



## QUICK START GUIDE

### SX3100 SERIES DIGITAL LINK



# Raven Research

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### FEDERAL COMMUNICATIONS COMMISSION AND INDUSTRY CANADA RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

*This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.*

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## 1.00 SPECIFICATIONS

### VIDEO

Video input electrical formats .....DVI, digital HD multimedia  
(video with embedded audio)  
Video input connector .....Digital HD

### USB TX

Signal type .....USB, 2.0, 1.1, 1.0  
Connector & (qty).....(1) female USB type B

### USB RX

Connector & (qty).....(4) female USB type A

### AUDIO TX

Auxiliary audio signal .....in and out via USB connector  
Audio characteristics .....forward (TX to RX) stereo 20Hz ~ 20kHz  
reverse (RX to TX) mono 20Hz ~ 15kHz

### AUDIO RX

Auxiliary audio digital .....in and out Via any of 4 USB connectors  
Aux audio input analog .....mic level via 3.5mm female phone jack  
Aux audio output analog .....line level via 3.5mm female phone jack  
Aux audio analog input Z @ RX .....>10k $\Omega$  – mono only – ring / sleeve  
Aux audio input level .....0dB @ 250mV p-p / 87mV RMS  
Aux audio output imped @ RX .....<100 $\Omega$   
Aux audio output level .....0dB @ 2.4V p-p / 850mV RMS

### SERIAL CHANNEL

Serial connectors.....standard DB9 male, both TX & RX  
Serial protocol.....Tx & Rx data only @ 9600 baud

### TX to RX LINK CONNECTION

Connector (qty) & type; TX .....(1) RJ-45 female  
Connector (qty) & type; RX.....(1) RJ-45 female  
Distance .....100m / 328ft on CAT5  
200m / 650ft on CAT6 or CAT7

### INFRARED REMOTE CHANNEL

Connector (qty) & type; TX .....(1) 3.5mm stereo phone jack output  
For IR emitter ("blaster")  
Connector (qty) & type; RX.....(1) 3.5mm stereo phone jack input for  
IR receiver  
IR carrier passband.....18 kHz ~ 65kHz; output carrier tracks  
input carrier frequency

### SYSTEM CHARACTERISTICS

Power.....5VDC  $\pm$ 10% @ 800mA typ; 1.2 Amps max  
Connector .....threaded locking cylindrical  
Temperature / humidity .....Storage: -40 ~ +158°F (-40 ~ 70°C)/  
10 ~ 90%, non-condensing  
operating: +32 ~ +122°F (0 ~ 50°C)/  
10 ~ 90%, non-condensing  
Cooling .....radiation/convection – no vents, no fan  
Enclosure .....powder coated 16ga Galvanealed steel  
Enclosure dimensions (H x W x D) ..1.0" x 7.5" x 4.2" / 25,4 x 190,5 x 160,7mm  
Weight .....2.5lbs / 1136g  
MTBF .....100,000 hours  
Warranty.....3 years parts & labor

Note: Specifications are subject to change without notice

## 2. Introduction

### 2.1 Overview

Raven's SX3100 series™ Digital Media Link Transports Digital Video, USB, RS-232, IR, and audio signals over ordinary Category 5 cable.

This manual covers the SX3100-T Transmitter & SX3100-R Receiver.

### **WARNING**

**This equipment is not intended for, nor does it support, distribution through an Ethernet network. Do not connect these devices to any sort of networking or telecommunications equipment!**

### 2.2 Equipment You May Also Need

- Computer with an HD multimedia or DVI-D output
- 1/8" (3.5 mm) Audio cable.
- Crossover (Null-Modem) RS-232 (DB-9 Female) Interconnect cables.
- USB Cable with Type A and/or Type B Standard USB connectors.
- Digital Video cable with HDMI or DVI connectors.
- CAT5 Unshielded Twisted Pair (UTP) cable with two RJ45 connectors.
- Optional Raven Research IR Blaster cable kit.

### 2.3 Compatible Cabling

All references to CAT5 cable in this document represent minimum requirement. Category 6 or better or STP cable may be substituted.

All RJ45 type connectors should be terminated in accordance with T568A or T568B standards. The same standard must be applied to both ends of a particular cable.

### 3.0 Product Contents

Packaged with:  
SX3100 Transmitter  
SX3100 Receiver  
5V, 2A power adapter (2)

## 4. Setup and Installation

### 4.1 Cabling Considerations

- We recommend mounting and connecting all cabling to the SX3100™ Series components before applying power.
- Make sure that the CAT5 cable you intend to use has been tested to comply with the T568A or T568B wiring specification (See **Appendix A**).

