Update STR RAM ground image from memory dump
File: H_FCP_OBS_2845.xls
Author: lstefanov-hp

Procedure Summary

Objectives

This Herschel OBSM nominal procedure is used to perform an STR1 or STR2 RAM ground image update from memory dump. The procedure assumes the following STR RAM areas are dumped:
- TRAP_TABLE_RAM
- PAPPL_SW
- EAPPL_SW (including the Star Catalogues)
- Bad Pixel Table

The ACMS ASW provides a dedicated function for executing STR memory dumps. This function manages both the collection of data from the STR and the transmission to the ground through standard service 6 memory dump packets.
The memory dump is commanded using TC(8,4,130,125) and the memory locations content is received on ground in TM(6,6) packets.

The procedure assumes that the command stack has already been generated using the OBSM system and is ready for loading on the Manual Stack. The command stack generation activity is not covered by this procedure.

This procedure is called by the Herschel ACMS procedures H_FCP_AOC_4S51 and H_FCP_AOC_4S52.

Summary of Constraints

CDMU in Operational Mode
- ACC in Operational Mode
- STR NOT in INI Mode

- A maximum of 1536 32-bit words can be dumped with a single STR memory dump command
- The value of the 'STRSw Nr Words' parameter in the STR memory dump TC has to be a multiple of 12
- The STR memory is addressed in 32-bit words, while the address propagation is done at byte level. The start address of any service 6 TC shall to be a multiple of 4
- STR Main telemetry is part of the essential and mode telemetry packets. If the STR selected for dump is not configured as MAIN, a diagnostic telemetry packet has to be enablen in order to verify the status of the physical unit.

Spacecraft Configuration

Start of Procedure

CDMU in Operational Mode
- ACC in Operational Mode
- STR NOT in INI Mode

End of Procedure

Same as start except:
- STR1 and/or STR2 RAM dump executed

Reference File(s)

Input Command Sequences

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Output Command Sequences

OFCP284U
OFCP284W

Referenced Displays

ANDs **GRDs** **SLDs**

AA01X109

Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
13/01/09	2	1	Created	lstefanov-hp	
02/04/09		2	1. steps 4.1 and 14.1 updated: 2nd and 3rd comments updated to include 'Bad Pixel Table' 2. steps 4.1.1 and 14.1.1 updated: added constraint for the 'STRSw Nr Words' TC parameter to be a multiple of 12 3. 'Summary of Constraints' on proc. cover page updated to include constraint for the 'STRSw Nr Words' TC parameter to be a multiple of 12	lstefanov-hp	
03/04/09	2.3	3	1. steps 4.1, 4.1.2, 4.1.3, 14.1, 14.1.2 and 14.1.3 updated to reflect the 32-bit STR SAU with byte-level address propagation	lstefanov-hp	

