How to Fabricate a Ribbon Cable Connector

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Abstract

Connecting two electronic devices together can be a simple, yet often overlooked process in engineering. Wiring can be taken for granted, but if done poorly, can greatly affect the performance of the electrical system. In this paper, I am going to explain a method in which electrical connections can be made that guarantee excellent performance. To do this, I am going to explain how to use a ribbon cable connector to make perfect electrical connections that will ensure durability and a long life for the product.

Introduction

Creating a ribbon cable connector is a very simple task and will go a long way in making sure that your electronic connections last forever, and can be much more cost effective compared to buying one that is pre-fabricated. As opposed to having individual wires connecting to several different pins, ribbon connectors provide a less bulky solution, and when combined with a header, provide a perfect contact to the desired inputs of the ribbon. In order to fabricate a ribbon connector, all one needs is the ribbon itself with the desired amount of wires, one or two headers depending on what the inputs are for the ribbon, some sort of crimpers/vice, and wire strippers/cutters.

Objective

The very first thing to do when deciding whether or not to use a ribbon connector is to determine how many wires one needs, the length of the ribbon, as well as what kind of headers one needs. When deciding how much ribbon to purchase, the user must know how much they will need, since the ribbon can be purchased in various lengths resulting in various prices. After deciding how long and how many wires your desired ribbon shall have, it is time to cut the ribbon. It is important to do this step correctly because the wires need to be cut perfectly straight, or else the wires could end up being different lengths which could mess up the end product. In order to ensure a straight cut, the user should use a wire cutter that has a built in flat edge as seen in the figure below (Figure 1). This tool allows the user to line up the ribbon against the flat edge, guaranteeing a perfect cut.

Figure 1: Wire Snipers

The next step is determining what kind of headers are needed, which are determined by color, size, and the amount of connections they have. When considering which header to use, the user must know exactly what they will be connecting the headers to. For example, if connecting to a microcontroller, the header will most likely need to have two rows of connections because most microcontrollers have two rows of GPIO pins. It is also very important to know which pins in the header will be connected to which wires of the ribbon because it is easy to put the header on the wrong end of the ribbon, which then wastes time and resources since the user will have to attach a new header. Another thing to consider when selecting a header is what sort of connection is needed, whether it is a male or female connection. For the microcontroller application, the user will need a female header since the microcontroller contains male pins. However, if making connections to a device with a female input, a male header is necessary. Shown below is a picture of a 26-pin female header which could be used to connect to a microcontroller (Figure 2).

Figure 2: 26-Pin Female Header

Once the ribbon and header have been selected, it is time to fabricate the final product. This is also a simple step, but equally as important because if done improperly, the final product will not work, and can waste the user's time and resources. Attaching the header to the ribbon is very simple. First, the header should be slid on to the end of the ribbon. It is important to make sure the header is lined up correctly to ensure that proper connections are made. Then, crimpers or a vice should be used to complete the connection. With the header in position, insert the header with ribbon into the crimper, and gently squeeze the crimper until the header has been fully clamped, and the header pins have made solid contact with the ribbon wires. Shown below is a picture of a crimper being used to crimp the header on to the end of a ribbon (Figure 3).

Figure 3: Crimper Used to Crimp the Header

Then, do the same thing to the other side of the ribbon if it requires another header connection. Shown below is the final product with a female header connected to each end of the ribbon (Figure 4).

Figure 4: Ribbon Connector with two Headers

Conclusion

As one can see, creating a ribbon cable connector is a relatively simple process that can save you a lot of money, instead of purchasing a pre-fabricated one. They are an important part in making secure electronic connections between electrical devices. As long as the user has the resources and proper tools, creating ribbon cables is a very simple task. For our design project specifically, we need to connect the piezoelectric sensor to the Raspberry PI microcontroller, so we are using a 12" ribbon cable with an 8-pin female header on each side of the ribbon.

References

Figure 1

Johnson, Benjamen. "Knipex Ribbon-Cable Cutter" 21 May 2008. Toolmonger.

http://toolmonger.com/category/manufacturers/knipex/

Figure 2

Photograph of 26-Pin Female Header. 2007. Curious Inventor.

http://store.curiousinventor.com/idc-socket-26-pos-for-ribbon-cable.html

Figure 3

Photograph of crimpers with header and ribbon. Cables Online.

http://www.cablesonline.com/idcribcabunc.html

Figure 4

Photograph of 2-foot ribbon cable with 50-pin female headers. Cyber Research.

http://www.cyberresearch.com/store/CBL_5002_1768.2.htm