

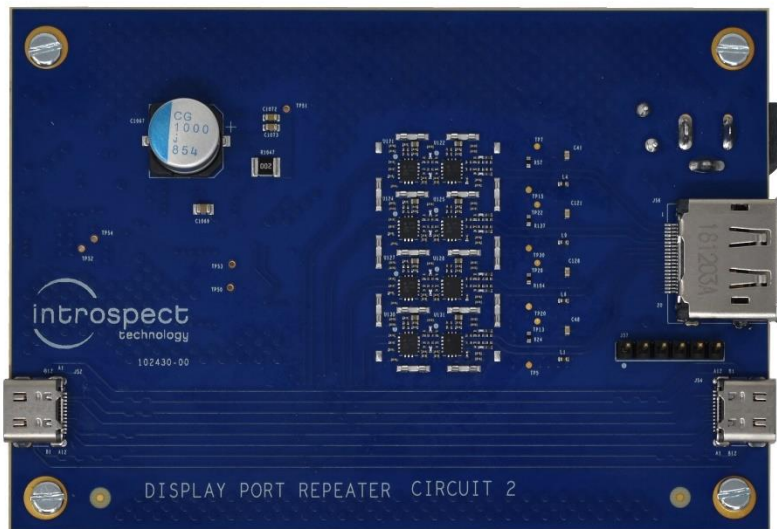


**QUICK START MANUAL**

# DisplayPort Repeater

DisplayPort Fanout and Repeater Module

**C SERIES**



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# Introduction

## OVERVIEW

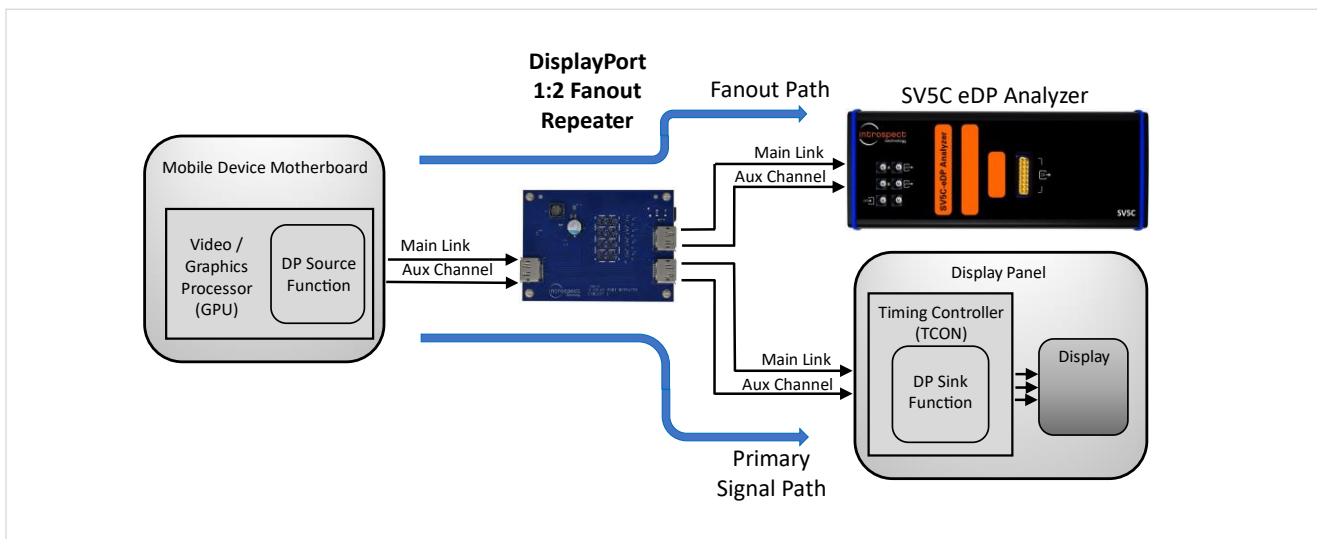
Introspect Technology’s DisplayPort Fanout and Repeater Module is designed for DisplayPort bus-probing applications, and a typical use case is shown in Figure 1 below. The primary signal path provides a direct connection between a DisplayPort Source and a DisplayPort Sink as shown. The fanout path uses a proprietary sensing technology to create a replica of the source signal for analyzing live traffic on the bus without affecting the waveform shape. Both analog signal analysis and complete protocol analysis can be performed using an SV3C-eDP or SV5C-eDP Analyzer on the fanout path, as shown in the figure, without disturbing the signal integrity of the main link lanes in the primary signal path.

