



Space Shuttle Mission 2007



Designed By: Michael Swannick

Mission Checklist STS-32

Crew Members

Commander - Daniel C. Brandenstein | Pilot - James D. Wetherbee

Mission Specialist

Bonnie J. Dunbar | David G. Low | Marsha S. Ivins

Mission Highlights

The STS-32 launch was initially scheduled for December 18, 1989, postponed to allow the completion and verification of modifications to launch pad 39A. Launch pad 39A was used for the first time since January 1986. The STS-32 next planned launch on January 9, 1990 was scrubbed due to weather conditions. Finally, STS-32 commenced on January 9, 1990 with the launch of Columbia. Mission highlights were the deployment of SYNCOM IV-F5 (aka LEASAT 5) DoD Communications Satellite and retrieval of NASA's Long Duration Exposure Facility (LDEF) which was launched six years ago by STS-41C. SYNCOM IV-F5 was deployed first followed by the LDEF retrieval during the fourth mission day, using the RMS.

Payload

Long Duration Exposure Facility (LDEF). Orbiting Earth. Will be brought back to Earth after 2,100 days in space.

SYNCOM-IV-F5 (aka LEASAT 5). A DoD Communications Satellite that will be deployed first day on orbit.

Additional Middeck Payloads Include the following

One 70 mm IMAX Motion Picture Camera | Protein Crystal Growth (PCG)
Characterization of Neurospora Circadian Rhythms (CNCR) | Latitude/Longitude Locator (L3)
Fluid Experiment Apparatus (FEA) | American Flight Echocardiograph (AFE)
Mesoscale Lightning Experiment (MLE) | Air Force Maui Optical Site (AMOS) Experiment

Flight Summary

Launchpad: Kennedy Space Center (KSC) 39A | Orbit: 280NM | Inclination: 28.5 | Orbits: 108

Duration: 10 Days, 21 Hours, 00 Minutes, 6 Seconds | Landing: Edwards Air Force Base



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PRE-LAUNCH CHECKLIST

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| COMM | MET | PANEL SECTION | PANEL | PROCEDURE | PANEL AREA & NOTES |
|------|---------------|----------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| 1 | T-00:01:50:00 | | | | Astronauts Enter The Shuttle |
| 2 | T-00:01:40:00 | Overhead Left Panel | O5 | * Set Left Audio XMIT/ICOM MODE To VOX/VOX * Set Left Audio A/G (1 & 2) To T/R * Set Left Audio A/A To T/R * Set Left Audio ICOM (A & B) To T/R * Set Left Audio (AUD) Power Switch To AUD/TONE | Activates Commander Communications |
| 3 | T-00:01:35:00 | Overhead Right Panel | O9 | * Set Right Audio XMIT/ICOM MODE To VOX/VOX * Set Right Audio A/G (1 & 2) To T/R * Set Right Audio A/A To T/R * Set Right Audio ICOM (A & B) To T/R * Set Right Audio (AUD) Power Switch To AUD/TONE | Activates Pilot Communications |
| 5 | T-00:01:20:00 | Front Left Panel | F6 | * Check ABORT Light (DIM/BRIGHT/DIM) For 8 Seconds | Abort Advisory Check |
| 6 | T-00:01:10:00 | | | | Flight Control Confirms With Commander That The Side Hatch Is Closed & Locked |
| 7 | T-00:01:05:10 | Left Panel | L2 | * Set CABIN VENT ISOL To CLOSE | Cabin Leak Check |
| | | Front Left Panel | F2 | * Set CABIN VENT To CLOSE * Press MASTER ALARM | Cancel Master Alarm Sound |
| 8 | T-00:00:51:00 | | | | Pilot Confirms IMU Alignment |
| 9 | T-00:00:50:00 | Right Panel | R2 | * Check BOILER PWR (1/2/3) Are ON * Check BOILER CNTLR/HTR (1/2/3) Are On - A * Set BOILER N2 Supply (1/2/3) To ON | Confirm Boiler Power On |
| 10 | T-00:00:45:00 | Left Panel | L2 | * Set CABIN VENT/VENT To OPEN | Open Cabin Vent |
| 11 | T-00:00:42:00 | Center Panel | C3 | * Set BFC CRT DISPLAY To ON | Enable Backup Flight System (BFS) And |
| | | | C2 | * Confirm BFC CRT SELECT Is At (3+1) * Enter ITEM 25 EXEC (Use Left Keypad) | Execute Computer Data Transfer To BFS Copy Primary Avionics SW To BFS |
| 12 | T-00:00:36:40 | Left Panel | L2 | * Set CABIN VENT To CLOSE | Cabin Leak Check - Continued |
| | | Overhead Low Panel | O1 | * Set CABIN VENT ISOL To OPEN * Check CABIN dP/dT Gauge For Possible Depressurization | |
| 13 | T-00:00:33:20 | Left Panel | L2 | * Set CABIN VENT ISOL To Close * Check CABIN VENT Is CLOSED | Cabin Pressurization Check Complete |
| 14 | T-00:00:30:00 | Center Panel | C2 | * Enter OPS 101 PRO (Use Right Keypad) * Enter SPEC 99 PRO (Use Right Keypad) * Press RESUME (Use Right Keypad) | Load OPS 1 - Planned 10 Minute Hold Load First Stage SW Into Primary Avionics System |
| 15 | T-00:00:29:00 | Center Panel | C2 | * Enter OPS 101 PRO (Use Left Keypad) | Load OPS 1 Into The BFS |
| 16 | T-00:00:26:00 | Right Panel | R2 | * Set He ISOLATION A (LEFT/CRT/RIGHT) To Open * Set He ISOLATION B (LEFT/CRT/RIGHT) To Open * Set PNEUMATICS He ISOL To Open * Set 6 ENGINE POWER Switches (LEFT/CTR/RIGHT) To ON | Begin The Main Propulsion System (MPS) Helium (He) Pressurization |
| 17 | T-00:00:15:00 | Front Left Panel | F6 | * Check ABORT Light ON/OFF For 8 Seconds | Final Test Of The ABORT System |
| | | Center Panel | C3 | * Set CAUTION/WARNING MEMORY To CLEAR | Clear C/W Memory |
| 18 | T-00:00:09:00 | Right Panel | R1 | * Set ESS BUS SOURCE (MN B/C, MN C/A, MN A/B) To ON | Enable Fuel Cells, Enable Countdown From |
| | | Center Panel | C3 | * Set Timer Thumbwheels To 0900 * Set TIMER Switch To SET | Nine (9) Minutes, Start The Countdown |
| | | Front Center Panel | F7 | * Check EVENT TIMER MODE Is DOWN * Set EVENT TIMER CONTROL To START * Confirm EVENT TIMER Display Continues The Countdown | |
| 19 | T-00:00:08:00 | Right Panel | R2 | * Check APU FUEL TK VLV (1/2/3) Are CLOSED * Check APU AUTO SHUT DOWN (1/2/3) Are Enable * Check HYD MAIN PUMP PRESS (1/2/3) Are LOW * Check APU SPEED SELECT (1/2/3) Are NORM * Set HYD CIRC PUMP (1/2/3) Set To GPC * Set APU CNTLR PWR (1/2/3) To ON | The Crew Access Arm Is Retracting APU Prestart Check Is Underway |
| 20 | T-00:00:05:10 | Right Panel | R2 | * Set APU FUEL TK VLV (1/2/3) To Open * Check APU/HYD READY TO START (1/2/3) Repeaters-(White) | APU Start |
| | | Front Center Panel | F7 | * Set APU OPERATE (1/2/3) To START/RUN | |
| | | Right Panel | R2 | * Check HYDRAULIC (APU) Pressure 900psi (Use MFD #2) | |
| | | Front Center Panel | F7 | * Set HYD MAIN PUMP PRESS (1/2/3) To NORM | |
| | | Front Left Panel | F2 | * Check HYDRAULIC (APU) Pressure 3000psi (Use MFD #2) | |
| | | Right Panel | R2 | * Press MASTER ALARM (If Required) * Set HYD CIRC PUMP (1/2/3) Set To OFF | The Master Alarm May Sound Until APU Pressure Reaches 3000 PSI. (Silence Alarm) |
| 21 | T-00:00:04:30 | Left Panel | L2 | * Set FLASH EVAP FEEDLINE HTR A & B SUPPLY To OFF | The Shuttle Is On Internal Power. Turn Off Flash Evaporator Feed Line & Heater Supply |
| | T-00:00:04:10 | | | | APU Check Complete |
| 22 | T-00:00:03:45 | | | | Start Hydraulic Check, Aero Surfaces Are Moved, A Gimbal Check Is Performed |
| | T-00:00:03:05 | | | | Hydraulic Check Complete |
| 23 | T-00:00:02:55 | | | | External Tank Liquid Oxygen (LOX) Vents Are Closing & The External Tank Begins To Pressurize. External Tank Cap Is Retracted. |
| 24 | T-00:00:02:00 | Right Panel | R2 | * Set APU AUTO SHUT DOWN (1/2/3) To INHIBIT | APU Power - Inhibit |
| | | | R1 | * Set AC BUS SNSR (1/2/3) To MONITOR | |
| | | Center Panel | C3 | * Set CAUTION/WARNING MEMORY To CLEAR | |
| 25 | T-00:00:01:40 | | | | Liquid Hydrogen External Tanks Close. |
| | T-00:00:01:20 | | | | Go For Launch Announcement. |



