

# USB Type-C ENGINEERING CHANGE NOTICE

## Title: USB Type-C Cable Assembly Grounding Applied to: USB Type-C Specification Release 1.2

### Brief description of the functional changes proposed:

This ECN requires that all grounds and shields are made common within the standard USB Type-C and USB Type-C to legacy cable assemblies.

### Benefits as a result of the proposed changes:

Currently it is allowable to isolate shell and signal grounds within a USB Type-C cable assembly. Cable assemblies with common grounds and isolated grounds require different compliance test methods/fixtures for IR drop measurement. This adds complexity and the potential for failure escapes. Finished product testing should also be tested with both types of ground connection cables to ensure compliance with product emissions.

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

No impact to existing systems.

### An analysis of the hardware implications:

Cable assembly suppliers continue to have flexibility in design, construction, and materials to meet the IR drop spec. However, the ECN unifies the measured path by mandating that if separate ground paths are present that they be made common. This also eliminates the need for emissions testing at the product level using both isolated shield and grounded shield cable assemblies.

### An analysis of the software implications:

NA

### An analysis of the compliance testing implications:

No change to current compliance testing requirements. Reduces chance of failure escapes.

# USB Type-C ENGINEERING CHANGE NOTICE

## Actual Change Requested

From Text (and location): Section 3.4.1, Table 3-10

Table 3-1 USB Full-Featured Type-C Standard Cable Assembly Wiring

USB Type-C Plug #1		Wire		USB Type-C Plug #2	
Pin	Signal Name	Wire Number	Signal Name	Pin	Signal Name
A1, B1, A12, B12	GND	1 [16]	GND_PWRrt1 [GND_PWRrt2]	A1, B1, A12, B12	GND
A4, B4, A9, B9	VBUS	2 [17]	PWR_VBUS1 [PWR_VBUS2]	A4, B4, A9, B9	VBUS
A5	CC	3	CC	A5	CC
B5	VCONN	18	PWR_VCONN (See Section 4.9)	B5	VCONN
A6	Dp1	4	UTP_Dp	A6	Dp1
A7	Dn1	5	UTP_Dn	A7	Dn1
A2	SSTXp1	6	SDPp1	B11	SSRXp1
A3	SSTXn1	7	SDPn1	B10	SSRXn1
B11	SSRXp1	8	SDPp2	A2	SSTXp1
B10	SSRXn1	9	SDPn2	A3	SSTXn1
B2	SSTXp2	10	SDPp3	A11	SSRXp2
B3	SSTXn2	11	SDPn3	A10	SSRXn2
A11	SSRXp2	12	SDPp4	B2	SSTXp2
A10	SSRXn2	13	SDPn4	B3	SSTXn2
A8	SBU1	14	SBU_A	B8	SBU2
B8	SBU2	15	SBU_B	A8	SBU1
Shell	Shield	Braid	Shield	Shell	Shield

Notes:

1. This table is based on the assumption that coaxial wire construction is used for all SDP's and there are no drain wires. The shields of the coaxial wires are connected to the ground pins. If shielded twisted pair is used, then drain wires are needed and shall be connected to the GND pins.
2. Pin B5 (VCONN) of the USB Type-C plug shall be used in electronically marked versions of this cable. See Section 4.9.
3. Contacts B6 and B7 should not be present in the USB Type-C plug.
4. All VBUS pins shall be connected together within the USB Type-C plug. A 10 nF bypass capacitor (minimum voltage rating of 30 V) is required for the VBUS pin in the full-featured cable at each end of the cable. The bypass capacitor should be placed as close as possible to the power supply pad.
5. All GND pins shall be connected together within the USB Type-C plug.

# USB Type-C ENGINEERING CHANGE NOTICE

To Text (and location): Section 3.4.1, Table 3-10

Table 3-2 USB Full-Featured Type-C Standard Cable Assembly Wiring

USB Type-C Plug #1		Wire		USB Type-C Plug #2	
Pin	Signal Name	Wire Number	Signal Name	Pin	Signal Name
A1, B1, A12, B12	GND	1 [16]	GND_PWRrt1 [GND_PWRrt2]	A1, B1, A12, B12	GND
A4, B4, A9, B9	VBUS	2 [17]	PWR_VBUS1 [PWR_VBUS2]	A4, B4, A9, B9	VBUS
A5	CC	3	CC	A5	CC
B5	VCONN	18	PWR_VCONN (See Section 4.9)	B5	VCONN
A6	Dp1	4	UTP_Dp	A6	Dp1
A7	Dn1	5	UTP_Dn	A7	Dn1
A2	SSTXp1	6	SDPp1	B11	SSRXp1
A3	SSTXn1	7	SDPn1	B10	SSRXn1
B11	SSRXp1	8	SDPp2	A2	SSTXp1
B10	SSRXn1	9	SDPn2	A3	SSTXn1
B2	SSTXp2	10	SDPp3	A11	SSRXp2
B3	SSTXn2	11	SDPn3	A10	SSRXn2
A11	SSRXp2	12	SDPp4	B2	SSTXp2
A10	SSRXn2	13	SDPn4	B3	SSTXn2
A8	SBU1	14	SBU_A	B8	SBU2
B8	SBU2	15	SBU_B	A8	SBU1
Shell	Shield	Outer shield	Shield	Shell	Shield