## KEY FEATURES

**Supported Data Rates:** up to 8.1 Gbps, for DisplayPort (DP) and Embedded DisplayPort (eDP) up to v1.4

**Lane Count:** 4 lanes (Main Link lanes 1-4) plus Auxiliary Channel (AUX)

**Connectors:** supports both standard DisplayPort and USB Type-C connector types



**Figure 1:** Typical application of the DisplayPort Fanout Repeater Module and the SV5C-eDP Analyzer

## KEY APPLICATIONS

- DisplayPort and Embedded DisplayPort live traffic analysis and bus-monitoring applications

## ORDERING INFORMATION

TABLE 1: DISPLAYPORT FANOUT REPEATER MODULE WITH RELATED PRODUCTS

PART NUMBER	NAME	KEY DIFFERENTIATORS
6312	DisplayPort Repeater with Type C Interface (Includes Sensing Probe)	Connectorized DisplayPort 1:2 Fanout / Repeater
6313	DisplayPort Repeater with Standard DisplayPort Connector Interface (Includes Sensing Probe)	Connectorized DisplayPort 1:2 Fanout / Repeater
4560	SV3C-eDP Analyzer (includes Introspect ESP SW license)	eDP protocol analyzer, operates at up to 3.5 Gbps
5741	SV5C-eDP Analyzer (includes Introspect ESP SW license)	High performance eDP protocol analyzer and source tester, operates at up to 8.1 Gbps

## ADDITIONAL DOCUMENTATION

SV3C Embedded Display Analyzer Datasheet

- EN-D025E-E-20303 – SV3C-eDP Analyzer Datasheet

SV5C Embedded Display Analyzer Datasheet

- EN-D027E-E-20345 – SV5C-eDP Analyzer Datasheet

## Connection Diagrams

There are two configurations supported for the DisplayPort Fanout and Repeater module. The first is intended for DisplayPort devices connected via standard DisplayPort cables and receptacles. The second is intended for DisplayPort devices connected via USB Type-C cables and receptacles. The hardware

requirements for each will be described below in separate sections, beginning with standard DisplayPort cable connections.

## STANDARD CONNECTORS: HARDWARE REQUIREMENTS

The list of hardware required for this Quick Start Manual is provided below:

- (QTY = 1) Introspect DisplayPort Fanout and Repeater module, standard DisplayPort receptacles
- (QTY = 1) 12V DC Voltage Adapter for DisplayPort Repeater (part number CUI SDI65-12-U-P5)
- (QTY = 1) DisplayPort breakout cable (part number Wilder Technologies DP-TPA-P, 640-0001-000)
- (QTY = 1) MXP to SMA cable assembly, 12 inch, SMA male (part number Huber+Suhner MF53/2x8A\_21MXP/11SK/305)
- (QTY = 1) Introspect SV3C or SV5C Embedded DisplayPort Analyzer
- (QTY = 1) 12V DC power supply for SV3C or SV5C (part number CUI SDI65-12-U-P5 or XP Power AHE220PS12)
- (QTY = 2) Standard DisplayPort cables

## CONNECTIONS AND PINOUTS

The physical ports of the DisplayPort Fanout and Repeater module with standard DisplayPort receptacles is shown in Figure 2 below. The part number for the DisplayPort receptacles is Molex 472720029.