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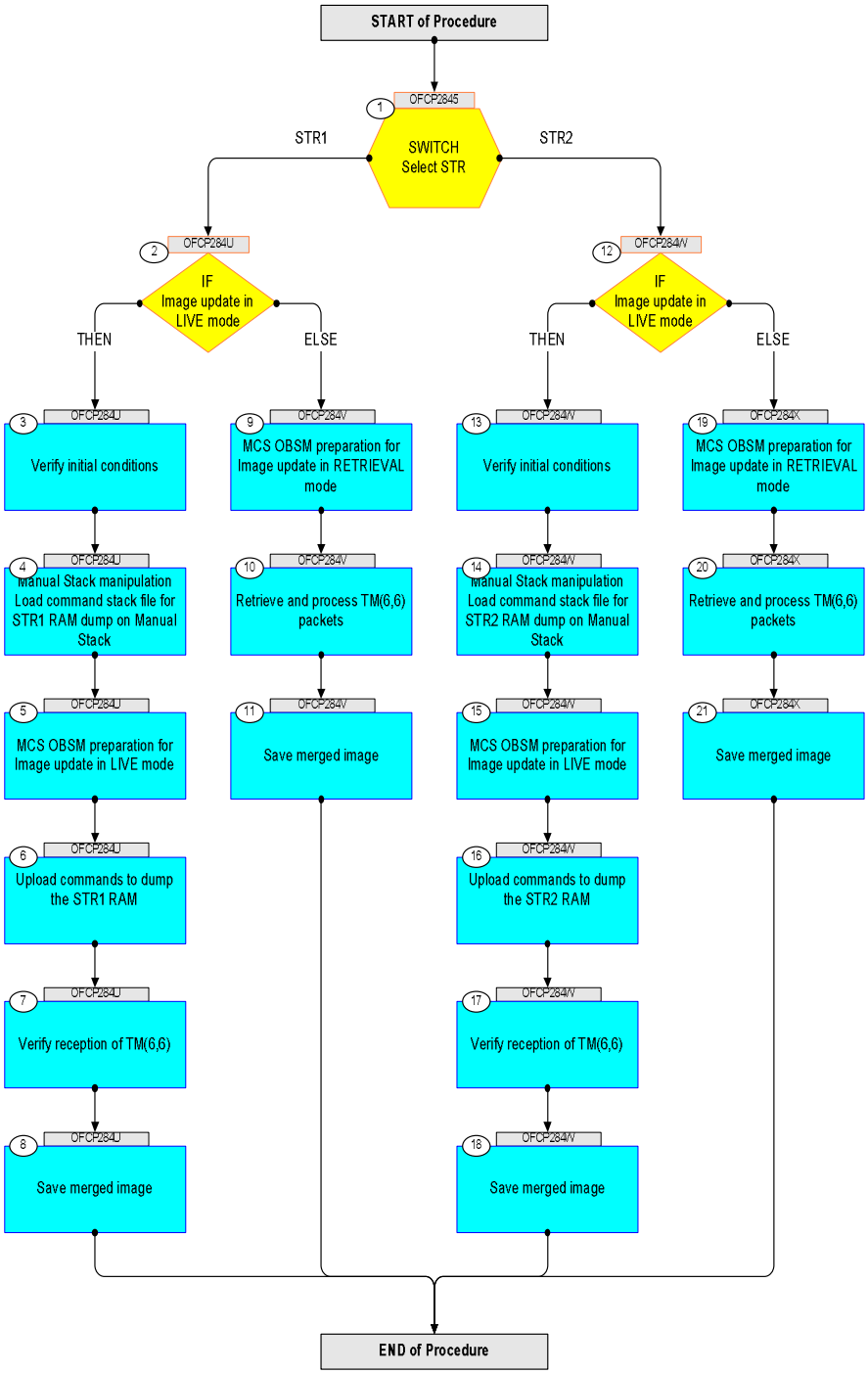
Procedure Flowchart Overview



