

<b>SEDECAL</b>	<i>Proyecto: - -</i> <b>R2CP.ETH Patient Workflow - Message Description</b>	<b>Revision: D</b>
<i>Código: IIS0010SPRO</i>		<b>Date: 11/03/2022</b>

# R2CP.ETH PATIENT WORKFLOW - MESSAGE DESCRIPTION

*Software Protocol Specification*

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## Table of Updates

Revision	Protocol Version	Date	Changes / Remarks	Affected Sections	Author
-	v1.0.5 and older				Jesús Albendea
-	V1.0.6	13/March/15	Introduction paragraph added. Procedure Definition message. Activate Procedure and Data Banks message. Clear Procedure and Clear All Procedures messages. Workstation Change Request message.	Chapters 1, 2, y and 4.	Aníbal Gómez
-	V1.0.7	24/March/15	Added Handswitches / Footswitches messages	Chapter 5	Jesús Albendea
			Generator and positioner procedure types redefined	Chapter 2.1	Jesús Albendea
-	V1.0.8	22/April/15	Positioning Procedure Type Position Library and Free Position merged to Std Position	Chapter 2.1	Jesús Albendea
-	V1.0.9	24/April/15	Add GET message	Chapter 2.2	Jesús Albendea
			Remove ANSWER, Add GET message	Chapter 2.3	Jesús Albendea
			Added GET to Default Procedure message	Chapter 2.3	Jesús Albendea
-	V2.1.0	20/July/15	New Messages to set individual fields in a procedure	Chapter 2	Jesús Albendea
			Patient and Procedure Info subindex range redefined	Chapter 3	Jesús Albendea
			Redefine Procedure fields	Chapter 2.6	Jesús Albendea
			Remove token information	Entire document	Jesús Albendea

-	V2.1.1	11/Sep/15	Add Workstation Change Request	Chapter 2.6.2.1	Jesús Albendea
		11/Sep/15	Add message to redefine workstation in a procedure	Chapter 2.6.2.2	Jesús Albendea
		16/Sep/15	Command Processed function described in this document instead of Generator and Positioner documents	Entire documents	Jesús Albendea
		22/Sep/15	Modified CP return codes for the following messages: Procedure Definition (generator) Activate procedure (generator) Default procedure (generator)	Chapter 2.1, 2.2,2.3	Fran Sánchez
		24/Sep/15	Patient Info and Procedure Info messages redefined	Chapter 3.1	Jesús Albendea
		25/Sep/15	Modified CP return codes for the following messages: Procedure Definition (positioner) Activate procedure (positioner) Default procedure (positioner) Procedure Clear (positioner) Procedure Clear All (positioner)	Chapter 2.1, 2.2, 2.3, 2.4, 2.5	Joaquín Suárez
		12/11/15	Generator Procedure Type indexes rearranged: 0 – Not defined 1 – Std RAD 2 – Stitching 3 – Tomography 4 – DSI: single energy, multi energy, tomosynthesis. 5 – CINE 6 – DSA	Chapter 2.1	Jesús Albendea

		28/01/16	Added CP when try to deactivate procedure default (always there must be a procedure activated)  Supported procedure id 0  Fixed change request subindex value	Chapter 2.2  Chapter 2.1, 2.2, 2.3, 2.5.1, 2.5.2  Chapter 2.5.3	Fco Sanchez
A	2.1.2	21/04/16	Added power off related messages:  PowerOffRequest, PowerOff, PowerOffCancel	Chapter 5.2, Chapter 5.3, Chapter 5.4	Lucía Maté
		12/04/16	Generator Procedure Type redefined	2.1	Jesús Albendea
		12/05/2016	Power Off/Power Recycling mode definition	Chapter 4.4	Lucía Maté
B	2.1.3	07/08/2017	New operation mode message (application, service, calibration). Subindex 50.	Chapter 4.6	Lucía Maté
C	2.1.4	10/05/2018	Change document revision numbers to letters, to match documentation software management		Lucía Maté
		10/05/2018	Modification for operation mode message to include issuing node number	Chapter 6	Lucía Maté
		23/05/2018	Modified name from Change Request to Workstation Change Request (as it is named at Message Index Table)  Added explanation to Change Request Workstation message	Chapter 2.5.3	Jose Alberto Torres
		23/05/2018	Added Change Request without selecting Programmed Position message	Chapter 2.5.4	Jose Alberto Torres
		04/07/2018	Added procedure number	Chapter 4.3	
		03/08/2018	Revised comment for SyncUp	Chapter 5.1	Lucia Maté
		22/11/2018	Change format to section titles	All	Lucía Maté
D		06/11/2019	Review paragraph numbering	All	Jesús Albendea