The required hardware connections for the module are shown in Figure 3 on the following page. The DisplayPort breakout cable from Wilder Technologies has signal markings on each of the breakout wires (important note: please see Appendix). The mapping of these breakout wires to the MXP of either the SV3C-eDP or SV5C-eDP, made via the Huber+Suhner MXP to SMA cable assembly, is given in Table 2. For example, for the “Main Link 0P” signal, connect Wilder breakout cable “T0\_N / R3\_P” directly to MXP cable “pin 1” for SV3C, or to MXP cable “pin 3” for SV5C, as read from a single row of Table 2).



Figure 2: Physical ports of the DisplayPort Fanout and Repeater Module, standard DisplayPort connectors

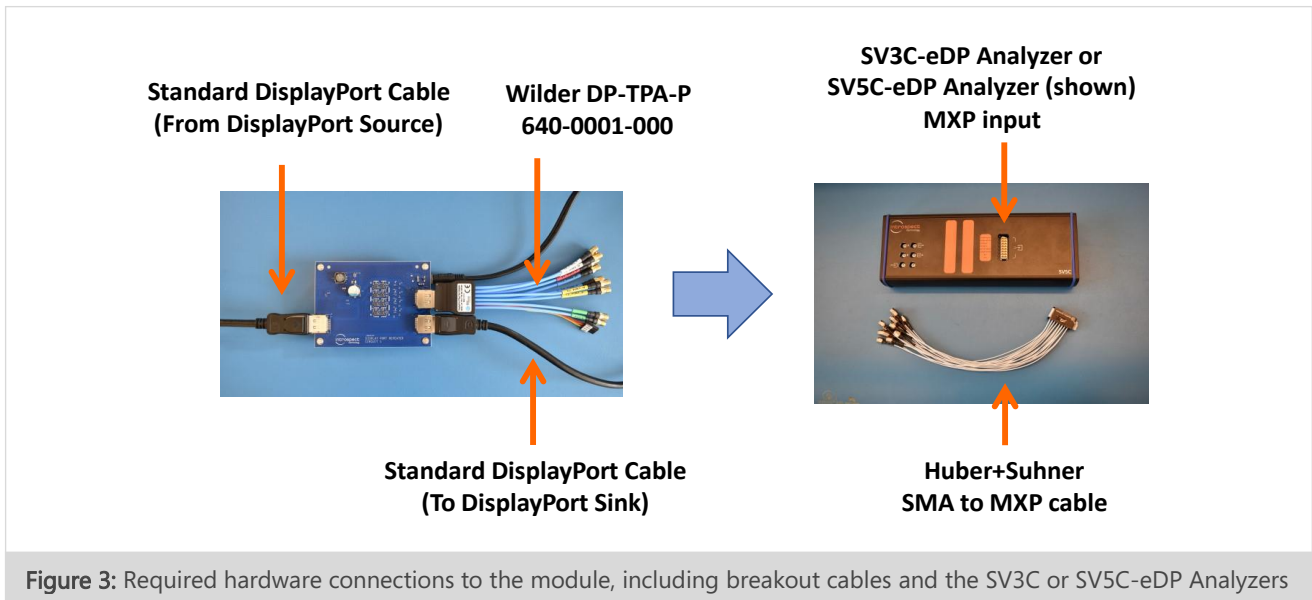


Figure 3: Required hardware connections to the module, including breakout cables and the SV3C or SV5C-eDP Analyzers

TABLE 2: MAPPING OF WILDER BREAKOUT CABLE TO MXP CABLE (APPLIES TO DISPLAYPORT REPEATER BOARD IN FIGURE 3 ABOVE)

