CMP_SRS_PORSCHE_MIB4_MFGT_Diagnostics

APTIV

Advanced Safety & User Experience
Infotainment

Requirements Specification

10059891 PORSCHE MIB4
Customer Name PORSCHE
Model Year - 2026

Document Name	CMP_SRS_PORSCHE_MIB4_MFGT_DIAGNOSTICS
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Date	2026-02-02
Owner	Srinivasa V

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Refer to Review Software Requirements (STAGES).

List all supporting roles as reviewers and the accountable role as approver in the table below.

In case a team is listed in RASIC (e.g. Engineering Competency Leads) list all individual roles in the table below.

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Reviewer/ Approver Title	Reviewer/ Approver Name	Review/ Approval Date
Product Owner	Srimurugan Thirumalaivel	<YYYY-MMM-DD>
SW Dev Team	Srinivasa V	<YYYY-MMM-DD>
SW Dev Team	Surya Padma Namrata	<YYYY-MMM-DD>
System team		
Sw Test Team		

Revision Record

Revision Number	Revision Status*	Date	Peer review ID	Description / Reason for Revision	Author
1.0	Draft	2025-07-01	-	Initial Draft	Srinivasa V
1.1	In Review	2025-10-09	816024.1287	updated PPM4-163595	Priyanka Dhumal
1.2	In- Review	2025-10-14	816642.9168	updated PPM4-238781	Mayur Pahariya
1.3	In-Review	2025-10-24	818087.8245	Updated PPM4-242172	Mayur Padhariya
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1.5	In Review	2025-10-29	818483.6686	Updated PPM4-164647	Mayur Padhariya
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1.7	In Review	2025-10-30	818680.1618	Updated PPM4-242258	Asphin John J
1.8	In Review	2025-11-04	819616.3344	Updated PPM4-243613	S P Namrata
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2.4	In Review	2025-11-11	820069.9728	PPM4-164789	YatheendraNatha Reddy , Beecharla
2.5	In Review	2025-11-13	820855.6713	PPM4-245367	Mayur Padhariya
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3.1	In Review	2025-11-20	821903.9375 821904.3842	Updated PPM4-246020, PPM4-245832	Priyanka Dhumal
3.2	In Review	2025-11-21	822036.7437 822015.1745	Updated PPM4-245834, PPM4-246174	Mohamed Samrood M
3.3	In Review	202-11-25	822507.3111 822512.2661	Updated PPM4-246002, PPM4-246005	N S P Namrata
3.4	In Review	2025-11-27	822837.9465 822840.5438	Updated PPM4-245824, PPM4-245837	Priyanka Dhumal
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4.9	In Review	2025-12-24	825951.8697	Updated PPM4-251248	Mayur Padhariya
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*Revision Status of this document can be: Draft, In Review and Approved

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<INSTRUCTIONS

1) Identify version of this template to be used in the project by consulting project-specific PTADD: **Process Tailoring and Deviation Document**.

a. Open the document's version referenced in the PTADD of this template (if the document does not exist yet, take the latest baselined version) from the project's Polarion Navigation Menu on the left, under Documents\Templates\ Templates_READ_ME_FIRST_PAGE ,

b. Instantiate this template using the instructions **FAQ Polarion - Instantiate a template to start a new document** (NOTE: an exported word version is in STAGES as the official reference, however it should not be used to instantiate the document in your project).

2) Update the title page with the information appropriate to the project.

3) Remove the 'Template Revision Record' and 'Template Review and Approval' table of the instantiated document.

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a. Start with revision draft 0.1, begin maintaining the revision information and add a note specifying from which template's version you started from. For future draft revisions, move to draft 0.2, draft 0.3 accordingly.

b. Once the appropriate approvals are obtained for an official release, move the revision to approved 1.0 (in accordance with the guidelines of the project's PCMP) and record peer review ID.

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INSTRUCTIONS>

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Table of Contents

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1 Scope

The purpose of this document is to gather APTIV's software requirements which shall be accounted for WIFI feature development.

This document provides software requirements that are applicable for PROSCHE-MIB4 Project and describes requirements specification for the WIFI features.

This document also describes the PROSCHE-MIB4

specific requirements for WIFI which is derived from Product requirement.

2 Definitions and Acronyms

[TBD] - List applicable terms and their definitions. Terms must be in acronym or parameter format.
Acronyms have each letter capitalized, followed by a dash and then the spelling out of each word in the acronym.

Parameter format is used when multiple words are brought together for a specific meaning. Each word in the parameter name is capitalized, and words are separated by an underscore. A dash is used between the parameter name and the definition. Parameter names must be used throughout the document each time the defined term is referenced to maximize reuse and commonality.
Example: Maximum_Operating_Voltage - The maximum voltage at which the ECU operates according to specification

3 References

3.1 References - Stakeholder Documents

[TBD] - List applicable reference documents. Each reference document must be a separate row. Hyperlinks should be added where applicable.

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3.2 References - Internal documents

[TBD] - List applicable reference documents. Each reference document must be a separate row. Hyperlinks should be added where applicable.

3.3 References - Industry Documents

[TBD] - List applicable reference documents. Each reference document must be a separate row. Hyperlinks should be added where applicable.

4 Overview and context

4.1 Assumptions

4.1.1 Manufacturing diagnostics procedure

To perform the manufacturing diagnostics it is necessary to first turn ON the manufacturing session, then perform the tests.

Once all tests are finished, the user should turn OFF the session.

Figure 2 schematizes the manufacturing diagnostics procedure.

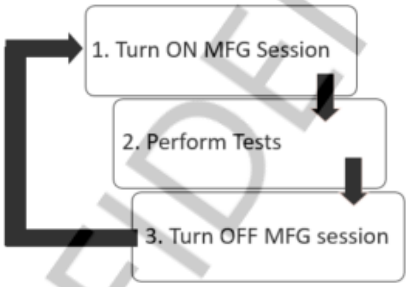

Figure 1 Schematic of the Manufacturing Diagnostic procedure.

To achieve a good performance level while performing diagnostics operations at manufacturing plant, Manufacturing Diagnostics features shall use it's own dedicated message protocol/syntax that is described in the following sub-chapter (Manufacturing Diagnostic Message Format)

4.1.2 Manufacturing Diagnostic Message Format

All MFG messages are built using ASCII characters. The data shall be represented in hexadecimal format (two characters for each byte between 00 and FF) and shall not be case sensitive.

Each message should have the structure described in the following table:

Diagnostics Mode Structure								
Manufacturing Prefix	**Diagnostics ID**		**Operation ID**	**Status Information**	**Number of Data Bytes**	**Data Byte**	**Data Byte**	**Checksum CRC-CCITT (0xFFFF)**
Bytes 1,2,3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte n, n+1
Request: 6D643E			01 - Set 00 - Get	Request: 00 - Always Response:	# of Data	Data	Data	

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Response: 6D643C	Group ID	Test ID	11 - Set + CS 10 - Get + CS	00 - ACK_NOK 01 - ACK_OK (...) Additional values described below	Bytes	Byte 1	Byte 2	MSB - LSB

Table 1 Message Format of Manufacturing Diagnostic

Please note that:

- All messages must include "space" character between the bytes (except for the prefix),
- The minimum length of a MFG message is 8 bytes, so bytes #1 - #8 shall be send always.

The next sub-chapters list the items present in the MFG message as well as their descriptions.

1. Manufacturing Prefix

The prefix shall distinguish between request and response messages.

The prefix **6D643E** ("md>") shall be send by the Test System (**Request**).

The prefix **6D643C** ("md<") shall be send by the Unit (**Response**).

2. Diagnostics ID

Diagnostics ID is always a group of 2 bytes:

-The first one, called **Group ID** , is used to identify the function group (example, Audio, Tuner, Power, etc)

-The second, **Test ID** , is used to identify a specific test from a group ID (example, Volume level, Phantom Voltage, etc)

3. Operations ID

Command	Operation ID	Comment
01	Set	To send parameters/information to the unit
00	Get	To request information from the unit or to run some self tests
11	Set + CS	To send parameters/information to the unit + checksum for the complete message
10	Get + CS	To request information from the unit or to run some self tests + checksum for the complete message

The response shall always be same of the operation value sent in the request command.

4. Status Information

This byte shall only indicate the command processing **status** only and shall NOT indicate a result of any requested test routine.

- **Request**

Command	Comment
00	always "00" for the request operation

- Positive Response

Command	Status Information	Comment
01	PASS	The command was executed with success

- Pending Response

Command	Status Information	Comment
		Shall be used for some commands that need more time to be executed, the current

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AA	PENDING STATE	status shall be requested by the "GET" command

Negative/Positive Status Byte description:

This byte indicates the command processing status as mentioned below,

- 01 if the command was executed with success
- 00 if the diagnostic command failed or was not executed for some reason
- AA if the requested action is in progress
- XX refer below table for other status bytes

Command	Status Information	Comment
00	FAIL	This command indicates that the diagnostic command fails because the command was not executed for any other reason that is not described bellow.
7E	DIAGNOSTICS SESSION ALREADY OPEN	If diagnostic session is already open in other console.
7F	DIAGNOSTICS SESSION NOT OPEN	Before sending any diagnostic command, diagnostic session needs to be open.
F0	BAD CRC	The checksum is not matching to the command
F1	CLIENT APPLICATION NOT ALIVE	Client application is not active (not started / closed due to potential failure)
F2	CLIENT APPLICATION NOT READY	Client application is not ready (not ready to accept the requests)
F3	NOT IMPLEMENTED	Feature not implemented or defined in the configuration file
F4	DELIVERY FAILED	Message delivery failed to Mfg/Client, or between the tester and the UDS engine communication
F5	RESPONSE TIMEOUT	Timeout in receiving the response (Timeout defined in the configuration file)
F6	COMMAND ERROR FORMAT	Value in header byte #8 (number of data bytes) don't match to the trailing number of data bytes)
F7	FUNCTION NOT SUPPORTED	Current test doesn't contain selected function.
F8	MISMATCH DATA LENGTH	Number of data bytes don't match test configuration.
F9	EXISTING_REQUEST_IN_PROGRESS	Already a request is in progress and a new request has been received

4.2 Dependencies to other Software functions

4.3 Dependencies to other elements

5 Interfaces

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5.1 Interfaces - Inputs

The MfgDiag commands shall be sent on the IOC UART Interface.

The MfgDiag SW Shall use the Diagnostic Router Interfaces to interact with Component in IOC, CPV and CPR.

The MfgDiag SW shall use the Shell Interface to process the request from IOC UART.

5.2 Interfaces - Outputs

The ManDiag Response shall be printed on the IOC UART interface.

The MfgDiag SW shall use the Shell interface to print the response back to IOC UART

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6 Functionality

6.1 <Software subfunction 1>

6.1.1 States

<OPERATION MODES

Identify the OPERATION MODES affecting the function behavior (ex. – start-up, shut-down, calibration etc.). Leave blank if none>

6.1.1.1 Functionality - Behavior in SW State = Initalization

<describe what the software shall do with respect to the functionality when in the Software State from the heading
Example: see *PDP2.0_GoldenExample/512-SRS_ProductName/CMP_SRS_Template* >

6.1.1.2 Functionality - Behavior in SW State = Run

<describe what the software shall do with respect to the functionality when in the Software State from the heading>

6.1.1.3 Functionality - Behavior in SW State = Powerdown

<describe what the software shall do with respect to the functionality when in the Software State from the heading>

6.1.2 General

6.1.3 Diagnostics EOL

6.1.3.1 System Features Group (0x00)

6.1.3.1.1 00 01 Manufacturing Diagnostics Session State

00 01 Manufacturing Diagnostics Session State

When the Manufacturing Diagnostics Session is set to active, all applications that can take part of a MFG routine, shall start without the need for additional configuration. The software shall enable the Manufacturing Diagnostics Session upon reception of This command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	00	01	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	00	01	01 - Set 11 - Set + CS	Note 1	00	

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	00	01	00 - Get 10 - Get + CS	00	00	

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Response for GET	6D643C	00	01	00 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - Session state byte can assume one of the following values, depending on product specification:
- 00 Manufacturing Diagnostics Session OFF.
- 01 Manufacturing Diagnostics Session ON.

Example :

"SET" Manufacturing Diagnostics Session State - "Active"

- TX: 6D643E 00 01 01 00 01 **01**
- RX: 6D643C 00 01 01 01 00

"SET" Manufacturing Diagnostics Session State - "Inactive**"**

- TX: 6D643E 00 01 01 00 01 **00**
- RX: 6D643C 00 01 01 01 00

"GET" Manufacturing Diagnostics Session State

- TX: 6D643E 00 01 00 00 00
- RX: 6D643C 00 01 00 01 01 XX (**XX** - value depends on the state of ManDiag session being entered or exited.)

6.1.3.1.2 00 02 Terminal Filter

The software shall enable or disable the Terminal Filter upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	00	02	01 - Set 11 - Set + CS	00	01	Filter status, Note 2
Response for SET	6D643C	00	02	01 - Set 11 - Set + CS	Note 1	01	Filter status, Note 2

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2- This byte enables and disables the terminal filter, depending on product specification:
- 00 Filter OFF
- 01 Only Manufacturing Diagnostics messages shall be present including extra info strings.
- 02 Only request and response messages shall be present.

Example :

"SET" Terminal Filter to ON"

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- TX: 6D643E 00 02 01 00 01 **02**
- RX: 6D643C 00 02 01 01 01 02

6.1.3.1.3 00 03 watchdog timer

The software shall enable or disable the watchdog timer upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	00	03	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	00	03	01 - Set 11 - Set + CS	Note 1	01	Note 2

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	00	03	00 - Get 10 - Get + CS	00	00	
Response for GET	6D643C	00	03	00 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - Timer state byte can assume one of the following values, depending on product specification:
- 00 Watchdog Disable
- 01 Watchdog Enable

Example :

"SET" Watchdog timer status- "Enable"

- TX: 6D643E 00 03 01 00 01 **01**
- RX: 6D643C 00 03 01 01 01 01

"SET" Watchdog timer status- "Disable"

- TX: 6D643E 00 03 01 00 01 **00**
- RX: 6D643C 00 03 01 01 01 00

"GET" Watchdog timer status

- TX: 6D643E 00 03 00 00 00
- RX: 6D643C 00 03 00 01 01 XX (**XX** - value depends on the status of Watchdog timer being enabled or disabled.

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6.1.3.1.4 00 04 Death Mode

The software shall provide the ability to read and reset the Death Mode Reset Counter via ManDiag command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	00	04	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	00	04	01 - Set 11 - Set + CS	Note 1	00	

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	00	04	00 - Get 10 - Get + CS	00	00	
Response for GET	6D643C	00	04	00 - Get 10 - Get + CS	Note 1	01	Note 3

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2

-Data Bytes always **00** to Set the Reset counter to 00.

Note 3

-Death Mode Reset counter (g_dm_reset_counter) is being incremented if there is any timeout happens due to watchdog alive supervision.

Example :

"SET" Death mode Reset Counter to 0x00

- TX: 6D643E 00 04 01 00 01 00
- RX: 6D643C 00 04 01 01 00

"GET" Death mode status

- TX: 6D643E 00 04 00 00 00
- RX: 6D643C 00 04 00 01 01 **XX** (**XX** - value depends on the Death mode reset counter value).

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6.1.3.1.5 00 06 Reset Counter

The software shall provide the ability to read and reset the Reset Counter via ManDiag command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	00	06	00 - Get 10 - Get+ CS	00	00	
Response for GET	6D643C	00	06	00 - Get 10 - Get+ CS	Note 1	01	Number of Resets (Note 2)

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	00	06	01 - Set 11 - Set + CS	00	01	Note 3
Response for SET	6D643C	00	06	01 - Set 11 - Set + CS	Note 1	01	Set Reset Counter to 0x00

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Example:

Set "Reset Counter" to 0x00:
Tx: 6D643E 00 06 01 00 01 00
Rx: 6D643C 00 06 01 01 01 00
Executing Set command SW will reset the **g_sw_reset_counter** to 0x00.

Get Number of Resets:
Tx: 6D643E 00 06 00 00 00
Rx: 6D643C 00 06 00 01 01 00
Executing GET command, we will get to know the numbers of resets.

Note 2:
The counter is expected to increment in case of watch-dog triggered resets.

Note 3:
Data Bytes always **00** to Set the Reset counter to 00.

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6.1.3.2 Power Features Group (0x0A)

6.1.3.2.1 0A 01 Radio ON/OFF

The software shall change the state of Radio from Full ON to HMI Standby and vice versa upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	0A	01	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	0A	01	01 - Set 11 - Set + CS	Note 1	01	Note 2

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	0A	01	00 - Get 10 - Get + CS	00	00	
Response for GET	6D643C	0A	01	00 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte represents the Radio State:
- 00 OFF
- 01 ON

Example :
"SET Radio ON"

- TX: 6D643E 0A 01 01 00 01 **01**
- RX: 6D643C 0A 01 01 01 01 **01**

"SET Radio OFF"

- TX: 6D643E 0A 01 01 00 01 **00**
- RX: 6D643C 0A 01 01 01 01 00

"GET" Radio ON/OFF status

- TX: 6D643E 0A 01 00 00 00
- RX: 6D643C 0A 01 00 01 01 XX (**XX** - value depends on the status of Radio being ON or OFF.)

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6.1.3.2.2 0A 02 Power Ignition ON/OFF

The software shall change the state of Power Ignition from ON to OFF and vice versa upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	0A	02	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	0A	02	01 - Set 11 - Set + CS	Note 1	01	Note 2

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	0A	02	00 - Get 10 - Get + CS	00	00	
Response for GET	6D643C	0A	02	00 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte represents the Power Ignition State:

- 00 OFF
- 01 ON

Example :

"SET Power Ignition ON"

- TX: 6D643E 0A 02 01 00 01 **01**
- RX: 6D643C 0A 02 01 01 01 01

"SET Power Ignition OFF"

- TX: 6D643E 0A 02 01 00 01 **00**
- RX: 6D643C 0A 02 01 01 01 00

"GET" Power Ignition ON/OFF status

- TX: 6D643E 0A 02 00 00 00
- RX: 6D643C 0A 02 00 01 01 XX (**XX** - value depends on the status of Power Ignition being ON or OFF.)

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6.1.3.2.3 0A 03 Power Clamp S ON/OFF

The software shall change the state of Power Clamp S (Driver Door) from ON to OFF and vice versa upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	0A	03	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	0A	03	01 - Set 11 - Set + CS	Note 1	01	Note 2

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	0A	03	00 - Get 10 - Get + CS	00	00	
Response for GET	6D643C	0A	03	00 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte represents the Power Clamp S State:
- 00 OFF
- 01 ON

Example :

"SET Power Clamp S ON"

- TX: 6D643E 0A 03 01 00 01 **01**
- RX: 6D643C 0A 03 01 01 01 01

"SET Power Clamp S OFF"

- TX: 6D643E 0A 03 01 00 01 **00**
- RX: 6D643C 0A 03 01 01 01 00

"GET" Power Clamp S ON/OFF status

- TX: 6D643E 0A 03 00 00 00
- RX: 6D643C 0A 03 00 01 01 XX (**XX** - value depends on the status of Power Clamp S being ON or OFF.)

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6.1.3.2.4 0A 04 Sleep Mode

The software shall go to sleep mode upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	0A	04	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	0A	04	01 - Set 11 - Set + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte represents the Sleep Mode State:
- 01 Sleep mode in normal sleep
- 02 Sleep mode in Suspend to RAM

Example :

"SET Sleep mode to Normal sleep "

- TX: 6D643E 0A 04 01 00 01 **01**
- RX: 6D643C 0A 04 01 01 01 01

"SET Sleep mode to Suspend to RAM "

- TX: 6D643E 0A 04 01 00 01 **02**
- RX: 6D643C 0A 04 01 01 01 02

6.1.3.2.5 0A 05 Unit Restart

The software shall perform a controlled restart of the unit upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	0A	05	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	0A	05	01 - Set 11 - Set + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte represents the Restart mode :
- 01 Unit restart in normal mode

Note - The expected current consumption is <100mA

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Example :

"SET Unit restart to normal mode"

- TX: 6D643E 0A 05 01 00 01 **01**
- RX: 6D643C 0A 05 01 01 01 01

6.1.3.2.6 0A 06 Battery Calibration

The software shall align all the components to a BATT Voltage of 14.4V upon reception of this command.

The ADC Alignment value shall be updated in the system memory and also in run-time usage.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	0A	06	01 - Set 11 - Set + CS	00	01	Calibration ON/OFF, Note 2
Response for SET	6D643C	0A	06	01 - Set 11 - Set + CS	Note 1	01	Note 2

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1	Data Byte 2
Request for GET	6D643E	0A	06	00 - Get 10 - Get + CS	00	00		
Response for GET	6D643C	0A	06	00 - Get 10 - Get + CS	Note 1	01	02	Note 3

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte triggers the battery calibration (01).

Note 3- The 2 data bytes returned shall be a hex representation of the measured supply Voltage (ADC Voltage).