			Workstation change request without selecting autoposition changed to Change detector location	3.5	Jesús Albendea
D		29/04/2020	New Procedure Definition: 2.1 Deprecated 2.4 New Definition	2.1 2.4	Jesús Albendea
		02/07/2020	Added Load Workspace message	2.6	Jesús Albendea
		02/10/2020	Positioner calibration event	6.2	Lucía Maté

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## 1. INTRODUCTION

This document describes the Patient Workflow R2CP protocol area, which is closely related to the Generator and Positioner areas, as many Procedure related messages are described at the Patient Workflow level, while the responses are explained at the Generator or Positioner level.

### Compatibility table

Document Revision	A	B	C
Date	6/04/17	0/02/18	22/11/2018
Protocol Version	2.1.2	2.1.3	2.1.4

## 2. PROCEDURE

### 2.1 PROCEDURE DEFINITION (1) (DEPRECATED)

#### SUBINDEX: 1

#### SET

BYTE	DATA	FORMAT
1	Procedure ID	[1..255]
2	Generator Type      Procedure	0 – Not defined 1 – Std RAD 2 – Stitching 3 – Tomography 4 - Multienergy 10 – DSI: single energy, multi energy, tomosynthesis. 11 – CINE 12 – DSA  100 – Std Fluoro 101 – Boost Fluoro 102 – Roadmap Mask Fluoro 103 – Roadmap Fluoro

3	Positioner Procedure Type	0 – Not defined 1 – Std Position 2 – Stitching 3 – Tomography 4 – Tomosynthesis
4	Handswitch / Footswitch ID	[1..255]
5	Activate When Handswitch/Footswitch is pressed	0, Do not Activate procedure when Footswitch/Handswitch pressed. Procedure is activated with Patient Workflow message.  1, Activate procedure when Footswitch/Handswitch pressed
6	Workstation	[1..255]
7	Total Number of Exposure Data Banks in Procedure	[1..255]
8	Total Number of Positioning Data Banks in Procedure	[1..255]
9	Total Number of Collimator FOV Data Banks in Procedure	[1..255]
10	Total Number of Collimator Filter Data Banks in Procedure	[1..255]
11	Generator Data Bank Sequencing	0 – N/A  1 – Activate next Exposure Data Bank  2 – Pause Procedure until next Exposure Data Bank is activated by a Patient Workflow message



12	Positioning Data Bank Sequencing	<p>0 – N/A</p> <p>1 – Activate next Positioning Data Bank</p> <p>2 – Pause Procedure until next Positioning Data Bank is activated by a Patient Workflow message</p>
13	Collimator FOV Data Bank Sequencing	<p>0 – N/A</p> <p>1 – Activate next Collimator FOV Data Bank</p> <p>2 – Pause Procedure until next Collimator FOV Data Bank is activated by a Patient Workflow message</p>
14	Collimator Filter Data bank Sequencing	<p>0 – N/A</p> <p>1 – Activate next Collimator Filter Data Bank</p> <p>2 – Pause Procedure until next Collimator Filter Data Bank is activated by a Patient Workflow message</p>

