

APIX Display Link Kit

The APIX Display Link Kit is designed to demonstrate the combined transmission of video and data using only one small-size STP-cable. It transmits digital graphics in VGA and SVGA resolution over one standard STP cable across distances of up to 20m. Interfacing to DVI-D and TTL RGB is supported.



Features:

- Supports DVI-D and digital RGB video
- Resolutions up to SVGA
- Supports UART interfacing
- Up to 20m distance
- Single +5V power supply

Applications:

- In-car information Displays
- Automotive Dashboard Displays
- Head-up Displays
- Vision Systems
- Security Systems
- Remote Terminals
- Hand-held equipment

APIX Display Link Overview:

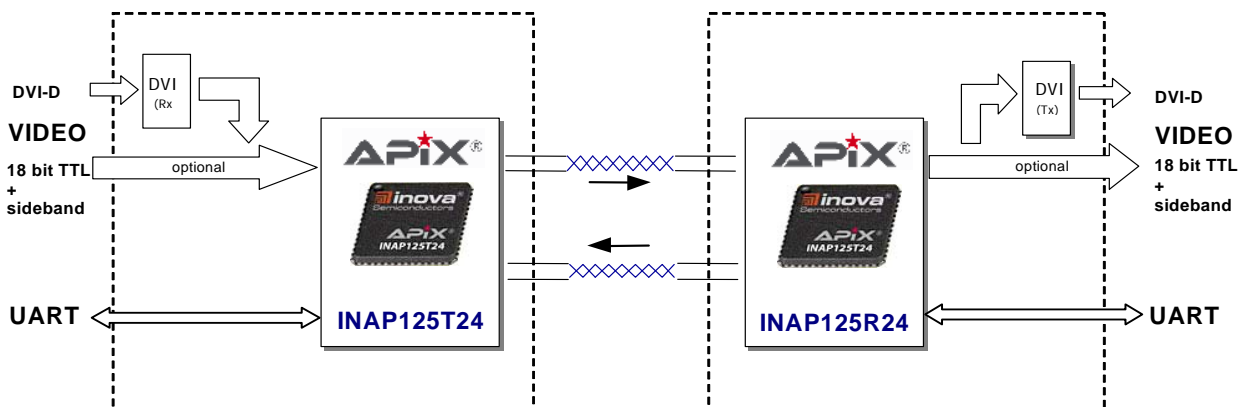


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1 Overview

The APIX Display Link Demo Kit consists of two boards, one transmitter and one receiver board, (also referred to as ADLTX and ADLRX) as well as one standard CAT5e cable.

The APIX Display Link kit supports video data transmission ranging from QVGA to SVGA in 18 bit quality (262144 colors). The kit supports DVI-D or TTL video interfaces plus an additional UART interface via APIX sidebands.

Kit contents :

- One Transmitter board ADL Tx
- One Receiver board ADL Rx
- 10m CAT5e transmission cable
- 5V AC/DC supply
- Apix Display Link user manual

All technical documentation, schematics and gerber files of the Apix Display Link kit are available on request. Please contact technical support for further information.

