USB Power Delivery ENGINEERING CHANGE NOTICE

Title: Section 7.3 Restructure and Update

Applied to: USB Power Delivery Specification Revision 3.1 Version 1.7

Brief description of the functional changes proposed:

Change pSnkStby to iSnkStby to more accurately describe actual behaviors of Sinks during transitions.

Reorganize Section 7.3 to group the transitions and add additional transitions.

Update all transition diagrams and accompanying tables to reflect the change in specification for SenderResponseTimer.
Add a time limit (tSrcTransReq) for sending PS_RDY to the diagrams.
Add tSrcTransOff and tSrcTransOn for PR_Swap.

Add new parameters to support above.

Benefits as a result of the proposed changes:

Improved readability and to acknowledge and allow actual behavior for bus powered Sinks during voltage transitions.

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

None

An analysis of the hardware implications:

None

An analysis of the software implications:

None

An analysis of the compliance testing implications:

Minimal impact.

USB Power Delivery ENGINEERING CHANGE NOTICE
Actual Change Requested

(a) Section 7.1.13, P295

From Text:

The new Sink ***Shall Not*** draw more than ***pSnkStdby*** from V_{BUS} until ***tSnkFRSwap*** after it has started sending the FRS signal or V_{BUS} has fallen below ***vSafe5V*** (min).

To Text:

The new Sink ***Shall Not*** draw more than ~~***pSnkStdby***~~ ***iSnkStdby*** from V_{BUS} until ***tSnkFRSwap*** after it has started sending the FRS signal or V_{BUS} has fallen below ***vSafe5V*** (min).

(b) Section 7.2.3, P300

From Text:

The Sink ***Shall*** transition to Sink Standby before a positive or negative Voltage transition of V_{BUS}. During Sink Standby the Sink ***Shall*** reduce its power draw to ***pSnkStdby.*** This allows the Source to manage the Voltage transition as well as supply sufficient operating current to the Sink to maintain PD operation during the transition. The Sink ***Shall*** complete this transition to Sink Standby within ***tSnkStdby*** after evaluating the ***Accept*** Message from the Source. The transition when returning to Sink operation from Sink Standby ***Shall*** be completed within ***tSnkNewPower***. The ***pSnkStdby*** requirement ***Shall*** only apply if the Sink power draw is higher than this level.
See Section 7.3 for details of when ***pSnkStdby*** ***Shall*** be applied for any given transition.

To Text:

The Sink ***Shall*** transition to Sink Standby before a positive Voltage transition of V_{BUS}. During Sink Standby the Sink ***Shall*** reduce the current drawn to ***iSnkStdby***. This allows the Source to manage the Voltage transition as well as supply sufficient operating current to the Sink to maintain PD operation during the transition. The Sink ***Shall*** complete this transition to Sink Standby within ***tSnkStdby*** after evaluating the ***Accept*** Message from the Source. The transition when returning to Sink operation from Sink Standby ***Shall*** be completed within ***tSnkNewPower***. The ***iSnkStdby*** requirement ***Shall*** only apply if the Sink ~~power~~current draw is higher than this level.
See Section 7.3 for details of when ***iSnkStdby*** ***Shall*** be applied for any given transition.

(c) Section 7.3 Transitions, p301

From Text:

The following sections illustrate the power supply's response to various types of negotiations. The negotiation cases take into consideration for the examples are as follows:

- Higher Power Transitions
  - Increase the current
  - Increase the Voltage.
  - Increase the Voltage and the current
- Relatively Constant Power Transitions
  - Increase the Voltage and decrease the current
  - Decrease the Voltage and increase the current
- Lower Power Transitions
  - Decrease the current
  - Decrease the Voltage.

- Decrease the Voltage and the current
- Power Role Swap Transitions
  - Source requests a Power Role Swap
  - Sink requests a Power Role Swap
- Goto Minimum Current Transition
- Response to ***Hard Reset*** Signaling.
  - Source issues ***Hard Reset*** Signaling.
  - Sink issues ***Hard Reset*** Signaling.
- No change in Current or Voltage.

The transition from ***[USB 2.0]***, ***[USB 3.2]***, ***[USB4]***, ***[USB Type-C 2.2]*** or ***[USBBC 1.2]*** operation into Power Delivery Mode can also lead to a Power Transition since this is the initial Contract negotiation. The following types of Power Transitions ***Shall*** also be applied when moving from ***[USB 2.0]***, ***[USB 3.2]***, ***[USB Type-C 2.2]*** or ***[USBBC 1.2]*** operation into Power Delivery Mode:

- High Power
- Relatively Constant Power
- Lower Power Transitions

No change in Current or Voltage.

To Text:

The following sections illustrate the power supply's response to various types of negotiations. The negotiations are triggered by certain Messages or Signaling. It provides examples of the transitions and is organized around each of the Messages and Signals that result in a response from the power supply. The response to a Message or Signal may result in different transitions depending upon the power supply's starting conditions and the requested change. ~~The negotiation cases take into consideration for the examples are as follows:~~

- Transitions caused by a Request Message:
  - Transitions between (A)PDOs
    - Generic transition between (A)PDOs[1]

~~- Higher Power Transitions~~
    - ♦ Increase the voltage
    - ♦ Decrease the voltage

~~- Relatively Constant Power Transitions~~
    - ♦ Increase the voltage and the current
    - ♦ Increase the voltage and decrease the current

~~- Lower Power Transitions~~
    - ♦ Decrease the voltage and increase the current
    - ~~♦ Decrease the current~~
    - ~~♦ Decrease the Voltage.~~
    - ♦ Decrease the voltage and the current
    - ♦ No change in voltage or current
  - Transitions within the same PDO (Fixed, Battery, Variable):
    - Increase the current
    - Decrease the current
    - No change in current
  - Transitions within the same PPS APDO:
    - Increasing the Programmable Power Supply (PPS) Voltage
    - Decreasing the Programmable Power Supply (PPS) Voltage
    - Increasing the Programmable Power Supply (PPS) Current
    - Decreasing the Programmable Power Supply (PPS) Current
    - Same Request Programmable Power Supply (PPS)
  - Transitions within the same AVS APDO:
    - Increasing the Adjustable Voltage Supply (AVS) Voltage
    - Decreasing the Adjustable Voltage Supply (AVS) Voltage
    - Same Request Adjustable Voltage Supply (AVS)

[1] Includes:

- From one (A)PDO to another (A)PDO
- From an Implicit contract to an Explicit Contract
- From ***[USB Type-C 2.2]*** operation to the initial PD contract

- ~~Power Role Swap~~ ~~Transitions~~Transitions caused by ***PR_ Swap*** Message
  - Source requests a Power Role Swap
  - Sink requests a Power Role Swap
- ~~Goto Minimum Current Transition~~
- Transitions caused by ***GotoMin*** Message
  - Sink decreases its current draw to pre-negotiated minimum.
- ~~Response to ***Hard Reset*** Signaling.~~ Transitions caused by Hard Reset Signaling:
  - Source issues ***Hard Reset*** Signaling.
  - Sink issues ***Hard Reset*** Signaling.
- Transitions caused by ***FR_Swap*** Signaling
  - Source asserts Rd at its preferred ***[USB Type-C 2.2]*** current

~~- No change in Current or Voltage.~~
~~The transition from ***[USB 2.0], [USB 3.2], [USB4], [USB Type-C 2.2]*** or ***[USBBC 1.2]*** operation into Power Delivery Mode can also lead to a Power Transition since this is the initial Contract negotiation. The following types of Power Transitions ***Shall*** also be applied when moving from ***[USB 2.0], [USB 3.2], [USB Type-C 2.2]*** or ***[USBBC 1.2]*** operation into Power Delivery Mode:~~
~~- High Power~~
~~- Relatively Constant Power~~
~~- Lower Power Transitions~~
~~No change in Current or Voltage.~~

(d) New Section 7.3.1 Transitions caused by a Request Message

New Text:

7.3.1 Transitions caused by a Request Message

This section describes transitions that are caused by a Request Message

(e) Section 7.3.20 Changing the Source PDO or APDO, p343

From Text:

7.3.20 Changing the Source PDO or APDO

The interaction of the Device Policy Manager, the port Policy Engine and the Power Supply when changing *between* Source PDOs and APDOs, as listed below, is shown in Figure 7-42 Transition Diagram for Changing the Source PDO or APDO.

- PDO to PDO
- PDO to APDO
- APDO to APDO
- APDO to PDO

The Source Voltage as the transition starts ***Shall*** be any Voltage within the ***Valid*** V_{BUS} range of the previous Source PDO or APDO. The Source Voltage after the transition is complete ***Shall*** be any Voltage within the ***Valid*** V_{BUS} range of the new Source

PDO or APDO. The sequence that ***Shall*** be followed is described in Table 7-18. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-42 Transition Diagram for Changing the Source PDO or APDO

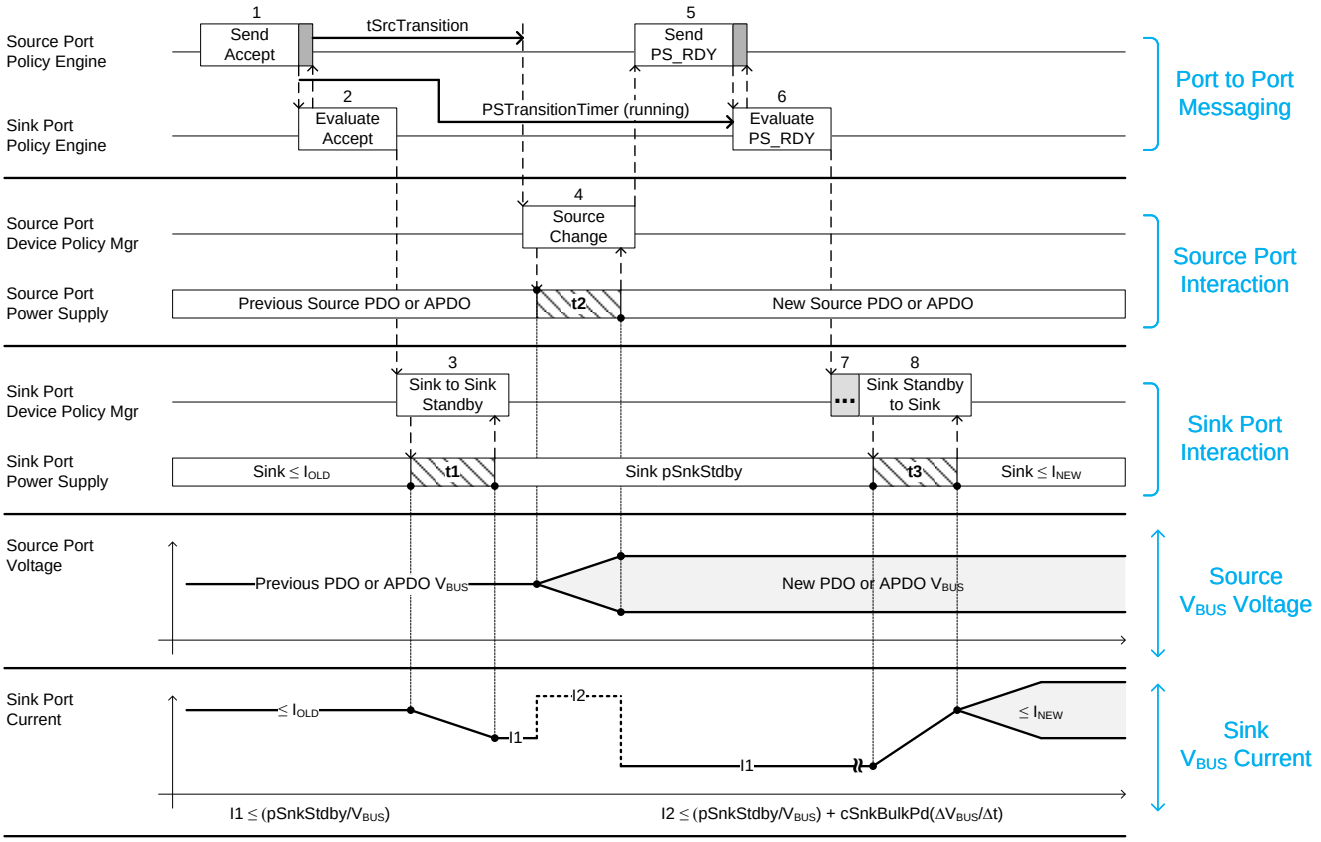

Table 7-1 Sequence Description for Changing the Source PDO or APDO

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message and starts the ***PSTransitionTimer***.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to change to the new Source PDO or APDO.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine. Policy Engine then evaluates the ***Accept*** Message.
3		Policy Engine tells the Device Policy Manager to instruct the power supply to reduce power consumption to ***pSnkStdby*** within ***tSnkStdby*** (t1); t1 Shall complete before ***tSrcTransition***. The Sink ***Shall Not*** violate transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.
4	***tSrcTransition*** after the ***GoodCRC*** Message was received the Source starts to change to the new PDO or APDO. The Source ***Shall*** be ready to operate at the new power level within ***tSrcReady*** (t2). The power supply informs the Device Policy Manager that it is ready to operate at the new power level. The power supply status is passed to the Policy Engine.	
5	The Policy Engine sends the ***PS_RDY*** Message to the Sink.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
6	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***PS_RDY*** Message from the Source and tells the Device Policy Manager that the Source is operating at the new PDO or APDO.

Step	Source Port	Sink Port
7		The Sink ***May*** begin operating at the new power level any time after evaluation of the ***PS_RDY*** Message. This time duration is indeterminate.
8		The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. The time duration (t3) depends on the magnitude of the load change.

To Text:

7.3.1.1~~7.3.20~~ Changing the Source ~~PDO or APDO~~ between Different (A)PDOs

In these transition descriptions the term (A)PDO is used to describe any Power Data Object, regardless of whether it is a PDO or an APDO in the Capabilities Message.

This section describes transitions in response to a Request message:

- From one (A)PDO to another (A)PDO
- From an Implicit contract to an Explicit Contract
- From ***[USB Type-C 2.2]*** operation to the initial PD contract

These transitions usually result in a Voltage change but is not required.

The interaction of the Device Policy Manager, the port Policy Engine and the Power Supply that ***Shall*** be followed when increasing the current ~~is changing *between* Source PDOs and APDOs, as listed below,~~ is shown in ~~Figure 7-42 Transition Diagram for Changing the Source PDO or APDO~~Figure 7-24 Generic Change for the Source to another (A)PDO.

- ~~PDO to PDO~~
- ~~PDO to APDO~~
- ~~APDO to APDO~~
- ~~APDO to PDO~~

The Source Voltage as the transition starts ***Shall*** be any Voltage within the ***Valid*** V_{BUS} range of the previous Source ~~PDO or APDO~~(A)PDO. The Source Voltage after the transition is complete ***Shall*** be any Voltage within the ***Valid*** V_{BUS} range of the new Source ~~PDO or APDO~~(A)PDO. The sequence that ***Shall*** be followed is described in ~~Table 7-20~~Table 7 1 Sequence Description for Changing the Source to another (A)PDO. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

The voltage is considered to increase if the change from V_{OLD} to V_{NEW} is greater than vSmallStep. The determination Shall be based on the nominal (A)PDO voltage before and after, unless either (A)PDO is Battery or Variable when the worst case of of the following is assumed in making this determination.

- Minimum Voltage to Voltage
- Minimum Voltage to Maximum Voltage
- Voltage to Maximum Voltage

The following sections begin with a description of the generic process followed by more specific examples of the most common transitions.

7.3.1.1.1 Generic Transition Diagram for changing the Source to another (A)PDO

The process for changing from one (A)PDO to another (A)PDO is described in general terms in this section. Note it also applies to the transition from ***[USB 2.0]***, ***[USB 3.2]***, ***[USB4]***, ***[USB Type-C 2.2]*** or ***[USBBC 1.2]*** operation into Power Delivery Mode during the initial Contract negotiation.

The sequence that ***Shall*** be followed is described in ~~Table 7-20~~**Error! Reference source not found.**. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-~~42~~24 Generic Change for the Source to another (A)PDO

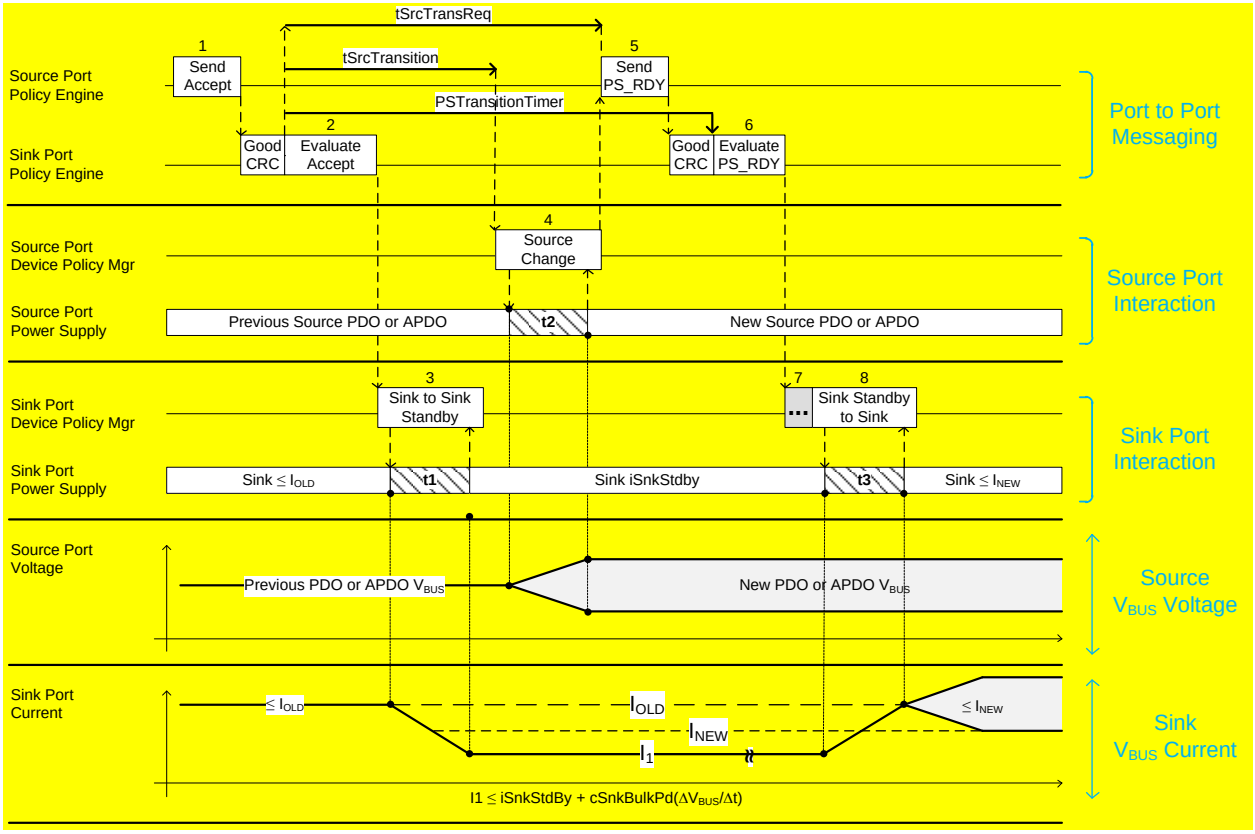

Table 7-~~20~~1 Sequence Description for Changing the Source ~~PDO or APDO~~to another (A)PDO

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message ~~and starts the ***PSTransitionTimer***~~.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to change to the new Source ~~PDO or APDO~~(A)PDO.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then starts the ***PSTransitionTimer*** and evaluates the ***Accept*** Message. There are 3 cases: • If the voltage is expected to increase between different (A)PDOs, the Sink Port Current ***Shall*** be decreased to ***iSnkStdby.*** • If the voltage is not expected to increase and I_{NEW} is lower than I_{OLD} the current ***Shall*** be reduced to I_{NEW}. • If the voltage is not expected to increase and I_{NEW} is greater than or equal to I_{OLD} the Sink Port Current ***May*** remain the same.
3		Policy Engine tells the Device Policy Manager to instruct the power supply to reduce ~~power consumption~~current drawn to ~~***pSnkStdby***~~***iSnkStdby*** within ***tSnkStdby*** (t1); t1 Shall complete before ***tSrcTransition*** min. The Sink ***Shall Not*** violate transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.
4	***tSrcTransition*** after the ***GoodCRC*** Message was received the Source starts to change to the new ~~***PDO or APDO***~~***(A)PDO***. The Source ***Shall*** be ready to operate at the new power level within ***tSrcReady*** (t2). The power supply informs the Device Policy Manager that it is ready to operate at the new power level. The power supply status is passed to the Policy Engine.	

Step	Source Port	Sink Port
5	The Policy Engine sends the ***PS_RDY*** Message to the Sink starting within ***tSrcTransReq*** of the end of the ***GoodCRC*** following the ***Accept*** message.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
6	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then stops the ***PSTransitionTimer***, evaluates the ***PS_RDY*** Message from the Source and tells the Device Policy Manager that the Source is operating at the new ~~PDO or APDO~~A(PDO). If the ***PS_RDY*** Message is not received before ***PSTransitionTimer*** times out the Sink starts sending ***Hard Reset*** signaling.
7		The Sink ***May*** begin operating at the new power level any time after evaluation of the ***PS_RDY*** Message. This time duration is indeterminate.
8		The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. The time duration (t3) depends on the magnitude of the load change.

(f) New Section 7.3.1.1.2 Examples of changes from one (A)PDO to another (A)PDO

New Text:

7.3.1.1.2 Examples of changes from one (A)PDO to another (A)PDO

The seven examples of (A)PDO change transitions below illustrate the most common transitions.

(g) Section 7.3.2 Increasing the Voltage, p304

From Text:

7.3.2 Increasing the Voltage

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when increasing the Voltage is shown in Figure 7-24 Transition Diagram for Increasing the Voltage. The sequence that ***Shall*** be followed is described in Table 7-2. The timing parameters that ***Shall*** be followed are listed in Table 7-22, Table 7-23 and Table 7-24. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-24 Transition Diagram for Increasing the Voltage

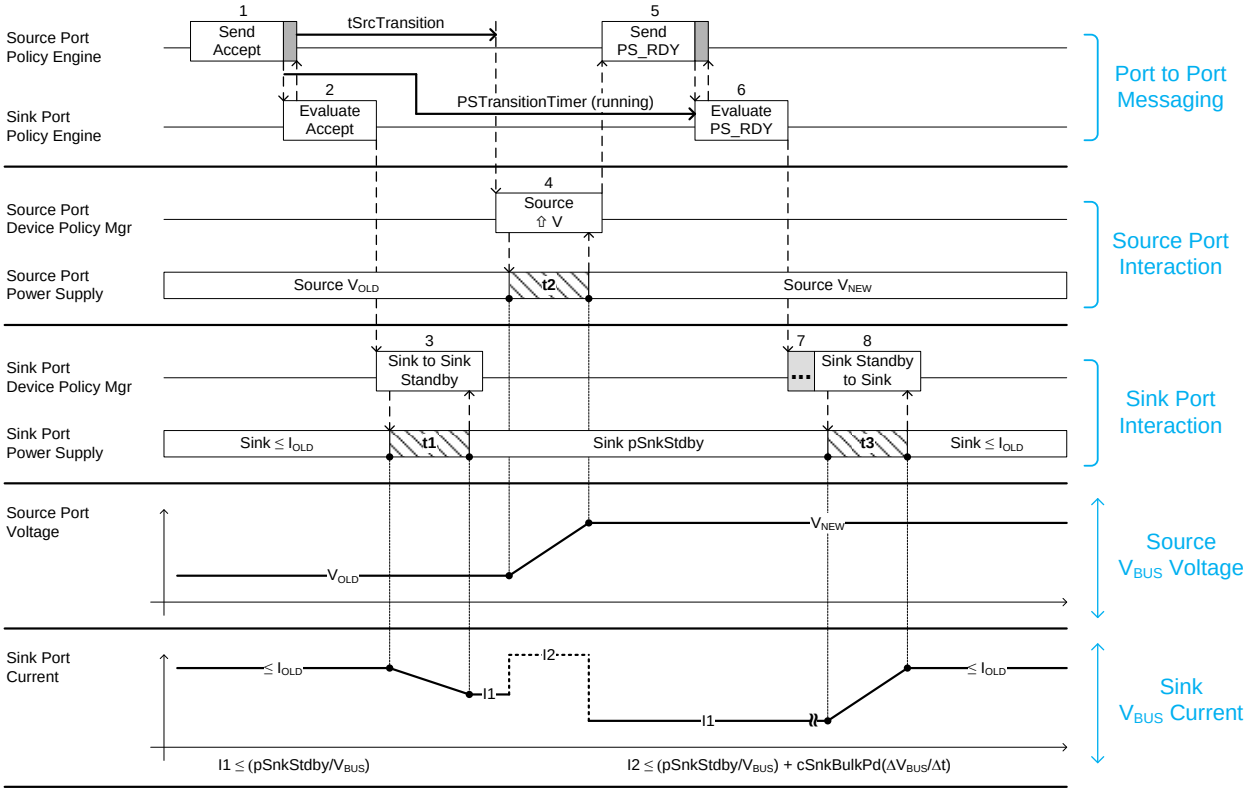

Table 7-2 Sequence Description for Increasing the Voltage

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message and starts the ***PSTransitionTimer***.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine. Policy Engine then evaluates the ***Accept*** Message.
3		Policy Engine tells the Device Policy Manager to instruct the power supply to reduce power consumption to ***pSnkStdby*** within ***tSnkStdby*** (t1); t1 ***Shall*** complete before ***tSrcTransition***. The Sink ***Shall Not*** violate transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.
4	***tSrcTransition*** after the ***GoodCRC*** Message was received the power supply starts to change its output power capability. The power supply ***Shall*** be ready to operate at the new power level within ***tSrcReady*** (t2). The power supply informs the Device Policy Manager that it is ready to operate at the new power level. The power supply status is passed to the Policy Engine.	
5	The Policy Engine sends the ***PS_RDY*** Message to the Sink.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
6	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***PS_RDY*** Message from the Source and tells the Device Policy Manager it is okay to operate at the new power level.
7		The Sink ***May*** begin operating at the new power level any time after evaluation of the ***PS_RDY*** Message. This time duration is indeterminate.

Step	Source Port	Sink Port
8		The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. The time duration (t3) depends on the magnitude of the load change.

To Text:

7.3.1.1.2.1~~7.3.2~~ Increasing the Voltage

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when changing from one (A)PDO to another while increasing the Voltage is shown in Figure 7-245 Transition Diagram for Increasing the Voltage. The sequence that ***Shall*** be followed is described in Table 7-2 Sequence Description for Increasing the Voltage. The timing parameters that ***Shall*** be followed are listed in Table 7-22, Table 7-23 and Table 7-24. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-245 Transition Diagram for Increasing the Voltage

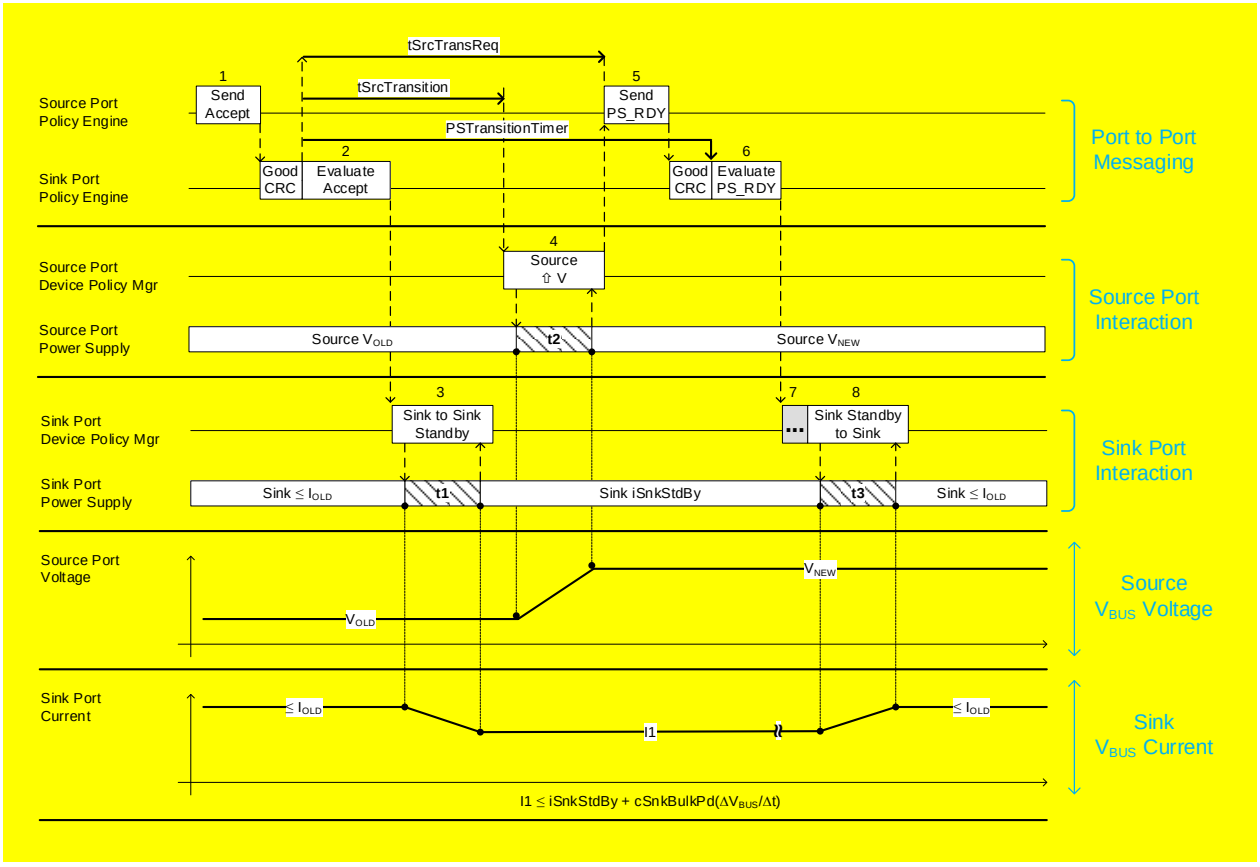

Table 7-2 Sequence Description for Increasing the Voltage

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message ~~and starts the PSTransitionTimer~~.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine. Policy Engine then starts the ***PSTransitionTimer and*** evaluates the ***Accept*** Message.

Step	Source Port	Sink Port
3		Policy Engine tells the Device Policy Manager to instruct the power supply to reduce ~~power consumption~~current drawn to ~~***pSnkStdby***~~***iSnkStdby*** within ***tSnkStdby*** (t1); t1 ***Shall*** complete before ***tSrcTransition***. The Sink ***Shall Not*** violate transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.
4	***tSrcTransition*** after the ***GoodCRC*** Message was received the power supply starts to change its output power capability. The power supply ***Shall*** be ready to operate at the new power level within ***tSrcReady*** (t2). The power supply informs the Device Policy Manager that it is ready to operate at the new power level. The power supply status is passed to the Policy Engine.	
5	The Policy Engine sends the ***PS_RDY*** Message to the Sink starting within ***tSrcTransReq*** of the end of the ***GoodCRC*** Message following the ***Accept*** message.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
6	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then stops the ***PSTransitionTimer***, evaluates the ***PS_RDY*** Message from the Source, and tells the Device Policy Manager ~~it is okay to operate~~ that the Source is operating at the new ~~power level~~(A)PDO. If the ***PS_RDY*** Message is not received before ***PSTransitionTimer*** times out the Sink starts sending ***Hard Reset*** signaling.
7		The Sink ***May*** begin operating at the new power level any time after evaluation of the ***PS_RDY*** Message. This time duration is indeterminate.
8		The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. The time duration (t3) depends on the magnitude of the load change.

(h) Section 7.3.3 Increasing the Voltage and Current, p306

From Text:

7.3.3 Increasing the Voltage and Current

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when increasing the Voltage and current is shown in Figure 7-25 Transition Diagram for Increasing the Voltage and Current. The sequence that ***Shall*** be followed is described in Table 7-3. The timing parameters that ***Shall*** be followed are listed in Table 7-22, Table 7-23 and Table 7-24. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-25 Transition Diagram for Increasing the Voltage and Current

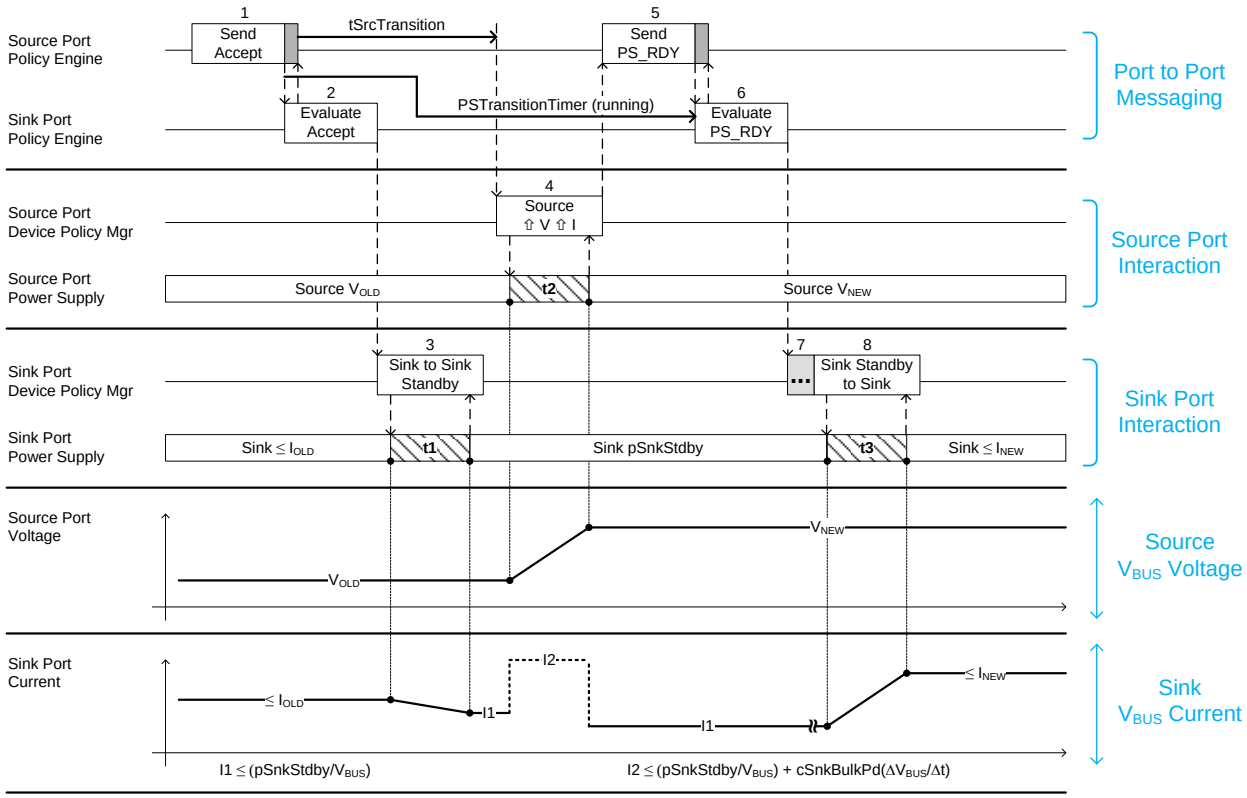

Table 7-3 Sequence Diagram for Increasing the Voltage and Current

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message and starts the ***PSTransitionTimer***.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***Accept*** Message.
3		Policy Engine tells the Device Policy Manager to instruct the power supply to reduce power consumption to ***pSnkStdby*** within ***tSnkStdby*** (t1); t1 ***Shall*** complete before ***tSrcTransition***. The Sink ***Shall Not*** violate transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.
4	***tSrcTransition*** after the ***GoodCRC*** Message was received the power supply starts to change its output power capability. The power supply ***Shall*** be ready to operate at the new power level within ***tSrcReady*** (t2). The power supply informs the Device Policy Manager that it is ready to operate at the new power level. The power supply status is passed to the Policy Engine.	
5	The Policy Engine sends the ***PS_RDY*** Message to the Sink.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
6	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***PS_RDY*** Message from the Source and tells the Device Policy Manager it is okay to operate at the new power level.
7		The Sink ***May*** begin operating at the new power level any time after evaluation of the ***PS_RDY*** Message. This time duration is indeterminate.

