

UCSI ENGINEERING CHANGE NOTIFICATION FORM

NOTICE: Any Company or Companies submitting a UCSI ECR proposal must be one of the following: a Promoter or Contributor of the UCSI 3.0 Specifications who have completed the UCSI addendum. If a group of Companies is submitting an ECR proposal, each company must be either a Promoter or Contributor of the UCSI 3.0 Specifications who have completed the USB Power Delivery addendum.

SPECIFICATION REVISIONS AND ADDENDA: At any point in time, there shall only be one current version of the UCSI specification, termed the production version. At the same time, there may also be proposed revisions to the specification's design which are not yet approved and shall be held confidential as deemed necessary by the UCSI 3.0 Promoters and within the Group of Working Committee(s).

PROCEDURES FOR SUBMITTING PROPOSALS: Both members of the USB Implementers Forum as a whole and members of the UCSI 3.0 Promoters may submit requests to revise the UCSI Specification. Such a request may be rejected or may result in a UCSI Engineering Change Notice (ECN), which is the official way USB specifications may be changed.

FORMAT OF PROPOSAL: The originator of a request to alter the UCSI Specification may do so by posting this to the USB Newark Software UCSI working group for review. Once the proposal has been reviewed by the working group it will be passed to the UCSI 3.0 Promoters for approval to publish.

RESUBMISSION AND APPEAL: The originator of a request that was not approved can redraft the original request. Rewritten proposal will be treated as a new proposal and will be evaluated using the procedures described above. The originator of a request that was not approved can also submit an appeal to the UCSI 3.0 Promoters. The appeal must be made in writing and addressed to the Secretary of the USB Implementers Forum.

ABOUT THE ENGINEERING CHANGE REQUEST FORM:

The Purpose of this Engineering Change Request Form is to expedite the review process of the proposal by providing explanations, background information, and examples of the proposed changes at a high level. This form serves as an executive summary to the actual proposal.

STEPS ON HOW TO SUBMIT A USB PD ENGINEERING CHANGE REQUEST:

- 1) Please fill out the Engineering Change Request Form on the following pages completely:
 - a) Detail the names and contact details for each of the ECR contributors
 - b) Update the ECR Title
 - c) Give a minimum of 2-3 sentences for each description on the form outlining the background to the ECR
- 2) For each section/table/figure to be updated:
 - a) Detail the section number, starting page and figure/table number to be updated as appropriate.
 - b) Detail existing text under "From Text"
 - c) Detail changed text under "To Text"
- 3) Save the file as "UCSI 3.x R 1" followed by the ECR Title as per step 1)b)
- 4) Post the ECR in the UCSI Documents section under "ECR | New ECRs".
 - a) This ECR will then be reviewed by the USB Newark Software Working Group.
 - b) Revisions to the ECR originating from the review should be submitted as document revision of the original ECR using "Add new document".

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Title: Add SET_CAM_PRIORITY Command
Applied to: UCSI Specification Version 3.0 Revision 1

Brief description of the functional changes proposed:

Adds a new command for the OPM to set alternate mode priorities in the LPM.

Benefits as a result of the proposed changes:

Common alternate modes (DP, TBT) are mutually exclusive and LPMs often implement a static alternate mode entry policy. For example, LPMs often enter TBT over DP when both modes are available. The OPM may want to set its own alternate mode entry policy to address security concerns or improve performance.

Currently this requires the OPM to dynamically enter and exit modes using the SET_NEW_CAM command. This also requires the OPM to use GET_ALTERNATE_MODES, GET_CURRENT_CAM and GET_CAM_SUPPORTED to query the LPM for any active and available alternate modes. GET_CURRENT_CAM, and GET_CAM_SUPPORTED do not return static data, meaning the OPM would need to resend these on every connection in addition to SET_NEW_CAM to enforce mode entry policy.

Adding SET_CAM_PRIORITIES allows the OPM to set mode entry policy with a single command which does not need to be sent each connection. This can reduce OPM/PPM/LPM traffic and allow for a simpler OPM implementation for setting alternate mode policy.

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

There is no impact to existing systems that conform to the current UCSI specification. No existing commands or data structures are changed.

An analysis of the hardware implications:

No hardware implication

An analysis of the software implications:

For an LPM to support alternate modes, it will need to implement SET_CAM_PRIORITY to fully conform to UCSI 3.1. This is consistent with the command applicability for SET_NEW_CAM which is currently normative for LPMs which implement alternate modes.

An analysis of the compliance testing implications:

UCSI does not have a compliance test specification, no compliance implications.

Actual Change Requested

(a). Section 6.5.33, Page 95

New Text:

6.5.32 Set Connector Alternate Mode Priority

This command is used to set the LPM alternate mode priority for present and future connections.

SET_CAM_PRIORITY shall list all alternate modes the OPM wants the LPM/PPM to autoenter. If an alternate mode supported by the connector is not listed, the LPM shall not autoenter that mode on present and future connections. The OPM may still instruct the LPM to enter or exit any alternate modes with SET_NEW_CAM.