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		Beginning of Procedure			
	OFCP2845	*TC Seq. Name :* OFCP2845 (STR RAM Dmp) STR RAM Gnd image update via memory dump *TimeTag Type:* *Sub Schedule ID:*			
1		SWITCH Select STR type: [Switch]		Next Step: STR1 2 STR2 12	
		End of Sequence			
	OFCP284U	*TC Seq. Name :* OFCP284U (STR1 RAM GI update U) STR1 RAM Gnd image update in LIVE mode *TimeTag Type: B* *Sub Schedule ID:*			
2		IF Image update in LIVE mode type: [If]		Next Step: THEN 3 ELSE 9	
3		Verify initial conditions		Next Step: 4	
		Check: - CDMU in Operational Mode - ACC in Operational Mode - STR1 NOT in INI Mode			
		Note: In ACMS mode in which the STR data are used for attitude determination, the STR cannot be in INI mode without triggering FDIR. The procedure can, however be executed also in SAM, in which there is no constraint on the STR mode so that explicit check is necessary to make sure that the download commands will not be rejecteded by the STR.			
		CDMU SOE to confirm CDMU mode			
		AOCS SOE to confirm ACC and STR mode			
		Note: **STR Main** telemetry is part of the essential and mode telemetry packets. If not configured as MAIN, a diagnostic telemetry packet has to be enabled in order to verify the status of the physical unit. This is executed in calling procedure H_SVT_AOC_4S51 or H_SVT_AOC_4S52.			
		Verify Telemetry **STRM Mode AEX04001**	**<> Initialisation**	AND=AA01X109	
		OR			
		Verify Telemetry **Operating Mode AMX12074**	**<> Initialisation**	AND=AA01X109	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
4		Manual Stack manipulation Load command stack file for STR1 RAM dump on Manual Stack		Next Step: 5	
		NOTE: The current procedure assumes that the memory dump in Live mode is performed using commands with immediate execution.			
		Select the File -> **LoadStack** option from the main menu of the Manual Stack window			
		Select file **STR1RMPG_DI_XXXXYYY_N_NoModel_NoModel_YYYY_DDDThhmmss.machine** from directory /home/hmcsops/HPMCS/SESSION/current/data/CMD/STACKS/OBSM/STR1RMPG as indicated by the OBSM engineer			
		IMPORTANT: XXXXYYYY = Image ID(X) and Version(Y) - depend on image used for stack generation YYYY_DDD hhmmss - depend on stack generation time machine - depends on the name of the machine used for stack generation			
		File name **examples** - No model associated to the memory image: STR1RMPG_DI_0002001_N_NoModel_NoModel_2007_254T123300.sun043 - CT STR1RMPG1, ID 0003, Version 001 associated to the memory image: STR1RMPG_DI_0002001_C_STR1RMPG1_0003001_2007_337T093320.sun043			
4.1		Check memory dump command stack loaded			
		For a **full** STR RAM **dump**: **Start Address = 0200.0000 hex** **End Address = 0207.FFDF hex** **Length = 1FFF8 hex (32-bit words)** **IMPORTANT:** The **STR memory** is addressed in **32-bit words**, while the **address propagation** is done **at byte level**. The start address of any service 6 TC shall to be a multiple of 4.			

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		For a complete dump of the following STR RAM areas (contiguous memory area): **TRAP_TABLE_RAM** **PAPPL_SW** **EAPPL_SW (including Star Catalogues)** **Bad Pixel Table** **Start Address** = **0200.0000 hex** **End Address = TBC hex** **Length = TBC hex (32-bit words)** **IMPORTANT:** The **STR memory** is addressed in **32-bit words**, while the **address propagation** is done **at byte level**. The start address of any service 6 TC shall to be a multiple of 4.			
		Note: Following steps assume a complete dump of the following STR1 RAM areas(contiguous memory area): **TRAP_TABLE_RAM** **PAPPL_SW** **EAPPL_SW (including Star Catalogues)** **Bad Pixel Table** IF one or several other partial dumps of the STR1 RAM are commanded, the number of dump TCs, start address and length will be different.			
4.1.1		Check number of memory dump commands in the stack			
		IMPORTANT: A **maximum** of **1536** 32-bit **words** can be dumped with a single STR memory dump command.			
		IMPORTANT: The value of the '**STRSw Nr Words**' parameter in TC **ACXD1001** has to be always a **multiple of 12**.			
		Note: For **full** STR1 RAM **dump**, the stack contains: **86** TCs **ACXD1001**			
		Note: For a complete dump of the following STR RAM areas (contiguous memory area): **TRAP_TABLE_RAM** **PAPPL_SW** **EAPPL_SW (including Star Catalogues)** **Bad Pixel Table** the loaded stack contains: **TBC** TCs **ACXD1001**			
4.1.2		Check start address and length of the first dump command in the stack			