**GET**

BYTE	DATA	FORMAT
1	Procedure ID	[0..255]

**COMMAND PROCESSED FUNCTION RETURN CODES**

**SET**

BYTE	DATA	FORMAT
1	SEQ Number for the SET request	1 .. 255
2	Return Code	RETURN CODES:  0    OK 1    XXXX

**GET**

BYTE	DATA	FORMAT
1	SEQ Number for the GET request	1 .. 255
2	Return Code	RETURN CODES:  0    OK 1    XXXXX

**DESCRIPTION**

Defines a procedure. Message to be sent to all positioners and generators in the room. Each positioner and generator will reply with a Positioner Procedure and Generator Procedure ANSWER-EVENT.

## 2.2 Activate Procedure and Data Banks

### SUBINDEX: 2

#### SET

BYTE	DATA	FORMAT
1	Procedure ID	[0 .. 255]
2	Command	0 – Deactivate Procedure 1 – Activate Procedure
3	Exposure Data Bank Sequence Number	[0 .. 255]  0 – Do Not Activate Exposure Data Bank Sequence Number  1 .. 255 Activate Exposure Data Bank Sequence Number
4	Positioning Data Bank Sequence Number	[0 .. 255]  0 – Do Not Activate Positioning Data Bank Sequence Number  1 .. 255 Activate Positioning Data Bank Sequence Number
5	Collimator FOV Data Bank Sequence Number	[0 .. 255]  0 – Do Not Activate Collimator FOV Data Bank Sequence Number  1 .. 255 Activate Collimator FOV Data Bank Sequence Number

6	Collimator Filter Data Bank Sequence Number	[0 .. 255]  0 – Do Not Activate Collimator Filter Data Bank Sequence Number  1 .. 255 Activate Collimator Filter Data Bank Sequence Number

**GET**

BYTE	DATA	FORMAT
1	Procedure ID	[1 .. 255]

**DESCRIPTION**

Activates the specified Procedure, Exposure/Position/Collimator FOV/Collimator Data Bank Sequence Numbers.

There can only be one procedure active.

All masters will reply with a Positioner or Generator Activate Procedure and Data Banks ANSWER.

If activation is driven by handswitch/footswitch, masters will send EVENT messages.

**COMMAND PROCESSED FUNCTION RETURN CODES****SET**

BYTE	DATA	FORMAT
1	SEQ Number for the SET request	1 .. 255
2	Return Code.	RETURN CODES:

		<p>0 OK</p> <p><b><u>GENERATOR</u></b></p> <p>1 Procedure ID not defined  2 Procedure ID out of range  3 Exposure Sequence Number out of range  4 Exposure DB not assigned  5 Procedure invalid activation  6 Procedure invalid deactivation  7 Exposure Sequence Number invalid</p> <p><b><u>POSITIONER</u></b></p> <p>101 Procedure ID out of range  (ERROR_INVALID_PROC)  102 Procedure ID not defined  103 Procedure not fully assigned  104 Procedure invalid activation  105 Positioning DB not assigned  106 Collimator FOV DB not assigned  107 Collimator Filter DB not assigned  108 Positioning DB incompatible with  Procedure Type</p>
--	--	---

**GET**

BYTE	DATA	FORMAT
1	SEQ Number for the SET request	1 .. 255
2	Return Code.	<p>RETURN CODES:</p> <p>0 OK</p>

## 2.3 Define Default Procedure and Data Banks

### SUBINDEX: 3

#### SET

BYTE	DATA	FORMAT
1	Procedure ID	[0 .. 255]
2	Command	0 – Deactivate Procedure 1 – Activate Procedure
3	Exposure Data Bank Sequence Number	[0 .. 255]  0 – Do Not Activate Exposure Data Bank Sequence Number  1 .. 255 Activate Exposure Data Bank Sequence Number
4	Positioning Data Bank Sequence Number	[0 .. 255]  0 – Do Not Activate Positioning Data Bank Sequence Number  1 .. 255 Activate Positioning Data Bank Sequence Number
5	Collimator FOV Data Bank Sequence Number	[0 .. 255]  0 – Do Not Activate Collimator FOV Data Bank Sequence Number  1 .. 255 Activate Collimator FOV Data Bank Sequence Number
6	Collimator Filter Data Bank Sequence Number	[0 .. 255]