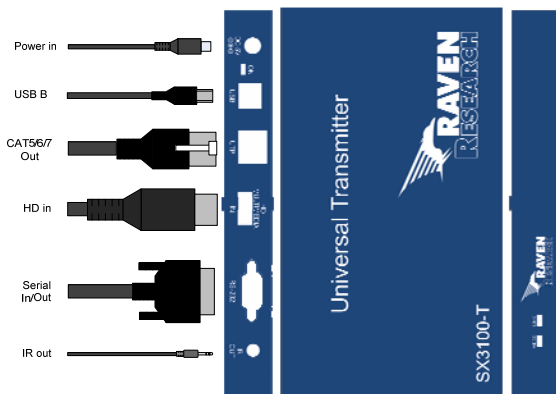
### 4.2 Making the Connections

#### 4.2.1 CONNECTIONS TO TRANSMITTER

This section contains figures showing connections with the specific SX3100™ Series models. In general, however, the connection and setup procedure at both transmitter and receiver ends is as follows:

*At the transmitter end:*

1. Connect the source video to the SX3100-T transmitter video input port, which is an HD multimedia connector labeled HD Multimedia IN. Adapter cables may be necessary if using DVI signals.
2. Connect the USB connection via the Type B USB Connector.
3. Connect the RS-232 (DB-9 Female, Null Modem) cable to the transmitter.
4. Connect the IR Remote Emitter cable to the 1/8 jack
5. Connect the CAT5 cable to the rear of the transmitter

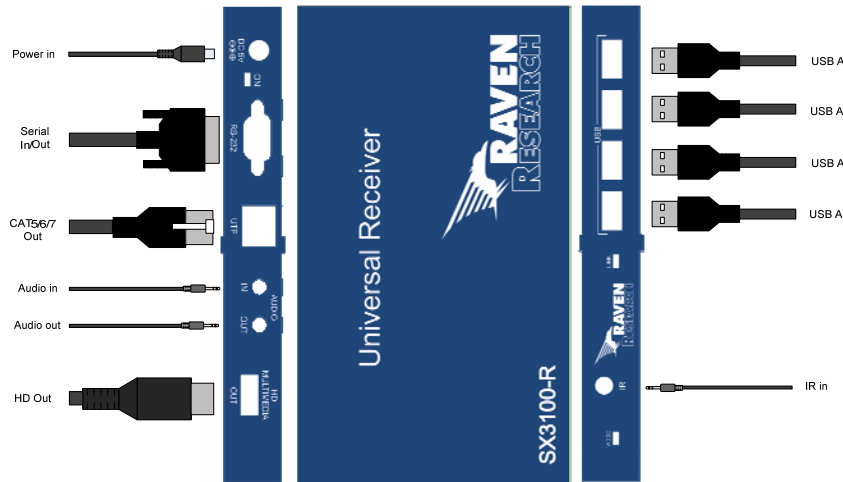


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### 4.2.2 CONNECTIONS TO RECEIVER

*At the receiver end*

1. Connect the Display to the SX3100-R receiver video output port, which is an HD multimedia connector labeled HD Multimedia Out. Adapter cables may be necessary if using DVI signals.
2. Connect the USB (1-4) connection (s) via the Type A USB Connectors.
3. Connect the RS-232 (DB-9 Female, Null Modem) cable to the Receiver
4. Connect the AUDIO OUT 1/8" (3.5 mm) Cable to the Receiver
5. Connect the AUDIO IN 1/8" (3.5 mm) Cable to the Receiver
6. Connect the IR Blaster cable to the 1/8 jack
7. Connect the CAT5 cable to the rear of the Receiver



### 4.2.3 CONNECTING TO POWER SUPPLIES

At the transmitter and receiver ends connect a Raven Research approved 5VDC Power Supply. Be sure to tighten the outer coupling nut on versions that have locking style connectors. Apply power to Raven Units, followed by display, and finally the source equipment.