Notes:

1. This table is based on the assumption that coaxial wire construction is used for all SDP's and there are no drain wires. The shields of the coaxial wires are connected to the ground pins. If shielded twisted pair is used, then drain wires are needed and shall be connected to the GND pins.
2. Pin B5 (VCONN) of the USB Type-C plug shall be used in electronically marked versions of this cable. See Section 4.9.
3. Contacts B6 and B7 should not be present in the USB Type-C plug.
4. All VBUS pins shall be connected together within the USB Type-C plug. A 10 nF bypass capacitor (minimum voltage rating of 30 V) is required for the VBUS pin in the full-featured cable at each end of the cable. The bypass capacitor should be placed as close as possible to the power supply pad.
5. All GND pins shall be connected together within the USB Type-C plug.
6. Shield and GND shall be connected within the USB Type-C plug on both ends of the cable assembly.

# USB Type-C ENGINEERING CHANGE NOTICE

## Actual Change Requested

From Text (and location): Section 3.4.2, Table 3-11

Table 3-3 [USB 2.0](#) Type-C Standard Cable Assembly Wiring

USB Type-C Plug #1		Wire		USB Type-C Plug #2	
Pin	Signal Name	Wire Number	Signal Name	Pin	Signal Name
A1, B1, A12, B12	GND	1	GND_PWRrt1	A1, B1, A12, B12	GND
A4, B4, A9, B9	VBUS	2	PWR_VBUS1	A4, B4, A9, B9	VBUS
A5	CC	3	CC	A5	CC
B5	VCONN	18	PWR_VCONN (See Section 4.9)	B5	VCONN
A6	Dp1	4	UTP_Dp	A6	Dp1
A7	Dn1	5	UTP_Dn	A7	Dn1
Shell	Shield	Braid	Shield	Shell	Shield

Notes:

1. Pin B5 (VCONN) of the USB Type-C plug shall be used in electronically marked versions of this cable. See Section 4.9.
2. Contacts B6 and B7 should not be present in the USB Type-C plug.
3. All VBUS pins shall be connected together within the USB Type-C plug. A bypass capacitor is not required for the VBUS pin in the [USB 2.0](#) Type-C cable.
4. All GND pins shall be connected together within the USB Type-C plug.
5. All USB Type-C plug pins that are not listed in this table shall be open (not connected).

To Text (and location): Section 3.4.2, Table 3-11

# USB Type-C ENGINEERING CHANGE NOTICE

Table 3-4 [USB 2.0](#) Type-C Standard Cable Assembly Wiring

USB Type-C Plug #1		Wire		USB Type-C Plug #2	
Pin	Signal Name	Wire Number	Signal Name	Pin	Signal Name
A1, B1, A12, B12	GND	1	GND_PWRrt1	A1, B1, A12, B12	GND
A4, B4, A9, B9	VBUS	2	PWR_VBUS1	A4, B4, A9, B9	VBUS
A5	CC	3	CC	A5	CC
B5	VCONN	18	PWR_VCONN (See Section 4.9)	B5	VCONN
A6	Dp1	4	UTP_Dp	A6	Dp1
A7	Dn1	5	UTP_Dn	A7	Dn1
Shell	Shield	Outer shield	Shield	Shell	Shield

Notes:

1. Pin B5 (VCONN) of the USB Type-C plug shall be used in electronically marked versions of this cable. See Section 4.9.
2. Contacts B6 and B7 should not be present in the USB Type-C plug.
3. All VBUS pins shall be connected together within the USB Type-C plug. A bypass capacitor is not required for the VBUS pin in the [USB 2.0](#) Type-C cable.
4. All GND pins shall be connected together within the USB Type-C plug.
5. All USB Type-C plug pins that are not listed in this table shall be open (not connected).
6. Shield and GND grounds shall be connected within the USB Type-C plug on both ends of the cable assembly.