		<p>0 – Do Not Activate Collimator Filter Data Bank Sequence Number</p> <p>1 .. 255 Activate Collimator Filter Data Bank Sequence Number</p>
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**GET**

No data.

**COMMAND PROCESSED FUNCTION RETURN CODES****SET**

BYTE	DATA	FORMAT
1	SEQ Number for the SET request	1 .. 255
2	Return Code	<p>RETURN CODES:</p> <p>0 OK</p> <p><b><u>GENERATOR</u></b></p> <p>1 Procedure ID not defined 2 Procedure ID out of range 3 Exposure Sequence Number out of range 4 Exposure DB not assigned</p> <p><b><u>POSITIONER</u></b></p> <p>101 Procedure ID not defined 102 Positioning DB not assigned 103 Collimator FOV DB not assigned 104 Collimator Filter DB not assigned</p>

**GET**

BYTE	DATA	FORMAT
1	SEQ Number for the SET request	1 .. 255
2	Return Code.	RETURN CODES:  0 OK

**DESCRIPTION**

For procedures activated from handswitches/footswitches, defines the procedure that is activated when no handswitch/footswitch is pressed. It can be used to always be ready for the most commonly used procedure, typically fluoro.

If no procedure is defined, default procedure 0 is used when there is no active handswitch/footswitch.

**2.4 Clear All Procedures****SUBINDEX: 5****SET**

No Data

**COMMAND PROCESSED FUNCTION RETURN CODES****SET**

BYTE	DATA	FORMAT
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1	SEQ Number for the GET request	1 .. 255
2	Return Code	RETURN CODES:  0    OK

**DESCRIPTION**

Clears all Procedures. All masters will reply with a Positioner Clear All Procedures or Generator Clear All Procedures EVENT.

**2.5 PROCEDURE DEFINITION (2)**

**SUBINDEX: 6**

**SET**

BYTE	DATA	FORMAT
1	Procedure ID	[1..255]
2	Generator Type    Procedure	0 – Not defined 1 – Std RAD 2 – Stitching 3 – Tomography 4 - Multienergy 10 – DSI: single energy, multi energy, tomosynthesis. 11 – CINE 12 – DSA  100 – Std Fluoro 101 – Boost Fluoro 102 – Roadmap Mask Fluoro 103 – Roadmap Fluoro

3	Positioner Type      Procedure	0 – Not defined 1 – Std Position 2 – Stitching 3 – Tomography 4 – Tomosynthesis
4	Handswitch / Footswitch ID	[1..255]
5	Activate When Handswitch/Footswitch is pressed	0, Do not Activate procedure when Footswitch/Handswitch pressed. Procedure is activated with Patient Workflow message.  1, Activate procedure when Footswitch/Handswitch pressed
6	Workstation	[1..255]
7	Total Number of Exposure Data Banks in Procedure	[1..255]
8	Total Number of Positioning Data Banks in Procedure	[1..255]
9	Total Number of Collimator FOV Data Banks in Procedure	[1..255]
10	Total Number of Collimator Filter Data Banks in Procedure	[1..255]
11	Generator Data Bank Sequencing	0 – N/A  1 – Activate next Exposure Data Bank  2 – Pause Procedure until next Exposure Data Bank is activated by a Patient Workflow message
12	Positioning Data Bank	0 – N/A