If the OPM includes an SVID which is not supported by the connector, the command should return an error. If the command returns an error for any reason, the LPM autoentry policy should remain unchanged.

If the OPM does not send this command, it defers mode entry policy to the PPM/LPM. Prior to receiving this command, the LPM/PPM may implement any default mode entry policy. The value set by this command only gets reset when PPM is reset or is power cycled.

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.

The format of the CONTROL Data Structure for this command is given in Table 6-XX.

Table 6-XX: SET_CAM_PRIORITY Command

Offset (Bits)	Field	Size (Bits)	Description
0	<i>Command</i>	8	This field shall be set to SET_CAM_PRIORITY.
8	<i>Data Length</i>	8	This field shall be set to the number of SVIDs multiplied by 2
16	<i>Connector Number</i>	7	This field indicates the connector number whose alternate mode priority shall be set.
23	<i>Trigger Mode</i>	1	0 = Apply priorities to future connections only 1 = Apply priorities to current and future connections. If this bit is set the LPM shall enter the highest priority available mode. If any active modes conflict with the highest priority available mode, the LPM shall exit them prior to entering the

Offset (Bits)	Field	Size (Bits)	Description
			highest priority available mode.
24	<i>Number of SVIDs</i>	8	This field shall be set to the total number of SVIDs written to the LPM in this command. If the SET_CAM_PRIORITY command is chunked, the first chunk of the command shall have this field populated. For the following chunks this field is optional.
32	<i>Data Index</i>	7	The index of the SET_CAM_PRIORITY command chunk. The SET_CAM_PRIORITY command could be broken into chunks. The maximum number of chunks shall not exceed the number of total SVIDs. The index increments by 1 for each SET_CAM_PRIORITY chunk. The index shall roll over to 0 after the maximum value (7Fh) is reached.
39	<i>End of Message</i>	1	This field indicates the end of the command series. Set to 1 if this chunk is the only chunk or the last chunk in a message. Otherwise, shall be 0.
40	<i>Reserved</i>	24	Reserved and shall be set to 0.

The MESSAGE_OUT Structure shall look like in the table below.

Table 6-XX: SET_CAM_PRIORITY MESSAGE_OUT Structure

Offset (Bits)	Field	Size (Bits)	Description
0	<i>SVID[0]</i>	16	SVID (If present). The SVID at this index is the highest priority alternate mode. The LPM shall enter this mode when available.
16	<i>SVID[1]</i>	16	Next SVID (If present). The SVID at this index is the 2nd highest priority alternate mode. The LPM shall enter this mode if SVID[0] is not supported by the partner or cable.
...	...	...	...
N*16	<i>SVID[N]</i>	16	Next SVID (If present). The SVID at this

			index is the N+1th highest priority alternate mode. The LPM shall enter this mode if SVID[0] through SVID[N-1] are not supported by the partner or cable.
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On completion of the command the PPM shall set the CCI Data Structure as described in Table 6-XX.

Table 6-XX: SET_CAM_PRIORITY 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_CAM_PRIORITY 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 1 if the connector does not support this command. Else 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.
31	<i>Command Completed Indicator</i>	1	Set this field to a 1b.

(b). Section 6.6, Page 95, Table 6-87

From Text:

Table 6-87 Command Applicability Table

Control Command	OPM	PPM	LPM
...	...	...	...
Set New Connector Alternate Mode	0	NA	CN^6
...	...	...	...

To Text:

Table 6-87 Command Applicability Table

Control Command	OPM	PPM	LPM
...	...	...	...
Set New Connector Alternate Mode	0	NA	CN^6
Set Connector Alternate Mode Priority	0	NA	CN^6
...	...	...	...

(c). Section 6.7.4, Page 95, Table 6-87

From Text:

6.7.4 Alternate Mode Override Supported

This feature indicates that the PPM allows the OPM to change the currently negotiated alternate mode using the SET_NEW_CAM command.

If the Alternate Mode Override Supported bit in the bmOptionalFeatures field is 0b, the PPM shall set the Not Supported Indicator in the CCI Data Structure if it receives SET_NEW_CAM command.

To Text:

6.7.4 Alternate Mode Override Supported

This feature indicates that the PPM allows the OPM to change the currently negotiated alternate mode using the SET_NEW_CAM and SET_CAM_PRIORITY commands.

If the Alternate Mode Override Supported bit in the bmOptionalFeatures field is 0b, the PPM shall set the Not Supported Indicator in the CCI Data Structure if it receives SET_NEW_CAM or SET_CAM_PRIORITY command.

(d). Appendix A, Table A-1. Page 107

From Text:

Command	Value
...	...
GET_LPM_PPM_INFO	0x22

To Text:

Command	Value
...	...
GET_LPM_PPM_INFO	0x22
SET_CAM_PRIORITY	0x23

ECR Appendix

Either SET_CAM_PRIORITY or the existing UCSI 3.0 commands can be used by the OPM to enforce a mode entry policy. Figure 1 shows how the two sets of commands compare during initialization, hotplug and mode switching.