# USB Type-C ENGINEERING CHANGE NOTICE

## Actual Change Requested

From Text (and location): Section 3.5.1, Table 3-12

Table 3-5 USB Type-C to [USB 3.1](#) Standard-A Cable Assembly Wiring

USB Type-C Plug		Wire		USB 3.1 Standard-A plug	
Pin	Signal Name	Wire Number	Signal Name	Pin	Signal Name
A1, B1, A12, B12	GND	1	GND_PWRrt1	4	GND
		7, 10	SDP1_Drain, SDP2_Drain	7	GND_DRAIN
A4, B4, A9, B9	VBUS	2	PWR_VBUS1	1	VBUS
A5	CC				
B5	VCONN				
A6	Dp1	3	UTP_Dp	3	D+
A7	Dn1	4	UTP_Dn	2	D-
A2	SSTXp1	5	SDPp1	6	StdA_SSRX+
A3	SSTXn1	6	SDPn1	5	StdA_SSRX-
B11	SSRXp1	8	SDPp2	9	StdA_SSTX+
B10	SSRXn1	9	SDPn2	8	StdA_SSTX-
Shell	Shield	Braid	Shield	Shell	Shield

Notes:

1. This table is based on the assumption that shielded twisted pair is used for all SDP's and there are drain wires. If coaxial wire construction is used, then no drain wires are present and the shields of the coaxial wires are connected to the ground pins.
2. Pin A5 (CC) of the USB Type-C plug shall be connected to VBUS through a resistor Rp. See Section 4.5.3.2.2 and Table 4-13 for the functional description and value of Rp.
3. Pin B5 (VCONN) of the USB Type-C plug shall be used in electronically marked versions of this cable. See Section 4.9.
4. Contacts B6 and B7 should not be present in the USB Type-C plug.
5. All VBUS pins shall be connected together within the USB Type-C plug. A bypass capacitor is required between the VBUS and ground pins in the USB Type-C plug side of the cable. The bypass capacitor shall be  $10\text{nF} \pm 20\%$  in cables which incorporate a USB Standard-A plug. The bypass capacitor shall be  $100\text{pF} \pm 20\%$  (minimum voltage rating of 30V) in cables which incorporate a [USB PD](#) Standard-A plug. The bypass capacitor shall be placed as close as possible to the power supply pad.
6. All Ground return pins shall be connected together within the USB Type-C plug.
7. All USB Type-C plug pins that are not listed in this table shall be open (not connected).

# USB Type-C ENGINEERING CHANGE NOTICE

## To Text (and location): Section 3.5.1, Table 3-12

Table 3-6 USB Type-C to [USB 3.1](#) Standard-A Cable Assembly Wiring

USB Type-C Plug		Wire		USB 3.1 Standard-A plug	
Pin	Signal Name	Wire Number	Signal Name	Pin	Signal Name
A1, B1, A12, B12	GND	1 7, 10	GND_PWRrt1 SDP1_Drain, SDP2_Drain	4 7	GND GND_DRAIN
A4, B4, A9, B9	VBUS	2	PWR_VBUS1	1	VBUS
A5	CC				
B5	VCONN				
A6	Dp1	3	UTP_Dp	3	D+
A7	Dn1	4	UTP_Dn	2	D–
A2	SSTXp1	5	SDPp1	6	StdA_SSRX+
A3	SSTXn1	6	SDPn1	5	StdA_SSRX–
B11	SSRXp1	8	SDPp2	9	StdA_SSTX+
B10	SSRXn1	9	SDPn2	8	StdA_SSTX–
Shell	Shield	Outer shield	Shield	Shell	Shield

Notes:

1. This table is based on the assumption that shielded twisted pair is used for all SDP's and there are drain wires. If coaxial wire construction is used, then no drain wires are present and the shields of the coaxial wires are connected to the ground pins.
2. Pin A5 (CC) of the USB Type-C plug shall be connected to VBUS through a resistor Rp. See Section 4.5.3.2.2 and Table 4-13 for the functional description and value of Rp.
3. Pin B5 (VCONN) of the USB Type-C plug shall be used in electronically marked versions of this cable. See Section 4.9.
4. Contacts B6 and B7 should not be present in the USB Type-C plug.
5. All VBUS pins shall be connected together within the USB Type-C plug. A bypass capacitor is required between the VBUS and ground pins in the USB Type-C plug side of the cable. The bypass capacitor shall be 10nF  $\pm$  20% in cables which incorporate a USB Standard-A plug. The bypass capacitor shall be 100pF  $\pm$  20% (minimum voltage rating of 30V) in cables which incorporate a [USB PD](#) Standard-A plug. The bypass capacitor shall be placed as close as possible to the power supply pad.
6. All Ground return pins shall be connected together within the USB Type-C plug.
7. Shield and GND grounds shall be connected within the USB Type-C and USB 3.1 Standard-A plugs on both ends of the cable assembly.
8. All USB Type-C plug pins that are not listed in this table shall be open (not connected).

