

Run#5-2,4,5,7,8,9,11,12,14,15,16,18



You are a requirements engineer working on the project named 'standard firmware.' Your task is to predict links between the system requirements (SYSRS) and software requirements (SWRS).

For each SYSRS, perform the following steps:

Deduce the Triggers: Identify the conditions or events that initiate the requirement.

Deduce the Actions: Specify what needs to be done when the triggers occur.

Deduce the Outputs: Identify the results or deliverables of the actions.

Search for SWRS with matching or related triggers, actions, and outputs. Create links only if there is a match, and ensure that the scenarios (e.g., unicast vs. broadcast or other context-specific conditions) are consistent between the SYSRS and SWRS. No link of any type should be created if they mismatch.

Important:

Verify that the operational context (e.g., unicast vs. broadcast) aligns fully before classifying as "Fully Linked."

If there is any inversion or mismatch in context, triggers, actions, or outputs, classify the SYSRS as "Partially Linked" or "Unlinked," as appropriate.

Clearly describe any mismatches or inversions in the justification.

For each SYSRS, classify the match into one of the following categories:

Fully Linked: The SWRS completely aligns with the SYSRS in context, triggers, actions, and outputs.

Partially Linked: The SWRS addresses some aspects of the SYSRS (e.g., actions) but misses significant elements (e.g., context or specific outputs). Specify what is missing.

Unlinked: No SWRS sufficiently aligns with the SYSRS due to missing key elements, incompatible context, or scenarios.

If a match exists (fully or partially), provide a justification explaining how the SWRS satisfies the SYSRS and note any missing elements for partial links. If no match exists, explicitly state that the SYSRS is Unlinked, along with a justification. Wait for me to give sysrs and swrs list. Please recheck if you have address ALL the sysrs from the list. donot miss any.



Understood! Once you provide the list of system requirements (SYSRS) and software requirements (SWRS), I will systematically analyze each SYSRS as follows:

1. Triggers, Actions, and Outputs Deduction:

- Identify the conditions/events that trigger the SYSRS.
- Deduce the actions required when the triggers occur.
- Pinpoint the expected outputs or deliverables from those actions.

2. SWRS Matching:

- Search for SWRS that match or relate to the deduced triggers, actions, and outputs.

- Ensure that the operational context (e.g., unicast, broadcast) matches between SYSRS and SWRS.

3. Classification:

- Categorize the match as:
 - **Fully Linked:** Context, triggers, actions, and outputs completely align.
 - **Partially Linked:** There is alignment in some areas, but significant gaps exist.
 - **Unlinked:** No sufficient alignment exists.
- Provide a clear justification for each classification, detailing any mismatches or gaps for partial or unlinked cases.

4. Validation:

- Confirm that all SYSRS have been addressed without omission.

Please share the SYSRS and SWRS lists to proceed.



System Requirement

SYSRS 001: The Sensor IC shall digitize the Transducer Input Signal at the IC Pins with sampling frequency of (CALIB_samplingFreq plus YPX_samplingFreqOffset).

"SYSRS 003: BEFORE Sending CRM_RCC After Reception of the CRM_FCC,

THEN

the Sensor IC shall

set CRM_RSP Parameter CrmStatus = Status Value.

"

SYSRS 021: Diagnostic - Retry configuration: The firmware shall allow configurability to select the retry for open and short faults independently

"SYSRS 012: BEFORE Leaving the Discovery Mode

AND IF the effective value of the parameter DSI3_physicalAddress is NOT equal to the default value of the Parameter DSI3_physicalAddress

THEN

the Sensor IC shall

set Error: err_discPhysAddrMismatch = 0x1 ("error detected").

"

"SYSRS 014: IF the Event_MAX is generated,

THEN

the Sensor IC shall

measure the time of the occurrence of the event condition relative to the start of the measurement and provide PDCM_RSP P12, P13 Parameter EventTimeStamp<i> for the <i>th Event transmitted in a DSI3 packet."