Example

"SET (Trigger) Battery Calibration"

- 6D643E 0A 06 01 00 01 01
- 6D643C 0A 06 01 01 01 01

"GET Battery Voltage"

- 6D643E 0A 06 00 00 00
- 6D643C 0A 06 00 01 02 XX XX (**XX** - value is the hex representation of the measured supply Voltage (ADC Voltage).)

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6.1.3.2.7 0A 08 Power KL30 SW Output

The software shall change the state of Power Clamp 30 from ON to OFF and vice versa upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	0A	08	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	0A	08	01 - Set 11 - Set + CS	Note 1	01	Note 2

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	0A	08	00 - Get 10 - Get + CS	00	00	
Response for GET	6D643C	0A	08	00 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte represents the Power Clamp 30 State:

- 00 OFF
- 01 ON

Example :

"SET Power Clamp 30 ON"

- TX: 6D643E 0A 08 01 00 01 **01**
- RX: 6D643C 0A 08 01 01 00

"SET Power Clamp 30 OFF"

- TX: 6D643E 0A 08 01 00 01 **00**
- RX: 6D643C 0A 08 01 01 00

"GET" Power Clamp 30 ON/OFF status

- TX: 6D643E 0A 08 00 00 00
- RX: 6D643C 0A 08 00 01 01 XX (**XX** - value depends on the status of Power Clamp 30 being ON or OFF.)

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6.1.3.2.8 0A 09 Phantom Voltage AM/FM_1 Antenna

The software shall enable/disable the Phantom Voltage AM/FM_1 Antenna upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	0A	09	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	0A	09	01 - Set 11 - Set + CS	Note 1	01	Note 2

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	0A	09	00 - Get 10 - Get + CS	00	00	
Response for GET	6D643C	0A	09	00 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte represents the Phantom Voltage AM/FM_1 Antenna State:

- 00 Disable
- 01 Enable

Example :

"SET PV AM/FM_1 Antenna ON"

- TX: 6D643E 0A 09 01 00 01 **01**
- RX: 6D643C 0A 09 01 01 01 01

"SET PV AM/FM_1 Antenna OFF"

- TX: 6D643E 0A 09 01 00 01 **00**
- RX: 6D643C 0A 09 01 01 01 00

"GET" PV AM/FM_1 Antenna status

- TX: 6D643E 0A 09 00 00 00
- RX: 6D643C 0A 09 00 01 01 XX (**XX** - value depends on the status of PV AM/FM_1 Antenna being ON or OFF.)

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6.1.3.2.9 0A 0A Phantom Voltage FM_2 Antenna

The software shall enable/disable the Phantom Voltage FM_2 Antenna upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	0A	0A	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	0A	0A	01 - Set 11 - Set + CS	Note 1	01	Note 2

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	0A	0A	00 - Get 10 - Get + CS	00	00	
Response for GET	6D643C	0A	0A	00 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte represents the Phantom Voltage AM/FM_2 Antenna State:
- 00 Disable
- 01 Enable

Example :

"SET PV FM_2 Antenna ON"

- TX: 6D643E 0A 0A 01 00 01 **01**
- RX: 6D643C 0A 0A 01 01 01 01

"SET PV FM_2 Antenna OFF"

- TX: 6D643E 0A 0A 01 00 01 **00**
- RX: 6D643C 0A 0A 01 01 01 00

"GET" PV FM_2 Antenna status

- TX: 6D643E 0A 0A 00 00 00
- RX: 6D643C 0A 0A 00 01 01 XX (**XX** - value depends on the status of PV FM_2 Antenna being ON or OFF.)

6.1.3.2.10 0A 0B Phantom Voltage DRADIO

The software shall enable/disable the Phantom Voltage DRADIO upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	0A	0B	01 - Set 11 - Set + CS	00	01	Note 2
				01 - Set			

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Response for SET	6D643C	0A	0B	11 - Set + CS	Note 1	01	Note 2

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	0A	0B	00 - Get 10 - Get + CS	00	00	
Response for GET	6D643C	0A	0B	00 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte represents the Phantom Voltage DRADIO State:

- 00 Disable
- 01 Enable

Example :

"SET PV DRADIO ON"

- TX: 6D643E 0A 0B 01 00 01 **01**
- RX: 6D643C 0A 0B 01 01 01 01

"SET PV DRADIO OFF"

- TX: 6D643E 0A 0B 01 00 01 **00**
- RX: 6D643C 0A 0B 01 01 01 00

"GET" PV DRADIO status

- TX: 6D643E 0A 0B 00 00 00
- RX: 6D643C 0A 0B 00 01 01 XX (**XX** - value depends on the status of PV DRADIO being ON or OFF.)

6.1.3.2.11 0A 0D Phantom Voltage GPS

The software shall enable/disable the Phantom Voltage GPS upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	0A	0D	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	0A	0D	01 - Set 11 - Set + CS	Note 1	00	

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	0A	0D	00 - Get 10 - Get + CS	00	00	

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Response for GET	6D643C	0A	0D	00 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte represents the Phantom Voltage GPS State:

- 00 Disable
- 01 Enable

Example :

"SET PV GPS ON"

- TX: 6D643E 0A 0D 01 00 01 **01**
- RX: 6D643C 0A 0D 01 01 00

"SET PV GPS OFF"

- TX: 6D643E 0A 0D 01 00 01 **00**
- RX: 6D643C 0A 0D 01 01 00

"GET" PV GPS status

- TX: 6D643E 0A 0D 00 00 00
- RX: 6D643C 0A 0D 00 01 01 XX (**XX** - value depends on the status of PV GPS being ON or OFF.)

6.1.3.2.12 0A 0E Phantom Voltage MIC

The software shall enable/disable the Phantom Voltage MIC upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	0A	0E	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	0A	0E	01 - Set 11 - Set + CS	Note 1	00	

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	0A	0E	00 - Get 10 - Get + CS	00	00	
Response for GET	6D643C	0A	0E	00 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte represents the Phantom Voltage MIC State:

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- 00 Disable
- 01 Enable

Example :
"SET PV MIC ON"

- TX: 6D643E 0A 0E 01 00 01 **01**
- RX: 6D643C 0A 0E 01 01 00

"SET PV MIC OFF"

- TX: 6D643E 0A 0E 01 00 01 **00**
- RX: 6D643C 0A 0E 01 01 00

"GET" PV MIC status

- TX: 6D643E 0A 0E 00 00 00
- RX: 6D643C 0A 0E 00 01 01 XX (**XX** - value depends on the status of PV MIC being ON or OFF.)

6.1.3.2.13 0A 10 Phantom Voltage A2B MIC

The software shall enable/disable the Phantom Voltage A2B MIC upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	0A	10	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	0A	10	01 - Set 11 - Set + CS	Note 1	01	Note 2

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	0A	10	00 - Get 10 - Get + CS	00	00	
Response for GET	6D643C	0A	10	00 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte represents the Phantom Voltage A2B MIC State:
- 00 Disable
- 01 Enable

Example :
"SET PV A2B MIC ON"

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- TX: 6D643E 0A 10 01 00 01 **01**
- RX: 6D643C 0A 10 01 01 01 01

"SET PV A2B MIC OFF"

- TX: 6D643E 0A 10 01 00 01 **00**
- RX: 6D643C 0A 10 01 01 01 00

"GET" PV A2B MIC status

- TX: 6D643E 0A 10 00 00 00
- RX: 6D643C 0A 10 00 01 01 XX (**XX** - value depends on the status of PV A2B MIC being ON or OFF.)

6.1.3.2.14 0A 11 Phantom Voltage A2B BOOST

The software shall enable/disable the Phantom Voltage A2B BOOST upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	0A	11	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	0A	11	01 - Set 11 - Set + CS	Note 1	01	Note 2

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	0A	11	00 - Get 10 - Get + CS	00	00	
Response for GET	6D643C	0A	11	00 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte represents the Phantom Voltage A2B Boost State:
- 00 Disable
- 01 Enable

Example :
"SET PV A2B BOOST ON"

- TX: 6D643E 0A 11 01 00 01 **01**
- RX: 6D643C 0A 11 01 01 01 01

"SET PV A2B BOOST OFF"

- TX: 6D643E 0A 11 01 00 01 **00**

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- RX: 6D643C 0A 11 01 01 01 00

"GET" PV A2B BOOST status

- TX: 6D643E 0A 11 00 00 00
- RX: 6D643C 0A 11 00 01 01 XX (**XX** - value depends on the status of PV A2B BOOST being ON or OFF.)

6.1.3.2.15 0A 14 USB Voltage status

The software shall enable/disable the USB Voltage upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1	Data Byte 2
Request for SET	6D643E	0A	14	01 - Set 11 - Set + CS	00	02	Note 2	Note 3
Response for SET	6D643C	0A	14	01 - Set 11 - Set + CS	Note 1	00		

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1	Data Byte 2
Request for GET	6D643E	0A	14	00 - Get 10 - Get + CS	00	01	Note 2	
Response for GET	6D643C	0A	14	01 - Get 10 - Get + CS	Note 1	02	Note 2	Note 3

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte represents the USB version:
- 00 USB 3.0 version
- XX Not supported

Note 3 - This byte represents the USB voltage status:
- 00 OFF
- 01 ON

Example :

"SET USB VOLTAGE STATUS ON"

- TX: 6D643E 0A 14 01 00 02 00 01
- RX: 6D643C 0A 14 01 01 00

"SET USB VOLTAGE STATUS OFF"

- TX: 6D643E 0A 14 01 00 02 00 00
- RX: 6D643C 0A 14 01 01 00

"GET" USB VOLTAGE status

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- TX: 6D643E 0A 14 00 00 01 00
- RX: 6D643E 0A 14 00 01 02 00 XX (**XX** - value depends on the status of USB VOLTAGE being ON or OFF.)

6.1.3.2.16 0A 20 Power Unit Wake-Up reason

Upon receiving the command the system shall report the wakeup reason of power unit.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	0A	20	00 - Get 10 - Get + CS	00	00	
Response for GET	6D643C	0A	20	00 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - Wake-Up reason ID

ID	Wake-Up Reason
00	Not Event
01	Battery Connect
02	CD-ROM Disc Insertion
03	Front Panel User Interface Board Eject
04	LIN
05	Quick Link Emergency Call Mute
06	CAN1
07	CAN2
08	FOT Status Activity
09	Quick Link Voice Dialog Assistant Mute
10	User Interface Board
11	Quick Link Phone Cradle
12	Phone Module Interrupt
13	Multimedia extension Interrupt
14	Real-Time Clock Timer
15	Online Services

Example :

GET Power Unit Wake-Up reason status

- TX: 6D643E 0A 20 00 00 00

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- RX: 6D643E 0A 20 00 01 01 XX (**XX** - value depends on the Power Unit Wake-Up reason status)

6.1.3.2.17 0A 21 MMX Recovery Mode Sequence EDL

Upon receiving the command the system shall turn the MMX in Normal or Recovery mode.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	0A	21	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	0A	21	01 - Set 11 - Set + CS	Note 1	01	Note 2

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	0A	21	00 - Get 10 - Get + CS	00	00	
Response for GET	6D643C	0A	21	01 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - MMX Startup Sequence Mode

0x00 - Normal Mode

0x01 - Recovery Mode

Note :

After enabling MMX recovery mode, the `exit mandiag` command must be executed.

Example:

"Set Recovery Mode MMX Mode Sequence":

TX: 6D643E 0A 21 01 00 01 01

RX: 6D643C 0A 21 01 01 01 01

"Get MMX Sequence Mode (Return Recovery Mode)":

TX: 6D643E 0A 21 00 00 00

RX: 6D643C 0A 21 00 01 01 01

6.1.3.3 Audio Group (0x14)

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6.1.3.3.1 14 04 Audio Treble

The Software must be able to Switch between different treble value upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1	Data Byte 2	Data Byte 3
Request for SET	6D643E	14	04	01 - Set 11 - Set + CS	00	03	Note 2	Note 3	Note 4
Response for SET	6D643C	14	04	01 - Set 11 - Set + CS	Note 1	03	Note 2	Note 3	Note 4

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1	Data Byte 2	Data Byte 3
Request for GET	6D643E	14	04	00 - Get 10 - Get + CS	00	01	Note 2		
Response for GET	6D643C	14	04	00 - Get 10 - Get + CS	Note 1	03	Note 2	Note 3	Note 4

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.

Note 2 - Available options for primary source are, depending on product specification:

ID	Primary Source
01	FM
02	AM
04	DAB
06	MIC 1
07	MIC 2
0D	VDA (eCall)
0E	VNC (Microphone)
11	SDARS

Note 3 - Signal Information
0x00 - To be used with Positive Values or Zero.
0x01 - To be used with Negative Values.

Note 4- Treble value can take a value on the following range [0x00,0x09] hex base.

Example:
SET audio treble to primary source FM

- **TX:** 6D643E 14 04 01 00 03 02 00 00
- **RX:** 6D643C 14 04 01 01 03 02 00 00

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*GET audio treble to primary source FM

- **TX:** 6D643E 14 04 00 00 01 02
- **RX:** 6D643C 14 04 00 01 03 02 00 00

6.1.3.3.2 14 05 Audio Bass

The Software must switch between different audio levels upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1	Data Byte 2	Data Byte 3
Request for SET	6D643E	14	05	01 - Set 11 - Set + CS	00	03	Note 2	Note 3	Note 4
Response for SET	6D643C	14	05	01 - Set 11 - Set + CS	Note 1	03	Note 2	Note 3	Note 4

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1	Data Byte 2	Data Byte 3
Request for GET	6D643E	14	05	00 - Get 10 - Get + CS	00	01	Note 2		
Response for GET	6D643C	14	05	00 - Get 10 - Get + CS	Note 1	03	Note 2	Note 3	Note 4

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.

Note 2 - Available options for primary source are, depending on product specification:

ID	Primary Source
01	FM
02	AM
04	DAB
06	MIC 1
07	MIC 2
0D	VDA (eCall)
0E	VNC (Microphone)
11	SDARS

Note 3 - Signal Information
0x00 - To be used with Positive Values or Zero.
0x01 - To be used with Negative Values.

Note 4- Bass value can take a value on the following range [0x00,0x09] hex base.

Example:

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SET Primary audio Bass to AM

- **TX:** 6D643E 14 05 01 00 03 02 00 00
- **RX:** 6D643C 14 05 01 01 03 02 00 00

*GET Primary audio Bass to AM

- **TX:** 6D643E 14 05 00 00 01 02
- **RX:** 6D643C 14 05 01 01 03 02 00 00

6.1.3.3.3 14 08 Audio Primary Source

The Software must be able to Switch between different audio sources upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	14	08	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	14	08	01 - Set 11 - Set + CS	Note 1	01	Note 2

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	14	08	00 - Get 10 - Get + CS	00	00	
Response for GET	6D643C	14	08	00 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.

Note 2 - Available options for primary source are, depending on product specification:

ID	Primary Source
01	FM
02	AM
04	DAB
06	MIC 1
07	MIC 2
0D	VDA (eCall)
0E	VNC (Microphone)
11	SDARS

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Example:

SET Primary audio source to FM

- **TX:** 6D643E 14 08 01 00 01 02
- **RX:** 6D643C 14 08 01 01 01 02

*GET Primary audio source

- **TX:** 6D643E 14 08 00 00 00
- **RX:** 6D643C 14 08 00 01 01 XX

6.1.3.3.4 14 09 TMD J6-MMX Audio Loopback

SW shall able to get audio loop back on the TDM audio lines between the J6 and the MMX.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	14	09	00 - Get 10 - Get + CS	00	00	
Response for GET	6D643C	14	09	00 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.

Note 2 - this byte indicates the Result

Result	ID
TDM test FAILED	00
TDM test PASSED	01

- Example:
  Get:
  - TX: 6D643E 14 09 00 00 00
  - RX: 6D643C 14 09 00 01 01 **XX**

6.1.3.3.5 14 01 Audio Volume

The software shall change the volume (sound-wise) of the system, while performing audio measurements, upon reception of DID_Volume

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1	Data Byte 2
Request for SET	6D643E	14	01	01 - Set 11 - Set + CS	00	02	Note 2	Note 3
Response for SET	6D643C	14	01	01 - Set 11 - Set + CS	Note 1	02	Note 2	Note 3

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Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1	Data Byte 2
Request for GET	6D643E	14	01	00 - Get 10 - Get + CS	00	01	Note 2	
Response for GET	6D643C	14	01	00 - Get 10 - Get + CS	Note 1	02	Note 2	Note 3

Note 1 - This byte indicates the command processing status:
- 01 if the command was executed with success
- 00 if the diagnostic command failed or was not executed for some reason

Note 2 - Data Byte #1 is the representation of the primary source (01, 02, 03)

Note 3 - Data Byte #2 is the representation of the system volume level and shall be in the range [00, 45hex].

Example
set:
Tx> 6D643E 14 01 01 00 02 03 1F
Rx> 6D643C 14 01 01 01 02 03 1F
get:
Tx> 6D643E 14 01 00 00 01 03
Rx> 6D643C 14 01 00 01 02 03 1F

6.1.3.3.6 14 0A Audio Fader Balance

This routine shall update the speaker level with the balance/fader offset when the tester change these settings

Balance:

The software shall allow the user to adjust the Balance setting via the HMI within the range -9 (fully left) to +9 (fully right), with a default value of 0.

- At +9, audio shall play only through the right-side speakers.
- At -9, audio shall play only through the left-side speakers.
- At 0, audio shall play through both left and right speakers.

Fader:

The software shall allow the user to adjust the Fader setting via the HMI within the range -9 (rear) to +9 (front), with a default value of 0.

- At +9, audio shall play only through the front speakers.
- At -9, audio shall play only through the rear speakers.
- At 0, audio shall play through both front and rear speakers.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5
Request for SET	6D643E	14	0A	01 - Set 11 - Set + CS	00	05	Note 2	Note 3	Note 4	Note 5	Note 6
Response for SET	6D643C	14	0A	01 - Set 11 - Set + CS	Note 1	05	Note 2	Note 3	Note 4	Note 5	Note 6

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Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5
Request for GET	6D643E	14	0A	00 - Get 10 - Get + CS	00	01	Note 2				
Response for GET	6D643C	14	0A	00 - Get 10 - Get + CS	Note 1	05	Note 2	Note 3	Note 4	Note 5	Note 6

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer FPPM4-159724

Note 2- Primary Source

ID	Primary Source
01	FM
02	AM
04	DAB
06	MIC 1
07	MIC 2
0D	VDA (eCall)
0E	VNC (Microphone)
11	SDARS

Note 3- Balance Signal Information

0x00 - To be used with Positive Values or Zero;

0x01 - To be used with Negative Values.

Note 4- Balance Level

Balance Level can take a value on the following range [0x00,0x09] hex base.

NB: Special consideration

-9 - (#1 Data Byte = 0x01 & #2 Data Byte = 0x09) > Sound only on left speaker.

9 - (#1 Data Byte = 0x00 & #2 Data Byte = 0x09) > Sound only on right speaker.

Note 5- Fader Signal Information

0x00 - To be used with Positive Values or Zero;

0x01 - To be used with Negative Values.

Note 6- Fader Level

Fader Level can take a value on the following range [0x00,0x09] hex base.

NB: Special consideration

-9 - (#1 Data Byte = 0x01 & #2 Data Byte = 0x09) > Sound only on rear speakers.

9 - (#1 Data Byte = 0x00 & #2 Data Byte = 0x09) > Sound only on front speakers.

Example:

SET

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Tx: 6D643E 14 0A 01 00 05 01 00 09 00 09

Rx: 6D643C 14 0A 01 01 05 01 00 09 00 09

GET

Tx: 6D643E 14 0A 00 00 01 01

Rx: 6D643C 14 0A 00 01 05 01 00 09 00 09

6.1.3.3.7 14 0B A2B Audio Loopback

SW shall able to test the A2B HW lines and and DSP to play the received loopback signal.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1	Data Byte 2	Data Byte 3
Request for GET	6D643E	14	0B	00 - Get 10 - Get + CS	00	02	Note 2	Note 3	
Response for GET	6D643C	14	0B	00 - Get 10 - Get + CS	Note 1	03	Note 2	Note 3	Note 4

Note 1 - This byte indicates the command processing status:

- 01 if the command was executed with success
- 00 if the diagnostic command failed or was not executed for some reason
- XX Refer PPM4-159724

Note 2 - A2B transceiver device number

A2B Device	ID
BOOST	01
MIC	02

Note 3 - Operation Mode

0x01 – DSP To Compare the Transmitted and Received Signal.

0x02 – DSP To Play the Received Loopback signal on the Front Speakers

Note 4 - Test Result

0x00 - FAIL

0x01 - PASS

Example :
Precondition:

- **TX:** 6D643E 38 00 01 00 02 01 02 **-** SET A2B Operational Mode to A2B Loopback mode
- **RX:** 6D643C 38 00 01 01 00

- **TX:** 6D643E 38 00 00 00 01 01 - GET A2B Operation Mode
- **RX:** 6D643C 38 00 00 01 02 01 02

Actual Test :

- **TX:** 6D643E 14 0B 00 00 02 01 02 **-** SET A2B A2B Loopback mode for Boost
- **RX:** 6D643C 14 0B 00 01 03 01 02 01

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6.1.3.3.8 14 0C BT Audio Loop Back Test

SW shall able to test the BT HW lines and DSP to play the received loopback signal.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	14	0C	00 - Get 10 - Get + CS	00	00	
Response for GET	6D643C	14	0C	00 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:

- 01 if the command was executed with success
- 00 if the diagnostic command failed or was not executed for some reason
- XX Refer PPM4-159724

Note 2 - this byte indicates the Result

Result	ID
Fail	00
Pass	01

Example:

Get:

- TX: 6D643E 14 0C 00 00 00
- RX: 6D643C 14 0C 00 01 01 **X**

6.1.3.3.9 14 0D Audio Tone in all Channels

The software shall trigger the Platform DSP sinus generator to play a 1Khz Audio Tone in all the unit channels (4CH or 8CH).