Step	Source Port	Sink Port
8		The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. The time duration (t3) depends on the magnitude of the load change.

To Text:

7.3.1.1.2.2~~7.3.3~~ Increasing the Voltage and Current

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when changing from one (A)PDO to another while increasing the Voltage and current is shown in Figure 7-2~~5~~6 Transition Diagram for Increasing the Voltage and Current. The sequence that ***Shall*** be followed is described in Table 7-3 Increasing the Voltage and Decreasing the Current. The timing parameters that ***Shall*** be followed are listed in Table 7-22, Table 7-23 and Table 7-24. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-2~~5~~6 Transition Diagram for Increasing the Voltage and Current

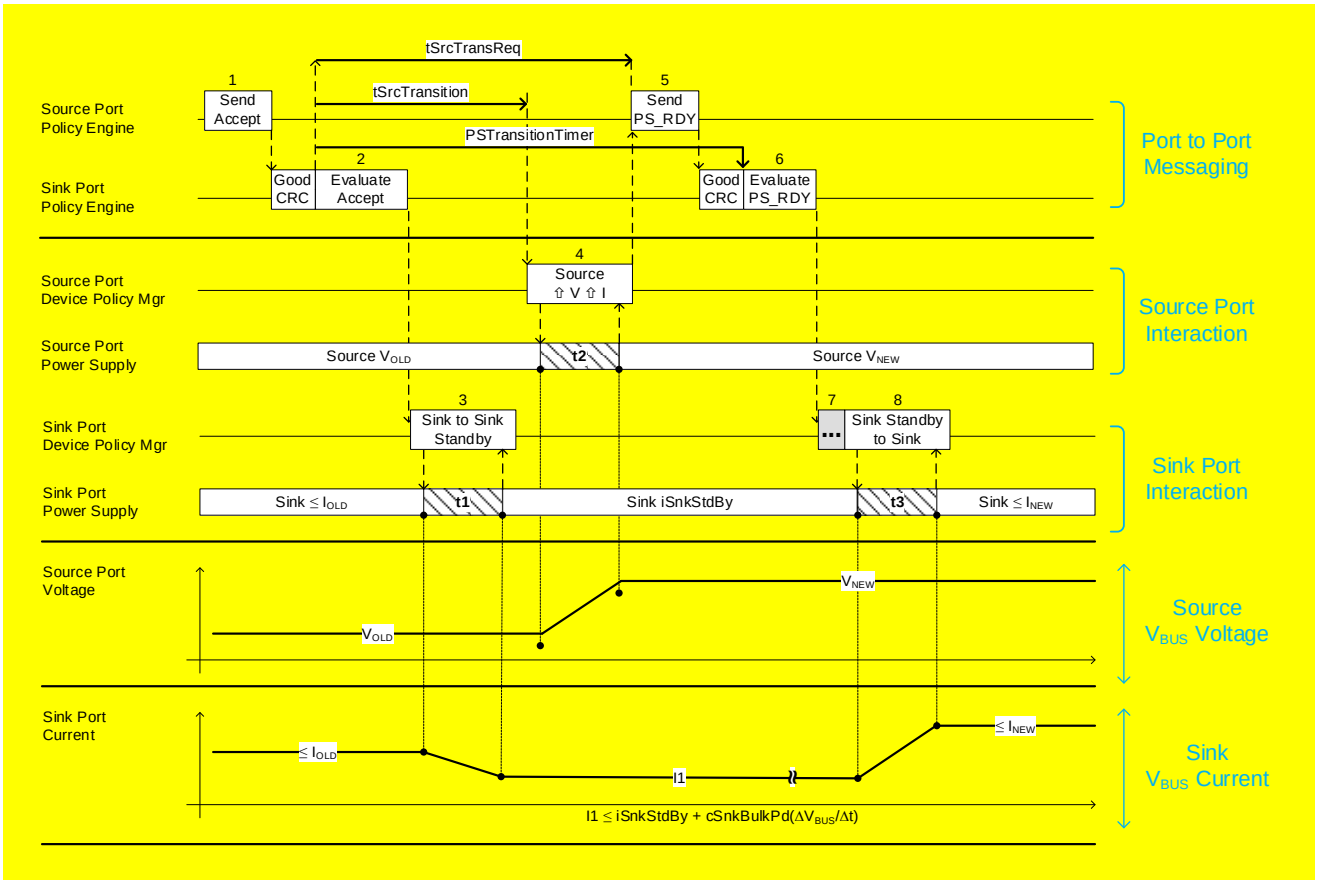

Table 7-3 Sequence Diagram for Increasing the Voltage and Current

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message ~~and starts the ***PSTransitionTimer***~~.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then starts the ***PSTransitionTimer*** and evaluates the ***Accept*** Message.
3		Policy Engine tells the Device Policy Manager to instruct the power supply to reduce ~~power consumption~~current draw to ~~***pSnkStdbyi***~~***SnkStdby*** within ***tSnkStdby*** (t1); t1 ***Shall*** complete before ***tSrcTransition***. The Sink ***Shall Not*** violate transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.
4	***tSrcTransition*** after the ***GoodCRC*** Message was received the power supply starts to change its output power capability. The power supply ***Shall*** be ready to operate at the new power level within ***tSrcReady*** (t2). The power supply informs the Device Policy Manager that it is ready to operate at the new power level. The power supply status is passed to the Policy Engine.	
5	The Policy Engine sends the ***PS_RDY*** Message to the Sink starting within ***tSrcTransReq*** of the end of the ***GoodCRC*** Message following the ***Accept*** message.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
6	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then stops the ***PSTransitionTimer***, evaluates the ***PS_RDY*** Message from the Source, and tells the Device Policy Manager ~~it is okay to operate~~that the Source is operating at the new ~~power level~~A(PDO). If the ***PS_RDY*** Message is not received before ***PSTransitionTimer*** times out the Sink starts sending ***Hard Reset*** signaling.
7		The Sink ***May*** begin operating at the new power level any time after evaluation of the ***PS_RDY*** Message. This time duration is indeterminate.
8		The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. The time duration (t3) depends on the magnitude of the load change.

(i) Section 7.3.4 Increasing the Voltage and Decreasing the Current, p308

From Text:

7.3.4 Increasing the Voltage and Decreasing the Current

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when increasing the Voltage and decreasing the current is shown in Figure 7-26 Transition Diagram for Increasing the Voltage and Decreasing the Current. The sequence that ***Shall*** be followed is described in Table 7-4. The timing parameters that ***Shall*** be followed are listed in Table 7-22, Table 7-23 and Table 7-24. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-26 Transition Diagram for Increasing the Voltage and Decreasing the Current

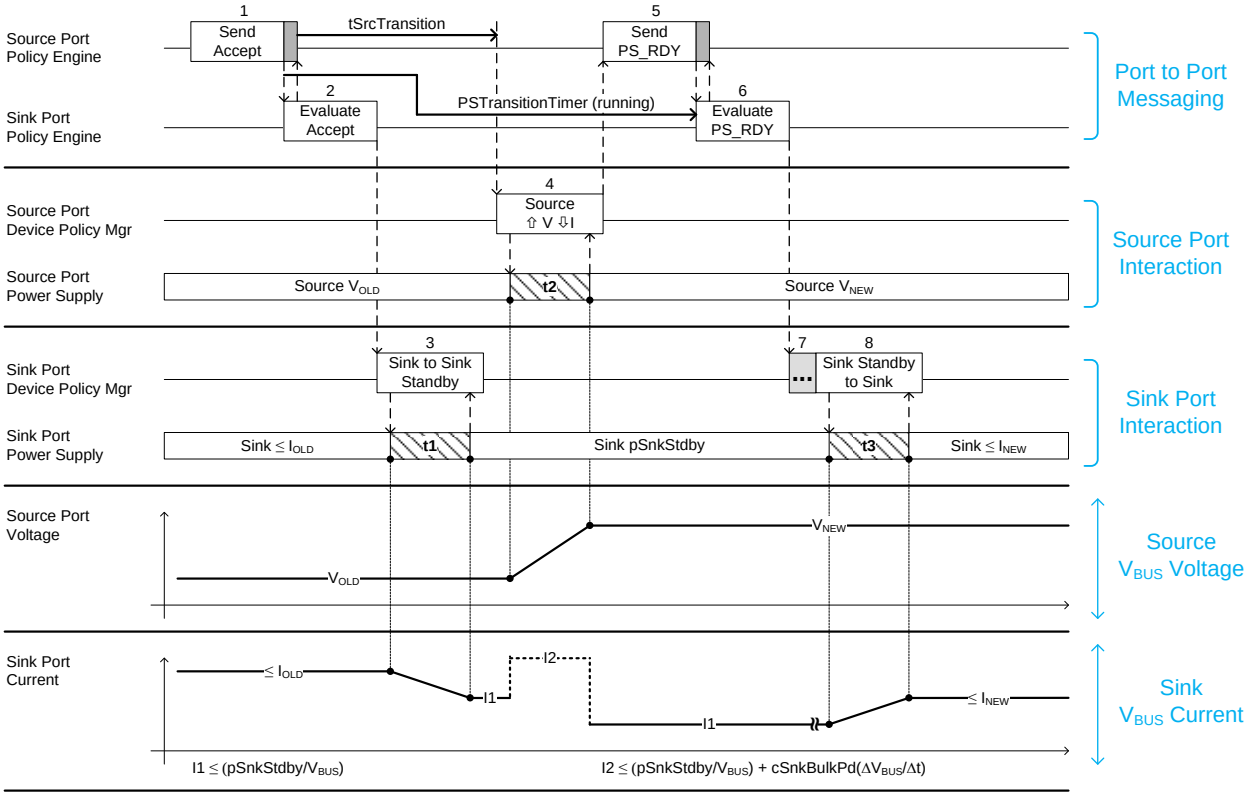

Table 7-4 Sequence Description for Increasing the Voltage and Decreasing the Current

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine evaluates the ***Accept*** Message and starts the ***PSTransitionTimer***.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***Accept*** Message.
3		Policy Engine tells the Device Policy Manager to instruct the power supply to reduce power consumption to ***pSnkStdby*** within ***tSnkStdby*** (t1); t1 ***Shall*** complete before ***tSrcTransition***. The Sink ***Shall Not*** violate transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.
4	***tSrcTransition*** after the ***GoodCRC*** Message was received the power supply starts to change its output power capability. The power supply ***Shall*** be ready to operate at the new power level within ***tSrcReady*** (t2). The power supply informs the Device Policy Manager that it is ready to operate at the new power level. The power supply status is passed to the Policy Engine.	
5	The Policy Engine sends the ***PS_RDY*** Message to the Sink.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
6	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***PS_RDY*** Message from the Source and tells the Device Policy Manager it is okay to operate at the new power level.
7		The Sink ***May*** begin operating at the new power level any time after evaluation of the ***PS_RDY*** Message. This time duration is indeterminate.

Step	Source Port	Sink Port
8		The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. The time duration (t3) depends on the magnitude of the load change.

To Text:

7.3.1.1.2.3~~7.3.4~~ Increasing the Voltage and Decreasing the Current

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when changing from one (A)PDO to another while increasing the Voltage and decreasing the current is shown in Figure 7-2~~6~~7 Transition Diagram for Increasing the Voltage and Decreasing the Current. The sequence that ***Shall*** be followed is described in Table 7-4 Sequence Description for Increasing the Voltage and Decreasing the Current. The timing parameters that ***Shall*** be followed are listed in Table 7-22, Table 7-23 and Table 7-24. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-2~~6~~7 Transition Diagram for Increasing the Voltage and Decreasing the Current

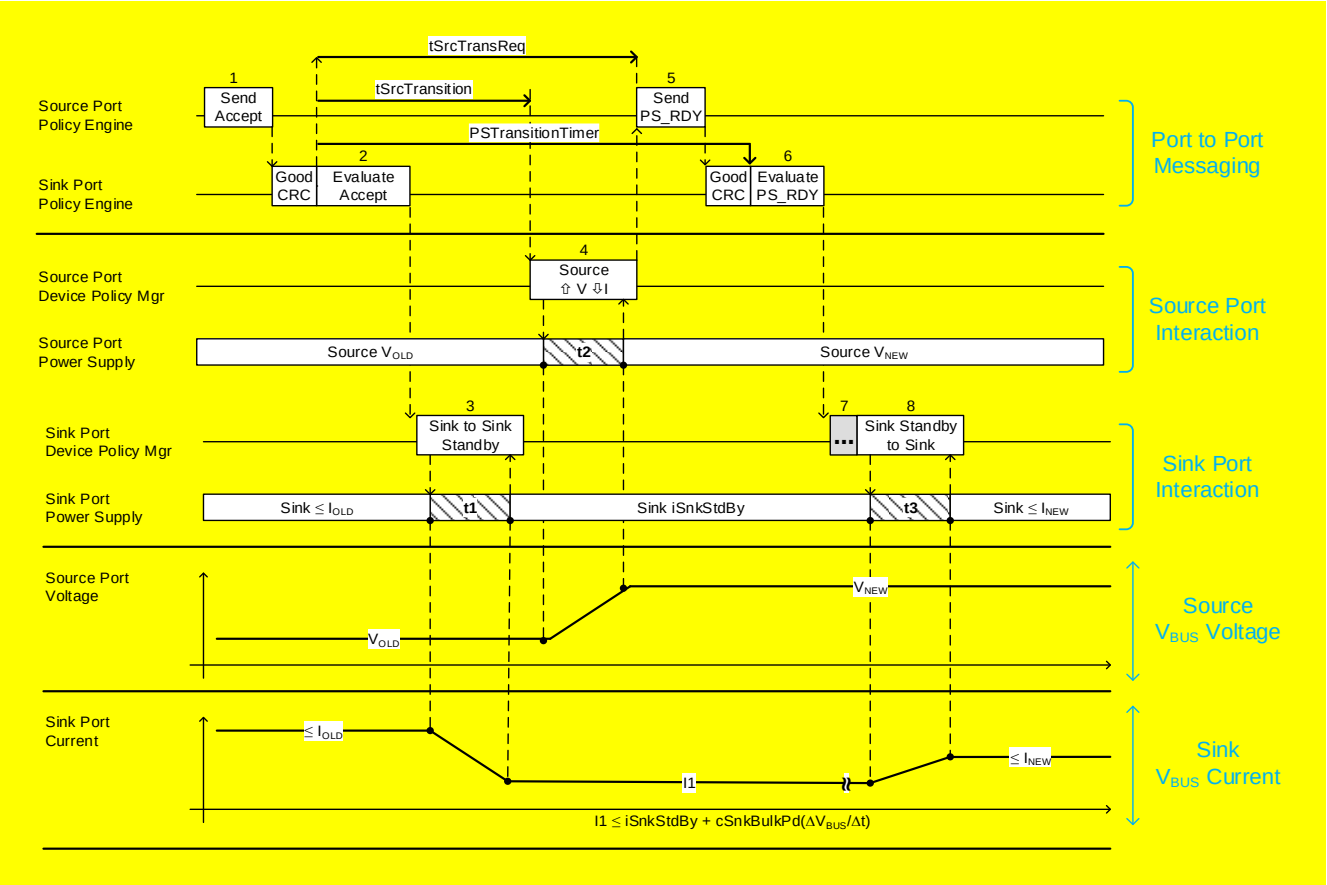

Table 7-4 Sequence Description for Increasing the Voltage and Decreasing the Current

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine ~~evaluates~~receives the ***Accept*** Message ~~and starts the ***PSTransitionTimer***~~.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then starts the ***PSTransitionTimer*** and evaluates the ***Accept*** Message.
3		Policy Engine tells the Device Policy Manager to instruct the power supply to reduce ~~power consumption~~current draw to ~~***pSnkStdby***~~***iSnkStdby*** within ***tSnkStdby*** (t1); t1 ***Shall*** complete before ***tSrcTransition***. The Sink ***Shall Not*** violate transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.

Step	Source Port	Sink Port
4	***tSrcTransition*** after the ***GoodCRC*** Message was received the power supply starts to change its output power capability. The power supply ***Shall*** be ready to operate at the new power level within ***tSrcReady*** (t2). The power supply informs the Device Policy Manager that it is ready to operate at the new power level. The power supply status is passed to the Policy Engine.	
5	The Policy Engine sends the ***PS_RDY*** Message to the Sink starting within ***tSrcTransReq*** of the end of the ***GoodCRC*** Message following the ***Accept*** message.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
6	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then stops the PSTransitionTimer, evaluates the ***PS_RDY*** Message from the Source, and tells the Device Policy Manager ~~it is okay to operate~~that the Source is operating at the new ~~power level~~A(PDO). If the PS_RDY is not received before ***PSTransitionTimer*** times out the Sink starts sending ***Hard Reset*** signaling.
7		The Sink ***May*** begin operating at the new power level any time after evaluation of the ***PS_RDY*** Message. This time duration is indeterminate.
8		The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. The time duration (t3) depends on the magnitude of the load change.

(j) Section 7.3.5 Decreasing the Voltage and Increasing the Current, p310

From Text:

7.3.5 Decreasing the Voltage and Increasing the Current

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when decreasing the Voltage and increasing the current is shown in Figure 7-27 Transition Diagram for Decreasing the Voltage and Increasing the Current. The sequence that ***Shall*** be followed is described in Table 7-5. The timing parameters that ***Shall*** be followed are listed in Table 7-22, Table 7-23 and Table 7-24. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-27 Transition Diagram for Decreasing the Voltage and Increasing the Current

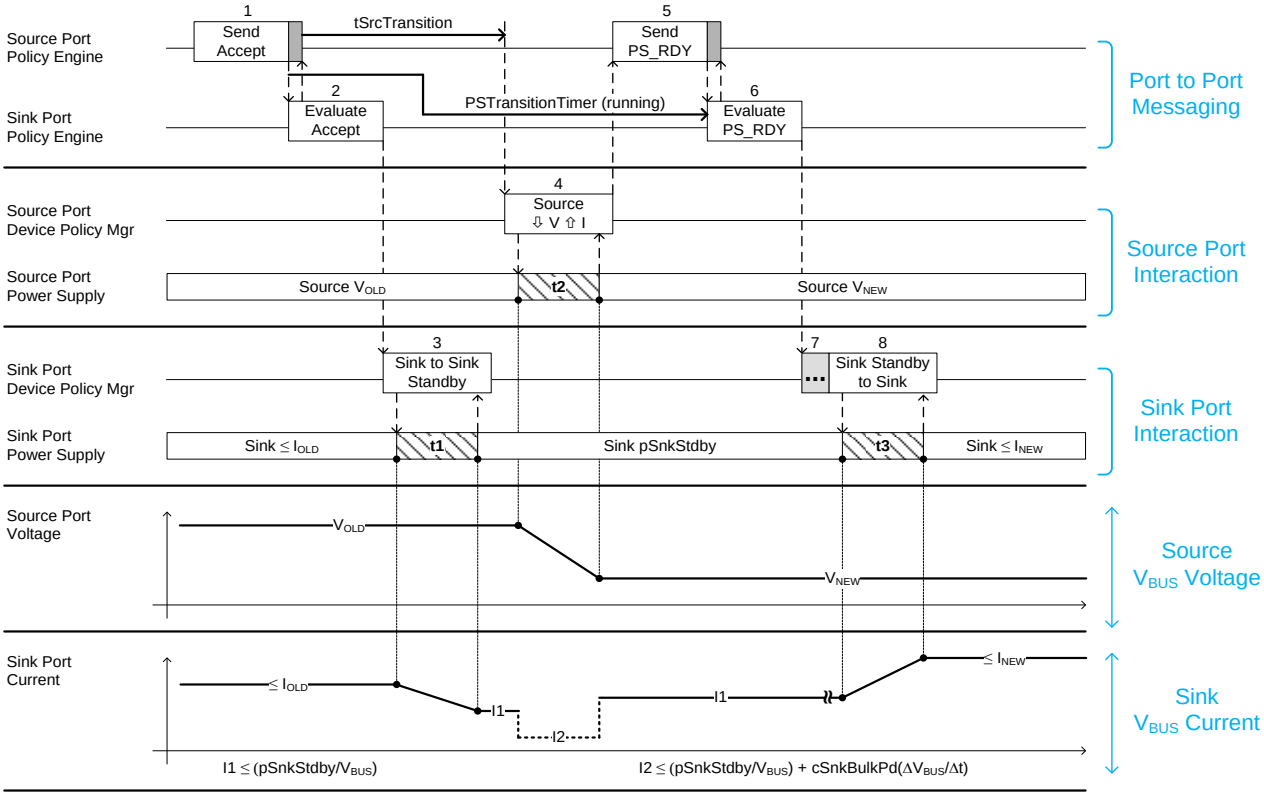

Table 7-5 Sequence Description for Decreasing the Voltage and Increasing the Current

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message and starts the ***PSTransitionTimer***.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***Accept*** Message.
3		Policy Engine tells the Device Policy Manager to instruct the power supply to reduce power consumption to ***pSnkStdby*** within ***tSnkStdby*** (t1); t1 ***Shall*** complete before ***tSrcTransition***. The Sink ***Shall Not*** violate transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.
4	***tSrcTransition*** after the ***GoodCRC*** Message was received the power supply starts to change its output power capability. The power supply ***Shall*** be ready to operate at the new power level within ***tSrcReady*** (t2). The power supply informs the Device Policy Manager that it is ready to operate at the new power level. The power supply status is passed to the Policy Engine.	
5	The Policy Engine sends the ***PS_RDY*** Message to the Sink.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
6	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***PS_RDY*** Message from the Source and tells the Device Policy Manager it is okay to operate at the new power level.
7		The Sink ***May*** begin operating at the new power level any time after evaluation of the ***PS_RDY*** Message. This time duration is indeterminate.

Step	Source Port	Sink Port
8		The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. The time duration (t3) depends on the magnitude of the load change.

To Text:

7.3.1.1.2.~~47.3.5~~ Decreasing the Voltage and Increasing the Current

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when changing from one (A)PDO to another while decreasing the Voltage and increasing the current is shown in Figure 7-2~~7~~8 Transition Diagram for Decreasing the Voltage and Increasing the Current. The sequence that ***Shall*** be followed is described in Table 7-5 Sequence Description for Decreasing the Voltage and Increasing the Current. The timing parameters that ***Shall*** be followed are listed in Table 7-22, Table 7-23 and Table 7-24. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-2~~7~~8 Transition Diagram for Decreasing the Voltage and Increasing the Current

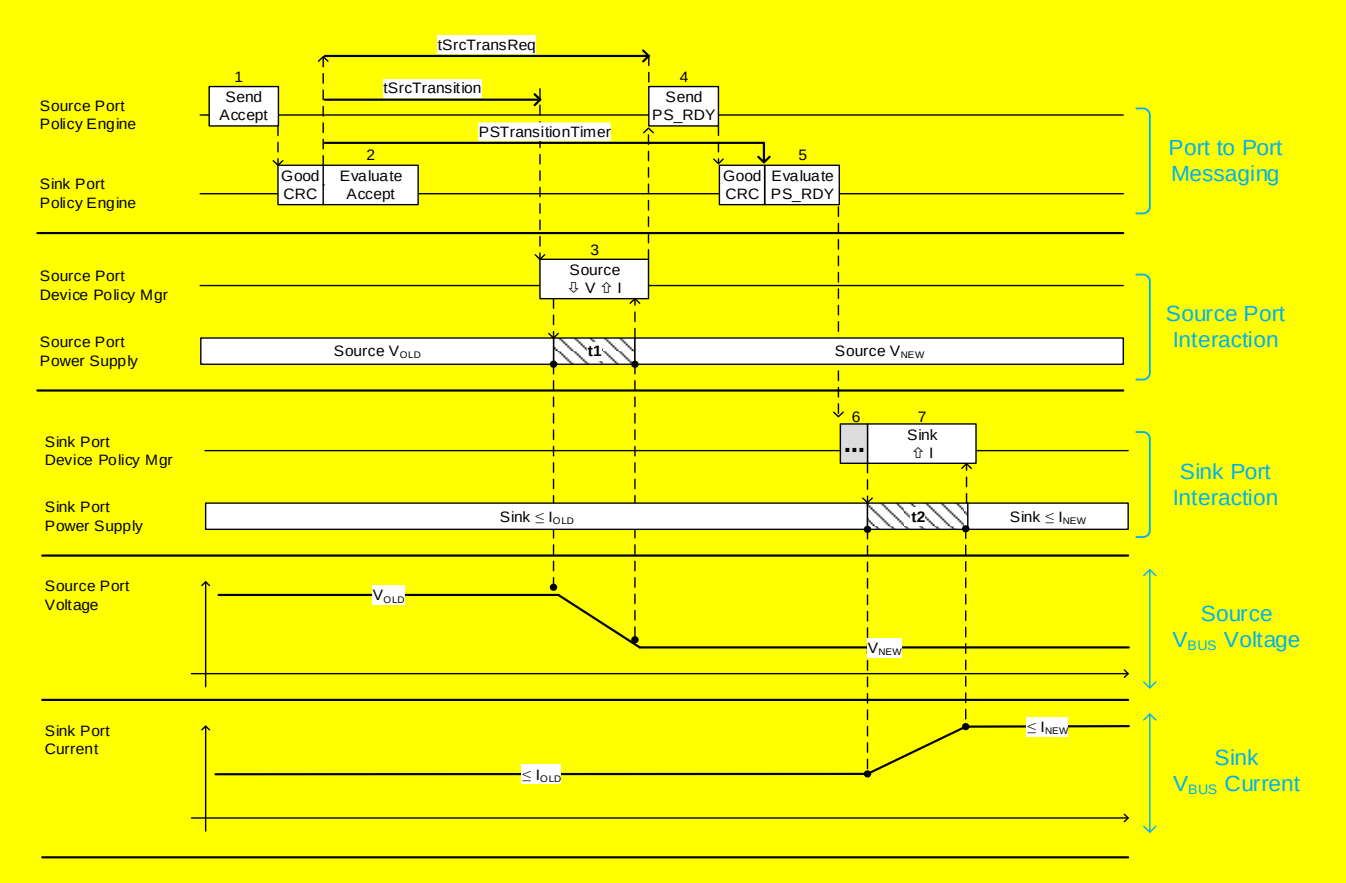

Table 7-5 Sequence Description for Decreasing the Voltage and Increasing the Current

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message ~~and starts the ***PSTransitionTimer***~~.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then starts the ***PSTransitionTimer*** and evaluates the ***Accept*** Message.
~~3~~		~~Policy Engine tells the Device Policy Manager to instruct the power supply to reduce power consumption to ***pSnkStdby*** within ***tSnkStdby*** (t1); t1 ***Shall*** complete before ***tSrcTransition***. The Sink ***Shall Not*** violate transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.~~

Step	Source Port	Sink Port
~~43~~	***tSrcTransition*** after the ***GoodCRC*** Message was received the power supply starts to change its output power capability. The power supply ***Shall*** be ready to operate at the new power level within ***tSrcReady*** (~~t2~~t1). The power supply informs the Device Policy Manager that it is ready to operate at the new power level. The power supply status is passed to the Policy Engine.	
~~54~~	The Policy Engine sends the ***PS_RDY*** Message to the Sink starting within ***tSrcTransReq*** of the end of the ***GoodCRC*** Message following the ***Accept*** message.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
~~65~~	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***PS_RDY*** Message from the Source and tells the Device Policy Manager it is okay to operate at the new power level.
~~76~~		The Sink ***May*** begin operating at the new power level any time after evaluation of the ***PS_RDY*** Message. This time duration is indeterminate.
~~87~~		The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. The time duration (~~t3~~t2) depends on the magnitude of the load change.

(k) Section 7.3.7 Decreasing the Voltage, p314

From Text:

7.3.7 Decreasing the Voltage

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when decreasing the Voltage is shown in Figure 7-29 Transition Diagram for Decreasing the Voltage. The sequence that ***Shall*** be followed is described in Table 7-7. The timing parameters that ***Shall*** be followed are listed in Table 7-22, Table 7-23 and Table 7-24. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-29 Transition Diagram for Decreasing the Voltage

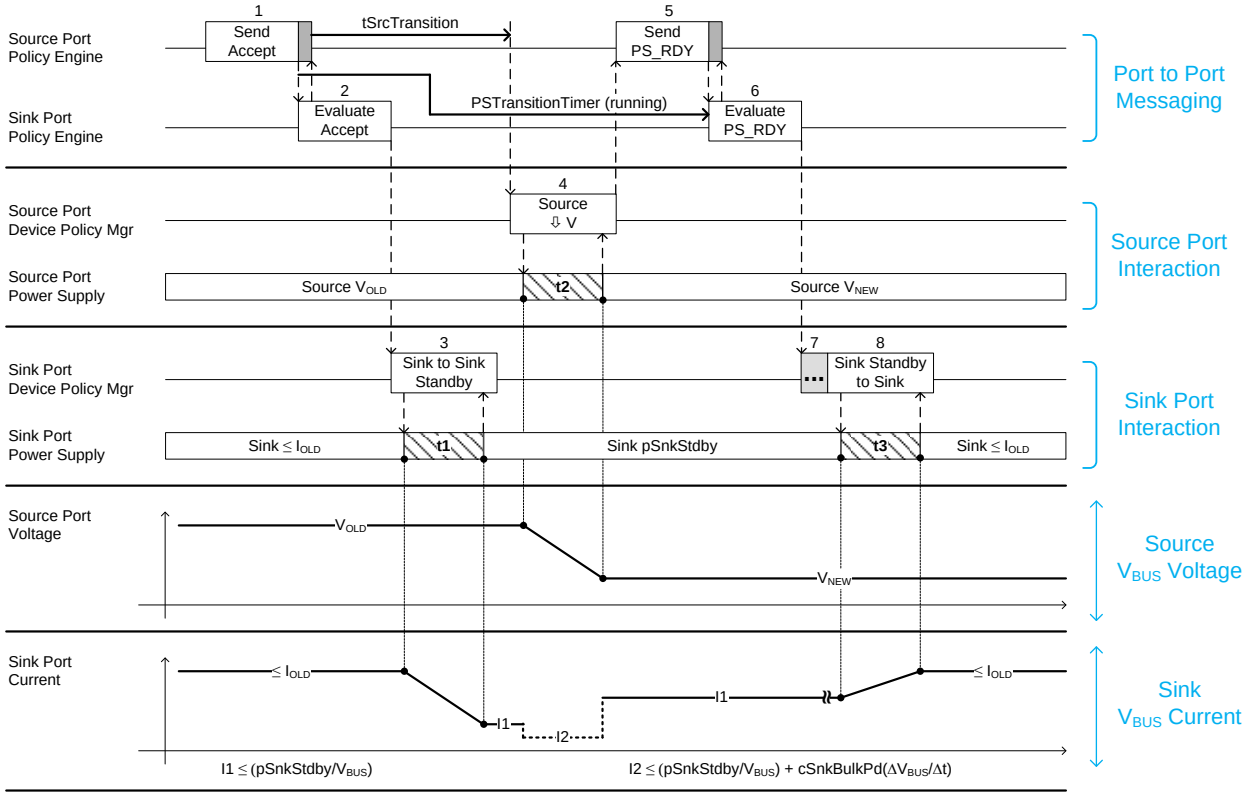

Table 7-7 Sequence Description for Decreasing the Voltage

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message and starts the ***PSTransitionTimer***.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***Accept*** Message.
3		Policy Engine tells the Device Policy Manager to instruct the power supply to reduce power consumption to ***pSnkStdby*** within ***tSnkStdby*** (t1); t1 ***Shall*** complete before ***tSrcTransition***. The Sink ***Shall Not*** violate transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.
4	***tSrcTransition*** after the ***GoodCRC*** Message was received the power supply starts to change its output power capability. The power supply ***Shall*** be ready to operate at the new power level within ***tSrcReady*** (t2). The power supply informs the Device Policy Manager that it is ready to operate at the new power level. The power supply status is passed to the Policy Engine.	
5	The Policy Engine sends the ***PS_RDY*** Message to the Sink.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
6	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***PS_RDY*** Message from the Source and tells the Device Policy Manager it is okay to operate at the new power level.
7		The Sink ***May*** begin operating at the new power level any time after evaluation of the ***PS_RDY*** Message. This time duration is indeterminate.

Step	Source Port	Sink Port
8		The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. The time duration (t3) depends on the magnitude of the load change.

