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International Space Station Communication and Tracking/ Motion Control System Book

ISS-Expedition 1

Mission Operations Directorate
Operations Division

Preliminary
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National Aeronautics and
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INTERNATIONAL SPACE STATION COMMUNICATION AND TRACKING/ MOTION CONTROL SYSTEM BOOK ISS-EXPEDITION 1

PRELIMINARY
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This document is not currently under the configuration control of the Systems Operations Data File Control Board (SODFCB). During the interim, changes may be submitted to the book manager.

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The SODF procedures listed here are for the use of the Expedition 1 crew. By final publication, all applicable Increment 1 procedures will be included in this list. The current list of procedures is for use from 2R docking to 5A docking based on Rev C Assembly Sequence.

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NOMINAL

NOMINAL PROCEDURES

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NODE 1 EARLY COMM VIDEO CONFERENCE

VIDEO TELECONFERENCE PREP

1. Perform OCA SETUP, all (SODF: TBD), then:

VIDEO TELECONFERENCE CHECKOUT

PGSC 2. sel ‘Shuttle Apps’ icon, then
sel ‘OCA’ icon
sel ‘OCA Proshare Video’ icon

NOTE
Video T/C takes ~30 seconds to start.

3. √Video active in ‘LOCAL’ window

4. Adjust Thinkpad display tilt-angle, camera position, iris.
Focus so operator’s face centered in ‘LOCAL’ video window.

5. √Picture quality and position

```
**************************************************
*  If picture quality poor                       *
*      From ‘LOCAL’ video window:                *
*      sel ‘Adjust Video’ (slide bar icon)       *
*      Adjust picture quality as required        *
*      sel ‘Close’                               *
*      If ‘Save camera control settings?’        *
*      appears, sel ‘Yes’ button                 *
*                                                *
*      √‘Zooms in’ button (mag glass) in out     *
*      position                                  *
**************************************************
```

Node/ FGB 6. Shuttle to **MCC-H**: “GO for video teleconference checkout.”

7. Wait for **MCC** to initiate call.

NOTE
Video teleconference will last approximately 15 minutes to test video/audio quality and auto pointing algorithm of Early Comm System.

CONDUCT VIDEO TELECONFERENCE

NOTE
Video teleconference performance may be affected if other applications are active.

8. √Remote video window active, audio active.
   Move remote video window directly beneath camera.
   Use ‘Split’ button to move window separate from handset.
   Adjust audio volume using slide bar under remote video window.

NOTE
When video teleconference completed, either side can terminate call. If **MCC** has disconnected, ‘Hang Up’ button will change to ‘Dial’.

PCS 9. Crew configures Early Comm System mode to LO
   nav Early Comm
   Early S-Band Comm Management
   ‘System Configuration’

   sel Sys Mode
   cmd Sys Mode LO **Execute**

   √SYS MODE - LO

PGSC 10. sel system menu (upper-left corner)
   sel ‘Exit’ (Alt-Shift-F4)

VIDEO TELECONFERENCE TEARDOWN

11. Go to OCA DEACT, all (SODF: TBD).

S-BAND POWER-UP AND POWERDOWN

1. <u>INHIBIT BUS FDIR ON BSP, XPDR, & RFG</u>
   C&T: 4A S-Band Overview: Bus FDIR I/O
   S_Band_Bus_FDIR_IO
   'Bus FDIR(T)'

   sel Inh = 0, Ena = 1: 0
   sel Bus ID: 11
   sel RT Address: 17
   cmd Bus FDIR(T)

   'Bus FDIR Status'

   √BSP - Inhibited

   sel RT Address: 16
   cmd Bus FDIR(T)

   'Bus FDIR Status'

   √XPDR - Inhibited

   sel RT Address: 15
   cmd Bus FDIR(T)

   'Bus FDIR Status'