### 4.2.4 LED Indicators: definition and operation. (See Following Page)

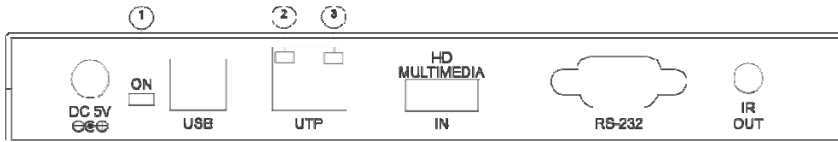
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## TX Front View



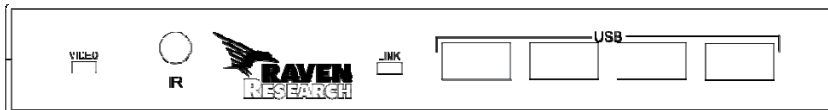
ITEM	TYPE	DESCRIPTION
Video	Video LED (Yellow)	LED Yellow indicates established Video link between TX & RX. Yellow Blinking indicates an invalid resolution is detected. Off indicates there is no link to Video source.
Link	Link LED (Green)	LED Green indicates a valid link is established between TX & RX. Green Blinking indicates the system is being configured.

## TX Rear View



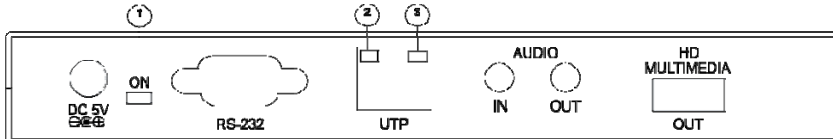
ITEM	TYPE	DESCRIPTION
1	ON LED (Blue)	LED Blue indicates system is powered on. Off indicates there is no power applied to the unit.
2	LED (Green)	LED Green indicates a valid link is established between TX & RX.
3	LED (Yellow)	LED Blinking Yellow indicates data is being transmitted between TX & RX.

## RX Front View



ITEM	TYPE	DESCRIPTION
Video	Video LED (Yellow)	LED Yellow indicates established Video link between TX & RX. Yellow Blinking indicates an invalid resolution is detected. Off indicates there is no link to Video source.
Link	Link LED (Green)	LED Green indicates a valid link is established between TX & RX. Green Blinking indicates the system is being configured.

## RX Rear View



ITEM	TYPE	DESCRIPTION
1	ON LED (Blue)	LED Blue indicates system is powered on. Off indicates there is no power applied to the unit.
2	LED (Green)	LED Green indicates a valid link is established between TX & RX.
3	LED (Yellow)	LED Blinking Yellow indicates data is being transmitted between TX & RX.

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### 5.00 RS-232 Operation & Connections

The SX3100 provides three-wire full duplex RS232 extension for controlling remote devices. Both the transmitter and receiver come equipped with a male DB9 connector. In order to use this feature a female DB9 cable must be used on the SX3100.

When using the RS232, both the transmitter and receiver act as a DTE device. Therefore when connecting 3rd party equipment or terminal programs, a null modem cable will be required. Please keep in mind that all non-Raven hardware is different and referencing the respective product manual may be necessary.

The SX3100 supports a default 9600 baud rate, no parity, 8 data bits, 1 stop bit and no hardware flow control. (contact factory for other options)

### 6.00 USB Operation & Connections

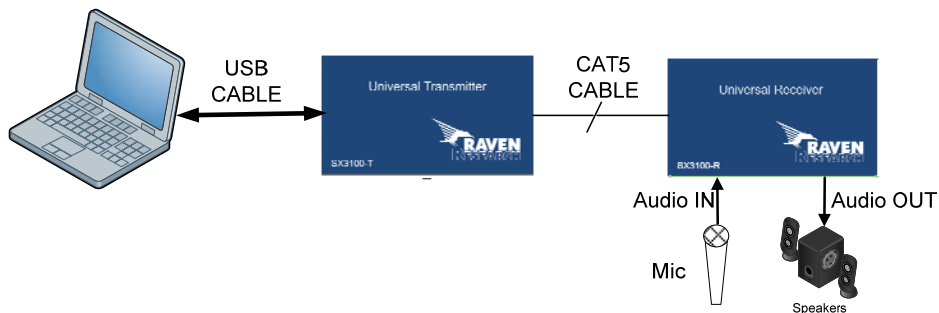
The SX3100 Link supports USB 2.00 Functionality over CAT5. To use this feature an A-B USB cable is required from the PC to the Transmitter, while the Receiver acts as a USB hub device with 4 ports. There may be a delay when connecting USB devices to the receiver, as the specific device drivers are loaded. (similar to connecting USB device directly to the host)

### 7.00 Audio Operations & Connections

The SX3100 supports digital audio via the HD multimedia interface, analog audio through the 3.5 mm I/O ports on the receiver, and USB audio devices via any of the USB ports.