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		With the Manual Stack in 'Full mode', check the **Start Address** (**STRSw STR Mem** parameter) and **Length** (**STRSw Nr Words** parameter) in the first ACXD1001 command: **STRSw STR Mem = 0200.0000 hex** **STRSw Nr Words = 1536 dec (32-bit words)** **IMPORTANT:** The **STR memory** is addressed in **32-bit words**, while the **address propagation** is done **at byte level**. The start address of any service 6 TC shall to be a multiple of 4.			
		Execute Telecommand **Dump STR software** *Command Parameter(s) :* **ASW Function ID** **AHFUN001** **STRSw AID Cmd** **AHFXB001** **STRSw DF86 Cmd** **AH8U1001** **STRSw DD86 Cmd** **AH8U2001** **STRSw STR ID** **AHFXU001** **STRSw STR Mem** **AHFXM001** **STRSw Nr Words** **AHFXN001** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC_DUMP_STR_SOFTWARE This Telecommand will not be included in the export	**ACXD1001** **STRSwHandling** (Def) **Dumping** (Def) **Disable 86** (Def) **Disable 86** (Def) **STR-1** **02000000 <hex>** **1536 <dec>**	**TC**	
4.1.3		Check start address and length of the last dump command in the stack			
		With the Manual Stack in 'Full mode', check the **Start Address** (**STRSw STR Mem** parameter) and **Length** (**STRSw Nr Words** parameter) in the last ACXD1001 command: **STRSw STR Mem = TBC hex** **STRSw Nr Words = TBC dec (32-bit words)** **IMPORTANT:** The **STR memory** is addressed in **32-bit words**, while the **address propagation** is done **at byte level**. The start address of any service 6 TC shall to be a multiple of 4.			
		Execute Telecommand **Dump STR software** *Command Parameter(s) :* **ASW Function ID** **AHFUN001** **STRSw AID Cmd** **AHFXB001** **STRSw DF86 Cmd** **AH8U1001** **STRSw DD86 Cmd** **AH8U2001** **STRSw STR ID** **AHFXU001** **STRSw STR Mem** **AHFXM001** **STRSw Nr Words** **AHFXN001** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC_DUMP_STR_SOFTWARE This Telecommand will not be included in the export	**ACXD1001** **STRSwHandling** (Def) **Dumping** (Def) **Disable 86** (Def) **Disable 86** (Def) **STR-1** **<hex>** (Def) **<dec>** (Def)	**TC**	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
5		MCS OBSM preparation for Image update in LIVE mode		Next Step: 6	
		Note: It is assumed that the OBSM application is already running and the OBSM Desktop is displayed on the MCS client. Starting the OBSM application is not covered by the current procedure.			
5.1		Select 'Image UPDATE' from the menu			
		Select the **Image** menu of the ***OBSM Desktop***. From the Image menu, select **Update**. The 'Image Catalog' window opens.			
5.2		Select image to be updated			
		Select the image to be updated for the memory device **STR1RMPG.** The 'Image UPDATE' window opens.			
5.3		Start dump TM processing			
		In **LIVE** mode, processing of incoming real-time telemetry starts automatically after the image selection.			
6		Upload commands to dump the STR1 RAM		Next Step: 7	
		Uplink the **ACXD1001** memory dump commands with **ARM-GO**			
		After successful execution of each command, 2 TM(6,6) packets shall be received on ground.			
7		Verify reception of TM(6,6)		Next Step: 8	
		Note: 2 TM(6,6) packets will be received for each memory dump command uplinked.			