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| 25 | T-00:00:01:00 T-00:00:00:30 | | | | One Minute Countdown Announcement Thirty Seconds Countdown Announcement |
| 26 | T-00:00:00:15 | | | | Begin Countdown To Liftoff The Shuttles Main Engines Will Ignite At T-00:00:00:05. A Staggered Start Of The Main Engines Will Commence In 120 millisecond Intervals. The Two SRB's Will Ignite At T-00:00:00:00, Followed By An Almost Instantaneous Liftoff. Once The Shuttle Clears The Tower, It Will Complete A Roll Maneuver. |
| 26 | T-00:00:00:00 | | | | Shuttle Liftoff |

Commence Ascent Checklist



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| 27 | T+00:00:00:30 T+00:00:01:05 | | | | Main Engines Throttle Down To 65% Main Engines Throttle Up To 104% |
| 28 | T+00:00:02:00 T+00:00:02:05 | Front Center Panel | F7 | * Check Pressure Pc<50 (MFD / CRT 1) | Standby For SRB Separation SRB Separation |
| 602 | T+00:00:03:00 | Overhead Low Panel | O1 | * Check FREON - EVAP OUT TEMP Gauge Shows Below 60 Degrees | Check Flash Evaporator Is Operational |
| 29 | T+00:00:04:20 | | | | Negative Return |
| 30 | T+00:00:06:56 | | | | Single Engine Press To MECO |
| 31 | Mission Dep. | Front Center Panel | F7 | * Check MAIN ENGINE STATUS Lights (Left/CTR/Right) Are Red | Engines Throttle Down In Preparation For Main Engine Cutoff (MECO) MECO Confirm Main Engine Shutdown External Tank Separation |
| 34 | Mission Dep. | Left Panel Center Panel Right Panel Front Left Panel Front Right Panel Center Panel | L1 L2 C3 R1 F6 F8 C3 | * Set FLASH EVAP CONTROLLER PRI A & PRI B To ON * Set FLASH EVAP FEEDLINE HTR A SUPPLY & B SUPPLY To 1 * Set BFC CRT DISPLAY To OFF * Set AC BUS SNSR (1/2/3) To AUTO TRIP * Set O2 TK 1 (B) & O2 TK 2 (B) HEATERS To AUTO * Set H2 TK 1 (B) & H2 TK 2 (B) HEATERS To AUTO * Check FLT CNTLR POWER Is OFF * Check FLT CNTLR POWER Is OFF * Check ORBIRAL DAP - CONTROL Is Set To AUTO | Remaining MPS Propellants Are Dumped Automatically. Main Engines Are Gimballed Down During The Dump |
| 35 | Mission Dep. | Center Panel | C3 | * Enter OPS 105 PRO (Use Left Keypad) | Prepare To Circularize Orbit |
| 36 | Mission Dep. | Center Panel Overhead Aft Panel Center Panel | C3 C2 O14 O16 C3 | * Check ORBIRAL DAP - CONTROL Is Set To AUTO * Enter ITEM 22 EXEC (Use Right Keypad) * Enter ITEM 27 EXEC (Use Right Keypad) * Enter ITEM 23 EXEC (Use Right Keypad) * Confirm L OMS ENG VLV Is ON * Confirm R OMS ENG VLV Is ON * Confirm OMS ENG (LEFT & RIGHT) Are Set To ARM/PRESS | Circularize Orbit |
| 37 | Mission Dep. | Right Panel | R2 R4 | * Set 6 ENGINE POWER Switches (LEFT/CTR/RIGHT) To OFF * Set He ISOL A (LEFT/CTR/RIGHT) To GPC * Set He ISOL B (LEFT/CTR/RIGHT) To GPC * Set PNEUMATICS He ISOL To GPC * Set H2 PRESS LINE VENT To OPEN | Propellant Dump Complete |
| 38 | Mission Dep. | Right Panel | R2 R4 | * Set ET UMBILICAL DOOR - MODE GPC To GPC/MAN * Set CENTERLINE LATCH To STOW * Set LEFT & RIGHT Door To CLOSE * Check Talkback Shows CLOSE * Set LEFT & RIGHT LATCH To LATCH * Check Talkback Shows CLOSED & LATCHED * Set LEFT & RIGHT DOOR To OFF * Set LEFT & RIGHT LATCH To OFF * Set HYD MAIN PUMP PRESS (1/2/3) To LOW * Set APU OPERATE - START/RUN (1/2/3) To OFF * Set APU FUEL TK VLV (1/2/3) To CLOSE * Set APU CNTLR PWR (1/2/3) To OFF * Set BOILER PWR (1/2/3) To OFF * Set BOILER N2 SUPPLY (1/2/3) To OFF * Set HYD CIRC PUMP (1/2/3) To GPC * Set H2 PRESS LINE VENT To GND | Close & Latch The ET Umbilical Doors. APU Shutdown |
| 39 | Mission Dep. | Center Panel | C2 | * Press EXEC - Confirms ready for OMS burn (Use Right Keypad) | Confirm OMS Burn |
| 40 | Mission Dep. | Right Panel Center Panel | R4 C3 | * Set PROPELLANT FILL/DRAIN LH 2 OUTBD & INBD To OPEN * Set OMS ENG LEFT & RIGHT To OFF | Liquid He Manual Dump |
| 41 | Mission Dep. | Overhead Aft Panel Right Panel | O17 R4 | * Set ATVC (1/2/3/4) To OFF * Set Engine Interface Units - EIU (L-C / C-R / R-L) To OFF * Set MEC (1 & 2) To OFF * Set MPS/TVC ISOL VLV - (SYS 1, SYS 2, SYS 3) To CLOSE | Turn Off Main Engine Controllers |
| 42 | Mission Dep. | Right Panel Center Panel Front Left Panel | R4 C3 F6 | * Set PROPELLANT FILL/DRAIN - LH2 OUTBD To GND * Check PROPELLANT FILL/DRAIN - LH2 INBD To OPEN * ORBITAL DAP/MANUAL MODE - ROTATION YAW, VERN=ON * Set FLIGHT CNTLR POWER To ON * Rotate The Shuttle To Zero Attitude (Pitch/Roll) (Joystick - RHC) | Set Liquid H2 Outboard Fill And Drain Valve To Ground Control. Enable Manual Control Of The RCS Align All ADI Needles |
| 43 | Mission Dep. | Right Panel Aft Left Panel | R4 A12 | * Set HYDRAULICS - BRAKE HEATERS (A/B/C) To AUTO * Set APU HEATER - GAS GEN/FUEL PUMPS (1/2/3) To A AUTO * Set APU HEATER - LUBE OIL LINES (1/2/3) To A AUTO * Set TANK/FUEL LINE/H2O (SYS 1A, SYS 2A, SYS 3A) To AUTO * Set HYDRAULIC HEATER - RUDDER SPD BRK To A AUTO * Set HYDRAULIC HEATER - BODY FLAP To A AUTO * Set HYDRAULIC HEATER - ELEVON To A AUTO * Set HYDRAULIC HEATER - AFT FUSELAGE To A AUTO | Thermal Condition The Shuttle |
| 44 | Mission Dep. | Aft Right Panel | A14 | * Set RCS/OMS HEATERS - FWD RCS To A AUTO * Set RCS/OMS HEATERS - LEFT POD To A AUTO * Set RCS/OMS HEATERS - RIGHT POD To A AUTO * Set RCS/OMS HEATERS - FWD RCS JET (1/2/3/4/5) To AUTO * Set RCS/OMS HEATERS - AFT RCS JET (1/2/3/4/5) To AUTO | |