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1
Request for SET	6D643E	14	0D	01 - Set 11 - Set +CS	00	01	Note 2
Response for SET	6D643C	14	0D	01 - Set 11 - Set +CS	Note 1	01	Note 2

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1
Request for GET	6D643E	14	0D	00 - Get 10 - Get +CS	00	00	
Response for GET	6D643C	14	0D	00 - Get 10 - Get +CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:

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- 01 if the command was executed with success
- 00 if the diagnostic command failed or was not executed for some reason
- XX Refer PPM4-159724

Note 2 - Operation
0x00 – Stop
0x01 – Play

Examples:
SET Audio Tone all Channels in Play mode.
TX : 6D643E 14 0D 01 00 01 01
RX : 6D643C 14 0D 01 01 01 01

GET Audio Tone in all Channels
TX : 6D643E 14 0D 00 00 00
RX : 6D643C 14 0D 00 01 01 01

6.1.3.3.10 14 0E Amplifier DC Status

The software shall verify the DC status of all channels (4CH or 8CH).

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4	Data Byte #5	Data Byte #6	Data Byte #7	Data Byte #8
Request for GET	6D643E	14	0E	00 - Get 10 - Get +CS	00	00								
Response for GET	6D643C	14	0E	00 - Get 10 - Get +CS	Note 1	08	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2

Note 1 - This byte indicates the command processing status:
- 01 if the command was executed with success
- 00 if the diagnostic command failed or was not executed for some reason
- XX Refer PPM4-159724

Note 2 - This byte indicates the DC status
00 -> OK (NO Fault)
01 -> Open Load
02 -> Short to Power
03 -> Short to ground
04 -> short across load
FF -> Not Applicable (This will be used in case of 4 channel amplifier as 4 channels are not there, so Data Byte # 5 to Data Byte #8 will be filled with this value).

Examples:
GET Amplifier DC Status for 8 Channel (Channel 3 having Open load fault and Channel 5 having Short to ground fault and other channels are No Fault)
TX : 6D643E 14 0E 00 00 00
RX : 6D643C 14 0E 00 01 08 00 00 01 00 03 00 00 00

GET Amplifier DC Status for 4 channel (Channel 2 having short to plus fault)
TX : 6D643E 14 0E 00 00 00
RX : 6D643C 14 0E 00 01 08 00 02 00 00 FF FF FF FF

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6.1.3.4 Tuner Feature Group (0x1F)

6.1.3.4.1 1F 01 Tuner Band / Frequency

Upon receiving the SET command the software shall setup the tuner frequency.

Upon receiving the GET command the software shall report the tuner frequency and band information.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4
Request for SET	6D643E	1F	01	01 - Set 11 - Set +CS	00	04	Note2	Note 3	MSB, Note 4	LSB, Note 4
Response for SET	6D643C	1F	01	01 - Set 11 - Set +CS	Note 1	04	Note2	Note3	MSB, Note 4	LSB, Note 4

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4
Request for GET	6D643E	1F	01	00 -Get 10 - Get +CS	00	01	Note2			
Response for GET	6D643C	1F	01	00 - Get 10 - Get +CS	Note 1	04	Note 2	Note 3	MSB, Note 4	LSB, Note 4

Note 1 - This byte indicates the command processing status:

- 01 if the command was executed with success
- 00 if the diagnostic command failed or was not executed for some reason
- XX Refer PPM4-159724

Note 2 - This byte indicates the selected tuner, depending on product specification

Tuner	ID
Tuner 1	01
Tuner 2	02
Tuner 3	03
Tuner 4	04

Note 3 - This byte represents the Band, depending on product specification

Band	ID
FM	00
AM	01

Note 4 - Frequency calculation:

The frequency will be expressed by using 2 bytes and depending on the band (FM or AM) the calculations will vary

FM=00: frequency [10 kHz steps]

AM=01: frequency [1 kHz steps]

Note 5 - Tuner 1 (T1) handles AM and FM bands, while Tuners 2 (T2), 3 (T3), and 4 (T4) are used for FM and DAB bands.

Example for band == 00 == FM: 98.1 MHz / 10 kHz == 98100 kHz / 10kHz == 9810 == 0x2652

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Example for band == 01 == AM: 540 kHz / 1kHz == 540 == 0x021C

Example:

"SET Band Frequency"

- TX: 6D643E 1F 01 01 00 04 01 00 26 52
- RX: 6D643C 1F 01 01 01 00

"GET Band/Frequency Tuner 1 (The Tuner 1 is set to FM in the frequency 98.1 MHz)"

- TX: 6D643E 1F 01 00 00 01 01
- RX: 6D643C 1F 01 00 01 04 01 00 26 52

6.1.3.4.2 1F 02 Tuner Measurement Mode

The software shall set the tuner measurement mode upon reception of this command

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4
Request for SET	6D643E	1F	02	01 - Set 11 - Set +CS	00	04	Note 2	Note 3	Note 4	Note 5
Response for SET	6D643C	1F	02	01 - Set 11 - Set +CS	Note 1	04	Note 2	Note 3	Note 4	Note 5

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4
Request for GET	6D643E	1F	02	00 -Get 10 - Get +CS	00	01	Note 4			
Response for GET	6D643C	1F	02	00 - Get 10 - Get +CS	Note 1	04	Note 2 (Measurement Mode)	Note 3 (Operation mode)	Note 4 (Tuner Selection)	Note 5 (Antenna selection)

Note 1 - This byte indicates the command processing status:

- 01 if the command was executed with success
- 00 if the diagnostic command failed or was not executed for some reason
- XX Refer PPM4-159724

Note 2 - this byte indicates the Measurement Mode

Measurement Mode	ID
On	01
Off	00

Note 3 - this byte indicates Operation Mode

Operation Mode	ID
Dual Mode	00
Phase Diversity	01

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Single Tuner FM/AM mode	02

Note 4 - this byte indicates Tuner Selection

(**Note** : Only tuner 1 will provide audio and is applicable for this 0x1F02 feature)

Tuner	ID	
Tuner 1	01	Applicable
Tuner 2	02	Not Applicable
Tuner 3	03	Not Applicable
Tuner 4	04	Not Applicable

Note 5 - this byte indicates Antenna Selection

Antenna Selection	ID	Applicable ID
Automatic Mode (Phase Diversity will be possible)	00	Applicable
FM/AM Antenna no. 1	01	Applicable
FM Antenna no. 2	02	Applicable
e-Mot Antenna	03	N.A

Example :

Set Tuner Measurement Mode (MM=01, OM=00, Tuner=01, Antenna=01)

- TX: 6D643E 1F 02 01 00 04 01 00 01 01
- RX: 6D643C 1F 02 01 01 04 01 00 01 01

Get Tuner Measurement Mode (MM=01, OM=00, Tuner=01, Antenna=01)

- TX: 6D643E 1F 02 00 00 01 01
- RX: 6D643C 1F 02 00 01 04 01 00 01 01

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6.1.3.4.3 1F 05 Tuner RDS

Upon receiving the command the MIB4 system shall report the RDS status.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4	Data Byte #5	Data Byte #6
Request for GET	6D643E	1F	05	00 - Get 10 - Get + CS	00	01	Note 2					
Response for GET	6D643C	1F	05	00 - Get 10 - Get + CS	Note 1	06	Note 2	Note 3	Note 4	Note 5	Note 6	Note 7

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - Tuner selection
0x01 - Tuner 1
0x02 - Tuner 2
0x03 - Tuner 3
0x04 - Tuner 4

Note 3 - Center
0x00 - Not Centered
0x01 - Centered

Note 4 - Traffic Program Status
0x00 - Inactive
0x01 - Active

Note 5 - Traffic Announcement Status
0x00 - Inactive
0x01 - Active

Note 6 - PTY Alarm Status
0x00 - Inactive
0x01 - Active

Note 7 - BER (Block Error Rate)
0x00-0x64 (0-100 Percentage)

6.1.3.4.4 1F 06 Tuner PTY / PI

The software shall get information from Program Identification (PI) and Program Type data (PTY)

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4
Request for GET	6D643E	1F	06	00 - Get 10 - Get + CS	00	01	Note 2			
Response for GET	6D643C	1F	06	00 - Get 10 - Get + CS	Note 1	04	Note 2	Note 3	Note 4 (MSB)	Note 4 (LSB)

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Note 1 - This byte indicates the command processing status

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte indicates the selected tuner

0x01 - AM/FM Tuner 1

0x03 - AM/FM Tuner 3

0x04 - AM/FM Tuner 4

Note 3 - This byte indicates the Program Type Number (PTY).

Note 4 - These two bytes indicate the Program Identification (PI).

Example

"GET PTY/PI for Background Tuner 4, with FM RDS is tuned "

TX: 6D643E 1F 06 00 00 01 04
RX: 6D643C 1F 06 00 01 04 04 0A 3F 44

6.1.3.4.5 1F 07 AF/TP/REG

The software shall be able to perform changes in the global settings regarding AF, TP and REG modes while performing the manufacturing EOL tests. To do this we will need the following feature.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3
Request for SET	6D643E	1F	07	01 - Set 11 - Set + CS	00	03	Note 2	Note 3	Note 4
Response for SET	6D643C	1F	07	01 - Set 11 - Set + CS	Note 1	03	Note 2	Note 3	Note 4

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3
Request for GET	6D643E	1F	07	00 - Get 10 - Get + CS	00	00			
Response for GET	6D643C	1F	07	00 - Get 10 - Get + CS	Note 1	03	Note 2	Note 3	Note 4

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - Alternative **F**requency Status

0x00 - OFF

0x01 - ON

Note 3 - Traffic **P**rogram State

0x00 - OFF

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0x01 - ON

Note 4 - Regional Mode State
0x00 - OFF
0x01 - ON

Examples :
"Set AF ON, TP OFF, REG ON"

- TX: 6D643E 1F 07 01 00 03 01 00 01
- RX: 6D643C 1F 07 01 01 03 01 00 01

"Get AF,TP and REG Status"

- TX: 6D643E 1F 07 00 00 00
- RX: 6D643C 1F 07 01 01 03 01 00 01

6.1.3.4.6 1F 08 BG Tuner Scanning State

Upon receiving the command the system shall start or stop the scanning of the BG-Tuner.
BG-Tuner is the background tuner setting up the AF-list (alternative frequency).

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1
Response for SET	6D643E	1F	08	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	1F	08	01 - Set 11 - Set + CS	Note 1	01	Note 2

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1
Request for GET	6D643E	1F	08	00 - Get 10 - Get + CS	00	00	
Response for GET	6D643C	1F	08	00 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - BG Tuner Scan State
0x00 - OFF
0x01 - ON

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This requirement is needed to stop the BG-Tuner running thru the band.
In order to be able to perform audio measurements on the BG-Tuner.

Example:
"Set BG-Tuner scanning ON"
TX: 6D643E 1F 08 01 00 01 01
RX: 6D643C 1F 08 01 01 01 01

"Get BG-Tuner scanning ON"
TX: 6D643E 1F 08 00 00 00
RX: 6D643C 1F 08 00 01 01 01

6.1.3.4.7 1F 1F Tuner Signal Strength

The software shall get the tuner signal strength value upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2,3
Request for GET	6D643E	1F	1F	00 - Get 10 - Get + CS	00	01	Note 2	
Response for GET	6D643C	1F	1F	00 - Get 10 - Get + CS	Note 1	03	Note 2	Note 3

Note 1 - This byte indicates the command processing status:
- 01 if the command was executed with success
- 00 if the diagnostic command failed or was not executed for some reason
- XX Refer PPM4-159724

Note 2 - This byte indicates the selected tuner

Tuner	ID
Tuner 1	01
Tuner 2	02
Tuner 3	03
Tuner 4	04

Note 3 - This byte indicates the Field Strength range [00,FF] (dbuV).

Example:
"GET Tuner Signal Strength of Tuner 1"

- TX: 6D643E 1F 1F 00 00 01 01
- RX: 6D643C 1F 1F 00 01 03 01 XX XX (Indicates the field strength)

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6.1.3.5 CAN Feature Group(0x33)

6.1.3.5.1 33 01 CAN Dummy Messages

33 01 CAN Dummy Messages

Upon receiving the SET command the system shall set the data from CAN interface (signal) . The received data will be send back as data byte in response.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2
Request for SET	**6D643E**	**33**	**01**	**01 - Set 11 - Set + CS**	**00**	**02**	**Note2**	**Note 3**
Response for SET	**6D643C**	**33**	**01**	**01 - Set 11 - Set + CS**	**Note 1**	**02**	**Note2**	**Note3**

Upon receiving the GET command the system shall receive the data from CAN interface (signal) . The received data will be send back as data byte in response.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2
Request for GET	6D643E	33	01	00 - Get 10 - Get + CS	00	01	Note2	
Response for GET	6D643C	33	01	00 - Get 10 - Get + CS	Note 1	02	Note2	Note3

Note 1 - This byte indicates the command processing status:
- 01 if the command was executed with success
- 00 if the diagnostic command failed or was not executed for some reason
- XX Refer PPM4-159724

Note 2 - This byte represents CAN interface ID
- 01 MIB_CAN
- 02 ICAN

Note 3 - This byte represents start or stop operation
- 00 Stop
- 01 Start

Example:
"GET Start Sending CAN dummy message on MIB CAN channel"

- TX: 6D643E 33 01 00 00 02 **01 01**
- RX: 6D643C 33 01 00 01 02 01 01

"GET stop Sending CAN dummy message on MIB CAN channel"

- TX: 6D643E 33 01 00 00 02 **01 00**
- RX: 6D643C 33 01 00 01 02 01 00

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"GET Start Sending CAN dummy message on ICAN channel"

- TX: 6D643E 33 01 00 00 02 **02 01**
- RX: 6D643C 33 01 00 01 02 02 01

"GET stop Sending CAN dummy message on ICAN channel"

- TX: 6D643E 33 01 00 00 02 **02 00**
- RX: 6D643C 33 01 00 01 02 02 00

6.1.3.5.2 33 02 CAN Loopback Test

Upon receiving the GET command the system shall perform a Loop Back Test routine from MIB interfaces

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1
Request for GET	6D643E	33	02	00 - Get 10 - Get + CS	00	01	Note 2
Response for GET	6D643C	33	02	00 - Get 10 - Get + CS	Note 1	01	Note 3

Note 1 - This byte indicates the command processing status:
- 01 if the command was executed with success
- 00 if the diagnostic command failed or was not executed for some reason
- XX Refer PPM4-159724

Note 2 - This byte represents CAN interface ID
- 01 MIB_CAN
- 02 ICAN

Note 3 - This byte represents start or stop operation
- 00 CAN Loop Back Test Failed
- 01 CAN Loop Back Test Passed

Example:

"Get CAN Loop Back test MIBCAN to ICAN**"**

- TX**:** 6D643E 33 02 00 00 01 01
- RX: 6D643C 33 02 00 01 01 01

"Get CAN Loop Back test via Internal CAN**"**

- TX**:** 6D643E 33 02 00 00 01 02
- RX: 6D643C 33 02 00 01 01 01

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6.1.3.6 Ethernet Features Group (0x34)

6.1.3.6.1 34 01 Ethernet Run State

The software shall enable/disable the Ethernet state and set Ethernet interface (passed as parameter) upon reception of SET command and SW shall read Ethernet state and Ethernet interface upon reception of GET command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2
Request for SET	6D643E	34	01	01 - Set 11 - Set + CS	00	02	Note 2	Note 3
Response for SET	6D643C	34	01	01 - Set 11 - Set + CS	Note 1	02	Note 2	Note 3

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2
Request for GET	6D643E	34	01	00 - Get 10 - Get + CS	00	01	Note 2	
Response for GET	6D643C	34	01	00 - Get 10 - Get + CS	Note 1	02	Note 2	Note 3

Note 1 - This byte indicates the command processing status:
- 01 if the command was executed with success
- 00 if the diagnostic command failed or was not executed for some reason
- XX Refer PPM4-159724

Note 2 - This byte represents ID of that ethernet PHY (Physical layer transceiver) chip we want to communicate with
- 01 PHY_ID_100MBIT
- 02 PHY_ID_1GBIT (Not Supported in MIB4)

Note 3 - This byte indicates Ethernet state:
- 00 Disable
- 01 Enable

Example:

"SET Ethernet Run state ON of PHY_ID_100MBIT"

- TX: 6D643E 34 01 01 00 02 01 01
- RX: 6D643C 34 01 01 01 02 01 01

"GET Ethernet Run state of PHY_ID_100MBIT"

- TX: 6D643E 34 01 00 00 01 01
- RX: 6D643C 34 01 00 01 02 01 XX (XX- value depends on the Run state)

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6.1.3.6.2 34 02 Ethernet MAC Address

The software shall read the MAC Address of a certain Ethernet interface (passed as parameter) upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4	Data Byte #5	Data Byte #6	Data Byte #7
Request for GET	6D643E	34	02	00 - Get 10 - Get + CS	00	0x01	Note 2						
Response for GET	6D643C	34	02	00 - Get 10 - Get + CS	Note 1	0x07	Note 2	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3

Note 1 - This byte indicates the command processing status:
- 01 if the command was executed with success
- 00 if the diagnostic command failed or was not executed for some reason
- XX Refer PPM4-159724

Note 2 - This byte represents ID of that ethernet PHY (Physical layer transceiver) chip we want to communicate with
- 01 PHY_ID_100MBIT
- 02 PHY_ID_1GBIT (Not Supported in MIB4)

Note 3 - This byte indicates Ethernet MAC Address:
Data Byte # 2 - Data Byte # 7:
Response: 6 Byte MAC Address Values
0x00 .. 0xFF - MAC Address Data Byte 1
0x00 .. 0xFF - MAC Address Data Byte 2
0x00 .. 0xFF - MAC Address Data Byte 3
0x00 .. 0xFF - MAC Address Data Byte 4
0x00 .. 0xFF - MAC Address Data Byte 5
0x00 .. 0xFF - MAC Address Data Byte 6

Example:
"GET Ethernet MAC Address no. 1":
TX: 6D643E 34 02 00 00 01 01
RX: 6D643C 34 02 00 01 07 01 AA BB CC DD EE FF

6.1.3.6.3 34 04 Ethernet Link Status

The software shall read the link status of a certain Ethernet interface (passed as parameter) upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2
Request for GET	6D643E	34	04	00 - Get 10 - Get + CS	00	01	Note 2	
Response for GET	6D643C	34	04	00 - Get 10 - Get + CS	Note 1	02	Note 2	Note 3

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Note 1 - This byte indicates the command processing status:
- 01 if the command was executed with success
- 00 if the diagnostic command failed or was not executed for some reason
- XX Refer PPM4-159724

Note 2 - This byte represents ID of that ethernet PHY(Physical layer transceiver) chip we want to communicate with
- 01 PHY_ID_100MBIT
- 02 PHY_ID_1GBIT (Not Supported in MIB4)

Note 3 - The Link Status byte can take of of the following values:
- 00 Link Down
- 01 Link Up

Example:
"GET Ethernet Link Status of PHY_ID_100MBIT"

- TX: 6D643E 34 04 00 00 01 01
  RX: 6D643C 34 04 00 01 02 01 XX (XX- value depends on the Link Status byte)

"GET Ethernet Link Status of PHY_ID_1GBIT"

- TX: 6D643E 34 04 00 00 01 02
  RX: 6D643C 34 04 00 01 02 02 XX (XX- value depends on the Link Status byte)

6.1.3.6.4 34 05 Ethernet IP address

software shall allow user to set new Ethernet IP address to network and read the present IP with mask bytes upon reception of 0x3405.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2 to #5	Data Byte #6 to #9
Request for SET	6D643E	34	05	01 - Set 11 - Set + CS	00	09	Note2	Note 3	Note 4
Response for SET	6D643C	34	05	01 - Set 11 - Set + CS	Note 1	00			

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2 to #5	Data Byte #6 to #9
Request for GET	6D643E	34	05	00 - Get 10 - Get + CS	00	00			
Response for GET	6D643C	34	05	00 - Get 10 - Get + CS	Note 1	09	Note2	Note 3	Note 4

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

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Note 2 - This byte represents ID of that ethernet PHY(Physical layer transceiver) chip we want to communicate with
- 01 PHY_ID_100MBIT
- 02 PHY_ID_1GBIT

Note 3 - This byte represents IPv4 4 bytes of IP address

Note 4 - This byte represents IPv4 4 bytes of IP address Mask Bytes

Example:
"SET interface IP to "192.168.1.34" and Mask to "255.255.255.0 of PHY_ID_100MBIT"

