u> - Redesign of connector gaskets for enhanced sealing capability.</p> <p><u>ECP 590</u> - Removal of anticreep module, 2007124.</p> <p><u>ECP 621</u> - Application of foil over exposed connector encapsulant surfaces.</p> <p><u>ECP 796</u> - Incorporated circuit change to provide for translunar bus isolation.</p> | <p><u>ECP 248</u> - Qualified by test. AP-M-16443-N1072, AP-M-17524-N1457.</p> <p><u>ECP 461</u> - Diode P/N 1010370 qualified at part level. AP-M-10815.</p> <p><u>ECP 529</u> - Qualified by test AP-M-16443-N1072.</p> <p><u>ECP 572</u> - Qualified by similarity.</p> <p><u>ECP 590</u> - Qualified by similarity.</p> <p><u>ECP 621</u> - Qualified by Flammability test. AP-M-18508.</p> <p><u>ECP 796</u> - Qualified by Evaluation test.</p> <p>Flight item qualified by test and by similarity to qualification item.</p> |
| | <u>-061</u> | <u>-081</u> | <u>-111</u> | <u>-151</u> | <u>-161</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 248 | | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 461 | | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 529 | | | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 572 | | | | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 590 | | | | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 621 | | | | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 796 | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| ITEM DESCRIPTION | DIFFERENCES BETWEEN QUALIFICATION ITEMS AND FLIGHT HARDWARE | REMARKS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <p>OPTICAL UNIT ASSEMBLY (OUA)</p> <p>Qualification Item: Thermal Vacuum, 2011000-061, S/N 23 Vibration Shock, 2011000-011, S/N 6 All other environments, 2011000-031, S/N 14</p> <p>Flight Item: ECP Incorporation -011 -031 -061 -071 -081 -091</p> <table border="0"> <tr> <td>318</td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>453</td> <td>X</td> <td></td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>475</td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>507</td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>590</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>724</td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> </tr> <tr> <td>786</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>1013</td> <td></td> <td></td> <td></td> <td></td> <td>X</td> </tr> </table> | 318 | | X | X | X | X | 453 | X | | X | X | X | 475 | | X | X | X | X | 507 | | X | X | X | X | 590 | | | X | X | X | 724 | | | | X | X | 786 | | | | | | 1013 | | | | | X | <p><u>ECP 318</u> - Provision of corrosion protection. <u>ECP 453</u> - Incorporation of two beryllium wedges in optical unit subassembly, P/N 2012736, to preclude SXT head shift. <u>ECP 475</u> - Provides lead-in chamfer for panel, P/N 2012728, and new spring and spacer, P/N's 2012759 and 2012752 respectively, to minimize particle creation and accumulation. <u>ECP 507</u> - Provides for utilization of P/N 1012156 - four motor tachometers in shaft and trunnion drive applications. <u>ECP 590</u> - Provides a trunnion hesitation spring. <u>ECP 724</u> - Contains improved trunnion gear box with selected parts in stop mechanism. <u>ECP 786</u> - Provides pin retention check of Geneva mechanism in counters and replacement if necessary. <u>ECP 1013</u> - Contains new lubricant for bearings and gears, new motor-tachs with new lubricant, new light rod assembly, and passivation of beryllium optical base.</p> | <p><u>ECP's 318, 453, 475, 507</u> - Qualified by test AP-M-15854-N902.</p> <p><u>ECP 590</u> - Qualified by evaluation test. <u>ECP 724</u> - Qualified by evaluation test.</p> <p><u>ECP 1013</u> - Light rod assembly and new lubricant in bearings qualified by similarity - Passivation of beryllium qualified by evaluation test - Motor tach to be qualified by evaluation test.</p> <p>Flight item is qualified by test.</p> |
| 318 | | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 453 | X | | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 475 | | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 507 | | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 590 | | | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 724 | | | | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 786 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1013 | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>NAVIGATION BASE ASSEMBLY</p> <p>Qualification Item: 2899982-021, S/N 2</p> <p>Flight Item: ECP Incorporation -021 -031 -041</p> <table border="0"> <tr> <td>630</td> <td></td> <td>X</td> <td>X</td> </tr> </table> | 630 | | X | X | <p><u>ECP 630</u> - Application of metallic sealing discs over mold material in inlets.