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		Verify Packet Reception Memory Dump - Absolute Addresses - SAU 8 Packet Mnemonic : MemDmpAbsAdd APID : 512 Type : 6 Subtype : 6 PI1 : PI2 :			
7.1		Check OBSM dump packet processing			
		Check that the OBSM is processing the incoming memory dump packets.			
8		Save merged image		Next Step: END	
		Save merged image with **new ID**.			
		End of Sequence			
	OFCP284V	*TC Seq. Name :* OFCP284V (STR1 RAM GI update V) STR1 RAM Gnd image update in Retrieval mode *TimeTag Type:* *Sub Schedule ID:*			
9		MCS OBSM preparation for Image update in RETRIEVAL mode		Next Step: 10	
		Note: It is assumed that the OBSM application is already running and the OBSM Desktop is displayed on the MCS client. Starting the OBSM application is not covered by the current procedure.			
9.1		Select 'Image UPDATE' from the menu			
		Select the **Image** menu of the ***OBSM Desktop***. From the Image menu, select **Update**. The 'Image Catalog' window opens.			
9.2		Select image to be updated			
		Select the image to be updated for the memory device **STR1RMPG.** The 'Image UPDATE' window opens.			

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
9.3		Start dump TM packets processing			
		Set **retrieval start** and **stop time** and start retrieval of TM packets using the **PLAY buttons**.			
10		Retrieve and process TM(6,6) packets		Next Step: 11	
		Use the **STEP** button to retrieve and process the TM(6,6) packets, packet by packet and starting from the time shown in the packet time field.			
		OR			
		Use the **PLAY** button to retrieve and process the TM(6,6) packets in automated mode. Pressing the PLAY button, the display will start to retrieve and process packets, starting from the time shown in the packet time field. This processing will stop automatically when a packet is received which creation time is greater than the one contained in the end time field.			
11		Save merged image		Next Step: END	
		Save merged image with **new ID**.			
		End of Sequence			
	OFCP284W	*TC Seq. Name :* OFCP284W (STR2 RAM GI update W) STR2 RAM Gnd image update in LIVE mode *TimeTag Type: B* *Sub Schedule ID:* □			
12		IF Image update in LIVE mode type: [If]		Next Step: THEN 13 ELSE 19	
13		Verify initial conditions		Next Step: 14	
		Check: - CDMU in Operational Mode - ACC in Operational Mode - STR1 NOT in INI Mode			
		Note: In ACMS mode in which the STR data are used for attitude determination, the STR cannot be in INI mode without triggering FDIR. The procedure can, however be executed also in SAM, in which there is no constraint on the STR mode so that explicit check is necessary to make sure that the download commands will not be rejecteded by the STR.			

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		CDMU SOE to confirm CDMU mode			
		AOCS SOE to confirm ACC and STR mode			
		Note: **STR Main** telemetry is part of the essential and mode telemetry packets. If not configured as MAIN, a diagnostic telemetry packet has to be enabled in order to verify the status of the physical unit. This is executed in calling procedure H_SVT_AOC_4S51 or H_SVT_AOC_4S52.			
		Verify Telemetry **STRM Mode AEX04001**	**<> Initialisation**	AND=AA01X109	
		OR			
		Verify Telemetry **Operating Mode AMX12074**	**<> Initialisation**	AND=AA01X109	
14		Manual Stack manipulation Load command stack file for STR2 RAM dump on Manual Stack		Next Step: 15	
		NOTE: The current procedure assumes that the memory dump in Live mode is performed using commands with immediate execution.			
		Select the File -> **LoadStack** option from the main menu of the Manual Stack window			
		Select file **STR2RMPG_DI_XXXXYYY_N_NoModel_NoModel_YYYY_DDDThhmmss.machine** from directory /home/hmcsops/HPMCS/SESSION/current/data/CMD/STACKS/OBSM/STR2RMPG as indicated by the OBSM engineer			
		IMPORTANT: XXXXYYYY = Image ID(X) and Version(Y) - depend on image used for stack generation YYYY_DDD hhmmss - depend on stack generation time machine - depends on the name of the machine used for stack generation			
		File name **examples** - No model associated to the memory image: STR2RMPG_DI_0002001_N_NoModel_NoModel_2007_254T123300.sun043 - CT STR2RMPG1, ID 0003, Version 001 associated to the memory image: STR2RMPG_DI_0002001_C_STR2RMPG1_0003001_2007_337T093320.sun043			
14.1		Check memory dump command stack loaded			