- TX: 6D643E 34 05 01 00 09 01 C0 A8 01 22 FF FF FF 00
  RX: 6D643C 34 05 01 01 00

"GET Ethernet interface IP with mask bytes of PHY_ID_1GBIT"

- TX: 6D643E 34 05 01 00 01 01
  RX: 6D643C 34 05 01 01 09 01 C0 A8 01 22 FF FF FF 00

6.1.3.6.5 34 06 Ethernet Configuration

The software shall read the status of Ethernet channels upon reception of the Ethernet_Configuration command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No of Data Bytes	Data Byte #1	Data Byte #2
Request for GET	6D643E	34	06	00 - Get 10 - Get + CS	00	01	Note 2	
Response for GET	6D643C	34	06	00 - Get 10 - Get + CS	Note 1	02	Note 2	Note 3

Note 1 - This byte indicates the command processing status:
- 01 If the command was executed with success
- 00 If the diagnostic command failed or was not executed for some reason
- XX Refer PPM4-159724

Note 2 - This byte represents the ID of the Ethernet PHY(Physical layer transceiver) chip we want to communicate with
- 01 PHY_ID_100MBIT
- XX Not Supported

Note 3 - This byte represents the configuration, depending on the product specification:
- 00 Deactivated
- 01 Slave
- 02 Master

Example:
"GET Ethernet configuration Status of PHY_ID_100MBIT"

- TX: 6D643E 34 06 00 00 01 01
  RX: 6D643C 34 06 00 01 02 01 XX (XX- value depends on the configuration Status byte)

"GET Ethernet configuration Status of PHY_ID_1GBIT"

- TX: 6D643E 34 06 00 00 01 XX
  RX: 6D643C 34 06 00 01 02 XX XX (XX- value depends on the configuration Status byte)

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6.1.3.6.6 34 03 Ethernet Loopback Test

The software shall perform a Loop Back Test routine at the Ethernet Interface and report the result upon receiving the command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3
Request for GET	6D643E	34	03	00 - Get 10 - Get + CS	00	02	Note2	Note3	
Response for GET	6D643C	34	03	00 - Get 10 - Get + CS	Note1	03	Note 2	Note3	Note 4

Note 1 - This byte indicates the command processing status:

- 01 If the command was executed with success
- 00 If the diagnostic command failed or was not executed for some reason
- XX Refer PPM4-159724

Note 2 - This byte represents the type of Ethernet interface

Ethernet Interface	ID	Applicable ID
BroadR-Reach	01	Applicable
Ethernet 1Gb Interface	02	Not Applicable

Note 3 - This byte represents the type of Ethernet Loop Back Test Mode

Ethernet Loop Back Test type	ID	Applicable ID
NA	00	Not applicable
Internal Ethernet Loop Back Test	01	Applicable
External Ethernet Loop Back Test	02	Applicable

Note 4 - This byte represents the Test Result

- 00 FAIL
- 01 PASS

Example:
"GET Ethernet Loopback Test Status of BroadR-Reach"

- TX: 6D643E 34 03 00 00 02 01 01
  RX: 6D643C 34 03 00 01 03 01 01 XX (XX- Test Result output)

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6.1.3.6.7 34 07 Ethernet Switch Legacy and IEEE

Temporary switch from Legacy to IEEE mode on the Ethernet tests.

This MDIAG command should switch from Legacy to IEEE mode without being necessary a hard reset, and don't changing on the persistence (with that, at the end of the test when the unit is restarted will be on the Legacy mode again). This command should be sent before all the ethernet tests. Should be possible to switch from IEEE mode to Legacy mode too.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	34	07	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	34	07	01 - Set 11 - Set + CS	Note 1	01	Note 2

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No of Data Bytes	Data Byte #1
Request for GET	6D643E	34	07	00 - Get 10 - Get + CS	00	00	
Response for GET	6D643C	34	07	00 - Get 10 - Get + CS	Note1	01	Note 2

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2:
Ethernet Mode
0x01 - IEEE Mode
0x02 - Legacy Mode

6.1.3.7 MOST Group (0x32)

6.1.3.7.1 3201 MOST FOT enable/disable

The software shall enable/disable the MOST FOT upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	32	01	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	32	01	01 - Set 11 - Set + CS	Note 1	01	Note 2

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	32	01	00 - Get	00	00	

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				10 - Get + CS			
Response for GET	6D643C	32	01	00 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte represents the MOST FOT State:
- 00 Disable
- 01 Enable

Example :
"SET MOST FOT ON"

- TX: 6D643E 32 01 01 00 01 **01**
- RX: 6D643C 32 01 01 01 01 01

"SET MOST FOT OFF"

- TX: 6D643E 32 01 01 00 01 **00**
- RX: 6D643C 32 01 01 01 01 00

"GET" MOST FOT status

- TX: 6D643E 32 01 00 00 00
- RX: 6D643C 32 01 00 01 01 XX (**XX** - value depends on the status of MOST FOT being ON or OFF.)

6.1.3.7.2 32 02 MOST FOT Self Test Status

The SW shall give MOST FOT self-test Status information upon using the GET command

Command Type	Prefix	Group ID	Test ID	Operation	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	32	02	00 - Get 10 - Get + CS	00	0x00	
Request for GET	6D643C	32	02	00 - Get 10 - Get + CS	Note 1	0x01	Note 2

Note 1 - This byte indicates the command processing status
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - Response: MOST FOT Self test Result
0x00 - MOST FOT Self test FAILED
0x01 - MOST FOT Self test PASSED

Example:

GET 'SELF TEST' status

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TX: 6D643E 32 02 00 00 00

RX: 6D643C 32 02 00 01 01 **XX** (XX - value depends on the status of MOST FOT being ON or OFF.)

6.1.3.7.3 32 03 MOST FOT Audio Loopback Test Routine

Upon receiving the command the system shall perform a Audio selftest(J6 <-> MOST) from J6 to the MOST FOT and report the result.

Command Type	Prefix	Group ID	Test ID	Operation	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	32	03	00 - Get 10 - Get + CS	00	0x00	
Request for GET	6D643C	32	03	00 - Get 10 - Get + CS	Note 1	0x01	Note 2

Note 1 - This byte indicates the command processing status

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - Response: MOST FOT Self test Result

0x00 - MOST FOT Self test FAILED

0x01 - MOST FOT Self test PASSED

Example:

"Set MOST FOT Selftest active"

- TX: 6D643E 32 03 00 00 00
- RX: 6D643C 32 03 00 01 01 01

6.1.3.8 LIN Group (0x36)

6.1.3.9 36 01 ECL Electrical control line enable/disable

The software shall enable/disable the ECL upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	36	01	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	36	01	01 - Set 11 - Set + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte represents the ECL State:

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- 00 Disable
- 01 Enable

Example :
"SET ECL ON"

- TX: 6D643E 36 01 01 00 01 **01**
- RX: 6D643C 36 01 01 01 01 01

"SET ECL OFF"

- TX: 6D643E 36 01 01 00 01 **00**
- RX: 6D643C 36 01 01 01 01 00

6.1.3.10 Memory Features Group (0x66)

6.1.3.10.1 66 01 Memory Read / Write

The software shall permit to configure the units memory and support both reading (GET) and writing (SET) into EPROM memory blocks.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1-#4	Data Byte #5	Data Byte #6-#n
Request for SET	6D643E	66	01	01 - Set 11 - Set + CS	00	Note 2	Note 3	Note 4	Note 5
Response for SET	6D643C	66	01	01 - Set 11 - Set + CS	Note 1	Note 2	Note 3	Note 4	Note 5

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1-#4	Data Byte #5	Data Byte #6-#n
Request for GET	6D643E	66	01	00 - Get 10 - Get + CS	00	05	Note 3	Note 4	
Response for GET	6D643C	66	01	00 - Get 10 - Get + CS	Note 1	Note 2	Note3	Note 4	Note 5

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - length of Number of Data bytes.
Note 3 - The command uses a 4-byte address structured as follows:

- Data byte #1-#2: Represent the NvM Block Identifier (the block that supports the operation).
- Data bytes #3-#4: Represent the offset, where the read/write operation begins.
  offset + number of data bytes must be less than the block size to ensure the operation stays within the block boundaries.

Note 4 - Number of Memory bytes: Number of memory data bytes to read or to write.
Note 5 - Values read from or to be written in memory. Data Byte #6 is MSB.

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ManDiagID (Block ID)	NvM autosar ID	Block size
0x01	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_Ident	108
0x02	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_Nv	20
0x03	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_01	50
0x04	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_02	292
0x05	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_03	292
0x06	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_04	84
0x07	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_05	178
0x08	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_06	114
0x09	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_07	114
0x0A	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_08	178
0x0B	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_09	292
0x0C	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_10	784
0x0D	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_11	84
0x0E	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_VariantString	84
0x0F	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_RT1	44
0x10	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_DTC	250
0x11	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_RT2	60
0x12	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_12	360
0x13	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_13	360
0x14	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_14	292
0x15	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_RT3	168
0x16	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_15	200
0x17	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_16	364
0x20	NvMConf_NvMBlockDescriptor_NvMBlock_SYSMAN	64
0x21	NvMConf_NvMBlockDescriptor_NvMBlock_DbgTrace_Levels	66
0x22	NvMConf_NvMBlockDescriptor_NvMBlock_Thermal_Mon	42
0x30	NvMConf_NvMBlockDescriptor_NvMBlock_PersistenceManDiag	64
0x50	NvMConf_NvMBlockDescriptor_NvMBlock_CPV_BAP_APP	96
0x51	NvMConf_NvMBlockDescriptor_NvMBlock_CPV_AMFM_PARAM	248
0x52	NvMConf_NvMBlockDescriptor_NvMBlock_CPV_DBG_TRACE_LEVEL_CFG	96
0x53	NvMConf_NvMBlockDescriptor_NvMBlock_CPV_AMFM_MNGR_LSM	32

Example :

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GET EEPROM data (read 6 bytes from address)

- TX: 6D643E 66 01 00 00 05 00 10 00 03 06
- RX: 6D643C 66 01 00 01 0B 00 10 00 03 06 AA BB CC DD EE FF

Write 6 Bytes from EEPROM

- TX: 6D643E 66 01 01 00 0B 00 02 00 03 06 AA BB CC DD EE FF
- RX: 6D643C 66 01 01 01 0B 00 02 00 03 06 AA BB CC DD EE FF

6.1.3.10.2 66 02 Factory Defaults

The software shall reset the given EEPROM memory block to ROM defaults upon reception.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte
Request for SET	6D643E	66	02	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	66	02	01 - Set 11 - Set + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.

- 00 The diagnostic command failed or was not executed for some reason.

- XX Refer PPM4-159724

Note 2 - This byte represents the EEPROM Block Number

Supported block number range is 01 to 17,20 to 22,30,50 to 53, and FF for all

Note : Supporting below block IDs to reset the EPROM memory Blocks to default data

ManDiagID	NvM autosar ID	Applicable Blocks
0x01	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_Ident	NA
0x02	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_Nv	Applicable
0x03	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_01	Applicable
0x04	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_02	Applicable
0x05	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_03	Applicable
0x06	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_04	Applicable
0x07	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_05	Applicable
0x08	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_06	Applicable
0x09	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_07	Applicable

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0x0A	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_08	Applicable
0x0B	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_09	Applicable
0x0C	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_10	Applicable
0x0D	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_11	Applicable
0x0E	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_VariantString	Applicable
0x0F	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_RT1	Applicable
0x10	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_DTC	Applicable
0x11	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_RT2	Applicable
0x12	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_12	Applicable
0x13	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_13	Applicable
0x14	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_14	Applicable
0x15	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_RT3	Applicable
0x16	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_15	Applicable
0x17	NvMConf_NvMBlockDescriptor_NvMBlock_DiagCust_General_16	Applicable
0x20	NvMConf_NvMBlockDescriptor_NvMBlock_SYSMAN	Applicable
0x21	NvMConf_NvMBlockDescriptor_NvMBlock_DbgTrace_Levels	Applicable
0x22	NvMConf_NvMBlockDescriptor_NvMBlock_Thermal_Mon	Applicable
0x30	NvMConf_NvMBlockDescriptor_NvMBlock_PersistenceManDiag	Applicable
0x50	NvMConf_NvMBlockDescriptor_NvMBlock_CPV_BAP_APP	Applicable
0x51	NvMConf_NvMBlockDescriptor_NvMBlock_CPV_AMFM_PARAM	Applicable
0x52	NvMConf_NvMBlockDescriptor_NvMBlock_CPV_DBG_TRACE_LEVEL_CFG	Applicable
0x53	NvMConf_NvMBlockDescriptor_NvMBloc	Applicable

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	k_CPV_AMFM_MNGR_LSM	

Example:

Reset the EEPROM Block 02 to default values

TX: 6D643E 66 02 01 00 01 02

RX: 6D643C 66 02 01 01 01 02

6.1.3.10.3 66 04 Save Persistence

The Software shall save all information into memory, without the need for a Sleep-Cycle (or Power-Cycle), when this routine is triggered, upon reception of Save Persistence

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1
Request for SET	6D643E	66	04	01 - Set 11 - Set + CS	00	00	
Response for SET	6D643C	66	04	01 - Set 11 - Set + CS	Note 1	01	Note 2

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1
Request for GET	6D643E	66	04	00 - Get 10 - Get + CS	00	00	
Response for GET	6D643C	66	04	00 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - Possible values for the operation result are

- 01 Pass - Data was saved/updated correctly

Example:

"SET to Save all EPROM memory Blocks data permanently."

TX: 6D643E 66 04 01 00 00

RX: 6D643C 66 04 01 01 01 01

"GET the status of this command."

TX: 6D643E 66 04 00 00 00

RX: 6D643C 66 04 00 01 01 01

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6.1.3.11 A2B Feature Group(0x38)

6.1.3.11.1 38 00 A2B Operation Mode

38 00 A2B Operation Mode

The software shall change the operation mode of the A2B chip / bus upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1	Data Byte 2
Request for SET	6D643E	38	00	01 - Set 11 - Set + CS	00	02	Note 2	Note 3
Response for SET	6D643C	38	00	01 - Set 11 - Set + CS	Note 1	00		

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1	Data Byte 2
Request for GET	6D643E	38	00	00 - Get 10 - Get + CS	00	01	Note 2	
Response for GET	6D643C	38	00	00 - Get 10 - Get + CS	Note 1	02	Note 2	Note 3

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer FPPM4-159724

Note 2 - This byte represents the A2B transceiver device number which will depend on product specification
- 01 for A2B Master transceiver 1
- 02 for A2B Master transceiver 2
- XX others are invalid

Note 3 - This byte represents the different operational Modes, depending on product specification

ID	Operation Mode
00	A2B BUS in Normal Mode (by default mode)
01	A2B BUS in Line In Slave Mode
02	A2B BUS in Loopback Mode

Example :
"SET" A2B Operational Mode to "Loopback mode - 02 " for A2B Master 1 transceiver device number "01"

- **TX:** 6D643E 38 00 01 00 02 **01 02**
- **RX:** 6D643C 38 00 01 01 00

"GET" Read the current A2B Operational Mode for A2B Master 1 transceiver device number "01"

- **TX:** 6D643E 38 00 00 00 01 **01**
- **RX:** 6D643C 38 00 00 01 02 **01 02**

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6.1.3.11.2 38 01 A2B Bus Status

38 01 A2B Bus Status

The software shall return the current bus status and also how many nodes the system has detected in the the A2B network upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4
Request for GET	6D643E	38	01	00 - Get 10 - Get + CS	00	01	Note 2			
Response for GET	6D643C	38	01	00 - Get 10 - Get + CS	Note 1	04	Note 2	Note 3	Note 4	Note 5

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer FPPM4-159724

Note 2 - This byte represents the A2B transceiver device number which will depend on product specification
- 01 for A2B Master transceiver 1
- 02 for A2B Master transceiver 2
- XX others are invalid

Note 3 - This byte gives status of A2B bus enable and disable.
- 00 OFF
- 01 ON

Note 4 - This byte gives No. of A2B slaves connected to A2B bus. and Expected Slave count based on configuration.

Note 5 - This byte displays the Fault Code, depending on product specification

ID	Fault Code
00	**Working : No Line Fault**
01	**Error: Open A2B interface wire**
02	**Error: Short between A2B interface wires**
03	**Error: Short of A2B interface wire to GND**
04	**Error: Short of A2B interface wire to V_Battery**
05	**Error: Reverse of A2B interface wires / Defective Node**
FF	**Error: unknown error**

Example :
"GET" Read the current A2B Bus status for A2B transceiver device number "01" - If ConBox/External Amplifier is connected

- **TX:** 6D643E 38 01 00 00 01 **01**

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- **RX:** 6D643C 38 01 00 01 04 01 01 01 00 - 1 Slave detected with with No Line fault

"GET" Read the current A2B Bus status for A2B transceiver device number "02"

- **TX:** 6D643E 38 01 00 00 01 **02**
- **RX:** 6D643C 38 01 00 00 04 02 00 00 00 - No slave detected with No Line fault

6.1.3.11.3 38 02 A2B Line Fault Diagnostics

Upon receiving the GET command the system shall report the status Line Fault diagnostic of the selected A2B bus interface.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1	Data Byte 2
Request for GET	6D643E	38	02	00 - Get 10 - Get + CS	00	01	Note 2	
Response for GET	6D643C	38	02	00 - Get 10 - Get + CS	Note 1	02	Note 2	Note 3

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer FPPM4-159724

Note 2 - Request: A2B transceiver device number
0x01 – A2B transceiver 1 - BOOST
0x02 – A2B transceiver 2 - MIC

Note 3 - A2B Line Fault code
0x00 – no Line Fault
0x01 – Error: Open A2B interface wire
0x02 – Error: Short between A2B interface wires
0x03 – Error: Short of A2B interface wire to GND
0x04 – Error: Short of A2B interface wire to V_Battery
0x05 – Error: Reverse of A2B interface wires
0x06 – Error: Defective Node
0xFF – Error: unknown error

Example 1:
GET Line Fault status of A2B bus interface 1:
TX: 6D643E 38 02 00 00 01 01
RX: 6D643C 38 02 00 01 02 01 02
(The Line Fault diagnostic detects a short between the wires of A2B master transceiver #1)

6.1.3.12 Diagnostics Part Feature Group(0x50)

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6.1.3.12.1 50 01 Temperature Sensors

The software shall get the temperatures values from the different sensor upon reception . Temperature values can take both positive and negative value, its necessary to make sure the value reported for temperature are expressed in an absolute way and signal indication is also present on the system response.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Frame number	Data Byte 1	Data Byte 2
Request for GET	6D643E	50	01	00 - Get 10 - Get + CS	00	01	Note 2		
Response for GET	6D643C	50	01	00 - Get 10 - Get + CS	Note 1	03	Note 2	Note 3	Note 4

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte indicates the Component ID from where the temperature will be measured

ID	Component	MIB4
01	Main Board (IOC)	Supported
02	MOST FOT	Supported
05	RSC (J6)	Supported
06	MMX PMIC	Supported
07	MMX MEM	Supported
08	MMX SOC	Supported

Note 3 - This by indicates the temperature Signal possible values:
- 00 Positive
- 10 Negative

Note 4 - Temperature value in absolute representation

Example:
"GET MMX RSC Temperature

- TX: 6D643E 50 01 00 00 01 05
- RX: 6D643C 50 01 00 01 03 05 00 2F

6.1.3.12.2 50 04 FAN Status and RPM Set

The software shall change the FAN state upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1	Data Byte 2
Request for SET	6D643E	50	04	01 - Set 11 - Set + CS	00	02	Note 2	Note 3
Response for				01 - Set				

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SET	6D643C	50	04	11 - Set + CS	Note 1	01	Note 2	

The software shall return the FAN state and RPM upon reception of this command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1	Data Byte 2	Data Byte 3
Request for GET	6D643E	50	04	00 - Get 10 - Get + CS	00	01	Note 2		
Response for GET	6D643C	50	04	00 - Get 10 - Get + CS	Note 1	03	Note 2	Note 4	Note 4

Note 1: This byte indicates the command processing status:
- 01: The diagnostic command was executed successfully.
- 00: The diagnostic command failed or was not executed for some reason.
- XX: Refer PPM4-159724

Note 2: This represents the FAN ID:
- 00: Main FAN
- 01: Mini FAN 1
- 02: Mini FAN 2
- 03: Mini FAN 3
- xx Not supported

Note 3: This byte represents the FAN speed in percentage
eg:
- 00: 0%
- 0F: 15%
- 19: 25%
- 32: 50%
- 50: 80%
- 5B: 91%

Note 4: This byte represents the FAN speed in RPM
0x00 .. 0xFF - Fan RPM LSB Byte, MSB Byte

Example :
"SET" FAN to 50% for Main FAN

- **TX:** 6D643E 50 04 01 00 02 **00 32**
- **RX:** 6D643C 50 04 01 **01** 01 00

"GET" Read the current FAN speed (in RPM) of Main FAN

- **TX:** 6D643E 50 04 00 00 01 **00**
- **RX:** 6D643C 50 04 00 01 03 00 16 80

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6.1.3.12.3 50 06 Amplifier DC Resistance

The software shall get the DIM output load DC Resistance for all the Amplifier Channels:
DB08-ADDR:"I0101000" - CH 1 - DIM output load DC Resistance
DB11-ADDR:"I0101011" - CH 2 - DIM output load DC Resistance
DB14-ADDR:"I0101110" - CH 3 - DIM output load DC Resistance
DB17-ADDR:"I0110001" - CH 4 - DIM output load DC Resistance

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1-2	Data Byte 3-4
Request for GET	6D643E	50	06	00 - Get 10 - Get + CS	00	00		
Response for GET	6D643C	50	06	00 - Get 10 - Get + CS	Note 1	08	Note 2	Note 2

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 -

Data Byte # 1-2:
CH1 DC Resistance Value Data

Byte # 3-4: CH2
DC Resistance Value Data

Byte # 5-6:
CH3 DC Resistance Value

Data Byte # 7-8:
CH4 DC Resistance Value

Example :

"GET Amplifier DC Resistance"

- TX: 6D643E 50 06 00 00 00
- RX: 6D643C 50 06 00 01 08 00 00 00 00 00 00 00 00

6.1.3.12.4 50 0C Antenna Diagnostics

The software shall check the current status of each interface upon reception of this command. The status is based on the Diagnostic Values [mA] of each interface.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1	Data Byte 2
Request for GET	6D643E	50	0C	00 - Get 10 - Get + CS	00	01	Note 2	
Response for GET	6D643C	50	0C	00 - Get 10 - Get + CS	Note 1	02	Note 2	Note 3

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.