</p> | <p><u>ECP 630</u> - Qualified by similarity.</p> <p>Flight item is qualified by similarity to qualification item.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 630 | | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>INTERCONNECT HARNESS GROUP (ICH)</p> <p>Qualification Item: 2014567-031, S/N 3</p> <p>Flight Item: ECP Incorporation -031 -061 -071</p> <table border="0"> <tr> <td>529</td> <td></td> <td>X</td> <td>X</td> </tr> <tr> <td>551</td> <td></td> <td>X</td> <td>X</td> </tr> <tr> <td>627</td> <td></td> <td>X</td> <td>X</td> </tr> <tr> <td>667</td> <td></td> <td></td> <td>X</td> </tr> </table> | 529 | | X | X | 551 | | X | X | 627 | | X | X | 667 | | | X | <p><u>ECP 529</u> - Provides for replacement of jacking screws on National connectors. <u>ECP 551</u> - Provides for replacement of Nylon lacing tape. <u>ECP 627</u> - Wrapping with aluminium tape; lacing with Bentley Harris tape STFE-40B (fireproofing). <u>ECP 667</u> - Additional of VHF ranging signals.</p> | <p><u>ECP 529</u> - Qualified by test, AP-M-16443-N1072. <u>ECP 551</u> - Qualified by similarity. <u>ECP 627</u> - Qualified by test, AP-M-18508. <u>ECP 667</u> - Qualified by similarity.</p> <p>Flight item qualified by test and by similarity to qualification item.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 529 | | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 551 | | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 627 | | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 667 | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| ITEM DESCRIPTION | DIFFERENCES BETWEEN QUALIFICATION ITEMS AND FLIGHT HARDWARE | REMARKS |
|--|--|--|
| <p>OPTICS SHROUD ASSEMBLY</p> <p>Qualification Item: P/N 2021394-011</p> <p>Flight Item: P/N 2021394-011</p> <p>RANGEFINDER</p> <p>Qualification Item: P/N 2013250, S/N 2</p> <p>Flight Item: P/N 2013250</p> <p>EYEPIECE STORAGE UNIT (ESU)</p> <p>Qualification Item: P/N 2021382-021, S/N AC-3</p> <p>Flight Item: ECP Incorporation</p> <p style="margin-left: 20px;">-021 -031</p> <p>790 X</p> | <p>There are no configuration differences between qualification item and flight item.</p> <p><u>ECP 764</u> — Provides for addition of a Rangefinder to Apollo G & N System. There are no configuration differences between qualification item and flight item.</p> <p><u>ECP 790</u> — Addition of finger tab and replacement of SXT eyepiece retainer bracket. NOTE: Eyepieces qualified as part of ESU with the exception of: <u>ECP 753</u> — Addition of steel inserts to SXT Mirror Housing <u>ECP 795</u> — Provides locking rings to SXT and SCT eyepiece assembly. SCT eyepiece assembly 2012793-000 to -011 SXT eyepiece assembly 2012700-011 to -021</p> <p><u>ECP 1007</u> — Addition of reticle stop to eliminate halo on reticle.</p> <p>Eyepiece dust covers qualified by test, in conjunction with the ESU/eyepiece qualification test; Report TR-1521</p> | <p>Flight item qualified by test. AP-M-18321-N1713.</p> <p>Flight item qualified by test.</p> <p><u>ECP 790</u> — Qualified by similarity. Flight item qualified by test and by similarity. AP-M-19332-H-3039.</p> <p><u>ECP 1007</u> — Qualified by similarity.</p> |
| <p>COMPUTER FIXED MEMORY MODULE</p> <p>Qualification Item: P/N 2003960, S/N 30, 37 P/N 186962, S/N's 1,5, 6, 7</p> <p>Flight Item: P/N 2003972</p> | <p>Difference between 2003960 and 2003972 is type of software program. Difference between 186962 and 2003972 is type of software program, plus 186962 configuration does not contain Silastic protection around diodes.</p> <p><u>ECP 766</u> — Provides a vacuum screen for all flight ropes.</p> | <p>Flight item qualified by test. AP-M-17235-N1361.</p> |

| ITEM DESCRIPTION | DIFFERENCES BETWEEN QUALIFICATION ITEMS AND FLIGHT HARDWARE | REMARKS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---------|------|------|------|------|------|------|-----|---|--|---|---|---|---|---|-----|--|---|---|---|---|---|---|-----|--|--|---|---|---|---|---|-----|--|--|---|---|---|---|---|-----|--|--|---|---|--|---|---|-----|--|--|---|---|---|---|---|-----|--|--|--|--|---|--|---|---|---|