#### Analog Audio I/O ports:

An A-B USB cable must be connected from the transmitter to the computer. This provides connectivity to the 3.5mm I/O jacks at the receiver. It is possible to connect line level stereo speakers to the Audio "OUT" jack and a microphone level source can be connected to the Audio "IN" jack. After making your cabling connections, if you open your computer's audio device manager, Raven appears as a USB audio device. Depending on the source in use, it may require the "USB PnP Device" be selected. Below is a drawing of a common installation.

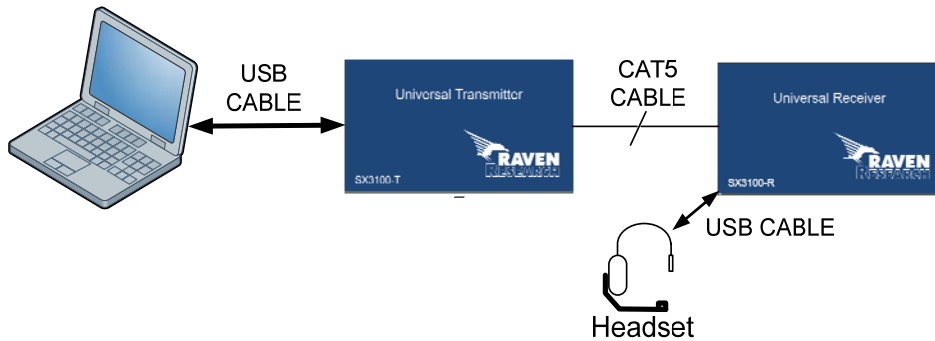




## 7.00 Audio Operations & Connections (Continued)

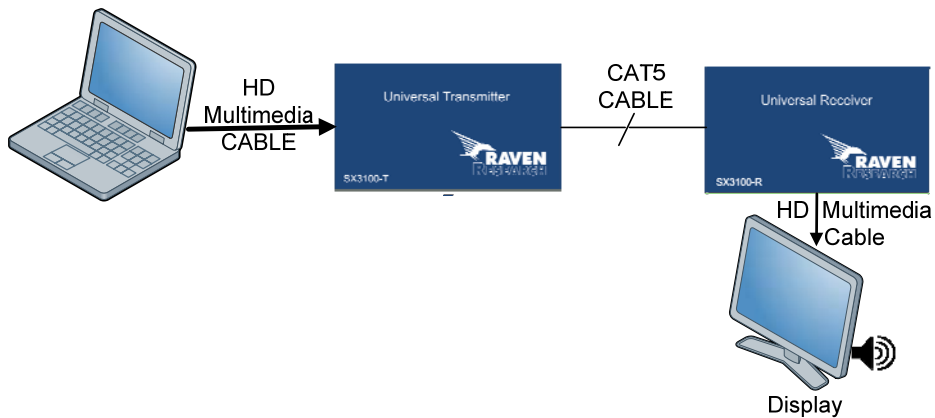
### USB Audio I/O ports:

When using any USB audio device ported into the Raven receiver, it will appear as a native device when viewed and accessed in the device manager of the computer. Note that the source may require selecting the "USB PnP Device" as the default audio device. Below is a drawing of a common type of installation.



### Digital Audio:

The embedded digital audio can be used by simply making the connections. If the source in use is a PC with multiple audio outputs, it may require setting the digital audio as the default device in the computers device manager. Please be sure to have a source and/or display that support audio over the HD multimedia connector. If both the analog and digital audio devices are connected to the receiver, the default device may need to be selected in order to have audio output on that device. Below is a drawing of a common type of installation.



## 8. Troubleshooting

### 8.1 Common Problems

***THERE ARE NO USER CONFIGURABLE SETTINGS IN THE SX3100 SERIES PRODUCTS***

In most cases, issues with the SX3100™ Series can be resolved by checking the CAT5 termination and making sure that it's pinned to the 568B or 568A wiring specification. Additionally, ensure that all other cabling (Power, HD Multimedia, USB, IR and RS232) is working properly before troubleshooting. In addition, there may be other problems that cause the system to not perform as designed. Below are solutions to the most common installation errors.