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- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - Antenna

ID	Antenna	Supported Diagnostic
01	FM/AM	All
02	FM	All
03	DRADIO	All
04	GPS	to be determined

Note 3 - Diagnostic Status

ID	Diagnostic Status
00	Open
01	Normal
02	Short to GND
03	Fault (Short by battery)

Example:

GET Diagnostic Status of FM Antenna"

- TX: 6D643E 50 0C 00 00 01 **02**
- RX: 6D643C 50 0C 00 01 02 02 00

6.1.3.13 DTC Features Group (0x51)

6.1.3.13.1 51 01 DTC monitoring Enable or disable

51 01 DTC Monitoring Enable or disable

This feature will be used for controlling the status of the underlying DTC routines. When enabled, all DTC routines shall perform their usual diagnostics. Otherwise (disable state), the routine shall be stopped and therefore not able to mark DTCs in the system.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for SET	6D643E	51	01	01 - Set 11 - Set + CS	00	01	Note 2
Response for SET	6D643C	51	01	01 - Set 11 - Set + CS	Note 1	01	Note 2

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1
Request for GET	6D643E	51	01	00 - Get 10 - Get + CS	00	00	

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Response for GET	6D643C	51	01	00 - Get 10 - Get + CS	Note 1	01	Note 2

Note 1 - This byte indicates the command processing status
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer FPPM4-159724

Note 2 - This byte enables/disables the DTC monitoring function:
- 00 Disable
- 01 Enable

Example:

"SET DTC Monitoring Status to OFF"

- TX: 6D643E 51 01 01 00 01 00
- RX: 6D643C 51 01 01 01 01 00

"SET DTC Monitoring Status to ON"

- TX: 6D643E 51 01 01 00 01 01
- RX: 6D643C 51 01 01 01 01 01

"GET DTC Monitoring Status"

- TX: 6D643E 51 01 00 00 00
- RX: 6D643C 51 01 00 01 01 xx - shows enable or Disable

6.1.3.13.2 51 02 DTC clear defaults

51 02 DTC clear defaults

This routine will clear every record of previous DTCs registered in the system.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes
Request for SET	6D643E	51	02	01 - Set 11 - Set + CS	00	00
Response for SET	6D643C	51	02	00 - Get 10 - Get + CS	Note 1	00

Note 1 - This byte indicates the command processing status
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer FPPM4-159724

Test sequence:

first attempt - you will get pending response because DTC clearing process takes few seconds based on no. of active DTCs.

- TX: 6D643E 51 02 01 00 00
- RX: 6D643C 51 02 01 AA 00

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Second attempt

- TX: 6D643E 51 02 01 00 00
- RX: 6D643C 51 02 01 01 00

6.1.3.13.3 51 03 DTC Number of faults

51 03 Number of DTCs

This routine shall report the number of DTCs that the system currently detected upon reception.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1	Data Byte 2
Request for GET	6D643E	51	03	00 - Get 10 - Get + CS	00	00		
Response for GET	6D643C	51	03	00 - Get 10 - Get + CS	Note 1	01	Note 2	

Note 1 - This byte indicates the command processing status
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer FPPM4-159724

Note 2 - Count of number of active DTCs.

Example:

"GET Number of DTCs "

- TX: 6D643E 51 03 00 00 00
- RX: 6D643C 51 03 00 01 02 00 02

6.1.3.13.4 51 04 List of DTCs

This routine shall output a list of all active DTCs in the system upon reception.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Frame number	Data Byte 1	Data Byte 2	Data Byte 3
Request for GET	6D643E	51	04	00 - Get 10 - Get + CS	00	01	Note 3			
Response for GET	6D643C	51	04	00 - Get 10 - Get + CS	Note 1	Note 2	Note 3	DTC1 Byte1, Note 4	DTC1 Byte2, Note 4	DTC1 Byte3, Note 4

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer FPPM4-159724

Note 2 - no of Data Bytes - This number will depend on the number of elements (DTCs) for the list being returned.

Note 3 - Frame number

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Note 4- This byte represents the DTC Number. Each DTC will be identified by 3 bytes.

Note - Link for List of DTCs

Example:

GET List of Active DTCs- Assuming 18 DTCs are set

- TX: 6D643E 51 04 00 00 01 **01**
- RX: 6D643C 51 04 00 01 31 01 00 00 05 00 00 06 00 06 13 00 06 14 D1 00 00 D2 00 00 EA 64 00 00 1A 29 00 1A 3B 00 1A 2C 00 1A 2E 00 1A 32 00 1A 34 00 1A 39 00 1A 3A 00 07 3A
- TX: 6D643E 51 04 00 00 01 **02**
- RX: 6D643C 51 04 00 01 07 02 00 06 06 00 06 89

6.1.3.13.5 51 05 Read Extended data

51 05 Read extended MBV by DTC Number

This routine will receive a DTC Number and will return the "Extended DTC data" information associated with such DTC.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte 1	Data Byte 2	Data Byte 3
Request for GET	6D643E	51	05	00 - Get 10 - Get + CS	00	03	Note 2		
Response for GET	6D643C	51	05	00 - Get 10 - Get + CS	Note 1	Note 3	Note 4		

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2- DTC Number

Note 3 - no of Data Bytes

Note 4- Extended data info of requested DTC

Example:

"GET extended data for given active DTC "

- TX:6D643E 51 05 00 00 03 **00 06 89**
- RX: 6D643C 51 05 00 01 28 00 06 89 01 02 01 02 FF FF FF FF 00 01 FF FF FF FF 48 75 07 03 07 03 03 07 03 06 06 06 07 07 03 03 03 03 03 03 03 03

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6.1.3.14 Software Features Group (0x64)

6.1.3.14.1 64 01 Software ID

Upon receiving the command the system shall report the requested SW ID

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #n
Request for GET	6D643E	64	01	00 - Get 10 - Get + CS	00	01	Note 2	
Response for GET	6D643C	64	01	00 - Get 10 - Get + CS	Note 1	n data bytes	Note 2	note 3

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte indicates the Component ID.

ID	Component	Size(in bytes)	MIB4
0x01	Companion processor (Jacinto) (RSC board)	04	Applicable
0x02	IOC (RSC board)	04	Applicable
0x05	CPV (RSC board)	04	Applicable
0x06	CPR (RSC board)	04	Applicable
0x08	VICS chip (RSC board)		NA
0x09	SDARS chip (RSC board)		Applicable(NAR Variant dependent)
0x0C	INIC chip (RSC board)	03	Applicable
0x10	Mercury (Tuner IC 2) (RSC board)	06	Applicable
0x11	Titan (Tuner IC 1) (RSC board)	06	Applicable
0x12	Merlin (Tuner IC 3) (RSC board)	05	Applicable
0x21	HD BBP		
0x22	TNRREF	12	Applicable
0x23	TNRDIAG	12	Applicable

Note 3 - Extended data info of requested Software ID

Example :

"GET SW ID of IOC (RSC board)"

- TX: 6D643E 64 01 00 00 01 02
- RX: 6D643C 64 01 00 01 05 02 30 30 30 31

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6.1.3.14.2 64 02 Software Version

Upon receiving the command the software shall report the requested SW version string of the various partitions of the IOC or Jacinto.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #n
Request for GET	6D643E	64	02	00 - Get 10 - Get + CS	00	Note 2	Note 3	Note 4	
Response for GET	6D643C	64	02	00 - Get 10 - Get + CS	Note 1	n data bytes	Note 3	Note 4	Note 5

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - Number of data bytes to transmit

0x01- IOC

0x02 - Jacinto

Note 3 - µC Processor ID

0x01 - IOC

0x02 - Jacinto

Note 4 - Partition number

IOC has no partitions hence, Data starts from Data Byte #2 in response

Jacinto -

Partition Number	Partition
0x01	IPL
0x02	DIAG
0x03	EMBOOT
0x04	STDBOOT
0x05	STDFLASH
0x07	STORAGE
0x08	BOOT1
0x09	BOOT2
0x12	DSP
0x13	FSC
0x14	VIP1
0x15	VIP2
0x17	ROUTER
0x18	HOME

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0x20	DSP_RO
0x21	DSP_RW
0x22	PA
0x23	ROUTER2

Note 5 -SW Version String (with variable length of bytes)

Example :

"GET SW version of IOC"

- TX: 6D643E 64 02 00 00 01 01
- 6D643C 64 02 00 01 3B 01 49 4F 43 5F 32 30 32 36 30 31 32 34 5F 43 4C 34 35 2F 31 63 61 38 38 35 36 36 39 32 66 33 39 31 39 39 62 37 62 61 35 64 37 31 64 64 38 64 37 61 33 36 66 38 61 36 65 31 36 64

"GET SW version of Jacinto- IPL partition "

- TX: 6D643E 64 02 00 00 02 02 01
- RX: 6D643C 64 02 00 01 35 02 01 4D 49 42 33 54 4F 50 5F 45 52 20 43 50 41 5F 43 4C 34 35 5F 32 30 32 35 31 32 32 31 2E 32 20 32 30 32 35 2F 31 32 2F 32 31 20 32 31 3A 35 37 3A 33 39 20

6.1.3.14.3 64 03 Software Hash

Upon receiving the command the software shall report the requested SW checksum of the various partitions(byte 2) of the flash memory listed in data byte 1#. The software shall internally calculate the 32-bit checksum of it's flash memory partition content of non changeable data sections.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4	Data Byte #5	Data Byte #6
Request for GET	6D643E	64	03	00 - Get 10 - Get + CS	00	Note 2	Note 3	Note 4				
Response for GET	6D643C	64	03	00 - Get 10 - Get + CS	Note 1	06	Note 3	Note 4	Note 5	Note 5	Note 5	Note 5

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - Number of data bytes to transmit
0x01 - Tuner
0x02- IOC,J6
Note 3 - Request: uC Processor:
0x01 - IOC
0x02 - J6
0x03 - Tuner
Note 4- Request: Partition checksum
Tuner : zero partitions

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IOC:
0x01 - OTP BootLoader Checksum
0x02 - Boot Path B Checksum
CPA:

Partition Number	Partition
0x02	DIAG
0x03	EMBOOT
0x04	STDBOOT
0x05	STDFLASH
0x08	BOOT1
0x09	BOOT2
0x12	DSP
0x14	VIP1
0x15	VIP2
0x17	ROUTER
0x20	DSP_RO
0x23	ROUTER2

Response: Memory partition checksum
Echo from request command

Data Byte # 3 - Data Byte # 6:
Note 5- Response: Memory partition checksum
0x00 .. 0xFF - Memory Checksum Byte 1
0x00 .. 0xFF - Memory Checksum Byte 2
0x00 .. 0xFF - Memory Checksum Byte 3
0x00 .. 0xFF - Memory Checksum Byte 4

Example:
"GET Memory Checksum of Tuner":
TX: 6D643E 64 03 00 00 01 03
RX: 6D643C 64 03 00 01 05 03 66 37 ED 4A

Example response string : AA11BB22 - means 32bit checksum of 0xAA11BB22

6.1.3.14.4 64 12 Software IOC Signature

Upon receiving the command the system shall report the requested IOC SW Signature.
- The IOC SW Signature shall exclude the CEK-encrypted class keys areas, and it shall be unique for all the units with same IOC SW Package.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte # ...	Data Byte #16
Request for				00 - Get					

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GET	6D643E	64	12	10 - Get + CS	00				
Response for GET	6D643C	64	12	00 - Get 10 - Get + CS	Note 1	0x16	MSB, Note 2	....	LSB, Note 2

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.

Note 2 - SW Signature
Data byte #1 - byte #16: 128 bits = 16 bytes
(MSB) ----- (LSB)

6.1.3.15 I/O Port Features Group (0x82)

6.1.3.15.1 82 01 GPIO Ports Control

Upon receiving the SET command the system shall control the output value of the selected bit of the selected GPIO port.
Upon receiving the GET command the system shall read the current value of the selected bit of the selected GPIO port.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3
Request for SET	6D643E	82	01	01 - Set 11 - Set +CS	00	03	Note 2	Note 3	Note 4
Response for SET	6D643C	82	01	01 - Set 11 - Set +CS	Note 1	03	Note 2	Note 3	Note 4

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No. of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3
Request for GET	6D643E	82	01	00 - Get 10 - Get + CS	00	02	Note 2	Note 3	
Response for GET	6D643C	82	01	00 - Get 10 - Get + CS	Note 1	03	Note 2	Note 3	Note 4

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte represents the I/O Port ID to interact
Note 3 - This byte represents the Pin ID
Note 4 - Pin status
0x00 - OFF (low)
0x01 - ON (high)

Port ID	Pin ID	Signal	Port type	MIB4
0x00(PORT 0)	0x00	PI_POWER_ALWAYS_ON	Output	NA
	0x01	HK_MCM_PWR_EN	Output	Applicable
	0x02	CAN1_HK_MIB_RX	Input	NA

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	0x03	CAN1_MIB_TX	Output	NA
	0x04	HK_CAN2_INFO_TX	Output	NA
	0x05	CAN2_HK_INFO_RX	Input	NA
	0x06	FOT_STATUS_ACTIVITY_N	Input	Applicable
	0x07	HK_CAN1_ERROR_N	Input	Applicable
	0x08	MCM_PGOOD_OC	Input	Applicable
	0x09	HK_RBD_LIN_HK_RXD	Input	NA
	0x0A	HK_RBD_LIN_TXD	Output	Applicable
	0x0B	HKP_EXPANDER_I2C_SDA	Input	NA
	0x0C	JHKP_EXPANDER_I2C_SCL	Input	Applicable
	0x0D	MMX_HK_UART0_RXD	Input	NA
	0x0E	HK_MMX_UART0_TXD	Output	NA
0x01(PORT 1)	0x00	J6_HK_RXD_UART3	Input	NA
	0x01	HK_TXD_J6_UART3	Output	NA
	0x02	PPU_ZRRESET_CLEAR	Output	Applicable
	0x03	HK_MCM_S2R_WAKE	Output	Applicable
	0x04	PWR_RESET_FLAG	Input	Applicable
	0x05	HK_CAN2_ERROR_N	Input	Applicable
	0x06	MCM_HK_B2B_TRUE	Input	Applicable
	0x07	PPU_INIC_RESET_N	Output	Applicable
	0x08	QL_HK_RXD_DBG	Input	NA
	0x09	HK_TXD_QL_DBG	Output	NA
	0x0A	HK_MCM_RESET_N	Output	Applicable
	0x0B	HK_FLASH_RESET_N	Output	Applicable
0x02(PORT AP0)	0x00	VBAT_HK_SENSE	Input	Applicable
	0x01	BOARD_TEMP_SENSE	Input	Applicable
	0x02	MOST_FOT_TEMP_SENSE	Input	Applicable
	0x03	ANT_AMFM_I_SENSE	Input	Applicable
	0x04	VNC_U_SENSE	Input	Applicable
	0x05	ANT_DRADIO_I_SENSE	Input	Applicable
	0x06	A2BPHT_I_SENSE	Input	Applicable
	0x07	GSML_PHT_I_SENSE	Input	Applicable
	0x08	ANT_GPS_I_SENSE	Input	Applicable
	0x09	PPU_MMX_PMIC_PWRON	Output	Applicable
	0x0A	MIC1_U_SENSE	Input	Applicable

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	0x0B	MIC_U_REF	Input	Applicable
	0x0C	MIC2_U_SENSE	Input	Applicable
	0x0D	RBIAS_CODE_0	Input	Applicable
	0x0E	RBIAS_CODE_1	Input	Applicable
	0x0F	RBIAS_CODE_2	Input	Applicable
0x03(PORT AP1)	0x00	3V3_J6_PGOOD	Input	Applicable
	0x01	USB3_1K_SENSE	Input	Applicable
	0x02	1V8_J6	Input	Applicable
	0x03	QL_UIB_RESET_N	Input	Applicable
	0x04	PPU_KL30_SW_EN	Output	Applicable
	0x05	HK_J6_GPIO_2	Output	Applicable
	0x06	HK_J6_GPIO_1	Output	Applicable
	0x07	HK_J6_GPIO_0	Output	Applicable
0x04(PORT JTAG)	0x00	Pin 0	Input	Applicable
	0x01	Pin 1	Input	Applicable
	0x02	Pin 2	Input	Applicable
	0x03	Pin 3	Input	Applicable
	0x04	Pin 4	Input	Applicable
	0x05	Pin 5	Input	Applicable
	0x06	Pin 6	Input	Applicable
0x05(PORT INPUT0)	0x00	Pin 0	Output	Applicable
0x08(PORT 8)	0x00	MMX_PPU_S2R_STATE1_N	Input	Applicable
	0x01	PWR_BOOST_STATE_N	Input	Applicable
	0x02	MCM_SYS_WAKEUP_N	Input	Applicable
	0x03	PO_PPU_MMX_SOC_WRESET	Output	Applicable
	0x04	CAN2_INF_HK_WAKEUP_N	Input	NA
	0x05	AN1_MIB_HK_WAKEUP_N	Input	NA
	0x06	HK_FAN3_CTRL	Output	Applicable
	0x07	PPU_5V_SW_PWR_EN	Output	Applicable
	0x08	HK_B2B_FORCE_RECOVERY	Output	Applicable
	0x09	PPU_BST_FB_EN	Output	Applicable
	0x0A	HK_CAN1_EN	Output	Applicable
	0x0B	CAN2_EN	Output	Applicable

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	0x0C	PPU_3V3_CAN_PWR_EN	Output	Applicable
0x09(PORT 9)	0x00	QL_CRADLE_RX	Input	NA
	0x01	PPU_CSI_PHT_EN	Output	Applicable
	0x02	PPU_5V_TUN_PWR_EN	Output	Applicable
	0x03	PPU_1V8_MMX_PWR_EN	Output	Applicable
	0x04	PPU_1V8_J6_PWR_EN	Output	Applicable
0x0A(PORT 10)	0x00	HK_CAN0RX	Input	NA
	0x01	HK_CAN0TX	Output	NA
	0x02	FAN3_HK_SPEED	Input	Applicable
	0x03	FAN1_HK_SPEED	Input	Applicable
	0x04	HK_5V_SW_PGOOD	Input	Applicable
	0x05	PPU_3V3_TUN_PWR_EN	Output	Applicable
	0x06	RESET_ACK	Input	Applicable
	0x07	HK_J6_RESET_N	Output	Applicable
	0x08	PI_PPUJTAG_FLMD1	Input	Applicable
	0x09	J6_HK_RXD_UART5	Input	NA
	0x0A	HK_TXD_J6_UART5	Output	NA
	0x0B	PMIC_INT_HK	Input	Applicable
	0x0C	HK_ANT_AMFM_EN	Output	Applicable
	0x0D	HK_ANT_FM_EN	Output	Applicable
	0x0E	HK_ANT_DRADIO_EN	Output	Applicable
	0x0F	HK_FAN_CTRL	Output	Applicable
0x0B(PORT 11)	0x00	HK_USB3_DIAG_EN	Output	Applicable
	0x01	PPU_AMP_MUTE	Output	Applicable
	0x02	FAN_HK_SPEED	Input	Applicable
	0x03	PI_HK_UART0_CTS_MMX_B2B	Input	NA
	0x04	HK_A2B_PHT2_PWR_EN	Output	Applicable
	0x05	HK_A2B_PHT2_PWR_EN	Output	Applicable
	0x06	HK_PHT_SENSE_SEL	Output	Applicable
	0x07	HK_ANT_GPS_EN	Output	Applicable
	0x08	HK_FAN2_CTRL	Output	Applicable
	0x09	HK_GMSL_PHT1_PWR_EN	Output	Applicable
	0x0A	HK_UART0_RTS_MMX_B2B	Output	Applicable
	0x0B	PPU_3V3_MMX_PWR_EN	Output	Applicable

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	0x0C	HK_ANT_EMOT_EN	Output	Applicable
	0x0D	PPU_BST_PWR_EN	Output	Applicable
	0x0E	HK_RBD_LIN_EN	Output	Applicable
	0x0F	PPU_3V3_PMIC_PWR_EN	Output	Applicable
0x0C(PORT 12)	0x00	PMIC_PGOOD	Input	Applicable
	0x01	QL_ECALL_MUTE_N	Input	Applicable
	0x02	PPU_1V8_TUN_PWR_EN	Output	Applicable
0x12(PORT 18)	0x00	PPU_1V2_TUN_PWR_EN	Output	Applicable
	0x01	HK_CAN1_STB_N	Output	Applicable
	0x02	HK_CAN2_STB_N	Output	Applicable
	0x03	HK_J6_BOOT_SEL0	Output	Applicable
0x14(PORT 20)	0x04	HK_PMIC_PWR_EN	Output	Applicable
	0x05	HK_FAN1_CTRL	Input	Applicable

Example :

"SET Port 8 Pin 7 (P8_7) to HIGH state"

- TX: 6D643E 82 01 01 00 03 08 07 01
- RX: 6D643C 82 01 01 01 03 08 07 01

"SET Port 8 Pin 7 (P8_7) to LOW state"

- TX: 6D643E 82 01 01 00 03 08 07 00
- RX: 6D643C 82 01 01 01 03 08 07 00

"GET Port 8 Pin 7 (P8_7) state"

- TX: 6D643E 82 01 00 00 02 08 07
- RX: 6D643C 82 01 00 01 03 08 07 XX (**XX** - value depends on the status of Port 8 Pin 7 (P8_7) HIGH or LOW.)