| <p>INERTIAL MEASUREMENT UNIT (IMU)</p> <p>Qualification Item: Block II Level Vibration, 2018601-071, S/N 3</p> <p>All other Block II Environments, 2018601-051, S/N 3</p> <p>Flight Item: ECP Incorporation</p> <table border="1" data-bbox="207 273 535 433"> <thead> <tr> <th></th> <th>-051</th> <th>-071</th> <th>-191</th> <th>-201</th> <th>-211</th> <th>-221</th> <th>-231</th> </tr> </thead> <tbody> <tr> <td>306</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>500</td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>587</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>605</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>653</td> <td></td> <td></td> <td>X</td> <td>X</td> <td></td> <td>X</td> <td>X</td> </tr> <tr> <td>678</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>688</td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td></td> <td>X</td> </tr> </tbody> </table> | | -051 | -071 | -191 | -201 | -211 | -221 | -231 | 306 | X | X | X | X | X | X | X | 500 | | X | X | X | X | X | X | 587 | | | X | X | X | X | X | 605 | | | X | X | X | X | X | 653 | | | X | X | | X | X | 678 | | | X | X | X | X | X | 688 | | | | | X | | X | <p><u>ECP 306</u> - Addition of harness cable clamp to IMU cover.</p> <p><u>ECP 500</u> - Replacement of capacitor, P/N 1010317-001, with P/N 1008848 in PIP preamplifier application, which becomes P/N 2007060-021 as a consequence. Also provides for epoxy resin conformal coating on all solder terminals.</p> <p><u>ECP 587</u> - Advancement of 25 IRIG from 2021500-051 to -071 configuration. Change incorporates new end cap - aluminum base, turret terminals, longer connector mounting screws.</p> <p><u>ECP 605</u> - Removal of insulating blankets, P/N's 2018805 and 2018806, from IMU.</p> <p><u>ECP 653</u> - Change of stable member harness wiring to reduce IRIG preamplifier oscillations.</p> <p><u>ECP 678</u> - Lockwashers and C-7 adhesive added to IRIG connector mounting hardware.</p> <p><u>ECP 688</u> - Addition of capacitor P/N 1006777 across signal microsyn output terminals. IRIG's advanced to -111 configuration.</p> | <p><u>ECP 306</u> - Qualified by test.</p> <p><u>ECP 500</u> - Capacitor P/N 1008848 qualified at part level. AP-M-14177-N426.</p> <p><u>ECP 587</u> - Qualified by test at IRIG level.</p> <p><u>ECP 605</u> - Analytical thermal analysis indicated test not required. AP-M-17974-N1596.</p> <p><u>ECP 653</u> - Qualified by similarity.</p> <p><u>ECP 678</u> - Qualified by similarity.</p> <p><u>ECP 688</u> - Capacitor, P/N 1006777, qualified at part level. AP-M-13039-N186.</p> <p>IMU coolant hoses qualified as part of IMU qualification.</p> <p>Flight item qualified by test and by similarity to qualification item.</p> |
| | -051 | -071 | -191 | -201 | -211 | -221 | -231 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 306 | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 500 | | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 587 | | | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 605 | | | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 653 | | | X | X | | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 678 | | | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 688 | | | | | X | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>25 IRIG</p> <p>Qualification Item: - 2021500-051 Qualification by System Test in 2018601-071 S/N 3</p> <p>Flight Item: ECP Incorporation</p> <table border="1" data-bbox="207 622 425 660"> <thead> <tr> <th></th> <th>-111</th> <th>-151</th> <th>-171</th> <th>-181</th> </tr> </thead> <tbody> <tr> <td>688</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> </tbody> </table> | | -111 | -151 | -171 | -181 | 688 | X | X | X | X | <p>111 - Block I float permissible, Barden (X-26) or ND forward production bearings, ORR synthane retainer, V78 oil, 3 lb. preload.</p> <p>151 - ND, old Barden (X-26) and Polaris bearing hardware, ORR nylasint retainer, V 78 oil, 3 lb. preload.</p> <p>171 - Refurbished Barden (X-44) bearings, IRR nylasint retainer, SRG 160 oil, .8 lb preload</p> <p>181 - Refurbished ND bearing hardware, IRR nylasint retainer, N3 oil, .8 lb preload</p> | <p>151 - S/N 8A101 through 8A199</p> <p>171 - S/N 9A7, 9A8 MIT built 9A41, 9A42 S/N 9A11 through 9A40 Bendix built</p> <p>-181 - S/N 8A201 and Up</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | -111 | -151 | -171 | -181 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 688 | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| ITEM DESCRIPTION | DIFFERENCES BETWEEN QUALIFICATION ITEMS AND FLIGHT HARDWARE | REMARKS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---------|------|------|------|------|------|------|-----|---|---|--|--|---|--|---|-----|--|--|---|--|---|--|---|-----|--|---|---|---|---|--|---|-----|--|--|---|---|---|--|---|-----|--|--|--|--|--|---|---|-----|--|--|---|---|---|--|---|-----|--|--|---|---|---|--|---|--|------|------|--|--|--|--|--|-----|---|---|--|--|--|--|--|-----|--|--|--|--|--|--|--|-----|---|---|--|--|--|--|--|-----|--|--|---|---|--|--|--|-----|--|--|---|--|--|--|--|-----|---|---|--|--|--|--|--|-----|---|---|--|--|--|--|--|-----|---|---|--|--|--|--|--|--|---|