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| 44 | Mission Dep. | Aft Right Panel Aft Left Panel Left Panel | A14 A8L L1 | * Set RCS/OMS HEATERS - OMS CRSFD LINES To A AUTO * Set PORT RMS HEATER To AUTO A * Set TOPPING EVAP HEATER - NOZZLE (L & R) To A AUTO * Set TOPPING EVAP HEATER - DUCT Selector To A/B * Set HI LOAD EVAP - HI LOAD DUCT HTR Selector To A/B | |
| 45 | Mission Dep. | Left Panel Overhead Aft Panel | L2 L1 O14 O15 O16 O15 | * Set O2 SYS 2 SUPPLY To CLOSE * Set N2 SYS 2 SUPPLY To CLOSE * Set N2 SYS 2 REG INLET To CLOSE * Set H2O LOOP 2 BYPASS - MODE To AUTO * Set H2O PUMP - LOOP 1 To OFF H2O PUMP - LOOP 2 To GPC * Set RGA 1 To OFF * Set RGA 2 & 4 To OFF * Set RGA 3 To OFF * Set ACCEL 3 To OFF * Set ACCEL 4 To OFF | |
| 46 | Mission Dep. | Overhead Left Panel Right Aft Panel Overhead Left Panel | O6 R11L O6 | * Set GENERAL PURPOSE COMPUTER - MODE 5 To HALT * Check MAJ FUNC Set To GNC * Enter OPS 201 PRO (AFT Keypad) * Set MAJ FUNC To SM * Press GPC/CRT (AFT Keypad) * Enter 4 EXEC (AFT Keypad) * Enter OPS 201 PRO (AFT Keypad) * Set GENERAL PURPOSE COMPUTER - MODE 3 To HALT | Configure Computers For Orbit Switch To On-Orbit SW Mode Load GPC 1/2/3 With GNC SW GPC 3 Preserves Independent Source Data GPC 4 Contains System Management Data GPC 5 Retains The Backup Flight System |
| 47 | Mission Dep. | Left Panel | L1 L2 | * Set RAD CONTROLLER - (LOOP 1 & LOOP 2) To AUTO A * Set RAD CONTROLLER - BYPASS MODE (1 & 2) To AUTO * Set FREON LOOP ISOLATION - MODE To AUTO | Activate Radiator Cooling |
| 48 | Mission Dep. | Right Aft Panel | R11L R13L | * Confirm MAJOR FUNC Is Set To SM * Enter OPS 202 PRO (AFT Keypad) * Enter ITEM 3 EXEC * Enter ITEM 1 EXEC * Set PL BAY DOOR (SYS 1 & SYS 2) To ENABLE * Set PL BAY DOOR To OPEN * Confirm PL BAY DOOR Talkbacks Show DEP | Open Payload Doors PL BAY DOOR SPEC Display Enable Auto Mode Enable AC Power Opening Both PL Doors Takes 3 Minutes Indicating Both PL Doors Are Open |
| 49 | Mission Dep. | Right Aft Panel | R13L | * Set PL BAY MECH PWR (SYS 1 & SYS 2) To ON * Set RADIATOR LATCH (SYS A & SYS B) To RELEASE * Check RADIATOR LATCH SYS Talkbacks Indicate REL * Set RADIATOR CONTROL (SYS A & SYS B) To DEPLOY * Check RADIATOR CONTROL SYS Talkbacks Indicate DEP | Deploy Radiators Indicating That The Radiators Are Ready For DEP. Deploying Both Radiators Takes 30 Seconds. Indicating Both Radiators Are Deployed. |
| 50 | Mission Dep. | Right Aft Panel | R13L R11L | * Set RADIATOR LATCH (SYS A & SYS B) To OFF * Set RADIATOR CONTROL (SYS A & SYS B) To OFF * Set PL BAY DOOR To STOP * Set PL BAY MECH PWR (SYS 1 & SYS 2) To OFF * Set PL BAY DOOR (SYS 1 & SYS 2) To DISABLE * Enter ITEM 2 EXEC (AFT Keypad) | Disable All Power To PL Doors And Radiators. Disable AC Power To The Doors |
| 51 | Mission Dep. | Right Aft Panel | R11U | * Set FUEL CELL - PURGE HEATER To GPC * Set H2O LINE HTR & H2O RELIEF HTR To A AUTO * Confirm PURGE VALVES (1/2/3) Are On GPC * Confirm STARTUP HEATER (1/2/3) Are Set To ENABLE * Set GPC PURGE SEQ To START - Press START For 3 Seconds * Confirm GPC PURGE SEQ START Talkback Is WHITE | Initiate Fuel Cell Purge |
| 52 | Mission Dep. | Right Aft Panel Left Panel | R11L L1 | * Confirm MAJOR FUNC Is Set To SM * Enter SPEC 69 PRO (AFT Keypad) * Enter SPEC 88 PRO (AFT Keypad) * Set FLASH EVAP CONTROLLER (PRI A & PRI B) To OFF * Set FLASH EVAP CONTROLLER - SEC To OFF * Set HILOAD EVAP To OFF | Check Purge Process On The SPEC Display Check Coolant Loops Secure The Flash Evaporator |
| 53 | Mission Dep. | Overhead Left Panel Right Aft Panel | O6 R11L | * Set STAR TRACKER POWER (-Y & -Z) To ON * Set DOOR CONTROL (SYS 1 & SYS 2) To OPEN * Check DOOR CONTROL (SYS 1 & SYS 2) Talkbacks Are OP * Set DOOR CONTROL (SYS 1 & SYS 2) To OFF * Set MAJ FUNC To GNC * Enter SPEC 22 PRO (AFT Keypad) * Enter ITEM 3 EXEC (AFT Keypad) * Enter ITEM 4 EXEC (AFT Keypad) | Deploy & Activate The Star Trackers Indicating The ST Doors Are Open |
| 54 | Mission Dep. | Right Aft Panel | R11L | * Check MAJ FUNC To GNC * Enter SPEC 21 PRO (AFT Keypad) * Enter ITEM 16 EXEC (AFT Keypad) | Initiate IMU Alignment |
| 55 | Mission Dep. | Overhead Center Panel | O7 | * Set GPS 1 POWER To ON * Set GPS 1 PRE AMPL UPPER To ON * Set GPS 1 PRE AMPL LOWER To ON * Set GPS 2 POWER To ON * Set GPS 2 PRE AMPL UPPER To ON * Set GPS 2 PRE AMPL LOWER To ON * Set GPS 3 POWER To ON * Set GPS 3 PRE AMPL UPPER To ON * Set GPS 3 PRE AMPL LOWER To ON | Activate Global Positioning System (GPS) Activate GPS 1 Activate GPS 2 Activate GPS 3 |



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| 55 | Mission Dep. | Right Aft Panel | R11L | * Set DUMP ISOL VLV To OPEN | |
| 59 | Mission Dep. | Right Aft Panel Aft Right Panel Right Aft Panel | R11L R13L A1U R11L | * Check MAJ FUNC To GNC * Enter SPEC 25 PRO (AFT Keypad) * Set KU ANTENNA To DEPLOY * Check KU ANTENNA Talkback For DEP * Set KU ANTENNA To GND * Set KU BAND POWER To STBY * Check MAJ FUNC To GNC * Enter SPEC 33 PRO (AFT Keypad) * Enter ITEM 2 EXEC (AFT Keypad) | Deploy KU Antenna Indicates Status For All THC/RHC (Joysticks). KU Antenna Deployment Takes 15 Seconds Indicates KU Antenna Is Deployed Enable KU Antenna |
| 60 | Mission Dep. | | | | Shuttle Is Configured & Ready For Mission |