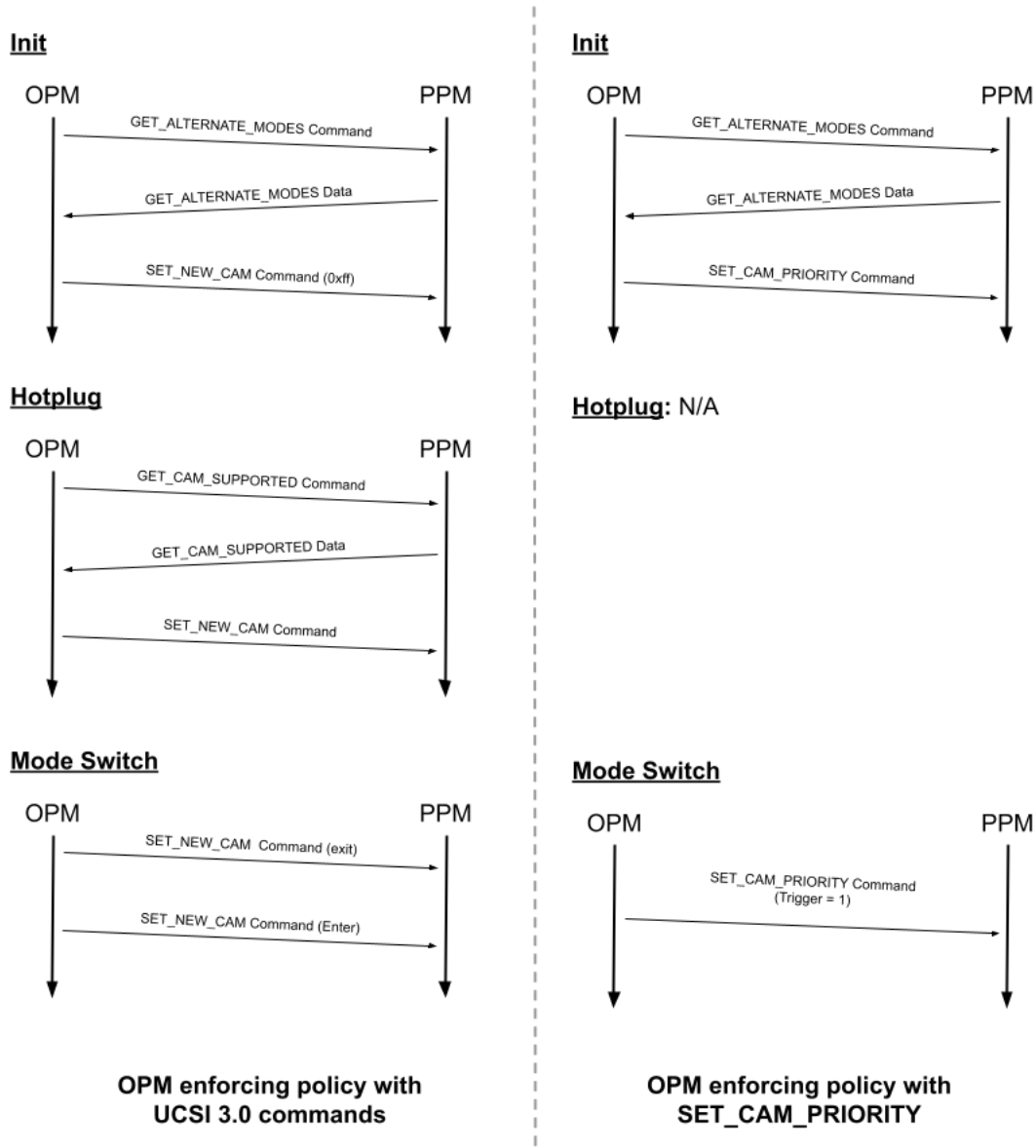


Figure 1. OPM mode selection

During initialization, the OPM needs to send `GET_ALTERNATE_MODE` to know which alternate modes the connector supports. For UCSI 3.0, the OPM should then send `SET_NEW_CAM` (0xff) to prevent the LPM from auto-entering alternate modes. With `SET_CAM_PRIORITY`, the OPM should send the command on initialization to set the default mode entry policy. On hotplug, an OPM using UCSI 3.0 commands must send `GET_CAM_SUPPORTED` to know which alternate modes are available then send `SET_NEW_CAM` to enter the desired mode. With `SET_CAM_PRIORITY`, no command needs to be sent by the OPM on hotplug. To switch modes with UCSI 3.0 commands, the OPM must send 2 `SET_NEW_CAM` commands: One to exit the current mode and another to enter the desired mode. With `SET_CAM_PRIORITY`, the OPM must send one command with the Trigger mode field set to 1.