6.1.3.15.2 8C 01 ADC Feature Group

6.1.3.15.2.1 8C 01 ADC Read

The Software shall read a signal A/D channel (Reference to Internal A/D Reference Voltage) upon reception of **Adc_ReadGroup.** Acquiring reading from the A/D port is most needed , since it will be used to check if the Sense circuits are behaving properly.

Prefix	Diagnostics ID	Operation ID	Status	No of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3
Request 6D643E	8C 01	00 - Get 10 - Get + CS	00	01	Channel, Note 2		
Response 6D643C	8C 01	00 - Get 10 - Get + CS	Note 1	03	Channel, Note 2	Reading Value	Reading Value

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						(MSB), Note 3	(LSB), Note 3

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte specifies the Channel that we want to interact with, depending on product specification

Note 3 - This data is 2 bytes of ADC count value.

ManDiag ID	Port	DESC.	MIB4
0x00	AP0	VBATT_HK_SENSE	Applicable
0x01	AP1	BOARD_TEMP_SENSE	Applicable
0x02	AP2	MOST_FOT_TEMP_SENSE	Applicable
0x03	AP3	ANT_FM_I_SENSE	Applicable
0x04	AP3.1	ANT_FMAM_SENSE	Applicable
0x05	AP4	VNC_U_SENSE	Applicable
0x06	AP5	ANT_EMOT_I_SENSE_RC	Applicable
0x07	AP6	A2B_PHT_I_SENSE_MIC	Applicable
0x08	AP6.1	A2B_PHT_I_SENSE_BOOST	Applicable
0x09	AP7	USB_5V_ETH	Applicable
0x0A	AP7.1	GMSL_PHT_I_SENSE	Applicable
0x0B	AP8	ANT_GPS_I_SENS	Applicable
0x0C	AP8.1	ANT_DRADIO_I_SENS	Applicable
0x0D	AP9	MMX_S2R_STATE2_N	NA
0x0E	AP10	MIC1_U_SENSE	Applicable
0x0F	AP11	MIC_U_REF	Applicable
0x10	AP12	MIC2_U_SENSE	Applicable
0x11	AP13	RBIAS_VAR_CODE_0	NA
0x12	AP14	RBIAS_VAR_CODE_1	NA
0x13	AP15	RBIAS_VAR_CODE_2	NA
0x14	AP1.1	USB3_1K_SENSE *(Note block should be checked)	Applicable

NOTE:

To read the ADC from AP1.1 (USB3_1K_SENSE -> 0x14) is needed to first enable Port 11 pin 0 using 8201 command. After read it, that pin should be disable using again the 8201 command.

6.1.3.16 Hardware Features Group

6.1.3.16.1 78 01 Components Hardware ID

The software shall report about the hardware version of the all components (if applicable) upon reception of KEY Name (DR_MD_).

Prefix	Diagnostics ID	Operation ID	Status	# of Data Bytes	Data Byte #1	Data Byte #2		Data Byte #n
Reque	78 01	00 - Get	00	01	Component ID,			

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st 6D643E		10 - Get + CS			Note 2			
Response 6D643C	78 01	00 - Get 10 - Get + CS	Note 1	n	Component ID, Note 2	HW ID MSB, Note 3		HW ID LSB, Note 3

Note 1 - This byte indicates the command processing
status: - 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte represents the Component ID, depending on product specification:

ID	HW Component	Size (in bytes)	MIB4	Description
0x00	Companion processor (Jacinto version)	04		
0x01	Mainboard (variant resistor coding) (RSC board)	04		
0x02	IOC	28		
0x05	Mercury (Tuner IC 2)	08		Data format: X.YYYY.Z where: • X - tuner series • YYYY - device variant • Z - IC version **Ex:** 1.4001.2 (ASCII)
0x06	Titan (Tuner IC 1)	08		Data format: X.YYYY.Z where: • X - tuner series • YYYY - device variant • Z - IC version **EX:** 1.7770.1 (ASCII)
0x07	Merlin (Tuner IC 3)	14		format is: XXXX_vY.ZZ where: • XXXX - device name, SW building block

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				support also TEF7100 predecessor TEF7018 in at least two sub versions, this string gets you device name and sub version as defined by supplier • Y - HW major version • ZZ - HW minor version **EX:** TEF7100D_v2.02 (ASCII)
0x08	VICS chip (RSC board)	-	NA	
0x09	SDARS chip	-	Only for NAR variant	
0x0C	MOST INIC chip	01		
0x0E	1 Gbit Ethernet chip	-	NA	
0x0F	100 Mbit Ethernet chip	03		
0x19	A2B chip	04	NA	
0x1A	A2B chip	04		

Note 3 - Identification of the Software ID for the component, shall arrive in Hex format, example OS81118BFR shall translate to "4f533831313138424652" (ASCII).

Example

"GET HWID Mainboard (variant resistor coding)"

Note: Since the ITS is generally reused for multiple projects the response will have following structure "HW01DAB" and avoid project details.

- TX: 6D643E 78 01 00 00 01 02
- RX: 6D643C 78 01 00 01 1D 02 48 57 5F 31 34 20 42 31 20 28 30 30 31 29 28 52 37 46 37 30 31 35 36 35 20 20 20 29

Note:

For NAR variant you'll have:

- Tuner IC1 - SAF4000
- Tuner IC2 - none
- Tuner IC3 - TEF7100

For rest of world / Asia units:

- Tuner IC1 - SAF7700
- Tuner IC2 - none

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- Tuner IC3 - non

6.1.3.16.2 78 04 Hardware RAM Size

Upon receiving the GET command the system shall report the current DDR3 RAM size. The size shall be reported as Mega Bytes.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No of Data Bytes	Data Byte #1	Data Byte # 2
Request for GET	6D643E	78	04	00 - Get 10 - Get + CS	0x00	0x00		
Response for GET	6D643C	78	04	00 - Get 10 - Get + CS	Note1	0x02	Note 2	Note 2

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - DDR3 RAM Size in hex values to be interpreted in dec (MB)
Data byte #1 :0x00 ... 0xFF
Data byte #2 :0x00 ... 0xFF

Example :
"GET DDR3 RAM size"
TX : 6D643E 78 04 00 00 00
RX : 6D643C 78 04 00 01 02 **01 00**
Note: "01 00" hex value represent size of DDR3 RAM as 256 MB

6.1.3.17 Security Features Group (0x6E)

6.1.3.17.1 6E 01 Public ID

Upon receiving the command the system shall report the requested public ID number of the Jacinto chip or of the IOC chip for certificate generation purpose.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No of Data Bytes	Data Byte #1	Data Byte # 2 - Data Byte # 250
Request for GET	6D643E	6E	01	00 - Get 10 - Get + CS	0x00	0x01	Note 2	
Response for GET	6D643C	6E	01	00 - Get 10 - Get + CS	Note 1	0x10	Note 2	Note 3

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - Public ID No

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0x00 - n.a.

0x01 - Companion processor (Jacinto) (RSC board)

0x02 - IOC (RSC board)

Note 3 - Public ID

(with variable length of bytes)
0x00 .. 0xFF - ID Byte 1
.....
up to
.....
0x00 .. 0xFF - ID Byte 250

Example:
"GET public ID of IOC chip":
TX: 6D643E 6E 01 00 00 01 02
RX: 6D643C 6E 01 00 01 10 02 11 22 33 44 55 66 77 88 99 AA BB CC DD EE FF
0x11 ..... 0xFF -> Public ID

6.1.3.17.2 6E 02 Security certificate presence & intergrity

Upon receiving the command the system shall return if the security certificate is present in the system.
Get certificate presence : (**J6 0x01 and IOC 0x02**)

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No of Data Bytes	Data Byte #1	Data Byte #2
Request for GET	6D643E	6E	02	00 - Get 10 - Get + CS	0x00	0x01	Note 2	
Response for GET	6D643C	6E	02	00 - Get 10 - Get + CS	Note 1	0x02	Note 2	Note 3

Get IOC provisioning status: **0x03**

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3
Request for GET	6D643E	6E	02	00 - Get 10 - Get + CS	0x00	0x01	Note 2		
Response for GET	6D643C	6E	02	00 - Get 10 - Get + CS	Note 1	0x03	Note 2	Note 4	Note 5

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 -
0x00 - n.a.
0x01 - Certificate of companion processor (Jacinto) (RSC board)
0x02 - Certificate of IOC (RSC board)
0x03 – IOC provisioning status

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Note 3 - Result value (For 0x01 and 0x02):
0x00 - certificate NOT present or invalid
0x01 - certificate present AND valid
Note 4 - (For **0x03** (MSB)):
Request: Result value
bit 1 = KEY_6 for VKMS
bit 2 = NA (Reserved for future use)
bit 3 = NA (Reserved for future use)
bit 4 = NA (Reserved for future use)
bit 5 = NA (Reserved for future use)
bit 6 = NA (Reserved for future use)
bit 7 = NA (Reserved for future use)
bit 8 = NA (Reserved for future use)

Note 5 - (For **0x03** (LSB)):
Request: Result value
bit 1 = MEK
bit 2 = BOOT_MAC_KEY
bit 3 = BOOT_MAC (always 0)
bit 4 = KEY_1
bit 5 = KEY_2
bit 6 = KEY_3
bit 7 = KEY_4
bit 8 = KEY_5
Example:
"Get presence of security certificate":

- TX: 6D643E 6E 02 00 00 01 02
- RX: 6D643E 6E 02 00 01 02 02 01 - Certificate present AND valid

"Get IOC Provisioning Status":

- TX: 6D643E 6E 02 00 00 01 03
- RX: 6D643C 6E 02 00 01 03 03 01 FB - IOC key Provisioned

6.1.3.17.3 6E 03 Security certificate deletion

Upon receiving the command the system shall delete security certificate in the system and reply the success of this action.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	# of Data Bytes	Data Byte #1	Data Byte #2
Request for SET	6D643E	6E	03	01 - Set 11 - Set + CS	00	0x01	Note 2	
Response for SET	6D643C	6E	03	01 - Set 11 - Set + CS	Note 1	0x02	Note 2	Note 3

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Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - Certificate
0x00 - n.a.
0x01 - Certificate of companion processor (Jacinto) (RSC board)
0x02 - Certificate of IOC (RSC board

Note 3 - Result value
0x00 - deletion of certificate FAILED
0x01 - deletion of certificate PASSED

Example:
"Set security certificate to be deleted":
TX: 6D643E 6E 03 01 00 01 01
RX: 6D643C 6E 03 01 01 02 01 01

6.1.3.17.4 6E 04 Security Certificate Writing

Upon receiving the command, the system shall write the security certificates in the corresponding flash memory of the system and reply to the success of this action. Due to the high amount of data bytes of the certificates this action will needed to be done in a sequence of writing commands.
The number of commands per sequence will be around 46 if the payload data amount is 45 bytes and while the certification contains around 2kB.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	# of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3
Request for SET	6D643E	6E	04	01 - Set 11 - Set + CS	00	Note 2	Note 3	Note 4	Note 5
Response for SET	6D643C	6E	04	01 - Set 11 - Set + CS	Note 1	0x03	Note 3	Note 4	Note 5

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2- No of data byte
The Maximum number of data byte for Security Certificate writing should be 0x2C
Note 3 - Certificate No.
0x00 - N.A
0x01 - Certificate of companion processor (Jacinto) (RSC board)
0x02 - Certificate of IOC (RSC board)

Note 4 - Frame No.
0x00 - No meaning
0x01 - Frame no. 1 with first 45 bytes portion of certificate data will be send

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0x02 - Frame no. 2 with second 45 bytes portion of certificate data will be send
0x... -
0x... -
0x... -
0x40 - Frame no. 45 with next-to-last 45 bytes portion of certificate data will be send
0x41 - Frame no. 46 with last 45 bytes portion of certificate data will be send

Note 5 - Certificate Status.
Request:
0x00 - No meaning
Response: Result value
0x00 - Writing of certificate (portion) FAILED
0x01 - Writing of certificate (portion) PASSED

6.1.3.17.5 6E 09 IOC Key provisioning

This command is used to send encrypted key container into the IOC device.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	# of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3....#n
Request for SET	6D643E	6E	09	01 - Set 11 - Set + CS	00	Note 2	Note 3	Note 4	Note 5
Response for SET	6D643C	6E	09	01 - Set 11 - Set + CS	Note 1	0x01	Note 3		

Note 2 - The maximum no of data byte of IOC key provisioning should be 0x2C

Note 3 - Frame Number
- Frame number should Start from 01--->nth frame

Note 4 - Max number of Frames
- Max no of frames will be based on IOC encrypted key data.

Note 5 - Encrypted key data
The data transferred into the device are encrypted and no special measures are required to protect them in the manufacturing environment.

6.1.3.18 DAB Features Group (0x20)

6.1.3.18.1 20 01 DAB Frequency

Upon receiving the SET command, the system shall tune to the requested DAB frequency at requested DAB antenna input.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	# of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4	Data Byte #5
Request for SET	6D643E	20	01	01 - Set 11 - Set + CS	00	0x05	DAB Ant. no. (Note 2)	DAB Frequency MSB (Note 3)	DAB Frequency MSB (Note 3)	DAB Frequency LSB (Note 4)	DAB Frequency LSB (Note 4)
Response	6D643C	20	01	01 - Set	Note 1	0x05	DAB	DAB	DAB	DAB	DAB

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for SET				11 - Set + CS			Ant. no. (Note 2)	Frequency MSB (Note 3)	Frequency MSB (Note 3)	Frequency LSB (Note 4)	Frequency LSB (Note 4)

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	# of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4	Data Byte #5
Request for GET	6D643E	20	01	00 - Get 10 - Get + CS	00	0x01	DAB Ant. no. (Note 2)				
Response for GET	6D643C	20	01	00 - Get 10 - Get + CS	Note 1	0x05	DAB Ant. no. (Note 2)	DAB Frequency MSB (Note 3)	DAB Frequency MSB (Note 3)	DAB Frequency LSB (Note 4)	DAB Frequency LSB (Note 4)

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - DAB Antenna No.

DAB Antenna	ID
DAB Antenna no. 1	**01**
DAB Antenna no. 2	**02**

Note 3 - DAB Frequency

0x00 ... 0xFF DAB Frequency (MSB)

Note 4 - DAB Frequency

0x00 ... 0xFF DAB Frequency (LSB)

Example:174.928 MHz

222.064 *1000=222064

HEX (174928) = 0x00, 0x03, 0x63, 0x70

MSB = 0x00, 0x03 LSB = 0x63, 0x70

Example:

"Set DAB Frequency of Antenna no. 1":

TX: 6D643E 20 01 01 00 05 01 00 03 63 70

RX: 6D643C 20 01 01 01 05 01 00 03 63 70

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6.1.3.18.2 20 02 DAB Test Mode

Upon receiving this command, allows specifying which DAB tuner is currently providing audio and forces a certain antenna path to be used that supports testing all antenna paths and all tuners supplying audio.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	# of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3
Request for SET	6D643E	20	02	01 - Set 11 - Set + CS	00	03	Note 2	Note 3	Note 4
Response for SET	6D643C	20	02	01 - Set 11 - Set + CS	Note 1	03	Note 2	Note 3	Note 4

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	# of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3
Request for GET	6D643E	20	02	00 - Get 10 - Get + CS	00	00			
Response for GET	6D643C	20	02	00 - Get 10 - Get + CS	Note 1	03	Note 2	Note 3	Note 4

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - State Option byte

- 00 OFF
- 01 ON

Note 3 - DAB Audio Tuner

0x01 - DAB/FM tuner 6 -> tuner 1

0x02 - DAB/FM tuner 8 -> tuner 2

Note 4 - Antenna

0x01 - DAB Antenna Main

Example:

"SET ON for Tuner 1, Antenna main "

- TX: 6D643E 20 02 01 00 03 01 01 01
- RX: 6D643C 20 02 01 01 03 01 01 01

"GET current Tuner test mode state "

- TX: 6D643E 20 02 00 00 00
- RX: 6D643C 20 02 00 01 03 01 01 01

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6.1.3.18.3 20 03 DAB ensemble ID

Upon receiving the SET command the software shall select the requested DAB ensemble at listed antenna input.
Upon receiving the GET command the software shall return the ensemble ID of selected DAB service at requested antenna input.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	# of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3
Request for SET	6D643E	20	03	01 - Set 11 - Set + CS	00	0x03	DAB Ant. no. (Note 2)	DAB Ensemble value (MSB) (Note 3)	DAB Ensemble value (LSB) (Note 4)
Response for SET	6D643C	20	03	01 - Set 11 - Set + CS	Note 1	0x03	DAB Ant. no. (Note 2)	DAB Ensemble value (MSB) (Note 3)	DAB Ensemble value (LSB) (Note 4)

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	# of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3
Request for GET	6D643E	20	03	00 - Get 10 - Get + CS	00	0x03	DAB Ant. no. (Note 2)		
Response for GET	6D643C	20	03	00 - Get 10 - Get + CS	Note 1	0x03	DAB Ant. no. (Note 2)	DAB Ensemble value (MSB) (Note 3)	DAB Ensemble value (LSB) (Note 4)

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - DAB Antenna No.

DAB Antenna	ID
DAB Antenna no. 1	**01**
DAB Antenna no. 2	**02**

Note 3 - DAB Ensemble value (MSB)
0x00 ... 0xFF DAB Ensemble value (MSB)
Note 4- DAB Ensemble value (LSB)
0x00 ... 0xFF DAB Ensemble value (LSB)

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Example :

"Get Ensemble ID of DAB at Antenna no. 1":
TX: 6D643E 20 03 00 00 01 01
RX: 6D643C 20 03 00 01 03 01 10 08

6.1.3.18.4 20 04 DAB Service ID

SW shall select the requested DAB service at listed antenna input upon receiving the SET command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	# of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3
Request for SET	6D643E	20	04	01 - Set 11 - Set + CS	00	03	DAB Ant. no. Note 2	DAB Service ID (MSB) Note 3	DAB Service ID (LSB) Note 4
Response for SET	6D643C	20	04	01 - Set 11 - Set + CS	Note 1	03	DAB Ant. no. Note 2	DAB Service ID (MSB) Note 3	DAB Service ID (LSB) Note 4

SW shall return the service ID of selected DAB signal at requested antenna input upon receiving the GET command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3
Request for GET	6D643E	20	04	00 - Get 10 - Get + CS	0x00	0x01	DAB Ant. no. Note 2	-	-
Response for GET	6D643C	20	04	00 - Get 10 - Get + CS	Note 1	0x03	DAB Ant. no. Note 2	DAB Service ID (MSB) Note 3	DAB Service ID (LSB) Note 4

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - Request: Antenna No.
0x01 = DAB Antenna no. 1
0x02 = DAB Antenna no. 2

Note 3 - DAB Service ID
Request:
0x00 ... 0xFF DAB Service ID (MSB)
Response:
0x00 ... 0xFF DAB Service ID (MSB)

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Note 4- DAB Service ID

Request:

0x00 ... 0xFF DAB Service ID (LSB)

Response:

0x00 ... 0xFF DAB Service ID (LSB)

Example:

"SET Service ID of DAB at Antenna no. 1"

- **TX:** 6D643E 20 04 01 00 03 XX YY ZZ
- **RX:** 6D643C 20 04 01 01 03 XX YY ZZ

"Get Service ID of DAB at Antenna no. 1":

- **TX:** 6D643E 20 04 00 00 01 01
- **RX:** 6D643C 20 04 00 01 03 01 YY ZZ

Where -

XX - Request: Antenna No.