Commence On-Orbit Mission



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| 1100 | Mission Dep. | | | | Powered Up & Check The RMS. Next Event |
| 1101 | Mission Dep. | Aft Left Panel | A8L | * Set RMS POWER To PRIMARY * Set RMS SELECT To PORT * Set The PORT RMS DEPLOY To DEPLOY | Power Up & Deploy The RMS |
| 1102 | Mission Dep. | Aft Left Panel | A8L | * Set The PORT RMS DEPLOY To OFF * Set The PORT RMS Latch To RELEASE * Set The PORT RMS Latch To OFF * Hold The RMS SHOULDER BRACE RELEASE Toward PORT | RMS Deployed Wait Until Talkback Indicates REL Press Until Talkback Indicator Turns White |
| 1103 | Mission Dep. | Right Aft Panel Aft Left Panel | R11L A8U | * Set MAJ FUNC To SM * Enter SPEC 94 PRO (Aft Keypad) * Set MODE Rotary Switch To SINGLE * Press ENTER Just Below The MODE Rotary Switch * Set BRAKES Switch To OFF | Continue RMS Preparation |
| 1104 | Mission Dep. | Aft Left Panel | A8U | * Set The PARAMETER Rotary Switch To JOINT ANGLE * Set The JOINT Rotary Switch To SHOULDER/PITCH * Press & Hold The SINGLE DIRECT DRIVE In The + Position * Set The JOINT Rotary Switch To ELBOW * Press & Hold The SINGLE DIRECT DRIVE In The - Position * Set The MODE Rotary Switch To MANUAL ORB UNL * Press ENTER Just Below The MODE Rotary Switch | Move RMS Out Of Reach Limit Confirm Digital Readout Indicates +3 Degrees Confirm Digital Readout Indicates -3 Degrees |
| 1105 | Mission Dep. | Aft Right Panel | A6U | * Set FLT CNTLR POWER To ON | Assign RHC/THC Control To The RMS |
| 1106 | Mission Dep. | Aft Left Panel Front Left Panel | A8L A8U F6 | * Set RMS POWER To OFF * Set RMS BRAKES To ON * Set FLT CNTLR POWER To ON | Turn Off RMS Power For Later Use. |
| 1107 | Mission Dep. | | | | This Ends The Activation And Checkout Of The RMS. Next Event |
| 1110 | Mission Dep. | Center Panel Overhead Aft Panel Center Panel | C2 C3 O16 C2 | * Set MAJOR FUNC To GNC For CRT #2 * Enter OPS 202 PRO (Right Keypad) * Enter ITEM 3 EXEC (Right Keypad) * Enter ITEM 22 EXEC (Right Keypad) * Enter ITEM 27 EXEC (Right Keypad) * Enter ITEM 23 EXEC (Right Keypad) * Set OMS ENG (Right) To ARM/PRESS * Confirm R OMS ENG VLV Is ON * Press EXEC - (Right Keypad) Confirms ready for OMS burn | First In A Series Of Rendezvous Burns |
| 1111 | Mission Dep. | Center Panel | C3 | * Set OMS ENG (Right) To OFF | First NC Burn Complete - Disable OMS Next Event |
| 1120 | Mission Dep. | Left Aft Panel | L12 | * Standard Switch Panel ASE POWER To ON | Power Up The SYNCOM Satellite |
| 1121 | Mission Dep. | | | | SYNCOM Satellite Systems Are Tested Next Event |
| 1125 | Mission Dep. | Left Aft Panel | L12 | * Standard Switch Panel ASE KEEL PIN RETRACT Switch =UP | Central Keel/Pivot Pin On The SYNCOM Satellite Is Retracted. Press The ASE Keel Pin In The UP/RETRACT Position. |
| 1126 | Mission Dep. | Front Left Panel | F6 | * Rotate Shuttle To Proper Attitude (Pitch/Roll) Joystick - RHC) | Maneuver Shuttle To Correct Attitude Target Attitude: Roll=180, Pitch=117, Yaw=0 |
| 1127 | Mission Dep. | Left Aft Panel | L12 | * Standard Switch Panel ASE PUSHOFF PIN Switch = UP | The Pushoff Pin On The SYNCOM Satellite Is Now Retracted. Press The ASE Pushoff Pin In The UP/RETRACT Position. |
| 1128 | Mission Dep. | Left Aft Panel | L12 | * Standard Switch Panel ASE DEPLOY Switch = UP | The SYNCOM Satellite Is Launched. Press The Momentary ASE DEPLOY Switch In The Up Position. |
| 1129 | Mission Dep. | | | | The SYNCOM Satellite Rotates Out Of The Payload Bay. |
| 1130 | Mission Dep. | Center Panel Overhead Aft Panel Center Panel | C2 C3 O14 C2 | * Set MAJOR FUNC To GNC For CRT #2 * Enter OPS 202 PRO (Right Keypad) * Enter ITEM 2 EXEC (Right Keypad) * Enter ITEM 22 EXEC (Right Keypad) * Enter ITEM 23 EXEC (Right Keypad) * Set OMS ENG (Left) To ARM/PRESS * Confirm L OMS ENG VLV Is ON * Press EXEC - (Right Keypad) Confirms ready for OMS burn | A SYNCOM Satellite Separation Burn Is Now Performed Using The Left OMS Engine. |
| 1131 | Mission Dep. | Center Panel | C3 | * Set OMS ENG (Left) To OFF | Separation Burn Complete, Disable OMS Next Event |
| 1135 | Mission Dep. | | | | The SYNCOM Satellite Perigee Kick Motor Ignites. |
| 1136 | Mission Dep. | | | | The Perigee Kick motor Will Burn For About 70 seconds And Raise The Apogee To Around 10,000 Nautical Miles. |
| 1137 | Mission Dep. | | | | The Initial Burn Is Complete. The SYNCOM Satellite Will Require Additional Burns To Achieve The Correct Position In Space. Full Deployment Is Achieved One The Satellite Is In Full Geo-Sync Orbit. The Next Objective Is To Retrieve The LDEF. Next Event |