| <p>ELECTRONIC DATA COUPLING UNIT (ECDU)</p> <p>Qualification Item:</p> <p>Block II Vibration only, 2007222-121</p> <p>Other Environments, 2007222-081, S/N 19</p> <p>Flight Item:</p> <p>ECP Incorporation</p> <table border="1" data-bbox="132 308 496 664"> <thead> <tr> <th></th> <th>-081</th> <th>-121</th> <th>-181</th> <th>-191</th> <th>-221</th> <th>-231</th> <th>-241</th> </tr> </thead> <tbody> <tr> <td>336</td> <td>X</td> <td>X</td> <td></td> <td></td> <td>X</td> <td></td> <td>X</td> </tr> <tr> <td>398</td> <td></td> <td></td> <td>X</td> <td></td> <td>X</td> <td></td> <td>X</td> </tr> <tr> <td>499</td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td>X</td> </tr> <tr> <td>515</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td>X</td> </tr> <tr> <td>564</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> </tr> <tr> <td>603</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td>X</td> </tr> <tr> <td>609</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td>X</td> </tr> <tr> <td></td> <td>-251</td> <td>-261</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>336</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>398</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>499</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>515</td> <td></td> <td></td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> </tr> <tr> <td>564</td> <td></td> <td></td> <td>X</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>603</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>609</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>781</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | | -081 | -121 | -181 | -191 | -221 | -231 | -241 | 336 | X | X | | | X | | X | 398 | | | X | | X | | X | 499 | | X | X | X | X | | X | 515 | | | X | X | X | | X | 564 | | | | | | X | X | 603 | | | X | X | X | | X | 609 | | | X | X | X | | X | | -251 | -261 | | | | | | 336 | X | X | | | | | | 398 | | | | | | | | 499 | X | X | | | | | | 515 | | | X | X | | | | 564 | | | X | | | | | 603 | X | X | | | | | | 609 | X | X | | | | | | 781 | X | X | | | | | | <p><u>ECP 336</u> - Change potting material of LM ECDU trays from solid PR 1538 to a combination of PR 1538 and polyurethane foam for weight reduction.</p> <p><u>ECP 398</u> - Changes potting material of CM ECDU trays from solid PR 1538 to a combination of PR 1538 and polyurethane foam for weight reduction. Also incorporates improved bonding of ECDU EMI covers.</p> <p><u>ECP 499</u> - Incorporation of module vibration damper plate between trays S and X.</p> <p><u>ECP 515</u> - Provides for individual selection of optimum resistance value in circuit position R-73, system coarse module; module part number advanced from 2007236-011 to -031.</p> <p><u>ECP 564</u> - Implementation of flight processing specifications, ND 1002359A and ND 1002358B, for logic integrated circuits.</p> <p><u>ECP 603</u> - Replacement of P/N 1010317-004 capacitors with P/N 1008900-24 counterpart in MSA and Quad Reject Module.</p> <p><u>ECP 609</u> - Circuit redesign of MSA and Quad Reject Module.</p> <ol style="list-style-type: none"> Diodes, CR 10; P/N 1010385 removed. Resistor, R 140; P/N 1006750-12 added. Diode CR 13, P/N 1008815, replaced by P/N 1010372. Value of Resistor R-76, P/N 1006750, changed. <p><u>ECP 714</u> - Reduction of ECDU noise susceptibility by rerouting 1x resolver winding, read counter logic interconnect, and CDU reset lead in headers.</p> <p><u>ECP 714</u> - has an in-line effectivity of ECDU-40 and subsequent. Retrofit has been accomplished on S/N-14, 16, 17, 20, 23, 29, 30, 33, 36, and 39.</p> <p><u>ECP 781</u> - Provides for standardization of mounting bolts to preclude inadvertent installation of shorter bolts.</p> | <p><u>ECP 336</u> - Qualified by test.</p> <p><u>ECP 398</u> - Qualified by similarity.</p> <p><u>ECP 499</u> - Qualified by test. AP-M-16622-N1120.</p> <p><u>ECP 515</u> - Qualified by similarity.</p> <p><u>ECP 564</u> - Qualified by part test.</p> <p><u>ECP 603</u> - Capacitor, P/N 1008900, qualified at part level, based on results of evaluation test, 20-P-400.</p> <p><u>ECP 609</u> - Qualified by part test.</p> <p><u>ECP 714</u> - Qualified by similarity.</p> <p>Flight item qualified by test and by similarity to qualification item.</p> <p><u>ECP 781</u> - Qualified by similarity.</p> |
| | -081 | -121 | -181 | -191 | -221 | -231 | -241 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 609 | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 781 | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

