

Patch STR1 Memory  
File: H\_FCP\_AOC\_8PM1.xls  
Author: dsalt-hp



## Procedure Summary

### Objectives

The objective of this Herschel ACMS procedure is to patch the EEPROM and/or the RAM memory of STR1.

The procedure involves the following activities:

- verifying initial ACMS mode & STR1 status
- transition to SAM, if necessary (calls H\_FCP\_AOC\_3A01)
- load and enable DTM (SA10)
- commanding STR1 reset
- patch STR1 EEPROM, as necessary (calls H\_FCP\_OCC\_2282)
- patch STR1 RAM, as necessary (calls H\_FCP\_OCC\_2284)
- commanding STR1 to STB with or without RAM load
- verifying STR1 status
- commanding STR1 to AAD mode
- disable and remove DTM (SA10)

### Summary of Constraints

The ACMS must be in SAM if SRT1 is designated as Main. Otherwise, if STR1 is designated as Redundant, it is assumed to be powered ON prior to executing the procedure.

The worst case duration of a STR memory load depends on the rate with which memory load TC's are sent. The maximum rate with which data can be sent to the STR by the ACC is 56 32-bit words in a single ACMS cycle equivalent to 224 words / second.

The loading of STR memory is carried out using a dedicated TC provided by the ACC ASW. The size of the TC packet imposes limitations on the number of words that can be uplinked in a single command. If the TC's are sent directly from ground, packet size limitations restrict the number of 32-bit data words to 55; for TC's sent through the MTL the maximum is reduced further to 52 words.

The maximum size of an STR memory block that can be uploaded is 512 kb, which requires 2384 TC's. If the TC's are sent at a rate of one command per second, the time required will be close to 40 minutes.

### Spacecraft Configuration

#### Start of Procedure

Spacecraft initial conditions:  
- S/C nominal

#### End of Procedure

Spacecraft final conditions:  
- as initial conditions but with STR1 memory patched

### Reference File(s)

#### Input Command Sequences

#### Output Command Sequences

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HFA8PM1A  
 HFA8PM1B  
 HFA8PM1C  
 HFA8PM1D