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| 1140 | Mission Dep. | Center Panel Overhead Aft Panel Center Panel | C2 C3 O14 C2 | * Set MAJOR FUNC To GNC For CRT #2 * Enter OPS 202 PRO (Right Keypad) * Enter ITEM 2 EXEC (Right Keypad) * Enter ITEM 22 EXEC (Right Keypad) * Enter ITEM 27 EXEC (Right Keypad) * Enter ITEM 23 EXEC (Right Keypad) * Set OMS ENG (LEFT) To ARM/PRESS * Confirm L OMS ENG VLV Is ON * Press EXEC - (Right Keypad) Confirms ready for OMS burn | A Normal Slow Rate Burn Is Performed To Move The Shuttle Closer To The LDEF Orbit. Only The Left OMS Engine Is Used For This Maneuver. |
| 1141 | Mission Dep. | Center Panel | C3 | * Set OMS ENG (LEFT) To OFF | NRS Burn Complete, Disable OMS Next Event |
| 1145 | Mission Dep. | Center Panel Overhead Aft Panel Center Panel | C2 C3 O14 C2 | * Set MAJOR FUNC To GNC For CRT #2 * Enter OPS 202 PRO (Right Keypad) * Enter ITEM 2 EXEC (Right Keypad) * Enter ITEM 22 EXEC (Right Keypad) * Enter ITEM 27 EXEC (Right Keypad) * Enter ITEM 23 EXEC (Right Keypad) * Set OMS ENG (LEFT) To ARM/PRESS * Confirm L OMS ENG VLV Is ON * Press EXEC - (Right Keypad) Confirms ready for OMS burn | A Normal Height Burn (NH) Is Performed To Move The Shuttle Closer To The LDEF Orbit. Only The Left OMS Engine Is Used For This Maneuver. |
| 1146 | Mission Dep. | Center Panel Overhead Aft Panel Center Panel | C2 C3 O16 C2 | * Set MAJOR FUNC To GNC For CRT #2 * Enter OPS 202 PRO (Right Keypad) * Enter ITEM 3 EXEC (Right Keypad) * Enter ITEM 22 EXEC (Right Keypad) * Enter ITEM 27 EXEC (Right Keypad) * Enter ITEM 23 EXEC (Right Keypad) * Set OMS ENG (LEFT) To OFF * Set OMS ENG (RIGHT) To ARM/PRESS * Confirm R OMS ENG VLV Is ON * Press EXEC - (Right Keypad) Confirms ready for OMS burn | A Final NC Burn Is Performed To Match The Shuttle And LDEF Orbits. Only The Right OMS Engine Is Used For This Maneuver. |
| 1147 | Mission Dep. | Center Panel | C3 | * Set OMS ENG (RIGHT) To OFF | Final NC Burn Complete, Disable OMS |
| 1150 | Mission Dep. | Right Aft Panel | R11L | * Set MAJ FUNC To GNC * Enter SPEC 22 PRO (Aft Keypad) * Enter ITEM 5 EXEC (Aft Keypad) * Enter ITEM 6 EXEC (Aft Keypad) * Enter ITEM 11+1 EXEC (Aft Keypad) * Enter ITEM 12+1 EXEC (Aft Keypad) | Activate Star Trackers Target = LDEF |
| 1151 | Mission Dep. | Aft Left Panel Right Aft Panel | A1U R11L | * Set KU BAND POWER To ON * Set KU BAND Rotary Switch To AUTO TRACK * Enter SPEC 33 PRO (Aft Keypad) * Enter ITEM 1 EXEC (Aft Keypad) | Activate KU Band Radar |
| 1152 | Mission Dep. | Right Aft Panel Front Left Panel | R11L F6 | * Press RESUME (Aft Keypad) * Rotate Shuttle To Proper Attitude (Pitch/Roll) Joystick - RHC) | Star Trackers Are Configured. Resume Closes Star Tracker Display <u>Maneuver Shuttle To Correct Attitude</u> Target Attitude: Roll=0, Pitch=0, Yaw=90 |
| 1159 | Mission Dep. | Aft Right Panel | A2 | * Use RCS Thrusters To Close On The LDEF | The LDEF Is About 45,000 Feet Away. Use The RCS Thrusters To Translate The Shuttle Up/Down Until The Yellow Reticules Overlap The White Cross Hairs. Always Maintain The Following Attitude ROLL=0 PITCH=0 YAW=0 When The Reticules Are Centered, The LDEF Is Right In Front Of The Shuttle. Now give The Shuttle Forward Translational Thrust Until The LDEF Is Within Visual Range. If You Are Impatient, Use Next Event |
| 1160 | Mission Dep. | Aft Right Panel Aft Left Panel Aft Right Panel Aft Left Panel | A2 A8L A8U A6U A8U | * Use RCS Thrusters To Position The Shuttle * Set RMS POWER To PRIMARY * Set BRAKES Switch To OFF * Set FLT CNTLR POWER To ON * Set END EFFECTOR MODE To AUTO | Slowly Place The Shuttle Within Grapple Range Of The LDEF. One The LDEF Is In Position Grapple The LDEF |
| 1161 | Mission Dep. | | | | The LDEF Will Be Examined & Photographed Before It Is Stowed In The Payload Bay. Next Event |
| 1170 | Mission Dep. | Center Panel Aft Right Panel | C3 A6U | * PAYLOAD SAFING Switches (1-2-3-4-5) To NORM * PAYLOAD RETENTION LOGIC POWER (SYS 1) To ON * PAYLOAD SELECT Rotary Switch To 1 * PAYLOAD RETENSION LATCHES (1-2-3-4-5) To RELEASE * PAYLOAD RETENSION LATCHES (1-2-3-4-5) To OFF | Prepare The Shuttle For Berthing The LDEF Confirm Talkbacks Indicate REL |
| 1171 | Mission Dep. | Aft Left Panel | A8L | * Use The RMS Controls View Diagram On The Next Page | Position The LDEF To Its Latched Position Within The Shuttle Bay. |



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|------|--------------|------------------------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1171 | Mission Dep. | Aft Left Panel | A8L | <p>* Grapple The LDEF-1 Using The Port Fixture</p>  | <p>LDEF Latch Position Coordinates</p> <p><u>POSITION - P Y R</u> P: -090.5 Y: -060.0 R: 000.3</p> <p><u>POSITION - X Y Z</u> X: 782 Y: -077 Z: 462</p> <p><u>JOINT ANGLE</u> YAW: 004.0 SHOULDER: 078.0 ELBOW: -123.3 WRIST PITCH: -052.1 WRIST YAW: -059.7 WRIST ROLL: -008.4</p> |
| 1172 | Mission Dep. | Aft Right Panel Aft Left Panel | A6U A8L | <p>* PAYLOAD RETENSION LATCHES (1-2-3-4-5) To LATCH * PAYLOAD RETENSION LATCHES (1-2-3-4-5) To OFF * Release The LDEF - Press Backspace * Use RMS Controls To Stow The RMS</p> | <p>The LDEF Is Ready for Latch</p> <p>When The End Effector Talkbacks indicate Derigid & Extend, Stow The RMS.</p> |
| 1173 | Mission Dep. | Aft Right Panel Center Panel | A6U C3 | <p>* PAYLOAD RETENTION LOGIC POWER (SYS 1) To OFF * PAYLOAD SAFING Switches (1-2-3-4-5) To SAFE</p> | <p>Disable Payload Latch Power</p> |
| 1175 | Mission Dep. | Aft Left Panel Front Left Panel | A8L A8U F6 | <p>* Set RMS POWER To OFF * Set BRAKES Switch To ON * Set FLT CNTLR POWER To ON</p> | <p>Disable RMS</p> <p>Next Event</p> |