0x01 = DAB Antenna no. 1

0x02 = DAB Antenna no. 2

YY : DAB service ID (MSB)

ZZ : DAB service ID (LSB)

6.1.3.18.5 20 05 DAB BER

Upon receiving the GET command the system shall return the BER (Bit error rate) of selected DAB service at requested DAB antenna input

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	# of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4	Data Byte #5
Request for GET	6D643E	20	05	00 - Get 10 - Get + CS	00	01	Note 2				
Response for GET	6D643C	20	05	00 - Get 10 - Get + CS	Note 1	05	Note 2	Note 3 (bits 24…31)	Note 3 (bits 16…23)	Note 3 (bits 8…15)	Note 3 (bits 0…7)

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - Antenna Number

0x01 - DAB Antenna no. 1

0x02 - DAB Antenna no. 2

Note 3 - BER value

Data byte #2 : 0x00 ... 0xFF BER (value bits 24...31)

Data byte #3 : 0x00 ... 0xFF BER (value bits 16...23)

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Data byte #4 : 0x00 ... 0xFF BER (value bits 8...15)
Data byte #5 : 0x00 ... 0xFF BER (value bits 0...7)

Example
"Get BER of DAB service at Antenna no. 1"
TX: 6D643E 20 05 00 00 01 01
RX: 6D643C 20 05 00 01 05 01 00 00 00 00

6.1.3.18.6 20 06 SNR (Signal Noise Ratio)

Upon receiving the GET command the system shall return the SNR value of incoming DAB signal at requested antenna input.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	# of Data Bytes	Data Byte #1	Data Byte #2
Request for GET	6D643E	20	06	00 - Get 10 - Get + CS	00	0x01	DAB Ant. no. (Note 2)	
Response for GET	6D643C	20	06	00 - Get 10 - Get + CS	Note 1	0x02	DAB Ant. no. (Note 2)	SNR value (Note 3)

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - DAB Antenna No.

DAB Antenna	ID
DAB Antenna no. 1	01
DAB Antenna no. 2	02

Note 3- 0x00 ... 0xFF SNR value
Example:
"Get SNR for DAB signal at Antenna no. 1":

- TX: 6D643E 20 06 00 00 01 01
- RX: 6D643C 20 06 00 01 02 01 3C

6.1.3.18.7 20 07 DAB Signal Quality

Upon receiving the GET command the software shall return the Signal Quality value of incoming DAB signal at requested antenna input.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	# of Data Bytes	Data Byte #1	Data Byte #2
Request for GET	6D643E	20	07	00 - Get 10 - Get + CS	00	0x01	DAB Ant. no. (Note 2)	
Response for	6D643C	20	07	00 - Get	Note 1	0x02	DAB Ant. no.	Signal Quality value

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GET				10 - Get + CS			(Note 2)	(Note 3)

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - DAB Antenna No.

DAB Antenna	ID
DAB Antenna no. 1	**01**
DAB Antenna no. 2	**02**

Note 3- 0x00 ... 0xFF Signal Quality value

Example:

Get Signal Quality from DAB Antenna no. 1:

- **TX:** 6D643E 20 07 00 00 01 01
- **RX:** 6D643C 20 07 00 01 02 01 07

6.1.3.18.8 0x02008 DAB Audio Quality

SW shall return the field strength of incoming DAB signal of antenna input upon receiving of GET command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No of Data Bytes	Data Byte #1	Data Byte #2
Request for GET	6D643E	20	08	00 - Get 10 - Get + CS	0x00	0x01	Note 2	-
Response for GET	6D643C	20	08	00 - Get 10 - Get + CS	Note 1	0x02	Note 2	Note 3

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - Request: Antenna No.
0x01 = DAB Antenna no. 1
0x02 = DAB Antenna no. 2

Note 3 - Audio Quality value
0x00 ... 0xFF

Example:

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"Get Audio Quality of DAB service at Antenna no. 1":

- TX: 6D643E 20 08 00 00 01 01
- RX: 6D643C 20 08 00 01 02 01 07

6.1.3.18.9 20 1F DAB Signal Strength

SW shall return the field strength of incoming DAB signal of antenna input upon receiving of GET command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No of Data Bytes	Data Byte #1	Data Byte #2
Request for GET	6D643E	20	1F	00 - Get 10 - Get + CS	0x00	0x01	Note 2	-
Response for GET	6D643C	20	1F	00 - Get 10 - Get + CS	Note 1	0x02	Note 2	Note 3

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - Request: Antenna No.
0x01 = DAB Antenna no. 1
0x02 = DAB Antenna no. 2

Note 3 -Field Strength
0x00 ... 0xFF Field Strength (dbuV)

Example:
"Get Field Strengh for DAB Antenna no. 1":
TX: 6D643E 20 1F 00 00 01 01
RX: 6D643C 20 1F 00 01 02 01 **XX** (**XX** - 0x00 ... 0xFF Field Strength (dbuV))

6.1.3.18.10 20 0A DAB Available Services

SW shall check which DAB services are available on the currently selected DAB Audio tuner upon reception of below GET command.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	No of Data Bytes	Data Byte #1	Data Byte #2	...	Data Byte #n-1	Data Byte #n
Request for GET	6D643E	20	0A	00 - Get 10 - Get + CS	0x00	0x00	-	-	-	-	-
Response for GET	6D643C	20	0A	00 - Get 10 - Get + CS	Note 1	Note 2	Note 3	Note 3	Note 3	Note 3	Note 3

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.

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Note 2 - # of Data Bytes will be equal to the double of the services that system is able to see. This is because each service will be represented by 2 bytes.

Note 3 -
Maximum number of services is 25 implying 50 as a maximum number of bytes on response.
Data Byte #1 - Service1 MSB
Data Byte #2 - Service1 LSB
Data Byte #n-1 - Service (n/2) MSB
Data Byte #n - Service (n/2) LSB

Example:
"Get DAB Available Services ":

- TX: 6D643E 20 0A 00 00 00
- RX: 6D643C 20 0A 00 01 02 00 C8

6.1.3.19 SDARS Features Group (0x24)

6.1.3.19.1 24 01 SDARS Channel setting

While using a "SDARS" signal generator we will need to be able to set the "SDARS" module to a certain channel.
This feature will allow us to set or get the current channel from the "SDARS" module.
The SET command should always be used before the GET.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	# of Data Bytes	Data Byte #1
Request for SET	6D643E	24	01	01 - Set 11 - Set + CS	00	0x01	Note 2
Response for SET	6D643C	24	01	01 - Set 11 - Set + CS	Note 1	0x01	Note 2

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	# of Data Bytes	Data Byte #1
Request for GET	6D643E	24	01	00 - Get 10 - Get + CS	00	0x00	
Response for GET	6D643C	24	01	00 - Get 10 - Get + CS	Note 1	0x01	Note 2

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - Channel ID
0x00 - Channel 0
0x01 - Channel 1
...

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0x0F - Channel 15

Example:

"SET Channel 3"

TX : 6D643E 24 01 01 00 01 03

RX : 6D643C 24 01 01 01 01 03

"GET Channel 15"

TX : 6D643E 24 01 00 00 00

RX : 6D643C 24 01 00 01 01 0F

6.1.3.19.2 24 02 SDARS SID

Upon receiving the command the software shall set/report the "SDARS" SID.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	# of Data Bytes	Data Byte #1	Data Byte #1
Request for SET	6D643E	24	02	01 - Set 11 - Set + CS	00	0x02	Note 2	Note 2
Response for SET	6D643C	24	02	01 - Set 11 - Set + CS	Note 1	0x02	Note 2	Note 2

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	# of Data Bytes	Data Byte #1	Data Byte #2
Request for GET	6D643E	24	02	00 - Get 10 - Get + CS	00	0x00		
Response for GET	6D643C	24	02	00 - Get 10 - Get + CS	Note 1	0x02	Note 2	Note 2

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - This byte indicates the SID

Data Byte #1 - SID(MSB)

Data Byte #2 - SID(LSB)

Example:

"Set SID to 3020"

TX : 6D643E 24 02 01 00 02 0B CC

RX : 6D643C 24 02 01 01 02 0B CC

"GET SID 500"

TX : 6D643E 24 02 00 00 00

RX : 6D643C 24 02 00 01 02 01 F4

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6.1.3.19.3 24 03 SDARS BER

The SDARS Module is able to provide BER information for 3 parts: SAT1, SAT2, and TERR. Each BER will be represented by using 2 bytes.

To get this information we will need the following feature.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	# of Data Bytes	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4	Data Byte #5	Data Byte #6
Request for GET	6D643E	24	03	00 - Get 10 - Get + CS	00	0x00						
Response for GET	6D643C	24	03	00 - Get 10 - Get + CS	Note 1	0x06	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 -

Data Byte #1 - SAT1 BER (MSB)

Data Byte #2 - SAT1 BER (LSB)

Data Byte #3 - SAT2 BER (MSB)

Data Byte #4 - SAT2 BER (LSB)

Data Byte #5 - TERR BER (MSB)

Data Byte #6 - TERR BER (LSB)

Example :

"GET Bit Error Rates"

TX : 6D643E 24 03 00 00 00

RX : 6D643C 24 03 00 01 06 00 00 00 00 00 00

6.1.3.19.4 24 04 SDARS Audio Status

Checking the Audio Status on SDARS will be done in order to see if the module is currently receiving some valid signal.

Command Type	Prefix	Group ID	Test ID	Operation ID	Status	# of Data Bytes	Data Byte #1	Data Byte #2
Request for GET	6D643E	24	04	00 - Get 10 - Get + CS	00	0x00		
Response for GET	6D643C	24	04	00 - Get 10 - Get + CS	Note 1	0x02	Note 2	Note 3

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2 - Audio Status

0x01 - Audio Present

0x00 - Audio Not Present

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Note 3 - Decoder Bit-Rate

[0x00...0xFF]

Example :

"Get Audio Status**"**

TX : 6D643E 24 04 00 00 00

RX : 6D643C 24 04 00 01 02 01 00

6.1.4 Diagnostic MOL

6.1.4.1 Software Download Features Group (0xA0)

This is the overview about the requirements what address the support of the Software Download purpose done on production floor by teh MoL-Station (Mid-of-Line Programming Station). The communication at this station needs to be done via CAN interface since the UART interfaces are not accessible at this station. Therefore, the test system will send CAN messages to the MIB4 unit what have to be forwarded by the MDiag application of the IOC into the MIB4 system via HSIP /RSTP communication. In addition to the CAN messages the MIB4 shall support UART commands to perform exact the same actions as the defined CAN messages. This to allow the software update on bench level not having any CAN hardware available or
connected.

Command Structure for MOL Requirements

Frame Request :

Test ID	Operation ID	Status Byte	Data 1	Data 2	Data 3	Data 4	Data 5

Test ID – Unique ID for each Feature

Operation ID – SET/GET (01 – SET, 00 – GET)

Status Byte – Status (01- OK, 00- NOK)

Frame Response :

1. Single Frame:

Test ID	Operation ID	Status Byte	Data 1	Data 2	Data 3	Data 4	Data 5

2. Multi Frame:

First frame:

Test ID	Operation ID	Status Byte	Frame Number (0x01)	Length of String	Data 1	Data 2	Data 3

Next Frame:

Test ID	Operation ID	Status Byte	Frame Number (0x0X)	Length of String	Data #	Data #	Data #

Last Frame:

Test ID	Operation ID	Status Byte	Frame Number (0xFF)	Length of String	Data #	Data #	Data #

Single frame -> Data length less than or equal 5 byte.

Multi frame -> Data length more than 5byte.

Test ID - Unique ID for each Feature

Operation ID - SET/GET (01 – SET, 00 – GET)

Status Byte -Status (01- OK, 00- NOK)

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Frame Number - No of frames which data will receive in the response (**01 -FF**)
Length of String - This byte will be present only in first frame.

6.1.4.1.1 Enable CAN Password Protection

The software shall enable the CAN Password Session upon reception of This command.

- CAN password command has to be provided once after startup, prior to any other MOL commands.
- In MIB4 Projects CAN Password Protection Set as

  Tx: 29 32 36 31 38 1F 08 00
  Rx: 29 32 36 31 38 1F 08 00

- These CAN ID's are applicable in MIB4 Project.
  CAN ID's :
  DEV_ZR_Produktion_1_Rx_1D : 0x1735A107
  DEV_ZR_Produktion_1_Tx_1C : 0x1735A507

6.1.4.1.2 Manufacturing Diagnostics Mode

The software shall activate the Manufacturing Diagnostics mode in order to perform the MOL verifications upon reception of DID_MOL_Manufacturing_Diagnostics_Mode.

Set Manufacturing Diagnostics Mode ON
Tx: `FF 01 00 xx 00 00 00 00`
Rx: `FF 01 01 xx 00 00 00 00`
Set Manufacturing Diagnostics Mode OFF
Tx: `FF 01 00 xx 00 00 00 00`
Rx: `FF 01 01 xx 00 00 00 00`

XX-This byte indicates the status of the Manufacturing Diagnostics Mode:

- 00 - OFF
- 01 - ON

Example :
Set Manufacturing Diagnostics Mode ON
Tx: `FF 01 00 01 00 00 00 00`
Rx: `FF 01 01 01 00 00 00 00`
Set Manufacturing Diagnostics Mode OFF
Tx: `FF 01 00 00 00 00 00 00`
Rx: `FF 01 01 00 00 00 00 00`

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6.1.4.1.3

6.1.4.1.4 A0 06 GPIO MMX Recovery Test Sequence

The software shall force the MMX board in recovery mode to have the booting source changed to external device done by GPIO setting of IOC.

Command Type	Test ID	Operation ID	Status	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4	Data byte #5
Request for SET	0x06	0x01	0x00	Note 2	Note 3	0x00	0x00	0x00
Response for SET	0x06	0x01	Note 1	Note 2	Note 3	0x00	0x00	0x00

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.
- XX Refer PPM4-159724

Note 2-
This byte indicates the pin number
0x01.. 0x07: Pin Number
0x01 -- HK_MCM_PWR_EN
0x02 -- HK_B2B_FORCE_RECOVERY
0x03 -- HK_MCM_S2R_WAKE
0x04 -- HK_MCM_RESET_N
0x05 -- HK_J6_RESET_N
0x06 -- HK_J6_GPIO_2
0x07 -- PPU_MMX_PMIC_PWRON

Note 3 -
This byte indicates the Pin State
0 or 1: Pin state

Example:
Test sequence for GPIO MMX Recovery

TX: 06 01 00 02 01 00 00 00 -> Turn OFF MDG_B2B_SOC_FORCE_RECOVERY_PIN_ID
RX: 06 01 01 02 01 00 00 00

TX: 06 01 00 07 00 00 00 00 -> Turn OFF MDG_PPU_MMX_PMIC_PWRON_PIN_ID
RX: 06 01 01 07 00 00 00 00

Manual delay time 20seconds

TX: 06 01 00 07 01 00 00 00 -> Turn ON MDG_PPU_MMX_PMIC_PWRON_PIN_ID
RX: 06 01 01 07 01 00 00 00

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6.1.4.1.5 A0 07 Read UBN SW Info

Upon receiving the command the system shall report the SW UBN number for IOC and CPA.

Command Type	Test ID	Operation ID	Status	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4	Data byte #5
Request for GET	0xA0	0x07	0x00	Note 2	0x00	0x00	0x00	0x00
Response for GET	0xA0	0x07	Note 1	Note 2	Note 3	Note 3	Note 3	Note 3

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.

Note 2 - UBN ID.
0x01 - CPA UBN number
0x02 - IOC UBN number

Note 3 - UBN number.
0x00 ..... 0xFF

Example:
GET SW UBN number for IOC :
TX_logging: 1735a107 07 00 00 02 00 00 00 00
RX_logging: 1735a507 07 00 01 02 **30 32 34 39**

GET SW UBN number for CPA :
TX_logging: 1735a107 07 00 00 01 00 00 00 00
RX_logging: 1735a507 07 00 01 01 **30 35 31 33**

Note:
This feature is needed in order to be verify if SW update was done successfully or not.

6.1.4.1.6 A0 1C MMX Recovery Mode Sequence EDL

Upon receiving the command, the system shall turn the MMX in Normal and Recovery mode.

Command Type	Test ID	Operation ID	Status	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4	Data byte #5
Request for SET	0x1C	0x01	0x00	Note 2	0x00	0x00	0x00	0x00
Response for SET	0x1C	0x01	Note 1	Note 2	0x00	0x00	0x00	0x00

Command Type	Test ID	Operation ID	Status	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4	Data byte #5
Request for GET	0x1C	0x00	0x00	0x00	0x00	0x00	0x00	0x00
Response for GET	0x1C	0x00	Note 1	Note 2	0x00	0x00	0x00	0x00

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Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.

- 00 The diagnostic command failed or was not executed for some reason.

Note 2 - MMX Startup Sequence Mode

0x00 - Normal Mode

0x01 - Recovery Mode

Example:

SET MMX in Recovery Mode :

TX_logging: 1735a107 1C 01 00 01 00 00 00 00

RX_logging: 1735a507 1C 01 01 01 00 00 00 00

GET MMX in Recovery Mode :

TX_logging: 1735a107 1C 00 00 00 00 00 00 00

RX_logging: 1735a507 1C 00 01 01 00 00 00 00

NOTE:

Once MMX recovery mode is set need to perform exit mandiag and around 3mins to get state SYS_TD_MMI_OFF.

6.1.4.1.7 A0 12 Software version

Upon receiving the command the software shall report the requested SW version string of the various partitions of the IOC or Jacinto.

Request:

Command Type	Test ID	Operation ID	Status	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4	Data byte #5
Request for GET	0x12	0x00	0x00	Note 2	Note 3	0x00	0x00	0x00

Response: for IOC

First Frame	Diagnostic ID	Operation	Status	Frame #	Data # 1	Data # 2	Data # 3	Data # 4
	0XA012	GET	Note 1	0x0X	**Length of String**	Note 2	Data #	Data #
Next Frame	**Diagnostic ID**	**Operation**	**Status**	**Frame #**	**Data # 1**	**Data # 2**	**Data # 3**	**Data # 4**
	0XA012	GET	Note 1	0x0X	Data #	Data #	Data #	Data #
Last Frame	**Diagnostic ID**	**Operation**	**Status**	**Frame #**	**Data # 1**	**Data # 2**	**Data # 3**	**Data # 4**
	0XA012	GET	Note 1	**0xFF**	Data #	Data #	Data #	Data #

Response: for CPA

First Frame	Diagnostic ID	Operation	Status	Frame #	Data # 1	Data # 2	Data # 3	Data # 4
	0XA012	GET	Note 1	0x0X	**Length of String**	Note 2	Note 3	Data #
Next Frame	**Diagnostic ID**	**Operation**	**Status**	**Frame #**	**Data # 1**	**Data # 2**	**Data # 3**	**Data # 4**
	0XA012	GET	Note 1	0x0X	Data #	Data #	Data #	Data #
Last Frame	**Diagnostic ID**	**Operation**	**Status**	**Frame #**	**Data # 1**	**Data # 2**	**Data # 3**	**Data # 4**
	0XA012	GET	Note 1	**0xFF**	Data #	Data #	Data #	Data #

Note 1: This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.

- 00 The diagnostic command failed or was not executed for some reason.

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Note 2:

Processor ID (to be used in the Data byte #1 of request command)	SW_VERSION
IOC	
IOC Version	12 00 00 01 00 00 00 00
CPA	
0x01 IPL	12 00 00 02 01 00 00 00
0x02 DIAG	12 00 00 02 02 00 00 00
0x03 EMBOOT	12 00 00 02 03 00 00 00
0x04 STDBOOT	12 00 00 02 04 00 00 00
0x05 STDFLASH	12 00 00 02 05 00 00 00
0x07 STORAGE	12 00 00 02 07 00 00 00
0x08 BOOT1	12 00 00 02 08 00 00 00
0x09 BOOT2	12 00 00 02 09 00 00 00
0x12 DSP	12 00 00 02 12 00 00 00
0x13 FSC	12 00 00 02 13 00 00 00
0x14 VIP1	12 00 00 02 14 00 00 00
0x15 VIP2	12 00 00 02 15 00 00 00
0x17 ROUTER	12 00 00 02 17 00 00 00
0X18 HOME	12 00 00 02 18 00 00 00
0x20 DSP_RO	12 00 00 02 20 00 00 00
0x21 DSP_RW	12 00 00 02 21 00 00 00
0x22 PA	12 00 00 02 22 00 00 00
0x23 ROUTER2	12 00 00 02 23 00 00 00

Example

TX: 12 00 00 01 00 00 00 00

RX:

12 00 01 01 3B 01 49 4F

12 00 01 02 43 5F 32 30

12 00 01 03 32 36 30 31

12 00 01 04 32 34 5F 43

12 00 01 05 4C 34 35 2F

12 00 01 06 31 63 61 38

12 00 01 07 38 35 36 36

12 00 01 08 39 32 66 33

12 00 01 09 39 31 39 39

12 00 01 0A 62 37 62 61

12 00 01 0B 35 64 37 31

12 00 01 0C 64 64 34 68

12 00 01 0D 57 31 33 36

12 00 01 0E 66 38 61 36

12 00 01 FF 65 31 36 64

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6.1.4.1.8 A0 13 Software ID

The software shall report about the software version of the all components (if applicable) upon requesting the below MOL commands.