	Sequencing	<p>1 – Activate next Positioning Data Bank</p> <p>2 – Pause Procedure until next Positioning Data Bank is activated by a Patient Workflow message</p>
13	Collimator FOV Data Bank Sequencing	<p>0 – N/A</p> <p>1 – Activate next Collimator FOV Data Bank</p> <p>2 – Pause Procedure until next Collimator FOV Data Bank is activated by a Patient Workflow message</p>
14	Collimator Filter Data bank Sequencing	<p>0 – N/A</p> <p>1 – Activate next Collimator Filter Data Bank</p> <p>2 – Pause Procedure until next Collimator Filter Data Bank is activated by a Patient Workflow message</p>
15 16	Total Number of Exposures in Procedure	<p>0 Not defined</p> <p>[1..65535]</p>

**GET**

BYTE	DATA	FORMAT
1	Procedure ID	[0..255]

## COMMAND PROCESSED FUNCTION RETURN CODES

## SET

BYTE	DATA	FORMAT
1	SEQ Number for the SET request	1 .. 255
2	Return Code	<p>RETURN CODES:</p> <p>0 OK</p> <p><b><u>GENERATOR</u></b></p> <p>1 Procedure ID out of range</p> <p>2 Procedure Type not supported</p> <p>10 Handswitch/footswitch index out of range</p> <p>12 Non existent workstation</p> <p>13 Incorrect number of exposure DB's</p> <p>14 Exposure DB sequencing not possible (exposure DB=1)</p> <p>15 Exposure DB sequencing not supported</p> <p>16 Workstation out of range</p> <p>17 Handswitch/footswitch Index not defined</p> <p>18 Procedure Already Created</p> <p><b><u>POSITIONER</u></b></p> <p>101 Procedure ID out of range (ERROR_INVALID_PROC)</p> <p>102 Invalid Workstation (ERROR_INVALID_WORKSTATION)</p> <p>103 Invalid Procedure Type</p> <p>104 Invalid Procedure DB Sequence</p> <p>105 Invalid Image Receptor (ERROR_INVALID_IMAGE_RECEPTOR)</p> <p>106 Invalid Pedals (ERROR_INVALID_PEDALS)</p>

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**GET**

BYTE	DATA	FORMAT
1	SEQ Number for the GET request	1 .. 255
2	Return Code	RETURN CODES:  0 OK  <b><u>GENERATOR</u></b>  1 Procedure ID not defined 2 Procedure ID out of range  <b><u>POSITIONER</u></b>  101 Procedure ID not defined

**DESCRIPTION**

Defines a procedure. Message to be sent to all positioners and generators in the room. Each positioner and generator will reply with a Positioner Procedure and Generator Procedure ANSWER-EVENT.

If Total Number of Exposures in Procedure is not specified, the generator determines Procedure Finished based on the number of DB's, and other procedure. If the number of exposures is specified, procedure finished is fired when this number is achieved and generator waits for exposure switch to be released.

## 2.6 LOAD WORKSPACE

SUBINDEX: 7

### SET / ANSWER-EVENT

BYTE	DATA	FORMAT
1	Workspace ID	[1..255]

### GET

BYTE	DATA	FORMAT
1	Procedure ID	[0..255]

### COMMAND PROCESSED FUNCTION RETURN CODES

#### SET

BYTE	DATA	FORMAT
1	SEQ Number for the SET request	1 .. 255

#### GET

BYTE	DATA	FORMAT
1	SEQ Number for the GET request	1 .. 255
2	Return Code	RETURN CODES:  0 OK

		1 XXXX
--	--	--------

## DESCRIPTION

A Workspace defines a set of procedures, exposure DB's and their associations. Instead of defining, loading, assigning and activating procedures and exposure DB's through individual messages, these relationships are programmed in an xml file and grouped by a Workspace ID. When a Workspace is loaded, the same result is obtained saving a lot of work on the imaging SW and making the whole process much faster.

