NODE 1 INITIALIZATION

1. VERIFY OIU CONFIGURATION FOR FGB TLM

CRT

SM 212 OIU

√STATUS ACTIVE DEVICES AD1 PD - FGB2
√BUS - 3
√LOCK - N/A
OIU FORMAT 001 LOAD - ITEM 1 EXEC
√FORMAT - 001
√BUS 3 BC, ITEM 11 - ∗
√BUS 4 RT, ITEM 14 - ∗

SM 204 FGB

√BC SYNC - YES
√FRM CTR - incrementing

2. VERIFY OIU BUS CHANNELS

> NOTE
> 1. The following steps check out OIU Buses 3 and 4, side A and B.
>
> 2. Possible PDI DECOM fail message with each bus configuration.

SM 212 OIU

√BUS 3 A - ∗ (ITEM 12)
BUS 3 B - ITEM 13 EXEC (∗)

SM 204 FGB

√BC SYNC - YES
√FRM CTR - incrementing

SM 212 OIU

BUS 3 A - ITEM 12 EXEC (∗)
BUS 4 BC - ITEM 15 EXEC (∗)
Reroute FGB-2(1) to BUS 4 - ITEM 18 +5(7) EXEC
BUS 3 RT - ITEM 10 EXEC (∗)
√BUS 4 A - ∗ (ITEM 16)

SM 204 FGB

√BC SYNC - YES
√FRM CTR - incrementing

SM 212 OIU

BUS 4 B - ITEM 17 EXEC (∗)

SM 204 FGB

√BC SYNC - YES
√FRM CTR - incrementing

SM 212 OIU

BUS 4 A - ITEM 16 EXEC (∗)
BUS 3 BC - ITEM 11 EXEC (∗)
Reroute FGB-2(1) to BUS 3 - ITEM 18 + 6(8) EXEC
BUS 4 RT - ITEM 14 EXEC (∗)

SM 204 FGB

√BC SYNC - YES
√FRM CTR - incrementing

3. VERIFY FGB RACU 5 AND RACU 6 OFF

SM 204 FGB

√RACU 5 INP AMPS < 2.0
√OUT VOLTS: 0.00
√RACU 6 INP AMPS < 2.0
√OUT VOLTS: 0.00
√RACU 5 PWR OFF ∗
√6 PWR OFF ∗

Notify EV, “RACUs Off. Go for umbilical mate.”

4. COMMAND RACU 5 AND RACU 6 ON

NOTE
RACU commands sent from orbiter will not work if FGB relay matrix is in **MCC-M** command state (COMMANDING - INH). Crew can follow ground activities using the "If ENA" block below.

SM 204 FGB

√COMMANDING - INH

If COMMANDING - INH

RUSSIAN GROUND	AOS	LOS
Pass 1	___/___:___:___	___/___:___:___
Pass 2	___/___:___:___	___/___:___:___

Crew inform **MCC-H**, "FGB power umbilicals are mated."
MCC-H inform **MCC-M**, "Go for RACU 5,6 Power On."
MCC-M inform **MCC-H**, "RACU 5,6 Powered On at ___/___:___:___ GMT."
MCC-H inform crew, "RACU 5,6 Powered On at ___/___:___:___ GMT."

If COMMANDING - ENA
Crew inform **MCC-H**, "FGB power umbilicals are mated."
MCC-M inform **MCC-H**, "Go for RACU 5,6 Power On."
MCC-H inform crew, "Moscow Go for RACU 5,6 Power On."

On MCC GO

SM 204 FGB

√MAIN BUS V1,V2 VOLTS(two): 28.0 --- 29.0
√BATT 1-6 VOLTS (six) > 25.5

```
* ************************************************ *
*  If any BATT VOLTS < 25.5 V                      *
*       Notify MCC-H: "FGB Batteries Low.          *
*         Wait one rev for FGB battery charge."    *
* ************************************************ *
```

00:00:00 RACU 5 PWR ON VIA FGB - ITEM 1 EXEC

00:00:30 RACU 6 PWR ON VIA FGB - ITEM 3 EXEC

SM 204 FGB

√RACU 5 PWR ON *
√INP AMPS > 3.0
√OUT VOLTS: 121 --- 125
√AMPS > 0.3

√RACU 6 PWR ON *
√INP AMPS > 3.0
√OUT VOLTS: 121 --- 125
√AMPS > 0.3

NOTE
Amperage should be @ 0.5 amps at MDM power ON. Could be as high as 10 amps after MDM initialization, approximately 2.5 minutes, depending on heater usage.

```
*************************************************************
*  If RACU 5 OUT AMPS > 10                                  *
*      RACU 5 PWR OFF VIA FGB - ITEM 5 EXEC (*)             *
*  If RACU 6 OUT AMPS > 10                                  *
*      RACU 6 PWR OFF VIA FGB - ITEM 7 EXEC (*)             *
*************************************************************
```

5. COMMAND OIU TO FORMAT 002

NOTE
1. MDM may take up to 5 minutes to warm-up and go through POST.