To Text:

7.3.1.1.2.5~~7.3.7~~ Decreasing the Voltage

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when changing from one (A)PDO to another while decreasing the Voltage is shown in Figure 7-29 Transition Diagram for Decreasing the Voltage. The sequence that ***Shall*** be followed is described in Table 7-~~7~~6 Sequence Description for Decreasing the Voltage. The timing parameters that ***Shall*** be followed are listed in Table 7-22, Table 7-23 and Table 7-24. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-29 Transition Diagram for Decreasing the Voltage

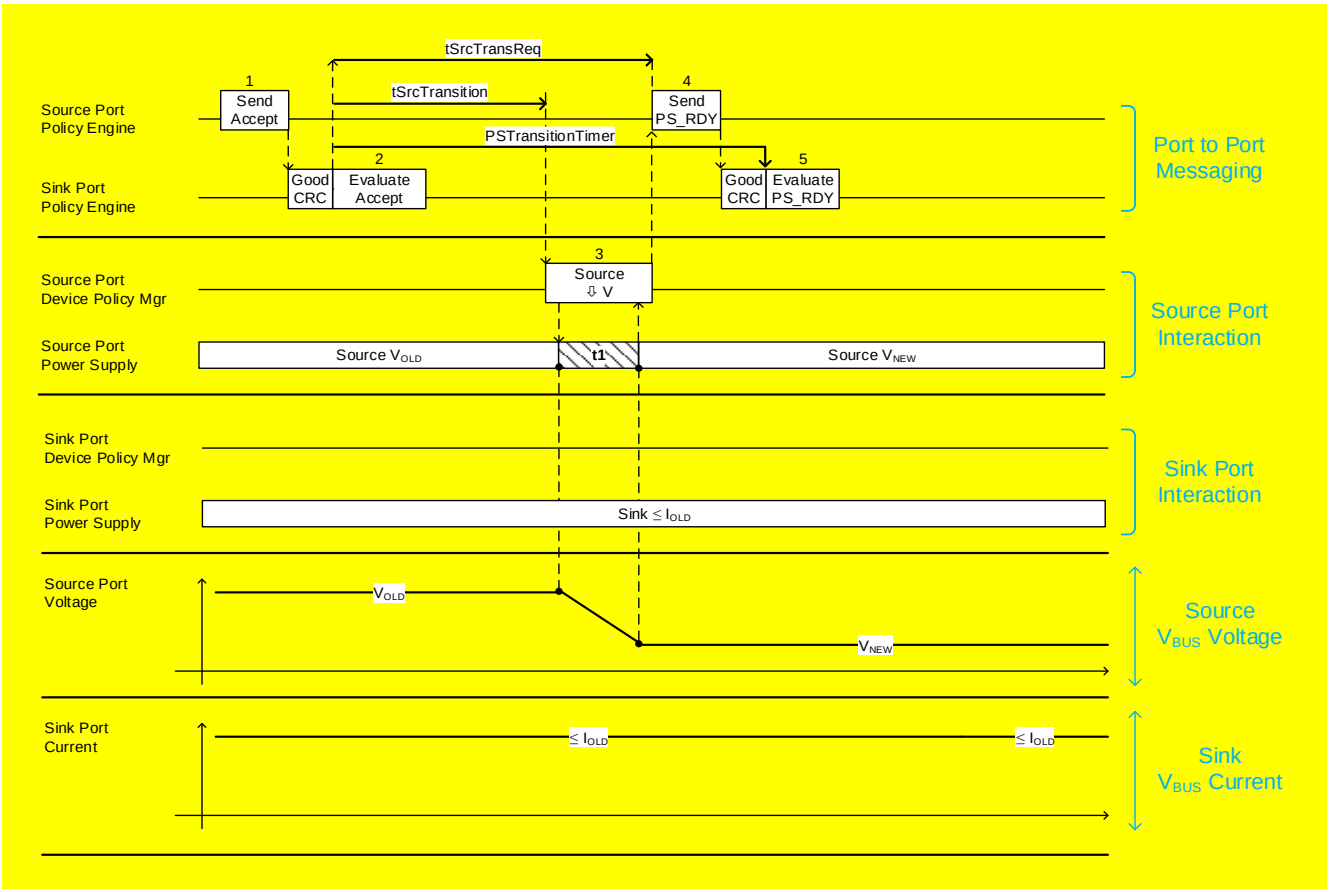

Table 7-~~7~~6 Sequence Description for Decreasing the Voltage

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message ~~and starts the ***PSTransitionTimer***~~.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then starts the ***PSTransitionTimer*** and evaluates the ***Accept*** Message.
~~3~~		~~Policy Engine tells the Device Policy Manager to instruct the power supply to reduce power consumption to ***pSnkStdby*** within ***tSnkStdby*** (t1); t1 ***Shall*** complete before ***tSrcTransition***. The Sink ***Shall Not*** violate transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.~~

Step	Source Port	Sink Port
~~43~~	***tSrcTransition*** after the ***GoodCRC*** Message was received the power supply starts to change its output power capability. The power supply ***Shall*** be ready to operate at the new power level within ***tSrcReady*** (~~t2~~t1). The power supply informs the Device Policy Manager that it is ready to operate at the new power level. The power supply status is passed to the Policy Engine.	
~~54~~	The Policy Engine sends the ***PS_RDY*** Message to the Sink starting within ***tSrcTransReq*** of the end of the ***GoodCRC*** following the ***Accept*** message.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
~~65~~	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then stops the PSTransitionTimer, evaluates the ***PS_RDY*** Message from the Source, and tells the Device Policy Manager ~~it is okay to operate~~that the Source is operating at the new ~~power level~~A(PDO). If the PS_RDY is not received before ***PSTransitionTimer*** times out the Sink starts sending ***Hard Reset*** signaling.
~~7~~		~~The Sink ***May*** begin operating at the new power level any time after evaluation of the ***PS_RDY*** Message. This time duration is indeterminate.~~
~~8~~		~~The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. The time duration (t3) depends on the magnitude of the load change.~~

(l) Section 7.3.8 Decreasing the Voltage and the current, p316

From Text:

7.3.8 Decreasing the Voltage and the Current

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when decreasing the Voltage and current is shown in Figure 7-30 Transition Diagram for Decreasing the Voltage and the Current. The sequence that ***Shall*** be followed is described in Table 7-8. The timing parameters that ***Shall*** be followed are listed in Table 7-22, Table 7-23 and Table 7-24. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-30 Transition Diagram for Decreasing the Voltage and the Current

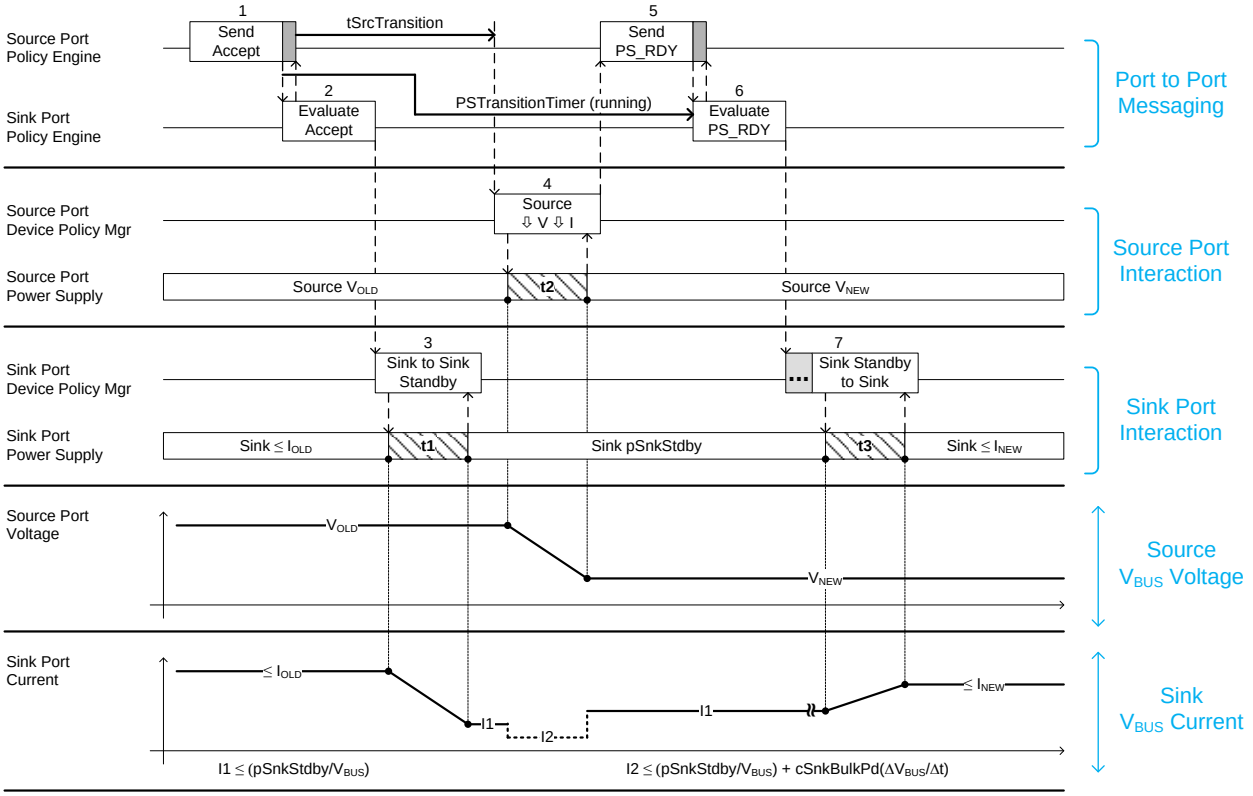

Table 7-8 Sequence Description for Decreasing the Voltage and the Current

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message and starts the ***PSTransitionTimer***.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***Accept*** Message.
3		Policy Engine tells the Device Policy Manager to instruct the power supply to reduce power consumption to ***pSnkStdby*** within ***tSnkStdby*** (t1); t1 ***Shall*** complete before ***tSrcTransition***. The Sink ***Shall Not*** violate transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.
4	***tSrcTransition*** after the ***GoodCRC*** Message was received the power supply starts to change its output power capability. The power supply ***Shall*** be ready to operate at the new power level within ***tSrcReady*** (t2). The power supply informs the Device Policy Manager that it is ready to operate at the new power level. The power supply status is passed to the Policy Engine.	
5	The Policy Engine sends the ***PS_RDY*** Message to the Sink.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
6	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***PS_RDY*** Message from the Source and tells the Device Policy Manager it is okay to operate at the new power level.
7		The Sink ***May*** begin operating at the new power level any time after evaluation of the ***PS_RDY*** Message. This time duration is indeterminate.

Step	Source Port	Sink Port
8		The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. The time duration (t3) depends on the magnitude of the load change.

To Text:

~~7.3.1.1.2.6~~7.3.8 Decreasing the Voltage and the Current

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when changing from one (A)PDO to another while decreasing the Voltage and current is shown in Figure 7-30 Transition Diagram for Decreasing the Voltage and the Current. The sequence that ***Shall*** be followed is described in Table 7-~~8~~7 Sequence Description for Decreasing the Voltage and the Current. The timing parameters that ***Shall*** be followed are listed in Table 7-22, Table 7-23 and Table 7-24. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-30 Transition Diagram for Decreasing the Voltage and the Current

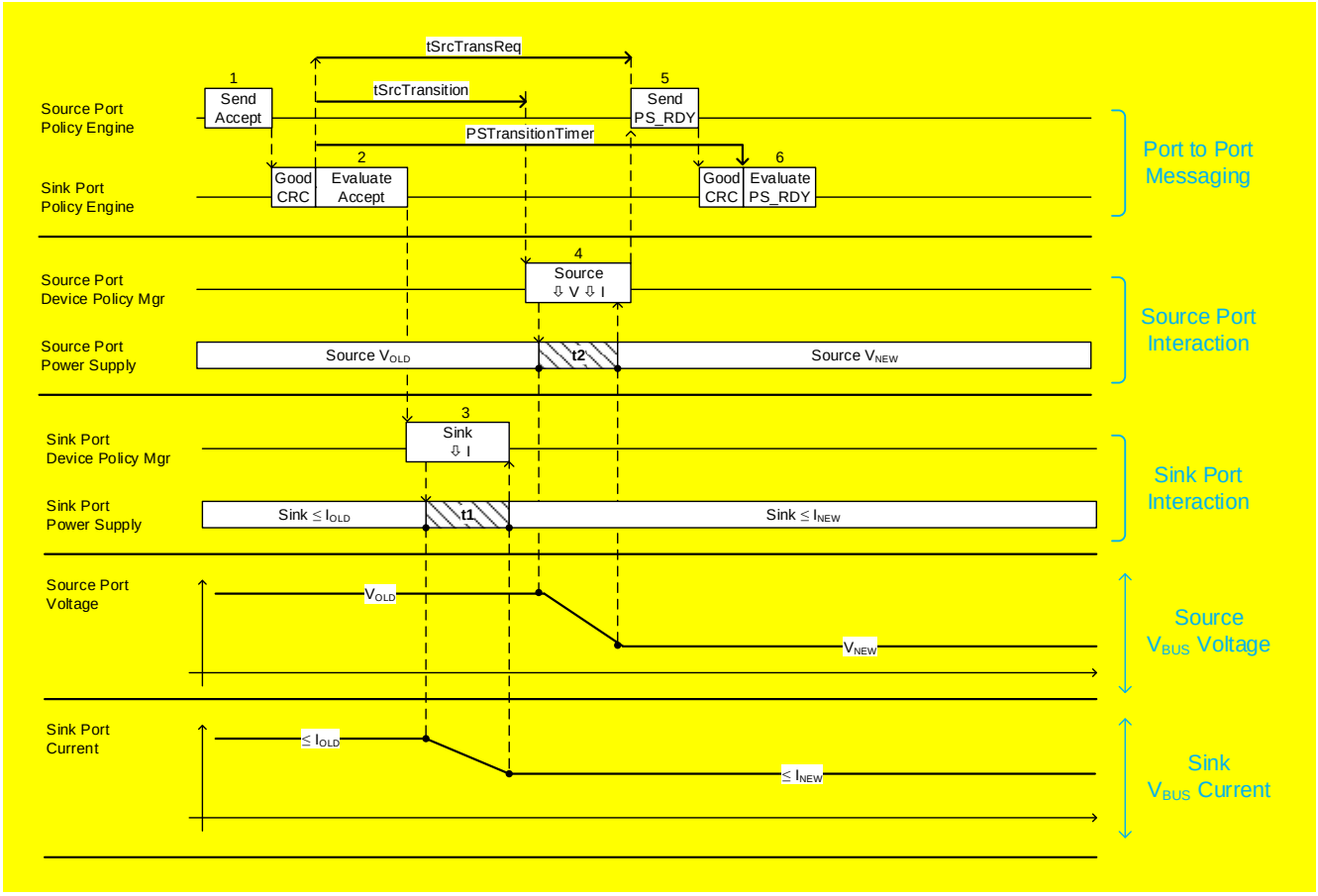

Table 7-~~8~~7 Sequence Description for Decreasing the Voltage and the Current

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine ~~evaluates~~receives the ***Accept*** Message ~~and starts the ***PSTransitionTimer***~~.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then starts the ***PSTransitionTimer*** and evaluates the ***Accept*** Message.

Step	Source Port	Sink Port
3		~~Policy Engine tells the Device Policy Manager to instruct the power supply to reduce power consumption to *pSnkStdby* within *tSnkStdby*~~ The Sink ***Shall*** be able to operate with lower current within ***tSnkNewPower*** (t1); t1 ***Shall*** complete before ***tSrcTransition***. The Sink ***Shall Not*** violate transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.
4	***tSrcTransition*** after the ***GoodCRC*** Message was received the power supply starts to change its output power capability. The power supply ***Shall*** be ready to operate at the new power level within ***tSrcReady*** (t2). The power supply informs the Device Policy Manager that it is ready to operate at the new power level. The power supply status is passed to the Policy Engine.	
5	The Policy Engine sends the ***PS_RDY*** Message to the Sink starting within ***tSrcTransReq*** of the end of the ***GoodCRC*** following the ***Accept*** message.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
6	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then stops the PSTransitionTimer, evaluates the ***PS_RDY*** Message from the Source, and tells the Device Policy Manager ~~it is okay to operate~~that the Source is operating at the new ~~power level~~A(PDO). If the PS_RDY is not received before ***PSTransitionTimer*** times out the Sink starts sending ***Hard Reset*** signaling.
~~7~~		~~The Sink ***May*** begin operating at the new power level any time after evaluation of the ***PS_RDY*** Message. This time duration is indeterminate.~~
~~8~~7		The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. ~~The time duration (t3) depends on the magnitude of the load change.~~

Table 7-14 Sequence Description for no change in Current or Voltage

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine ~~evaluates~~ receives the ***Accept*** Message ~~and starts the ***PSTransitionTimer***~~.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	~~Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine. Policy Engine then evaluates the ***Accept*** Message.~~ Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then starts the ***PSTransitionTimer*** and evaluates the ***Accept*** Message.
3	The Policy Engine waits ***tSrcTransition*** then sends the ***PS_RDY*** Message to the Sink.	Policy Engine receives the ***PS_RDY*** Message.
4	Policy Engine receives the ***GoodCRC*** Message from the Sink. Note: the decision that no power transition is required could be made either by the Device Policy Manager or the power supply depending on implementation.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine evaluates the ***PS_RDY*** Message.

(m) Section 7.3.8 Decreasing the Voltage and the current, p316

From Text:

7.3.14 No change in Current or Voltage

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when the Sink requests the same Voltage and Current as it is currently operating at is shown in Figure 7-36 Transition Diagram for no change in Current or Voltage. The sequence that ***Shall*** be followed is described in Table 7-14. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23.

Figure 7-36 Transition Diagram for no change in Current or Voltage

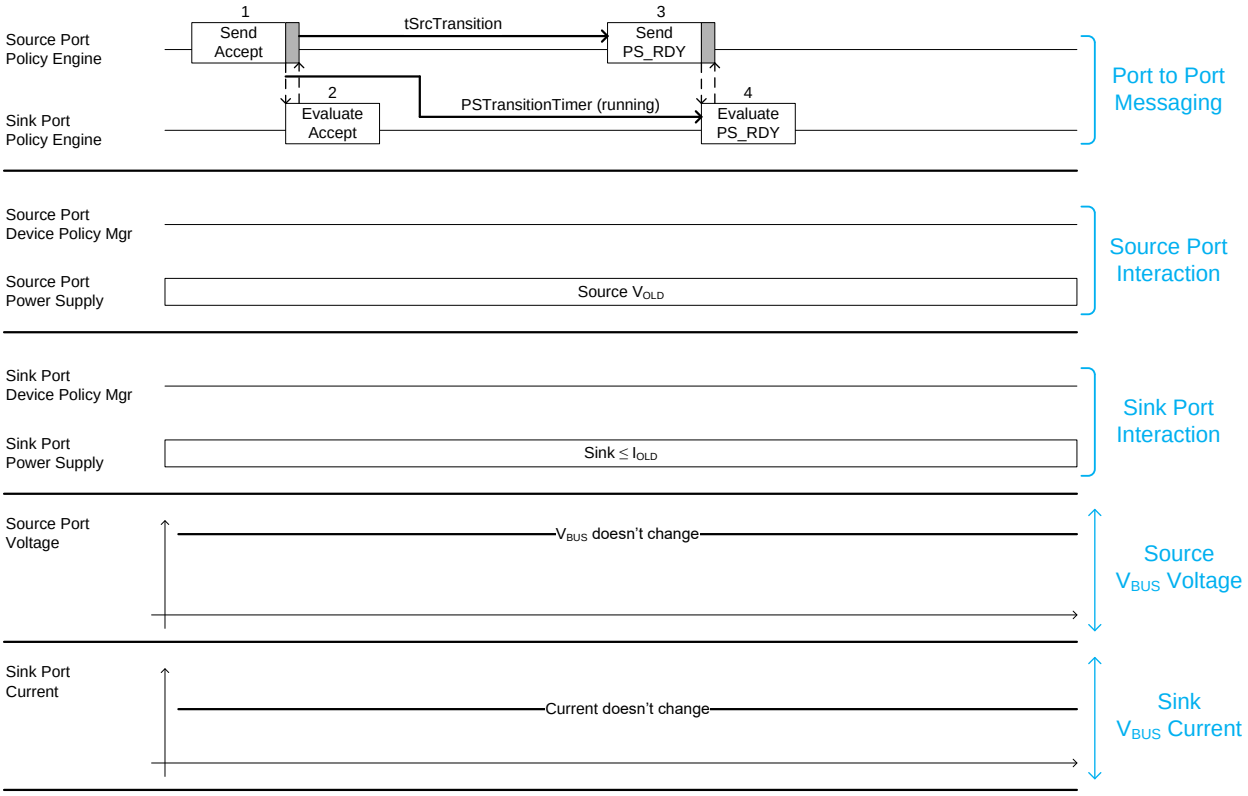

Table 7-14 Sequence Description for no change in Current or Voltage

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message and starts the ***PSTransitionTimer***.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***Accept*** Message.
3	The Policy Engine waits ***tSrcTransition*** then sends the ***PS_RDY*** Message to the Sink.	Policy Engine receives the ***PS_RDY*** Message.
4	Policy Engine receives the ***GoodCRC*** Message from the Sink. Note: the decision that no power transition is required could be made either by the Device Policy Manager or the power supply depending on implementation.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine evaluates the ***PS_RDY*** Message.

To Text:

7.3.1.1.2.7~~7.3.14~~ No change in Current or Voltage

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when changing from one (A)PDO to another while the Sink requests the same Voltage and Current as it is currently operating at is shown in Figure 7-3~~6~~1 Transition Diagram for no change in Current or Voltage. The sequence that ***Shall*** be followed is described in Table 7-~~14~~8 Sequence Description for no change in Current or Voltage. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-~~3~~61 Transition Diagram for no change in Current or Voltage

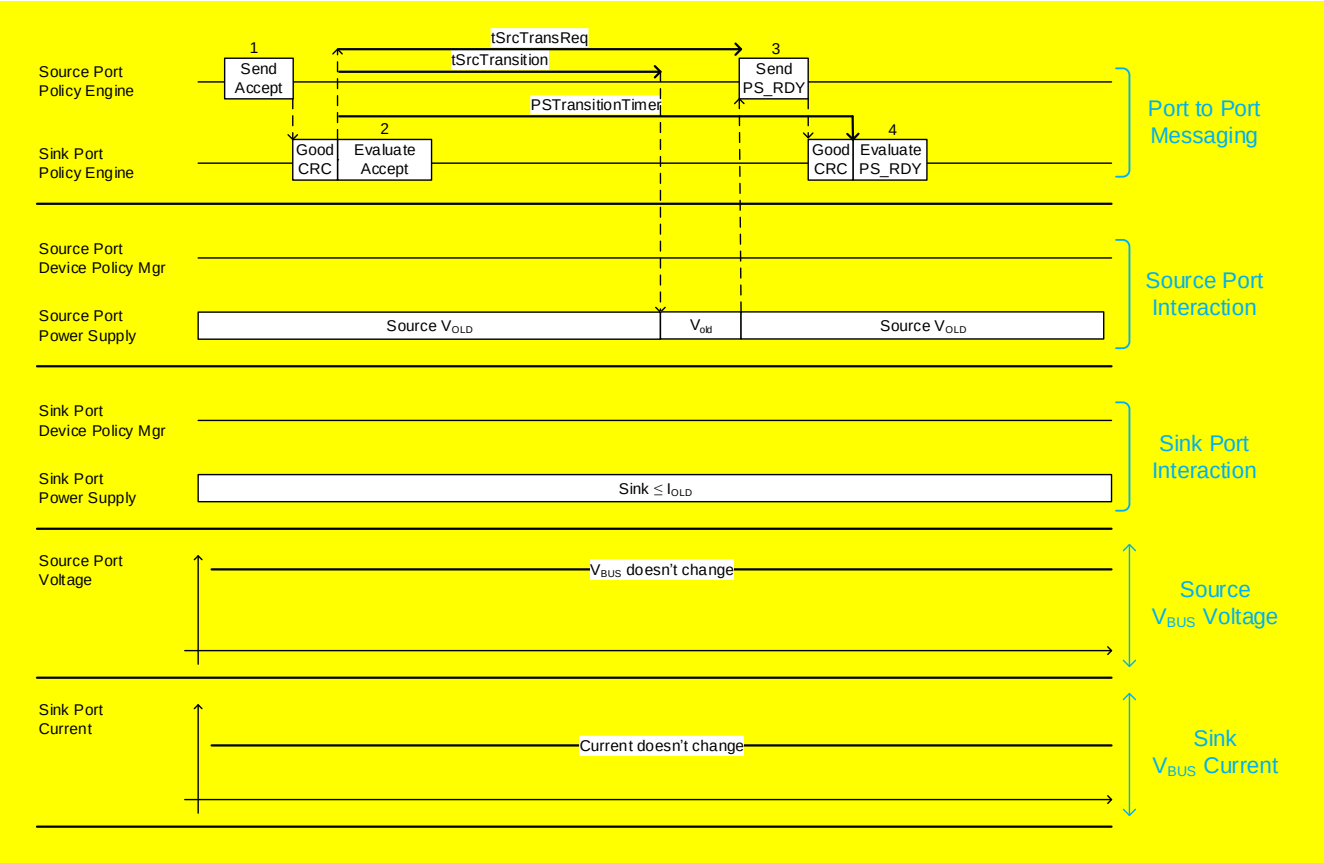

Table 7-~~148~~ Sequence Description for no change in Current or Voltage

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message ~~and starts the ***PSTransitionTimer***~~.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then starts the ***PSTransitionTimer*** and evaluates the ***Accept*** Message.
3	The Policy Engine waits ***tSrcTransition*** then sends the ***PS_RDY*** Message to the Sink starting within ***tSrcTransReq*** of the end of the ***GoodCRC*** following the ***Accept*** message.	Policy Engine receives the ***PS_RDY*** Message.
4	Policy Engine receives the ***GoodCRC*** Message from the Sink. Note: the decision that no power transition is required could be made either by the Device Policy Manager or the power supply depending on implementation.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine evaluates the ***PS_RDY*** Message.

(n) New Section 7.3.1.3 Transitions within the same Fixed, Battery or Variable PDO or between Different (A)PDOs

New Text:

7.3.1.2 Transitions within the same Fixed, Battery or Variable PDO or between Different (A)PDOs

USB Power Delivery ENGINEERING CHANGE NOTICE

(o) Section 7.3.1 Increasing the Current, p302

From Text:

7.3.1 Increasing the Current

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when increasing the current is shown in Figure 7-20. The sequence that ***Shall*** be followed is described in Table 7-1. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-23 Transition Diagram for Increasing the Current

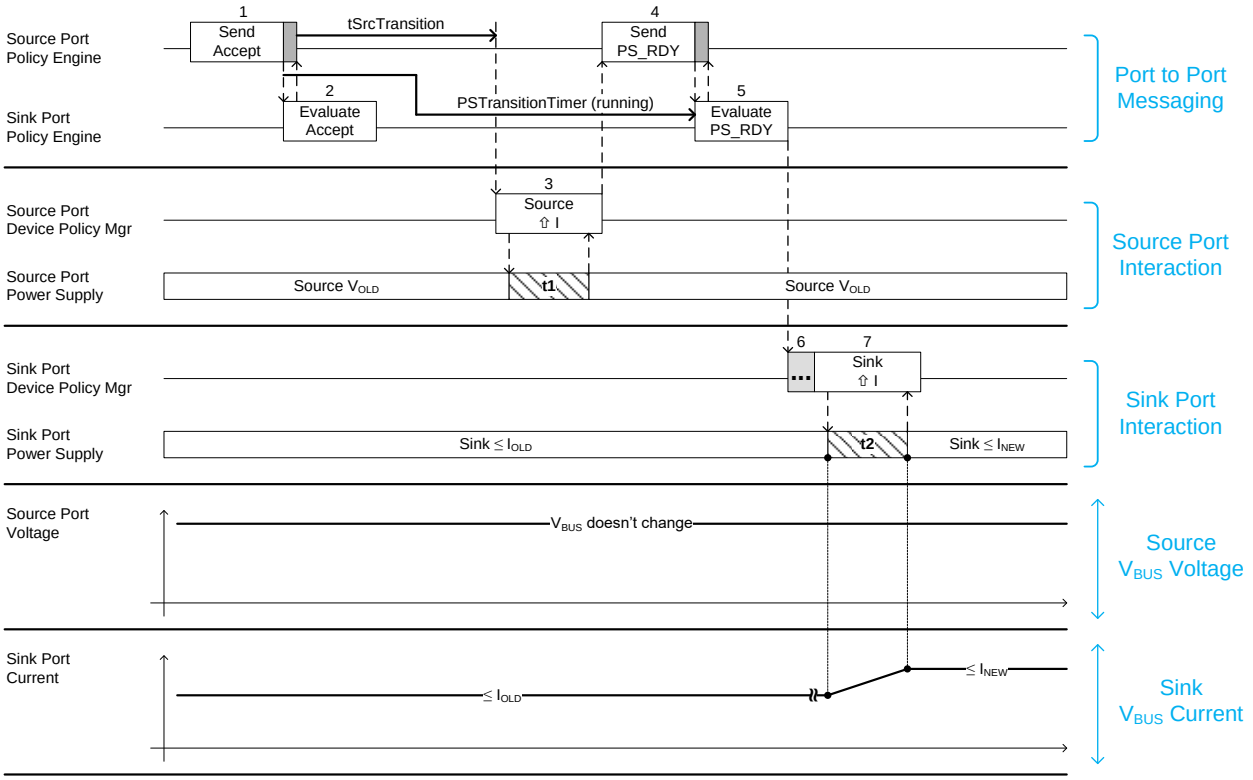

Table 7-1 Sequence Description for Increasing the Current

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message and starts the ***PSTransitionTimer***.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***Accept*** Message.
3	***tSrcTransition*** after the ***GoodCRC*** Message was received the power supply starts to change its output power capability. The power supply ***Shall*** be ready to operate at the new power level within ***tSrcReady*** (t1). The power supply informs the Device Policy Manager that it is ready to operate at the new power level. The power supply status is passed to the Policy Engine.	
4	The Policy Engine sends the ***PS_RDY*** Message to the Sink.	The Policy Engine receives the ***PS_RDY*** Message from the Source.

Step	Source Port	Sink Port
5	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***PS_RDY*** Message from the Source and tells the Device Policy Manager it is okay to operate at the new power level.
6		The Sink ***May*** begin operating at the new power level any time after evaluation of the ***PS_RDY*** Message. This time duration is indeterminate.
7		The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. The time duration (t2) depends on the magnitude of the load change.

To Text:

7.3.1.2.1~~7.3.1~~ Increasing the Current Only

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when increasing the current without changing the voltage is shown in Figure 7-~~23~~32 Transition Diagram for no change in Current or Voltage. The sequence that ***Shall*** be followed is described in Table 7-~~18~~ Sequence Description for no change in Current or Voltage. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-~~23~~32 Transition Diagram for Increasing the Current

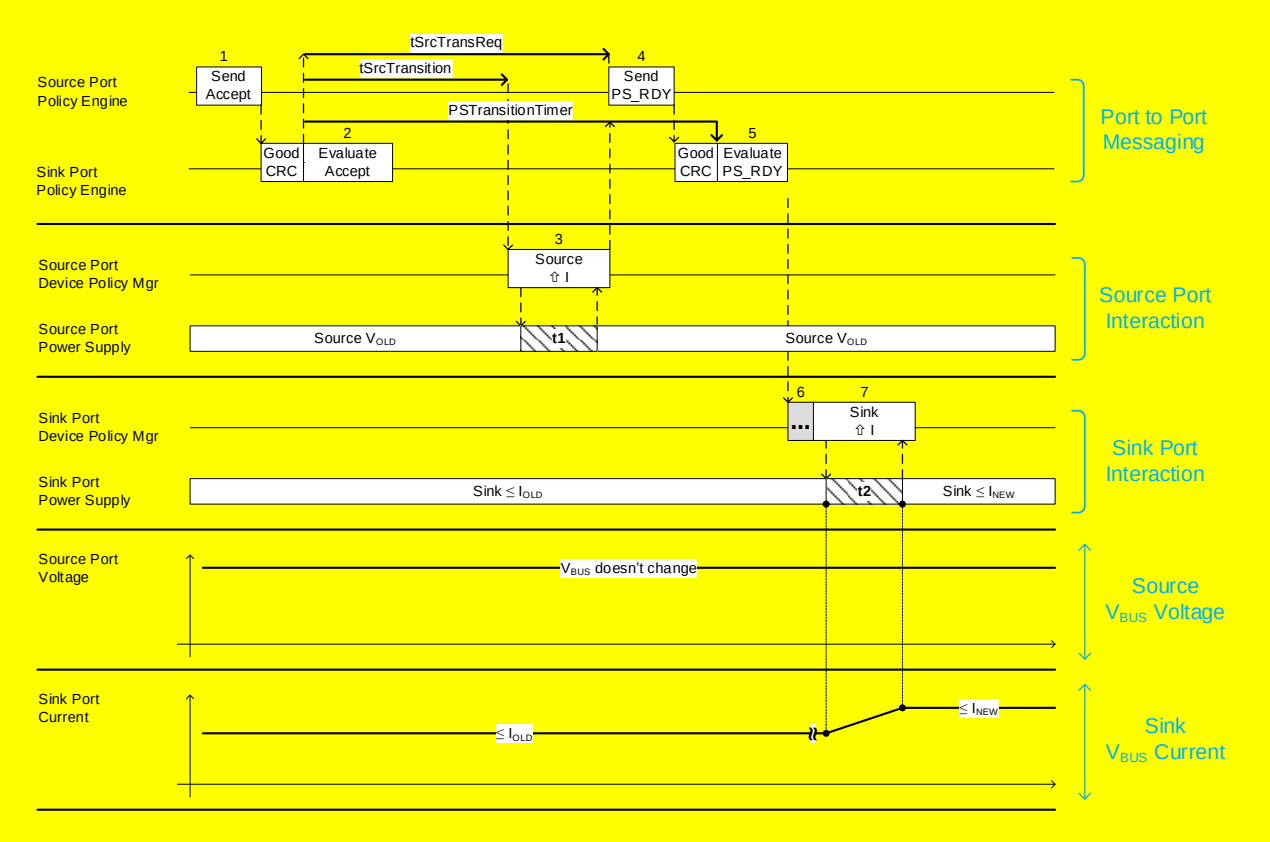

Table 7-~~18~~ Sequence Description for Increasing the Current

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message~~and starts the ***PSTransitionTimer***~~.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then starts the ***PSTransitionTimer*** and evaluates the ***Accept*** Message.

Step	Source Port	Sink Port
3	***tSrcTransition*** after the ***GoodCRC*** Message was received the power supply starts to change its output power capability. The power supply ***Shall*** be ready to operate at the new power level within ***tSrcReady*** (t1). The power supply informs the Device Policy Manager that it is ready to operate at the new power level. The power supply status is passed to the Policy Engine.	
4	The Policy Engine sends the ***PS_RDY*** Message to the Sink starting within ***tSrcTransReq*** of the end of the ***GoodCRC*** following the ***Accept*** message.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
5	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then stops the ***PSTransitionTimer***, evaluates the ***PS_RDY*** Message from the Source, and tells the Device Policy Manager ~~it is okay to operate~~that the Source is operating at the new ~~power level~~A(PDO). If the PS_RDY is not received before ***PSTransitionTimer*** times out the Sink starts sending ***Hard Reset*** signaling.
6		The Sink ***May*** begin operating at the new power level any time after evaluation of the ***PS_RDY*** Message. This time duration is indeterminate.
7		The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. The time duration (t2) depends on the magnitude of the load change.

(p) Section 7.3.6 Decreasing the Current, p312

From Text:

7.3.6 Decreasing the Current

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when decreasing the current is shown in Figure 7-28 Transition Diagram for Decreasing the Current. The sequence that ***Shall*** be followed is described in Table 7-6. The timing parameters that ***Shall*** be followed are listed in Table 7-22, Table 7-23 and Table 7-24. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-28 Transition Diagram for Decreasing the Current

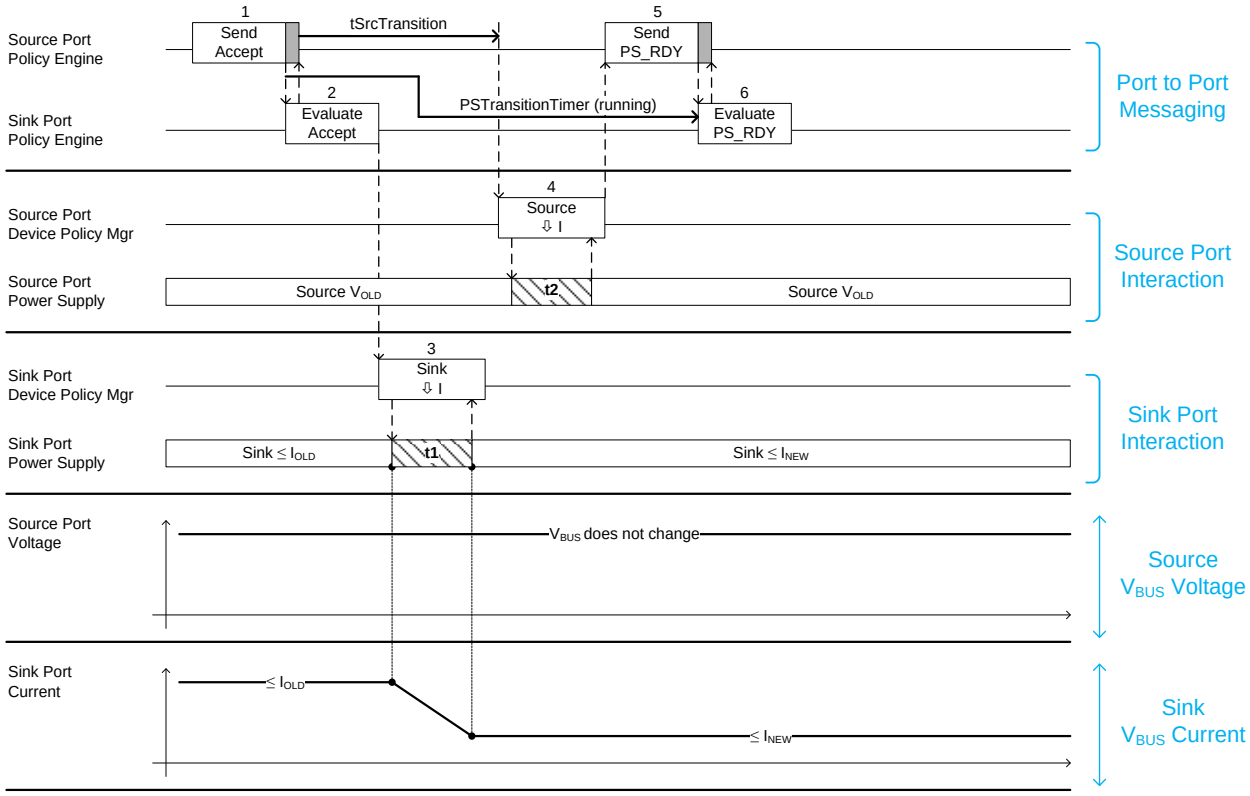

Table 7-6 Sequence Description for Decreasing the Current

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message starts ***PSTransitionTimer***.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***Accept*** Message. Policy Engine tells the Device Policy Manager to instruct the power supply to reduce power consumption.
3		The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. The Sink ***Shall*** be able to operate with lower current within ***tSnkNewPower*** (t1); t1 ***Shall*** complete before ***tSrcTransition***.
4	***tSrcTransition*** after the ***GoodCRC*** Message was received the power supply starts to change its output power capability. The power supply ***Shall*** be ready to operate at the new power level within ***tSrcReady*** (t2). The power supply informs the Device Policy Manager that it is ready to operate at the new power level. The power supply status is passed to the Policy Engine.	
5	The Policy Engine sends the ***PS_RDY*** Message to the Sink.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
6	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine evaluates the ***PS_RDY*** Message from the Source. The Sink is already operating at the new power level, so no further action is required.