   √RFG - Inhibited

2. <u>ENABLE BSP, XPDR & RFG FOR CYCLIC I/O</u>
   C&T: 4A S-Band Overview: Bus FDIR I/O
   S_Band_Bus_FDIR_IO
   'Cyclic IO(T)'

   sel Inh = 0, Ena = 1: 1
   sel Bus ID: 11
   sel RT Address: 17
   cmd Cyclic ID(T)
   √BSP Cyclic IO - Enabled

   sel RT Address: 16
   cmd Cyclic ID(T)
   √XPDR Cyclic IO - Enabled

   sel RT Address: 15
   cmd Cyclic ID(T)
   √RFG Cyclic IO - Enabled

3. <u>POWER ON BSP, XPDR, & RFG</u>
C&T: 4A S-Band Overview
4A S-Band Overview

sel RPCM Z1-3B B RPC 4
RPCM Z1-3B B RPC 4

√Close cmd - Enabled

'RPC Position'

cmd Close
√RPC Position - Closed

4A S-Band Overview

sel RPCM Z1-3B B RPC 3
RPCM Z1-3B B RPC 3

√Close cmd - Enabled

'RPC Position'

cmd Close
√RPC Position - Closed

4A S-Band Overview

sel RPCM Z1-3B B RPC 2
RPCM Z1-3B B RPC 2

√Close cmd - Enabled

'RPC Position'

cmd Close
√RPC Position - Closed

4. <u>VERIFY BSP, XPDR, & RFG HEALTH</u>
C&T: 4A S-Band Overview: Baseband Signal Processor 2
4A S-Band Baseband Signal Processor 2
'BIT Summary'

√POST/ECM - Pass
√Environmental - Pass

4A S-Band Overview

sel Transponder 2
4A S-Band Transponder 2
'BIT Summary'

√POST/ECM - Pass
√Environmental - Pass

4A S-Band Overview

sel Radio Frequency Group 2
4A S-Band Radio Frequency Group 2
'BIT Summary'

√POST/ECM - Pass
√Environmental - Pass

5. RUN BSP, XPDR & RFG SELF TESTS
C&T: 4A S-Band Overview: Test
S_Band_4A_ORU_Test
'ORU Self Test Selection'

cmd BSP Self Test
cmd Xpdr Self Test
cmd RFG Self Test

6. VERIFY BSP, XPDR & RFG SELF TEST STATUS
C&T: 4A S-Band Overview
4A S-Band Overview

sel Baseband Signal Processor 2
4A S-Band Baseband Signal Processor 2
'BIT Summary'

√Equipment Self Test - Pass

4A S-Band Overview

sel Transponder 2
4A S-Band Transponder 2
'BIT Summary'

√Equipment Self Test - Pass

4A S-Band Overview

sel Radio Frequency Group 2
4A S-Band Radio Frequency Group 2
'BIT Summary'

√Equipment Self Test - Pass

7. RUN S-BAND XPDR BASEBAND BSP LOOPBACK SYSTEM TEST
C&T: 4A S-Band Overview: Test
S_Band_4A_ORU_Test
'System Test Selection'

cmd Xpdr BB BSP Fill CADU Lpbk

'BIT Function Configuration'

√BSP2 - System Fill CADU Loopback
√Xpdr2 - Baseband Loopback

NOTE
Allow test to run for one minute.

8. VERIFY BSP THROUGHPUT STATUS AND FWD LINK PROCESSING ERRORS
C&T: 4A S-Band Overview
4A S-Band Overview

sel Baseband Signal Processor 2
4A S-Band Baseband Signal Processor 2
'Throughput Status'

√CADUs Received: 92 --- 95
√Fill CADUs Received: 92 --- 95
√Fill CADUs Transmitted: 92 --- 95

'Forward Link Processing Errors'

√Demux Packet Length Errors - 0
√Demux R-S Decoder Failures - 0
√Demux Sequence Errors - 0
√CADU Headers Received in Error - 0
√Fill CADUs Received in Error - 0
√VCDUs Lost to Demux Overflow - 0

9. STOP S-BAND XPDR BASEBAND BSP LOOPBACK SYSTEM TEST
C&T: 4A S-Band Overview: Test
S_Band_4A_ORU_Test

cmd Stop Test

'BIT Function Configuration'

√BSP2 - Inactive
√Xpdr2 - Inactive

10. RUN S-BAND XPDR RF BSP LOOPBACK SYSTEM TEST
‘System Test Selection’

cmd Xpdr RF BSP Fill CADU Lpbk

‘BIT Function Configuration’

√BSP2 - System Fill CADU Loopback
√Xpdr2 - RF Loopback

NOTE
Allow test to run for one minute.