2 Hardware description

2.1 APIX Display Link Transmitter ADL_TX

2.1.1 Overview

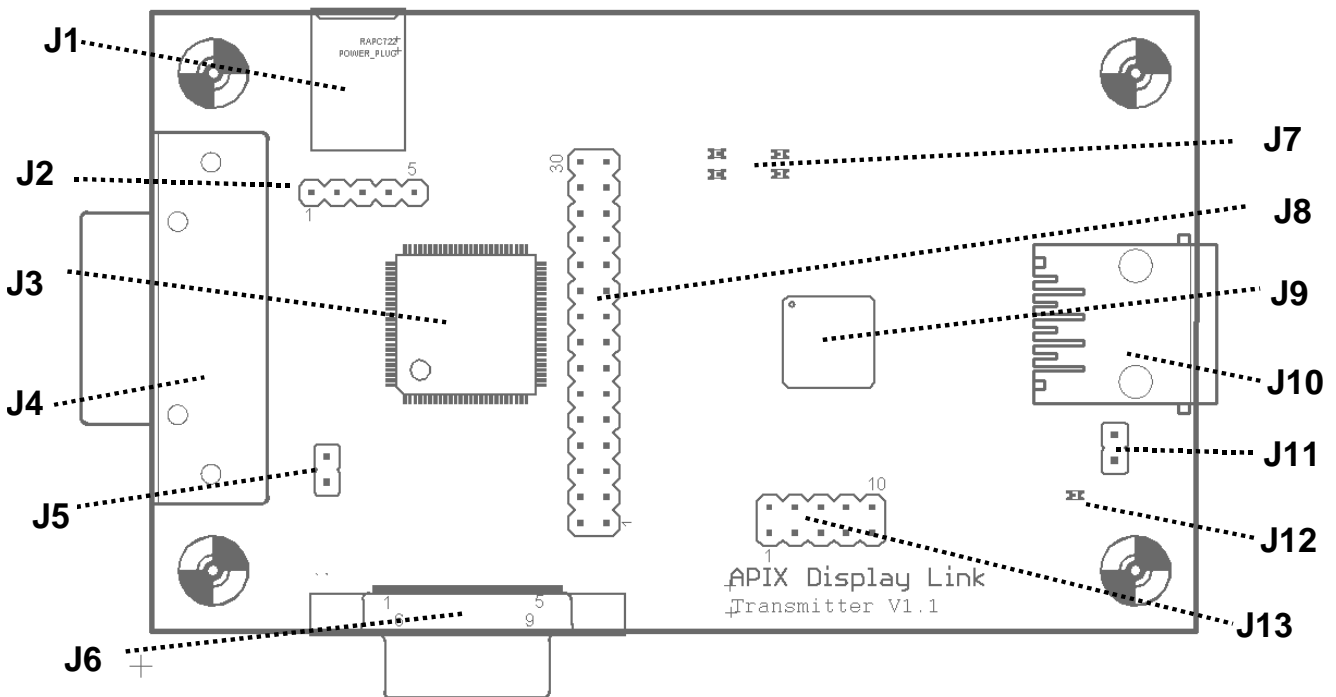


Figure 1: APIX Display Link ADLTX top view

2.1.2 Connectors and interfaces

- J1 - power plug for +5V supply
- J2 - programming adapter for DDC proxy EEPROM
- J3 - DVI-D receiver
- J4 - DVI input connector
- J5 - jumper to by-pass parallel DVI outputs (see chapter 4)
- J6 - SUB-D9 connector fo UART interfacing
- J7 - status signaling LEDs (see chapter 4)
- J8 - connector for APIX parallel video input data interfacing
- J9 - APIX Transmitter INAP125T24
- J10 - RJ45 APIX Display Link connector
- J11 - board reset jumper
- J12 - board reset status LED
- J13 - connector for APIX sideband data interfacing

2.1.3 Pin assignment

J4 – DVI connector (DVI-D video input):

Pin	Signal Assignment	Pin	Signal Assignment	Pin	Signal Assignment
1	T.M.D.S. Data2-	9	T.M.D.S. Data1-	17	T.M.D.S. Data0-
2	T.M.D.S. Data2+	10	T.M.D.S. Data1+	18	T.M.D.S. Data0+
3	T.M.D.S. Data2 Shield	11	T.M.D.S. Data1 Shield	19	T.M.D.S. Data0 Shield
4	N.C.	12	N.C.	20	N.C.
5	N.C.	13	N.C.	21	N.C.
6	DDC Clock	14	+5V Power	22	T.M.D.S. Clock Shield
7	DDC Data	15	GND	23	T.M.D.S. Clock+
8	N.C.	16	Hot Plug Detect	24	T.M.D.S. Clock-

Table 1: DVI input connector pin assignment (ADLTX)

J1 – power supply connector :

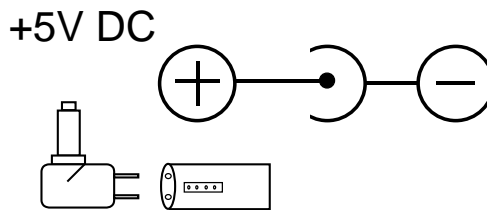


Figure 2: Power plug pin assignment (ADLTX)

J6 - Sub-D 9 connector for UART interfacing :

Pin	Signal Assignment
1	GND
2	RXD
3	TXD
4	N.C.
5	N.C.
6	N.C.
7	N.C.
8	N.C.
9	N.C.