## 3. Redefine Procedure Fields

### 3.1 Handswitch/Footswitch Procedure Activation

SUBINDEX: 10

SET

BYTE	DATA	FORMAT
1	Procedure ID	[0..255]
2	Activate When Handswitch/Footswitch is pressed	0, Do not Activate procedure when Footswitch/Handswitch pressed. Procedure is activated with Patient Workflow message.  1, Activate procedure when Footswitch/Handswitch pressed

## DESCRIPTION

Redefines Handswitch/Footswitch Procedure Activation Field. Message to be sent to all positioners and generators in the room. Each positioner and generator will reply with a Positioner Procedure and Generator Procedure ANSWER-EVENT.

## COMMAND PROCESSED FUNCTION RETURN CODES

SET

BYTE	DATA	FORMAT
1	SEQ Number for the SET request	1 .. 255
2	Return Code	<p>RETURN CODES:</p> <p>0 OK</p> <p><b><u>GENERATOR</u></b></p> <p>1 Procedure not defined 2 Procedure out of range 11 Handswitch/footswitch procedure activation not supported</p> <p><b><u>POSITIONER</u></b></p> <p>101 Procedure ID not defined</p>

### 3.2 New Workstation

#### SUBINDEX: 11

##### SET

BYTE	DATA	FORMAT
1	Procedure ID	[0..255]
2	Workstation	[1..255]

#### DESCRIPTION



Redefines Workstation Field. Message to be sent to all positioners and generators in the room. Each positioner and generator will reply with a Positioner Procedure and Generator Procedure ANSWER-EVENT.

## COMMAND PROCESSED FUNCTION RETURN CODES

### SET

BYTE	DATA	FORMAT
1	SEQ Number for the SET request	1 .. 255
2	Return Code	<p>RETURN CODES:</p> <p>0 OK</p> <p><b><u>GENERATOR</u></b></p> <p>1 Procedure not defined 2 Procedure out of range 12 Non existent workstation</p> <p><b><u>POSITIONER</u></b></p> <p>101 Procedure not defined 102 Invalid Workstation 103 Invalid Image Receptor</p>

## 3.3 Workstation Change Request

### SUBINDEX: 12

### SET

BYTE	DATA	FORMAT
1	Workstation	[1..255]

## COMMAND PROCESSED FUNCTION RETURN CODES

### SET

BYTE	DATA	FORMAT
1	SEQ Number for the SET request	1 .. 255
2	Return Code	RETURN CODES:  0 OK 1 Non existent workstation

## DESCRIPTION

Requests a workstation change.

Workstation in use is defined by the Acquisition SW through the Procedure. Workstation is closely related to image receptor used and is where it is located, this means that a change in Workstation should be managed by Acquisition SW because a switch in image receptor is needed. For digital systems, Acquisition SW should manage detector switch when a workstation change is requested.

In this case the Acquisition SW must select a Programmed Position for this Workstation.

## 3.4 WORKSTATION CHANGE REQUEST WITHOUT SELECTING PROGRAMMED POSITION / RCC – REMOTE REQUEST

SUBINDEX: 13

**EVENT**

BYTE	DATA	FORMAT
1	Workstation	0 Free 1 Table 2 Wallstand

**DESCRIPTION**

Requests a workstation change without selecting Programmed Position.

Workstation in use is defined by the Acquisition SW through the Procedure. Workstation is closely related to image receptor used and is where it is located, this means that a change in Workstation should be managed by Acquisition SW because a switch in image receptor is needed. For digital systems, Acquisition SW should manage detector switch when a workstation change is requested.

The workstation change request is sent as an EVENT by the Positioner to the Acquisition SW. In this case the Acquisition SW does not have to select a Programmed Position for this Workstation. This action is performed by the Positioner.

When positioner receives P1, P2 or P3 message from RCC or remote, it selects a configured programmed position. If workstation needs to be changed, it sends this message.