To Text:

7.3.1.2.2~~7.3.6~~ Decreasing the Current Only

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when decreasing the current without changing the voltage is shown in Figure 7-~~28~~33 Transition Diagram for Decreasing the Current. The sequence that ***Shall*** be followed is described in Table 7-6 Sequence Description for Decreasing the Current. The timing parameters that ***Shall*** be followed are listed in Table 7-22, Table 7-23 and Table 7-24. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-~~28~~33 Transition Diagram for Decreasing the Current

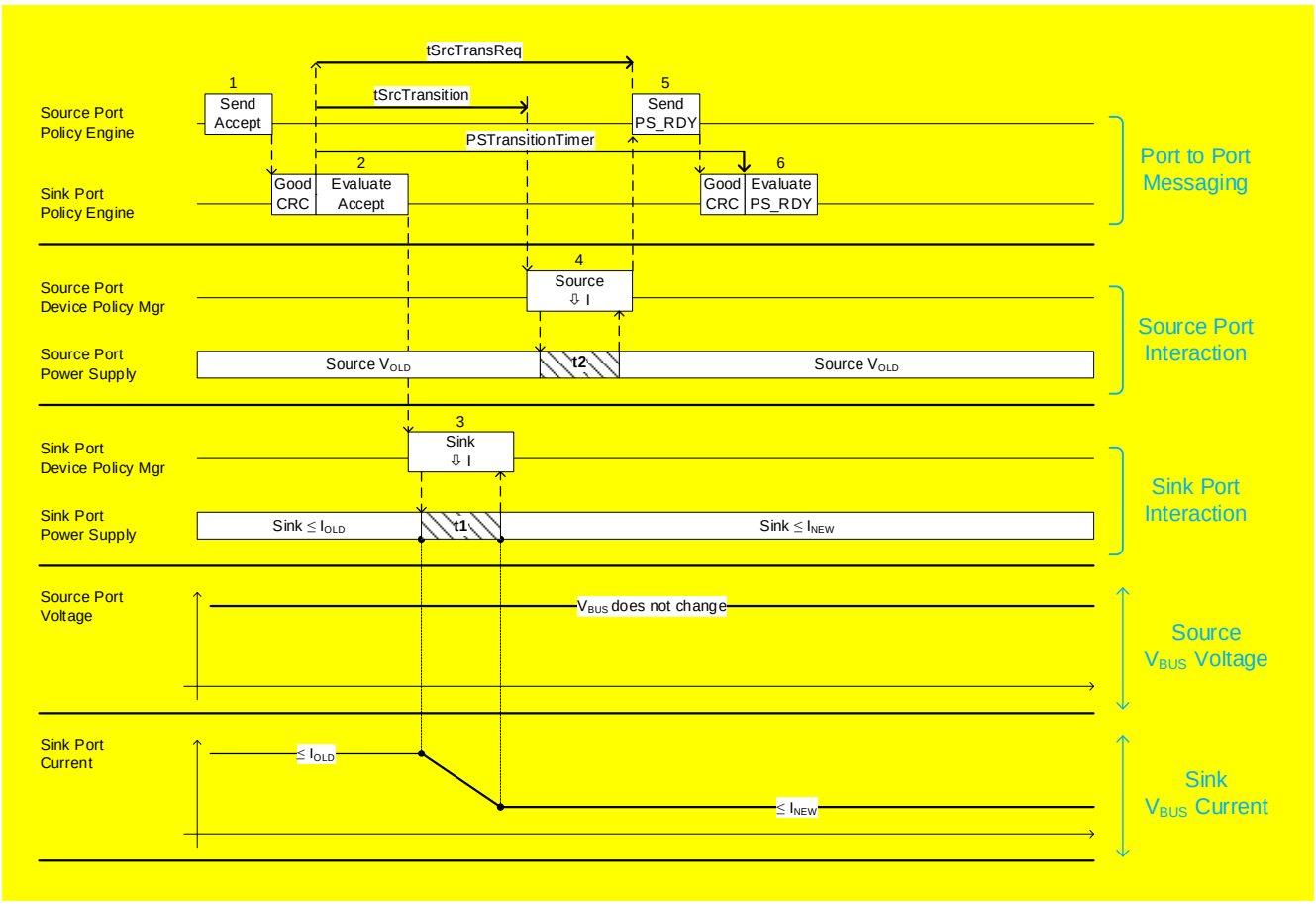

Table 7-6 Sequence Description for Decreasing the Current

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message ~~starts ***PSTransitionTimer***~~.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then starts the ***PSTransitionTimer*** and evaluates the ***Accept*** Message. Policy Engine tells the Device Policy Manager to instruct the power supply to reduce power consumption.
3		The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. The Sink ***Shall*** be able to operate with lower current within ***tSnkNewPower*** (t1); t1 ***Shall*** complete before ***tSrcTransition***.
4	***tSrcTransition*** after the ***GoodCRC*** Message was received the power supply starts to change its output power capability. The power supply ***Shall*** be ready to operate at the new power level within ***tSrcReady*** (t2). The power supply informs the Device Policy Manager that it is ready to operate at the new power level. The power supply status is passed to the Policy Engine.	

Step	Source Port	Sink Port
5	The Policy Engine sends the ***PS_RDY*** Message to the Sink starting within ***tSrcTransReq*** of the end of the ***GoodCRC*** following the ***Accept*** message.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
6	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then stops the ***PSTransitionTimer***, evaluates the ***PS_RDY*** Message from the Source, and tells the Device Policy Manager ~~it is okay to operate~~that the Source is operating at the new ~~power level~~A(PDO). If the PS_RDY is not received before ***PSTransitionTimer*** times out the Sink starts sending ***Hard Reset*** signaling.

(q) New Section 7.3.1.3 Changing Voltage or Current within the same PPS APDO

New Text:

7.3.1.3 Changing Voltage or Current within the same PPS APDO

(r) Section 7.3.16 Increasing the Programmable Power Supply (PPS) Voltage, p334

From Text:

7.3.16 Increasing the Programmable Power Supply (PPS) Voltage

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when increasing the Voltage is shown in Figure 7-38 Transition Diagram for Increasing the Programmable Power Supply Voltage. The sequence that ***Shall*** be followed is described in Table 7-16. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-38 Transition Diagram for Increasing the Programmable Power Supply Voltage

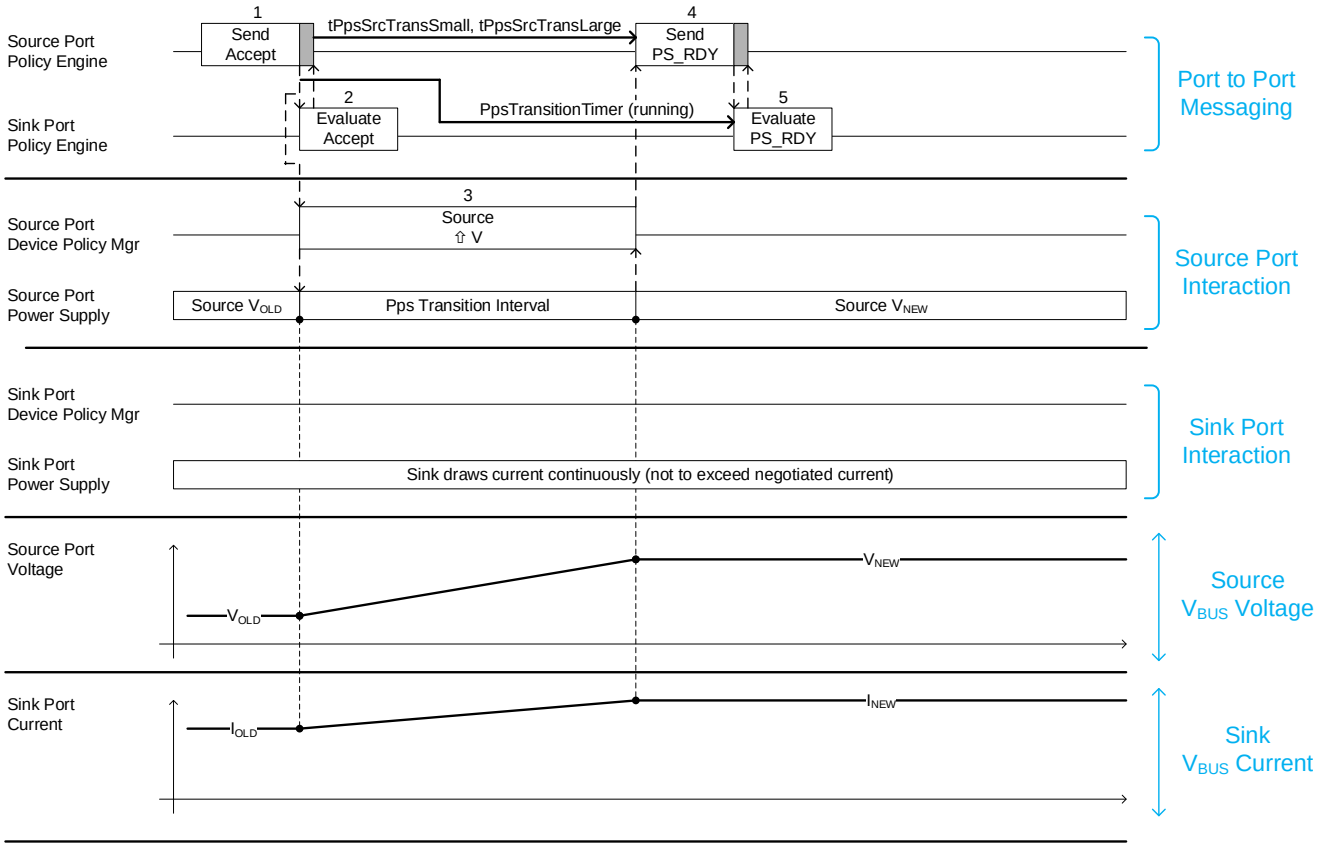

Table 7-16 Sequence Description for Increasing the Programmable Power Supply Voltage

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message and starts the ***PSTransitionTimer***.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to increase its output Voltage.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine. Policy Engine then evaluates the ***Accept*** Message.
3	After sending the ***Accept*** Message, the Programmable Power Supply starts to increase its output Voltage. The Programmable Power Supply new Voltage set-point ***Shall*** be reached by ***tPpsSrcTransLarge*** for steps larger than ***vPpsSmallStep*** or else by ***tPpsSrcTransSmall***. The power supply informs the Device Policy Manager that it has reached the new set-point and whether V_{BUS} is at the corresponding new level, or if the supply is operating in CL mode. The power supply status is passed to the Policy Engine.	
4	The Policy Engine sends the ***PS_RDY*** Message to the Sink.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
5	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***PS_RDY*** Message from the Source and tells the Device Policy Manager that the Programmable Power Supply is operating at the new Voltage set point.

To Text:

7.3.1.3.1~~7.3.16~~ Increasing the Programmable Power Supply (PPS) Voltage

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when increasing the Voltage is shown in Figure 7-3~~4~~ Transition Diagram for Increasing the Programmable Power Supply Voltage. The sequence that ***Shall*** be

followed is described in Table 7-161 Sequence Description for Increasing the Programmable Power Supply Voltage. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-384 Transition Diagram for Increasing the Programmable Power Supply Voltage

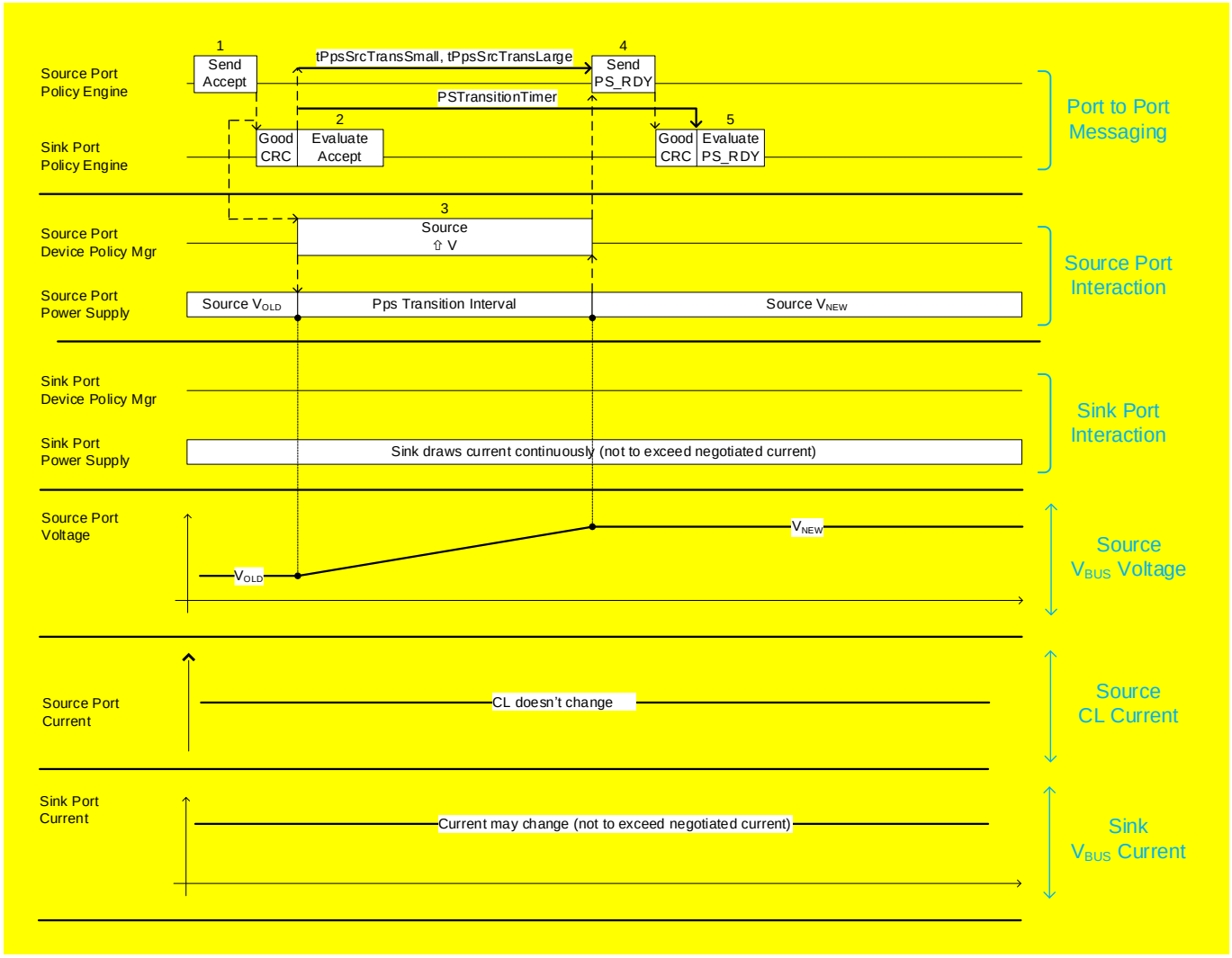

Table 7-161 Sequence Description for Increasing the Programmable Power Supply Voltage

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message ~~and starts the ***PSTransitionTimer***~~.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to increase its output Voltage.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then starts the ***PSTransitionTimer*** and evaluates the ***Accept*** Message.
3	After sending the ***Accept*** Message, the Programmable Power Supply starts to increase its output Voltage. The Programmable Power Supply new Voltage set-point ***Shall*** be reached by ***tPpsSrcTransLarge*** for steps larger than ***vPpsSmallStep*** or else by ***tPpsSrcTransSmall***. The power supply informs the Device Policy Manager that it has reached the new set-point and whether V_{BUS} is at the corresponding new level, or if the supply is operating in CL mode. The power supply status is passed to the Policy Engine.	

Step	Source Port	Sink Port
4	The Policy Engine sends the ***PS_RDY*** Message to the Sink starting within ***tPpsSrcTransSmall*** or ***tPpsSrcTransLarge*** of the end of the ***GoodCRC*** Message following the ***Accept*** message.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
5	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then stops the ***PSTransitionTimer***, evaluates the ***PS_RDY*** Message from the Source and tells the Device Policy Manager that the ~~Programmable Power Supply~~Source is operating at the new Voltage set point (corresponding to ***vPpsNew***). If the ***PS_RDY*** is not received before ***PSTransitionTimer*** times out the Sink starts sending ***Hard Reset*** signaling.

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(s) Section 7.3.17 Decreasing the Programmable Power Supply (PPS) Voltage, p336

From Text:

7.3.17 Decreasing the Programmable Power Supply (PPS) Voltage

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when decreasing the Voltage is shown in Figure 7-39 Transition Diagram for Decreasing the Programmable Power Supply Voltage. The sequence that ***Shall*** be followed is described in Table 7-17. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-39 Transition Diagram for Decreasing the Programmable Power Supply Voltage

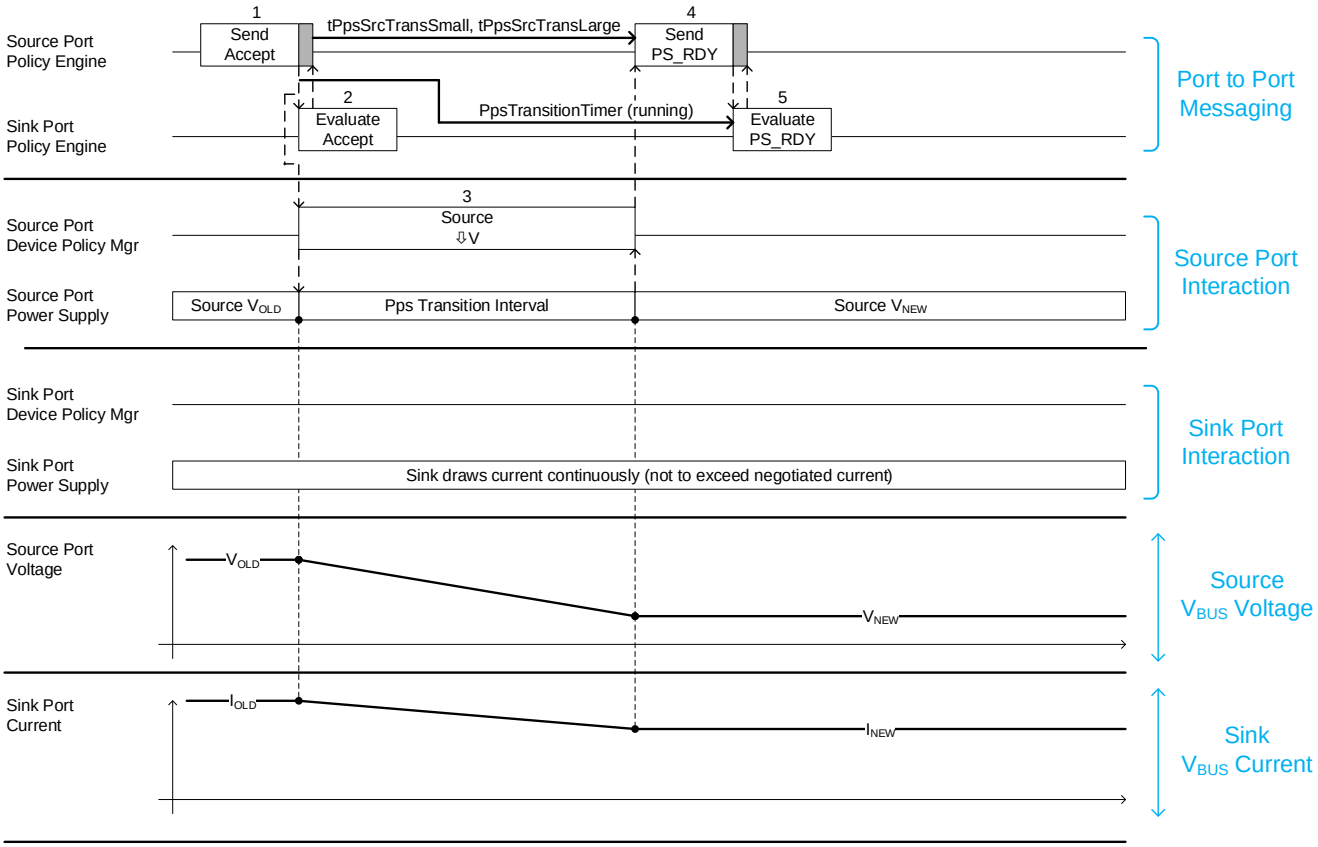


Table 7-17 Sequence Description for Decreasing the Programmable Power Supply Voltage

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message and starts the ***PSTransitionTimer***.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to decrease its output Voltage.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine. Policy Engine then evaluates the ***Accept*** Message.
3	After sending the ***Accept*** Message, the Programmable Power Supply starts to decrease its output Voltage. The Programmable Power Supply new Voltage set-point (corresponding to ***vPpsNew***) ***Shall*** be reached by ***tPpsSrcTransLarge*** for steps larger than ***vPpsSmallStep*** or else by ***tPpsSrcTransSmall***. The power supply informs the Device Policy Manager that it is has reached the new level. The power supply status is passed to the Policy Engine.	

Step	Source Port	Sink Port
4	The Policy Engine sends the ***PS_RDY*** Message to the Sink.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
5	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***PS_RDY*** Message from the Source and tells the Device Policy Manager that the Programmable Power Supply is operating at the new Voltage set point (corresponding to ***vPpsNew***).

To Text:

7.3.1.3.27.3.17 Decreasing the Programmable Power Supply (PPS) Voltage

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when decreasing the Voltage is shown in Figure 7-395 Transition Diagram for Decreasing the Programmable Power Supply Voltage. The sequence that ***Shall*** be followed is described in Table 7-1772 Sequence Description for Decreasing the Programmable Power Supply Voltage. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-395 Transition Diagram for Decreasing the Programmable Power Supply Voltage

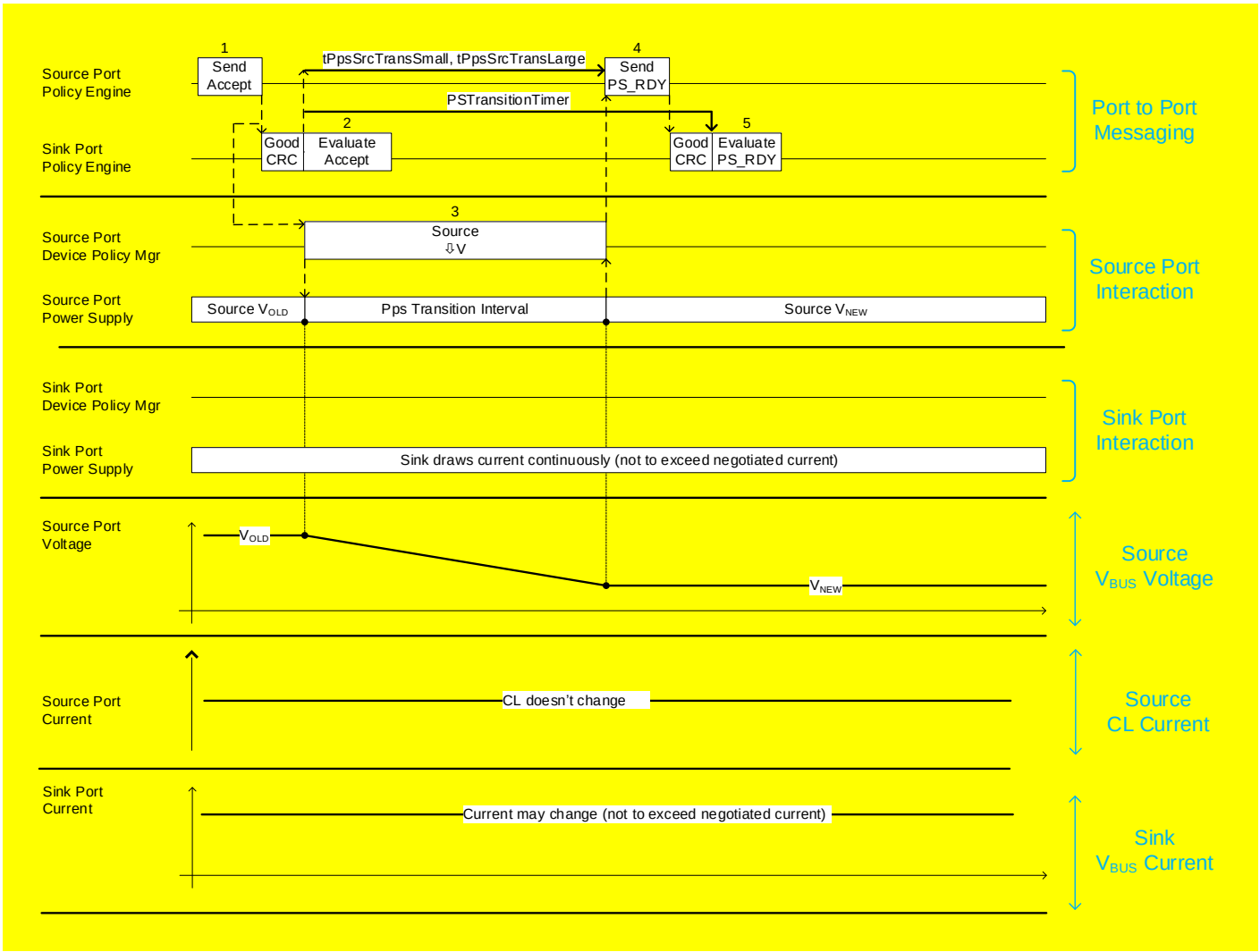


Table 7-1772 Sequence Description for Decreasing the Programmable Power Supply Voltage

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message ~~and starts the~~ ~~***PSTransitionTimer***~~.

Step	Source Port	Sink Port
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to decrease its output Voltage.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then starts the ***PSTransitionTimer*** and evaluates the ***Accept*** Message.
3	After sending the ***Accept*** Message, the Programmable Power Supply starts to decrease its output Voltage. The Programmable Power Supply new Voltage set-point (corresponding to ***vPpsNew***) ***Shall*** be reached by ***tPpsSrcTransLarge*** for steps larger than ***vPpsSmallStep*** or else by ***tPpsSrcTransSmall***. The power supply informs the Device Policy Manager that it is has reached the new level. The power supply status is passed to the Policy Engine.	
4	The Policy Engine sends the ***PS_RDY*** Message to the Sink starting within ***tPpsSrcTransSmall*** or ***tPpsSrcTransLarge*** of the end of the ***GoodCRC*** following the ***Accept*** message.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
5	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then stops the ***PSTransitionTimer,*** evaluates the ***PS_RDY*** Message from the Source and tells the Device Policy Manager that the ~~Programmable Power Supply~~Source is operating at the new Voltage set point (corresponding to ***vPpsNew***). If the ***PS_RDY*** is not received before ***PSTransitionTimer*** times out the Sink starts sending ***Hard Reset*** signaling.

(t) Section 7.3.21 Increasing the Programmable Power Supply Current, p344

From Text:

7.3.21 Increasing the Programmable Power Supply Current

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when increasing the current limit in the same APDO, not exceeding the maximum for that APDO and without changing the requested Voltage is shown in Figure 7-43 Transition Diagram for increasing the Current in PPS mode. The sequence that ***Shall*** be followed is described in Table 7-19. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

The Sink ***May*** draw current equal to the increasing Current Limit of the Source before it has received the ***PS_RDY*** Message for the new request.

Figure 7-43 Transition Diagram for increasing the Current in PPS mode

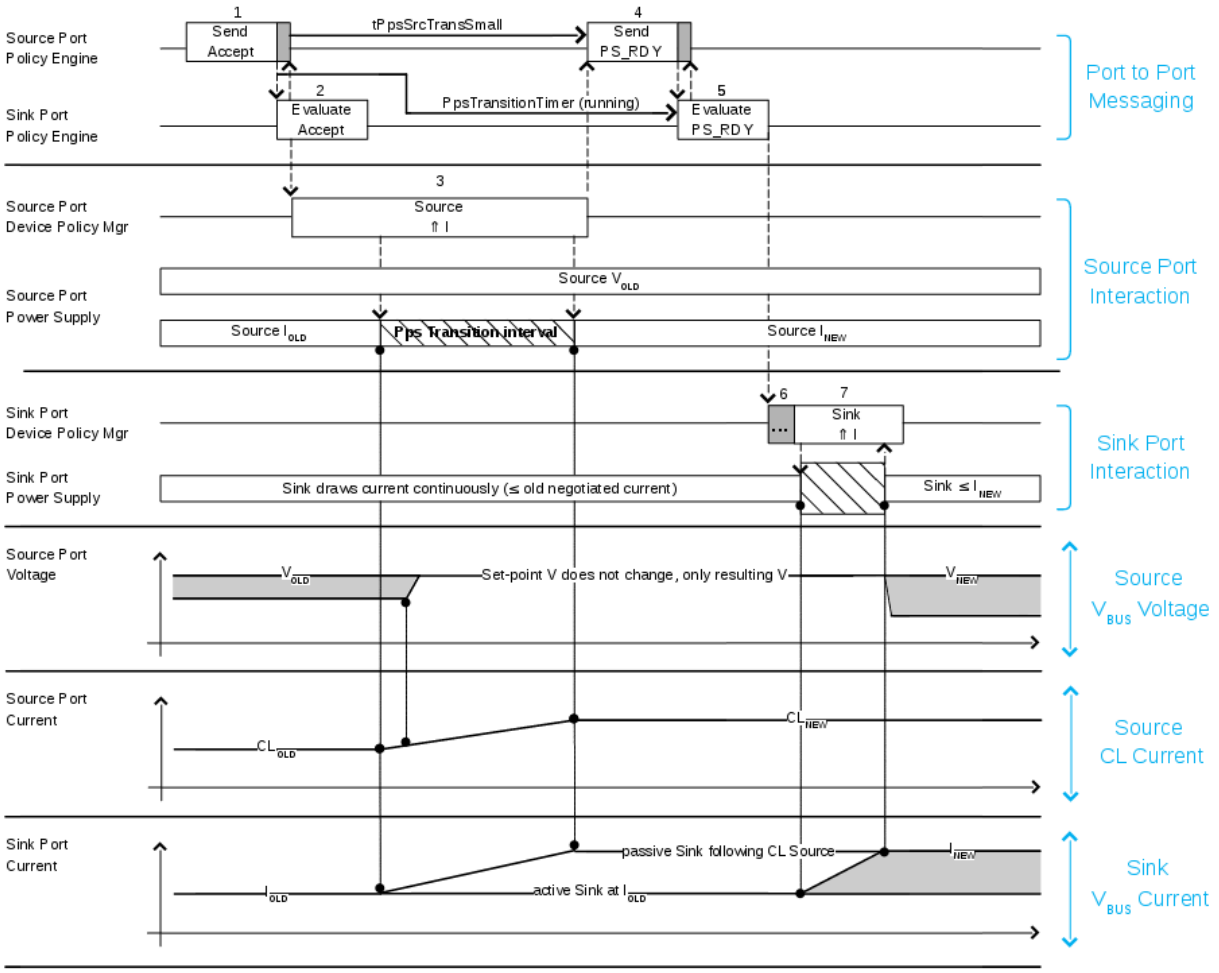


Table 7-21 Sequence Description for increasing the Current in PPS mode

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message and starts the ***PSTransitionTimer***.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to increase its set-point for the current limit.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***Accept*** Message.
3	The Power Supply increases its Current Limit set-point to the new requested value.	The Sink draws current according to the increased Current Limit of the Source.
4	The Policy Engine waits ***tPpsSrcTransSmall*** then sends the ***PS_RDY*** Message to the Sink.	Policy Engine receives the ***PS_RDY*** Message.
5	Policy Engine receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source.
6		Policy Engine evaluates the ***PS_RDY*** Message and tells the Device Policy Manager it can increase the current up to the requested value without the Source going into CL mode.
7		The Sink increases its current.

To Text:

7.3.1.3.~~37.3.21~~ Increasing the Programmable Power Supply (PPS) Current

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when increasing the current limit in the same APDO, not exceeding the maximum for that APDO and without changing the requested Voltage is shown in Figure 7-~~43~~36 Transition Diagram for increasing the Current in PPS mode. The sequence that ***Shall*** be followed is described in Table

7-193 Sequence Description for increasing the Current in PPS mode. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.
The Sink ***May*** draw current equal to the increasing Current Limit of the Source before it has received the ***PS_RDY*** Message for the new request.

Figure 7-43 Transition Diagram for increasing the Current in PPS mode

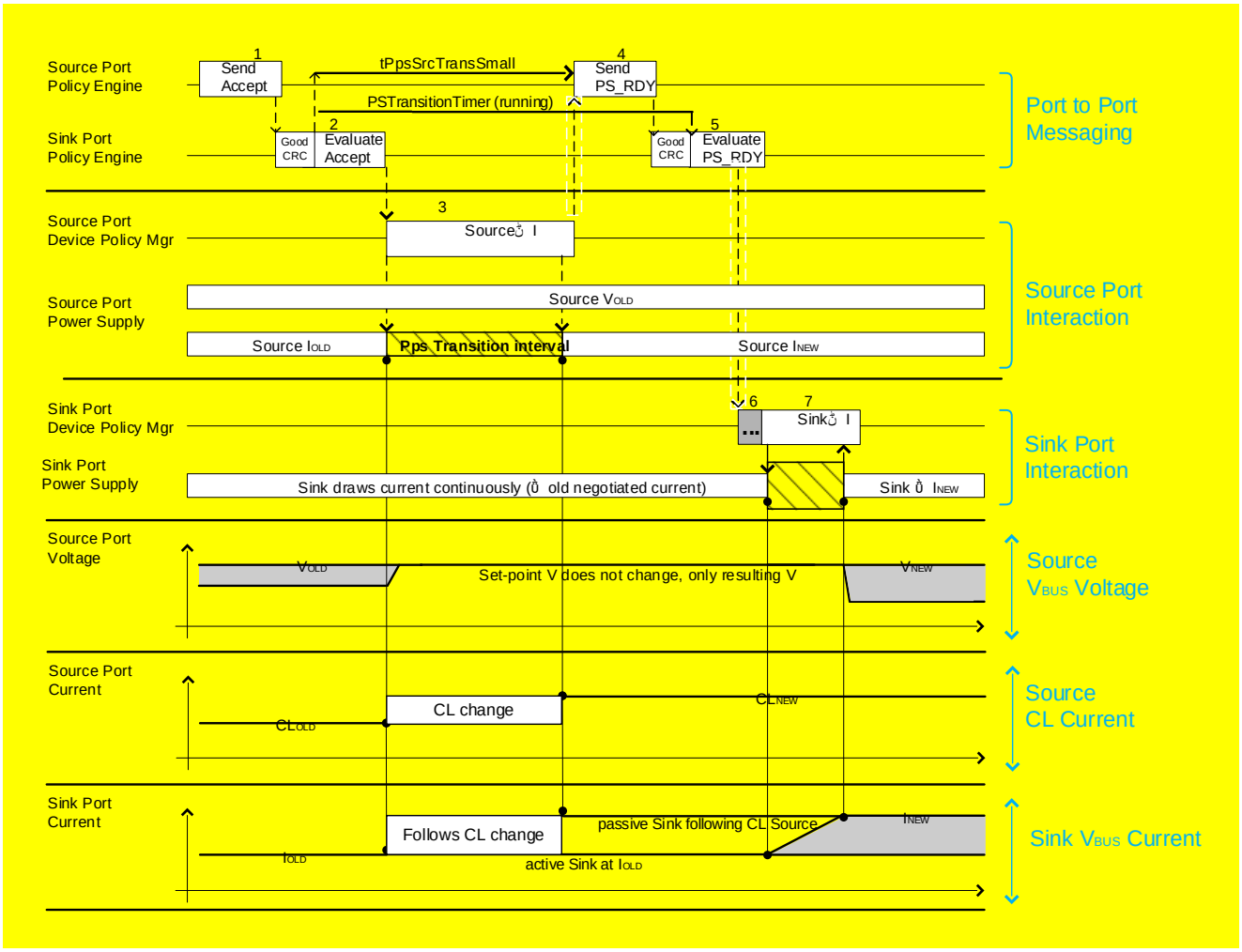


Table 7-21 Sequence Description for increasing the Current in PPS mode

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message ~~and starts the ***PSTransitionTimer***~~.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to increase its set-point for the current limit.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then starts the ***PSTransitionTimer*** and evaluates the ***Accept*** Message.
3	The Power Supply increases its Current Limit set-point to the new requested value.	The Sink draws current according to the increased Current Limit of the Source.
4	The Policy Engine waits ***tPpsSrcTransSmall*** then sends the ***PS_RDY*** Message to the Sink starting within ***tPpsCLProgramSettle*** of the end of the ***GoodCRC*** following the ***Accept*** Message.	Policy Engine receives the ***PS_RDY*** Message.
5	Policy Engine receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source.
6		Policy Engine then stops the ***PSTransitionTimer,*** evaluates the ***PS_RDY*** Message, and tells the Device Policy Manager it can increase the current up to the requested value without the Source going into CL mode. If the ***PS_RDY*** is not received before ***PSTransitionTimer*** times out the Sink starts sending ***Hard Reset*** signaling.