Request:

Command Type	Test ID	Operation ID	Status	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4	Data byte #5
Request for GET	0x13	0x00	0x00	Note 2	0x00	0x00	0x00	0x00

Response:

First Frame	**Diagnostic ID**	**Operation**	**Status**	**Frame #**	**Data # 1**	**Data # 2**	**Data # 3**	**Data # 4**
	0XA013	GET	Note 1	0x0X	**Length of String**	Note 2	Data #	Data #
Next Frame	**Diagnostic ID**	**Operation**	**Status**	**Frame #**	**Data # 1**	**Data # 2**	**Data # 3**	**Data # 4**
	0XA013	GET	Note 1	0x0X	Data #	Data #	Data #	Data #
Last Frame	**Diagnostic ID**	**Operation**	**Status**	**Frame #**	**Data # 1**	**Data # 2**	**Data # 3**	**Data # 4**
	0XA013	GET	Note 1	**0xFF**	Data #	Data #	Data #	Data #

Note 1: This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.

Note 2:

Component ID(to be used in the Data byte #1 of request command)	**Combined Frame**
SW	**SW_ID**
0x01 - Companion processor (Jacinto) (RSC board)	13 00 00 01 00 00 00 00
0x02 - IOC (RSC board)	13 00 00 02 00 00 00 00
0x05 - CPV (RSC board)	13 00 00 05 00 00 00 00
0x06 - CPR (RSC board)	13 00 00 06 00 00 00 00
0x08 - VICS chip (RSC board)	13 00 00 08 00 00 00 00
0x09 - SDARS chip (RSC board)	13 00 00 09 00 00 00 00
0x0C - INIC chip (RSC board)	13 00 00 0C 00 00 00 00
0x10 - Mercury (Tuner IC 2) (RSC board)	13 00 00 10 00 00 00 00
0x11 - Titan (Tuner IC 1) (RSC board)	13 00 00 11 00 00 00 00
0x12 - Merlin (Tuner IC 3) (RSC board)	13 00 00 12 00 00 00 00
0x21 - HD BBP	13 00 00 21 00 00 00 00

Example:

SW version ID for 0x11 - Titan (Tuner IC 1) (RSC board)

TX: 13 00 00 11 00 00 00 00

RX: 13 00 01 01 08 11 31 31

13 00 01 02 2E 38 30 2E

13 00 01 FF 30 00 00 00

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6.1.4.1.9 A0 14 Software IOC Signature

The software shall report about the requested IOC SW Signature.
-The IOC SW Signature shall exclude the CEK-encrypted class keys areas, and it shall be unique for all the units with same IOC SW Package.

Request:

Command Type	Test ID	Operation ID	Status	Data Byte #1	Data Byte #2	Data Byte #3
Request for GET	0x14	0x00	0x00	Note 2	0x00	0x00

Response:

First Frame	Diagnostic ID	Operation	Status	Frame #	Data # 1	Data # 2	Data # 3	Data # 4
	0XA014	GET	Note 1	0x01	**Length of String**	Data#1	Data#2	Data#2
Next Frame	**Diagnostic ID**	**Operation**	**Status**	**Frame #**	**Data # 1**	**Data # 2**	**Data # 3**	**Data # 4**
	0XA014	GET	Note 1	0x0X	Data #	Data #	Data #	Data #
Last Frame	**Diagnostic ID**	**Operation**	**Status**	**Frame #**	**Data # 1**	**Data # 2**	**Data # 3**	**Data # 4**
	0XA014	GET	Note 1	**0xFF**	Data #	Data #	Data #	Data #

Note 1 - This byte indicates the command processing status:
- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.

6.1.4.1.10 A0 15 Components HW ID

The software shall report about the hardware version of the all components (if applicable) upon requesting the below MOL commands.

Request:

Command Type	Test ID	Operation ID	Status	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4	Data byte #5
Request for GET	0x15	0x00	0x00	Note 1	0x00	0x00	0x00	0x00

Response:

First Frame	Test ID	Operation	Status	Frame #	Data # 1	Data # 2	Data # 3	Data # 4
	0X15	GET	Note 2	0x0X	**Lengt of String**	Data#1	Data#2	Data#2
Next Frame	**Test ID**	**Operation**	**Status**	**Frame #**	**Data # 1**	**Data # 2**	**Data # 3**	**Data # 4**
	0X15	GET	Note 2	0x0X	Data #	Data #	Data #	Data #
Last Frame	**Test ID**	**Operation**	**Status**	**Frame #**	**Data # 1**	**Data # 2**	**Data # 3**	**Data # 4**
	0X15	GET	Note 2	**0xFF**	Data #	Data #	Data #	Data #

Note 1:

Request: HW ID	CAN cmd
0x00 - Companion processor (Jacinto version) (RSC board) (DRA Information)	**15 00 00 00 00 00 00 00**
0x01 - Mainboard (variant resistor coding) (RSC board)	**15 00 00 01 00 00 00 00**

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0x02 - IOC (RSC board)	15 00 00 02 00 00 00 00
0x05 - Mercury (Tuner IC 2) (RSC board)	15 00 00 05 00 00 00 00
0x06 - Titan (Tuner IC 1) (RSC board)	15 00 00 06 00 00 00 00
0x07 - Merlin (Tuner IC 3) (RSC board)	15 00 00 07 00 00 00 00
0x08 - VICS chip (RSC board)	15 00 00 08 00 00 00 00
0x09 - SDARS chip (RSC board)	15 00 00 09 00 00 00 00
0x0C - MOST INIC chip (RSC board)	15 00 00 0C 00 00 00 00
0x0E - 1 Gbit Ethernet chip (RSC board)	15 00 00 0E 00 00 00 00
0x0F - 100 Mbit Ethernet chip (RSC board)	15 00 00 0F 00 00 00 00
0x19 - A2B chip (MIC) (RSC board)	15 00 00 19 00 00 00 00
0x1A - A2B chip (BOOST) (RSC board)	15 00 00 1A 00 00 00 00

Note 2- This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.

Example:

2584 11:51:37.837 [INFO] 0x00 - Companion processor (Jacinto version) (RSC board) (DRA Information)	
2585 11:51:37.837 [IOC_CAN] < 9735A107 15 00 00 00 00 00 00 00	
2586 11:51:37.861 [IOC_CAN] > 9735A507 15 00 01 01 05 00 84 25	
2590 11:51:37.882 [IOC_CAN] > 9735A507 15 00 01 FF 33 1A 00 00	

6.1.4.1.11 A0 0A GPIO Commands for CAN

Upon receiving the SET command the system shall control the output value of the selected bit of the selected GPIO port.
Upon receiving the GET command the system shall read the current value of the selected bit of the selected GPIO port.
All Ports should be implemented for CAN Control.

Command Type	Test ID	Operation ID	Status	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4	Data byte #5
Request for SET	0x0A	0x01	0x00	Note 2	Note 3	Note 4	0x00	0x00
Response for SET	0x0A	0x01	Note 1	Note 2	Note 3	Note 4	0x00	0x00

Command Type	Test ID	Operation ID	Status	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4	Data byte #5
Request for GET	0x0A	0x00	0x00	Note 2	Note 3	0x00	0x00	0x00
Response for GET	0x0A	0x00	Note 1	Note 2	Note 3	Note 4	0x00	0x00

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.
- 00 The diagnostic command failed or was not executed for some reason.

Note 2 - This byte represents the I/O Port ID to interact mentioned in below table

Note 3 - This byte represents the Pin ID mentioned in below table

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Note 4 - Pin status

0x00 - OFF (low)

0x01 - ON (high)

Port ID	Pin ID	Signal	Port type	MIB4
0x00(PORT 0)	0x00	PI_POWER_ALWAYS_ON	Output	NA
	0x01	HK_MCM_PWR_EN	Output	Applicable
	0x02	CAN1_HK_MIB_RX	Input	NA
	0x03	CAN1_MIB_TX	Output	NA
	0x04	HK_CAN2_INFO_TX	Output	NA
	0x05	CAN2_HK_INFO_RX	Input	NA
	0x06	FOT_STATUS_ACTIVITY_N	Input	Applicable
	0x07	HK_CAN1_ERROR_N	Input	Applicable
	0x08	MCM_PGOOD_OC	Input	Applicable
	0x09	HK_RBD_LIN_HK_RXD	Input	NA
	0x0A	HK_RBD_LIN_TXD	Output	Applicable
	0x0B	HKP_EXPANDER_I2C_SDA	Input	NA
	0x0C	JHKP_EXPANDER_I2C_SCL	Input	Applicable
	0x0D	MMX_HK_UART0_RXD	Input	NA
	0x0E	HK_MMX_UART0_TXD	Output	NA
0x01(PORT 1)	0x00	J6_HK_RXD_UART3	Input	NA
	0x01	HK_TXD_J6_UART3	Output	NA
	0x02	PPU_ZRRESET_CLEAR	Output	Applicable
	0x03	HK_MCM_S2R_WAKE	Output	Applicable
	0x04	PWR_RESET_FLAG	Input	Applicable
	0x05	HK_CAN2_ERROR_N	Input	Applicable
	0x06	MCM_HK_B2B_TRUE	Input	Applicable
	0x07	PPU_INIC_RESET_N	Output	Applicable
	0x08	QL_HK_RXD_DBG	Input	NA
	0x09	HK_TXD_QL_DBG	Output	NA
	0x0A	HK_MCM_RESET_N	Output	Applicable
	0x0B	HK_FLASH_RESET_N	Output	Applicable
0x02(PORT AP0)	0x00	VBAT_HK_SENSE	Input	Applicable
	0x01	BOARD_TEMP_SENSE	Input	Applicable
	0x02	MOST_FOT_TEMP_SENSE	Input	Applicable
	0x03	ANT_AMFM_I_SENSE	Input	Applicable

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	0x04	VNC_U_SENSE	Input	Applicable
	0x05	ANT_DRADIO_I_SENSE	Input	Applicable
	0x06	A2BPHT_I_SENSE	Input	Applicable
	0x07	GSML_PHT_I_SENSE	Input	Applicable
	0x08	ANT_GPS_I_SENSE	Input	Applicable
	0x09	PPU_MMX_PMIC_PWRON	Output	Applicable
	0x0A	MIC1_U_SENSE	Input	Applicable
	0x0B	MIC_U_REF	Input	Applicable
	0x0C	MIC2_U_SENSE	Input	Applicable
	0x0D	RBIAS_CODE_0	Input	Applicable
	0x0E	RBIAS_CODE_1	Input	Applicable
	0x0F	RBIAS_CODE_2	Input	Applicable
0x03(PORT AP1)	0x00	3V3_J6_PGOOD	Input	Applicable
	0x01	USB3_1K_SENSE	Input	Applicable
	0x02	1V8_J6	Input	Applicable
	0x03	QL_UIB_RESET_N	Input	Applicable
	0x04	PPU_KL30_SW_EN	Output	Applicable
	0x05	HK_J6_GPIO_2	Output	Applicable
	0x06	HK_J6_GPIO_1	Output	Applicable
	0x07	HK_J6_GPIO_0	Output	Applicable
0x04(PORT JTAG)	0x00	Pin 0	Input	Applicable
	0x01	Pin 1	Input	Applicable
	0x02	Pin 2	Input	Applicable
	0x03	Pin 3	Input	Applicable
	0x04	Pin 4	Input	Applicable
	0x05	Pin 5	Input	Applicable
	0x06	Pin 6	Input	Applicable
0x05(PORT INPUT0)	0x00	Pin 0	Output	Applicable
0x08(PORT 8)	0x00	MMX_PPU_S2R_STATE1_N	Input	Applicable
	0x01	PWR_BOOST_STATE_N	Input	Applicable
	0x02	MCM_SYS_WAKEUP_N	Input	Applicable
	0x03	PO_PPU_MMX_SOC_WRESET	Output	Applicable
	0x04	CAN2_INF_HK_WAKEUP_N	Input	NA

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	0x05	AN1_MIB_HK_WAKEUP_N	Input	NA
	0x06	HK_FAN3_CTRL	Output	Applicable
	0x07	PPU_5V_SW_PWR_EN	Output	Applicable
	0x08	HK_B2B_FORCE_RECOVERY	Output	Applicable
	0x09	PPU_BST_FB_EN	Output	Applicable
	0x0A	HK_CAN1_EN	Output	Applicable
	0x0B	CAN2_EN	Output	Applicable
	0x0C	PPU_3V3_CAN_PWR_EN	Output	Applicable
0x09(PORT 9)	0x00	QL_CRADLE_RX	Input	NA
	0x01	PPU_CSI_PHT_EN	Output	Applicable
	0x02	PPU_5V_TUN_PWR_EN	Output	Applicable
	0x03	PPU_1V8_MMX_PWR_EN	Output	Applicable
	0x04	PPU_1V8_J6_PWR_EN	Output	Applicable
0x0A(PORT 10)	0x00	HK_CAN0RX	Input	NA
	0x01	HK_CAN0TX	Output	NA
	0x02	FAN3_HK_SPEED	Input	Applicable
	0x03	FAN1_HK_SPEED	Input	Applicable
	0x04	HK_5V_SW_PGOOD	Input	Applicable
	0x05	PPU_3V3_TUN_PWR_EN	Output	Applicable
	0x06	RESET_ACK	Input	Applicable
	0x07	HK_J6_RESET_N	Output	Applicable
	0x08	PI_PPUJTAG_FLMD1	Input	Applicable
	0x09	J6_HK_RXD_UART5	Input	NA
	0x0A	HK_TXD_J6_UART5	Output	NA
	0x0B	PMIC_INT_HK	Input	Applicable
	0x0C	HK_ANT_AMFM_EN	Output	Applicable
	0x0D	HK_ANT_FM_EN	Output	Applicable
	0x0E	HK_ANT_DRADIO_EN	Output	Applicable
	0x0F	HK_FAN_CTRL	Output	Applicable
0x0B(PORT 11)	0x00	HK_USB3_DIAG_EN	Output	Applicable
	0x01	PPU_AMP_MUTE	Output	Applicable
	0x02	FAN_HK_SPEED	Input	Applicable
	0x03	PI_HK_UART0_CTS_MMX_B2B	Input	NA
	0x04	HK_A2B_PHT2_PWR_EN	Output	Applicable

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	0x05	HK_A2B_PHT2_PWR_EN	Output	Applicable
	0x06	HK_PHT_SENSE_SEL	Output	Applicable
	0x07	HK_ANT_GPS_EN	Output	Applicable
	0x08	HK_FAN2_CTRL	Output	Applicable
	0x09	HK_GMSL_PHT1_PWR_EN	Output	Applicable
	0x0A	HK_UART0_RTS_MMX_B2B	Output	Applicable
	0x0B	PPU_3V3_MMX_PWR_EN	Output	Applicable
	0x0C	HK_ANT_EMOT_EN	Output	Applicable
	0x0D	PPU_BST_PWR_EN	Output	Applicable
	0x0E	HK_RBD_LIN_EN	Output	Applicable
	0x0F	PPU_3V3_PMIC_PWR_EN	Output	Applicable
0x0C(PORT 12)	0x00	PMIC_PGOOD	Input	Applicable
	0x01	QL_ECALL_MUTE_N	Input	Applicable
	0x02	PPU_1V8_TUN_PWR_EN	Output	Applicable
0x12(PORT 18)	0x00	PPU_1V2_TUN_PWR_EN	Output	Applicable
	0x01	HK_CAN1_STB_N	Output	Applicable
	0x02	HK_CAN2_STB_N	Output	Applicable
	0x03	HK_J6_BOOT_SEL0	Output	Applicable
0x14(PORT 20)	0x04	HK_PMIC_PWR_EN	Output	Applicable
	0x05	HK_FAN1_CTRL	Input	Applicable

Example for CAN Commands:

Set 1st Port number and 0th Pin as low :

TX_logging: 1735A107 0A 01 00 01 00 00 00 00

RX_logging: 1735a507 0A 01 01 01 00 00 00 00

Get 1st Port number and 0th Pin as low :

TX_logging: 1735A107 0A 00 00 01 00 00 00 00

RX_logging: 1735a507 0A 00 01 01 00 00 00 00

6.1.4.1.12 A0 05 Read RSC Board ID

Upon receiving the command the software shall read out the unique RSC board identifier value.

Request:

Command Type	Test ID	Operation ID	Status	Data Byte #1	Data Byte #2	Data Byte #3	Data Byte #4	Data Byte #5
Request	0x05	0x00	0x00	Note 2	0x00	0x00	0x00	0x00

Response:

First Frame	Test ID	Operation	Status	Frame #	Data # 1	Data # 2	Data # 3	Data # 4
	0X05	GET	Note 1	0x01	0x08	Data #	Data #	Data #

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Next Frame	Test ID	Operation	Status	Frame #	Data # 1	Data # 2	Data # 3	Data # 4
	0X05	GET	Note 1	0x02	Data #	Data #	Data #	Data #
Last Frame	**Test ID**	**Operation**	**Status**	**Frame #**	**Data # 1**	**Data # 2**	**Data # 3**	**Data # 4**
	0X05	GET	Note 1	0xFF	Data #	0x00	0x00	0x00

Note 1 - This byte indicates the command processing status:

- 01 The diagnostic command was executed successfully.

- 00 The diagnostic command failed or was not executed for some reason.

Note 2 - Device number to read

0x01 - NA (at the momemt)

0x02 - RSC

Note:

The data will be stored during manufacturing process at ICT station at the very beginning of the memory area.

The physical address of the first byte to read is 0xFF200000, the virtual address in MPI file is 0x00000000.

The RSC board number shall be readout at MoL station to get the variant type of the device from the FIS database.

There will be CAN message as trigger for this MDiag command as for all other SWDL command.

The 16 digit number of the readout action need to be send to the CAN application as response.

Example for CAN Command:

"GET RSC unique board identifier number":

TX : 05 00 00 02 00 00 00 00

RX : 05 00 01 01 08 37 36 30

RX : 05 00 01 02 33 35 30 32

RX : 05 00 01 FF 32 00 00 00

6.1.5 General

6.1.6

Fault Management

<Error Detection and Handling

List down the behavior in case of erroneous data and how the function should respond. Insert fault management requirements for the software to accomplish the specified function. Each requirement must be a separate object. Failure and Faults shall comply with the standardized PDP2.0 naming convention: PDP2.0 Naming Convention >
Example: The software shall qualify F_xxx when xxx_Failure is present for yyy_Time.

6.1.7 Configuration

<[TBD] - Insert configuration requirements for the ECU. Each requirement must be a separate row. Configuration requirements should use parameter names if defined. >
Example: The software shall be configurable with respect to the [TBD - parameter name]

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6.1.8 Safety and SOTIF

< Insert Safety or SOTIF requirements. Each requirement must be a separate row. Requirements should use parameter names, failure names if defined.>
Example: The ECU shall trigger no inadvertent activation of AEB (ASIL = xxx).

6.1.9 Security

<Insert Security requirements. Each requirement must be a separate row. Requirements should use parameter names if defined.>

6.2 <Software subfunction 2>

6.3 <Software subfunction n>

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7 Non functional Requirements

<Insert performance requirements for the software related to outputs accuracy, timing constraints... etc

7.1 Development Constraints

<List any constraint specific to this SW Function which is not covered by the SRS_ArchitectureConstraints document>

7.2 Memory constraints

7.3 Quality

7.4 Timing

<TBD - Insert performance requirements for the ECU related to outputs accuracy, timing constraints... etc>
Examples: The software shall provide actual Detections less than Radar_Initialization_Time after Power_Conditions are satisfied.

7.5 Throughput

7.6 Verification

<List use cases that can be used to verify requirements above for this SW Function.

- First call out the Document(s) Name which hold(s) Test cases which are or will be linked to the content of this document. Example: CMP_SQT_Radar_PowerManagement and CMP_SQT_Radar_DIDs>
- If the document holds Test Cases which will link to multiple specifications (left side), point to the chapter's name within the Test specification (right side), OR specify the filter/query that allows to identify these requirements inside the Test specification. Example: chapter 5.6 Power DIDs of CMP_SQT_Radar_DIDs ---- or ---- <CustomFieldName>= xxx >

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8 Traceability

<Provide a link to Traceability Report(s) which you will have pre-configured in the Polarion project to demonstrate the traceability coverage. Do not copy paste the picture of the report in the document as it may change over time independently of the approved content of this document.

Traceability should be bidirectional between SRS<->PRS (and may be in special cases directly to SHR), SRS<->PAD, SRS<->SAD, refer to Information to review the full traceability scheme. >

9 Data Dictionnary

<All the data elements that have to be uploaded into the data dictionary can be tabulated here with just the names and Storage type. It can help in cross checking whether all the elements have been uploaded (during Data Dictionary review). This section shall be updated whenever a new feature warrants new additions into the DD>

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