Commence Deorbit & Landing



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| COMM | MET | PANEL SECTION | PANEL | PROCEDURE | NOTES |
|------|--------------|-------------------------------------------------------------------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1000 | Mission Dep. | Left Panel | L1 | * Set RAD CONTROLLER - OUT TEMP To HIGH * Set RAD CONTROLLER (LOOP 1 & LOOP 2) To OFF * Set RAD CONTROLLER - BYPASS MODE (1 & 2) To MAN * Confirm RAD FLOW BYPASS VALVE Talkbacks Display (BYP) * Confirm The HI LOAD EVAP ENABLE Is Set To OFF * Set FLASH EVAP CONTROLLER (PRI A & PRI B) To ON * Set FLASH EVAP CONTROLLER - SEC GPC To ON | Trap Cold Freon In The Bay Radiators If The Rad Bypass Valve Talkbacks Do Not Display (BYP), Set The Manual Rad Flow Bypass Switches 1 & 2 To Bypass. |
| 1001 | Mission Dep. | Right Aft Panel Aft Right Panel Right Aft Panel | R11L A1U R13L R11L | * Set The MAJ FUNC Switch To GNC * Enter SPEC 33 PRO (AFT Keypad) * Enter ITEM 2 EXEC (AFT Keypad) * Enter ITEM 1 EXEC (AFT Keypad) * Set KU BAND POWER To OFF * Set KU Antenna To STOW * When KU Antenna Talkback Shows STO, Set KU Antenna To GND * Enter SPEC 22 PRO (Aft Keypad) * Enter ITEM 9 EXEC (Aft Keypad) * Enter ITEM 10 EXEC (Aft Keypad) | Deactivate & Stow The KU Antenna NOTE: Rendezvous Navigation Has Been Used It Must Be Disabled. Confirm On CRT 4 There Are No Asterisks Besides The Following Entries. RNDZ NAV ENA 1 KU ANT ENA 2 MEAS ENA 3 |
| 1002 | Mission Dep. | Right Aft Panel | R13L | * Set PL BAY MECH PWR (SYS 1 & SYS 2) To ON * Set RADIATOR CONTROL (SYS A & SYS B) To STOW * Set LATCH CONTROL (SYS A & SYS B) To LATCH * Set LATCH CONTROL (SYS A & SYS B) To OFF * Set RADIATOR CONTROL (SYS A & SYS B) To OFF * Set PL BAY MECH PWR (SYS 1 & SYS 2) To OFF | Stow The Radiators Wait Until The RADIATOR CONTROL Talkbacks Show STO Before Setting The LATCH CONTROLS SYS 1 & SYS 2 To LATCH. Wait Until Latch Control Talkbacks Show LAT Before Turning Off ALL Radiators. |
| 1003 | Mission Dep. | Overhead Left Panel Center Panel Right Panel | O6 C3 R2 | * Set GENERAL PURPOSE COMPUTER - MODE 5 To STBY * Set The BFC/CRT - Display To ON * Confirm The BFC/CRT SELECT Is Set To (3+1) * Confirm BOILER CNTLR/HTR Switches (1/2/3) Are ON * Set HYD CIRC PUMP Switches (1/2/3) To OFF | Activate Backup Flight System |
| 1004 | Mission Dep. | Overhead Aft Panel Right Aft Panel | O14 O15 O16 O15 R11L | * Set RGA 1 To ON * Set RGA (2 & 4) To ON * Set RGA 3 To ON * Set ACCEL 3 To ON * Set ACCEL 4 To ON * Set SUPPLY H2O - Crossover Valve To OPEN | Gyro Assemblies & Accelerators |
| 1090 | Mission Dep. | Aft Left Panel | A8L | * Set RMS POWER To PRIMARY * Set RMS SELECT To STBD * Set STARBOARD RMS (DEPLOY/OFF/STOW) To STOW * Set STARBOARD RMS (DEPLOY/OFF/STOW) To OFF | Stow The OBSS Boom Wait Until Talkbacks Indicate (STO) |
| 1091 | Mission Dep. | Aft Left Panel Aft Right Panel Aft Left Panel | A8L A6U A8U | * Set RMS POWER To PRIMARY * Set RMS SELECT To PORT * Set FLT CNTLR POWER To ON * Set RMS BRAKES To OFF * Set The MODE Rotary Selector To SINGLE * Press ENTER Just Below The MODE Rotary Selector * Set The PARAMETER Rotary Selector To JOINT ANGLE * Set The JOINT Rotary Selector As Required * Depress The SINGLE/DIRECT DRIVE (+/-) Spring Switch | Stow The RMS Return All Joint Angles To Their Stowed Position. By Returning All Joint Angles To Zero, You Will Eventually Reach The RMS Latch Position. |
| 1092 | Mission Dep. | Aft Left Panel Front Left Panel | A8L F6 | * Port RMS Retention Latches Ready For Latch Talkbacks (White) * Set PORT RMS (RELEASE/OFF/LATCH) To LATCH * Set PORT RMS (RELEASE/OFF/LATCH) To OFF * Set PORT RMS (DEPLOY/OFF/STOW) To STOW * Set PORT RMS (DEPLOY/OFF/STOW) To OFF * Set RMS POWER To OFF * Set FLT CNTLR POWER To ON | Latch The RMS Wait Until Talkbacks Indicate (LAT) Wait Until Talkbacks Indicate (STO) |
| 1093 | Mission Dep. | Aft Left Panel | A7U | * Check/Set All PAYLOAD BAY FLOOD Lights To OFF | Turn Off All Payload Bay Flood Lights |
| 1006 | Mission Dep. | Right Aft Panel | R11L R13L R11L | * Set MAJ FUNC Switch To SM * If Required, Enter OPS 202 PRO (AFT Keypad) * Enter ITEM 1 EXEC (AFT Keypad) * If Not Already Enabled, Enter ITEM 3 EXEC (AFT Keypad) * Set PL BAY DOOR (SYS 1 & SYS 2) To ENABLE * Set PL BAY DOOR To CLOSE * Set PL BAY DOOR To STOP * Set PL BAY DOOR (SYS 1 & SYS 2) To DISABLE * Enter ITEM 2 EXEC (AFT Keypad) | Close Payload Bay Doors Wait Until The PL BAY DOOR Talkback Shows CL. |
| 1008 | Mission Dep. | Right Aft Panel Overhead Left Panel Right Aft Panel | R11L O6 R11L | * Set MAJ FUNC To GNC * Press GPC/CRT (AFT Keypad) * Enter 4 EXEC (AFT Keypad) * Enter OPS 201 PRO (AFT Keypad) * Set GENERAL PURPOSE COMPUTER - MODE 3 To RUN * Enter OPS 301 PRO (AFT Keypad) | Reconfigure GNC's For Deorbit |
| 1009 | Mission Dep. | Overhead Left Panel | O6 | * STAR TRACKER DOOR CONTROL (SYS 1 & SYS 2) To CLOSE * STAR TRACKER DOOR CONTROL (SYS 1 & SYS 2) To OFF * Set The STAR TRACKER POWER Switches (-Y & -Z) To OFF | Close Star Tracker Doors Wait Until STAR TRACKER DOOR POSITION Talkback Shows CL. |



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| 1010 | Mission Dep. | Right Panel Overhead Aft Panel Center Panel Left Panel Aft Right Panel | R4 O15 O14 O16 C3 L2 L1 L2 A12 | * Check HYDRAULICS BRAKE HEATER (A/B/C) Set To AUTO * Set BRAKES MN B To ON * Set BRAKES MN A To ON * Set BRAKES MN C To ON * ORBITAL DAP / MANUAL MODE / ROTATION - ROLL To PRI * Check ORBITAL DAP / CONTROL To AUTO * Confirm ANTI SKID - Set To ON * Confirm NOSE WHEEL STEERING - Set To 1 * Confirm ENTRY MODE - Set To AUTO * Set FLASH EVAP CONTROLLER (PRI A & PRI B) To GPC * Set FLASH EVAP CONTROLLER SEC To GPC * FREON LOOP ISOLATION - MODE To OFF * Set O2 SYS 2 SUPPLY To OPEN * Set N2 SYS 2 SUPPLY To OPEN * Set N2 SYS 2 REG INLET To OPEN * Set O2/N2 CNTLR VLV SYS 1 To OPEN * Set APU HEATER - GAS GEN/FUEL PUMP (1/2/3) To OFF * Set APU HEATER - LUBE OIL LINE (1/2/3) To OFF * Set All TANK/FUEL LINE/H2O SYS Switches To OFF * HYDRAULIC HEATER - RUDDER SPD BRK (A & B) To OFF * HYDRAULIC HEATER - BODY FLAP (A & B) To OFF * HYDRAULIC HEATER - ELEVON (A & B) To OFF * HYDRAULIC HEATER - AFT FUSELAGE (A & B) To OFF | Final Switch Configuration Check |
| 1012 | Mission Dep. | Right Panel | R2 | * Set He ISOLATION A LEFT/CENTER/RIGHT To OPEN * Set He ISOLATION B LEFT/CENTER/RIGHT To OPEN * Set PNEUMATICS L ENG He XOVR To OPEN * Set PNEUMATICS He ISOL To OPEN * Set LEFT He INTERCONNECT To - IN OPEN * Set CENTER & RIGHT INTERCONNECT To - OUT OPEN | Main Propulsion System / Helium Release |
| 1013 | Mission Dep. | Right Aft Panel | R11L | * Confirm MAJ FUNC Set To GNC * Enter SPEC 21 PRO (AFT Keypad) * Enter ITEM 16 EXEC | Final IMU Alignment |
| 1014 | Mission Dep. | Center Panel Right Panel Center Panel | C2 R2 C2 | * Enter ITEM 34 EXEC (Right Keypad) * Set BOILER N2 SUPPLY (1/2/3) To ON * Set BOILER PWR (1/2/3) To ON * Set APU FUEL TK VLV (1/2/3) To OPEN * Set APU CNTLR PWR (1/2/3) To ON * Set APU AUTO SHUT DOWN (1/2/3) Set To INHIBIT * Confirm HYD MAIN PUMP PRESS (1/2/3) Set To LOW * Confirm APU SPEED SELECT Set To NORM * Confirm APU/HYD Ready To Start Talkbacks Are WHITE * Confirm GIMBAL CK 34 On CRT 2 Is Complete (No Asterisk) * Enter OPS 302 PRO (Right Keypad) | Perform OMS Gimbal If there's an asterisk next to GMBL CK 34 It means the gimbal check is incomplete. You must wait for the asterisk to Disappear. |
| 1015 | Mission Dep. | Center Panel | C2 | * Confirm (CRT 1, CRT 3, CRT 2) Are Set To MAJ FUNC GNC * Enter SPEC 50 PRO (Left Keypad) * Enter SPEC 51 PRO (Right Keypad) * Enter ITEM 44 EXEC (Right Keypad) | Horizontal Situation & Override Displays |
| 1016 | Mission Dep. | Center Panel Right Panel | C2 R2 | * Press RESUME (Right Keypad) * Set APU OPERATE - START/RUN For APU 1 | |
| 1017 | Mission Dep. | Center Panel Overhead Aft Center Panel | F7 C2 O14 O16 C3 C2 | * Check CRT 1 Confirm Display Of OPS MODE 3021 * ITEM 22 EXEC (Right Keypad) * ITEM 27 EXEC (Right Keypad) * ITEM 23 EXEC (Right Keypad) * Confirm L OMS ENG VLV Is ON * Confirm R OMS ENG VLV Is ON * Set OMS ENG (LEFT & RIGHT) To ARM/PRESS * Press EXEC - (Right Keypad) Confirms ready for OMS burn | Perform Deorbit Burn |
| 1018 | Mission Dep. | Center Panel Overhead Aft Panel | C3 O14 O16 | * Set OMS ENG (LEFT & RIGHT) To OFF * Set L OMS ENG VLV To OFF * Set R OMS ENG VLV To OFF | Deorbit Burn Complete |
| 1020 | Mission Dep. | Center Panel Front Left Panel | C2 F6 | * Enter OPS 303 PRO (Right Keypad) * Position The Shuttle To The Correct Attitude | Correct Attitude Align All ADI Needles |
| 1022 | Mission Dep. | Center Panel Right Panel Overhead Aft Panel Right Panel Center Panel | C2 R2 O17 R1 C2 | * Enter ITEM 36 EXEC (Right Keypad) * Enter ITEM 37 EXEC (Right Keypad) * Set APU OPERATE - START/RUN For APU (2 & 3) * Set HYD MAIN PUMP PRESS (1/2/3) To NORM * Set ATVC - (1/2/3/4) To ON * Set AC BUS SNSR (1/2/3) To MONITOR * Enter ITEM 39 EXEC (Right Keypad) | Dump RCS Propellant Pressure Should Rise To 3000 psi |
| 1023 | Mission Dep. | Center Panel Overhead Right Panel | C2 O8 | * Enter ITEM 38 EXEC (Right Keypad) * Enter ITEM 40 EXEC (Right Keypad) * Set FWD RCS - He PRESS (A & B) To CLOSE * Set TANK ISOLATION (1/2 & 3/4/5) To CLOSE * Set MANIFOLD ISOLATION (1/2/3/4/5) To CLOSE | Wait Until The Cycle Completes |