# USB Type-C ENGINEERING CHANGE NOTICE

## Actual Change Requested

From Text (and location): Section 3.5.2, Table 3-13

Table 3-7 USB Type-C to [USB 2.0](#) Standard-A Cable Assembly Wiring

USB Type-C Plug		Wire		USB 2.0 Standard-A plug	
Pin	Signal Name	Wire Number	Signal Name	Pin	Signal Name
A1, B1, A12, B12	GND	1	GND_PWRrt1	4	GND
A4, B4, A9, B9	VBUS	2	PWR_VBUS1	1	VBUS
A5	CC				
B5	VCONN				
A6	Dp1	3	UTP_Dp	3	D+
A7	Dn1	4	UTP_Dn	2	D-
Shell	Shield	Braid	Shield	Shell	Shield

Notes:

1. Pin A5 (CC) of the USB Type-C plug shall be connected to VBUS through a resistor Rp. See Section 4.5.3.2.2 and Table 4-13 for the functional description and value of Rp.
2. Pin B5 (VCONN) of the USB Type-C plug shall be used in electronically marked versions of this cable. See Section 4.9.
3. Contacts B6 and B7 should not be present in the USB Type-C plug.
4. All VBUS pins shall be connected together within the USB Type-C plug. Bypass capacitors are not required for the VBUS pins in this cable.
5. All Ground return pins shall be connected together within the USB Type-C plug.
6. All USB Type-C plug pins that are not listed in this table shall be open (not connected).



# USB Type-C ENGINEERING CHANGE NOTICE

## To Text (and location): Section 3.5.2, Table 3-13

Table 3-8 USB Type-C to [USB 2.0](#) Standard-A Cable Assembly Wiring

USB Type-C Plug		Wire		USB 2.0 Standard-A plug	
Pin	Signal Name	Wire Number	Signal Name	Pin	Signal Name
A1, B1, A12, B12	GND	1	GND_PWRrt1	4	GND
A4, B4, A9, B9	VBUS	2	PWR_VBUS1	1	VBUS
A5	CC				
B5	VCONN				
A6	Dp1	3	UTP_Dp	3	D+
A7	Dn1	4	UTP_Dn	2	D-
Shell	Shield	Outer shield	Shield	Shell	Shield

Notes:

1. Pin A5 (CC) of the USB Type-C plug shall be connected to VBUS through a resistor Rp. See Section 4.5.3.2.2 and Table 4-13 for the functional description and value of Rp.
2. Pin B5 (VCONN) of the USB Type-C plug shall be used in electronically marked versions of this cable. See Section 4.9.
3. Contacts B6 and B7 should not be present in the USB Type-C plug.
4. All VBUS pins shall be connected together within the USB Type-C plug. Bypass capacitors are not required for the VBUS pins in this cable.
5. All Ground return pins shall be connected together within the USB Type-C plug.
6. Shield and GND grounds shall be connected within the USB Type-C and USB 2.0 Standard-A plugs on both ends of the cable assembly.
7. All USB Type-C plug pins that are not listed in this table shall be open (not connected).

# USB Type-C ENGINEERING CHANGE NOTICE

## Actual Change Requested

From Text (and location): Section 3.5.3, Table 3-14

Table 3-9 USB Type-C to [USB 3.1](#) Standard-B Cable Assembly Wiring

USB Type-C Plug		Wire		USB 3.1 Standard-B plug	
Pin	Signal Name	Wire Number	Signal Name	Pin	Signal Name
A1, B1, A12, B12	GND	1	GND_PWRrt1	4	GND
		7, 10	SDP1_Drain, SDP2_Drain	7	GND_DRAIN
A4, B4, A9, B9	VBUS	2	PWR_VBUS1	1	VBUS
A5	CC				
B5	VCONN				
A6	Dp1	3	UTP_Dp	3	D+
A7	Dn1	4	UTP_Dn	2	D-
A2	SSTXp1	5	SDPp1	9	StdB_SSRX+
A3	SSTXn1	6	SDPn1	8	StdB_SSRX-
B11	SSRXp1	8	SDPp2	6	StdB_SSTX+
B10	SSRXn1	9	SDPn2	5	StdB_SSTX-
Shell	Shield	Braid	Shield	Shell	Shield

Notes:

1. Pin A5 (CC) of the USB Type-C plug shall be connected to GND through a resistor Rd. See Section 4.5.3.2.1 and Table 4-14 for the functional description and value of Rd.
2. Pin B5 (VCONN) of the USB Type-C plug shall be used in electronically marked versions of this cable. See Section 4.9.
3. This table is based on the assumption that shielded twisted pair is used for all SDP's and there are drain wires. If coaxial wire construction is used, then no drain wires are present and the shields of the coaxial wires are connected to the ground pins.
4. Contacts B6 and B7 should not be present in the USB Type-C plug.
5. All VBUS pins shall be connected together within the USB Type-C plug. A bypass capacitor is required between the VBUS and ground pins in the USB Type-C plug side of the cable. The bypass capacitor shall be  $10\text{nF} \pm 20\%$  in cables which incorporate a USB Standard-B plug. The bypass capacitor shall be  $100\text{pF} \pm 20\%$  (minimum voltage rating of 30V) in cables which incorporate a [USB PD](#) Standard-B plug. The bypass capacitor shall be placed as close as possible to the power supply pad.
6. All Ground return pins shall be connected together within the USB Type-C plug.
7. All USB Type-C plug pins that are not listed in this table shall be open (not connected).

# USB Type-C ENGINEERING CHANGE NOTICE

## To Text (and location): Section 3.5.3, Table 3-14

Table 3-10 USB Type-C to [USB 3.1](#) Standard-B Cable Assembly Wiring

USB Type-C Plug		Wire		USB 3.1 Standard-B plug	
Pin	Signal Name	Wire Number	Signal Name	Pin	Signal Name
A1, B1, A12, B12	GND	1	GND_PWRrt1	4	GND
		7, 10	SDP1_Drain, SDP2_Drain	7	GND_DRAIN
A4, B4, A9, B9	VBUS	2	PWR_VBUS1	1	VBUS
A5	CC				
B5	VCONN				
A6	Dp1	3	UTP_Dp	3	D+
A7	Dn1	4	UTP_Dn	2	D-
A2	SSTXp1	5	SDPp1	9	StdB_SSRX+
A3	SSTXn1	6	SDPn1	8	StdB_SSRX-
B11	SSRXp1	8	SDPp2	6	StdB_SSTX+
B10	SSRXn1	9	SDPn2	5	StdB_SSTX-
Shell	Shield	Outer shield	Shield	Shell	Shield

### Notes:

1. Pin A5 (CC) of the USB Type-C plug shall be connected to GND through a resistor  $R_d$ . See Section 4.5.3.2.1 and Table 4-14 for the functional description and value of  $R_d$ .
2. Pin B5 (VCONN) of the USB Type-C plug shall be used in electronically marked versions of this cable. See Section 4.9.
3. This table is based on the assumption that shielded twisted pair is used for all SDP's and there are drain wires. If coaxial wire construction is used, then no drain wires are present and the shields of the coaxial wires are connected to the ground pins.
4. Contacts B6 and B7 should not be present in the USB Type-C plug.
5. All VBUS pins shall be connected together within the USB Type-C plug. A bypass capacitor is required between the VBUS and ground pins in the USB Type-C plug side of the cable. The bypass capacitor shall be  $10\text{nF} \pm 20\%$  in cables which incorporate a USB Standard-B plug. The bypass capacitor shall be  $100\text{pF} \pm 20\%$  (minimum voltage rating of 30V) in cables which incorporate a [USB PD](#) Standard-B plug. The bypass capacitor shall be placed as close as possible to the power supply pad.
6. All Ground return pins shall be connected together within the USB Type-C plug.
7. Shield and GND grounds shall be connected within the USB Type-C and USB 3.1 Standard-B plugs on both ends of the cable assembly.
8. All USB Type-C plug pins that are not listed in this table shall be open (not connected).

# USB Type-C ENGINEERING CHANGE NOTICE

## Actual Change Requested

From Text (and location): Section 3.5.4, Table 3-15

Table 3-11 USB Type-C to [USB 2.0](#) Standard-B Cable Assembly Wiring

USB Type-C Plug		Wire		USB 2.0 Standard-B plug	
Pin	Signal Name	Wire Number	Signal Name	Pin	Signal Name
A1, B1, A12, B12	GND	1	GND_PWRrt1	4	GND
A4, B4, A9, B9	VBUS	2	PWR_VBUS1	1	VBUS
A5	CC				
B5	VCONN				
A6	Dp1	3	UTP_Dp	3	D+
A7	Dn1	4	UTP_Dn	2	D-
Shell	Shield	Braid	Shield	Shell	Shield

Notes:

1. Pin A5 (CC) of the USB Type-C plug shall be connected to GND through a resistor  $R_d$ . See Section 4.5.3.2.1 and Table 4-14 for the functional description and value of  $R_d$ .
2. Pin B5 (VCONN) of the USB Type-C plug shall be used in electronically marked versions of this cable. See Section 4.9.
3. Contacts B6 and B7 should not be present in the USB Type-C plug.
4. All VBUS pins shall be connected together within the USB Type-C plug. Bypass capacitors are not required for the VBUS pins in this cable.
5. All Ground return pins shall be connected together within the USB Type-C plug.
6. All USB Type-C plug pins that are not listed in this table shall be open (not connected).

