AMRX-1500
Ultra-slim Scrollwheel with 5-way Switch
Mounting and Electrical Connection Consideration

Application Note 5323

Description

Avago Technologies' AMRX-1500 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-1500 is ideal for scrolling of menus in new handheld electronic devices, such as in mobile phones, 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 and center selection from a list of menu. The aesthetic design of the scrollwheel is customizable to different colors and design features. Please refer to factory for further details.

Mounting Consideration

As AMRX-1500 is a constituent component of a system, e.g. a portable devices, the backplane of AMRX-1500 has readily available locational holes to allow proper placement of this component as illustrated Figure 1. In Figure 2, before the locating of this component, two sided adhesive tape can be implemented within the surface of the backplane. For selection of adhesive tape, please refer to factory.

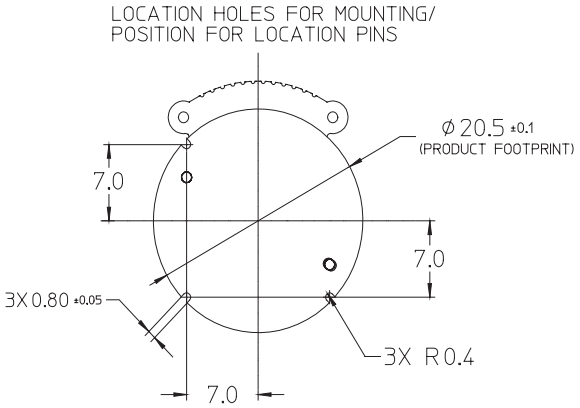


Figure 1. Backplane dimension for standard options

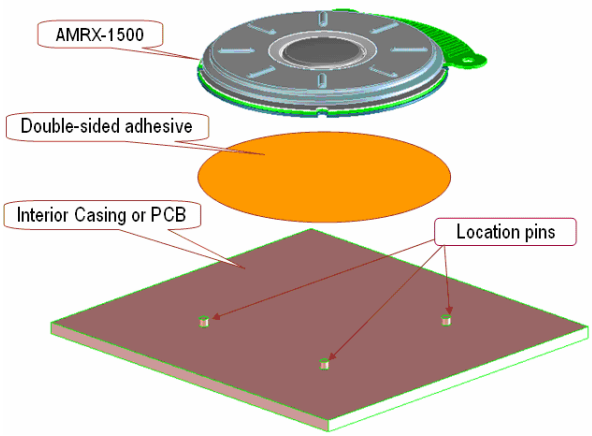


Figure 2. Exploded view of the components used for assembly

Besides standard options, there are different mounting/ placement methods available dependent on designer's preference. Figure 3 shows an alternative mounting option using a backplane with flanges. Using this alternative backplane design with flanges, designer can implement a few protrusion features on their plastic enclosures/covers to allow heat staking operation during assembly of this component.

Figure 4 shows a typical heat staking process.

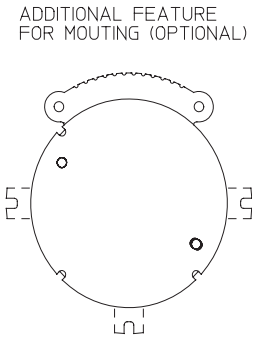


Figure 3. Backplane dimension for alternative options

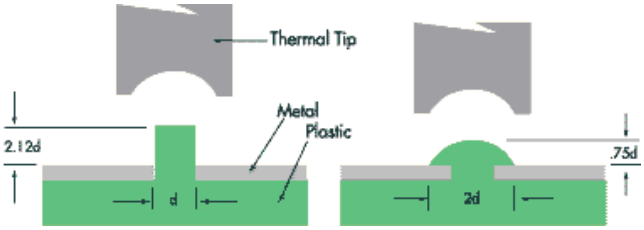


Figure 4. Typical heat staking process

The scrollwheel mechanical design 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 scrollwheel. In Figure 5, recommendation on the casing design is provided. The recommended gap takes into consideration – the clearance for the rotational movement of scrollwheel and the tilting of scrollwheel during 5-way switch operation.