2. Expect possible PDI DECOM fail message.

SM 212 OIU

00:02:30 OIU FORMAT 002 LOAD - ITEM 1 +2 EXEC
√FORMAT - 002
√BUS 3 BC - * (ITEM 11)
√BUS 4 RT - * (ITEM 14)
√STATUS ACTIVE DEVICES AD1 PD - N1-2
√BUS - 4
√LOCK - YES

```
*****************************************************************
*  If LOCK - NO                                                 *
*      Repeat step 5 every 30 seconds until Lock - YES.         *
*      If 5 minutes have elapsed, continue with step 6.         *
*****************************************************************
```

6. CONFIGURE PCS FOR N1-2 MDM DATA
On PCS attached to PDIP N1-2 port

sel icon to open PCS CDS Main Control Panel Window and enlarge
(may be buried behind displays)

√Status Box green
Verify ‘Connected to MDM’ indicated.

```
**************************************************
*  If Status Box not green                       *
*      sel Connect to MDM                        *
*    √Status Box green                           *
*      Verify ‘Connected to MDM’ indicated.      *
**************************************************
```

NOTE
Expect possible increment of advisory log count PMA 1 heater failed messages.

7. VERIFY MDM N1-2 AND N1-1 STATUS VIA PCS

PCS Node 1: C&DH: MDM N1-2
Primary NCS MDM Node1
‘MDM Major State’

√State - Primary
√Frame Count incrementing

‘Software Control’

Configuration - 1

PCS Node 1: C&DH: MDM N1-1
Secondary NCS MDM Node1
‘MDM Major State’

√State - Standby

```
                 ***************************************************************************
                 *  If good MDM TLM via PCS but NO TLM VIA OIU, SWITCH OIU 2               *
                 *      Pwr on PSP 2                                                       *
A1L              *      S-BD PL PWR SYS → 2                                                *
                 *                    √SEL - PSP                                           *
                 *           √CMD OUTPUT  -  P/L UMB                                       *
                 *             CNTL → PNL, CMD                                             *
                 *                                                                         *
CRT              *      [SM 62 PCMMU/PL COMM]                                              *
                 *                                                                         *
                 *      Perform I/O RESET on PSP 2 - ITEM 7 EXEC                           *
                 *                                                                         *
                 *      MCC will configure PSP 2 for OIU COMMANDING.                       *
                 *                                                                         *
                 *      POWER OIU 2                                                        *
                 *                                                                         *
L12              *      OIU PWR → 2  (tb  - Down)                                          *
                 *                                                                         *
CRT              *      [SM 212 OIU]                                                       *
                 *                                                                         *
                 *      OIU FORMAT 002 - ITEM 1 +2 EXEC                                    *
                 *    √FORMAT   - 002                                                      *
                 *    √BUS 3 BC  - * (ITEM 11)                                             *
                 *    √BUS 4 RT  - * (ITEM 14)                                             *
                 *    √STATUS ACTIVE DEVICES AD 1 PD      - N1-2                           *
                 *                                  √BUS    - 4                            *
                 *                                  √LOCK - YES                            *
                 ***************************************************************************
```