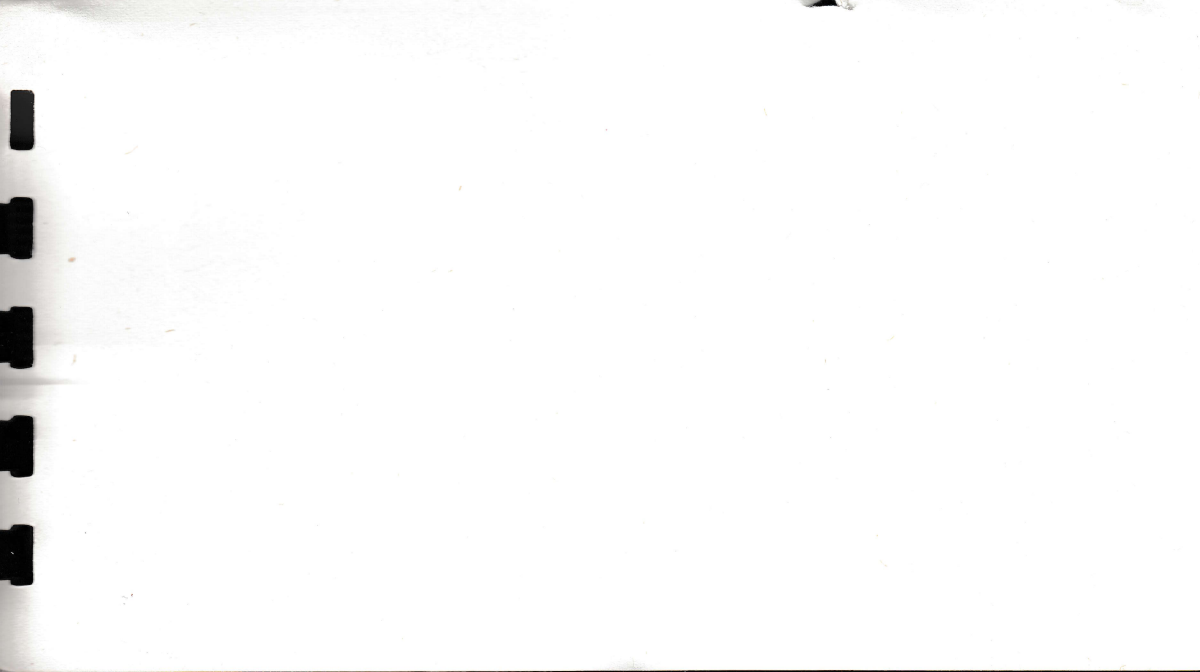
| ITEM DESCRIPTION | DIFFERENCES BETWEEN QUALIFICATION ITEMS AND FLIGHT HARDWARE | REMARKS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <p>GUIDANCE COMPUTER (LGC)</p> <p>Qualification Item: 2003200-021, S/N RAY 16 (C1)</p> <p>Flight Item: ECP Incorporation 2003200 2003993</p> <table border="1"> <thead> <tr> <th></th> <th>-021</th> <th>-011</th> <th>-021</th> <th>-031</th> <th>-041</th> <th>-051</th> <th>-061</th> </tr> </thead> <tbody> <tr> <td>452</td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>474</td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>483</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>485</td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>501/505</td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>511</td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>518</td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>564</td> <td></td> <td></td> <td></td> <td>X</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>604</td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> <td></td> <td>X</td> </tr> <tr> <td>719</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> </tr> </tbody> </table> | | -021 | -011 | -021 | -031 | -041 | -051 | -061 | 452 | | X | X | X | X | X | X | 474 | | X | X | X | X | X | X | 483 | | | | | | | | 485 | | X | X | X | X | X | X | 501/505 | | X | X | X | X | X | X | 511 | | X | X | X | X | X | X | 518 | | | X | X | X | X | X | 564 | | | | X | | | X | 604 | | | | X | X | | X | 719 | | | | | | X | X | <p><u>ECP 452</u> - Replacement of Tray A Assembly, P/N 2003092-011, with -031 configuration. Wiring changes to permit operation with Auxiliary Computer Memory (ACM) and reduce noise signals.</p> <p><u>ECP 474</u> - Replacement of Test Connector Cover, P/N 2004115, with 2003099-011. New connector eliminates noise problems when GSE is not connected to the AGC.</p> <p><u>ECP 483</u> - Replacement of R36 with a P/N 1008815 Zener diode to preclude induced breakdown of sense amplifier devices. P/N 2003981 and 2003982-021 changed to -031.</p> <p><u>ECP 485</u> - Replacement of Power Supply Module, P/N 2008953-011, with P/N 2003887-011 configuration. Modified screening characteristics to better assure suitability of P/N 1006310 transistors for certain tight applications; eliminated of DSKY 28 V Regulator, and reduced value of R 43 from 5.1 K to 2.2 K ohms.</p> <p><u>ECP's 501 and 505</u> - Change of several modules via implementation of Flight Processing Specification ND 1002313 for transistors, P/N 1006323 (ECP 501), and ND 1002314 for diodes, and new diode P/N 1006399 (ECP 505). ECP 505 also includes replacement of P/N 1006751 diodes with P/N 1006399 because of channeling and surface instabilities.</p> <p><u>ECP 511</u> - Replacement of Tray B Assembly, P/N 2003093-011 with -021 configuration. Wiring changes to reduce cross coupling between Rope Inhibit wires and logic signal SCAFAL.</p> <p><u>ECP 518</u> - Tied 28 V ground to Power Supply Module header to reduce noise on 28 V COM line. Added circuit elements R48, R49, R50, C25, Q17 to Standby circuitry to obtain signal delays. Changed Power Supply Module P/N from 2003887 to 2003892-011.</p> <p><u>ECP 564</u> - Implementation of flight processing specifications - ND 1002358B - for logic integrated circuits, 1006321, 1006394. Only partially incorporated per waiver C-1089.</p> <p><u>ECP 604</u> - Incorporation of vibration damping paid in area of erasable memory module.</p> <p><u>ECP 719</u> - Changed the alarm module V-Fail level from 28 Vdc to 20 Vdc through nominal selection of resistor R3, P/N 1006750.</p> <p><u>ECP 815</u> - Replacement of Connector Assembly, P/N 2003099-011, with Restart Monitor Module, P/N 2003310, to facilitate analysis of computer restarts after Spacecraft installation.</p> | <p><u>ECP 452</u> - Qualified by similarity.</p> <p><u>ECP 474</u> - Qualified by evaluation test.</p> <p><u>ECP 483</u> - Diode, P/N 1008815 qualified at part level by evaluation test.</p> <p><u>ECP 485</u> - Qualified by similarity.</p> <p><u>ECP 501/505</u> - Qualified by part test.</p> <p><u>ECP 511</u> - Qualified by evaluation test.</p> <p><u>ECP 518</u> - Qualified by evaluation test.</p> <p><u>ECP 564</u> - Qualified by part test.</p> <p><u>ECP 604</u> - Qualified by test. AP-M-20010-N3323.</p> <p><u>ECP 719</u> - Qualified by similarity.</p> <p><u>ECP 815</u> - Qualified by test.</p> <p>Flight item qualified by test and by similarity to qualification item.</p> |