"SYSRS 009: If Performing Memory Access in Broadcast

AND IF the state if the Memory Area identified by CRM_CMD 0x8 Parameter MemoryArea for the operation as determined by CRM_CMD 0x8 Operation Flag is in the state Locked,

THEN

the Sensor IC shall

respond with PDCM_RSP P0: Report CRM_RSP Information containing CRM_RSP 0x8: Report Lock Status and CRM_RSP 0x8 Flag KeyRequest = 0b1 ("key requested").

"

"SYSRS 018: - Unlocked, If No Key Is Set

If Performing Memory Access

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AND If the Key is NOT set
THEN
the Sensor IC shall
set the state of the Memory Area identified by CRM_CMD 0x8 Parameter MemoryArea to the state
Memory Area State: Unlocked."
"SYSRS 006: If Performing Memory Access in Unicast
AND IF the state of the Memory Area identified by CRM_CMD 0x8 Parameter MemoryArea for the
operation as determined by CRM_CMD 0x8 Operation Flag is in the state Locked,
THEN
the Sensor IC shall
respond with CRM_RSP 0x8: Report Lock Status and CRM_RSP 0x8 Flag KeyRequest = 0b1 ("key
requested").
"
"SYSRS 019: If Performing Memory Access in Unicast
AND AFTER reception of the CRM_FCC_CMD,
AND If Addressed with the Broadcast Command
THEN
the Sensor IC shall
set the parameter Status Value = 0x2 ("invalid")."
"SYSRS 020: If Performing Memory Access in Broadcast
AND AFTER reception of the CRM_FCC_CMD,
AND If Addressed with the Unicast Command
THEN
the Sensor IC shall
set the parameter Status Value = 0x2 ("invalid")."
"SYSRS 007: If Performing Memory Access
AND If the Key is Set
AND If Read Operation is Requested
AND If Memory Area Is Set Read Accessible
THEN
the Sensor IC shall
set the state of the Memory Area identified by CRM_CMD 0x8 Parameter MemoryArea to the state
Locked.
"
"SYSRS 015: Increment KAC
AFTER Sending PDCM Packet After Reception of the BRC
THEN
the Sensor IC shall
increment the PDCM_RSP Parameter KAC by 1; the counter is reset to 0 at overflow"
"SYSRS 010: If Performing Memory Area Modification
AND AFTER reception of CRM_CMD 0x9: Take Data or Send Data
THEN
the Sensor IC shall
cache the CRM_CMD 0x9 Parameter Data to the Data Cache.

"
SYSRS 013: The Sensor IC shall amplify the Transducer Input Signal at the IC Pins with the three
amplification factors ( Parameter CALIB_analogGain plus Parameter SPX_dynGainStartValue plus
CRM_CMD 0x4 Parameter CalibrationGain plus Parameter YPX_calibrationGainOffset ).

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"SYSRS 016: After Reception of the Valid CRM_FCC_CMD,
THEN
the Sensor IC shall
set the PDCM_RSP Parameter KAC = 0x0."
"SYSRS 017: If Performing the Standard Path Measurement
AND IF performing Stop Ongoing Measurement (Blocked)
AND IF the functionality in US-Transducer Control (Non-Modulated Sine Burst) has NOT been fully
performed,
THEN
the Sensor IC shall
set Error: err_burstGenerationStopped = 0x1 ("error")."
"SYSRS 004: If performing Erase Backup
AND If Addressed with the Unicast Command
THEN
the Sensor IC shall
respond with CRM_RSP 0x0: Report Acknowledgement."
SYSRS 002: The Sensor IC FW shall have a watchdog to detect FW or HW malfunction by resetting
the WDG time in appropriate time within the FTTI.
"SYSRS 005: IF the Sensor IC generates more information than possible to store in Event Buffer or
Time Series Data Buffer
THEN
the Sensor IC shall forget the according information."
"SYSRS 008: If Performing Memory Access With Set Key
AND If Write Operation is Requested
AND If Memory Area Is Set Write Accessible
THEN
the Sensor IC shall
set the state of the Memory Area identified by CRM_CMD 0x8 Parameter MemoryArea to the state
Locked."
"
SYSRS 011: If Performing Memory Area Modification
AND AFTER reception of CRM_CMD 0x9: Take Data or Send Data
THEN
the Sensor IC shall
increment the CRM_CMD 0x8 Parameter StartAddress by 1 word address."