# USB Type-C ENGINEERING CHANGE NOTICE

To Text (and location): Section 3.5.4, Table 3-15

Table 3-12 USB Type-C to [USB 2.0](#) Standard-B Cable Assembly Wiring

USB Type-C Plug		Wire		USB 2.0 Standard-B plug	
Pin	Signal Name	Wire Number	Signal Name	Pin	Signal Name
A1, B1, A12, B12	GND	1	GND_PWRrt1	4	GND
A4, B4, A9, B9	VBUS	2	PWR_VBUS1	1	VBUS
A5	CC				
B5	VCONN				
A6	Dp1	3	UTP_Dp	3	D+
A7	Dn1	4	UTP_Dn	2	D-
Shell	Shield	Outer shield	Shield	Shell	Shield

Notes:

1. Pin A5 (CC) of the USB Type-C plug shall be connected to GND through a resistor Rd. See Section 4.5.3.2.1 and Table 4-14 for the functional description and value of Rd.
2. Pin B5 (VCONN) of the USB Type-C plug shall be used in electronically marked versions of this cable. See Section 4.9.
3. Contacts B6 and B7 should not be present in the USB Type-C plug.
4. All VBUS pins shall be connected together within the USB Type-C plug. Bypass capacitors are not required for the VBUS pins in this cable.
5. All Ground return pins shall be connected together within the USB Type-C plug.
6. Shield and GND grounds shall be connected within the USB Type-C and USB 2.0 Standard-B plugs on both ends of the cable assembly.
7. All USB Type-C plug pins that are not listed in this table shall be open (not connected).

**Actual Change Requested**

# USB Type-C ENGINEERING CHANGE NOTICE

**From Text (and location): Section 3.5.5, Table 3-16**

**Table 3-13 USB Type-C to [USB 2.0](#) Mini-B Cable Assembly Wiring**

USB Type-C Plug		Wire		USB 2.0 Mini-B plug	
Pin	Signal Name	Wire Number	Signal Name	Pin	Signal Name
A1, B1, A12, B12	GND	1	GND_PWRrt1	5	GND
A4, B4, A9, B9	VBUS	2	PWR_VBUS1	1	VBUS
A5	CC				
A6	Dp1	3	UTP_Dp	3	D+
A7	Dn1	4	UTP_Dn	2	D-
				4	ID
Shell	Shield	Braid	Shield	Shell	Shield

Notes:

1. Pin A5 of the USB Type-C plug shall be connected to GND through a resistor Rd. See Section 4.5.3.2.1 and Table 4-14 for the functional description and value of Rd.
2. Contacts B6 and B7 should not be present in the USB Type-C plug.
3. All VBUS pins shall be connected together within the USB Type-C plug. Bypass capacitors are not required for the VBUS pins in this cable.
4. All Ground return pins shall be connected together within the USB Type-C plug.
5. Pin 4 (ID) of the [USB 2.0](#) Mini-B plug shall be terminated as defined in the applicable specification for the cable type.
6. All USB Type-C plug pins that are not listed in this table shall be open (not connected).

**To Text (and location): Section 3.5.5, Table 3-16**

# USB Type-C ENGINEERING CHANGE NOTICE

**Table 3-14 USB Type-C to [USB 2.0](#) Mini-B Cable Assembly Wiring**

USB Type-C Plug		Wire		USB 2.0 Mini-B plug	
Pin	Signal Name	Wire Number	Signal Name	Pin	Signal Name
A1, B1, A12, B12	GND	1	GND_PWRrt1	5	GND
A4, B4, A9, B9	VBUS	2	PWR_VBUS1	1	VBUS
A5	CC				
A6	Dp1	3	UTP_Dp	3	D+
A7	Dn1	4	UTP_Dn	2	D–
				4	ID
Shell	Shield	Outer shield	Shield	Shell	Shield

Notes:

1. Pin A5 of the USB Type-C plug shall be connected to GND through a resistor Rd. See Section 4.5.3.2.1 and Table 4-14 for the functional description and value of Rd.
2. Contacts B6 and B7 should not be present in the USB Type-C plug.
3. All VBUS pins shall be connected together within the USB Type-C plug. Bypass capacitors are not required for the VBUS pins in this cable.
4. All Ground return pins shall be connected together within the USB Type-C plug.
5. Pin 4 (ID) of the [USB 2.0](#) Mini-B plug shall be terminated as defined in the applicable specification for the cable type.
6. Shield and GND grounds shall be connected within the USB Type-C and USB 2.0 Mini-B plugs on both ends of the cable assembly.
7. All USB Type-C plug pins that are not listed in this table shall be open (not connected).