Referenced Displays

ANDs      GRDs      SLDs  
 ZAA01999  
 ZAA00999  
 ZAAA3999

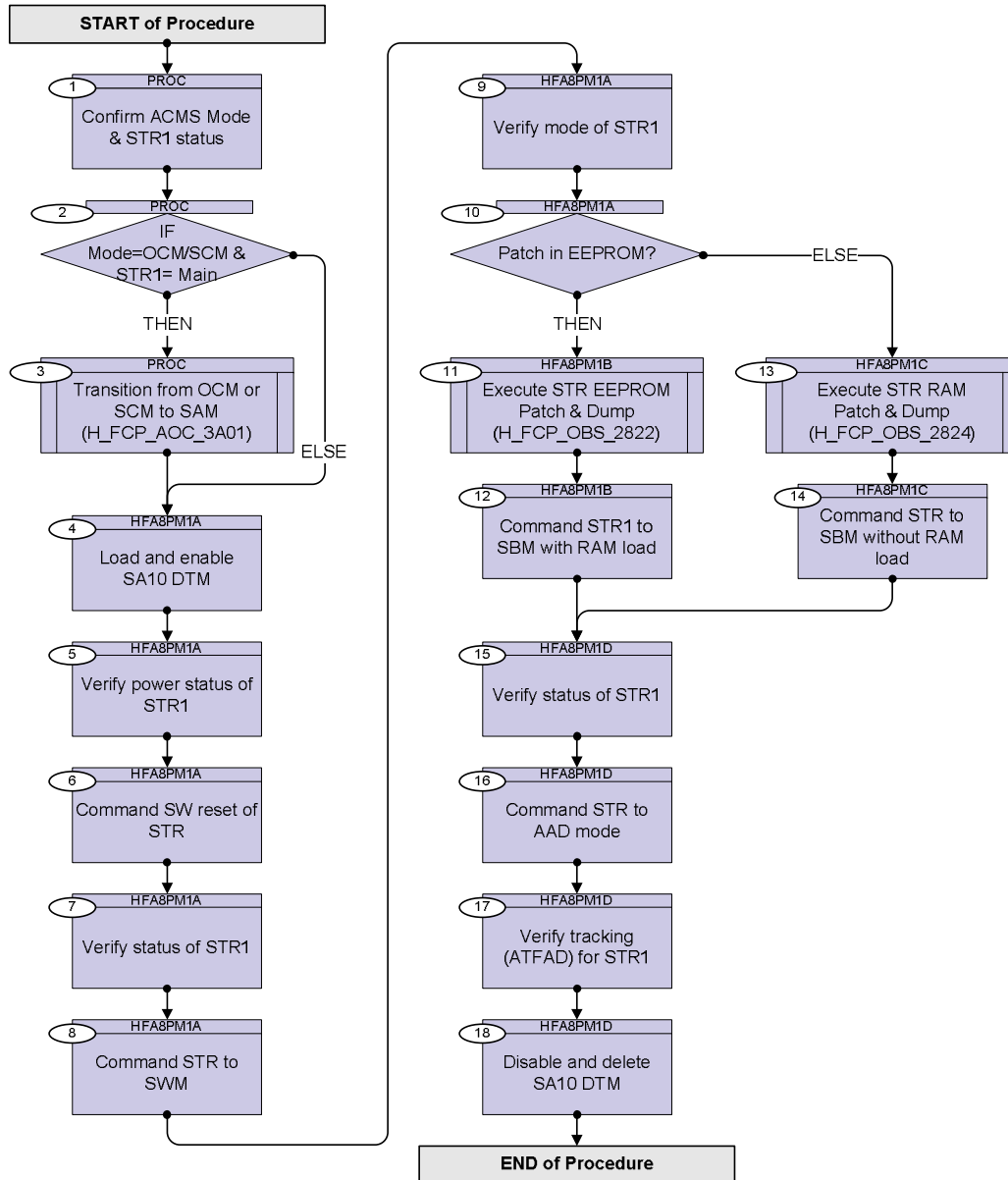
Configuration Control Information

| DATE     | FOP ISSUE | VERSION | MODIFICATION DESCRIPTION | AUTHOR   | SPR REF |
|----------|-----------|---------|--------------------------|----------|---------|
| 03/08/08 | 1         | 1       | Created                  | dsalt-hp |         |

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### Procedure Flowchart Overview



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| Step No.                      | Time | Activity/Remarks  | TC/TLM         | Display/ Branch                |
|-------------------------------|------|---|----------------|--------------------------------|
| <b>Beginning of Procedure</b> |      |   |                |                                |
| PROC Procedure Properties     |      |   |                |                                |
| SSID :                        |      |   |                |                                |
| 1                             |      | Confirm ACMS Mode & STR1 status   |                | Next Step:<br>2                |
|                               |      | Verify Telemetry<br><b>AcmsMode</b> <b>AESMG002</b>                                     | <b>= SAM</b>   | AND=ZAA01999                   |
|                               |      | Verify Telemetry<br><b>Curr STR in use</b> <b>AES18002</b>                              | <b>= STR 2</b> | AND=ZAA01999                   |
| 2                             |      | IF<br>Mode=OCM/SCM & STR1= Main   |                | Next Step:<br>ELSE 4<br>THEN 3 |
| 3                             |      | Transition from OCM or SCM to SAM (H_FCP_AOC_3A01)                                      |                | Next Step:<br>4                |
|                               |      | Execute Procedure:<br><b>H_FCP_AOC_3A01</b><br><b>Transition from OCM or SCM to SAM</b> |                |                                |
| HFA8PM1A Ready STR1 for patch |      |   |                |                                |
| SSID :                        |      |   |                |                                |
| 4                             |      | Load and enable SA10 DTM  |                | Next Step:<br>5                |