| | -021 | -011 | -021 | -031 | -041 | -051 | -061 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 604 | | | | X | X | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 719 | | | | | | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th></th> <th>-071</th> <th>-081</th> <th>-091</th> <th>-111</th> </tr> </thead> <tbody> <tr> <td>452</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>474</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>483</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>485</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>501/505</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>511</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>518</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>564</td> <td>X</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>604</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>719</td> <td></td> <td></td> <td>X</td> <td>X</td> </tr> <tr> <td>815</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> </tbody> </table> | | -071 | -081 | -091 | -111 | 452 | X | X | X | X | 474 | X | X | X | X | 483 | | | | | 485 | X | X | X | X | 501/505 | X | X | X | X | 511 | X | X | X | X | 518 | X | X | X | X | 564 | X | | | X | 604 | X | X | X | X | 719 | | | X | X | 815 | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | -071 | -081 | -091 | -111 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 452 | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 474 | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 483 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 485 | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 501/505 | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 511 | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 518 | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 564 | X | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 604 | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 719 | | | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 815 | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| ITEM DESCRIPTION | DIFFERENCES BETWEEN QUALIFICATION ITEMS AND FLIGHT HARDWARE | REMARKS |
|-------------------------------|---|--|
| DISPLAY AND KEYBOARD (DSKY) | | |
| Qualification Item: | <u>ECP 419 and 493</u> - Replacement of IDM modules, P/N 2003950-021, with -031 configuration, which incorporates P/N 1005001-2 and P/N 1005003-2 Filters Relays, and change of resistors R13 and R17. | <u>ECP 491</u> - Qualified by test. Change was incorporated in Qualification Item via Raytheon Waiver C-888. |
| 2003950-011, S/N 30 | <u>ECP 476</u> - Change Alarm Indicator Module, P/N 1006387-001 to -002, application of light diffusing paint to alarm indicator face to prevent outgassing. | <u>ECP 476</u> - Qualified by evaluation test. |
| Flight Items: | <u>ECP 479</u> - Application of polytetrafluoroethylene coating to shaft of DSKY Pushbutton Switch Assembly. | <u>ECP 479</u> - Qualified by evaluation test. |
| ECP Incorporation | <u>ECP 494</u> - Replacement of Front Housing Assembly, P/N 2003885-011, with P/N 2003949-021, product improvement change for ease of manufacturing. | <u>ECP 494</u> - Qualified by similarity. |
| 2003950 | <u>ECP's 501 and 505</u> - Change of several modules via implementation of Flight Processing Specification ND 1002313 for transistors, P/N 1006323 (ECP 501), and ND 1002314 for diodes, and new diode P/N 1006399 (ECP 505). ECP 505 also includes replacement of P/N 1006751 diodes with P/N 1006399 because of channeling and surface instabilities. | <u>ECP 501/505</u> - Qualified by part test. |
| 2003994 | <u>ECP 504</u> - Implementation of FPS ND 1002341 for P/N's 1005001 and 100502 relays. | <u>ECP 504</u> - Qualified by similarity. |
| -011 -011 -021 -031 -041 -051 | <u>ECP 641</u> - Incorporation of aluminum pushbutton caps, glass overlays of Indicator Alarm Face (Fire Fix). | <u>ECP 641</u> - Qualified by test. AP-M-19631-N3162. |
| 419 | <u>ECP 673</u> - Incorporation of redesigned leaf spring in pushbutton cap housings. | <u>ECP 673</u> - Qualified by test. AP-M-19631-N3162. |
| 476 | <u>ECP 735</u> - Incorporates safety glass over I/L and E/L panels. | <u>ECP 735</u> - Qualified by test. AP-M-19631-N3162. |
| 479 | <u>ECP 739</u> - Incorporates additional legends in I/L panel. | <u>ECP 739</u> - Qualified by similarity. |
| 493 | <u>ECP 768</u> - Incorporation design change to increase safety margin of E/L displays. | <u>ECP 768</u> - Qualified by test. |
| 494 | | Flight item is qualified by test and by similarity to qualification item. |
| 501 | | |
| 504 | | |
| 505 | | |
| 641 | | |
| 673 | | |
| 735 | | |
| 739 | | |
| 768 | | |
| 2003994 (continued) | | |