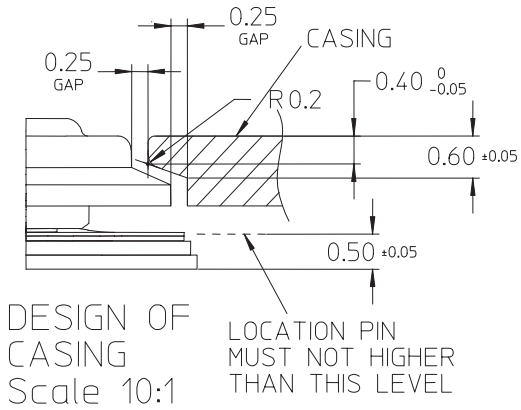


Figure 5. Recommendation on casing design

Electrical Connection Consideration

AMRX-1500 has 12 contact pads on the flexible cable for connectivity. They are of 1 mm pitch and 0.6 mm width. This configuration makes it compatible with FPC connector. In addition to that, the contact pads are designed to ease direct soldering onto a customer printed circuit board. The contact pads can be soldered direct as illustrated in Figure 6 and Figure 7. Two soldering alignment holes are designed into the flexible cable to ease the locating of the contact pads. Refer to Figure 13, for the dimensional information on the alignment holes.

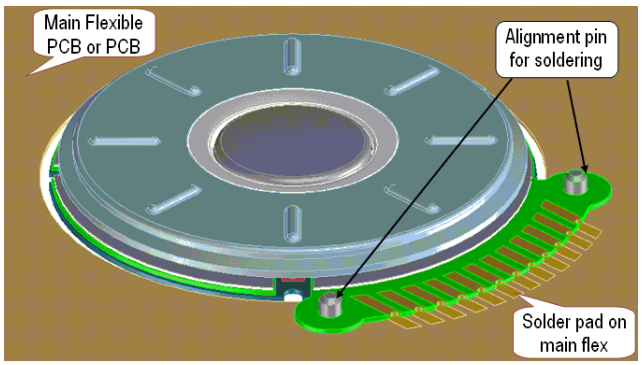


Figure 6. Direct soldering approach

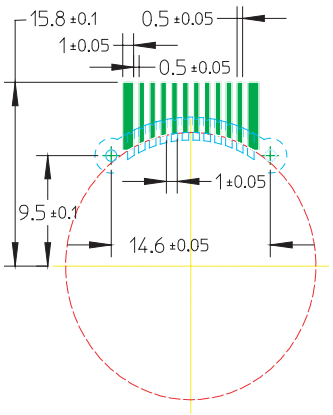


Figure 7. PCB footprint for AMRX-1500

Alternatively, by implementing a flexible cable soldered to the contact pads, the other end of the flexible cable can be connected to the main board via a FPC connector, e.g. MOLEX 1 mm pitch SMT ZIF Bottom Contact Type FFC/FPC connector 52271. The implementation of flexible cable allows flexibility in the system design, by not restricting mounting of AMRX-1500 to be close to the system main board, but may be away from the main board or host processing unit via a flexible cable. For example, the AMRX-1500 unit can be mounted at the different portion of a clam shell type mobile phone, away from the main board as illustrated in Figure 8.