## Actual Change Requested

**From Text (and location): Section 3.5.6, Table 3-17**

# USB Type-C ENGINEERING CHANGE NOTICE

**Table 3-15 USB Type-C to [USB 3.1](#) Micro-B Cable Assembly Wiring**

USB Type-C Plug		Wire		USB 3.1 Micro-B plug	
Pin	Signal Name	Wire Number	Signal Name	Pin	Signal Name
A1, B1, A12, B12	GND	1 7, 10	GND_PWRrt1 SDP1_Drain, SDP2_Drain	5 8	GND GND_DRAIN
A4, B4, A9, B9	VBUS	2	PWR_VBUS1	1	VBUS
A5	CC				
B5	VCONN				
A6	Dp1	3	UTP_Dp	3	D+
A7	Dn1	4	UTP_Dn	2	D-
A2	SSTXp1	5	SDPp1	10	MicB_SSRX+
A3	SSTXn1	6	SDPn1	9	MicB_SSRX-
B11	SSRXp1	8	SDPp2	7	MicB_SSTX+
B10	SSRXn1	9	SDPn2	6	MicB_SSTX-
				4	ID
Shell	Shield	Braid	Shield	Shell	Shield

Notes:

1. Pin A5 (CC) of the USB Type-C plug shall be connected to GND through a resistor Rd. See Section 4.5.3.2.1 and Table 4-14 for the functional description and value of Rd.
2. Pin B5 (VCONN) of the USB Type-C plug shall be used in electronically marked versions of this cable. See Section 4.9.
3. This table is based on the assumption that shielded twisted pair is used for all SDP's and there are drain wires. If coaxial wire construction is used, then no drain wires are present and the shields of the coaxial wires are connected to the ground pins.
4. Contacts B6 and B7 should not be present in the USB Type-C plug.
5. All VBUS pins shall be connected together within the USB Type-C plug. A bypass capacitor is required between the VBUS and ground pins in the USB Type-C plug side of the cable. The bypass capacitor shall be 10nF  $\pm$  20% in cables which incorporate a USB Micro-B plug. The bypass capacitor shall be 100pF  $\pm$  20% (minimum voltage rating of 30V) in cables which incorporate a [USB PD](#) Micro-B plug. The bypass capacitor should be placed as close as possible to the power supply pad.
6. All Ground return pins shall be connected together within the USB Type-C plug.
7. Pin 4 (ID) of the [USB 3.1](#) Micro-B plug shall be terminated as defined in the applicable specification for the cable type.
8. All USB Type-C plug pins that are not listed in this table shall be open (not connected).

**To Text (and location): Section 3.5.6, Table 3-17**

**Table 3-16 USB Type-C to [USB 3.1](#) Micro-B Cable Assembly Wiring**

USB Type-C Plug	Wire	USB 3.1 Micro-B plug
-----------------	------	----------------------



# USB Type-C ENGINEERING CHANGE NOTICE

Pin	Signal Name	Wire Number	Signal Name	Pin	Signal Name
A1, B1, A12, B12	GND	1 7, 10	GND_PWRrt1 SDP1_Drain, SDP2_Drain	5 8	GND GND_DRAIN
A4, B4, A9, B9	VBUS	2	PWR_VBUS1	1	VBUS
A5	CC				
B5	VCONN				
A6	Dp1	3	UTP_Dp	3	D+
A7	Dn1	4	UTP_Dn	2	D-
A2	SSTXp1	5	SDPp1	10	MicB_SSRX+
A3	SSTXn1	6	SDPn1	9	MicB_SSRX-
B11	SSRXp1	8	SDPp2	7	MicB_SSTX+
B10	SSRXn1	9	SDPn2	6	MicB_SSTX-
				4	ID
Shell	Shield	Outer shield	Shield	Shell	Shield