Step	Source Port	Sink Port
7		The Sink increases its current.

(u) Section 7.3.22 Decreasing the Programmable Power Supply Current, p336

From Text:

7.3.22 Decreasing the Programmable Power Supply Current

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when decreasing the current limit in the same APDO, not exceeding the minimum for that APDO and without changing the requested Voltage is shown in Figure 7-44 Transition Diagram for decreasing the Current in PPS mode. The sequence that ***Shall*** be followed is described in Table 7-20. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-44 Transition Diagram for decreasing the Current in PPS mode

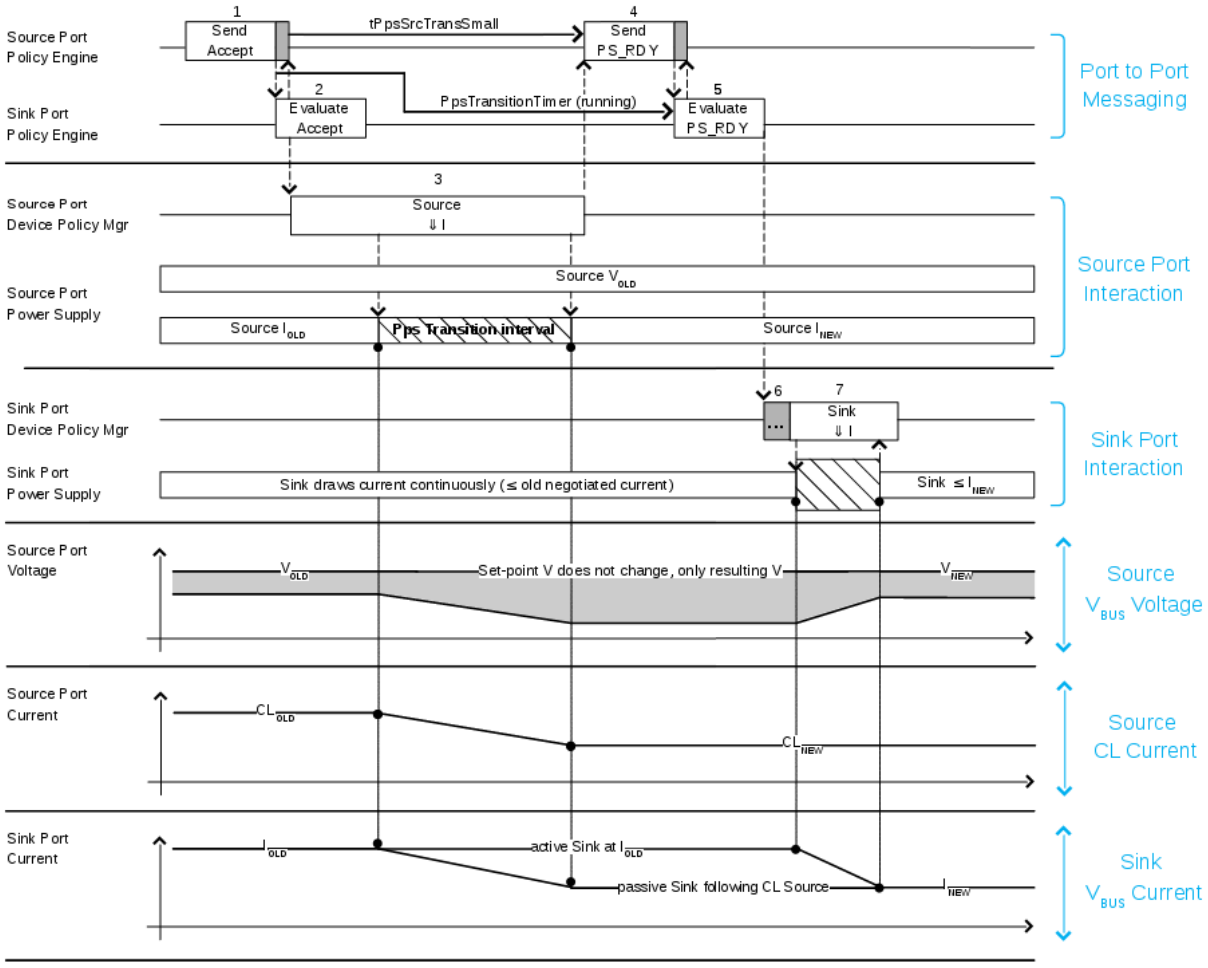


Table 7-22 Sequence Description for decreasing the Current in PPS mode

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message and starts the PSTransitionTimer.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to decrease its set-point for the current limit.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***Accept*** Message and instructs the Sink to reduce its current to below the new negotiated current level.
3	The Power Supply decreases its Current Limit set-point to the new negotiated value.	The Sink reduces its current to less than the new negotiated current to prevent the Source from going into Current Limit.

Step	Source Port	Sink Port
4	The Policy Engine waits ***tPpsSrcTransSmall*** then sends the ***PS_RDY*** Message to the Sink.	
5	Policy Engine receives the ***GoodCRC*** Message from the Sink.	Policy Engine receives the ***PS_RDY*** Message.
6		Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine evaluates the ***PS_RDY*** Message.
7		The Sink is allowed to draw I_{NEW} but must be aware the Voltage on V_{BUS} can drop doing so.

To Text:

7.3.1.3.~~47.3.22~~ Decreasing the Programmable Power Supply (PPS) Current

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when decreasing the current limit in the same APDO, not exceeding the minimum for that APDO and without changing the requested Voltage is shown in Figure 7-~~44~~37 Transition Diagram for decreasing the Current in PPS mode. The sequence that ***Shall*** be followed is described in Table 7-~~20~~14 Sequence Description for decreasing the Current in PPS mode. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-44 Transition Diagram for decreasing the Current in PPS mode

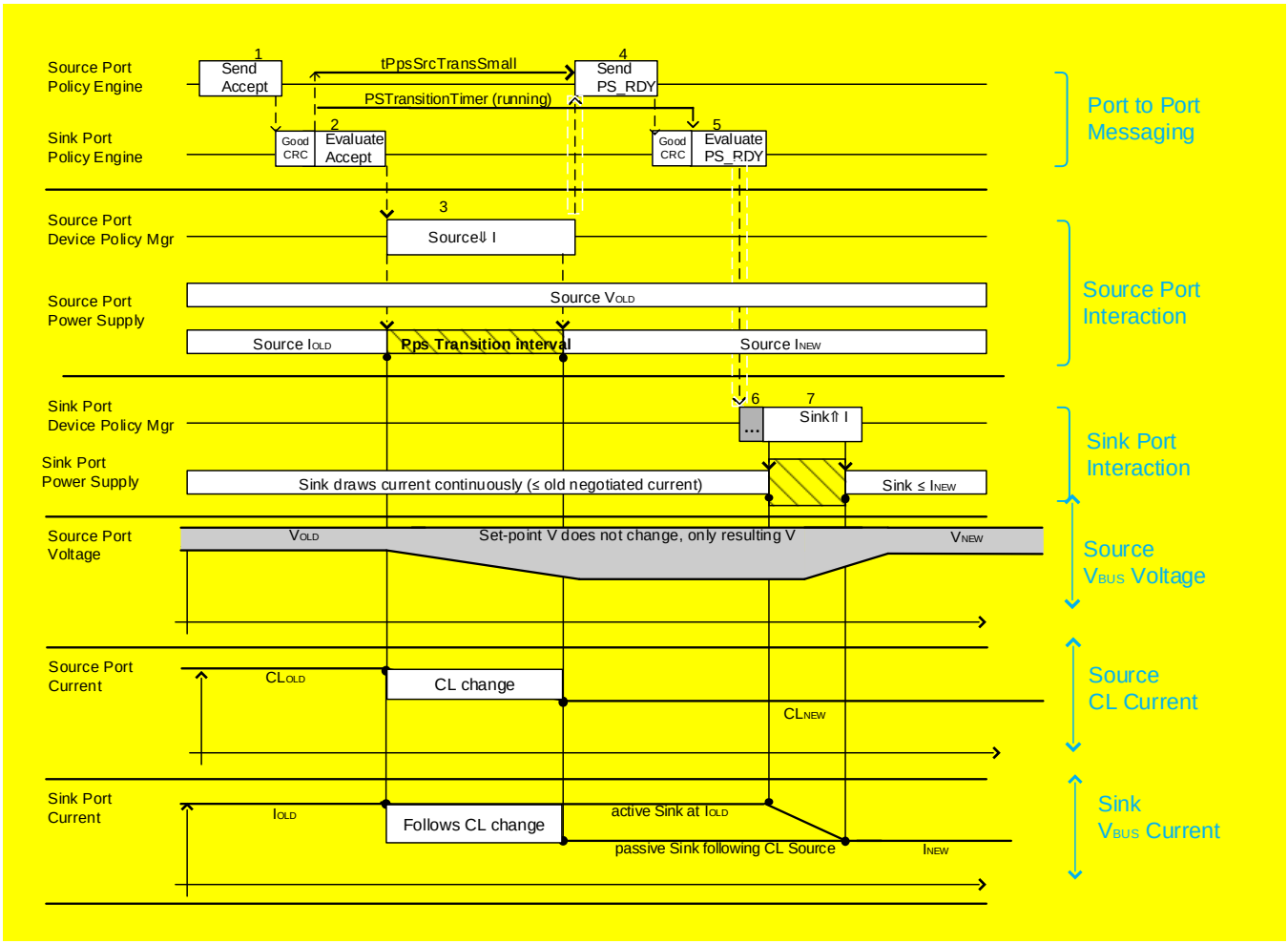


Table 7-~~22~~14 Sequence Description for decreasing the Current in PPS mode

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message ~~and starts the ***PSTransitionTimer***~~.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to decrease its set-point for the current limit.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***Accept*** Message and instructs the Sink to reduce its current to below the new negotiated current level and starts the ***PSTransitionTimer***.

Step	Source Port	Sink Port
3	The Power Supply decreases its Current Limit set-point to the new negotiated value.	The Sink reduces its current to less than the new negotiated current to prevent the Source from going into Current Limit.
4	The Policy Engine ~~waits ***tPpsSrcTransSmall*** then~~ sends the ***PS_RDY*** Message to the Sink starting within ***tPpsSrcTransSmall*** of the end of the ***GoodCRC*** Message following the ***Accept*** Message.	
5	Policy Engine receives the ***GoodCRC*** Message from the Sink.	Policy Engine receives the ***PS_RDY*** Message.
6		Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then stops the ***PSTransitionTimer*** and evaluates the ***PS_RDY*** Message. If the ***PS_RDY*** is not received before ***PSTransitionTimer*** times out the Sink starts sending ***Hard Reset*** signaling.
7		The Sink is allowed to draw I_{NEW} but must be aware the Voltage on V_{BUS} can drop doing so.

(v) Section 7.3.23 Same Request Programmable Power Supply, p348

From Text:

7.3.23 Same Request Programmable Power Supply

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when the Sink requests the same Voltage and current levels as the present negotiated levels for Voltage and current is shown in Figure 7-45 Transition Diagram for no change in Current or Voltage in PPS mode. The sequence that ***Shall*** be followed is described in Table 7-21. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-45 Transition Diagram for no change in Current or Voltage in PPS mode

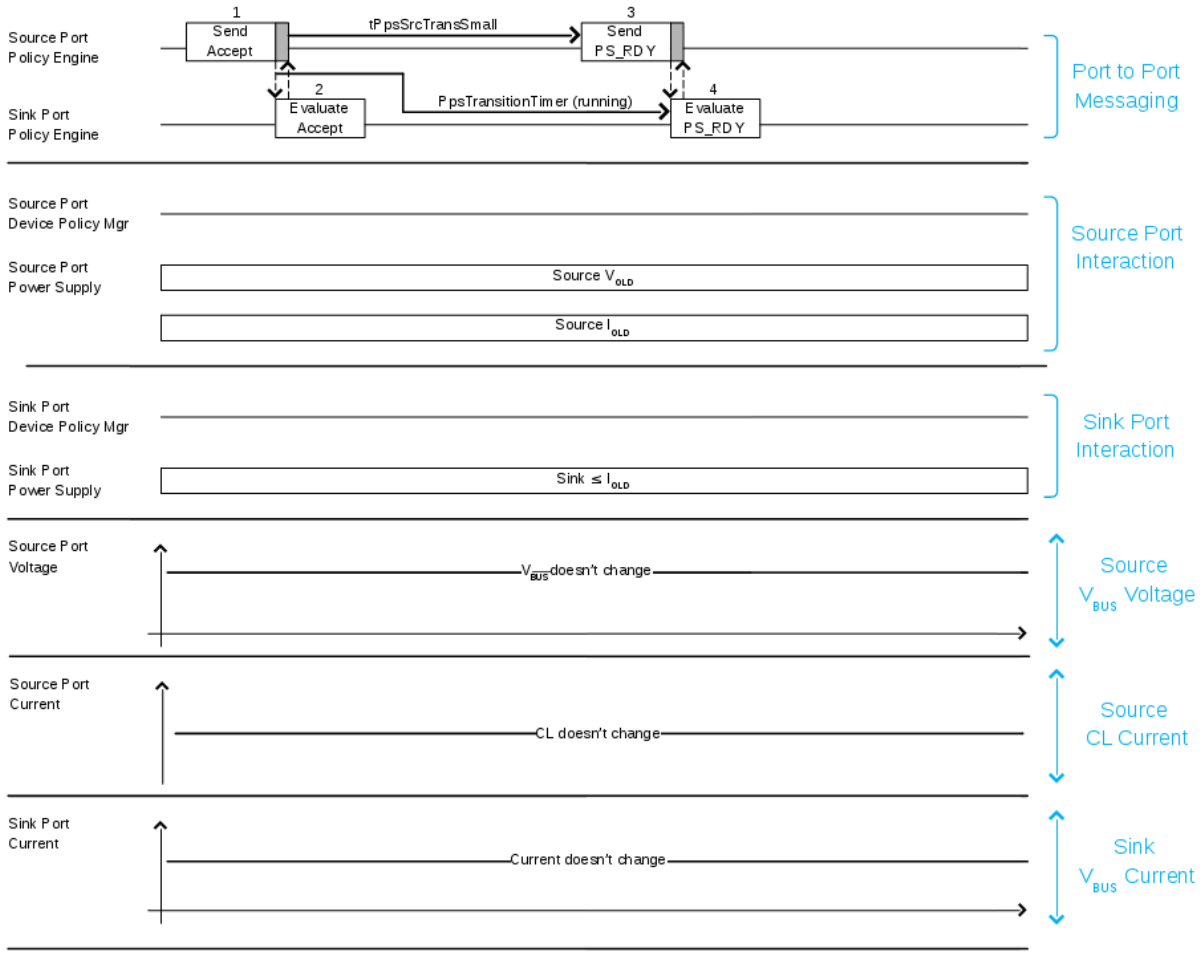


Table 7-23 Sequence Description for no change in Current or Voltage in PPS mode

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message and starts the PSTransitionTimer.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***Accept*** Message.
3	The Policy Engine then sends the ***PS_RDY*** Message to the Sink within ***tPpsSrcTransSmall***.	Policy Engine receives the ***PS_RDY*** Message.
4	Policy Engine receives the ***GoodCRC*** Message from the Sink. Note: the decision that no power transition is required could be made either by the Device Policy Manager or the power supply depending on implementation.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine evaluates the ***PS_RDY*** Message.

To Text:

7.3.1.3.~~57.3.23~~ Same Request Programmable Power Supply (PPS)

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when the Sink requests the same Voltage and current levels as the present negotiated levels for Voltage and current is shown in Figure 7-~~45~~38 Transition Diagram for no change in Current or Voltage in PPS mode. The sequence that ***Shall*** be followed is described in Table 7-~~21~~15 Sequence Description for no change in Current or Voltage in PPS mode. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-~~45~~38 Transition Diagram for no change in Current or Voltage in PPS mode

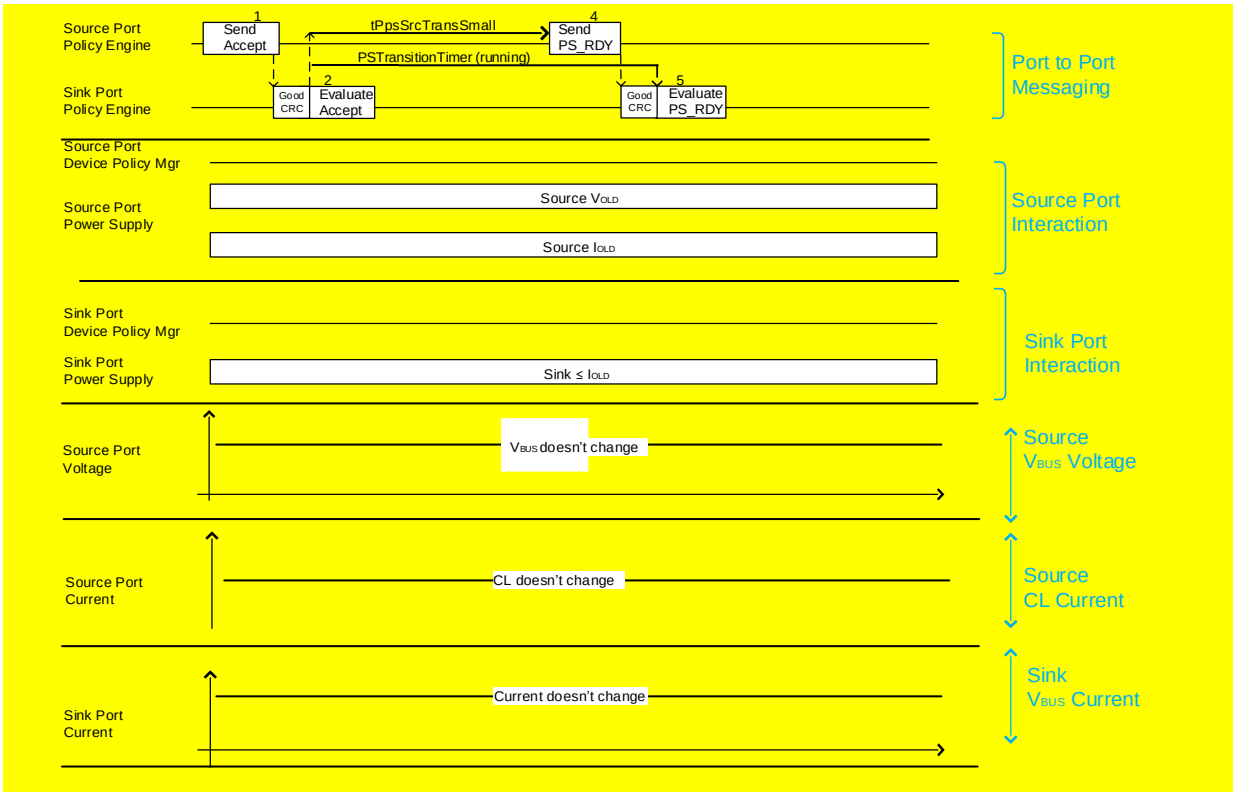


Table 7-~~23~~15 Sequence Description for no change in Current or Voltage in PPS mode

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message ~~and starts the ***PSTransitionTimer***~~.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***Accept*** Message and starts the ***PSTransitionTimer***.
3	The Policy Engine then sends the ***PS_RDY*** Message to the Sink starting within ***tPpsSrcTransSmall*** of the end of the ***GoodCRC*** following the ***Accept*** Message.	Policy Engine receives the ***PS_RDY*** Message.
4	Policy Engine receives the ***GoodCRC*** Message from the Sink. Note: the decision that no power transition is required could be made either by the Device Policy Manager or the power supply depending on implementation.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then stops the ***PSTransitionTimer*** and evaluates the ***PS_RDY*** Message from the Source. The Sink is already operating at the new power level, so no further action is required. If the ***PS_RDY*** Message is not received before the ***PSTransitionTimer*** times out the Sink starts sending ***Hard Reset*** signaling.

(w) New Section 7.3.1.4 Changing Voltage or Current within the same AVS APD

New Text:

7.3.1.4 Changing Voltage or Current within the same AVS APD

(x) Section 7.3.18 Increasing the Adjustable Voltage Supply (AVS) Voltage, p338

From Text:

7.3.18 Increasing the Adjustable Voltage Supply (AVS) Voltage

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when increasing the Voltage is shown in Figure 7-40 Transition Diagram for Increasing the Programmable Power Supply Voltage. The sequence that ***Shall*** be followed is described in Table 7-18. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-40 Transition Diagram for Increasing the Programmable Power Supply Voltage

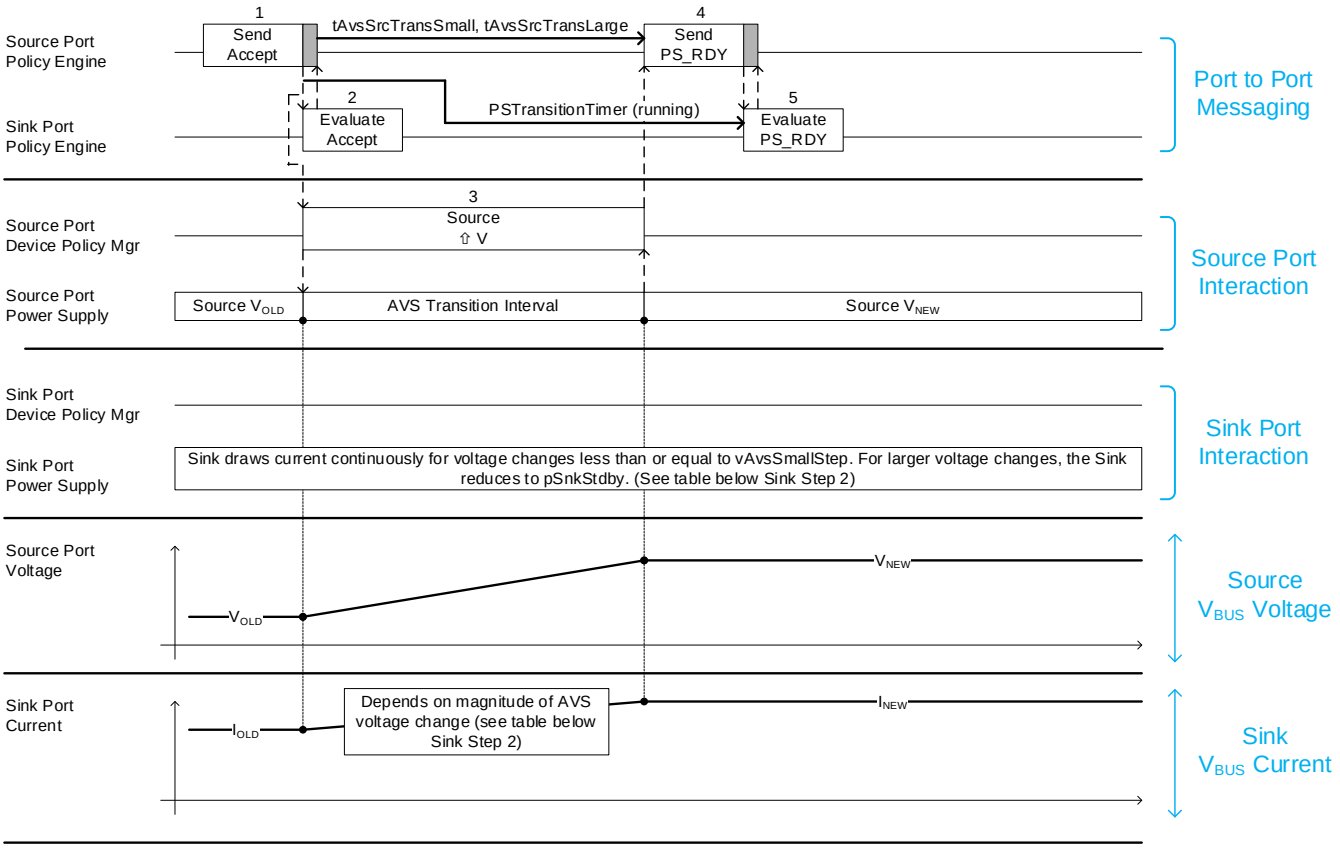


Table 7-18 Sequence Description for Increasing the Adjustable Voltage Supply Voltage

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message and starts the ***PSTransitionTimer***.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to increase its output Voltage.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine. Policy Engine then evaluates the ***Accept*** Message. If the Voltage increase is larger than ***vAvsSmallStep***, the Sink ***Shall*** reduce its power consumption to ***pSnkStdby*** within ***tSnkStdby***. The reduction to ***pSnkStdby*** is not required if the Voltage increase is less than or equal to ***vAvsSmallStep***.
3	After sending the ***Accept*** Message, the Adjustable Voltage Supply starts to increase its output Voltage. The Adjustable Voltage Supply new Voltage set-point ***Shall*** be reached by ***tAvsSrcTransLarge*** for steps larger than ***vAvsSmallStep*** or else by ***tAvsSrcTransSmall***. The power supply informs the Device Policy Manager that it has reached the new level. The power supply status is passed to the Policy Engine.	
4	The Policy Engine sends the ***PS_RDY*** Message to the Sink.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
5	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***PS_RDY*** Message from the Source and tells the Device Policy Manager that the Programmable Power Supply is operating at the new Voltage set point.

To Text:

7.3.1.4.1~~7.3.18~~ Increasing the Adjustable Voltage Supply (AVS) Voltage

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when increasing the Voltage is shown in Figure 7-~~40~~39 Transition Diagram for Increasing the Programmable Power Supply Voltage. The sequence that ***Shall*** be followed is described in Table 7-1~~86~~ Sequence Description for Increasing the Adjustable Voltage Supply Voltage. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-~~40~~39 Transition Diagram for Increasing the ~~Programmable Power~~Adjustable Voltage Supply Voltage

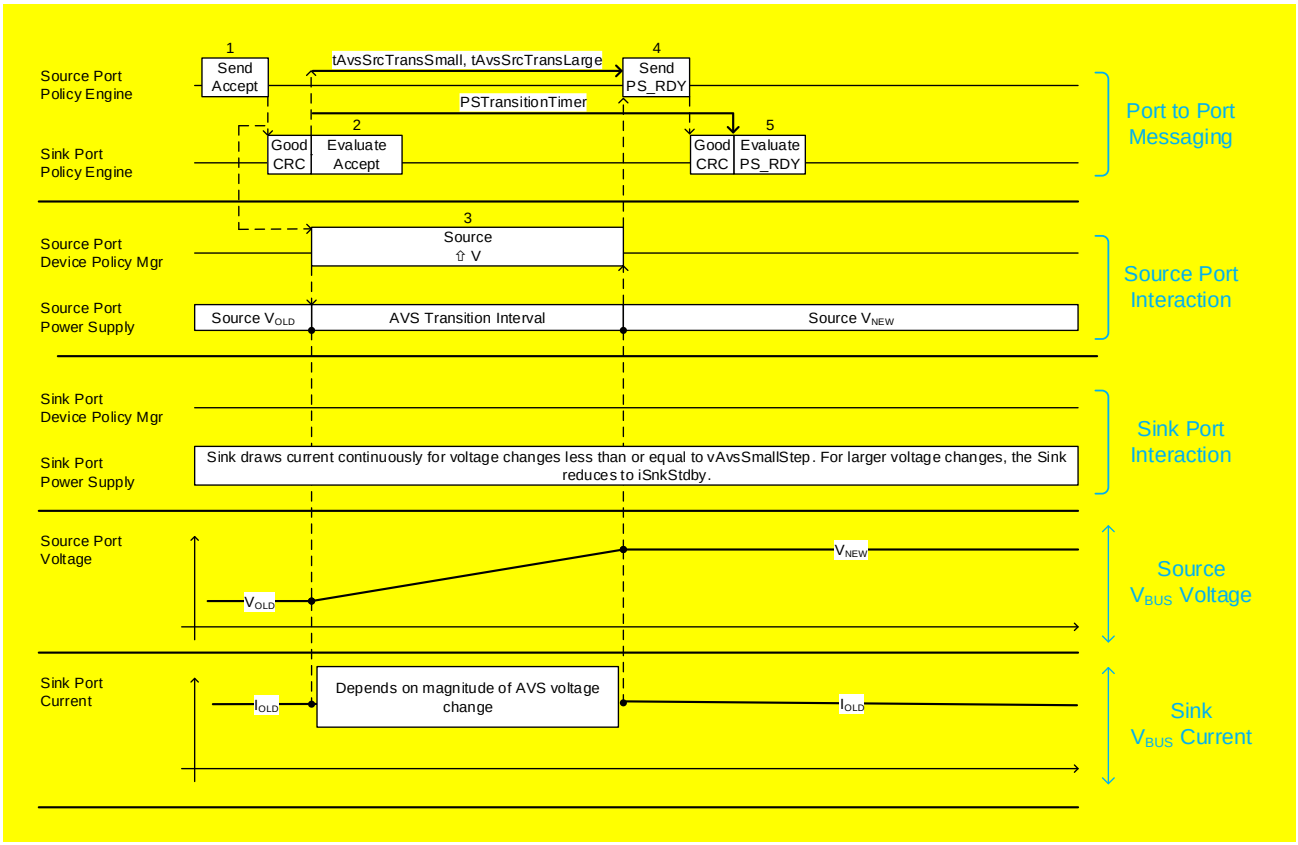


Table 7-1~~86~~ Sequence Description for Increasing the Adjustable Voltage Supply Voltage

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message ~~and starts the ***PSTransitionTimer***~~.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to increase its output Voltage.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine. Policy Engine then starts the ***PSTransitionTimer*** and evaluates the ***Accept*** Message. If the Voltage increase is larger than ***vAvsSmallStep***, the Sink ***Shall*** reduce its ~~power consumption~~current draw to ~~***pSnkStdby***~~***iSnkStdby*** within ***tSnkStdby***. The reduction to ~~***pSnkStdby***~~***iSnkStdby*** is not required if the Voltage increase is less than or equal to ***vAvsSmallStep***.
3	After sending the ***Accept*** Message, the Adjustable Voltage Supply starts to increase its output Voltage. The Adjustable Voltage Supply new Voltage set-point ***Shall*** be reached by ***tAvsSrcTransLarge*** for steps larger than ***vAvsSmallStep*** or else by ***tAvsSrcTransSmall***. The power supply informs the Device Policy Manager that it has reached the new level. The power supply status is passed to the Policy Engine.	
4	The Policy Engine sends the ***PS_RDY*** Message to the Sink starting within ***tAvsSrcTransSmall*** or ***tAvsSrcTransLarge*** of the end of the ***GoodCRC*** Message following the ***Accept*** Message.	The Policy Engine receives the ***PS_RDY*** Message from the Source.

Step	Source Port	Sink Port
5	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then stops the ***PSTransitionTimer***, evaluates the ***PS_RDY*** Message from the Source and tells the Device Policy Manager that the ~~Programmable Power Supply~~Source is operating at the new Voltage set point. The Sink **May** begin operating at the new power level any time after evaluation of the ***PS_RDY*** Message. If the ***PS_RDY*** Message is not received before the ***PSTransitionTimer*** times out the Sink starts sending ***Hard Reset*** signaling.

(y) Section 7.3.19 Decreasing the Adjustable Voltage Supply (AVS) Voltage, p340

From Text:

7.3.19 Decreasing the Adjustable Voltage Supply (AVS) Voltage

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when decreasing the Voltage is shown in Figure 7-41 Transition Diagram for Decreasing the Adjustable Voltage Supply Voltage. The sequence that ***Shall*** be followed is described in Table 7-17. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-41 Transition Diagram for Decreasing the Adjustable Voltage Supply Voltage

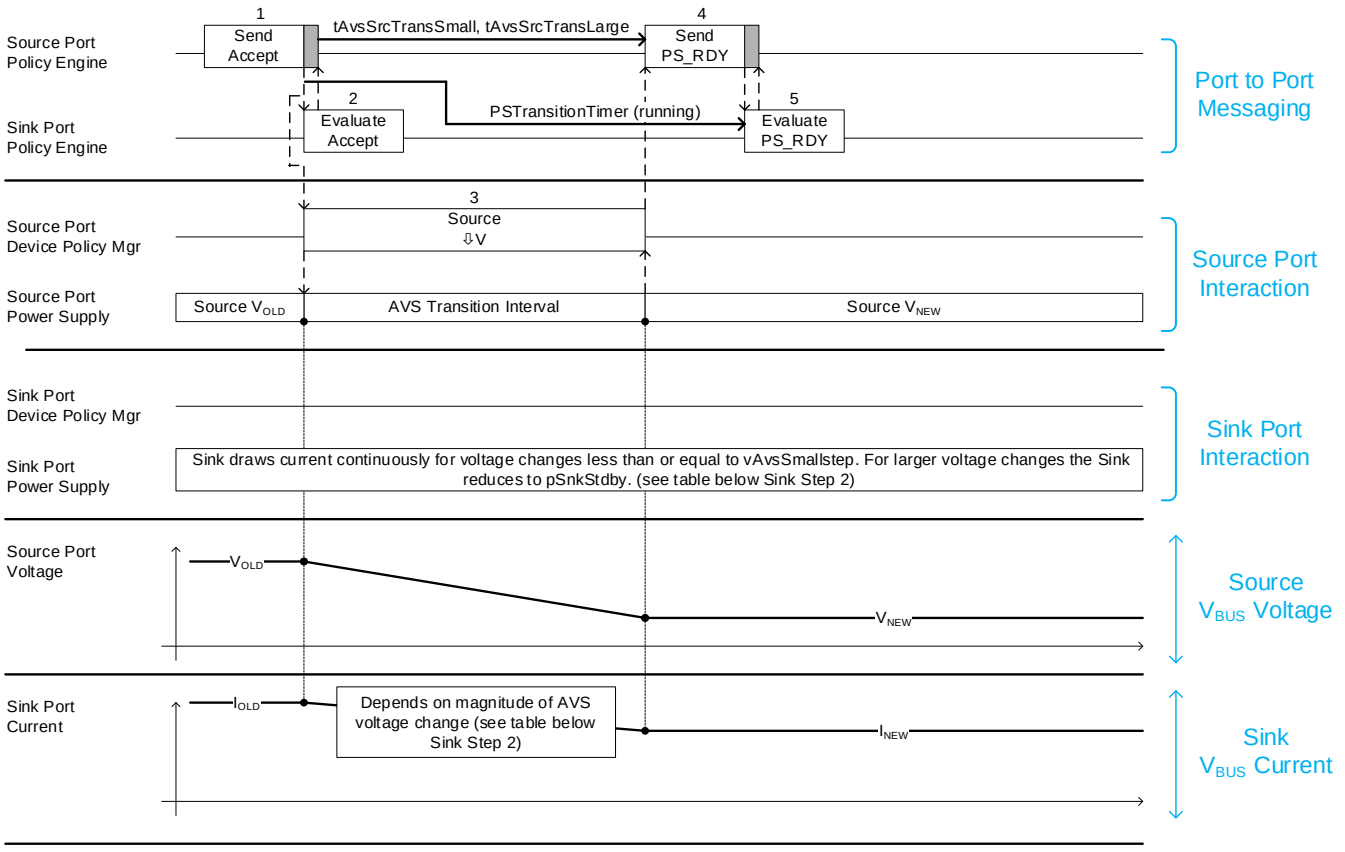


Table 7-19 Sequence Description for Decreasing the Adjustable Voltage Supply Voltage

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message and starts the ***PSTransitionTimer***.