| -061 -071 -081 -091 -111 -121 | | |
| 419 | | |
| 476 | | |
| 479 | | |
| 493 | | |
| 494 | | |
| 501 | | |
| 504 | | |
| 505 | | |
| 641 | | |
| 673 | | |
| 735 | | |
| 739 | | |
| 768 | | |

| ITEM DESCRIPTION | DIFFERENCES BETWEEN QUALIFICATION ITEMS AND FLIGHT HARDWARE | REMARKS | | | |
|---|---|-------------|-------------|--|---|
| <p>POWER AND SERVO ASSEMBLY (PSA)</p> <p>Qualification Item: P/N 6007200-041, S/N 4</p> <p>Flight Item: ECP Incorporation</p> <table border="0" data-bbox="318 222 409 243"> <tr> <td></td> <td><u>-041</u></td> <td><u>-081</u></td> </tr> </table> <p>461 X</p> <p>622 X</p> <p>757 X</p> | | <u>-041</u> | <u>-081</u> | <p><u>ECP 461</u> - Modification of module P/N 2007114-011, to -021 configuration, which contains two P/N 2007114-011, to -021 configuration, which contains two P/N 1010370 diodes in place of two P/N 1010392 diodes.</p> <p><u>ECP 622</u> - Application of aluminum foil to exposed encapsulant surfaces.</p> <p><u>ECP 757</u> - Incorporated circuit change to provide for translunar bus isolation.</p> | <p><u>ECP 461</u> - Diode P/N 1010370 qualified at part level. AP-M-10815.</p> <p><u>ECP 622</u> - Flammability test. AP-M-18508.</p> <p><u>ECP 757</u> - Qualified by evaluation test. Flight item qualified by test.</p> |
| | <u>-041</u> | <u>-081</u> | | | |
| <p>COMPUTER CONTROL AND RETICLE DIMMER (CCRD)</p> <p>Qualification Item: P/N 6014512-011, S/N 6</p> <p>Flight Item: ECP Incorporation</p> <table border="0" data-bbox="318 471 409 492"> <tr> <td></td> <td><u>-011</u></td> <td><u>-081</u></td> </tr> </table> <p>422 X</p> <p>538 X</p> <p>594 X</p> <p>594R1 X</p> | | <u>-011</u> | <u>-081</u> | <p><u>ECP 422</u> - CCRD mounting changed from AOT assembly to AOT guard assembly, heater pad modified, and wiring added.</p> <p><u>ECP 538</u> - Replacement of reticle brightness potentiometer, P/N 1010916-1 with P/N 1008932-1.</p> <p><u>ECP 594</u> - Replaced plastic overlays of E/L's to aluminum, P/N 1008943/44, replaced existing harness lacing tape with P/N 1008936, and added aluminum tape, P/N 1008937, over exposed polyurethane potting material.</p> <p><u>ECP 594R1</u> - Readout characters on illuminated panels are filled in for better legibility.</p> | <p><u>ECP 422</u> - Qualification test completed with CCRD mounted in a more severe orientation.</p> <p><u>ECP 538</u> - Qualified by Evaluation test. 26-P-391.</p> <p><u>ECP 594</u> - Flammability test. AP-M-18508.</p> <p><u>ECP 594R1</u> - Qualified by similarity. Flight item qualified by test and by similarity to qualification item.</p> |
| | <u>-011</u> | <u>-081</u> | | | |
| <p>SIGNAL CONDITIONER ASSEMBLY (SCA)</p> <p>Qualification Item: P/N 6007010-011, S/N 2</p> <p>Flight Item: ECP Incorporation 6007010 or 6007013</p> <table border="0" data-bbox="318 730 409 751"> <tr> <td></td> <td><u>-011</u></td> <td><u>-021</u></td> </tr> </table> <p>624 X</p> | | <u>-011</u> | <u>-021</u> | <p><u>ECP 624</u> - Application of aluminum foil tape on three sides of header heatsink interface. Operational Signal Conditioner, P/N 6007013, differs from flight qualification configuration, P/N 60070010, in the IRIG temperature telemetry circuitry is eliminated in P/N 6007013.</p> | <p><u>ECP 624</u> - Flammability test. AP-M-18508. Flight item qualified by test and by similarity qualification item.</p> |
| | <u>-011</u> | <u>-021</u> | | | |

| ITEM DESCRIPTION | DIFFERENCES BETWEEN QUALIFICATION ITEMS AND FLIGHT HARDWARE | REMARKS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----|-----|---|---|-----|---|---|-----|-----|---|-----|---|---|-----|---|---|-----|--|---|---|--|--|--|--|-----|--|--|--|--|--|--|---|-----|--|--|---|--|--|--|--|---|---|
| <p>ALIGNMENT OPTICAL TELESCOPE (AOT)</p> <p>Qualification Item: P/N 6011000-031, S/N 10</p> <p>Requalification Item for ECP's 421, 539, 540, 542, and 543: P/N 6011000-032, S/N 10</p> <p>Flight Item: -ECP Incorporation</p> <table border="0"> <tr><td></td><td><u>-074</u></td><td><u>-111</u></td></tr> <tr><td>410</td><td>X</td><td>X</td></tr> <tr><td>422</td><td>X</td><td>X</td></tr> <tr><td>473</td><td>X</td><td>X</td></tr> <tr><td>487</td><td>X</td><td>X</td></tr> <tr><td>633</td><td>X</td><td>X</td></tr> <tr><td>657</td><td>X</td><td>X</td></tr> <tr><td>697</td><td>X</td><td>X</td></tr> <tr><td>786</td><td></td><td></td></tr> </table> | | <u>-074</u> | <u>-111</u> | 410 | X | X | 422 | X | X | 473 | X | X | 487 | X | X | 633 | X | X | 657 | X | X | 697 | X | X | 786 | | | <p><u>ECP 410</u> - Repositioning of eyepiece locking lever to shift arc of operation 108 degrees.</p> <p><u>ECP 422</u> - Change of CCRD mounting from AOT Assembly to AOT Guard Assembly.