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| Step No. | Time | Activity/Remarks   | TC/TLM   | Display/ Branch |
|----------|------|--|--|-----------------|
| 5        |      | Verify power status of STR1  |  | Next Step:<br>6 |
|          |      | Verify Telemetry<br><br>STR1 power                      AE4F1002   | = ON   | AND=ZAA00999    |
| 6        |      | Command SW reset of STR  |  | Next Step:<br>7 |
|          |      | Execute Telecommand<br><br>STR1 SW RESET   | ACZM1109   |                 |
|          |      | Command Parameter(s) :<br>STRCfg DF86 Cmd                      AH8J3001<br>STRCfg DD86 Cmd                      AH8J4001<br>STRCfg Nrof Wrđ                      AHFX8001<br>STRCfg Data Wrđ                      AHFX9001 | Enable 86<br>Enable 86<br>1 <dec> (Def)<br>1 <dec> |                 |
|          |      | TC Control Flags :<br><br>SSID : 20  | GBM IL DSE<br>--Y -- ---                           |                 |
|          |      | Execute Telecommand<br><br>Fire Cmd STR config   | ACZ4M109   |                 |
|          |      | Command Parameter(s) :<br>FireFun DF86Cmd                      AH8F1001<br>FireFun DD86Cmd                      AH8F2001   | Enable 86<br>Enable 86                             |                 |
|          |      | TC Control Flags :<br><br>SSID : 20  | GBM IL DSE<br>--Y -- ---                           |                 |
|          |      | The STR reset command with the reset type set to 1 causes a SW reset in which only some initialisations are carried out. In particular, the contents of the RAM are entirely preserved.                                    |  |                 |
|          |      | ACYHH109 STRmain SW RESET<br>ACYHJ109 STRred SW RESET<br>ACZM1109 STR1 SW RESET<br>ACZM2109 STR2 SW RESET  |  |                 |
| 7        |      | Verify status of STR1  |  | Next Step:<br>8 |
|          |      | Wait 30 seconds for the new mode to be reflected in TM   |  |                 |

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| Step No. | Time | Activity/Remarks  | TC/TLM   | Display/ Branch                  |
|----------|------|---|--|----------------------------------|
|          |      | Normal sensor management functions, including acquisition of HK data and health checking are partly or totally disabled in the STR INI mode. Therefore, the only meaningful checks after a reset are the verification of operating mode and double-bit errors in the EEPROM (the contents of the EEPROM are checked and corrected in INI) |  |                                  |
|          |      | Verify Telemetry<br>Operating Mode AMX12074   | = Initialisation   | AND=ZAAA3999                     |
|          |      | Verify Telemetry<br>2 Errors PROM AMX18074  | = No failure   | AND=ZAAA3999                     |
| 8        |      | Command STR to SWM  |  | Next Step:<br>9                  |
|          |      | Execute Telecommand<br>STR1 SWM<br>Command Parameter(s) :<br>STRCfg DF86 Cmd AH8J3001<br>STRCfg DD86 Cmd AH8J4001<br>STRCfg Nrof Wrđ AHFX8001<br>STRCfg Data Wrđ AHFX9001<br>TC Control Flags :<br>GBM IL DSE<br>--Y -- --<br>SSID : 20   | ACZN6109<br><br>Enable 86<br>Enable 86<br>1 <dec> (Def)<br>0 <dec> |                                  |
|          |      | Execute Telecommand<br>Fire Cmd STR config<br>Command Parameter(s) :<br>FireFun DF86Cmd AH8F1001<br>FireFun DD86Cmd AH8F2001<br>TC Control Flags :<br>GBM IL DSE<br>--Y -- --<br>SSID : 20  | ACZ4M109<br><br>Enable 86<br>Enable 86                             |                                  |
|          |      | Wait 30 seconds to allow mode change to be reflected in TM  |  |                                  |
| 9        |      | Verify mode of STR1   |  | Next Step:<br>10                 |
|          |      | Verify Telemetry<br>Operating Mode AMX12074   | = SW Maintenance   | AND=ZAAA3999                     |
| 10       |      | Patch in EEPROM?  |  | Next Step:<br>THEN 11<br>ELSE 13 |