### 3.5 WORKSTATION CHANGE REQUEST WITHOUT SELECTING PROGRAMMED POSITION

**SUBINDEX: 14****EVENT**

BYTE	DATA	FORMAT
1	Workstation	1..255

**DESCRIPTION**

Requests a workstation change without selecting Programmed Position.

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## 4. Patient and Procedure Info

### 4.1 Patient Info

SUBINDEX: 30

#### ANSWER-EVENT

BYTE	DATA	FORMAT
1..N	Patient Info String	UTF16 (Unicode Coding)

#### DESCRIPTION

Patient info notification

### 4.2 Procedure Info

SUBINDEX: 31

#### ANSWER-EVENT

BYTE	DATA	FORMAT
1..N	Procedure Info String	UTF16 (Unicode Coding)

#### DESCRIPTION

Procedure info notification

### 4.3 Procedure Number

SUBINDEX: 32

**ANSWER-EVENT-SET**

BYTE	DATA	FORMAT
1..4	Procedure number	Unsigned int

**DESCRIPTION**

Procedure number/code selected or requested on/by the image system.

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## 5. MISCELLANEOUS

### 5.1 Sync Up

SUBINDEX: 40

GET

No data

#### ANSWER-EVENT

There is no EVENT for this message. The generator and positioner will respond with the following set of messages to update all the required information to startup.

##### Generator

- Messages related to status
  - Status
  - Current RAD Exposure Data Bank
  - Current FLUORO Exposure Data Bank
  - Active System Messages
- Related to procedures and data banks
  - Procedure for all defined procedure ID's.
  - Assign for all defined DB's
  - Load DB's

##### Positioner

- Messages related to status
  - Status
  - Current Position
  - Current Collimator Parameters
  - Current Grid
  - Current Detector Rotation and & Grid Lines Rotation
  - Active System Messages
  - Tracking
  - Detent

- Collision Avoidance Path
- Grab & Go
- Related to procedures and data banks
  - Procedure for all defined procedure ID's.
  - Assign for all defined DB's
  - Load DB's

## DESCRIPTION

This message is sent to positioner request a complete update of the current positioner status. This includes defined procedures and data banks.

This message is sent to generator request a complete update of the current generator status. This includes defined procedures and data banks.

## COMMAND PROCESSED FUNCTION RETURN CODES

### GET

BYTE	DATA	FORMAT
1	SEQ Number for the GET request	1 .. 255
2	Return Code	RETURN CODES:  0    OK

## 5.2 Power Off Request

SUBINDEX: 41



**ANSWER-EVENT**

BYTE	DATA	FORMAT
1	Power Off type	0: Power off 1: Power Recycling. The system will turn on after the power off

**DESCRIPTION**

This event is fired when a power off sequence is requested. It could be started from the RCC (Remote Control Console), or any other device (i.e Console, generator power off key, ...).

Power Recycling is available available on ChallengeX, and consists on a power on restart after a regular power off sequence.

**5.3 Power Off****SUBINDEX: 42****SET / ANSWER-EVENT**

BYTE	DATA	FORMAT
1 2	WaitTimeBeforePowerOff (sec)	[0.. 600]

**DESCRIPTION**

Set message should be sent after Power Off Confirm .

This message is sent to the generator to indicate the number of seconds to wait before the power removal (WaitTimeBeforePowerOff property). Normally, this time should be long enough to allow the PC workstations to do a clean shutdown.

Once the generator receives this request, notifies with an event to all devices that a power off will be done in the indicated time interval. There is no possibility to cancel power off at this point.

Maximum selectable time: 10 minutes (600 seconds).

## COMMAND PROCESSED FUNCTION RETURN CODES

### SET

BYTE	DATA	FORMAT
1	SEQ Number for the SET request	1 .. 255
2	Return Code	RETURN CODES: 0 OK 1 Out Of Range 2 Not possible

## 5.4 Power Off Cancel

SUBINDEX: 43

### ANSWER-EVENT

No data

### DESCRIPTION

This message is sent when a console cancels the power off sequence. It should be sent before the "Power Off" set.