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
No Video	DCP	Ensure the display is DCP compliant. Recycle power on all equipment to facilitate a renegotiation of DCP.
	Clock, EQ, or timing issue	If equipment other than the SX3100 series is being used with the source and display, then it is possible that the clock integrity is being disrupted as a result of all the equipment in line. Remove any excess equipment and re-test to establish a baseline.
	CATx Cable	The quality of the CATx cable may limit the features available within HD Multimedia. If this is the case, please lower the resolution on your source to 720P, disable deep color, or change the cabling. A combination of these solutions may be required. Raven Research recommends the use of a 23 AWG, gigabit rated CAT6 with bonded pairs and pair separator.
	Other	Check that both units are powered and LEDs are indicative of a properly working system. Make sure the CATx cable is terminated correctly per the 568B or 568A wiring specification. Ensure the display device is powered on and functioning. Check that the display functions properly when connected directly to the source.
Poor Video Quality	Clock, EQ, or timing issue	Check all cable connections. The video signal's format e.g. "1366 x 768" may be set incorrectly for the display. Reset to a different format (refer to the source's owners manual). Nearly all issues with video quality can be corrected following the above section under 'no video'.

## 8. Troubleshooting (continued)

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
No/poor audio	Compatibility Issue	The 3.5mm jacks on the SX3100 RX provide a mic level input and line level speaker output for connecting headphones, microphones and similar devices. In order for this to function the USB port on the transmitter must be connected to PC Host.
No EIA232	Baud Rate	Ensure both source and display are set to 9600, 8, n, 1 and no flow control.
	Null Modem Cable	Any DTE devices require a null modem cable, while DCE devices require a straight cable. Please refer to the source and controlled devices documentation for proper cabling instructions.
No USB	Overcurrent	Connected device draws more than the 500mA provided by the product.
	Drivers	Although rare, sometimes the USB device drivers must be installed on the PC in use. Install the drivers and cycle power on the SX3100 links.
	Compatibility Issue	If the USB device is malfunctioning, connect it directly to the PC to ensure it works. If so, test a different USB device to ensure the Link is working. If the 2nd device works then there is a compatibility issue with the 1st device.
	Suspend/Sleep Mode	Some drivers may take up to one minute to install before the device begins to operate. The operating system may put the Host in 'suspend' mode when inactive or put into standby state. If so, resume the operating system and/or disable automatic standby mode in the operating system.
	Compatibility issue	If no USB devices work, then the operating system does not support USB Hubs.
No IR	Frequency Range	IR Carrier Frequency range is from 16kHz to 65kHz. For proper operation please ensure that devices in use fall within this range.
	Emitter/receiver not on right port	Ensure the IR emitter and receiver are connected to the correct port on the transmitter and receiver respectively. See Chapter 9.0 for details.

## 9.0 Optional IR Blaster Installation and use.

5.1.1 Refer to Raven Research Model IR3100K Infrared Emitter & Target Kit.

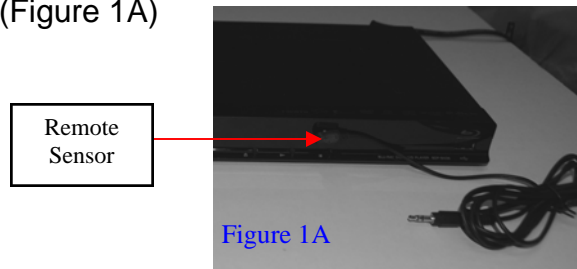


emitter



target

5.2.1 Connect the IR Emitter Assembly to the Transmitter via The IR OUT 3.5 mm Jack. Adhere the remote IR sensor Close to the built in IR sensor on the source device. (Figure 1A)



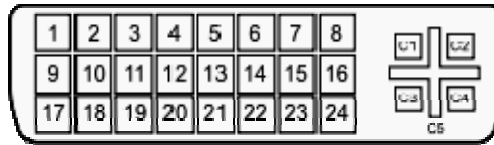
5.2.1 Connect the IR Target Assembly to the Receiver via the IR 3.5 mm Jack. Adhere the remote IR sensor so that it is in clear line of sight for the remote control. (figure 1B)