8. VERIFY MDM N1-2 STATUS VIA MCDS

```
CRT              [SM 210  NODE]

                √PRI MDM PHY ID   - N1-2
                          √STATE   - PRI
                          √CONFIG - C01
                          √FRM CTR incrementing

                 ***************************************************************************
                 *  If no N1-2 MDM data on MCDS and none on PCS                            *
                 *                                                                         *
                 *      Reconfigure for TLM from MDM N1-1                                  *
                 *      [SM 212 OIU]                                                       *
                 *                                                                         *
                 *                                                                         *
                 *      BUS 4 BC - ITEM 15 EXEC (*)                                        *
                 *      BUS 3 RT - ITEM 10 EXEC (*)                                        *
                 *      Switch backup device - ITEM 18 +4 EXEC                             *
```

```
*     OIU FORMAT 002 LOAD - ITEM 1 +2 EXEC                          *
*    √STATUS ACTIVE DEVICES AD1 PD     - N1-1                       *
*                                      √BUS   - 3                   *
*                                      √LOCK - YES                  *
*                                                                   *
*     Configure PCS for N1-1 MDM Data                               *
*     On PCS attached to PDIP N1-1 port                             *
*         sel arrow above 'PCS' logo                                *
*         sel Start/Restart PCS CDS                                 *
*         sel icon to open PCS CDS Main Control Panel Window        *
*                                                                   *
*        √Status Box green                                          *
*         Verify 'Connected to MDM' indicated.                      *
*                                                                   *
*         If Status Box not green                                   *
*             sel Connect to MDM                                    *
*                                                                   *
*         sel arrow above 'PCS' logo                                *
*         sel Start PCS CDDF display                                *
*                                                                   *
*         Home page will display when load complete (~1 minute).    *
*                                                                   *
*     [SM 210 NODE 1]                                               *
*                                                                   *
*    √PRI MDM PHY ID  - N1-1                                        *
*                 √STATE   - PRI                                    *
*                 √CONFIG - C01                                     *
*                 √FRM CTR incrementing                             *
*                                                                   *
PCS  *     Node 1: C&DH: MDM N1-1                                   *
*     [Primary NCS MDM Node1]                                       *
*     'MDM Major State'                                             *
*                                                                   *
*    √State - Primary                                               *
*    √Frame Count incrementing                                      *
*                                                                   *
*     'Software Control'                                            *
*                                                                   *
*    √Configuration - 1                                             *
*                                                                   *
*     Power SDO Card (MDM Heater)                                   *
PCS  *     Node 1: C&DH: MDM N1-1                                   *
*     [Primary NCS MDM Node 1]                                      *
*     'RPCM N1RS1 A'                                                *
*                                                                   *
*     sel    RPC 5                                                  *
*     sel    Commands                                               *
*     cmd    Close  Execute                                         *
```

```
*     √Position - Cl                                                    *
*                                                                       *
*       Notify MCC-H, 'MDM N1-2 failed to boot.'  >>                    *
*************************************************************************
```

9. PROVIDE POWER TO MDM SDO CARD

PCS Node 1: C&DH: MDM N1-2

Primary NCS MDM Node1

'RPCM N1RS2 C'

sel RPC 3
sel Commands
cmd Close **Execute**
√Position - Cl
Go for MDM N1-1 Thermal Cover Removal.

10. COMMAND N1-1 TO SEC

> NOTE
> First command to MDM via the OIU will initialize the command counter and must be sent again to execute.

SM 210 NODE 1

CRT √SEC MDM PHY ID - N1-1
√STATE - STBY
N1-1 TO SEC - ITEM 3 EXEC
√SEC MDM STATE - SEC

```
****************************************
*  If SEC MDM STATE - STBY             *
*      N1-1 TO SEC - ITEM 3 EXEC       *
*     √SEC MDM STATE - SEC             *
****************************************
```

PCS Node 1: C&DH: MDM N1-1

Secondary NCS MDM Node1

'MDM Major State'

√State - Secondary
√Frame Count incrementing

'Software Control'

√Configuration - 1

11. PROVIDE POWER TO MDM SDO CARD (MDM HEATER)

'RPCM N1RS1 A'

sel RPC 5
sel Commands

cmd Close **Execute**
√Position - Cl
Go for MDM N1-2 Thermal Cover Removal.

12. VERIFY FGB TLM VIA MDM

NOTE
The following steps verfiy that the Node MDMs are processing the FGB MDM telemetry. Any FGB display can be used. The "FGB: C&DH" page is an arbitrary choice.