Step	Source Port	Sink Port
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to decrease its output Voltage.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine. Policy Engine then evaluates the ***Accept*** Message. If the Voltage decrease is larger than ***vAvsSmallStep***, the Sink ***Shall*** reduce its power consumption to ***pSnkStdby*** within ***tSnkStdby***. The reduction to ***pSnkStdby*** is not required if the Voltage decrease is less than or equal to ***vAvsSmallStep***.
3	After sending the ***Accept*** Message, the Adjustable Voltage Supply starts to decrease its output Voltage. The Adjustable Voltage Supply new Voltage set-point ***Shall*** be reached by ***tAvsSrcTransLarge*** for steps larger than ***vAvsSmallStep*** or else by ***tAvsSrcTransSmall***. The power supply informs the Device Policy Manager that it has reached the new level. The power supply status is passed to the Policy Engine.	
4	The Policy Engine sends the ***PS_RDY*** Message to the Sink.	The Policy Engine receives the ***PS_RDY*** Message from the Source.
5	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***PS_RDY*** Message from the Source and tells the Device Policy Manager that the Programmable Power Supply is operating at the new Voltage set point (corresponding to ***vPpsNew***).

To Text:

7.3.1.4.2~~7.3.19~~ Decreasing the Adjustable Voltage Supply (AVS) Voltage

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when decreasing the Voltage is shown in Figure 7-4~~1~~0 Transition Diagram for Decreasing the Adjustable Voltage Supply Voltage. The sequence that ***Shall*** be followed is described in Table 7-17 Sequence Description for Decreasing the Adjustable Voltage Supply Voltage. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-4~~1~~0 Transition Diagram for Decreasing the Adjustable Voltage Supply Voltage

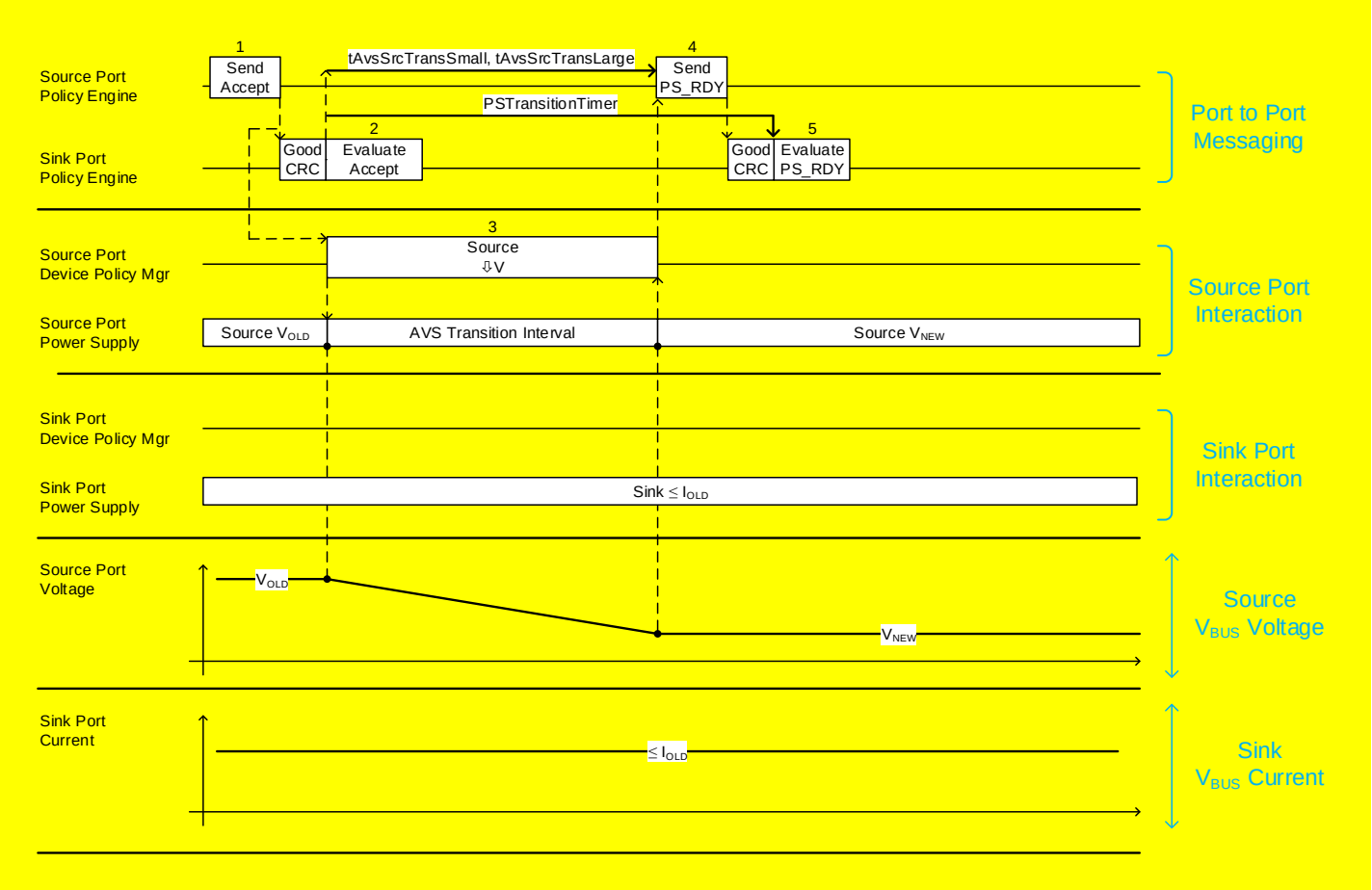


Table 7-19 Sequence Description for Decreasing the Adjustable Voltage Supply Voltage

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message ~~and starts the ***PSTransitionTimer***~~.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to decrease its output Voltage.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine. Policy Engine then starts the ***PSTransitionTimer*** and evaluates the ***Accept*** Message. ~~If the Voltage decrease is larger than ***vAvsSmallStep***, the Sink ***Shall*** reduce its power consumption to ***pSnkStdby*** within ***tSnkStdby***. The reduction to ***pSnkStdby*** is not required if the Voltage decrease is less than or equal to ***vAvsSmallStep***.~~
3	After sending the ***Accept*** Message, the Adjustable Voltage Supply starts to decrease its output Voltage. The Adjustable Voltage Supply new Voltage set-point ***Shall*** be reached by ***tAvsSrcTransLarge*** for steps larger than ***vAvsSmallStep*** or else by ***tAvsSrcTransSmall***. The power supply informs the Device Policy Manager that it has reached the new level. The power supply status is passed to the Policy Engine.	
4	The Policy Engine sends the ***PS_RDY*** Message to the Sink starting within ***tAvsSrcTransSmall*** or ***tAvsSrcTransLarge*** of the end of the ***GoodCRC*** Message following the ***Accept*** Message.	The Policy Engine receives the ***PS_RDY*** Message from the Source.

Step	Source Port	Sink Port
5	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then stops the ***PSTransitionTimer***, evaluates the ***PS_RDY*** Message from the Source and tells the Device Policy Manager that the ~~Programmable Power Supply~~Source is operating at the new Voltage set point (corresponding to ~~***vPpsNew***~~***vAvsNew***). If the ***PS_RDY*** Message is not received before the ***PSTransitionTimer*** times out the Sink starts sending ***Hard Reset*** signaling.

(z) New Section 7.3.1.1.2 Same Request Adjustable Voltage Supply (AVS)

New Text:

7.3.1.1.2 Same Request Adjustable Voltage Supply (AVS)

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed when the Sink requests the same Voltage and current levels as the present negotiated levels for Voltage and current is shown in Figure 7-41 Transition Diagram for no change in Current or Voltage in AVS mode. The sequence that ***Shall*** be followed is described in Table 7 18 Sequence Description for no change in Current or Voltage in AVS mode. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Note in this figure, the Sink has previously sent a ***Request*** Message to the Source.

Figure 7-41 Transition Diagram for no change in Current or Voltage in AVS mode

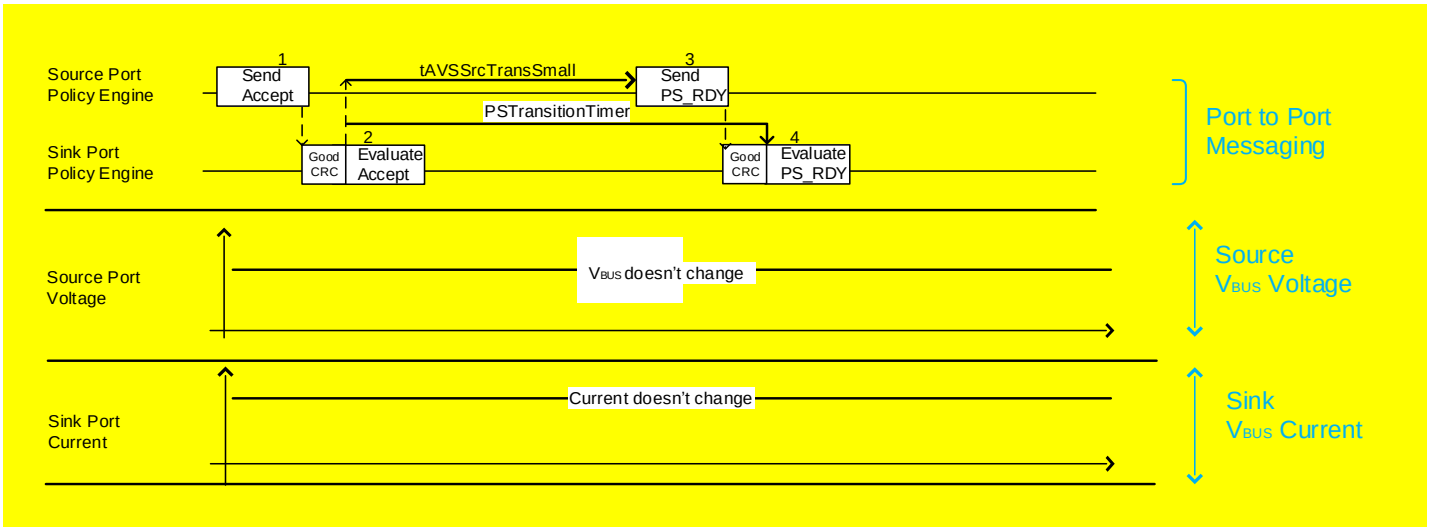


Table 7-18 Sequence Description for no change in Current or Voltage in AVS mode

Step	Source Port	Sink Port
1	Policy Engine sends the ***Accept*** Message to the Sink.	Policy Engine receives the ***Accept*** Message.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then starts the ***PSTransitionTimer*** and evaluates the ***Accept*** Message.
3	Policy Engine then sends the ***PS_RDY*** Message to the Sink starting within ***tAvsSrcTransSmall*** of the end of the ***GoodCRC*** Message following the ***Accept*** Message.	Policy Engine receives the ***PS_RDY*** Message.

Step	Source Port	Sink Port
4	Policy Engine receives the ***GoodCRC*** Message from the Sink. Note: the decision that no power transition is required could be made either by the Device Policy Manager or the power supply depending on implementation.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then stops the ***PSTransitionTimer***, and evaluates the ***PS_RDY*** Message from the Source. The Sink is already operating at the new power level, so no further action is required. If the ***PS_RDY*** Message is not received before ***PSTransitionTimer*** times out the Sink starts sending ***Hard Reset*** signaling.

(aa) New Section 7.3.2 Transitions caused by Power Role Swap

New Text:

7.3.2 Transitions Caused by Power Role Swap

(ab) Section 7.3.9 Sink Requested Power Role Swap, p318

From Text:

7.3.9 Sink Requested Power Role Swap

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed during a Sink requested Power Role Swap is shown in Figure 7-31 Transition Diagram for a Sink Requested Power Role Swap. The sequence that ***Shall*** be followed is described in Table 7-9. The timing parameters that ***Shall*** be followed are listed in Table 7-23. Note in this figure, the Sink has previously sent a ***PR_Swap*** Message to the Source.

Figure 7-31 Transition Diagram for a Sink Requested Power Role Swap

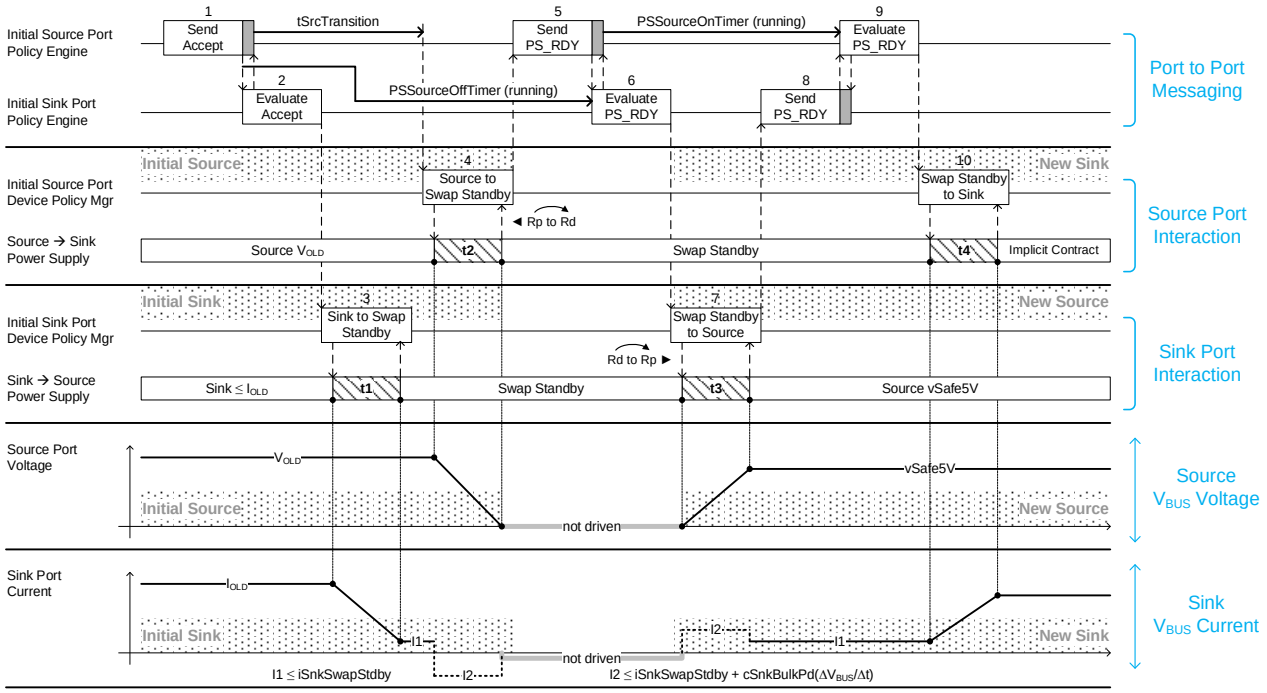


Table 7-9 Sequence Description for a Sink Requested Power Role Swap

Step	Initial Source Port → New Sink Port	Initial Sink Port → New Source Port
1	Policy Engine sends the ***Accept*** Message to the Initial Sink.	Policy Engine receives the ***Accept*** and starts the ***PSSourceOffTimer***.

Step	Initial Source Port → New Sink Port	Initial Sink Port → New Source Port
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer sends the ***GoodCRC*** Message to the Initial Source. Policy Engine then evaluates the ***Accept*** Message.
3		Policy Engine tells the Device Policy Manager to instruct the power supply to transition to Swap Standby within ***tSnkStdby*** (t1); t1 ***Shall*** complete before ***tSrcTransition***. When in Sink Standby the Initial Sink ***Shall Not*** draw more than ***iSnkSwapStdby*** (I1). The Sink ***Shall Not*** violate transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.
4	***tSrcTransition*** after the ***GoodCRC*** Message was received the power supply starts to change its output power capability to Swap Standby (see Section 7.1.10). The power supply ***Shall*** complete the transition to Swap Standby within ***tSrcSwapStdby*** (t2). The power supply informs the Device Policy Manager that it is ready to operate as the new Sink. The CC termination is changed from Rp to Rd (see ***[USB Type-C 2.2]***). The power supply status is passed to the Policy Engine.	
5	The power supply is ready, and the Policy Engine sends the ***PS_RDY*** Message to the device that will become the new Source.	
6	Protocol Layer receives the ***GoodCRC*** Message from the device that will become the new Source. Policy Engine starts the ***PSSourceOnTimer***. Upon sending the ***PS_RDY*** Message and receiving the ***GoodCRC*** Message the Initial Source is ready to be the new Sink.	Policy Engine stops the ***PSSourceOffTimer.*** The Protocol Layer sends the ***GoodCRC*** Message to the new Sink. Policy Engine tells the Device Policy to instruct the power supply to operate as the new Source.
7		The CC termination is changed from Rd to Rp (see ***[USB Type-C 2.2]***). The power supply as the new Source transitions from Swap Standby to sourcing default ***vSafe5V*** within ***tNewSrc*** (t3). The power supply informs the Device Policy Manager that it is operating as the new Source.
8	Policy Engine receives the ***PS_RDY*** Message from the Source.	Device Policy Manager informs the Policy Engine the power supply is ready, and the Policy Engine sends the ***PS_RDY*** Message to the new Sink.
9	Policy Engine stops the ***PSSourceOnTimer***. Protocol Layer sends the ***GoodCRC*** Message to the new Source. Policy Engine evaluates the ***PS_RDY*** Message from the new Source and tells the Device Policy Manager to instruct the power supply to draw current as the new Sink.	Protocol Layer receives the ***GoodCRC*** Message from the new Sink.
10	The power supply as the new Sink transitions from Swap Standby to drawing the current allowed by the Implicit Contract. The power supply informs the Device Policy Manager that it is operating as the new Sink. At this point subsequent negotiations between the new Source and the new Sink ***May*** proceed as normal. The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. The time duration (t4) depends on the magnitude of the load change (***iLoadStepRate***).	

To Text:

7.3.2.1~~7.3.9~~ Sink Requested Power Role Swap

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed during a Sink requested Power Role Swap is shown in Figure 7-~~31~~42 Transition Diagram for a Sink Requested Power Role Swap. The sequence that ***Shall*** be followed is described in Table 7-19 Sequence Description for a Sink Requested Power Role Swap. The timing parameters that ***Shall*** be followed are listed in Table 7-23. Note in this figure, the Sink has previously sent a ***PR_Swap*** Message to the Source.

Figure 7-~~31~~42 Transition Diagram for a Sink Requested Power Role Swap

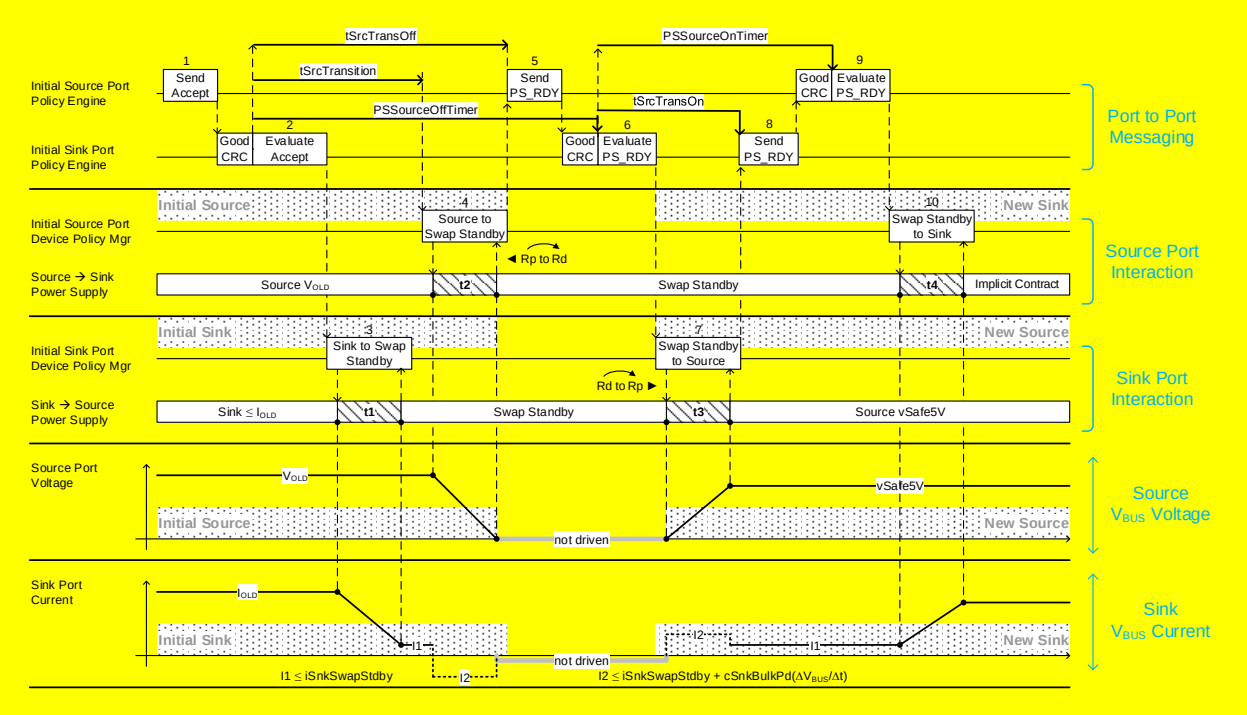


Table 7-19 Sequence Description for a Sink Requested Power Role Swap

Step	Initial Source Port → New Sink Port	Initial Sink Port → New Source Port
1	Policy Engine sends the ***Accept*** Message to the Initial Sink.	Policy Engine receives the ***Accept*** Message ~~and starts the ***PSSourceOffTimer***~~.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer sends the ***GoodCRC*** Message to the Initial Source. Policy Engine then starts the ***PSSourceOffTimer*** and evaluates the ***Accept*** Message.
3		Policy Engine tells the Device Policy Manager to instruct the power supply to transition to Swap Standby within ***tSnkStdby*** (t1); t1 ***Shall*** complete before ***tSrcTransition*** min. When in Sink Standby the Initial Sink ***Shall Not*** draw more than ***iSnkSwapStdby*** (I1). The Sink ***Shall Not*** violate transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.
4	***tSrcTransition*** after the ***GoodCRC*** Message was received the power supply starts to change its output power capability to Swap Standby (see Section 7.1.10). The power supply ***Shall*** complete the transition to Swap Standby within ***tSrcSwapStdby*** (t2). The power supply informs the Device Policy Manager that it is ready to operate as the new Sink. The CC termination is changed from Rp to Rd (see ***[USB Type-C 2.2]***). The power supply status is passed to the Policy Engine.	
5	The power supply is ready, and the Policy Engine sends the ***PS_RDY*** Message to the device that will become the new Source, starting within ***tSrcTransOff*** of the end of the ***GoodCRC*** Message following the ***Accept*** Message.	

Step	Initial Source Port → New Sink Port	Initial Sink Port → New Source Port
6	Protocol Layer receives the ***GoodCRC*** Message from the device that will become the new Source. Policy Engine starts the ***PSSourceOnTimer***. Upon sending the ***PS_RDY*** Message and receiving the ***GoodCRC*** Message the Initial Source is ready to be the new Sink.	~~Policy Engine stops the ***PSSourceOffTimer.***~~ The Protocol Layer sends the ***GoodCRC*** Message to the new Sink. Policy Engine then stops the ***PSSourceOffTimer*** and tells the Device Policy to instruct the power supply to operate as the new Source. If the ***PS_RDY*** Message is not received before the ***PSSourceOffTimer*** times out the Sink starts sending ***Hard Reset*** Signaling.
7		The CC termination is changed from Rd to Rp (see ***[USB Type-C 2.2]***). The power supply as the new Source transitions from Swap Standby to sourcing default ***vSafe5V*** within ***tNewSrc*** (t3). The power supply informs the Device Policy Manager that it is operating as the new Source.
8	Policy Engine receives the ***PS_RDY*** Message from the Source.	Device Policy Manager informs the Policy Engine the power supply is ready, and the Policy Engine sends the ***PS_RDY*** Message to the new Sink, starting within ***tSrcTransOn*** of the end of the ***GoodCRC*** Message following the first ***PS_RDY*** Message.
9	~~Policy Engine stops the ***PSSourceOnTimer.***~~ Protocol Layer sends the ***GoodCRC*** Message to the new Source and then stops the ***PSSourceOnTimer***. Policy Engine evaluates the ***PS_RDY*** Message from the new Source and tells the Device Policy Manager to instruct the power supply to draw current as the new Sink.	Protocol Layer receives the ***GoodCRC*** Message from the new Sink.
10	The power supply as the new Sink transitions from Swap Standby to drawing the current allowed by the Implicit Contract. The power supply informs the Device Policy Manager that it is operating as the new Sink. At this point subsequent negotiations between the new Source and the new Sink ***May*** proceed as normal. The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. The time duration (t4) depends on the magnitude of the load change (***iLoadStepRate***).	

(ac) Section 7.3.10 Source Requested Power Role Swap, p321

From Text:

7.3.10 Source Requested Power Role Swap

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed during a Source requested Power Role Swap is shown in Figure 7-32 Transition Diagram for a Source Requested Power Role Swap. The sequence that ***Shall*** be followed is described in Table 7-10. The timing parameters that ***Shall*** be followed are listed in Table 7-22. Note in this figure, the Sink has previously sent a ***PR_Swap*** Message to the Source.

Figure 7-32 Transition Diagram for a Source Requested Power Role Swap

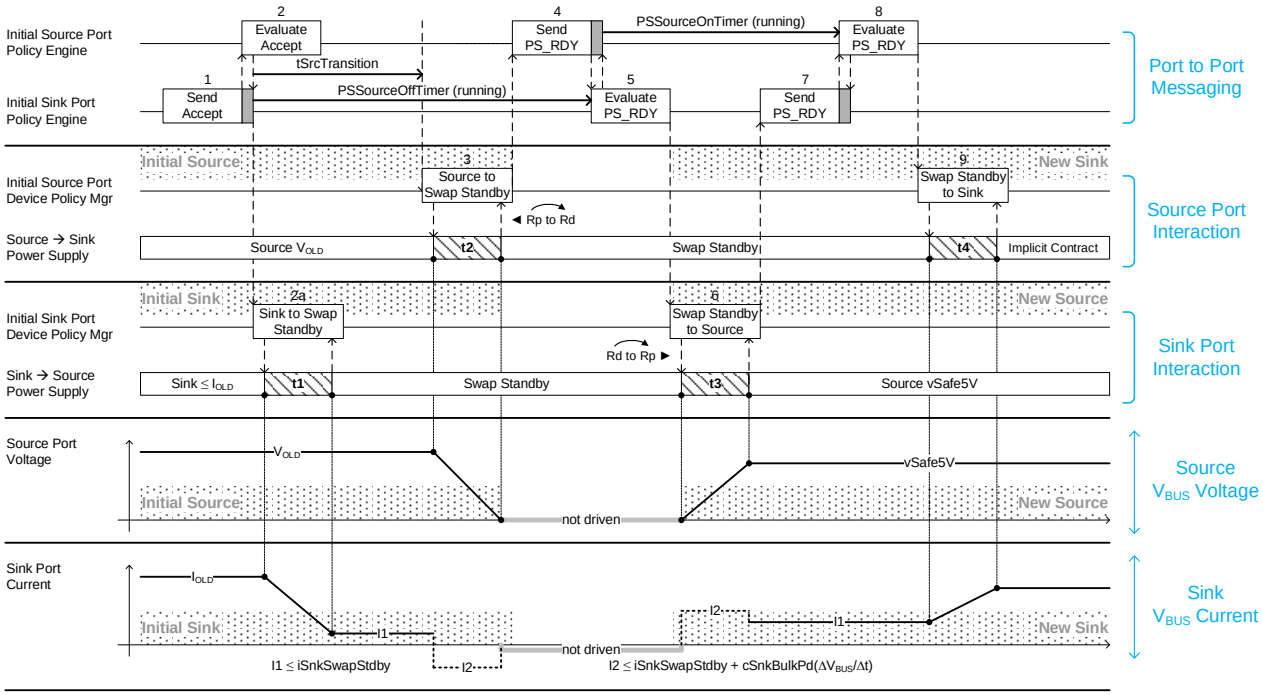


Table 7-10 Sequence Description for a Source Requested Power Role Swap

Step	Initial Source Port→ New Sink Port	Initial Sink Port → New Source Port
1	Policy Engine receives the ***Accept*** Message.	Policy Engine sends the ***Accept*** Message to the Initial Source.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer receives the ***GoodCRC*** Message from the Initial Source. Policy Engine starts the ***PSSourceOffTimer***.
2a		The Policy Engine tells the Device Policy Manager to instruct the power supply to transition to Swap Standby. The power supply ***Shall*** complete the transition to Swap Standby within ***tSnkStdby*** (t1); t1 ***Shall*** complete before ***tSrcTransition***. The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. Policy Engine starts ***PSSourceOffTimer***. When in Sink Standby the Initial Sink ***Shall Not*** draw more than ***iSnkSwapStdby*** (I1).
3	***tSrcTransition*** after the ***GoodCRC*** Message was received the power supply starts to change its output power capability to Swap Standby (see Section 7.1.10). The power supply ***Shall*** complete the transition to Swap Standby within ***tSrcSwapStdby*** (t2). The power supply informs the Device Policy Manager that it is ready to operate as the new Sink. The CC termination is changed from Rp to Rd (see ***[USB Type-C 2.2]***). The power supply status is passed to the Policy Engine.	
4	The Policy Engine sends the ***PS_RDY*** Message to the soon to be new Source.	Policy Engine receives the ***PS_RDY*** Message and stops the ***PSSourceOffTimer***.
5	Protocol Layer receives the ***GoodCRC*** Message from the soon to be new Source. Policy Engine starts the ***PSSourceOnTimer***. At this point the Initial Source is ready to be the new Sink.	Protocol Layer sends the ***GoodCRC*** Message to the new Sink. Upon evaluating the ***PS_RDY*** Message the Initial Sink is ready to operate as the new Source. Policy Engine tells the Device Policy to instruct the power supply to operate as the new Source.

Step	Initial Source Port→ New Sink Port	Initial Sink Port → New Source Port
6		The CC termination is changed from Rd to Rp (see ***[USB Type-C 2.2]***). The power supply as the new Source transitions from Swap Standby to sourcing default ***vSafe5V*** within ***tNewSrc*** (t3). The power supply informs the Device Policy Manager that it is operating as the new Source.
7	Policy Engine receives the ***PS_RDY*** Message and stops the ***PSSourceOnTimer***.	Device Policy Manager informs the Policy Engine the power supply is ready, and the Policy Engine sends the ***PS_RDY*** Message to the new Sink.
8	Protocol Layer sends the ***GoodCRC*** Message to the new Source. Policy Engine evaluates the ***PS_RDY*** Message from the new Source and tells the Device Policy Manager to instruct the power supply to draw current as the new Sink.	Protocol Layer receives the ***GoodCRC*** Message from the new Sink.
9	The power supply as the new Sink transitions from Swap Standby to drawing the power allowed by the Implicit Contract. The power supply informs the Device Policy Manager that it is operating as the new Sink. At this point subsequent negotiations between the new Source and the new Sink ***May*** proceed as normal. The new Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. The time duration (t4) depends on the magnitude of the load change (***iLoadStepRate***).	

To Text:

7.3.2.27~~.3.10~~ Source Requested Power Role Swap

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed during a Source requested Power Role Swap is shown in Figure 7-~~32~~43 Transition Diagram for a Source Requested Power Role Swap. The sequence that ***Shall*** be followed is described in Table 7-~~10~~20 Sequence Description for a Source Requested Power Role Swap. The timing parameters that ***Shall*** be followed are listed in Table 7-22. Note in this figure, the ~~Sink~~Source has previously sent a ***PR_Swap*** Message to the ~~Source~~Sink.

Figure 7-~~32~~43 Transition Diagram for a Source Requested Power Role Swap

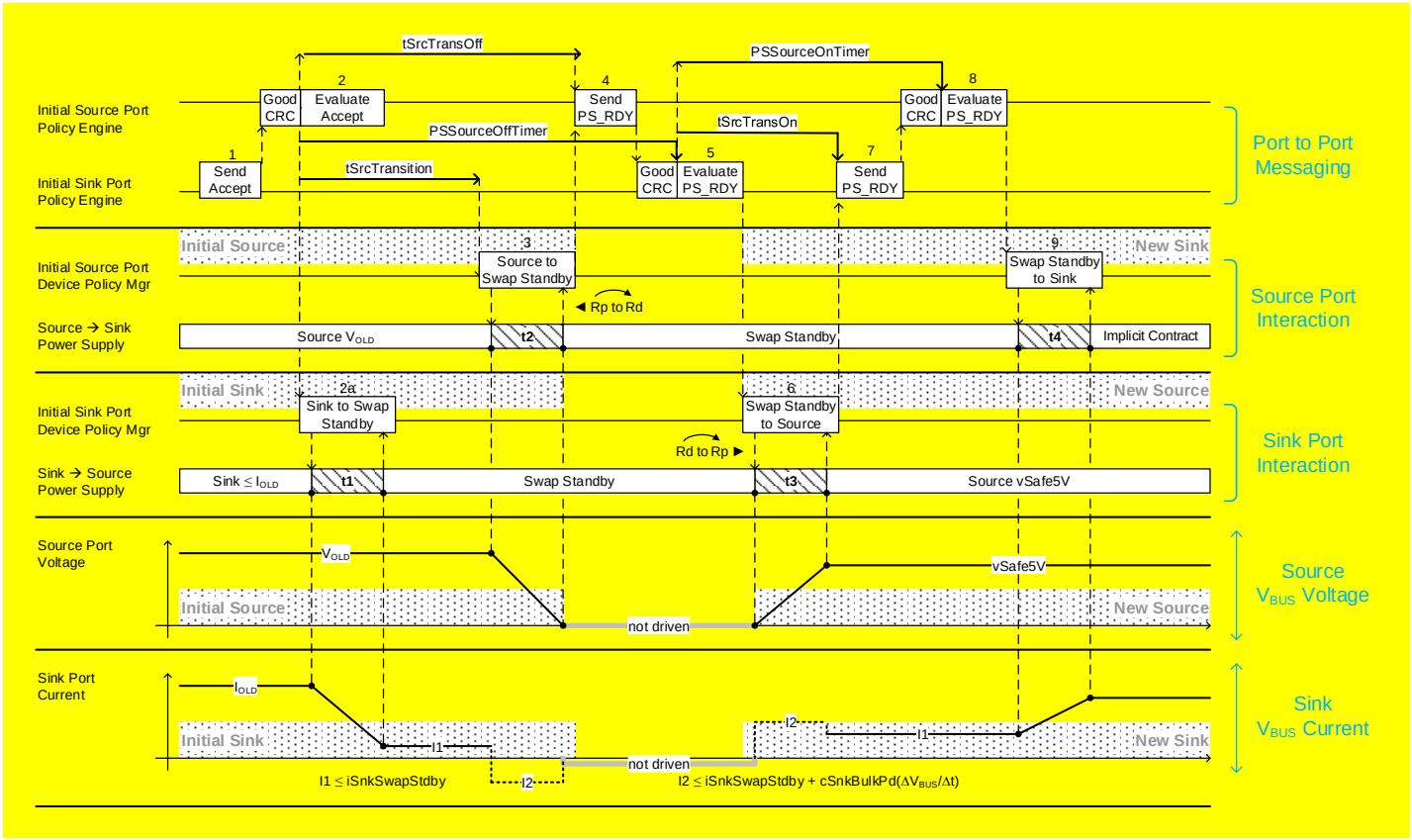


Table 7-~~10~~20 Sequence Description for a Source Requested Power Role Swap

Step	Initial Source Port→ New Sink Port	Initial Sink Port → New Source Port
1	Policy Engine receives the ***Accept*** Message.	Policy Engine sends the ***Accept*** Message to the Initial Source.
2	Protocol Layer ~~receives~~sends the ***GoodCRC*** Message ~~from~~to the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer receives the ***GoodCRC*** Message from the Initial Source. Policy Engine starts the ***PSSourceOffTimer***.
2a		The Policy Engine tells the Device Policy Manager to instruct the power supply to transition to Swap Standby. The power supply ***Shall*** complete the transition to Swap Standby within ***tSnkStdby*** (t1); t1 ***Shall*** complete before ***tSrcTransition***. The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. ~~Policy Engine starts ***PSSourceOffTimer***.~~ When in Sink Standby the Initial Sink ***Shall Not*** draw more than ***iSnkSwapStdby*** (I1).
3	***tSrcTransition*** after the ***GoodCRC*** Message was ~~received~~sent the power supply starts to change its output power capability to Swap Standby (see Section 7.1.10). The power supply ***Shall*** complete the transition to Swap Standby within ***tSrcSwapStdby*** (t2). The power supply informs the Device Policy Manager that it is ready to operate as the new Sink. The CC termination is changed from Rp to Rd (see ***[USB Type-C 2.2]***). The power supply status is passed to the Policy Engine.	
4	The Policy Engine sends the ***PS_RDY*** Message to the ~~soon to be~~ device that will become the new Source, starting within ***tSrcTransOff*** of the end of the ***GoodCRC*** Message following the ***Accept*** Message.	Policy Engine receives the ***PS_RDY*** Message ~~and stops the ***PSSourceOffTimer***~~.

