

UCSI ENGINEERING CHANGE NOTICE FORM

Title: Addition of SET_PDOs Command

Applied to: UCSI Specification Version 2.0 Revision 1

Brief description of the functional changes:

Adding capability to dynamically change available Source or Sink Capability PDOs for the connectors

Benefits as a result of the changes:

Be able to change dynamically the available Source or Sink Capability PDOs based on the system conditions.

An assessment of the impact to the existing revision and systems that currently conform to the UCSI specification:

Provides additional capability

An analysis of the hardware implications:

An analysis of the software implications:

An analysis of the compliance testing implications:

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Actual Change

(a). Section x.x.x, Page x, Figure/Table x-x

New Text:

Y.Y.Y Set PDOs(R)

This command is used for overwriting all Source or Sink Capabilities PDOs in either SPR or EPR range on a connector.

This command can update Sink or Source Capability PDOs within an atomic sequence using the End of Message field. If an LPM receives command for changing either Sink or Source Capability PDOs with the End of Message indicator set to 0b before an Explicit Contract is established, the LPM shall postpone establishing an Explicit Contract until it receives the SET_PDOS command with the End of Message indicator set to 1b. This should prevent the OPM from power over subscription on the multi-port system.

When the LPM receives the SET_PDOS command with the End of Message indicator set 0b, and replies with Command Completion Indicator, the OPM shall send another SET_PDOS command within SENDER_RESPONSE_TIMEOUT to complete the series. If the SENDER_RESPONSE_TIMEOUT elapsed and the LPM has not received this SET_PDOS command, it may proceed with pending contract negotiation.

In order to speed up the process of updating PDOs on all LPMs, there is an option to broadcast command to all LPMs by OPM setting the connector number to 0. In that case PPM shall aggregate status from LPMs before forwarding them to OPM.

If a command is broken in chunks, the Data Index field will serve as a synchronization mechanism between OPM, PPM and LPM and also for error handling. As an example, if an error happened for one of the chunks, OPM has a choice either to retry sending the same chunk and keep the Data Index the same or restart the SET_PDOS command from the first chunk and set Data Index to 0.

It is recommended to send all PDOs within a single SET_PDOS command chunk if possible.

The OPM shall send the PDOs in the correct order. The LPM shall not re-order the PDOs.

When the LPM receives a SET_PDOS command it deletes the old PDOs and sets the new ones from the SET_PDOS command.

The SET_PDOS command supersedes the SET_POWER_LEVEL command, or in other words SET_POWER_LEVEL shall change power within available PDO levels. The SET_PDOS command shall result in the LPM negotiating a new Explicit Contract if necessary.

For the SET_PDOS command example see Appendix.

The format of the Set PDOs Command Structure for this command is given in the table below

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Table X-XX: SET_PDOS Command

| Offset (Bits) | Field | Size (Bits) | Description |
|---------------|--|-------------|---|
| 0 | <i>Command</i> | 8 | This field shall be set to SET_PDOS. |
| 8 | <i>Data Length</i> | 8 | This field shall be set to the length of the number PDOs multiplied by 4bytes/PDO. |
| 16 | <i>Connector Number</i> | 7 | This field indicates the connector number who's PDOs shall set. A value of zero in this field indicates that this command shall be broadcasted to all connectors. |
| 23 | <i>Reserved</i> | 3 | Reserved and shall be set to 0b. |
| 26 | <i>Source or Sink Capabilities PDO</i> | 1 | This bit shall be set to one if source capabilities PDO and zero if sink capabilities PDO. |
| 27 | <i>Number of PDOs</i> | 4 | This field shall be set to total number of PDOs written to the LPM in this command. The number of PDOs shall not exceed the maximum number permitted by the PD specification for the specified range. Example: SPR – 7 If the SET_PDOS command is chunked, the first chunk of the command shall have this field populated. For the following chunks this field is optional |
| 31 | <i>Data Index</i> | 7 | The index of the SET_PDOS command chunk. The SET_PDOS command could be broken into chunks. The maximum number of chunks shall not exceed the number of total PDOs. The index increments by 1 for each SET_PDO chunk. The index shall roll over to 0 after the maximum value (7Fh) is reached. |
| 38 | <i>End of Message</i> | 1 | This field indicates the end of the command series. If this field is set to 0b, the series is not completed. If this field is set to 1b, the series is completed. As an example, the OPM may send SPR PDOs first with this bit set to 0b, and then send EPR PDOs with this bit set to 1b indicating the end of sequence. The OPM shall update “Number of PDOs” consecutive PDOs starting from PDO[0] with one command or with a command series. |
| 39-63 | <i>Reserved</i> | | Reserved and shall be set to 0. |

The MESSAGE_IN Structure shall look like in the table below.