DISPLAYPORT SIGNAL NAME	MAPPED TO: WILDER BREAKOUT CABLE NAME	CONNECT TO: SV3C-EDP MXP PIN (REFER TO COLUMN 5)	CONNECT TO: SV5C-EDP MXP PIN (REFER TO COLUMN 5)	MXP TOP VIEW, FOR REFERENCE
Main Link 0P	T0_N / R3_P	1	3	
Main Link 0N	T0_P / R3_N	2	4	
Main Link 1P	T1_N / R2_P	3	5	
Main Link 1N	T1_P / R2_N	4	6	
Main Link 2P	T2_N / R1_P	5	16	
Main Link 2N	T2_P / R1_N	6	15	
Main Link 3P	T3_N / R0_P	16	12	
Main Link 3N	T3_P / R0_N	15	11	
Aux Channel P	AUX P	12	1	
Aux Channel N	AUX N	11	2	

## USB TYPE-C CONNECTORS: HARDWARE REQUIREMENTS

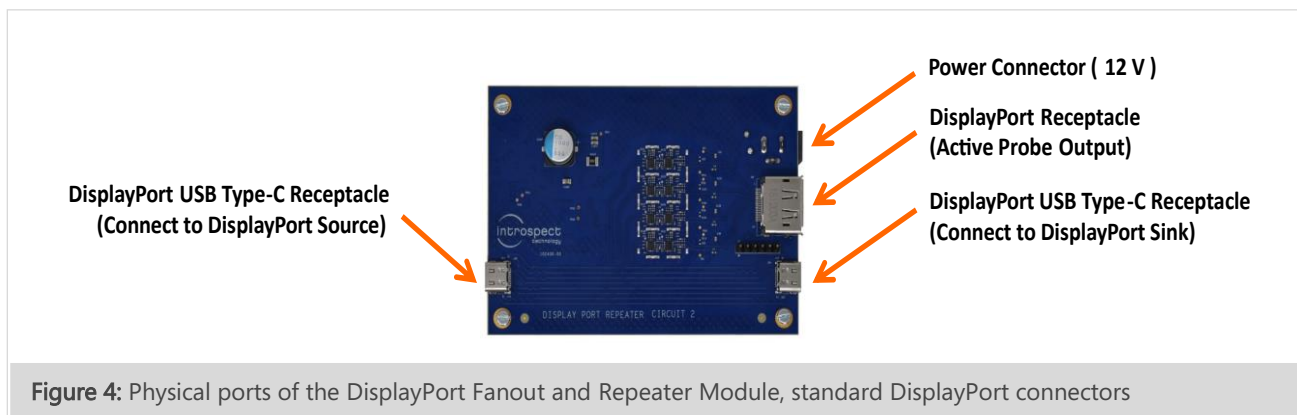
The list of hardware required for this Quick Start Manual is provided below:

- (QTY = 1) Introspect DisplayPort Fanout and Repeater module, USB Type-C receptacles
- (QTY = 1) 12V DC Voltage Adapter for DisplayPort Repeater (part number CUI SDI65-12-U-P5)
- (QTY = 1) DisplayPort breakout cable (part number Wilder Technologies DP-TPA-P, 640-0001-000)
- (QTY = 1) MXP to SMA male connector, 12 inch to SMA male, (part number Huber & Suhner MF53/2x8A\_21MXP/11SK/305)
- (QTY = 1) Introspect SV3C or SV5C Embedded DisplayPort Analyzer
- (QTY = 1) 12V DC power supply for SV3C or SV5C (part number CUI SDI65-12-U-P5 or XP Power AHE220PS12)
- (QTY = 2) Standard DisplayPort cables