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| 1023 | Mission Dep. | Center Panel | C2 | * Enter OPS 304 PRO (Right Keypad) | |
| 1024 | Mission Dep. | Front Left Panel Front Right Panel | F6 F8 | * Set Commander ATTITUDE INRTL To LVLH * Set Pilot ATTITUDE INRTL To LVLH | |
| 1025 | Mission Dep. | Front Right Panel | F4 | * Check PITCH & ROLL/YAW Set To AUTO | |
| 1026 | Mission Dep. | | | | The Shuttle Will Perform Roll Reversals |
| 1027 | Mission Dep. | Left Panel | L1 | * Set RAD CONTROLLER - OUT TEMP To NORM * Set RAD CONTROLLER (LOOP 1 & LOOP 2) To AUTO A * Set RAD CONTROLLER - BYPASS MODE (1 & 2) To AUTO | |
| 1080 | Mission Dep. | Right Panel Left Panel | R4 L1 | * Set MPS/TVC/ISOL/VLV (SYS1, SYS2, SYS3) To OPEN * Set NH3 BOILER - NH3 CONTROLLER (A & B) To PRI/GPC | Hydraulics / Brake Heater |
| 1028 | Mission Dep. | Center Panel Front Left Panel Front Right Panel Overhead Right Panel | C3 F6 F8 O8 | * Set AIR DATA PROBE (Left & Right) To DEPLOY HEAT * Set AIR DATA To LEFT * Set AIR DATA To RIGHT * Set RADAR ALTIMETERS (1 & 2) To ON | Deploy Air Data Probes |
| 1029 | Mission Dep. | Front Left Panel Front Right Panel Front Left Panel | F3 F3 F2 | * Set HUD POWER To ON (Commander) * Set HUD POWER To ON (Pilot) * Set PITCH & ROLL/YAW To CSS (Commander) | Commander & Pilot HUD Power |
| 1031 | Mission Dep. | Overhead Right Panel | O8 | * Set MLS (1/2/3) Switches To ON * Set MLS Thumbwheel To (111) | Auto Software Transition To OPS 305 Microwave Scan Beam Landing System |
| 1033 | Mission Dep. | HUD Display Window | | * Press LANDING GEAR ARM (Twice) | Arm The Landing Gear |
| 1034 | Mission Dep. | HUD Display Window | | * Press LANDING GEAR DOWN (Twice) | Deploy Landing Gear |
| 1035 | Mission Dep. | HUD Display Window | | * Press SHUTE ARM (Twice) * Press DEPLOY SHUTE (Twice) * Press CHUTE JETT (Twice) | Touchdown: Gently Push The Nose Down Until The Nose Wheel Touches The Runway. Use The Rudder To Steer. Apply Wheel Brakes. |
| 1036 | Mission Dep. | HUD Display Window | | * Press CHUTE JETT (Twice) | Release Brake Shute |
| 1037 | Mission Dep. | | | | End Of Mission |

Commence Shutdown



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| | Mission Dep. | Left Panel Right Panel Front Left Panel Front Right Panel Front Left Panel Front Right Panel | L2 R2 R1 F6 F8 F3 F3 | * SPD BK - MAN (Full FWD) * NWS - OFF * APU Auto Shutdown (1/2/3) - ENABLE * APU Speed Select (1/2/3) - NORM * AC BUS SNSR (1/2/3) - AUTO TRIP * Commander FLT CNTLR POWER - OFF * Pilot FLT CNTLR POWER - OFF * Commander HUD POWER - OFF * Pilot HUD POWER - OFF | |
| | Mission Dep. | Center Panel | C3 | (PERFORMED IF ELS) * MSTR MADS - OFF (DoD ELS, MCC call DoD OSC on NCC) | Note: MCC Will Report Go/No-Go To DOFF Suits. (Post Safety Assessment) |
| | Mission Dep. | Center Panel Overhead Aft Panel | C3 O14 O15 O16 O14 O15 O16 O14 O16 | * OMS ENG (Left & Right) - OFF * RJDA 1A DRIVER (L2/R2 MANF) - OFF * RJDA 2A DRIVER (L4/R4 MANF) - OFF * RJDF 1B DRIVER (F1 MANF) - OFF * RJDA 1B DRIVER (L1/R1 MANF) - OFF * RJDF 1A DRIVER (F2 MANF) - OFF * RJDA 2B DRIVER (L1/R1 MANF) - OFF * RJDF 2A DRIVER (F1 MANF) - OFF * RJDF 2B DRIVER (F1 MANF) - OFF * RJDA 1A LOGIC (L2/R2 MANF) - OFF * RJDA 2A LOGIC (L4/R4 MANF) - OFF * RJDF 1B LOGIC (F1 MANF) - OFF * RJDA 1B LOGIC (L1/R1 MANF) - OFF * RJDF 1A LOGIC (F2 MANF) - OFF * RJDA 2B LOGIC (L1/R1 MANF) - OFF * RJDF 2A LOGIC (F1 MANF) - OFF * RJDF 2B LOGIC (F1 MANF) - OFF * L OMS ENG VLV - OFF * R OMS ENG VLV - OFF | RMS OMS Safing (RDJs) |
| | Mission Dep. | Overhead Aft Panel | O15 O16 F2 F3 F4 | (NOT PERFORMED IF ELS) * MNB - DRAG CHUTE SYS 2 - op * MNC - DRAG CHUTE SYS 1 - op * DRAG SHUTE - LT OFF * DRAG SHUTE - LT OFF * DRAG SHUTE - LT OFF | Drag Chute Safing |
| | Mission Dep. | Center Panel | C3 | * AIR DATA PROBE (Left & Right) - DEPLOY | Deactivate Air Data Probe HTRS |
| | Mission Dep. | Right Aft Panel Aft Right Panel Front Left Panel Front Right Panel Aft Right Panel Right Aft Panel | R14 A12 F6 F8 A12 R14 | (NOT PERFORMED IF ELS) * ESS 1BC LDG GEAR / ARM/DN - RESET CL * LG ARM/DN RESET - Set Switch To The RESET Position * LDG GEAR - LT OFF * LDG GEAR - LT OFF * LG ARM/DN RESET - Set Switch To The Down Position * ESS 1BC LDG GEAR / ARM/DN - RESET OP | Landing Gear Safing |
| | Mission Dep. | Right Panel | R2 | * ET UMBILICAT DOOR / MODE - GCP/MAN * ET UMBILICAT DOOR / RIGHT LATCH - RELEASE * ET UMBILICAT DOOR / RIGHT LATCH - OFF * ET UMBILICAT DOOR / LEFT LATCH - RELEASE * ET UMBILICAT DOOR / LEFT LATCH - OFF * ET UMBILICAT DOOR / MODE - GCP | ET Umbilical Door Opening |
| | Mission Dep. | Front Right Panel Front Left Panel Right Panel Center Panel | F4 F8 R2 C3 R2 | * BODY FLAP - MAN * FLT CNTLR PWR - ON * HYD MAIN PUMP PRESS #1 - LO * Run Full Load Test * HYD MAIN PUMP PRESS #1 - NORM * HYD MAIN PUMP PRESS #3 - LO * Repeat Load Test * HYD MAIN PUMP PRESS #3 - NORM | Hydraulic Load Test A Minimum Of Two Operating Hydraulic Systems Are Required For This Test |
| | Mission Dep. | Center Panel Front Right Panel Center Panel Right Panel Center Panel Right Panel Center Panel | C3 C2 F4 C3 R4 C2 R4 C2 | * BFC CRT DISPLAY - ON * Enter Item OPS 000 PRO (Right Keypad) * Enter Item OPS 901 PRO (Right Keypad) * BODY FLAP - MAN * BODY FLAP - DOWN * HYDRAULICS - MPS/TVC ISOL VLV (SYS 1, SYS 2, SYS 3) OPEN * Enter ITEM 8 EXEC (Right Keypad) * Enter ITEM 1 +0 2 EXEC (Right Keypad) * Enter ITEM 5 EXEC (Right Keypad) * HYDRAULICS - MPS/TVC ISOL VLV (SYS 1, SYS 2, SYS 3) CLOSE * Enter ITEM 23 EXEC (Right Keypad) * Enter ITEM 1 EXEC (Right Keypad) * Enter ITEM 29+1 EXEC (Right Keypad) * Enter ITEM 30+8 EXEC (Right Keypad) * Enter ITEM 31 EXEC (Right Keypad) * Enter ITEM 32 EXEC (Right Keypad) | DPS Transition GNC 9 (If Pass) |