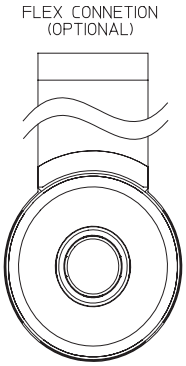


Figure 8. AMRX-1500 with a flexible cable

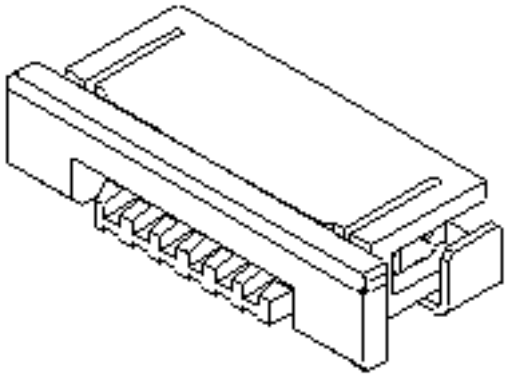
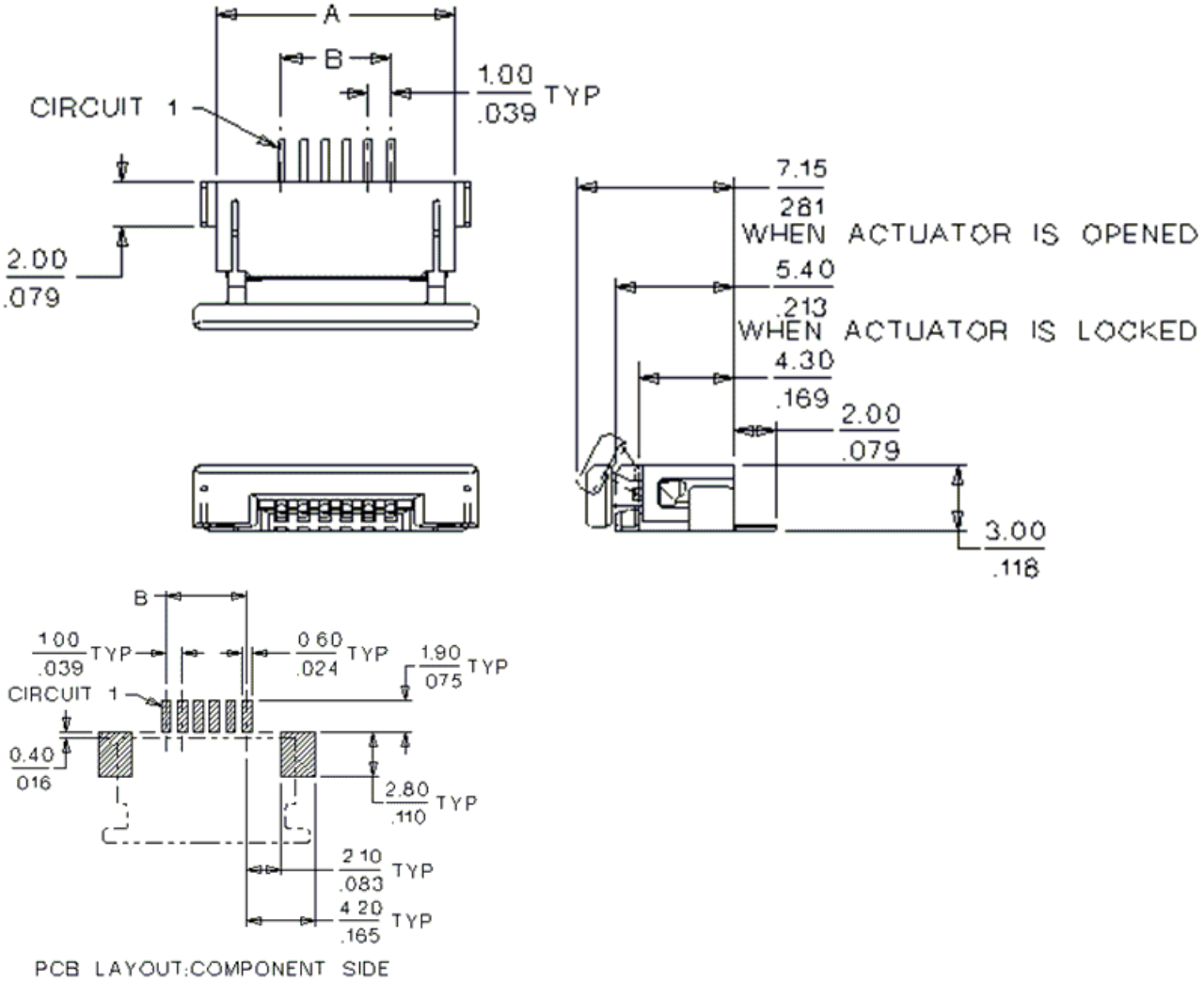