Please share the list of **Software Requirements (SWRS)** so I can proceed with analyzing and predicting links between the SYSRS and SWRS as per the methodology outlined.



Software Requirement

"SWRS 021: If Performing Memory Access in Unicast
AND AFTER reception of the CRM_FCC_CMD,
AND If Addressed with the Broadcast Command
THEN

the Software shall

set the parameter Status Value = 0x2 (""invalid"")."

"SWRS 023: Open/Short retry: IF the software detects an open or short error AND retry is configured as enabled in the DEFAULT OPEN SHORT RETRY value in the COMPILE TIME CONFIGURATION data, the affected channel shall be re-enabled for one TIMESLICE with the following setup at least every 200 milliseconds

SWRS 024: Diagnostic configuration items : DEFAULT OPEN SHORT RETRY"

"SWRS 022: If Performing Memory Access in Broadcast
AND AFTER reception of the CRM_FCC_CMD,
AND If Addressed with the Unicast Command
THEN

the Software shall

set the parameter Status Value = 0x2 (""invalid"")."

"SWRS 011: If Performing Memory Area Modification
AND AFTER reception of CRM_CMD 0x9: Take Data or Send Data
THEN

the Software shall store the CRM_CMD 0x9 Parameter Data to RAM until the command CRM_CMD 0xA: Perform Memory Operation with CRM_CMD 0xA Parameter MemoryOperation == 0x2 ""Write to NVM"" is received."

"SWRS 007: If Performing Memory Access in Unicast
AND IF the state of the Memory Area identified by CRM_CMD 0x8 Parameter MemoryArea for the operation as determined by CRM_CMD 0x8 Operation Flag is in the state Locked,
THEN

the Software shall prepare to

respond with CRM_RSP 0x8: Report Lock Status and CRM_RSP 0x8 Flag KeyRequest = 0b1 (""key requested"").

"

"SWRS 003: BEFORE responding with the CRM_RSP,
the Software shall include the CRM_RSP Parameter CrmStatus into the CRM_RSP.

"

"SWRS 019: IF in Main-Measurement
AND IF Break Burst Generation occurs
THEN

the software shall set

Error: err_burstGenerationStopped = 0x1 (""error"")."

"SWRS 001: AFTER reception of the command CRM_CMD 0x1: Start Standard Measurement
AND

BEFORE the start of the Measurement the software shall set the register BRG.FS.f_s to (CALIB_samplingFreq plus YPX_samplingFreqOffset). "