## 5.5 Power Off Confirm

SUBINDEX: 44

### SET

BYTE	DATA	FORMAT
------	------	--------

1	Power Off Confirm type	0: Power off 1: Power Recycling.

## DESCRIPTION

This message should sent to the positioner before the Power Off to confirm the Power Off Request event (power off or reboot).

## COMMAND PROCESSED FUNCTION RETURN CODES

### SET

BYTE	DATA	FORMAT
1	SEQ Number for the SET request	1 .. 255
2	Return Code	RETURN CODES: 0 OK

## 6. MODE OF OPERATION

### 6.1 Operation Mode

SUBINDEX: 50

#### SET / ANSWER-EVENT

BYTE	DATA	FORMAT
1	Operation Mode	0: Application, 1: Positioner Calibration, 2: Generator Calibration,

		3: Service
2	Issuing Node Number	Number ID of the node that requests the system to change the operation mode.

## GET

No data

## DESCRIPTION

This message is sent from the console to the generator/positioner to synchronize operation mode.

Operation Mode changes from an node ID will be accepted only if ID matches with the previous requesting node. Only in application mode requests from any node are considered. In other words:

- Generator/positioner in application mode, will accept an operation mode change from any node
- Generator/positioner in calibration/service, will only accept request from the node that requested the transition into this mode.

If the requesting node disconnects, the generator/positioner will go automatically to application mode.

## COMMAND PROCESSED FUNCTION RETURN CODES

### SET / GET

BYTE	DATA	FORMAT
1	SEQ Number for the SET request	1 .. 255
2	Return Code	RETURN CODES: 0 OK

## 6.2 Positioner Calibration Number

SUBINDEX: 51

### SET / ANSWER-EVENT

BYTE	DATA	FORMAT
1	Positioner ID	1: Positioner 1, 2: Positioner 2.

This message is sent to generator and positioner when there are more than one positioner configured in the room, to distinguish which positioner (tube) is about to be calibrated.

If this message is not sent, the devices will assume that positioner 1 is calibrated.

### GET

No data

## 7. MESSAGE INDEX TABLE

PATIENT WORKFLOW GROUP INDEX 0xE0		
GROUP	SUBINDEX	DESCRIPTION
PROCEDURE	1	PROCEDURE DEFINITION (1) (DEPRECATED)
	2	ACTIVATE PROCEDURE AND DATA BANKS
	3	DEFINE DEFAULT PROCEDURE AND DATA BANKS
	4	
	5	CLEAR ALL PROCEDURES
	6	PROCEDURE DEFINITION (2)
	7	LOAD WORKSPACE
	8	

	9	
REDEFINE PROCEDURE FIELDS	10	HANDSWITCH/FOOTSWITCH PROCEDURE ACTIVATION
	11	WORKSTATION VALUE
	12	WORKSTATION CHANGE REQUEST
	13	WORKSTATION CHANGE REQUEST WITHOUT SELECTING PROGRAMMED POSITION / RCC – REMOTE REQUEST
	14	WORKSTATION CHANGE REQUEST WITHOUT SELECTING PROGRAMMED POSITION
	15	
	16	
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PATIENT AND PROCEDURE INFO	30	PATIENT INFO
	31	PROCEDURE INFO
	32	PROCEDURE NUMBER
	33	

	34	
	35	
	36	
	37	
	38	
	39	
MISCELLANEOUS	40	SYNC UP
	41	POWER OFF REQUEST
	42	POWER OFF
	43	POWER OFF CANCEL
	44	POWER OFF CONFIRM
	45	
	46	
	47	
	48	
	49	
MODE OF OPERATION	50	OPERATION MODE (Application/Service/Calibration)
	51	Positioner Ccalibration Number (application/service/calibration)
	52	
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