## Notes:

1. Pin A5 (CC) of the USB Type-C plug shall be connected to GND through a resistor Rd. See Section 4.5.3.2.1 and Table 4-14 for the functional description and value of Rd.
2. Pin B5 (VCONN) of the USB Type-C plug shall be used in electronically marked versions of this cable. See Section 4.9.
3. This table is based on the assumption that shielded twisted pair is used for all SDP's and there are drain wires. If coaxial wire construction is used, then no drain wires are present and the shields of the coaxial wires are connected to the ground pins.
4. Contacts B6 and B7 should not be present in the USB Type-C plug.
5. All VBUS pins shall be connected together within the USB Type-C plug. A bypass capacitor is required between the VBUS and ground pins in the USB Type-C plug side of the cable. The bypass capacitor shall be  $10\text{nF} \pm 20\%$  in cables which incorporate a USB Micro-B plug. The bypass capacitor shall be  $100\text{pF} \pm 20\%$  (minimum voltage rating of 30V) in cables which incorporate a [USB PD](#) Micro-B plug. The bypass capacitor should be placed as close as possible to the power supply pad.
6. All Ground return pins shall be connected together within the USB Type-C plug.
7. Shield and GND grounds shall be connected within the USB Type-C and USB 3.1 Micro-B plugs on both ends of the cable assembly.
8. Pin 4 (ID) of the [USB 3.1](#) Micro-B plug shall be terminated as defined in the applicable specification for the cable type.
9. All USB Type-C plug pins that are not listed in this table shall be open (not connected).

## Actual Change Requested

From Text (and location): Section 3.5.7, Table 3-18

# USB Type-C ENGINEERING CHANGE NOTICE

Table 3-17 USB Type-C to [USB 2.0](#) Micro-B Cable Assembly Wiring

USB Type-C Plug		Wire		USB 2.0 Micro-B plug	
Pin	Signal Name	Wire Number	Signal Name	Pin	Signal Name
A1, B1, A12, B12	GND	1	GND_PWRrt1	5	GND
A4, B4, A9, B9	VBUS	2	PWR_VBUS1	1	VBUS
A5	CC				
B5	VCONN				
A6	Dp1	3	UTP_Dp	3	D+
A7	Dn1	4	UTP_Dn	2	D-
				4	ID
Shell	Shield	Braid	Shield	Shell	Shield

Notes:

1. Pin A5 (CC) of the USB Type-C plug shall be connected to GND through a resistor  $R_d$ . See Section 4.5.3.2.1 and Table 4-14 for the functional description and value of  $R_d$ .
2. Pin B5 (VCONN) of the USB Type-C plug shall be used in electronically marked versions of this cable. See Section 4.9.
3. Contacts B6 and B7 should not be present in the USB Type-C plug.
4. All VBUS pins shall be connected together within the USB Type-C plug. Bypass capacitors are not required for the VBUS pins in this cable.
5. All Ground return pins shall be connected together within the USB Type-C plug.
6. Pin 4 (ID) of the [USB 2.0](#) Micro-B plug shall be terminated as defined in the applicable specification for the cable type.
7. All USB Type-C plug pins that are not listed in this table shall be open (not connected).

**To Text (and location): Section 3.5.7, Table 3-18**

Table 3-18 USB Type-C to [USB 2.0](#) Micro-B Cable Assembly Wiring

USB Type-C Plug	Wire	USB 2.0 Micro-B plug
-----------------	------	----------------------

# USB Type-C ENGINEERING CHANGE NOTICE

Pin	Signal Name	Wire Number	Signal Name	Pin	Signal Name
A1, B1, A12, B12	GND	1	GND_PWRrt1	5	GND
A4, B4, A9, B9	VBUS	2	PWR_VBUS1	1	VBUS
A5	CC				
B5	VCONN				
A6	Dp1	3	UTP_Dp	3	D+
A7	Dn1	4	UTP_Dn	2	D-
				4	ID
Shell	Shield	Outer shield	Shield	Shell	Shield

## Notes:

1. Pin A5 (CC) of the USB Type-C plug shall be connected to GND through a resistor Rd. See Section 4.5.3.2.1 and Table 4-14 for the functional description and value of Rd.
2. Pin B5 (VCONN) of the USB Type-C plug shall be used in electronically marked versions of this cable. See Section 4.9.
3. Contacts B6 and B7 should not be present in the USB Type-C plug.
4. All VBUS pins shall be connected together within the USB Type-C plug. Bypass capacitors are not required for the VBUS pins in this cable.
5. All Ground return pins shall be connected together within the USB Type-C plug.
6. Shield and GND grounds shall be connected within the USB Type-C and USB 2.0 Micro-B plugs on both ends of the cable assembly.
7. Pin 4 (ID) of the [USB 2.0](#) Micro-B plug shall be terminated as defined in the applicable specification for the cable type.
8. All USB Type-C plug pins that are not listed in this table shall be open (not connected).