Table 2: Sub-D 9 connector pin assignment (ADLTX)

J2 - APIX Display Link RJ45 connector :

Pin	Signal Assignment	Pin	Signal Assignment
1	DDC_SCL	4	GND
2	DDC_SDA	5	+3V3
3	reserved		

Table 3: programming adapter for DDC proxy EEPROM (ADLTX)

J8 - connector for APIX pixel and control data input:

Pin	Signal Assignment	Pin	Signal Assignment
1	GND	2	GND
3	PX_DATA17	4	PX_DATA16
5	PX_DATA14	6	PX_DATA12
7	PX_DATA11	8	PX_DATA9
9	GND	10	GND
11	PX_DATA8	12	PX_DATA7
13	PX_DATA6	14	PX_DATA5
15	PX_DATA4	16	PX_DATA3
17	PX_DATA2	18	PX_DATA1
19	GND	20	GND
21	PX_DATA0	22	PX_DATA10
23	PX_DATA15	24	PX_DATA13
25	PX_CLK	26	PX_CTRL2
27	PX_CTRL1	28	PX_CTRL0
29	GND	30	GND

Table 4: pixel data input connector pin assignment (ADLTX)

J13 - connector for APIX sideband interface :

Pin	Signal Assignment	Pin	Signal Assignment
1	GND	2	SBDOWN_DATA[0]
3	GND	4	SBUP_DATA[0]
5	GND	6	SBUP_CLK
7	GND	8	SBUP_DATA[1]
9	GND	10	SBDOWN_DATA[1]

Table 5: sideband data input connector pin assignment (ADLTX)

J10 - APIX Display Link RJ45 connector :

Pin	Signal Assignment	Pin	Signal Assignment
1	APIX SDOUT+	5	DDC Data (optional)
2	APIX SDOUT-	6	GND from power supply
3	+5V from power supply	7	APIX SDIN+
4	DDC Clock (optional)	8	APIX SDIN-

Table 6: RJ45 connector pin assignment (ADLTX)