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		For a **full** STR RAM **dump**: **Start Address** = **0200.0000 hex** **End Address** = **0207.FFDF hex** **Length** = **1FFF8 hex (32-bit words)** **IMPORTANT:** The **STR memory** is addressed in **32-bit words**, while the **address propagation** is done **at byte level**. The start address of any service 6 TC shall to be a multiple of 4.			
		For a complete dump of the following STR RAM areas (contiguous memory area): **TRAP_TABLE_RAM** **PAPPL_SW** **EAPPL_SW (including Star Catalogues)** **Bad Pixel Table** **Start Address** = **0200.0000 hex** **End Address** = **TBC hex** **Length** = **TBC hex (32-bit words)** **IMPORTANT:** The **STR memory** is addressed in **32-bit words**, while the **address propagation** is done **at byte level**. The start address of any service 6 TC shall to be a multiple of 4.			
		Note: Following steps assume a complete dump of the following STR2 RAM areas(contiguous memory area): **TRAP_TABLE_RAM** **PAPPL_SW** **EAPPL_SW (including Star Catalogues)** **Bad Pixel Table** IF one or several other partial dumps of the STR2 RAM are commanded, the number of dump TCs, start address and length will be different.			
14.1.1		Check number of memory dump commands in the stack			
		Note: A **maximum** of **1536** 32-bit **words** can be dumped with a single STR memory dump command.			
		IMPORTANT: The value of the '**STRSw Nr Words**' parameter in TC **ACXD1001** has to be always a **multiple of 12**.			
		Note: For **full** STR RAM **dump**, the stack contains: **86** TCs **ACXD1001**			
		Note: For a complete dump of the following STR RAM areas (contiguous memory area): **TRAP_TABLE_RAM** **PAPPL_SW** **EAPPL_SW (including Star Catalogues)** **Bad Pixel Table** the loaded stack contains: **TBC** TCs **ACXD1001**			