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| | Mission Dep. | Overhead Left Panel Left Panel | O1 L1 | * Confirm FREON EVAP OUT TEMP >40 degrees * RADIATORS / RAD CONTROLLER - OUT TEMP - HI * H2O PUMP LOOP 1 - ON | Radiator Reconfiguration |
| | Mission Dep. | Right Panel | R4 R2 | * HYDRAULICS - MPS/TVC ISOL VLV (SYS 1, SYS 2, SYS 3) - CLOSE * BOILER PWR (1/2/3) - OFF * BOILER N2 SUPPLY (1/2/3) - OFF * APU OPERATE (1/2/3) - OFF * APU FUEL TK VLV (1/2/3) - CLOSE * APU CNTLR PWR (1/2/3) - OFF | APU/HYD Shutdown |
| | Mission Dep. | Right Panel | R2 | * He ISOLATION (A & B) - CLOSE * PNEUMATICS / L ENG He XOVR - CLOSE | Post Landing MPS Reconfiguration |
| | Mission Dep. | Left Panel | L2 | * Set O2 SYS SUPPLY 1 - CLOSE * Set O2 SYS SUPPLY 2 - CLOSE * Confirm O2 EMER Talkback Indicates CL | PCS Deactivation |
| | Mission Dep. | Aft Left Panel Overhead Center Panel | A13 O7 | * GPS POWER (1 & 2) - OFF * GPS PRE AMPL UN - OFF * GPS PRE AMPL LC - OFF * GPS POWER (GPS 1, GPS 2, GPS 3) - OFF * GPS PRE AMPL UPPER (GPS 1, GPS 2, GPS 3) - OFF * GPS PRE AMPL LOWER (GPS 1, GPS 2, GPS 3) - OFF | GPS Power Down |
| | Mission Dep. | Center Panel | O2 | * Enter ITEM 8 EXEC (Right Keypad) * Enter ITEM 1+03 EXEC (Right Keypad) * Enter ITEM 2 EXEC (Right Keypad) * Enter ITEM 5 EXEC (Right Keypad) | Vent Door Purge Positioning (PASS) |
| | Mission Dep. | Overhead Center Panel | O7 O8 O7 | * MASTER RCS CROSSFEED - OFF * LEFT OMS / He PRESS/VAPOR ISOL (A & B) - GPC * RIGHT OMS / He PRESS/VAPOR ISOL (A & B) - GPC * LEFT OMS CROSSFEED (A & B) - OPEN/CLOSE * RIGHT OMS CROSSFEED (A & B) - OPEN/CLOSE * LEFT OMS TANK ISOLATION (A & B) - CLOSE/OPEN/GPC * RIGHT OMS TANK ISOLATION (A & B) - CLOSE/OPEN/GPC * LEFT OMS CROSSFEED (A & B) - OPEN/GPC * FWD RCS / He PRESS (A & B) - CLOSE/GPC * FWD RCS TANK ISOLATION (1/2 & 3/4/5) - CLOSE * FWD RCS MANIFOLD ISOLATION (1/2/3/4/5) - CLOSE * FWD RCS MANIFOLD ISOLATION (1/2/3/4/5) - OPEN/GPC * LEFT OMS / He PRESS/VAPOR ISOL (A & B) - CLOSE/GPC * RIGHT OMS / He PRESS/VAPOR ISOL (A & B) - CLOSE/GPC * LEFT MANIFOLD ISOLATION (1/2/3/4/5) - CLOSE * RIGHT MANIFOLD ISOLATION (1/2/3/4/5) - CLOSE * LEFT MANIFOLD ISOLATION (1/2/3/4/5) - OPEN/GPC * RIGHT MANIFOLD ISOLATION (1/2/3/4/5) - OPEN/GPC * LEFT RCS TANK ISOLATION (1/2 & A 3/4/5 B) - CLOSE * RIGHT RCS TANK ISOLATION (1/2 & A 3/4/5 B) - CLOSE * LEFT & RIGHT RCS CROSSFEED - OPEN/CLOSE/GPC | RCS, OMS Valve Test Open, Then Close Open, Then Close Close, Then Open, Then GPC Close, Then Open, Then GPC Open, Then GPC Close, Then GPC Open, Then GPC Close, Then GPC Close, Then GPC Open, Then GPC Open, Then GPC Open, Then Close, Then GPC |
| | Mission Dep. | Overhead Center Panel | O7 | * LEFT RCS TANK ISOLATION (1/2 & A 3/4/5 B) - OPEN/GPC * RIGHT RCS TANK ISOLATION (1/2 & A 3/4/5 B) - OPEN/GPC | Open, Then GPC Open, Then GPC |
| | Mission Dep. | Overhead Left Panel | O6 | * GPC MODE (1/2/3/4/5) - STBY/HALT | STBY, Then Halt |
| | Mission Dep. | | | IF LANDING AT (KSC, EDW, NOR) <u>HATCH OPENING PROCEDURE</u> * Pull G SUIT Controller Clip - (If Inflated) * Lap Belt & Chute - Release * Egress Seat - (Helmet Required If ELS) * Unstow - 'Return To Houston' Bags - (Except ELS) | Hatch Opening |
| | Mission Dep. | | | IF YOU ARE NOT LANDING AT (KSC, EDW, NOR) <u>HATCH OPENING PROCEDURE</u> * Tabs/Visor - CLOSE * Green Apple - PULL * Open Hatch/Deploy Slide Per Decal | Hatch Opening |
| | Mission Dep. | | | <u>ORBITER UNAIDED EGRESS</u> * Egress Orbiter * Hand Carry Landing Site Data Book * If ELS - (Reference ELS POST LANDING Procedures) | Orbiter Egress |