2.2 APIX Display Link Receiver ADL_Rx

2.2.1 Overview

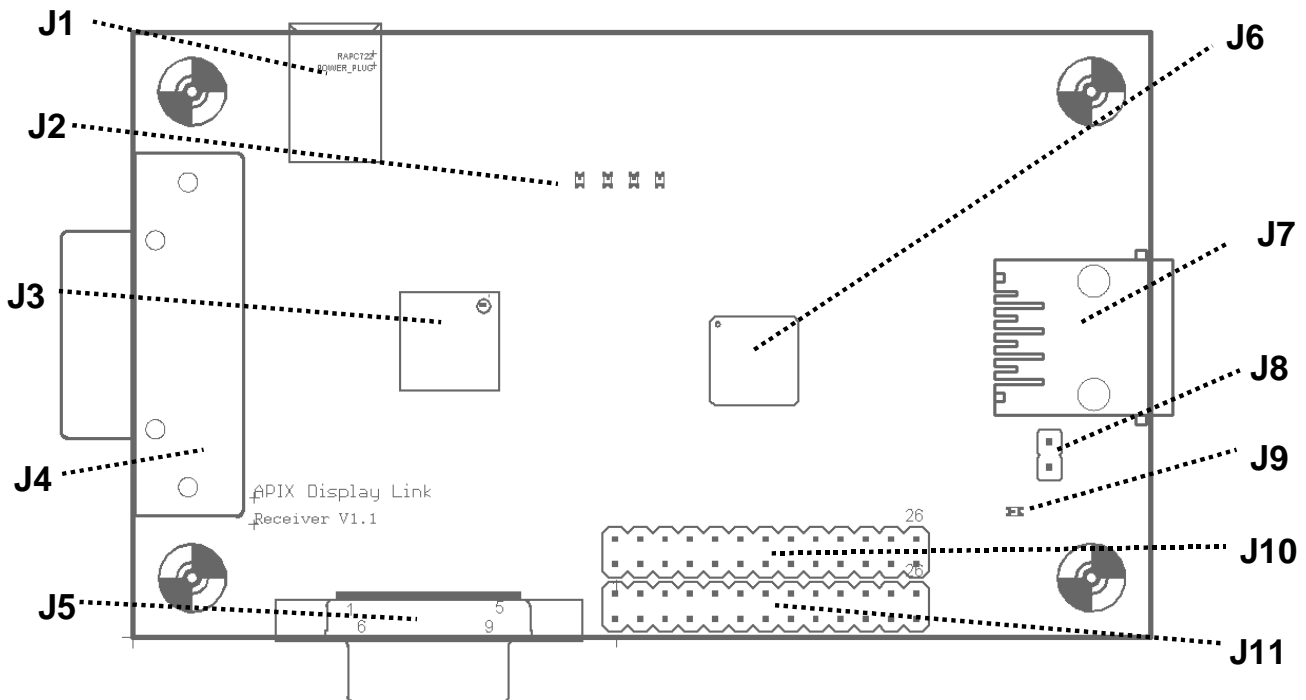


Figure 3.: APIX Display Link ADLRX top view

2.2.2 Connectors and Interfaces

J1	-	power supply +5V plug
J2	-	board status LEDs (see chapter 4)
J3	-	DVI-D transmitter
J4	-	DVI output connector
J5	-	SUB-D9 connector for UART interfacing
J6	-	APIX receiver INAP125R24
J7	-	RJ45 APIX Display Link connector
J8	-	board reset jumper
J9	-	board reset status LED
J10	-	connector for APIX parallel video and sideband data interfacing
J11	-	connector for APIX parallel video and sideband data interfacing

2.2.3 Pin assignment

J5 - DVI-D video output connector:

Pin	Signal Assignment	Pin	Signal Assignment	Pin	Signal Assignment
1	T.M.D.S. Data2-	9	T.M.D.S. Data1-	17	T.M.D.S. Data0-
2	T.M.D.S. Data2+	10	T.M.D.S. Data1+	18	T.M.D.S. Data0+
3	T.M.D.S. Data2 Shield	11	T.M.D.S. Data1 Shield	19	T.M.D.S. Data0 Shield
4	N.C.	12	N.C.	20	N.C.
5	N.C.	13	N.C.	21	N.C.
6	DDC Clock	14	5+V Power	22	T.M.D.S. Clock Shield
7	DDC Data	15	GND	23	T.M.D.S. Clock+
8	N.C.	16	Hot Plug Detect	24	T.M.D.S. Clock-

Table 6: DVI output connector pin assignment (ADLRX)

J1 - power supply connector:

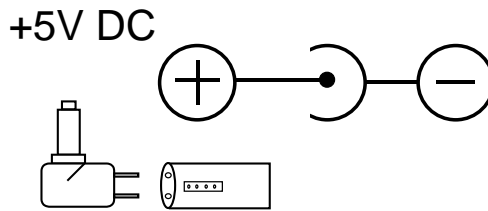


Figure 4: Power plug pin assignment (ADLRX)

J5 - Sub-D 9 connector for UART interfacing:

Pin	Signal Assignment
1	GND
2	RXD
3	TXD
4	N.C.
5	N.C.
6	N.C.
7	N.C.
8	N.C.
9	N.C.

