

# AMRX-1510

## Ultra-slim Scroll Wheel with 5-way Switch

### Mounting and Electrical Connection Consideration



## Application Note 5335

### Description

Avago Technologies' AMRX-1510 provides an integrated solution for scrolling, directional navigation and push button selection in a compact and ultra-slim package. With ease of use in mind, AMRX-1510 is ideal for scrolling of menus in new handheld electronic devices, such as in mobile device, music players, cameras, and entertainment consoles. Based on Avago Technologies' reflective optical technology, the motion sensor is non-contact and ensures reliable operations. The five tactile switches provide directional navigation (4-way switch) and selection from a list of menu (center switch).

The aesthetic design of the scroll wheel comes with several surface finish and illumination color. Customers can have a choice of finish in either black SF rubber, high gloss black or VM chrome with the push button of matt or high gloss black. Standard illumination color comes in white or blue on the internal ring. For other customer preferences, the aesthetic design is customizable to different colors and design features as shown in the examples in Figure 1. Please refer to factory for further details.

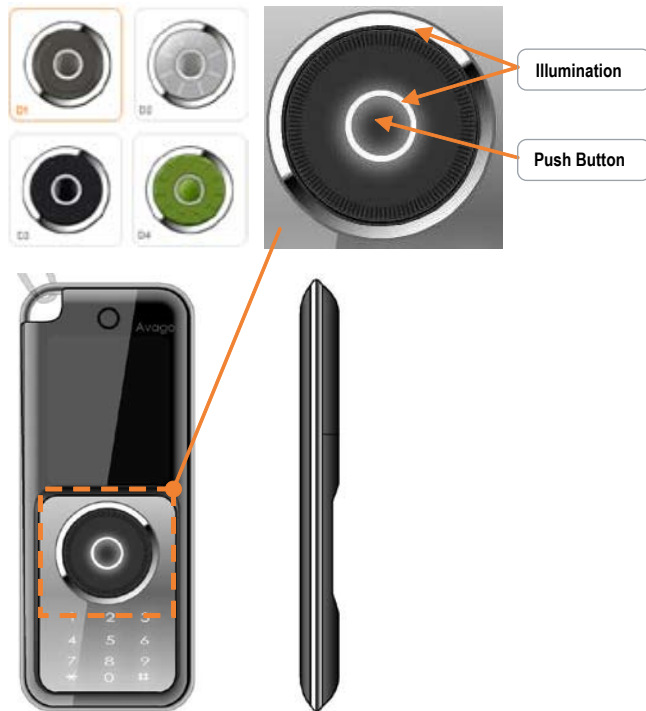
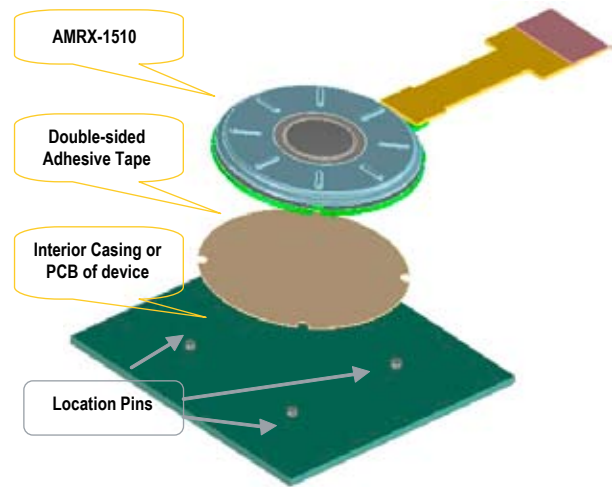


Figure 1. Example of application and aesthetic design

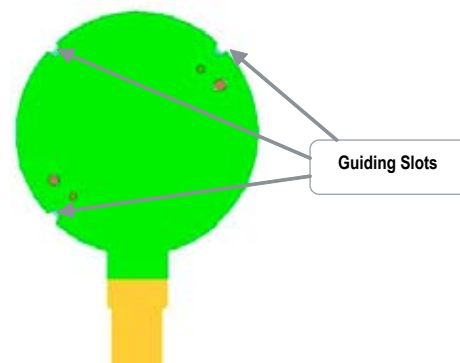
### Mounting Consideration

As the constituent component of a portable, handheld or any electronic device, the AMRX-1510 is readily designed with mounting or guiding slots located at its backplane to allow proper placement and fitting of the component onto the device as shown in Figure 2.

Double-sided adhesive tape can be implemented to secure the AMRX1510 onto the device (refer to Figure 2). For selection of adhesive tape, please refer to factory or adhesive tape manufacturer.



Exploded view of components for mounting or assembly



Bottom view of AMRX-1510

Figure 2. Mounting of AMRX-1510 on device

The scroll wheel mechanical architecture is designed with “step” feature to enhance protection against contaminants, during integration to larger system. With the exterior casing as protective cover, it will refrain user from applying excessive peeling force to the scroll wheel.