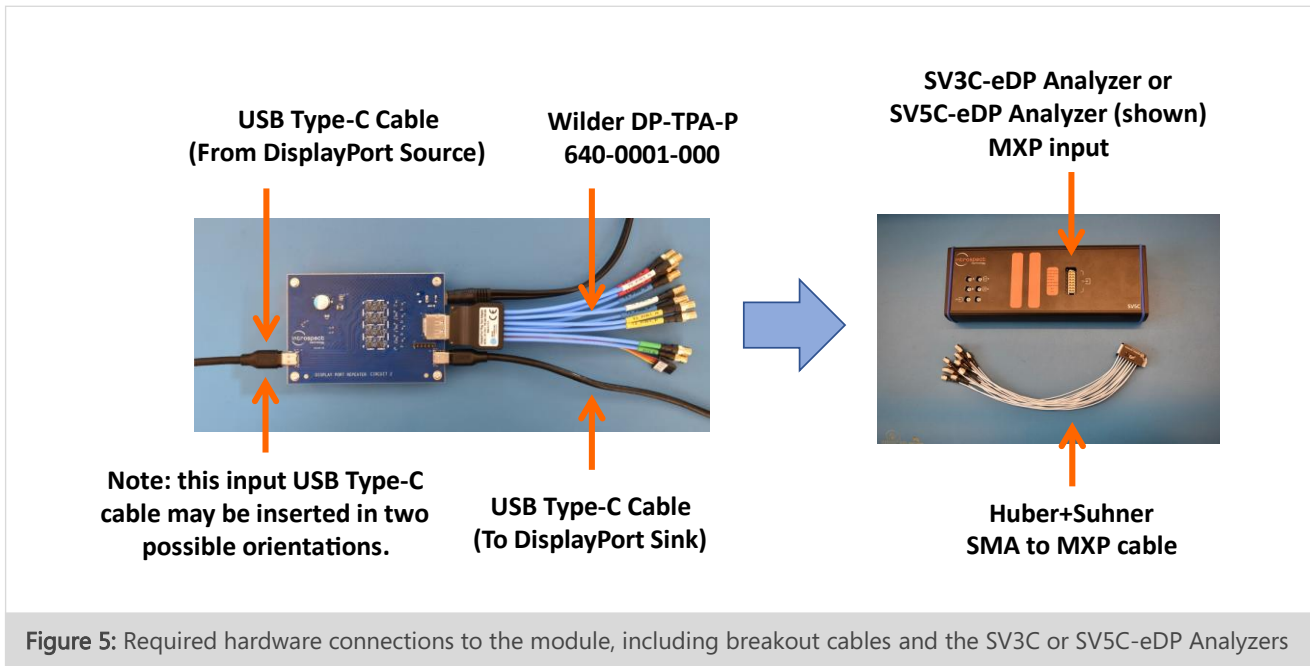
## CONNECTIONS AND PINOUTS

The physical ports of the DisplayPort Fanout and Repeater module with USB Type-C receptacles is shown in Figure 4 below. The part number for the USB Type-C connectors is Amphenol GSB4D31X302Y1HR, and the part number for the standard DisplayPort receptacle (for the fanout path) is Molex 472720029.

The required hardware connections for the module are shown in Figure 5 on the following page. The DisplayPort breakout cable from Wilder Technologies has signal markings on each of the breakout wires (important note: please see Appendix).



**Figure 4:** Physical ports of the DisplayPort Fanout and Repeater Module, standard DisplayPort connectors



The USB Type-C connector at the input of the repeater module (as explicitly labelled on the bottom left corner of Figure 5) can be inserted in two possible orientations. Because the repeater module does not detect the orientation, there are two possible mappings of the DisplayPort lanes to the Wilder SMA breakout cable and to the MXP of the SV5C-eDP.

For completeness, each of the possible mapping are shown in Table 3 (if the input USB Type-C cable is in regular orientation) and in Table 4 (if the input USB Type-C cable is in flipped orientation). As a connection example, for the orientation in Table 3, connect the Wilder breakout cable "T0\_P / R3\_N" directly to MXP cable "pin 1" for the SV3C, or to MXP cable "pin 3" for the SV5C, as read from a single row of Table 3.

