Sewing Machine, Tape Drive and Vending Machine Applications using Transmissive Encoders

Application Note 1250

Introduction

Avago Technologies' encoders are used in many applications. Encoders are closely related to motor related applications. They are used to detect position, direction and speed. This note briefly describes several uses of encoders, including sewing and vending machines, and tape drives.

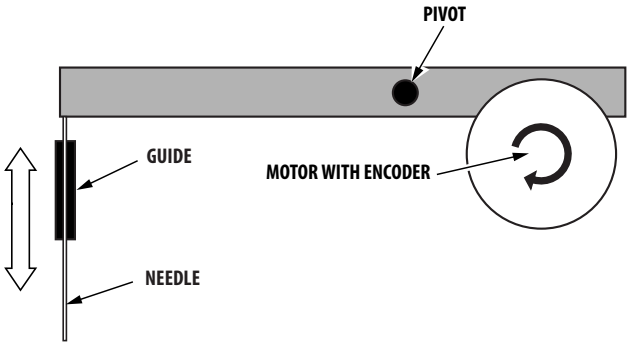

Figure 1. Sewing Machine Application

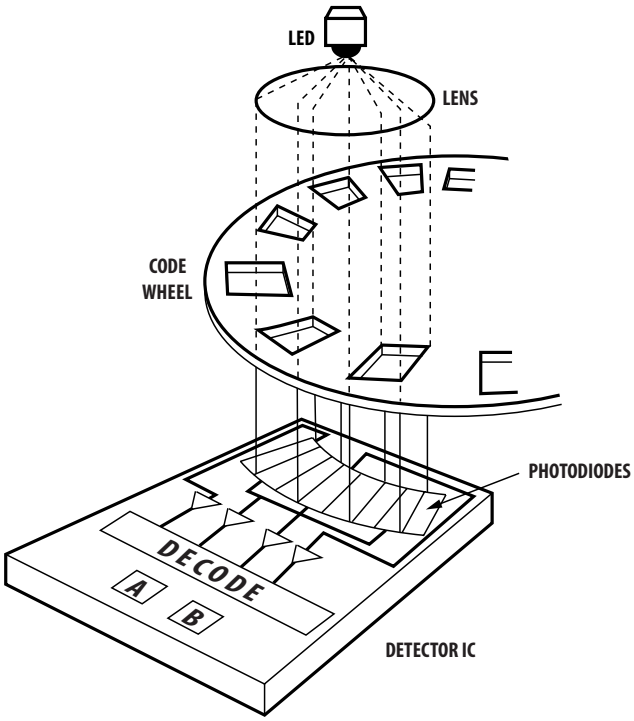

Figure 2. Optical Arrangement

Description

The diagram shown in Figure 1 is a schematic of a sewing machine and is one of the applications for encoders. Encoders such as the Avago Technologies HEDx-5xxx series (Quick Assembly Encoder) and HEDx-9xxx series with line drivers are used in this application. These encoders use a transmissive technique.

Basically, a transmissive encoder consists of three portions: emitter side, detector side and a code wheel. (Refer to Figure 2, "Optical Arrangement"). The LED will be the light source and the light will be collimated into a parallel beam by a lens. The light passes through the moving code wheel, which will be placed between the emitter side and the detector side, causing the light beam to be interrupted by the windows and bars on the code wheel. (Resolution of the code wheel is determined by the numbers of windows and bars). Multiple photodiodes in the IC detector will translate the light patterns into electronic signals. The signal processing circuitry and the comparators will produce the final digital outputs through channel A and B.

Function of an encoder in the sewing machine

Encoders are closely related to motor related applications. They are used to detect position, direction and speed. When used in the sewing machine, the encoder is part of a motor closed loop application. This is an error-checking loop to ensure that the system is running/working per inputs from the user. The encoder is used to provide digital signals to the control system (controller) for the spindle speed control.

NOTE:

For more information on the recommended parts please visit Avago Technologies' website:

http://www.avagotech.com