Table 7: Sub-D 9 connector pin assignment (ADLRX)

J10 - connector for APIX parallel video and sideband data interfacing:

Pin	Signal Assignment	Pin	Signal Assignment
1	GND	2	SBUP_Data0
3	GND	4	PX_DATA14
5	GND	6	PX_DATA12
7	GND	8	PX_DATA8
9	GND	10	PX_DATA5
11	GND	12	PX_DATA2
13	GND	14	PX_DATA3
15	GND	16	PX_DATA1
17	GND	18	PX_DATA10
19	GND	20	PX_CTRL1
21	GND	22	PX_CLK
23	GND	24	PX_DATA17
25	SBDOWN_CLK	26	SBDOWN_Data1

Table 8: parallel TTL output connector pin assignment (ADLRX)

J11 - connector for APIX parallel video and sideband data interfacing:

Pin	Signal Assignment	Pin	Signal Assignment
1	GND	2	SBDOWN_Data0
3	GND	4	PX_DATA15
5	GND	6	PX_DATA13
7	GND	8	PX_DATA11
9	GND	10	PX_DATA9
11	GND	12	PX_DATA7
13	GND	14	PX_DATA6
15	GND	16	PX_DATA4
17	GND	18	PX_DATA0
19	GND	20	PX_CTRL2
21	GND	22	PX_CTRL0
23	GND	24	PX_DATA16
25	GND	26	SBUP_Data1

Table 9: parallel TTL output connector pin assignment (ADLRX)

J7 - APIX Display Link RJ45 connector :

Pin	Signal Assignment	Pin	Signal Assignment
1	APIX SDIN+	5	DDC Data (optional)
2	APIX SDIN-	6	GND from power supply
3	+5V from power supply	7	APIX SDOUT+
4	DDC Clock (optional)	8	APIX SDOUT-

Table 10: APIX RJ45 connector pin assignment (ADLRX)

3 Getting Started

3.1 Power Supply

The APIX Display Link Kit comprises two boards, Transmitter and Receiver, marked with ADLTX** and ADLRX**. Only **one** of these requires one **single +5V supply** provided by the attached power supply. The other board is supplied via the powered board through the STP cable.

!! Do not power both boards !!

3.2 Using ADL Kit for DVI extension (default)

The ADL Tx board provides a DDC proxy at the DVI input connector. That allows to use the ADL extender boards with every standard PC or laptop. The proxy contains EDID data that define the useable resolutions up to SVGA.

- Connect the ADLTX and ADLRX boards with the included CAT5 STP cable.
- Connect the DVI source and sink to the ADLTX and ADLRX boards.
- Power up the ADLTX and ADLRX boards.
- Power up PC / Laptop

It is recommended to plug in all connections prior powering up the boards.

3.3 Using ADL for transmission of parallel RGB video data (optional)

The parallel outputs of the DVI receiver on the ADLTX board can be set to tristate via Jumper J5. Parallel video data can be fed into the APIX transmitter via connector J8.

The video output on the ADLRX board (DVI, TTL) can be selected via parallel resistor arrays. Please contact technical support for further informations.

3.4 UART interfacing

The Apex Display Link provides an UART RS232 extension interface. The transmission of the bi-directional UART data is performed using APIX side band capabilities.

3.5 Status signaling LED's

Both the ADLTX and ADLRX boards feature several LEDs. These LEDs make it easy to identify the status of the boards' power supplies and the link synchronization. Table 11 and 12 show the meaning of every LED.

LED	Status
LED 1	+3V3 power ok
LED 2	+5V power ok
LED 3	+1V8 power ok
LED 4	APIX upstream error
LED 5	board reset active

Table 11: Status LED assignment (ADLTX)

LED	Status
LED 1	+5V power ok
LED 2	+3V3 power ok
LED 3	+1V8 power ok
LED 4	video / transmission error
LED 5	board reset active

Table 12: Status LED assignment (ADLRX)

4 Characteristics

Parameter	min	typ	max	
Supply voltage	4.75	5.0	5.25	V
Current consumption ADLTX/RX		0.4		A

Table 13: DC characteristics

- The Apix Display Link Kit handles video resolutions of up to WSVGA. The maximum pixel clock frequency is 40MHz.
- The TTL pixel bus handles 3.3V LVCMOS signals.
- UART interface can handle up to 115,2 kBaud/s

5 Mechanical Dimensions

All dimensions in millimeters.