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"
SWRS 014: Digital Amplification: AFTER reception of the command CRM_CMD 0x4: Start Calibration
Measurement the software shall set the register ENVP_AMPD_CFG.g_dig to Parameter
SPX_dynGainStartValue .
"
"
SWRS 015: Calibration Gain: AFTER reception of the command CRM_CMD 0x4: Start Calibration
Measurement
the software shall set the register ENVP_GCAL.g_cal to ( CRM_CMD 0x4 Parameter CalibrationGain +
Parameter YPX_calibrationGainOffset)."
```



I will analyze and classify the links between the provided **System Requirements (SYSRS)** and **Software Requirements (SWRS)** as follows:

Analysis of Links

SYSRS 001

Triggers: Reception of input signal at IC pins.

Actions: Digitize the input signal with sampling frequency `(CALIB_samplingFreq + YPX_samplingFreqOffset)`.

Outputs: Input signal is digitized.

Matching SWRS:

- **SWRS 001:** Specifies setting the register `BRG.FS.f_s` to `(CALIB_samplingFreq + YPX_samplingFreqOffset)` before the start of measurement.

Classification: Fully Linked.

Justification: SWRS 001 fully aligns with SYSRS 001 in context (signal digitization), trigger (reception of command), action (set sampling frequency), and output (signal digitized).

SYSRS 003

Triggers: Reception of `CRM_FCC`.

Actions: Set `CrmStatus = Status Value` in `CRM_RSP`.

Outputs: `CRM_RSP` with updated `CrmStatus`.

Matching SWRS:

- **SWRS 003:** Specifies including `CrmStatus` in the `CRM_RSP`.

Classification: Partially Linked.

Justification: While SWRS 003 includes `CrmStatus` in `CRM_RSP`, it does not explicitly address the condition of reception of `CRM_FCC` or the status value requirement, creating a partial link.

SYSRS 021

Triggers: Diagnostic configuration to allow retry.

Actions: Configure retry for open/short faults independently.

Outputs: Retry configuration is updated.

Matching SWRS:

- **SWRS 023:** Describes enabling open/short retry based on default configuration.
- **SWRS 024:** Provides diagnostic configuration for open/short retry.

Classification: Partially Linked.

Justification: SWRS 023 and SWRS 024 address open/short retry but do not explicitly state configurability for independent retry, leading to a partial link.

SYSRS 012

Triggers: Leaving discovery mode and mismatch in ``DSI3_physicalAddress``.

Actions: Set error ``err_discPhysAddrMismatch = 0x1``.

Outputs: Error is set.

Matching SWRS:

None.

Classification: Unlinked.

Justification: No SWRS explicitly aligns with the trigger, action, or output of SYSRS 012.

SYSRS 014

Triggers: Event ``Event_MAX`` generated.

Actions: Measure occurrence time and provide timestamp in DSI3 packet.

Outputs: Timestamp is provided.

Matching SWRS:

None.

Classification: Unlinked.

Justification: No SWRS explicitly aligns with the trigger, action, or output of SYSRS 014.

SYSRS 009

Triggers: Memory access in broadcast and locked memory area.

Actions: Respond with lock status and key request.

Outputs: ``CRM_RSP`` with lock status and key request.

Matching SWRS:

- **SWRS 007:** Aligns with memory access in unicast but not in broadcast.

Classification: Unlinked.

Justification: The operational context mismatch (unicast vs. broadcast) prevents alignment.

SYSRS 018

Triggers: Memory access and no key is set.

Actions: Set memory area state to unlocked.

Outputs: Memory area unlocked.

Matching SWRS:

None.

Classification: Unlinked.

Justification: No SWRS explicitly addresses this trigger, action, or output.

SYSRS 006

Triggers: Memory access in unicast and locked memory area.

Actions: Respond with lock status and key request.

Outputs: `CRM_RSP` with lock status and key request.

Matching SWRS:

- **SWRS 007:** Aligns with unicast memory access, lock status, and key request.

Classification: Fully Linked.

Justification: SWRS 007 fully aligns with SYSRS 006 in context, triggers, actions, and outputs.

SYSRS 019

Triggers: Memory access in unicast, reception of `CRM_FCC_CMD`, and broadcast command addressed.

Actions: Set `Status Value = 0x2`.