Figure 3 provided below is the recommendation on the casing design whereby a substantial gap between the scroll wheel and the device casing is essential. The recommended gap takes into considerations – the clearance for the rotational movement of scroll wheel and the tilting of scroll wheel during 5-way switch operation.

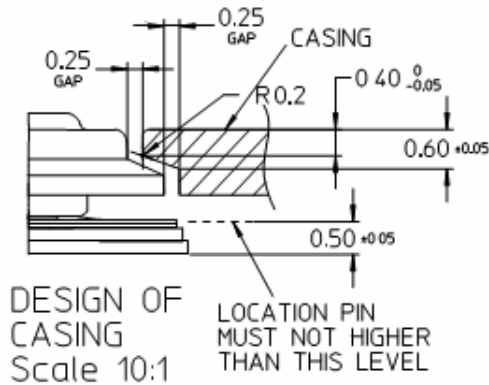
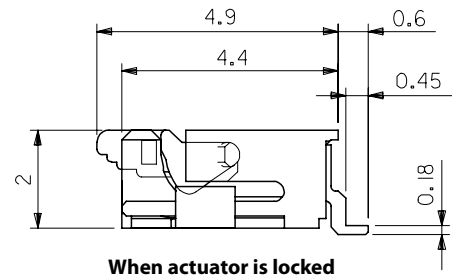
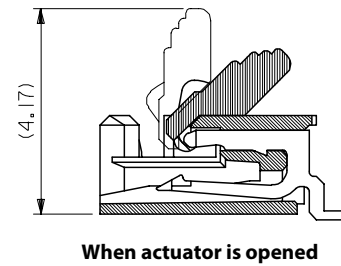
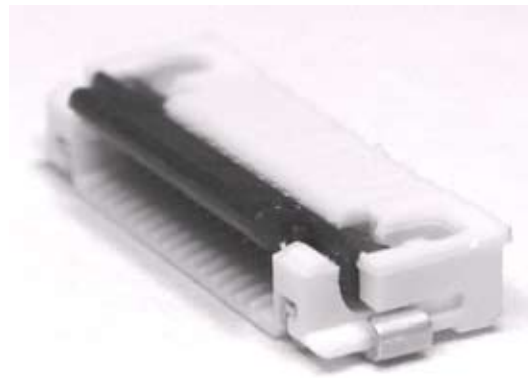


Figure 3. Recommendation on casing design

### Electrical Connection Consideration

AMRX-1510 is designed with a flexible cable utilizing 15-way 0.5mm pitch bottom contact type FPC for connectivity. This configuration makes it compatible with SMT ZIF bottom contact type FFC/FPC connector, e.g. MOLEX (52892-1595, 52893-1595 & etc.) that can be mounted onto devices for connectivity with the AMRX-1510 (refer to Figure 4). For smaller mobile devices or applications whereby space is a concern, lower profile connectors from KYOCERA 6239-015 (1.5mm height) and 6238-015 (1.1mm height) could be a solution.

The implementation of flexible cable allows flexibility in the system design, whereby the connection of the pin outs of the scroll wheel may be some distance away from the main board or host processing unit via a flexible cable and not restricted to the location of where the scroll wheel is mounted to on the device.