Figure 1B

## Appendix A. Cabling Pin outs

**Table A-1. DVI pin out**



Pin #	Signal Name	Pin #	Signal Name	Pin #	Signal Name
1	TMDS Data2-	9	TMDS Data1-	17	TMDS Data0-
2	TMDS Data2+	10	TMDS Data1+	18	TMDSData0+
3	TMDS Data2/4 Shield	11	TMDS Data1/3 Shield	19	TMDS Data0/5 Shield
4	TMDS Data4-	12	TMDS Data3-	20	TMDS Data5-
5	TMDS Data4+	13	TMDS Data3+	21	TMDS Data5+
6	DDC Clock [SCL]	14	+5 V Power	22	TMDS Clock Shield
7	DDC Data [SDA]	15	Ground (for +5)	23	TMDS Clock +
8*	Analog vertical	16	Hot Plug Detect	24	TMDS Clock -
C1*	Analog Red	-	-	-	-
C2*	Analog Green	-	-	-	-
C3*	Analog Blue	-	-	-	-
C4*	Analog Horizontal	-	-	-	-
C5*	Analog GND Return: (analog R, G, B)	-	-	-	-

\* Denotes signals not supported by SX3100 Link

## Appendix A. Cabling Pin outs

Table A-2. T568A & T568B CAT5 pin out

### T568A & T568B Cabling pinouts (CAT 5/5e/6)

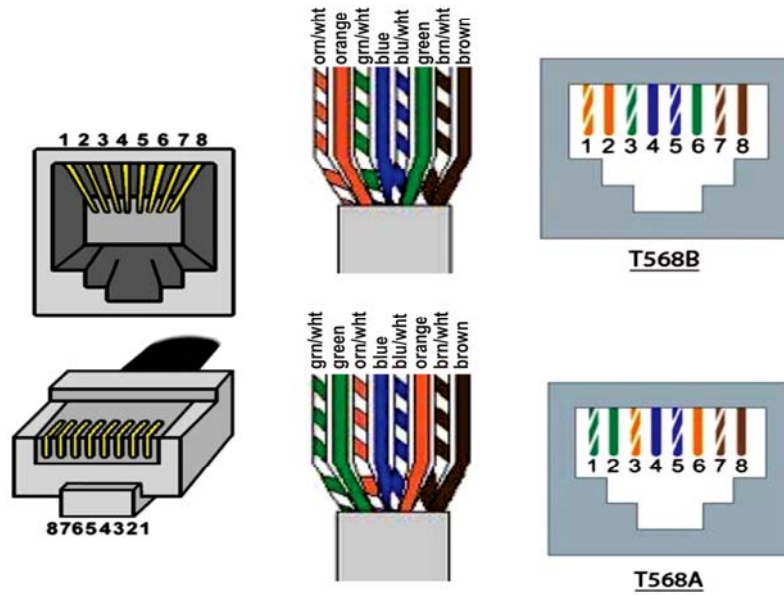
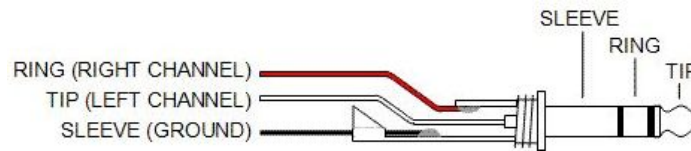


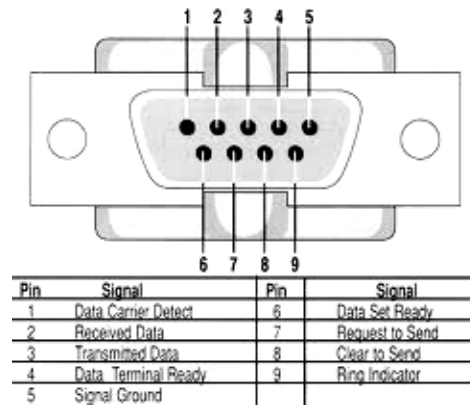
Table A-3. 1/8" (3.5 mm) Audio Connection



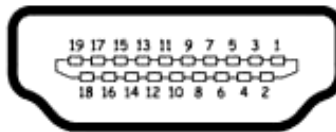
Pin	Channel 1	Channel 2
Tip	+	
Ring		+
Sleeve	-	-

## Appendix A. Cabling Pinouts

**Table A-4. RS-232 DB-9 MALE pinout**



**Table A-5. HD Multimedia Pinout**



Pin#	Signal	Pin#	Signal
1	TMDS data 2+	11	TMDS clock shield
2	TMDS data 2 shield	12	TMDS clock-
3	TMDS data 2-	13	CEC
4	TMDS data 1+	14	No connected
5	TMDS data 1 shield	15	DDC clock
6	TMDS data 1-	16	DDC data
7	TMDS data 0+	17	Ground
8	TMDS data 0 shield	18	+5V power
9	TMDS data 0-	19	Hot plug detect
10	TMDS clock+		

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