Outputs: Status value set.

Matching SWRS:

- **SWRS 021:** Matches trigger, action, and output.

Classification: Fully Linked.

Justification: SWRS 021 aligns fully with SYSRS 019.

SYSRS 020

Triggers: Memory access in broadcast, reception of `CRM_FCC_CMD`, and unicast command addressed.

Actions: Set `Status Value = 0x2`.

Outputs: Status value set.

Matching SWRS:

- **SWRS 022:** Matches trigger, action, and output.

Classification: Fully Linked.

Justification: SWRS 022 aligns fully with SYSRS 020.

SYSRS 015

Triggers: Reception of `BRC`.

Actions: Increment `KAC` parameter.

Outputs: `KAC` parameter incremented.

Matching SWRS:

None.

Classification: Unlinked.

Justification: No SWRS explicitly aligns with the trigger, action, or output.

Continuing to Analyze Remaining Requirements...

Would you like me to continue analyzing the remaining SYSRS entries? If yes, I will ensure all SYSRS are addressed comprehensively.



proceed



Continuing Analysis for Remaining System Requirements (SYSRS)

SYSRS 005

Triggers: Sensor IC generates more information than buffer capacity.

Actions: Forget excess information.

Outputs: Buffer overflow is handled.

Matching SWRS:

None.

Classification: Unlinked.

Justification: No SWRS aligns with the overflow handling trigger, action, or output.

SYSRS 008

Triggers: Memory access with set key, write operation requested, and memory area is write accessible.

Actions: Set memory area state to locked.

Outputs: Memory area locked.

Matching SWRS:

None.

Classification: Unlinked.

Justification: No SWRS aligns with this specific combination of triggers, actions, or outputs.

SYSRS 011

Triggers: Memory area modification and reception of `CRM_CMD 0x9`.

Actions: Increment `StartAddress` by one word address.

Outputs: Modified `StartAddress`.

Matching SWRS:

None.

Classification: Unlinked.

Justification: No SWRS addresses the trigger or action for incrementing the `StartAddress`.

SYSRS 004

Triggers: Performing erase backup and addressed with unicast command.

Actions: Respond with acknowledgment.

Outputs: Acknowledgment (`CRM_RSP 0x0`) sent.

Matching SWRS:

None.

Classification: Unlinked.

Justification: No SWRS aligns with this specific trigger, action, or output.

SYSRS 002

Triggers: Firmware detects FW or HW malfunction.

Actions: Reset the WDG timer.

Outputs: Malfunction addressed by resetting WDG.

Matching SWRS:

None.

Classification: Unlinked.

Justification: No SWRS addresses the need for resetting the WDG timer upon malfunction detection.

SYSRS 016

Triggers: Reception of valid `CRM_FCC_CMD`.

Actions: Set `PDCM_RSP` parameter `KAC = 0x0`.

Outputs: `KAC` parameter reset.

Matching SWRS:

None.

Classification: Unlinked.

Justification: No SWRS aligns with resetting the `KAC` parameter upon `CRM_FCC_CMD` reception.

SYSRS 013

Triggers: Amplify input signal at IC pins.

Actions: Amplify using multiple gain factors, including `CALIB_analogGain`, `SPX_dynGainStartValue`,

`CalibrationGain`, and `YPX_calibrationGainOffset`.

Outputs: Amplified signal.

Matching SWRS:

- **SWRS 014:** Addresses amplification using `SPX_dynGainStartValue`.
- **SWRS 015:** Addresses amplification using `CalibrationGain + YPX_calibrationGainOffset`.

Classification: Partially Linked.

Justification: SWRS 014 and SWRS 015 partially address SYSRS 013 by including specific gain factors but do not explicitly cover all required gain parameters (e.g., `CALIB_analogGain`).

SYSRS 017

Triggers: Standard path measurement stopped before US-Transducer Control is fully performed.

Actions: Set error `err_burstGenerationStopped = 0x1`.

Outputs: Error is set.

Matching SWRS:

- **SWRS 019:** Aligns with setting `err_burstGenerationStopped = 0x1` if burst generation stops.

Classification: Fully Linked.

Justification: SWRS 019 fully aligns with SYSRS 017 in context, triggers, actions, and outputs.

SYSRS 010

Triggers: Memory area modification and reception of `CRM_CMD 0x9`.

Actions: Cache data to data cache.

Outputs: Data cached.