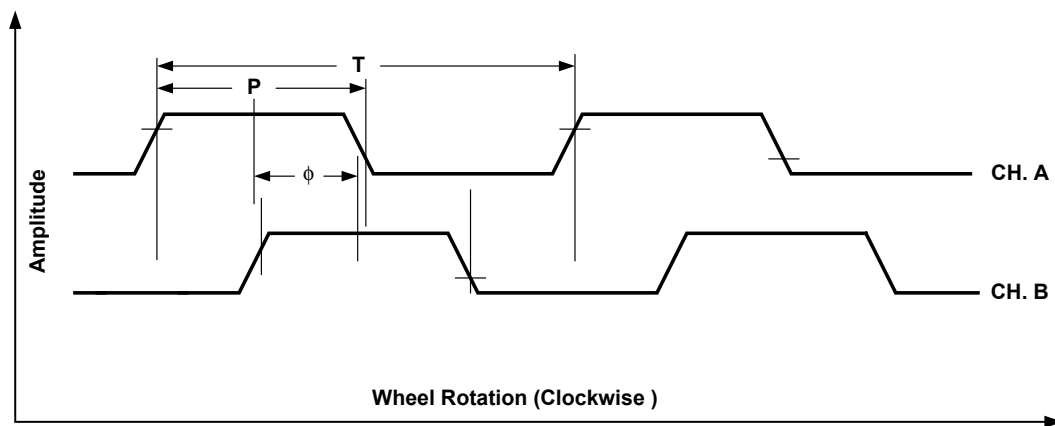
\*Note: Measurements in mm

Figure 4. Molex FFC/FPC 52892/3 series connector

## Electrical Connections

Pin	Symbol	Description
1	VLED	LED Anode
2	PDN	Power Down Control. LOW: Activate Power Down
3	S1	Connect to Switch 1 (S1)
4	S2	Connect to Switch 2 (S2)
5	S5	Connect to Switch 5 (S5)
6	GND_SW	Common Ground for S1,S2,S3,S4,S5
7	S4	Connect to Switch 4 (S4)
8	S3	Connect to Switch 3 (S3)
9	GND	Supply Ground
10	VCC	Supply Voltage
11	CH A	Channel A
12	CH B	Channel B
13	NC	Not Connected
14	NC	Not Connected
15	NC	Not Connected

## Scroll Wheel Output Waveform

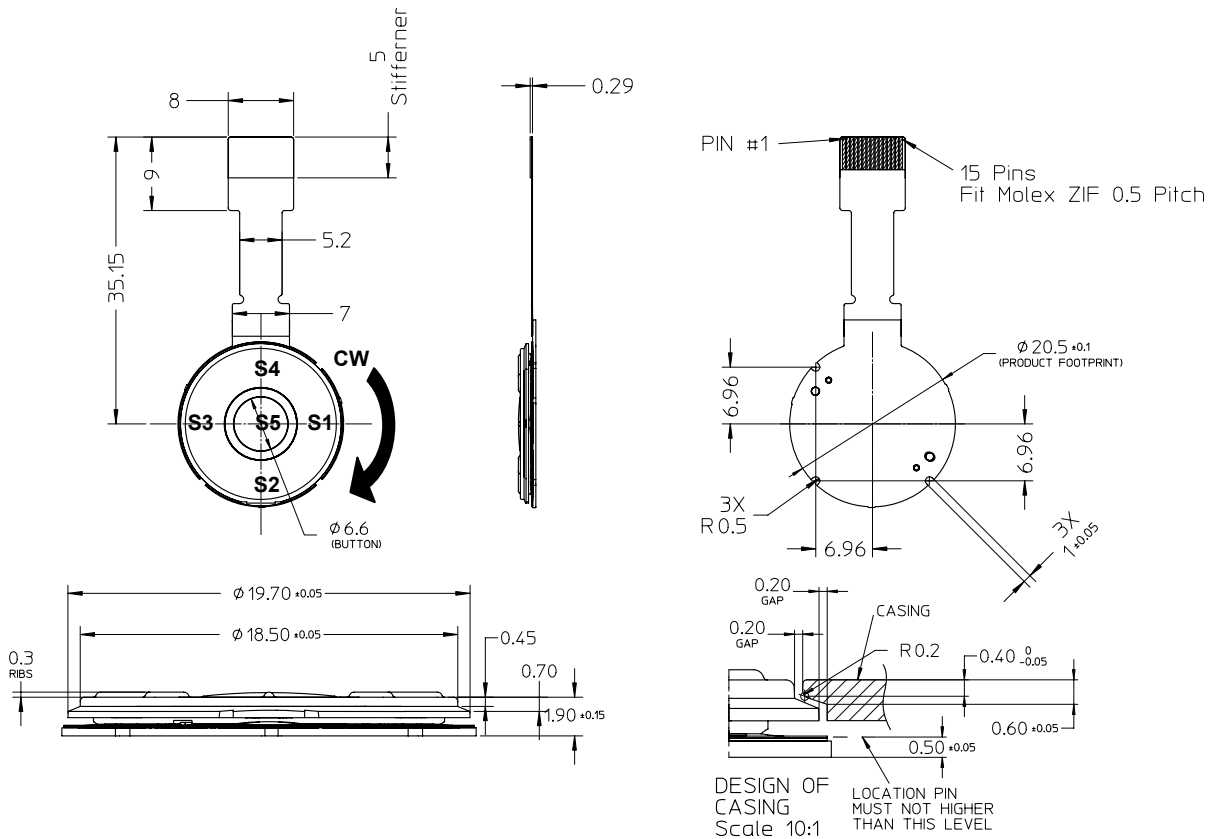


Notes:

1. CH A = Channel A; CH B = Channel B ; T = electrical cycle ; P = pulse width ;  $\phi$  = phase.

**Figure 5. Output Waveform**

## Package Dimensions



### Notes:

1. 3rd Angle Projection.
2. Unless otherwise specified, all dimensions are in mm.
3. Compatible with SMT ZIF bottom contact type FFC/FPC connectors for connectivity.

**Figure 6. Package Dimensions**

For product information and a complete list of distributors, please go to our web site: [www.avagotech.com](http://www.avagotech.com)

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