11. VERIFY BSP THROUGHPUT STATUS AND FWD LINK PROCESSING ERRORS
C&T: 4A S-Band Overview
4A S-Band Overview

sel Baseband Signal Processor 2
4A S-Band Baseband Signal Processor 2
‘Throughput Status’

√CADUs Received: 92 --- 95
√Fill CADUs Received: 92 --- 95
√Fill CADUs Transmitted: 92 --- 95

‘Forward Link Processing Errors’

√Demux Packet Length Errors - 0
√Demux R-S Decoder Failures - 0
√Demux Sequence Errors - 0
√CADU Headers Received in Error - 0
√Fill CADUs Received in Error - 0
√VCDUs Lost to Demux Overflow - 0

12. VERIFY XPDR TELEMETRY, ACQUISITION STATUS, AND FUNCTION STATUS
C&T: 4A S-Band Overview
4A S-Band Overview

sel Transponder 2
S-Band Transponder 2
‘Telemetry’

√RF Pwr Out (dBm) > 9dbm
√Receiver AGC (V)
This telemetry should be logged.

√Digital AGC
This telemetry should be logged.
√Carrier Loop Err (Hz)
This telemetry should be logged.

'Acquisition Status'

√Carrier Lock - Lock
√Long Code - Lock
√Short Code - Lock
√PN Main Lobe - Lock
√Bit Detector - Lock

'Function Status'

√Transmitter Coherency - Noncoh
√DSP Data Rate - 192 Kbps
√DSP Mode - 2
√Transponder Configured - Yes
√Processor Reset - No

13. STOP S-BAND XPDR RF BSP LOOPBACK SYSTEM TEST
C&T: 4A S-Band Overview: Test
S_Band_ORU_Test

cmd Stop Test

'BIT Function Configuration'

√BSP - Inactive
√Xpdr - Inactive

14. ENABLE BUS FDIR ON BSP, XPDR & RFG
C&T: 4A S-Band Overview: Bus FDIR I/O
S_Band_Bus_FDIR_IO
'Bus FDIR(T)'

sel Inh = 0, Ena = 1: 1
sel Bus ID: 11
sel RT Address: 17
cmd Bus FDIR(T)

'Bus FDIR Status'

√BSP - Enabled

sel RT Address: 16
cmd Bus FDIR(T)

‘Bus FDIR Status’

√XPDR - Enabled

sel RT Address: 15
cmd Bus FDIR(T)

‘Bus FDIR Status’

√RFG - Enabled

15. <u>VERIFY S-BAND NO-OP CONFIGURATION</u>
C&T: 4A S-Band Overview: Configuration
4A S-Band Configuration
‘Pending’

√Decryption - Off
√Key Select - 0000
√Xpdr Mode - Noncoherent
√Antenns Pointing Mode - Disabled
√Transmitter - On
√SSPA - Muted

S-BAND LOW DATA RATE CONFIGURATION

1. LOAD S-BAND LOW DATA RATE CONFIGURATION
   C&T: 4A S-Band Overview: Configuration
   4A S-Band Configuration

   sel Load Predefined Config
   S_Band_4A_Load_Predefined_Config

   cmd LDR

2 VERIFY S-BAND CONFIGURATION PENDING
   C&T: 4A S-Band Overview: Configuration
   4A S-Band Configuration
   'Pending'

   √Decryption - Off
   √Key Select - 0000
   √Xpdr Mode - NonCoh
   √Antenna Pointing Mode - Disabled
   √Transmitter - On
   √SSPA - Muted

3. TURN ON S-BAND DECRYPTION
   C&T: 4A S-Band Overview: Configuration
   4A S-Band Configuration

   sel Decryption
   S_Band_4A_Decryption

   cmd On
   √Pending - On

4. CHANGE S-BAND DECRYPTION KEY
   C&T: 4A S-Band Overview: Configuration
   4A S-Band Configuration

   sel Key Select
   S_Band_4A_Key_Select
   'Key Select (T)'

   sel writable field below: XXXX
   cmd Key Select(T)
   √Pending - XXXX

5. VERIFY S-BAND CONFIGURATION PENDING
C&T: 4A S-Band Overview: Configuration
4A S-Band Configuration
'Pending'

√Decryption - On
√Key Select - XXXX
√Xpdr Mode - NonCoh
√Antenna Pointing Mode - Disabled
√Transmitter - On
√SSPA - Muted