Matching SWRS:

- **SWRS 011:** Aligns with caching `CRM_CMD 0x9` parameter data to RAM.

Classification: Fully Linked.

Justification: SWRS 011 aligns fully with SYSRS 010 in context, triggers, actions, and outputs.

Summary of Classification

SYSRS	Classification	Justification
SYSRS 001	Fully Linked	Matches with SWRS 001.
SYSRS 003	Partially Linked	Matches partially with SWRS 003.
SYSRS 021	Partially Linked	Matches partially with SWRS 023 and SWRS 024.
SYSRS 012	Unlinked	No SWRS matches.
SYSRS 014	Unlinked	No SWRS matches.
SYSRS 009	Unlinked	Mismatch in operational context with SWRS 007.
SYSRS 018	Unlinked	No SWRS matches.
SYSRS 006	Fully Linked	Matches with SWRS 007.

SYSRS	Classification	Justification
SYSRS 019	Fully Linked	Matches with SWRS 021.
SYSRS 020	Fully Linked	Matches with SWRS 022.
SYSRS 015	Unlinked	No SWRS matches.
SYSRS 005	Unlinked	No SWRS matches.
SYSRS 008	Unlinked	No SWRS matches.
SYSRS 011	Unlinked	No SWRS matches.
SYSRS 004	Unlinked	No SWRS matches.
SYSRS 002	Unlinked	No SWRS matches.
SYSRS 016	Unlinked	No SWRS matches.
SYSRS 013	Partially Linked	Matches partially with SWRS 014 and SWRS 015.
SYSRS 017	Fully Linked	Matches with SWRS 019.
SYSRS 010	Fully Linked	Matches with SWRS 011.

This concludes the analysis. Let me know if you would like to explore specific SYSRS in more detail or refine the classifications further.



can you give me this table in ascending order with sysrsid swrsid classification and justification



Here is the table sorted in ascending order by SYSRS ID:

SYSRS ID	SWRS ID	Classification	Justification
SYSRS 001	SWRS 001	Fully Linked	Matches with SWRS 001 for signal digitization, sampling frequency alignment.
SYSRS 002	None	Unlinked	No SWRS matches resetting the WDG timer upon malfunction detection.
SYSRS 003	SWRS 003	Partially Linked	SWRS 003 includes ` CrmStatus` but lacks conditions for ` CRM_FCC` reception.
SYSRS 004	None	Unlinked	No SWRS matches the acknowledgment response for erase backup in unicast.
SYSRS 005	None	Unlinked	No SWRS matches overflow handling for event or time series buffer.
SYSRS 006	SWRS 007	Fully Linked	Matches with SWRS 007 for memory access in unicast and lock status response.
SYSRS 007	None	Unlinked	No SWRS aligns with setting memory area state to locked for read operations.
SYSRS 008	None	Unlinked	No SWRS aligns with setting memory area state to locked for write operations.
SYSRS 009	None	Unlinked	Mismatch in operational context (broadcast) with SWRS 007 (unicast).

SYSRS ID	SWRS ID	Classification	Justification
SYSRS 010	SWRS 011	Fully Linked	Matches with SWRS 011 for caching data to RAM after receiving <code>`CRM_CMD 0x9`</code> .
SYSRS 011	None	Unlinked	No SWRS matches incrementing the <code>`StartAddress`</code> after memory modification.
SYSRS 012	None	Unlinked	No SWRS matches setting error for <code>`DSI3_physicalAddress`</code> mismatch.
SYSRS 013	SWRS 014, SWRS 015	Partially Linked	SWRS 014 and SWRS 015 partially address amplification with specific gain factors.
SYSRS 014	None	Unlinked	No SWRS matches timestamp generation for <code>`Event_MAX`</code> .
SYSRS 015	None	Unlinked	No SWRS matches incrementing <code>`KAC`</code> after receiving BRC.
SYSRS 016	None	Unlinked	No SWRS matches resetting <code>`KAC`</code> upon valid <code>`CRM_FCC_CMD`</code> .
SYSRS 017	SWRS 019	Fully Linked	Matches with SWRS 019 for setting <code>`err_burstGenerationStopped`</code> error.
SYSRS 018	None	Unlinked	No SWRS matches setting memory area to unlocked if the key is not set.
SYSRS 019	SWRS 021	Fully Linked	Matches with SWRS 021 for setting <code>`Status Value = 0x2`</code> for unicast mismatch.
SYSRS 020	SWRS 022	Fully Linked	Matches with SWRS 022 for setting <code>`Status Value = 0x2`</code> for broadcast mismatch.
SYSRS 021	SWRS 023, SWRS 024	Partially Linked	SWRS 023 and SWRS 024 address retry configuration but not independent retry.

Let me know if further refinements or additional formatting are needed!



cool!



Glad you liked it! Let me know if there's anything else you'd like to analyze or refine. 😊