Step	Initial Source Port→ New Sink Port	Initial Sink Port → New Source Port
5	Protocol Layer receives the ***GoodCRC*** Message from the soon to be new Source. Policy Engine starts the ***PSSourceOnTimer***. At this point the Initial Source is ready to be the new Sink.	Protocol Layer sends the ***GoodCRC*** Message to the new Sink. ~~Upon evaluating the ***PS_RDY*** Message the Initial Sink is ready to operate as the new Source.~~ Policy Engine then stops the ***PSSourceOffTimer***. It evaluates the ***PS_RDY*** Message and tells the Device Policy Manager to instruct the power supply to operate as the new Source. If the ***PS_RDY*** Message is not received before the ***PSSourceOffTimer*** times out the Sink starts sending ***Hard Reset*** Signaling.
6		The CC termination is changed from Rd to Rp (see ***[USB Type-C 2.2]***). The power supply as the new Source transitions from Swap Standby to sourcing default ***vSafe5V*** within ***tNewSrc*** (t3). The power supply informs the Device Policy Manager that it is operating as the new Source.
7	Policy Engine receives the ***PS_RDY*** Message ~~and stops the ***PSSourceOnTimer***~~.	Device Policy Manager informs the Policy Engine the power supply is ready, and the Policy Engine sends the ***PS_RDY*** Message to the new Sink, starting within ***tSrcTransOn*** of the end of the ***GoodCRC*** Message following the first ***PS_RDY*** Message.
8	Protocol Layer sends the ***GoodCRC*** Message to the new Source and then stops the ***PSSourceOnTimer***. Policy Engine evaluates the ***PS_RDY*** Message from the new Source and tells the Device Policy Manager to instruct the power supply to draw current as the new Sink.	Protocol Layer receives the ***GoodCRC*** Message from the new Sink.
9	The power supply as the new Sink transitions from Swap Standby to drawing the power allowed by the Implicit Contract. The power supply informs the Device Policy Manager that it is operating as the new Sink. At this point subsequent negotiations between the new Source and the new Sink ***May*** proceed as normal. The new Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level. The time duration (t4) depends on the magnitude of the load change (***iLoadStepRate***).	

(ad) New Section 7.3.3 Transitions caused by Gotomin

New Text:

7.3.3 Transitions Caused by GotoMin

(ae) Section 7.3.11 GotoMin Current Decrease, p324

From Text:

7.3.11 GotoMin Current Decrease

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed during a GotoMin current decrease is shown in Figure 7-33 Transition Diagram for a GotoMin Current Decrease. The sequence that ***Shall*** be followed is described in Table 7-11. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-11.

Figure 7-33 Transition Diagram for a GotoMin Current Decrease

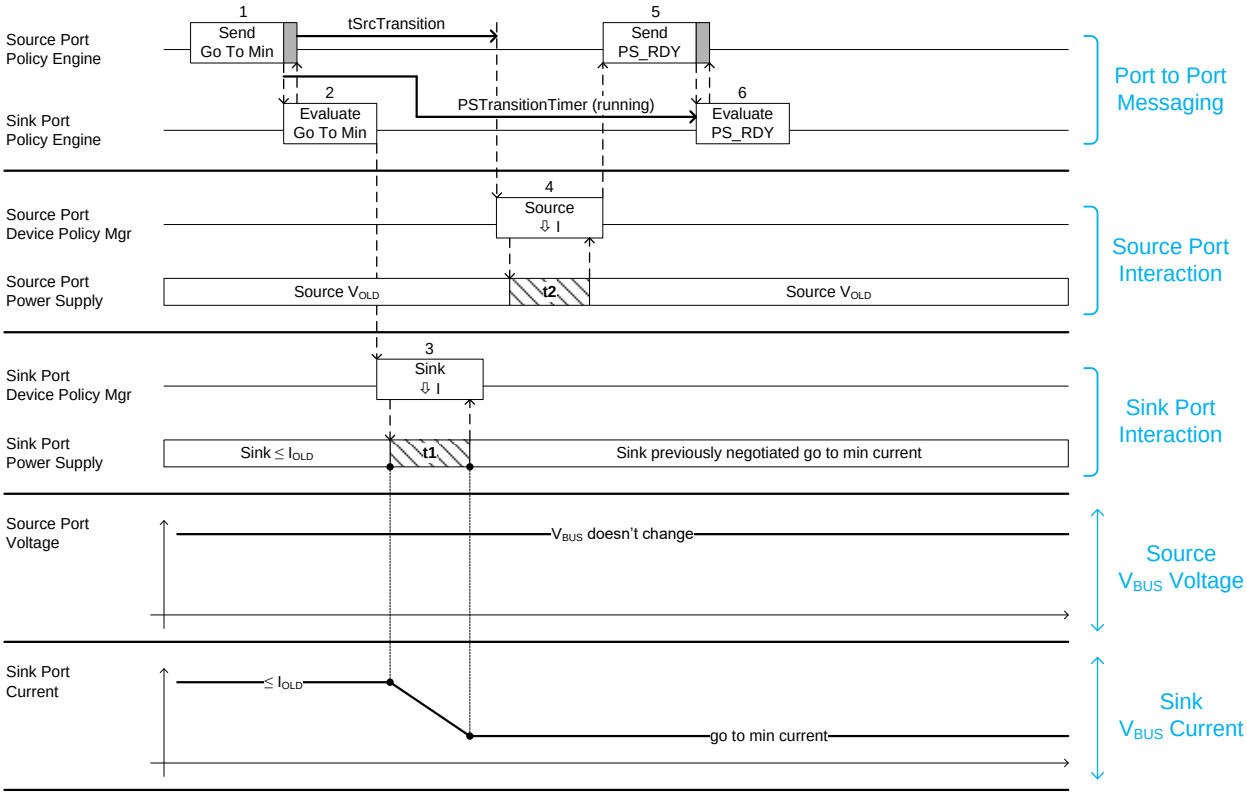


Table 7-11 Sequence Description for a GotoMin Current Decrease

Step	Source Port	Sink Port
1	Policy Engine sends the ***GotoMin*** Message to the Sink.	Policy Engine receives the ***GotoMin*** Message and starts the ***PSTransitionTimer.***
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then evaluates the ***GotoMin*** Message.
3		Policy Engine tells the Device Policy Manager to instruct the power supply to reduce power consumption, within ***tSnkNewPower*** (t1), to the pre-negotiated go to reduced power level); t1 ***Shall*** complete before ***tSrcTransition***. The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.
4	***tSrcTransition*** after the ***GoodCRC*** Message was received the power supply starts to change its output power capability. The power supply ***Shall*** be ready to operate at the new power level within ***tSrcReady*** (t2). The power supply informs the Device Policy Manager that it is ready to operate at the new power level. The power supply status is passed to the Policy Engine.	
5	The Policy Engine sends the ***PS_RDY*** Message to the Sink.	The Policy Engine receives the ***PS_RDY*** Message.
6	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine evaluates the ***PS_RDY*** Message from the Source and no further action is required.

To Text:

7.3.3.17~~7.3.11~~ GotoMin Current Decrease

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed during a GotoMin current decrease is shown in Figure 7-~~3344~~ Transition Diagram for a GotoMin Current Decrease. The sequence that ***Shall*** be followed is described in Table 7-~~11~~21 Sequence Description for a GotoMin Current Decrease. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-11.

Figure 7-33 Transition Diagram for a GotoMin Current Decrease

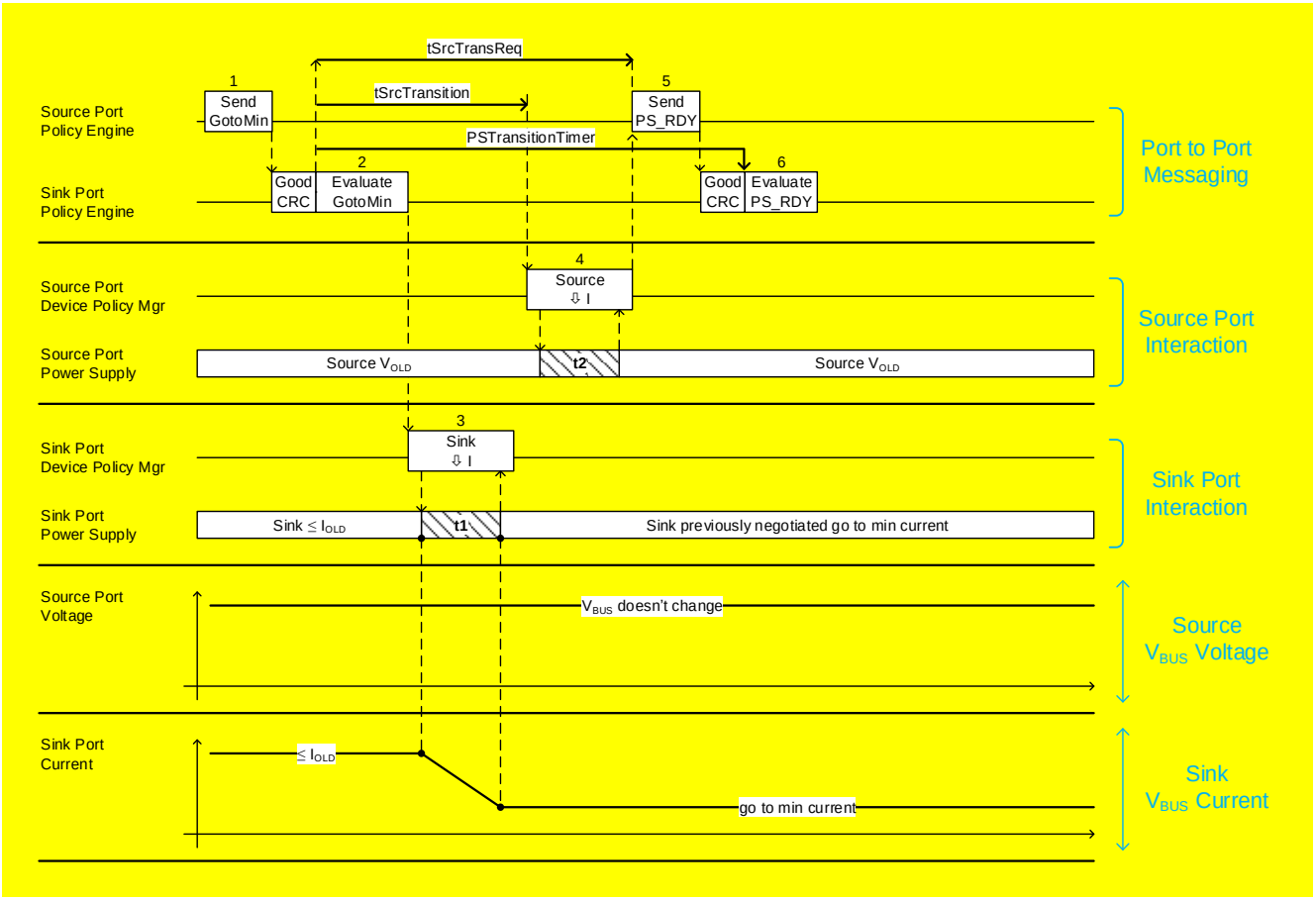


Table 7-11 Sequence Description for a GotoMin Current Decrease

Step	Source Port	Sink Port
1	Policy Engine sends the ***GotoMin*** Message to the Sink.	Policy Engine receives the ***GotoMin*** Message ~~and starts the ***PSTransitionTimer***~~.
2	Protocol Layer receives the ***GoodCRC*** Message from the Sink. The Policy Engine tells the Device Policy Manager to instruct the power supply to modify its output power.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then starts the ***PSTransitionTimer*** and evaluates the ***GotoMin*** Message.
3		Policy Engine tells the Device Policy Manager to instruct the power supply to reduce power consumption, within ***tSnkNewPower*** (t1), to the pre-negotiated go to reduced power level); t1 ***Shall*** complete before ***tSrcTransition*** min. The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.
4	***tSrcTransition*** after the ***GoodCRC*** Message was received the power supply starts to change its output power capability. The power supply ***Shall*** be ready to operate at the new power level within ***tSrcReady*** (t2). The power supply informs the Device Policy Manager that it is ready to operate at the new power level. The power supply status is passed to the Policy Engine.	
5	The Policy Engine sends the ***PS_RDY*** Message to the Sink starting within ***tSrcTransReq*** of the end of the ***GoodCRC*** Message following the ***Accept*** Message.	The Policy Engine receives the ***PS_RDY*** Message.
6	Protocol Layer receives the ***GoodCRC*** Message from the Sink.	Protocol Layer sends the ***GoodCRC*** Message to the Source. Policy Engine then stops the ***PSTransitionTimer***, and evaluates the ***PS_RDY*** Message from the Source and no further action is required. If the ***PS_RDY*** is not received before ***PSTransitionTimer*** times out the Sink starts sending ***Hard Reset*** signaling.

(af) New Section 7.3.4 Transitions caused by Hard Reset

New Text:

7.3.4 Transitions Caused by Hard Reset

(ag) Section 7.3.12 Source Initiated Hard Reset, p326

From Text:

7.3.12 Source Initiated Hard Reset

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed during a Source Initiated Hard Reset is shown in Figure 7-34 Transition Diagram for a Source Initiated Hard Reset. The sequence that ***Shall*** be followed is described in Table 7-12. The timing parameters that ***Shall*** be applied are listed in Table 7-22 and Table 7-23.

Figure 7-34 Transition Diagram for a Source Initiated Hard Reset

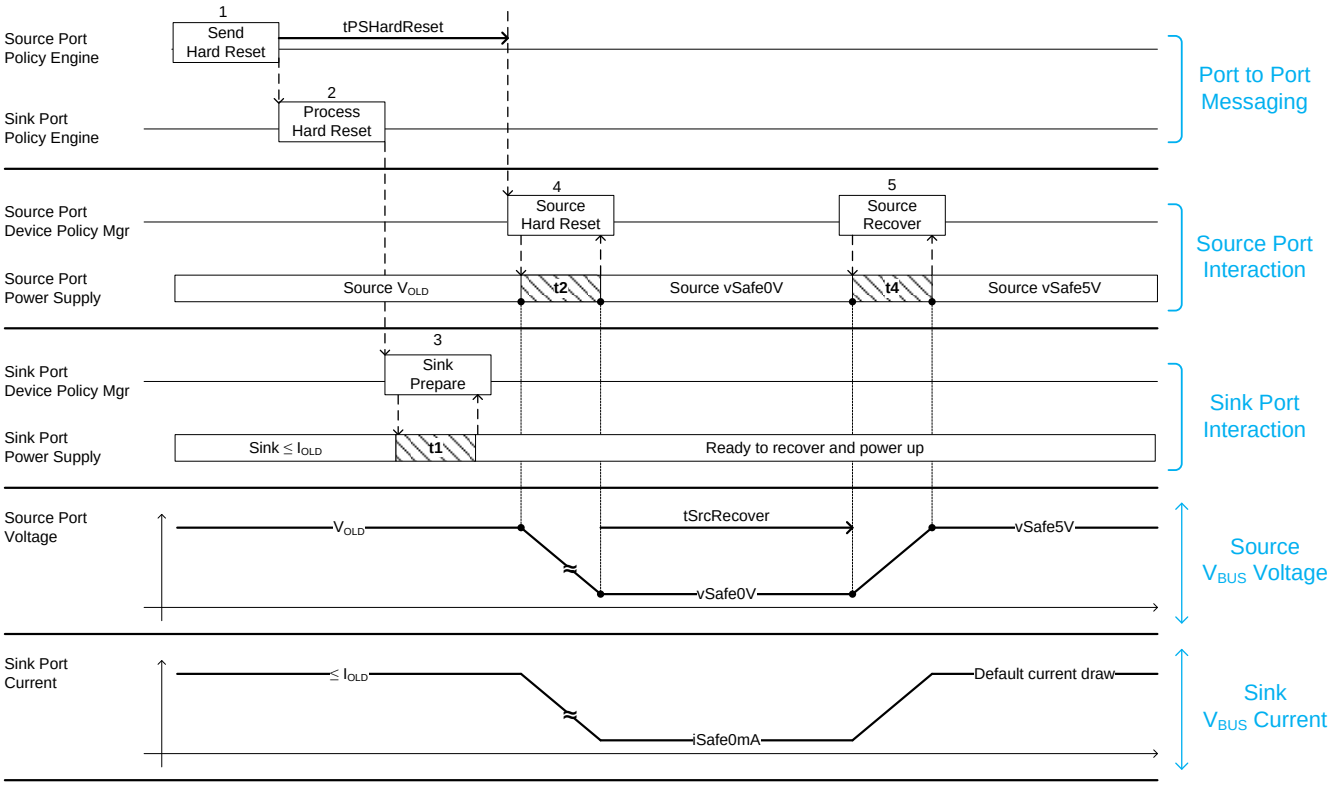


Table 7-12 Sequence Description for a Source Initiated Hard Reset

Step	Source Port	Sink Port
1	Policy Engine sends ***Hard Reset*** Signaling to the Sink.	Sink receives ***Hard Reset*** Signaling.
2		Policy Engine is informed of the Hard Reset. Policy Engine tells the Device Policy Manager to instruct the power supply to prepare for a Hard Reset.
3		The Sink prepares for the Hard Reset within ***tSnkHardResetPrepare*** (t1)) and passes an indication to the Device Policy Manger The Sink ***Shall Not*** draw more than ***iSafe0mA*** when V_{BUS} is driven to ***vSafe0V***.
4	Policy Engine waits ***tPSHardReset*** after sending ***Hard Reset*** Signaling and then tells the Device Policy Manager to instruct the power supply to perform a Hard Reset. The transition to ***vSafe0V*** ***Shall*** occur within ***tSafe0V*** (t2).	
5	After ***tSrcRecover*** the Source applies power to V_{BUS} in an attempt to re-establish communication with the Sink and resume USB Default Operation. The transition to ***vSafe5V*** ***Shall*** occur within ***tSrcTurnOn*** (t4).	The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.

To Text:

7.3.4.1~~7.3.12~~ Source Initiated Hard Reset

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed during a Source Initiated Hard Reset is shown in Figure 7-~~34~~45 Transition Diagram for a Source Initiated Hard Reset. The sequence that ***Shall*** be followed is described in Table 7-~~12~~22 Sequence Description for a Source Initiated Hard Reset. The timing parameters that ***Shall*** be applied are listed in Table 7-22 and Table 7-23.

Figure 7-~~34~~45 Transition Diagram for a Source Initiated Hard Reset

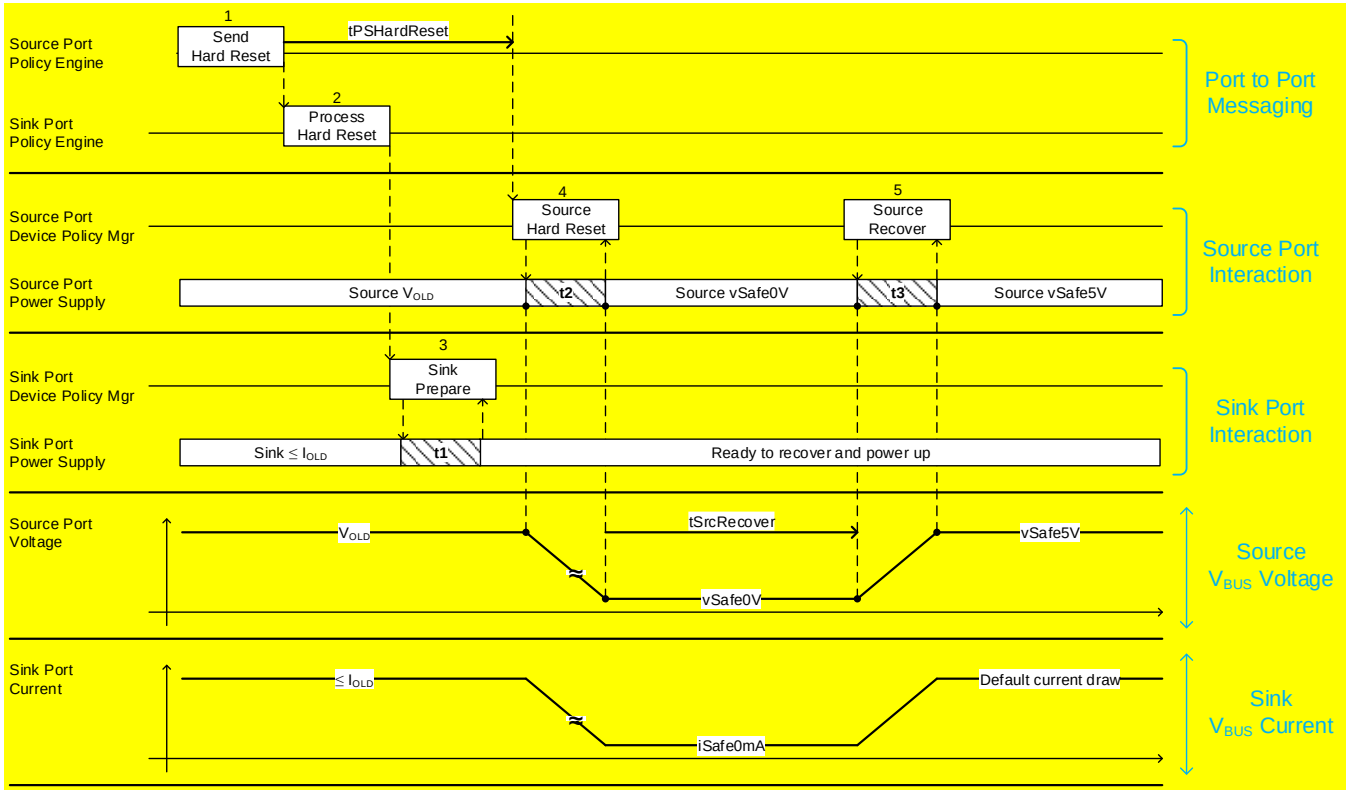


Table 7-~~12~~22 Sequence Description for a Source Initiated Hard Reset

Step	Source Port	Sink Port
1	Policy Engine sends ***Hard Reset*** Signaling to the Sink.	Sink receives ***Hard Reset*** Signaling.
2		Policy Engine is informed of the Hard Reset. Policy Engine tells the Device Policy Manager to instruct the power supply to prepare for a Hard Reset.
3		The Sink prepares for the Hard Reset within ***tSnkHardResetPrepare*** (t1)) and passes an indication to the Device Policy Manger The Sink ***Shall Not*** draw more than ***iSafe0mA*** when V_{BUS} is driven to ***vSafe0V***.
4	Policy Engine waits ***tPSHardReset*** after sending ***Hard Reset*** Signaling and then tells the Device Policy Manager to instruct the power supply to perform a Hard Reset. The transition to ***vSafe0V*** ***Shall*** occur within ***tSafe0V*** (t2).	
5	After ***tSrcRecover*** the Source applies power to V_{BUS} in an attempt to re-establish communication with the Sink and resume USB Default Operation. The transition to ***vSafe5V*** ***Shall*** occur within ***tSrcTurnOn*** (~~t~~4t3).	The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.

USB Power Delivery ENGINEERING CHANGE NOTICE
(ah) Section 7.3.13 Sink Initiated Hard Reset, p328

From Text:

7.3.13 Sink Initiated Hard Reset

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed during a Sink Initiated Hard Reset is shown in Figure 7-~~35~~46 Transition Diagram for a Sink Initiated Hard Reset. The sequence that ***Shall*** be followed is described in Table 7-~~13~~23 Sequence Description for a Sink Initiated Hard Reset. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23.

Figure 7-~~35~~46 Transition Diagram for a Sink Initiated Hard Reset

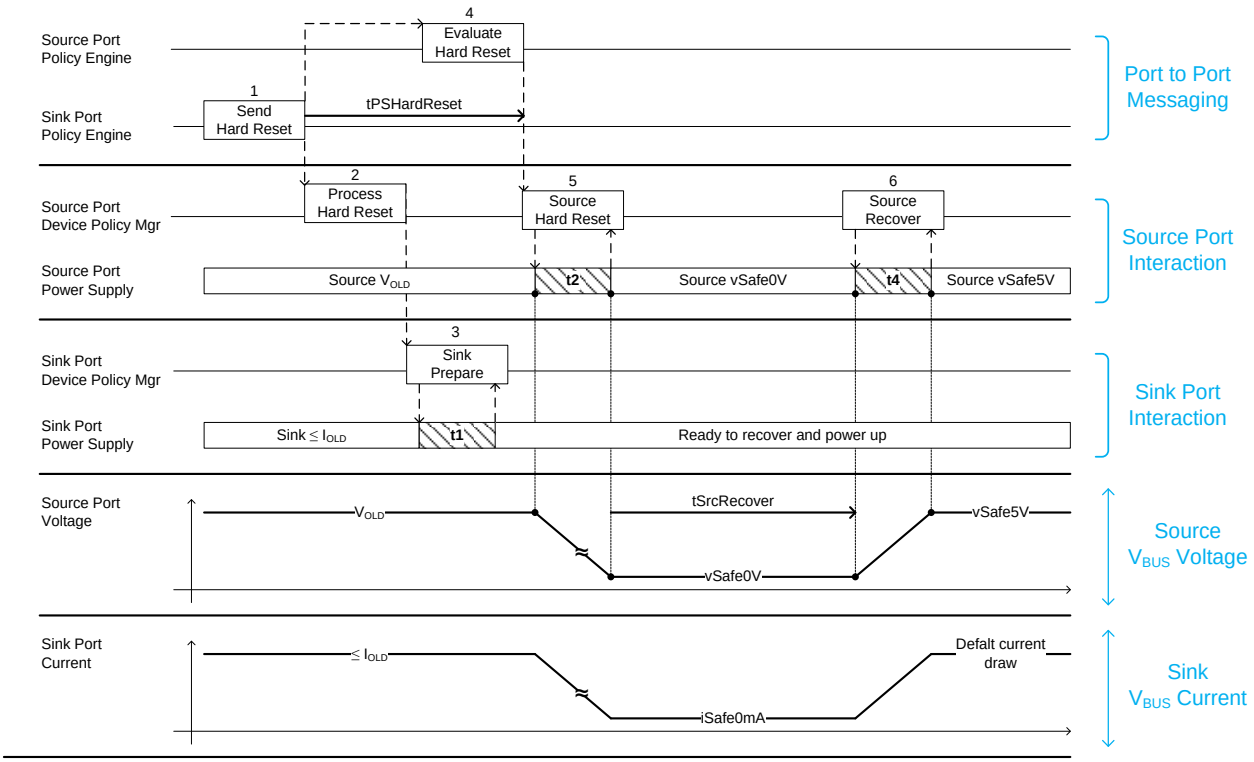


Table 7-~~13~~23 Sequence Description for a Sink Initiated Hard Reset

Step	Source Port	Sink Port
1		Policy Engine sends ***Hard Reset*** Signaling to the Source.
2		Policy Engine tells the Device Policy Manager to instruct the power supply to prepare for a Hard Reset.
3		The Sink prepares for the Hard Reset within ***tSnkHardResetPrepare*** (t1) and passes an indication to the Device Policy Manger. The Sink ***Shall Not*** draw more than ***iSafe0mA*** when V_{BUS} is driven to ***vSafe0V***.
4	Policy Engine is informed of the Hard Reset.	
5	Policy Engine waits ***tPSHardReset*** after receiving ***Hard Reset*** Signaling and then tells the Device Policy Manager to instruct the power supply to perform a Hard Reset. The transition to ***vSafe0V*** ***Shall*** occur within ***tSafe0V*** (t2).	
6	After ***tSrcRecover*** the Source applies power to V_{BUS} in an attempt to re-establish communication with the Sink and resume USB Default Operation. The transition to ***vSafe5V*** ***Shall*** occur within ***tSrcTurnOn*** (t4).	The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.

To Text:

7.3.4.1~~7.3.13~~ Sink Initiated Hard Reset

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed during a Sink Initiated Hard Reset is shown in Figure 7-~~3546~~ Transition Diagram for a Sink Initiated Hard Reset. The sequence that ***Shall*** be followed is described in Table 7-~~13~~23 Sequence Description for a Sink Initiated Hard Reset. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23.

Figure 7-35 Transition Diagram for a Sink Initiated Hard Reset

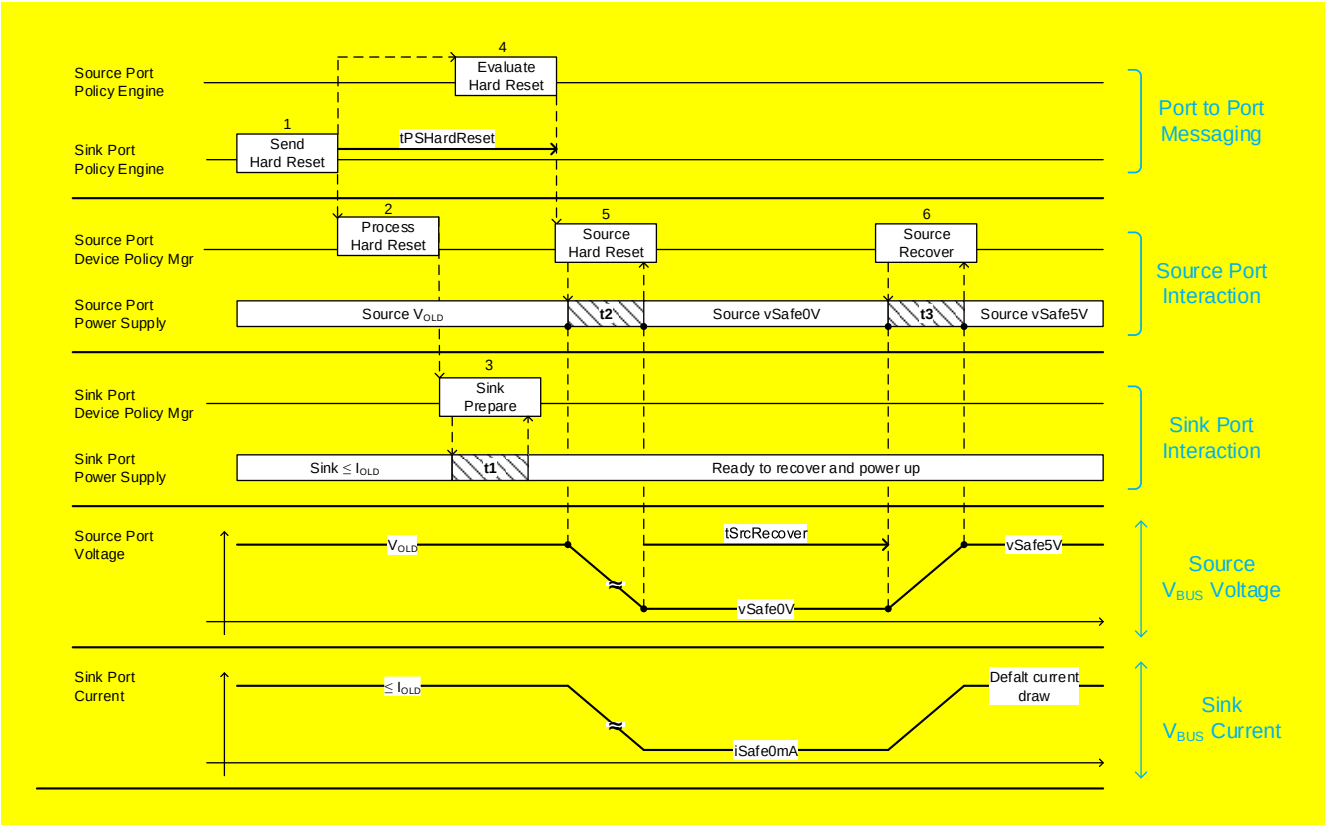


Table 7-~~13~~23 Sequence Description for a Sink Initiated Hard Reset

Step	Source Port	Sink Port
1		Policy Engine sends ***Hard Reset*** Signaling to the Source.
2		Policy Engine tells the Device Policy Manager to instruct the power supply to prepare for a Hard Reset.
3		The Sink prepares for the Hard Reset within ***tSnkHardResetPrepare*** (t1) and passes an indication to the Device Policy Manger. The Sink ***Shall Not*** draw more than ***iSafe0mA*** when V_{BUS} is driven to ***vSafe0V***.
4	Policy Engine is informed of the Hard Reset.	
5	Policy Engine waits ***tPSHardReset*** after receiving ***Hard Reset*** Signaling and then tells the Device Policy Manager to instruct the power supply to perform a Hard Reset. The transition to ***vSafe0V*** ***Shall*** occur within ***tSafe0V*** (t2).	
6	After ***tSrcRecover*** the Source applies power to V_{BUS} in an attempt to re-establish communication with the Sink and resume USB Default Operation. The transition to ***vSafe5V*** ***Shall*** occur within ***tSrcTurnOn*** (t~~4~~3).	The Sink ***Shall Not*** violate the transient load behavior defined in Section 7.2.6 while transitioning to and operating at the new power level.

(ai) New Section 7.3.5 Transitions caused by Fast Role Swap

New Text:

7.3.5 Transitions Caused by Fast Role Swap

(aj) Section 7.3.15 Fast Role Swap, p332

From Text:

7.3.15 Fast Role Swap

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed during a Fast Role Swap is shown in Figure 7-37 Transition Diagram for Fast Role Swap. The parallel sequences that ***Shall*** be followed are described in Table 7-15. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Negotiations between the new Source and the new Sink ***May*** occur after the new Source sends the final ***PS_RDY*** Message. Note: in Figure 7-37 Transition Diagram for Fast Role Swap. and Table 7-15 numbers are used to indicate Message related steps and letters are used to indicate other events.