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Table B-BB SET_PDOS MESSAGE_OUT Structure

| Offset (Bits) | Field | Size (Bits) | Description |
|---------------|---------------|-------------|--------------------------|
| 0 | <i>PDO[0]</i> | 32 | First PDO at PDO Offset. |
| 32 | <i>PDO[1]</i> | 32 | Next PDO (If present). |
| .. | .. | .. | ... |
| N*32 | <i>PDO[N]</i> | 32 | Next PDO (If present). |

On successful completion of the command the LPM/PPM shall set the CCI Data Structure as described in Table z-zz.

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Table z-zz: SET_PDOS Status

| Offset (Bits) | Field | Size (Bits) | Description |
|---------------|--------------------------------------|-------------|--|
| 0 | <i>Reserved</i> | 1 | Reserved and shall be set to zero. |
| 1 | <i>Connector Change Indicator</i> | 7 | If an asynchronous event occurred on a connector then the PPM shall set this field to the connector number on which the change occurred. |
| 8 | <i>Data Length</i> | 8 | Set to 0x00. |
| 16 | <i>Data Index</i> | 7 | The index of the message chunk. The index increments by 1 for each SET_PDOS chunk. The index shall roll over to 0 after the maximum value(7Fh) is reached. |
| 23 | <i>Security Request Indicator</i> | 1 | Set to 0b |
| 24 | <i>FW Update Request Indicator</i> | 1 | Set to 0b |
| 25 | <i>Not Supported Indicator</i> | 1 | Set to 1b if the command is not supported, otherwise set to 0b |
| 26 | <i>Cancel Completed Indicator</i> | 1 | Set to 0b. |
| 27 | <i>Reset Completed Indicator</i> | 1 | Set to 0b. |
| 28 | <i>Busy Indicator</i> | 1 | Set to 0b. If the PPM is Busy, then the PPM shall set this field to a 1b and all other fields to zero. |
| 29 | <i>Acknowledge Command Indicator</i> | 1 | Set to 0b. |
| 30 | <i>Error Indicator</i> | 1 | If the command was not successfully completed the PPM shall set this field to 1b. Also, if the Number of PDOs/RDOs exceeds allowed by the spec, this bit shall be set to 1b. |
| 31 | <i>Command Completed Indicator</i> | 1 | Set this field to 1b if the command is completed successfully. |

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Table A-1 Command Code

| Command | Value |
|--------------------------|-------|
| RESERVED | 0x00 |
| PPM_RESET | 0x01 |
| CANCEL | 0x02 |
| CONNECTOR_RESET | 0x03 |
| ACK_CC_CI | 0x04 |
| SET_NOTIFICATION_ENABLE | 0x05 |
| GET_CAPABILITY | 0x06 |
| GET_CONNECTOR_CAPABILITY | 0x07 |
| SET_CCOM | 0x08 |
| SET_UOR | 0x09 |
| SET_PDM (obsolete) | 0x0A |
| SET_PDR | 0x0B |
| GET_ALTERNATE_MODES | 0x0C |
| GET_CAM_SUPPORTED | 0x0D |
| GET_CURRENT_CAM | 0x0E |
| SET_NEW_CAM | 0x0F |
| GET_PDOS | 0x10 |
| GET_CABLE_PROPERTY | 0x11 |
| GET_CONNECTOR_STATUS | 0x12 |
| GET_ERROR_STATUS | 0x13 |
| SET_POWER_LEVEL | 0x14 |
| GET_PD_MESSAGE | 0x15 |
| GET_ATTENTION_VDO | 0x16 |
| Reserved | 0x17 |
| GET_CAM_CS | 0x18 |
| LPM_FW_UPDATE_REQUEST | 0x19 |
| SECURITY_REQUEST | 0x1A |
| SET_RETIMER_MODE | 0x1B |
| SET_SINK_PATH | 0x1C |
| SET_PDOS | 0x1D |

Updating Fixed PDO Example on multiple LPMs at the same time:

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