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
14.1.2		Check start address and length of the first dump command in the stack			
		With the Manual Stack in 'Full mode', check the **Start Address** (**STRSw STR Mem** parameter) and **Length** (**STRSw Nr Words** parameter) in the first ACXD1001 command: **STRSw STR Mem = 0200.0000 hex** **STRSw Nr Words = 1536 dec (32-bit words)** **IMPORTANT:** The **STR memory** is addressed in **32-bit words**, while the **address propagation** is done **at byte level**. The start address of any service 6 TC shall to be a multiple of 4.			
		Execute Telecommand **Dump STR software** *Command Parameter(s) :* **ASW Function ID** **AHFUN001** **STRSw AID Cmd** **AHFXB001** **STRSw DF86 Cmd** **AH8U1001** **STRSw DD86 Cmd** **AH8U2001** **STRSw STR ID** **AHFXU001** **STRSw STR Mem** **AHFXM001** **STRSw Nr Words** **AHFXN001** *TC Control Flags :* **GBM IL DSE** **--Y -- ---** *Subsch. ID : 20* Det. descr. : TC_DUMP_STR_SOFTWARE This Telecommand will not be included in the export	**ACXD1001** **STRSwHandling** (Def) **Dumping** (Def) **Disable 86** (Def) **Disable 86** (Def) **STR-2** **02000000 <hex>** **1536 <dec>**	**TC**	
14.1.3		Check start address and length of the last dump command in the stack			
		With the Manual Stack in 'Full mode', check the **Start Address** (**STRSw STR Mem** parameter) and **Length** (**STRSw Nr Words** parameter) in the last ACXD1001 command: **STRSw STR Mem = TBC hex** **STRSw Nr Words = TBC dec (32-bit words)** **IMPORTANT:** The **STR memory** is addressed in **32-bit words**, while the **address propagation** is done **at byte level**. The start address of any service 6 TC shall to be a multiple of 4.			
		Execute Telecommand **Dump STR software** *Command Parameter(s) :* **ASW Function ID** **AHFUN001** **STRSw AID Cmd** **AHFXB001** **STRSw DF86 Cmd** **AH8U1001** **STRSw DD86 Cmd** **AH8U2001** **STRSw STR ID** **AHFXU001** **STRSw STR Mem** **AHFXM001** **STRSw Nr Words** **AHFXN001** *TC Control Flags :* **GBM IL DSE** **--Y -- ---**	**ACXD1001** **STRSwHandling** (Def) **Dumping** (Def) **Disable 86** (Def) **Disable 86** (Def) **STR-2** **<hex>** (Def) **<dec>** (Def)	**TC**	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		Subsch. ID : 20 Det. descr. : TC_DUMP_STR_SOFTWARE This Telecommand will not be included in the export			
15		MCS OBSM preparation for Image update in LIVE mode		Next Step: 16	
		Note: It is assumed that the OBSM application is already running and the OBSM Desktop is displayed on the MCS client. Starting the OBSM application is not covered by the current procedure.			
15.1		Select 'Image UPDATE' from the menu			
		Select the **Image** menu of the ***OBSM Desktop***. From the Image menu, select **Update**. The 'Image Catalog' window opens.			
15.2		Select image to be updated			
		Select the image to be updated for the memory device **STR2RMPG.** The 'Image UPDATE' window opens.			
15.3		Start dump TM processing			
		In **LIVE** mode, processing of incoming real-time telemetry starts automatically after the image selection.			
16		Upload commands to dump the STR2 RAM		Next Step: 17	
		Uplink the **ACXD1001** memory dump commands with **ARM-GO**			
		After successful execution of each command, 2 TM(6,6) packets shall be received on ground.			
17		Verify reception of TM(6,6)		Next Step: 18	
		Note: 2 TM(6,6) packets will be received for each memory dump command uplinked.			

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		Verify Packet Reception Memory Dump - Absolute Addresses - SAU 8 Packet Mnemonic : MemDmpAbsAdd APID : 512 Type : 6 Subtype : 6 PI1 : PI2 :			
17.1		Check OBSM dump packet processing			
		Check that the OBSM is processing the incoming memory dump packets.			
18		Save merged image		Next Step: END	
		Save merged image with **new ID**.			
		End of Sequence			
	OFCP284X	*TC Seq. Name :* OFCP284X (STR2 RAM GI update X) STR2 RAM Gnd image update in Retrieval mode *TimeTag Type:* *Sub Schedule ID:*			
19		MCS OBSM preparation for Image update in RETRIEVAL mode		Next Step: 20	
		Note: It is assumed that the OBSM application is already running and the OBSM Desktop is displayed on the MCS client. Starting the OBSM application is not covered by the current procedure.			
19.1		Select 'Image UPDATE' from the menu			
		Select the **Image** menu of the ***OBSM Desktop***. From the Image menu, select **Update**. The 'Image Catalog' window opens.			
19.2		Select image to be updated			
		Select the image to be updated for the memory device **STR2RMPG.** The 'Image UPDATE' window opens.			

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
19.3		Start dump TM packets processing			
		Set **retrieval start** and **stop time** and start retrieval of TM packets using the **PLAY buttons**.			
20		Retrieve and process TM(6,6) packets		Next Step: 21	
		Use the **STEP** button to retrieve and process the TM(6,6) packets, packet by packet and starting from the time shown in the packet time field.			
		OR			
		Use the **PLAY** button to retrieve and process the TM(6,6) packets in automated mode. Pressing the PLAY button, the display will start to retrieve and process packets, starting from the time shown in the packet time field. This processing will stop automatically when a packet is received which creation time is greater than the one contained in the end time field.			
21		Save merged image		Next Step: END	
		Save merged image with **new ID**.			
		End of Sequence			
		End of Procedure			