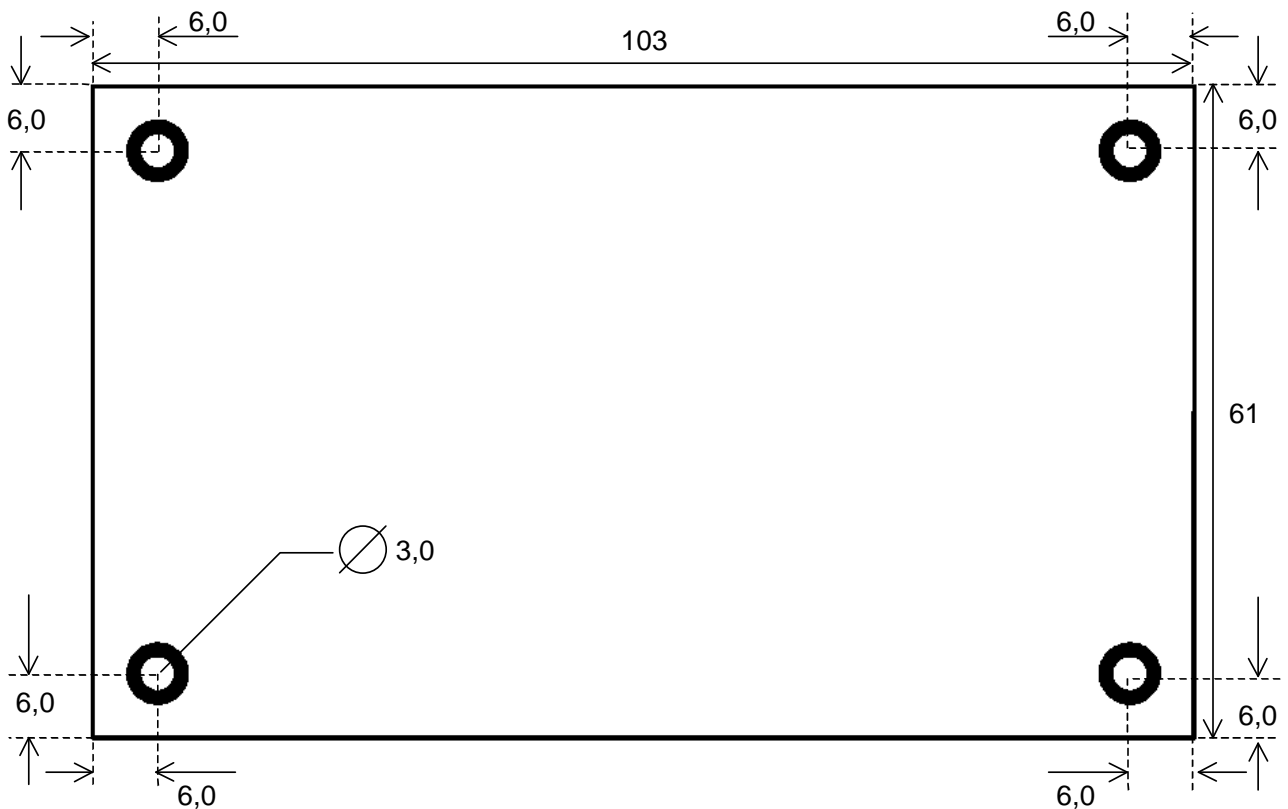


Figure 9: mechanical dimensions of ADLTX and ADLRX

Fig

6 Ordering Information

Ordering Code	Status
APIX_ADLS	full production

Table 14: Ordering information

7 Revision History

Rev.1.0	- Initial version
Rev.1.1	- text change: DVI -> DVI-D
Rev.1.2	- updated Table 4, Pin 26, 28

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