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| Step No. | Time | Activity/Remarks   | TC/TLM           | Display/ Branch  |
|----------|------|--|------------------|------------------|
| 15       |      | Verify status of STR1  |                  | Next Step:<br>16 |
|          |      | Verify Telemetry<br>Operating Mode AMX12074  | = Standby        | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>Mode Transition AMX10074   | = Cmd mode trans | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>1 Error in PROM AMX16074   | = No failure     | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>PROM loading AMX17074  | = No failure     | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>2 Errors PROM AMX18074   | = No failure     | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>AsicRam Overflw AMX1B074   | = No failure     | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>Timeout on HK AMX1E074   | = No failure     | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>Timeout on EOF AMX1D074  | = No failure     | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>Last TC Status AMX1G074  | = No failure     | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>TEC Curr Fail AMX24074   | = No failure     | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>Voltage 3 Fail AMX27074  | = No failure     | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>Voltage 2 Fail AMX26074  | = No failure     | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>Voltage 3 Fail AMX25074  | = No failure     | AND=ZAAA3999     |
|          |      | <i>STR housekeeping functions, including temperature control of the CCD, are suspended in software maintenance mode. The time necessary to bring the CCD temperature to nominal values when thermal control is re-started in standby mode depends on external conditions and may be as long as 10 minutes.</i> |                  |                  |
|          |      | Verify Telemetry<br>Optic Temp Fail AMX28074   | = No failure     | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>CCD Temp 1 Fail AMX2A074   | = No failure     | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>CCD Temp 2 Fail AMX29074   | = No failure     | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>Generic Fault AMX2B074   | = No failure     | AND=ZAAA3999     |

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|----------|------|---|--|------------------|
|          |      | All analog HK parameters should have values within the nominal operating range. This applies also to CCD temperatures, even though the control of the thermoelectric cooler is not active in INI and SWM modes.   |  |                  |
|          |      | Verify Telemetry<br>STR1 HK Volt 1 AMX1Y074   |  | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>STR1 HK Volt 2 AMX1Z074   |  | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>STR1 HK Volt 3 AMX20074   |  | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>STR1 CCD temp 1 AMX1V074  |  | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>STR1 CCD temp 2 AMX1W074  |  | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>STR1 Optic temp AMX1X074  |  | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>STR1 TEC Curr AMX21074  |  | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>SEU Count AMX2F074  |  | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>Mean CCDGlobBkg AMX2N074  |  | AND=ZAAA3999     |
|          |      | Verify Telemetry<br>RMS CCD LocBkg AMX2K074   |  | AND=ZAAA3999     |
| 16       |      | Command STR to AAD mode   |  | Next Step:<br>17 |
|          |      | Execute Telecommand<br><br>Command Parameter(s) :<br>STRCfG DF86 Cmd AH8J3001<br>STRCfG DD86 Cmd AH8J4001<br>STRCfG Nrof WrD AHFX8001<br>STRCfG Data WrD AHFX9001<br>STRCfG Data WrD AHFX9001<br>STRCfG Data WrD AHFX9001<br>STRCfG Data WrD AHFX9001<br>STRCfG Data WrD AHFX9001<br>STRCfG Data WrD AHFX9001<br>STRCfG Data WrD AHFX9001<br>STRCfG Data WrD AHFX9001<br>STRCfG Data WrD AHFX9001<br>STRCfG Data WrD AHFX9001 | H STR1 AAD<br><br>ACZM5109<br><br>Enable 86<br>Enable 86<br>18 <dec> (Def)<br>0 <dec><br>0 <dec><br>0 <dec><br>0 <dec><br>0 <dec><br>0 <dec><br>0 <dec><br>0 <dec><br>0 <dec><br>0 <dec> |                  |



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| Step No.                | Time | Activity/Remarks                  | TC/TLM        | Display/ Branch |
|-------------------------|------|-----------------------------------|---------------|-----------------|
|                         |      | Execute Telecommand               |               |                 |
|                         |      | <b>Clear Diagnostic Report</b>    | AC034109      |                 |
|                         |      | Command Parameter(s) :            |               |                 |
|                         |      | Number of pkts           AH3NP109 | 1 <dec> (Def) |                 |
|                         |      | HK Packet ID            AH3PK109  | 100 <dec>     |                 |
|                         |      | TC Control Flags :                |               |                 |
|                         |      | GBM IL DSE                        |               |                 |
|                         |      | --Y -- ---                        |               |                 |
|                         |      | SSID : 20                         |               |                 |
| <b>End of Procedure</b> |      |                                   |               |                 |