Figure 7-37 Transition Diagram for Fast Role Swap

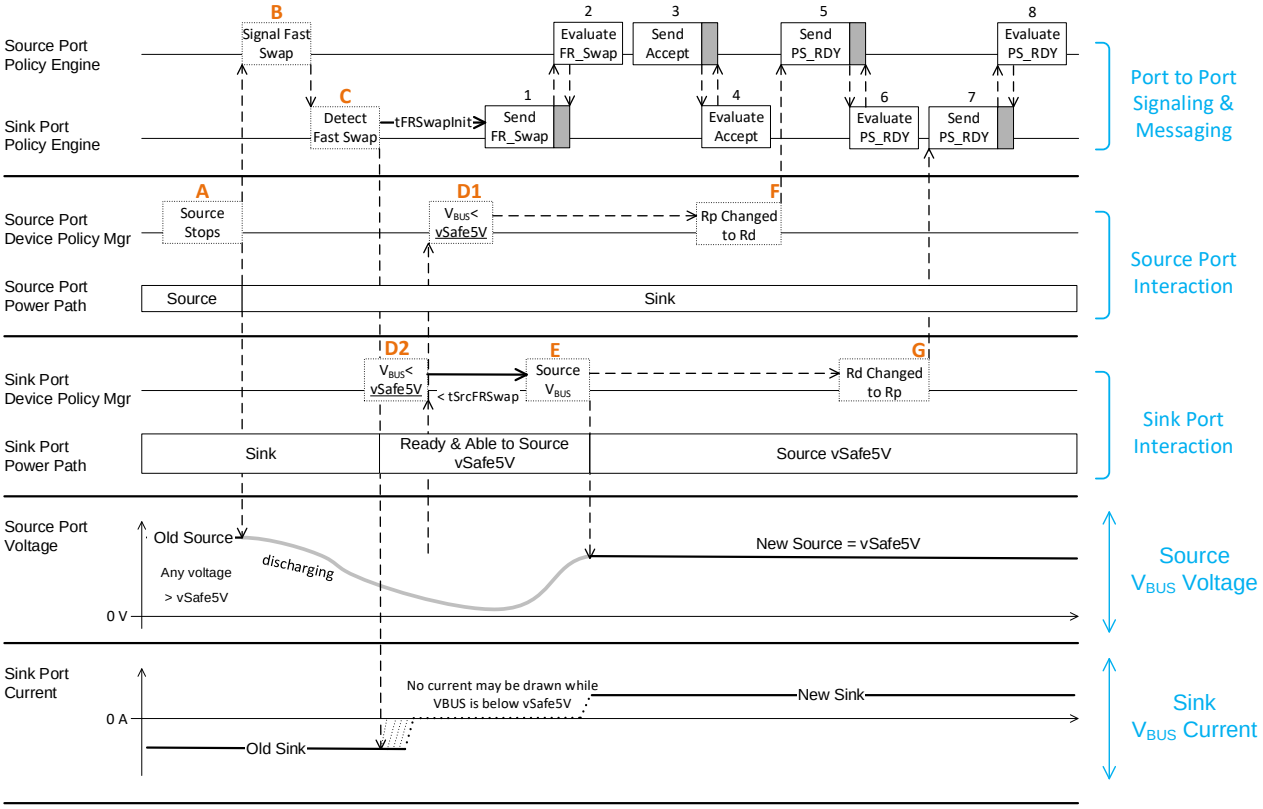


Table 7-15 Sequence Description for Fast Role Swap

Step	Initial Source Port→ New Sink Port	Initial Sink Port → New Source Port
Fast Role Swap Signaling and Power Transition		
A	The Source connected to the Hub UFP (see Figure 7-14) stops sourcing V_{BUS}.	
B	Policy Engine signals the Fast Role Swap to the initial Sink on the CC wire. When V_{BUS} < ***vSafe5V*** (min), it tells the Device Policy Manager not to draw more than ***pSnkStdby*** until the ***tSnkFRSwap*** timer has elapsed.	
C		Policy Engine detects the Fast Role swap signal on the CC wire from the initial Source and ***Shall*** send the ***FR_Swap*** Message back to the initial Source (that is no longer powering V_{BUS}) within time ***tFRSwapInit***.

Step	Initial Source Port→ New Sink Port	Initial Sink Port → New Source Port
D1	The Policy engine monitors for V_{BUS} ≤ ***vSafe5V*** so that a ***PS_RDY*** Message can be sent to the new Source at Step 5 of the messaging sequence.	
D2		The Policy engine monitors for V_{BUS} ≤ ***vSafe5V*** so the initial Sink can assume the role of new Source and begin to source V_{BUS}.
E		When V_{BUS} = ***vSafe5V*** the new Source ***May*** provide power to V_{BUS}. When V_{BUS} < ***vSafe5V*** the new Source ***Shall*** provide power to V_{BUS} within ***tSrcFRSwap***. Once the new Source is providing power, the ***PS_RDY*** Message can be sent to the new Sink at Step 7 of the messaging sequence.
F	The CC termination is changed from Rp to Rd (see ***[USB Type-C 2.2]***) before the new Sink sends the ***PS_RDY*** Message of Step 5 to the new Source.	
G		The CC termination is changed from Rd to Rp (see ***[USB Type-C 2.2]***) before the new Source sends the ***PS_RDY*** Message of Step 7 to the new Sink.
Fast Role Swap Message Sequence		
1	Policy Engine receives the ***FR_Swap*** Message from the initial Sink that is transitioning to be the new Source.	Policy Engine sends the ***FR_Swap*** Message to the initial Source (that is no longer powering V_{BUS}) after detecting the Fast Role Swap signal of Step C.
2	Protocol Layer sends the ***GoodCRC*** Message to the initial Sink. Policy Engine then evaluates the ***FR_Swap*** Message.	Protocol Layer receives the ***GoodCRC*** Message from the initial Source.
3	Policy Engine sends an ***Accept*** Message to the initial Sink that is transitioning to be the new Source.	Policy Engine receives the ***Accept*** Message from the initial Source that is transitioning to be the new Sink.
4	Protocol Layer receives the ***GoodCRC*** Message from the initial Sink that is transitioning to be the new Source.	Protocol Layer sends the ***GoodCRC*** Message to the initial Source that is transitioning to be the new Sink.
5	Policy Engine sends a ***PS_RDY*** Message to the initial Sink that is transitioning to be the new Source. The Policy Engine ***Shall*** start the ***PS_RDY*** Message at least ***tFRSwap5V*** after it has sent the ***Accept*** Message, and when Step D1 has also been completed.	Policy Engine receives the ***PS_RDY*** Message from the new Sink.
6	Protocol Layer receives the ***GoodCRC*** Message from the new Source.	Protocol Layer sends the ***GoodCRC*** Message from the initial Sink that has completed the transition to new Source. Policy Engine then evaluates the ***PS_RDY*** Message.
7	Policy Engine receives the ***PS_RDY*** Message from the new Source.	Policy Engine sends a ***PS_RDY*** Message to the new Sink. The Policy Engine ***Shall*** wait for Step E before sending the ***PS_RDY*** Message, and ***Shall*** send the ***PS_RDY*** Message within ***tFRSwapComplete*** of receiving the ***PS_RDY*** Message from the Initial Source Port.

To Text:

7.3.5.17~~7.3.15~~ Fast Role Swap

The interaction of the System Policy, Device Policy, and power supply that ***Shall*** be followed during a Fast Role Swap is shown in Figure 7-~~37~~47 Transition Diagram for Fast Role Swap. The parallel sequences that ***Shall*** be followed are described in Table 7-~~15~~24 Sequence Description for Fast Role Swap. The timing parameters that ***Shall*** be followed are listed in Table 7-22 and Table 7-23. Negotiations between the new Source and the new Sink ***May*** occur after the new Source sends the final ***PS_RDY*** Message. Note: in Figure 7-37 Transition Diagram for Fast Role Swap. and Table 7-15 numbers are used to indicate Message related steps and letters are used to indicate other events.

Figure 7-37 Transition Diagram for Fast Role Swap

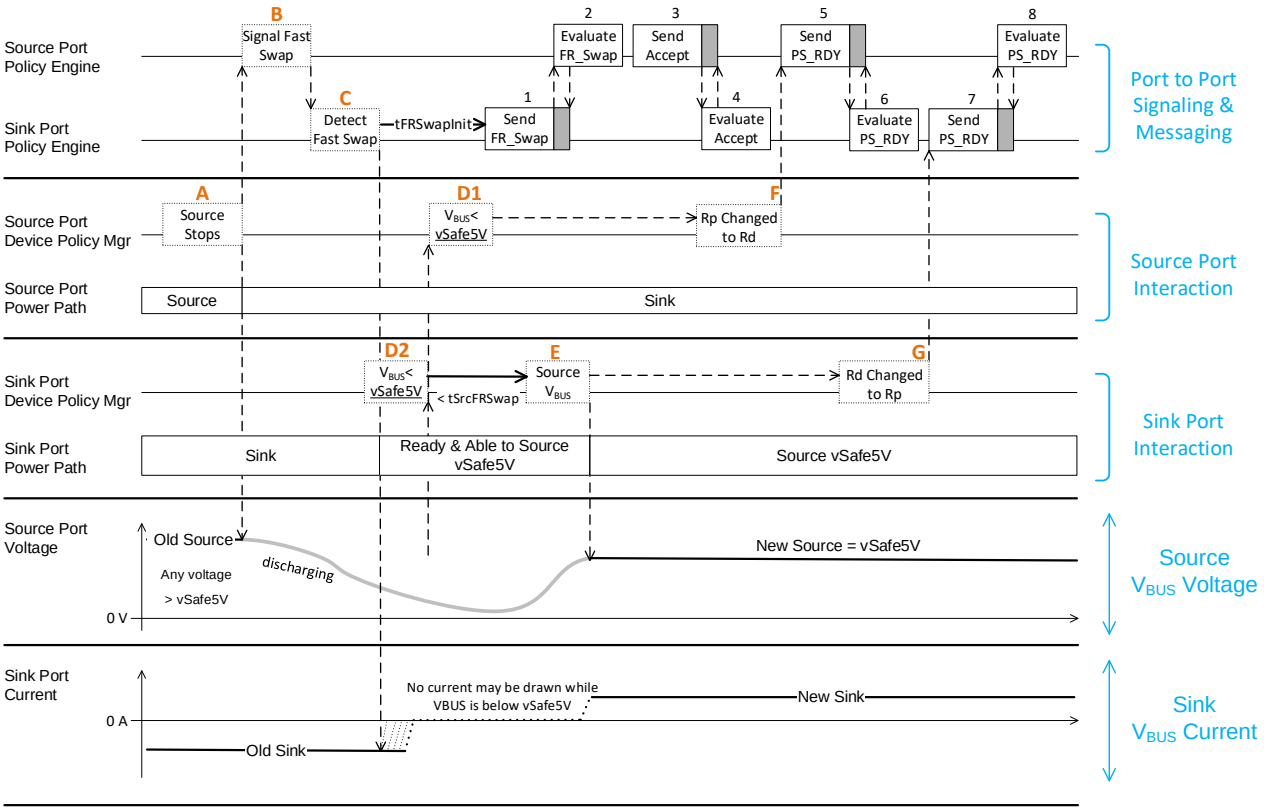


Table 7-~~1524~~ Sequence Description for Fast Role Swap

Step	Initial Source Port→ New Sink Port	Initial Sink Port → New Source Port
Fast Role Swap Signaling and Power Transition		
A	The Source connected to the Hub UFP (see Figure 7-14) stops sourcing V_{BUS}.	
B	Policy Engine signals the Fast Role Swap to the initial Sink on the CC wire. When V_{BUS} < ***vSafe5V*** (min), it tells the Device Policy Manager not to draw more than ~~***pSnkStdby***~~***iSnkStdby*** until the ***tSnkFRSwap*** timer has elapsed.	
C		Policy Engine detects the Fast Role swap signal on the CC wire from the initial Source and ***Shall*** send the ***FR_Swap*** Message back to the initial Source (that is no longer powering V_{BUS}) within time ***tFRSwapInit***.
D1	The Policy engine monitors for V_{BUS} ≤ ***vSafe5V*** so that a ***PS_RDY*** Message can be sent to the new Source at Step 5 of the messaging sequence.	
D2		The Policy engine monitors for V_{BUS} ≤ ***vSafe5V*** so the initial Sink can assume the role of new Source and begin to source V_{BUS}.
E		When V_{BUS} = ***vSafe5V*** the new Source ***May*** provide power to V_{BUS}. When V_{BUS} < ***vSafe5V*** the new Source ***Shall*** provide power to V_{BUS} within ***tSrcFRSwap***. Once the new Source is providing power, the ***PS_RDY*** Message can be sent to the new Sink at Step 7 of the messaging sequence.
F	The CC termination is changed from Rp to Rd (see ***[USB Type-C 2.2]***) before the new Sink sends the ***PS_RDY*** Message of Step 5 to the new Source.	
G		The CC termination is changed from Rd to Rp (see ***[USB Type-C 2.2]***) before the new Source sends the ***PS_RDY*** Message of Step 7 to the new Sink.

Step	Initial Source Port→ New Sink Port	Initial Sink Port → New Source Port
Fast Role Swap Message Sequence		
1	Policy Engine receives the ***FR_Swap*** Message from the initial Sink that is transitioning to be the new Source.	Policy Engine sends the ***FR_Swap*** Message to the initial Source (that is no longer powering V_{BUS}) after detecting the Fast Role Swap signal of Step C.
2	Protocol Layer sends the ***GoodCRC*** Message to the initial Sink. Policy Engine then evaluates the ***FR_Swap*** Message.	Protocol Layer receives the ***GoodCRC*** Message from the initial Source.
3	Policy Engine sends an ***Accept*** Message to the initial Sink that is transitioning to be the new Source.	Policy Engine receives the ***Accept*** Message from the initial Source that is transitioning to be the new Sink.
4	Protocol Layer receives the ***GoodCRC*** Message from the initial Sink that is transitioning to be the new Source.	Protocol Layer sends the ***GoodCRC*** Message to the initial Source that is transitioning to be the new Sink.
5	Policy Engine sends a ***PS_RDY*** Message to the initial Sink that is transitioning to be the new Source. The Policy Engine ***Shall*** start the ***PS_RDY*** Message at least ***tFRSwap5V*** after it has sent the ***Accept*** Message, and when Step D1 has also been completed.	Policy Engine receives the ***PS_RDY*** Message from the new Sink.
6	Protocol Layer receives the ***GoodCRC*** Message from the new Source.	Protocol Layer sends the ***GoodCRC*** Message from the initial Sink that has completed the transition to new Source. Policy Engine then evaluates the ***PS_RDY*** Message.
7	Policy Engine receives the ***PS_RDY*** Message from the new Source.	Policy Engine sends a ***PS_RDY*** Message to the new Sink. The Policy Engine ***Shall*** wait for Step E before sending the ***PS_RDY*** Message, and ***Shall*** send the ***PS_RDY*** Message within ***tFRSwapComplete*** of receiving the ***PS_RDY*** Message from the Initial Source Port.

(ak) Section 7.4.1, Table 7-24 Source Electrical Parameters, P352

From Text:

Parameter	Description	MIN	TYP	MAX	UNITS	Reference
tSrcTransition	The time the Source ***Shall*** wait before transitioning the power supply to ensure that the Sink has sufficient time to prepare.	25		35	ms	Section 7.3

To Text:

Parameter	Description	MIN	TYP	MAX	UNITS	Reference
tSrcTransition	The time the Source ***Shall*** wait before transitioning the power supply to ensure that the Sink has sufficient time to prepare (does not apply to transitions within the same PPS or AVS APDO).	25		35	ms	Section 7.3

(al) Section 7.4.1, Table 7-24 Source Electrical Parameters, P352

New Text:

Parameter		Description	MIN	TYP	MAX	UNITS	Reference
tSrcTransOff	SPR Mode	Time from the last bit of the ***GoodCRC*** Message acknowledging the ***Accept*** Message in response to the ***PR_Swap*** Message until the ***PS_RDY*** Message must be started. Applies only to SPR mode voltage transitions.			690	ms	Figure 7-2…
tSrcTransOn		Time from the last bit of the ***GoodCRC*** Message acknowledging the ***PS_RDY*** Message sent by the new Source, in response to the ***PR_Swap*** Message until the ***PS_RDY*** Message must be started.			280	ms	
tSrcTransReq	SPR Mode	Time from the last bit of the ***GoodCRC*** Message acknowledging the ***Accept*** Message in response to the Request Message until ***PS_RDY*** must be started. Applies only to SPR mode voltage transitions.			325	ms	
	EPR Mode	Time from the last bit of the ***GoodCRC*** Message acknowledging the ***Accept*** Message in response to the Request Message until ***PS_RDY*** must be started. Applies to EPR mode voltage transitions and any voltage transition that either begins or ends in EPR mode.			760	ms	
vSmallStep		V_{BUS} step size increase defined as a small step relative to the previous V_{BUS} when Requesting a different (A)PDO.			500	mV	Section 7.1.4.3.1

(am) Section 7.4.2, Table 7-25 Sink Electrical Parameters, P355

From Text:

Parameter	Description	MIN	TYP	MAX	UNITS	Reference
cSnkBulk[1]	Sink bulk capacitance on V_{BUS} at Attach and during FRS after the old Source stops sourcing and prior to establishing an Explicit Contract (see Appendix E for an example).	1		10	µF	Section 7.2.2
cSnkBulkPd[1]	Bulk capacitance on V_{BUS} a Sink is allowed after a successful negotiation.	1		100	µF	Section 7.2.2
iLoadReleaseRate	Load release di/dt.	-150			mA/µs	Section 7.2.6
iLoadStepRate	Load step di/dt.			150	mA/µs	Section 7.2.6

Parameter	Description	MIN	TYP	MAX	UNITS	Reference
iNewFrsSink	Maximum current the new Sink can draw during a Fast Role Swap until the new Source applies Rp. Matches the required USB Type-C® Current field of the Fixed Supply PDO of the old Source's ***Sink_Capabilities*** Message.			Default USB current or 1.5 or 3.0	A	Section7.1.13
iOvershoot	Positive or negative overshoot when a load change occurs less than or equal to ***iLoadStepRate***; relative to the settled value after the load change.	-230		230	mA	Section 7.2.6
iPpsCLLoadRelease	Maximum load release decrease during Current Limit.	-500			mA	Section 7.2.3.1
iPpsCLLoadReleaseRate	Maximum load decrease slew rate during Current Limit.	-150			mA/µs	Section 7.2.3.1
iPpsCLLoadStep	Maximum load step increase during Current Limit.			500	mA	Section 7.2.3.1
iPpsCLLoadStepRate	Maximum load increase slew rate during Current Limit.			150	mA/µs	Section 7.2.3.1
iSafe0mA	Maximum current a Sink is allowed to draw when V_{BUS} is driven to ***vSafe0V***.			1.0	mA	Figure 7-31 Figure 7-32
iSnkSwapStdby	Maximum current a Sink can draw during Swap Standby. Ideally this current is very near to 0 mA largely influenced by Port leakage current.			2.5	mA	Section 7.2.7
pHubSusp	Suspend power consumption for a hub. 25mW + 25mW per downstream Port for up to 4 ports.			125	mW	Section 7.2.3
pSnkStdby	Maximum power consumption while in Sink Standby.			2.5	W	Section 7.2.3
pSnkSusp	Suspend power consumption for a peripheral device.			25	mW	Section 7.2.3
tNewSrc	Maximum time allowed for an initial Sink in Swap Standby to transition to new Source operation.			275	ms	Section 7.2.7 Table 7-9 Table 7-10
tSnkFRSwap	Time during a Fast Role Swap when the new Sink can draw no more than ***pSnkStdby***.			200	µs	Section 7.1.13
tSnkHardResetPrepare	Time allotted for the Sink power electronics to prepare for a Hard Reset.			15	ms	Table 7-13
tSnkNewPower	Maximum transition time between power levels.			15	ms	Section 7.2.3
tSnkRecover	Time for the Sink to resume USB Default Operation.			150	ms	Table 7-12
tSnkStdby	Time to transition to Sink Standby from Sink.			15	ms	Section 7.2.3
tSnkSwapStdby	Maximum time for the Sink to transition to Swap Standby.			15	ms	Section 7.2.7
vEprMax	Highest Voltage an EPR Sink is expected to tolerate			55	V	

Parameter	Description	MIN	TYP	MAX	UNITS	Reference
vSprMax	Highest Voltage an SPR Sink is expected to tolerate			24	V	

Note 1: If more bypass capacitance than ***cSnkBulk*** max or ***cSnkBulkPd*** max is required in the device, then the device ***Shall*** incorporate some form of V_{BUS} surge current limiting as described in ***[USB 3.2]*** Section 11.4.4.1.

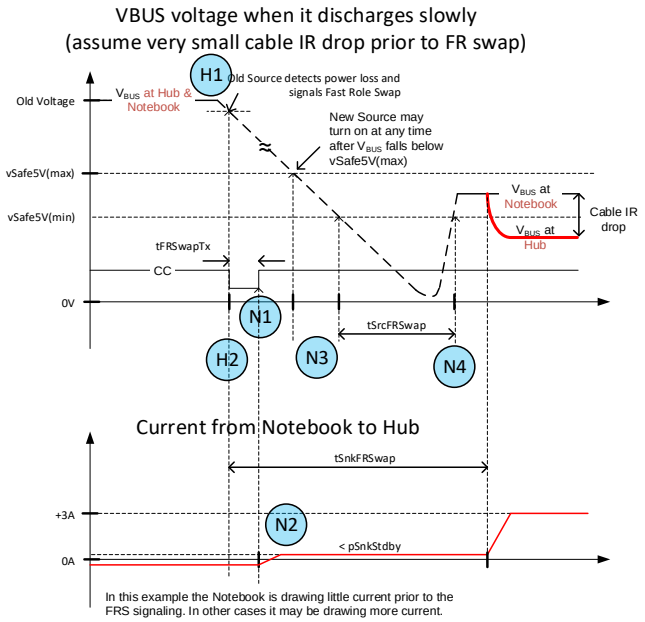
To Text:

Parameter	Description	MIN	TYP	MAX	UNITS	Reference
cSnkBulk[1]	Sink bulk capacitance on V_{BUS} at Attach and during FRS after the old Source stops sourcing and prior to establishing an Explicit Contract (see Appendix E for an example).	1		10	µF	Section 7.2.2
cSnkBulkPd[1]	Bulk capacitance on V_{BUS} a Sink is allowed after a successful negotiation.	1		100	µF	Section 7.2.2
iLoadReleaseRate	Load release di/dt.	-150			mA/µs	Section 7.2.6
iLoadStepRate	Load step di/dt.			150	mA/µs	Section 7.2.6
iNewFrsSink	Maximum current the new Sink can draw during a Fast Role Swap until the new Source applies Rp. Matches the required USB Type-C® Current field of the Fixed Supply PDO of the old Source's ***Sink_Capabilities*** Message.			Default USB current or 1.5 or 3.0	A	Section7.1.13
iOvershoot	Positive or negative overshoot when a load change occurs less than or equal to ***iLoadStepRate***; relative to the settled value after the load change.	-230		230	mA	Section 7.2.6
iPpsCLLoadRelease	Maximum load release decrease during Current Limit.	-500			mA	Section 7.2.3.1
iPpsCLLoadReleaseRate	Maximum load decrease slew rate during Current Limit.	-150			mA/µs	Section 7.2.3.1
iPpsCLLoadStep	Maximum load step increase during Current Limit.			500	mA	Section 7.2.3.1
iPpsCLLoadStepRate	Maximum load increase slew rate during Current Limit.			150	mA/µs	Section 7.2.3.1
iSafe0mA	Maximum current a Sink is allowed to draw when V_{BUS} is driven to ***vSafe0V***.			1.0	mA	Figure 7-31 Figure 7-32
iSnkStdby	Maximum current during voltage transition.			500	mA	Section 7.2.3
iSnkSwapStdby	Maximum current a Sink can draw during Swap Standby. Ideally this current is very near to 0 mA largely influenced by Port leakage current.			2.5	mA	Section 7.2.7
pHubSusp	Suspend power consumption for a hub. 25mW + 25mW per downstream Port for up to 4 ports.			125	mW	Section 7.2.3

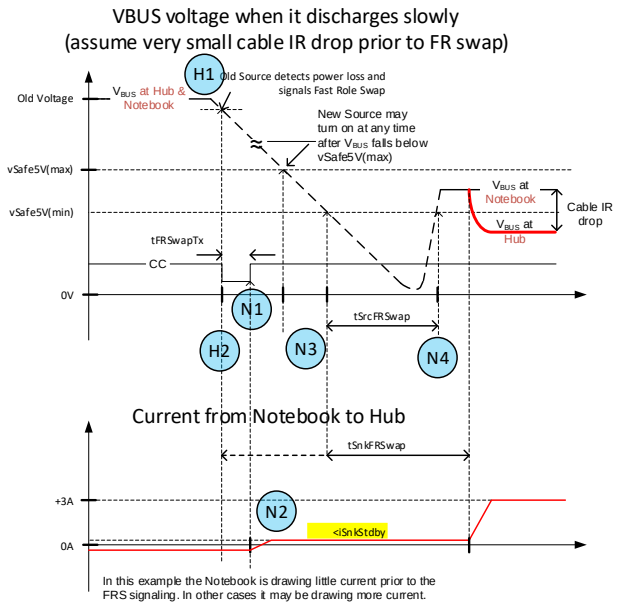
Parameter	Description	MIN	TYP	MAX	UNITS	Reference
~~*pSnkStdby*~~	~~Maximum power consumption while in Sink Standby.~~			~~2.5~~	~~W~~	~~Section 7.2.3~~
pSnkSusp	Suspend power consumption for a peripheral device.			25	mW	Section 7.2.3
tNewSrc	Maximum time allowed for an initial Sink in Swap Standby to transition to new Source operation.			275	ms	Section 7.2.7 Table 7-9 Table 7-10
tSnkFRSwap	Time during a Fast Role Swap when the new Sink can draw no more than ~~*pSnkStdby*~~*iSnkStdby*.			200	µs	Section 7.1.13
tSnkHardResetPrepare	Time allotted for the Sink power electronics to prepare for a Hard Reset.			15	ms	Table 7-13
tSnkNewPower	Maximum transition time between power levels.			15	ms	Section 7.2.3
tSnkRecover	Time for the Sink to resume USB Default Operation.			150	ms	Table 7-12
tSnkStdby	Time to transition to Sink Standby from Sink.			15	ms	Section 7.2.3
tSnkSwapStdby	Maximum time for the Sink to transition to Swap Standby.			15	ms	Section 7.2.7
vEprMax	Highest Voltage an EPR Sink is expected to tolerate			55	V	
vSprMax	Highest Voltage an SPR Sink is expected to tolerate			24	V	
Note 1: If more bypass capacitance than *cSnkBulk* max or *cSnkBulkPd* max is required in the device, then the device ***Shall*** incorporate some form of V_{BUS} surge current limiting as described in *[USB 3.2]* Section 11.4.4.1.						

(an). Figure E.2, P863

From Text:

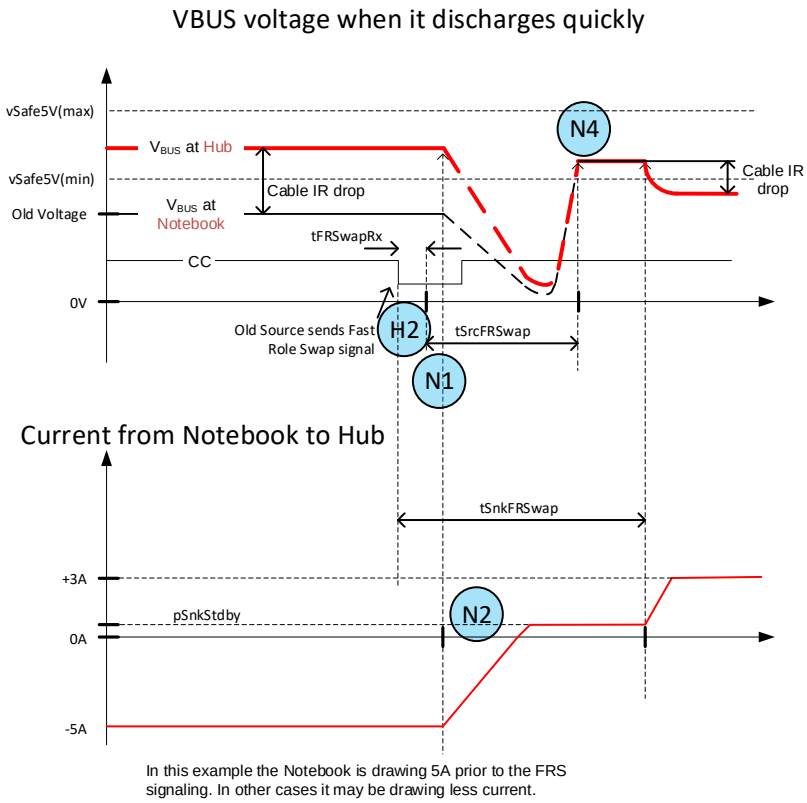


To Text:



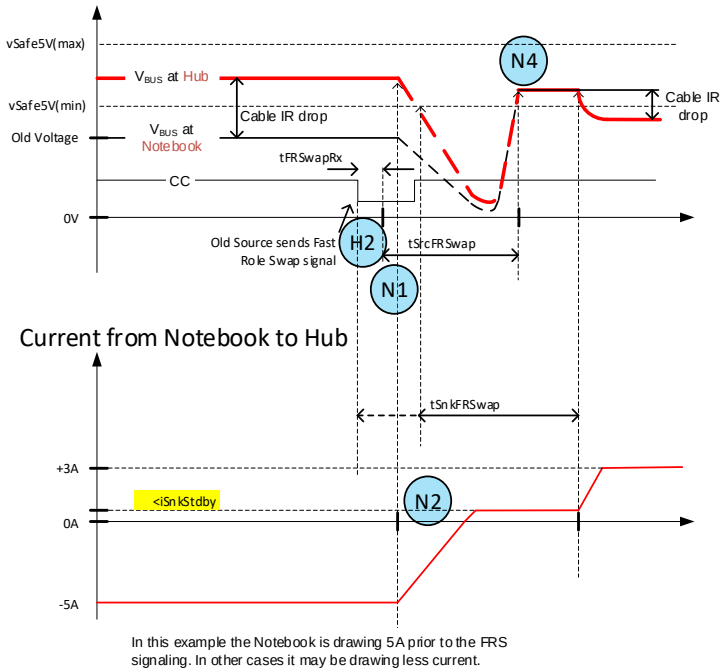
(ao). Figure E.3, P864

From Text:



To Text:

VBUS voltage when it discharges quickly



(ap) Table E-3, p865

From Text:

Step #	Hub	Notebook
1	The Power Adapter's AC mains power is lost.	
2	Hub detects the Power Adapter disconnect (H1) as quickly as possible.	
3	Hub sends FRS signal on CC (H2) and starts monitoring V_{HubVB} (H3). Hub also starts a ***tSnkFRSwap timer***.	
4		Notebook detects FRS signal on CC (N1) that triggers sending of the FR_Swap message. This may happen at any point in the following steps so long as it is within 15 ms (***tFRSwapInit***).
5		Notebook opens the sinking switch (N2), as quickly as possible to minimize power drained from hub after FRS signal.
6		Notebook begins monitoring V_{BUS} (N3) to know when to turn the Notebook into a Source.
7	Hub opens the sourcing switch (H4) while V_{HubVB} > 5.5V (after the FRS signal is sent). However, the sourcing switch (H4) should be kept closed until V_{HubVB} is as close to 5.5V as possible. It is important for the Hub to open its sourcing switch (H4) before the Notebook's sourcing switch (N4) gets closed to minimize inrush current.	
8	Hub closes the switch (H5) to use the hold-up capacitor to supply V_{BUS} to the peripheral(s). Systems with a holding cap permanently in place do not need the switch (H5). Hub does not draw more than ***pSnkStdby*** from V_{BUS}, until the ***tSnkFRSwap*** timer expires.	
9		Notebook detects V_{BUS} < V_{NbVB} (N1) before closing the sourcing switch (N4) when V_{NbVB} is as close as possible

		to 5.5V. This minimizes the time when V_{BUS} is not sourced.
10		Notebook closes sourcing switch (N4). When this occurs the Hub's input capacitance on V_{BUS} will be less than 10µF (***cSnkBulk***).
11	Hub's ***tSnkFRSwap*** timer expires (H6).	
12	Hub draws up to the current it advertised in the Fast Role Swap field of its ***Sink_Capabilities*** Message.	
13	Hubs with (H5) will open (H5) and remove the Hold-Up capacitor.	

To Text:

Step #	Hub	Notebook
1	The Power Adapter's AC mains power is lost.	
2	Hub detects the Power Adapter disconnect (H1) as quickly as possible.	
3	Hub sends FRS signal on CC (H2) and starts monitoring V_{HubVB} (H3). Hub also starts a ***tSnkFRSwap*** timer after the FRS signal begins and V_{BUS} has fallen below ***vSafe5V*** (min).	
4		Notebook detects FRS signal on CC (N1) that triggers sending of the FR_Swap message. This may happen at any point in the following steps so long as it is within 15 ms (***tFRSwapInit***).
5		Notebook opens the sinking switch (N2), as quickly as possible to minimize power drained from hub after FRS signal.
6		Notebook begins monitoring V_{BUS} (N3) to know when to turn the Notebook into a Source.
7	Hub opens the sourcing switch (H4) while V_{HubVB} > 5.5V (after the FRS signal is sent). However, the sourcing switch (H4) should be kept closed until V_{HubVB} is as close to 5.5V as possible. It is important for the Hub to open its sourcing switch (H4) before the Notebook's sourcing switch (N4) gets closed to minimize inrush current.	
8	Hub closes the switch (H5) to use the hold-up capacitor to supply V_{BUS} to the peripheral(s). Systems with a holding cap permanently in place do not need the switch (H5). Hub does not draw more than ~~***pSnkStdby***~~ ***iSnkStdby*** from V_{BUS}, until the ***tSnkFRSwap*** timer expires.	
9		Notebook detects V_{BUS} < V_{NbVB} (N1) before closing the sourcing switch (N4) when V_{NbVB} is as close as possible to 5.5V. This minimizes the time when V_{BUS} is not sourced.
10		Notebook closes sourcing switch (N4). When this occurs the Hub's input capacitance on V_{BUS} will be less than 10µF (***cSnkBulk***).
11	Hub's ***tSnkFRSwap*** timer expires (H6).	
12	Hub draws up to the current it advertised in the Fast Role Swap field of its ***Sink_Capabilities*** Message.	
13	Hubs with (H5) will open (H5) and remove the Hold-Up capacitor.	

(aq) Table E-4

Table E-4 Vbus discharges quickly after adapter disconnected.

Step #	Hub	Notebook
1	The Power Adapter is detached from the Hub.	
2	Hub detects Power Adapter disconnect (H1)-causing V_{HubVB} to drop below 5.5V very rapidly.	
3	Hub sends FRS signal on CC (H2) and starts monitoring V_{HubVB} (H3). Hub opens sourcing switch (H4). Hub also starts a ***tSnkFRSwap*** timer.	
4	Hub closes the switch (H5) to use the hold-up capacitor to supply V_{BUS} to the peripheral(s). Systems with a holding cap permanently in place do not need the switch (H5). Hub does not draw more than ~~***pSnkStdby***~~ i***SnkStdby*** from V_{BUS}, until the ***tSnkFRSwap*** timer expires.	
5		Notebook detects FRS signal on CC (N1) that triggers sending of the ***FR_Swap*** Message. This may happen at any point in the following steps so long as it is within 15 ms (***tFRSwapInit***).
6		Notebook opens the sinking switch (N2), as quickly as possible to minimize power drained from hub after FRS signal.
7		Notebook begin monitoring V_{BUS} (N3) to know when to turn the Notebook into a Source.
8		Notebook detects $V_{BUS} < V_{NbVB}$ (N3).
9		Notebook closes sourcing switch (N4). When this occurs the Hub's input capacitance on V_{BUS} will be less than 10 µF (***cSnkBulk***).
10	Hub's ***tSnkFRSwap*** timer expires (H6).	
11	Hub draws up to the current it advertised in the Fast Role Swap field of its ***Sink_Capabilities*** Message.	
12	Hubs with (H5) will open (H5) and remove the Hold-Up capacitor.	