6. EXECUTE S-BAND CONFIGURATION
C&T: 4A S-Band Overview: Configuration
4A S-Band Configuration

sel Execute Function Config
S_Band_4A_Execute_Function_Config

cmd Execute Function Configuration

7. VERIFY S-BAND CONFIGURATION ACTUAL
C&T: 4A S-Band Overview: Configuration
4A S-Band Configuration
'Actual'

√Decryption - On
√Key Select - XXXX
√Xpdr Mode - NonCoh
√Antenna Pointing Mode - Disabled
√Transmitter - On
√SSPA - Muted

8. ACTIVATE DATA LINK
C&T: 4A S-Band Overview: Configuration
4A S-Band Configuration

sel Activate Data Link
S_Band_4A_Activate_Data_Link

cmd Activate Data Link
√SSPA - Tx
√BDT Status - Enabled

9. VERIFY DATA LINK ACTIVE
C&T: 4A S-Band Overview: Configuration
4A S-Band Configuration

√Data Link Status - Active

10. <u>VERIFY SYSTEM CONFIGURATION</u>

C&T: 4A S-Band Overview

4A S-Band Overview

‘Baseband Signal Processor 2’

√Data Rate - Low
√Core Data - On
√Mux Output - On
√Demux Input - On
√DES - On
√Key - XXXX

‘Transponder 2’

√Data Rate - Low
√Mode - NonCoh

‘Radio Frequency Group 2’

√Antenna Select - LGA
√Pointing Mode - Disabled
√Transmitter - On
√SSPA - Tx

CMG EXTERNAL HEATER ACTIVATION

CLOSE RPC FOR CMG EXTERNAL HEATERS

NOTE
Heater activation occurs in the following pair: 2 and 3, 1 and 4.

PCS Node 1: EPS: RPCM Z14B B

RPCM Z14B B

sel RPCM Details

sel RPC [X] X = 10 12

√RPC [X] Close Cmd - Ena
sel RPC [X]
cmd Close **Execute**
√RPC [X] Position - Cl

Repeat

√**MCC-H**

PCS Node 1: EPS: RPCM Z13B B

RPCM Z13B B

sel RPCM Details

sel RPC [X] X = 10 12

√RPC [X] Close Cmd - Ena
sel RPC [X]
cmd Close **Execute**
√RPC [X] Position - Cl

Repeat

√**MCC-H**

CMG EXTERNAL HEATER DEACTIVATION

OPEN RPC

NOTE
Heater deactivation occurs in the following pair: 2 and 3, 1 and 4.

PCS Node 1: EPS: RPCM Z14B B

RPCM Z14B B

sel RPCM Details

sel RPC [X] X = 10 12

√RPC [X] Open Cmd - Ena
sel RPC [X]
cmd Open **Execute**
√RPC [X] Position - Op

Repeat

√**MCC-H**

PCS Node 1: EPS: RPCM Z13B B

RPCM Z13B B

sel RPCM Details

sel RPC [X] X = 10 12

√RPC [X] Open Cmd - Ena
sel RPC [X]
cmd Open **Execute**
√RPC [X] Position - Op

Repeat

√**MCC-H**

CORRECTIVE PROCEDURES

NODE 1 EARLY COMM ORU POWER CYCLE..... TBD

CORRECTIVE

CORRECTIVE

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CAUTION MESSAGES

C&T CAUTION MESSAGE TABLE..... 3-3

CAUTION

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C&T CAUTION MESSAGE TABLE

Message Text	Condition	Action
S-BAND XPDR 2 RT FAIL - Z1	TBD	TBD
S-BAND BSP 2 RT FAIL - Z1	TBD	TBD
S-BAND RFG 2 RT FAIL - P6	TBD	TBD

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