PCS FGB: C&DH
FGB: C&DH

√FGB MDM 1(2) - Active (blue button)

13. VERIFY MDM HEATER STATUS

PCS Secondary NCS MDM Node1

√N1_1_Operational - Ena Ops
√Survival - Ena Ops
√N1_2_Operational - Ena Ops
√Survival - Ena Ops

14. VERIFY SHELL HEATER STATUS

PCS Node 1: TCS
Node 1: TCS
'PMA 1'

√PMA1 Htr A (four) - Inh
√B (four) - Ena_Opr

'NODE 1'

√NOD1 Htr A (nine) - Inh
√B (nine) - Ena_Opr

15. CHECK NODE 1 CABIN PRESSURE

PCS Node 1: ECLSS
Node1:ECLSS
'Node 1'

√CABIN PRESS: 679 --- 760 mmHg

16. CLOSE APCU OUTPUT RELAY

(SSP2) L12L √SW PWR CB 1 - Cl

(SSP1) L12U √SW PWR CB 2 - Cl

√APCU 1,2 CONV tb (two) - bp
APCU 1,2 OUTPUT (two) → On

17. TURN ON APCU CONVERTER
APCU 1,2 CONV (two) → On (tb - Gray)
√OUTPUT tb (two) - Gray

CRT SM 200 APCU Status

√APCU 1,2 OUT VOLT RES LOW (two) > 122 V

18. ENABLE RPCM I/O

PCS Node 1: C&DH: MDM N1-1
Secondary NCS MDM Node1

sel LB SYS-LAB-1
sel RT STATUS
sel Ena_RT_Commands

cmd ENA_RPCM_N14B_C **Execute**
cmd ENA_RPCM_N14B_B **Execute**
cmd ENA_RPCM_N14B_A **Execute**

LB_SYS_LAB_RT_Status

√RT Inhibited 18, 19, 20 - all blank

PCS Node 1: C&DH: MDM_N1-2
Primary NCS MDM Node1

sel LB SYS-LAB-2
sel RT STATUS
sel Ena_RT_Commands

cmd ENA_RPCM_N13B_C **Execute**
cmd ENA_RPCM_N13B_B **Execute**
cmd ENA_RPCM_N13B_A **Execute**

LB_SYS_LAB_RT_Status

√RT Inhibited 18, 19, 20 - all blank

19. VERIFY LAB DATA BUS AND APCU POWER BUS CONNECTIVITY

PCS Node 1: EPS

NODE1: EPS

√N13B A, B, C (three) - Active (blue buttons)
√N14B A, B, C (three) - Active (blue buttons)

```
* ****************************** *
*  If any RPCM not active        *
*                                *
*     √MCC-H                     *
* ****************************** *
```

20. VERIFY LB SYS LAB 1 BUS CHANNEL B

PCS Node 1: C&DH: MDM N1-1

Secondary NCS MDM Node1

'BIA'

√Mode - BC
√A - X (Active)

sel BIA

N1_1_MDM_LB SYS_LAB_1_Sel_Ch_A_B

cmd B **Execute**
√B - X (Active)

sel BIA

N1_1_MDM_LB SYS_LAB_1_Sel_Ch_A_B

cmd A **Execute**
√A - X (Active)

21. <u>VERIFY EPS N1-14 BUS CHANNEL B</u>

PCS Node 1: C&DH: MDM N1-2

Primary NCS MDM Node1

'SPD 0'

√Mode Ch 2 - BC
√A Ch 2 - X (Active)

sel SPD 0
sel Commands
cmd Prim_NCS_UB_EPS_N1_14_Sel_Ch_B **Execute**
√B Ch 2 - X (Active)

sel SPD 0
sel Commands
cmd Prim_NCS_UB_EPS_N1_14_Sel_Ch_A **Execute**
√A Ch 2 - X (Active)

22. <u>VERIFY EPS N1-23 BUS CHANNEL B</u>

'SPD 1'

√Mode Ch 1 - BC
√A Ch 1 - X (Active)

sel SPD 1
sel Commands
cmd Prim_NCS_UB_EPS_N1_23_Sel_Ch_B **Execute**
√B Ch 1 - X (Active)

sel SPD 1
sel Commands
cmd Prim_NCS_UB_EPS_N1_23_Sel_Ch_A **Execute**
√A Ch 1 - X (Active)

23. <u>VERIFY LB SYS LAB 2 BUS CHANNEL B</u>

PCS Node 1: C&DH: MDM N1-2

PRIMARY NCS MDM Node1

'BIA'

√Mode - BC
√A - X (Active)
sel BIA

N1_2_MDM_LB SYS_LAB_2_Sel_Ch_A_B

cmd B **Execute**
√B - X (Active)

sel BIA

N1_2_MDM_LB SYS_LAB_2_Sel_Ch_A_B

cmd A **Execute**
√A - X