A user may have to perform a quick electrical test to determine which orientation is in use. A direct electrical connectivity test of the AUX\_P and AUX\_N lines, from the DisplayPort Source to the Wilder SMA breakout cable can provide this information. See the final two rows of each of Table 3 and Table 4 for reference.



TABLE 3: MAPPING OF WILDER BREAKOUT CABLE TO MXP CABLE (STANDARD USB TYPE-C INPUT CABLE ORIENTATION)

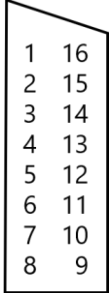

DISPLAYPORT SIGNAL NAME	MAPPED TO: WILDER BREAKOUT SIGNAL NAME	CONNECT TO: SV3C-EDP MXP PIN (REFER TO COLUMN 5)	CONNECT TO: SV5C-EDP MXP PIN (REFER TO COLUMN 5)	MXP TOP VIEW, FOR REFERENCE
Main Link 0P	T0_P / R3_N	1	3	
Main Link 0N	T0_N / R3_P	2	4	
Main Link 1P	T3_P / R0_N	3	5	
Main Link 1N	T3_N / R0_P	4	6	
Main Link 2P	T1_P / R2_N	5	16	
Main Link 2N	T1_N / R2_P	6	15	
Main Link 3P	T2_P / R1_N	16	12	
Main Link 3N	T2_N / R1_P	15	11	
Aux Channel P	AUX N (inversion)	12	1	
Aux Channel N	AUX P (inversion)	11	2	

TABLE 4: MAPPING OF WILDER BREAKOUT CABLE TO MXP CABLE (FLIPPED USB TYPE-C INPUT CABLE ORIENTATION)

DISPLAYPORT SIGNAL NAME	MAPPED TO: WILDER BREAKOUT SIGNAL NAME	CONNECT TO: SV3C-EDP MXP PIN (REFER TO COLUMN 5)	CONNECT TO: SV5C-EDP MXP PIN (REFER TO COLUMN 5)	MXP TOP VIEW, FOR REFERENCE
Main Link 0P	T2_P / R1_N	1	3	
Main Link 0N	T2_N / R1_P	2	4	
Main Link 1P	T1_P / R2_N	3	5	
Main Link 1N	T1_N / R2_P	4	6	
Main Link 2P	T3_P / R0_N	5	16	
Main Link 2N	T3_N / R0_P	6	15	
Main Link 3P	T0_P / R3_N	16	12	
Main Link 3N	T0_N / R3_P	15	11	
Aux Channel P	AUX P	12	1	
Aux Channel N	AUX N	11	2	

## Appendix

Some Wilder DisplayPort breakout cables (part number Wilder Technologies DP-TPA-P, 640-0001-000) shipped directly from Wilder may contain breakout cable labelling errors. When using Wilder DisplayPort breakout cables, please check whether the SMA labels are marked exactly as shown on the left side of Table 5. If so, the correction to the labels is given on the right side of Table 5.

If the Wilder DisplayPort breakout cable labels appear only as shown on the right side of Table 5, then there is no label correction required.

The mappings provided in Table 2, Table 3, and Table 4, each assume the corrected labelling on the right side of Table 5.

TABLE 5: CORRECTIONS FOR LABEL ERRORS ON WILDER BREAKOUT CABLE

MISLABELLED WILDER BREAKOUT SIGNAL NAME	NEEDS TO BE MAPPED TO:	CORRECTED WILDER BREAKOUT SIGNAL NAME
T0_P / R3_N	→	T0_P / R3_N
T0_P / R3_P	→	T0_N / R3_P
T1_P / R2_N	→	T1_P / R2_N
T1_P / R2_P	→	T1_N / R2_P
T2_P / R1_N	→	T2_P / R1_N
T2_P / R1_P	→	T2_N / R1_P
T3_P / R0_N	→	T3_P / R0_N
T3_P / R0_P	→	T3_N / R0_P
AUX P	→	AUX P
AUX N	→	AUX N



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