</p> <p><u>ECP 473</u> - Addition of shield to prism head end to eliminate light scatter from radar mount.</p> <p><u>ECP 487</u> - Incorporation of air focus test requirements into AOT procurement specification.</p> <p><u>ECP 633</u> - Spacecraft seal protection. Removed polyurethane foam heater insulators and replaced with metallic cover, replaced existing lacing tape with P/N 1008936 lacing tape, and added aluminum foil tape over exposed potting harness connectors.</p> <p><u>ECP 657</u> - Incorporation of conical sunshade and radar shield assembly.</p> <p><u>ECP 697</u> - Addition of AOT harness protective shield.</p> <p>AOT High Density Filter Assembly, P/N 6011856, qualified by similarity to SXT Filter, P/N 1011931, which was qualified as part of the Eyepiece Storage Unit.</p> <p><u>ECP 786</u> - Provides pin retention check of Geneva mechanism in counters and replacement if necessary.</p> | <p><u>ECP 410</u> - Qualified by similarity.</p> <p><u>ECP 422</u> - Qualification test completed with CCRD mounted in a more severe orientation.</p> <p><u>ECP 473</u> - Qualified by similarity.</p> <p><u>ECP 487</u> - Qualified by similarity.</p> <p><u>ECP 633</u> - Qualified by test. AP-M-17879-N1568.</p> <p><u>ECP 657</u> - Qualified by test. AP-M-19614-N3156.</p> <p><u>ECP 697</u> - Qualified by similarity.</p> <p>Flight item qualified by test and by similarity to qualification item.</p> | | | | | | | | | | | | | | | | | | | | | |
| | <u>-074</u> | <u>-111</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 410 | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 422 | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 473 | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 487 | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 633 | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 657 | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 697 | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 786 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>INTERCONNECT HARNESS GROUP</p> <p>Qualification Item: P/N 6014515-021, S/N 3 Harness Group P/N 6010659, S/N 3 A-Harness P/N 6010660, S/N 3 B-Harness</p> <p>Flight Item: ECP Incorporation</p> <table border="0"> <tr><td></td><td><u>-021</u></td><td><u>-031</u></td><td><u>-041</u></td><td><u>-051</u></td><td><u>-061</u></td><td><u>-071</u></td><td><u>-081</u></td></tr> <tr><td>533</td><td>X</td><td></td><td>X</td><td></td><td>X</td><td></td><td></td></tr> <tr><td>551</td><td></td><td></td><td></td><td></td><td>X</td><td>X</td><td></td></tr> <tr><td>562</td><td></td><td>X</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>582</td><td></td><td></td><td></td><td></td><td></td><td></td><td>X</td></tr> <tr><td>626</td><td></td><td></td><td>X</td><td></td><td></td><td></td><td></td></tr> </table> | | <u>-021</u> | <u>-031</u> | <u>-041</u> | <u>-051</u> | <u>-061</u> | <u>-071</u> | <u>-081</u> | 533 | X | | X | | X | | | 551 | | | | | X | X | | 562 | | X | | | | | | 582 | | | | | | | X | 626 | | | X | | | | | <p><u>ECP 533</u> - Incorporates Uplink wiring.</p> <p><u>ECP 551</u> - Provides for replacement of nylon lacing tape, G & N 607 A-Harness P/N 6010674; B-Harness P/N 6010675, G & N 605-606 A-Harness P/N 6010676; B-Harness P/N 6010675</p> <p><u>ECP 562</u> - Provides for replacement of nylon lacing tape, G & N 603 A-Harness P/N 6010672; B-Harness P/N 6010673</p> <p><u>ECP 582</u> - Provides for incorporation of flammability fixes in G & N 602 A-Harness P/N 6010677; B-Harness P/N 6010675</p> <p><u>ECP 626</u> - Flammability Protection. Replaced existing harness lacing tape with P/N 1008936 Betaglass tape and covered all exposed potting with aluminum tape.</p> | <p><u>ECP 533</u> - Qualified by similarity.</p> <p><u>ECP 551</u> - Qualified by Flammability test. AP-M-18508.</p> <p><u>ECP 562</u> - Qualified by Flammability test. AP-M-18508.</p> <p><u>ECP 582</u> - Qualified by Flammability test. AP-M-18508.</p> <p><u>ECP 626</u> - Qualified by Flammability test. AP-M-18508.</p> <p>Flight item qualified by test and by similarity to qualification items.</p> |
| | <u>-021</u> | <u>-031</u> | <u>-041</u> | <u>-051</u> | <u>-061</u> | <u>-071</u> | <u>-081</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 533 | X | | X | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 551 | | | | | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 562 | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 582 | | | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 626 | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |







Adverse References
ECP Lists