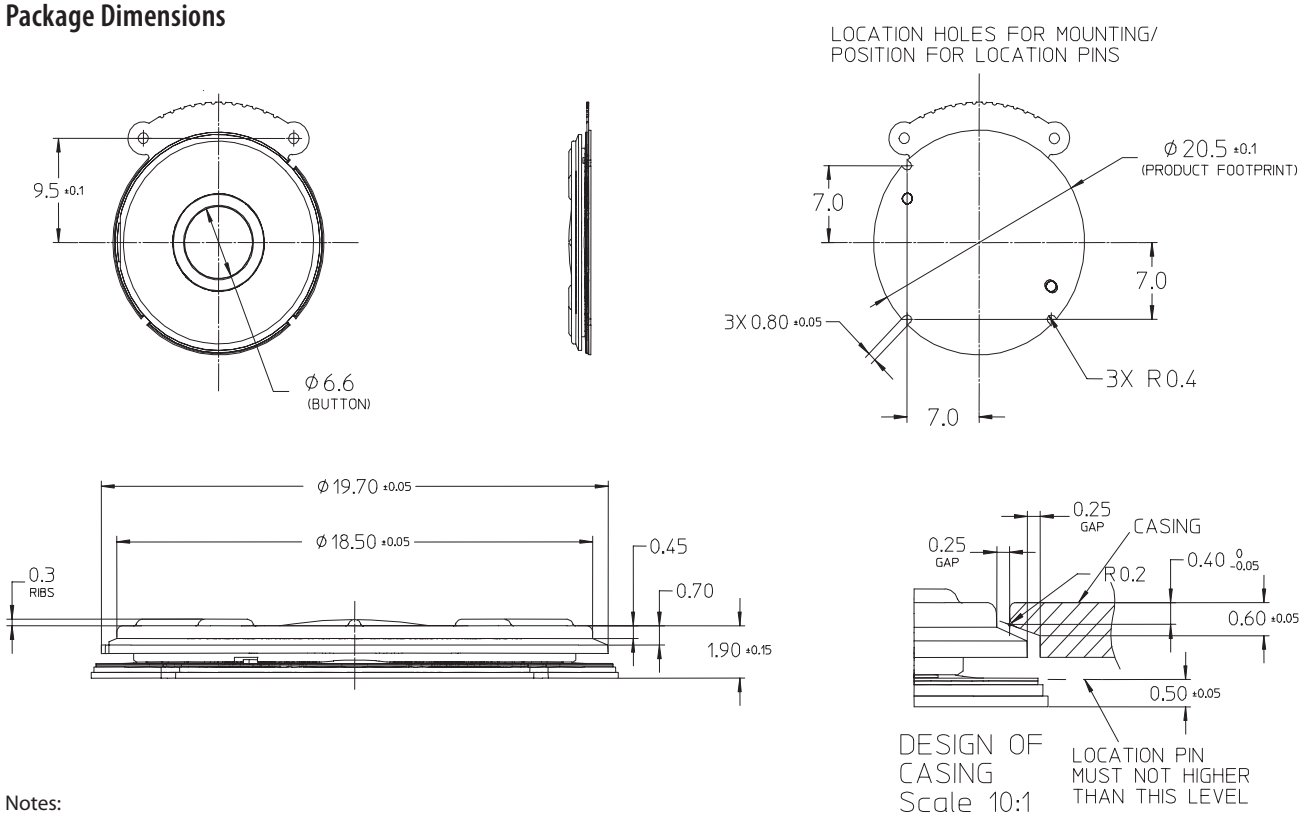
Figure 9. MOLEX 1 mm pitch SMT ZIF Bottom Contact Type FFC/FPC connector 52271



Circuit	Order No.	Dimension A, mm (inches)	Dimension B, mm (inches)	Carrier Tape Width, mm (inches)
12	52271-1290	17.00 (.669)	11.00 (.433)	32.00 (1.260)

Figure 10. FPC connector 52271-1290 outline dimension and PCB foot print

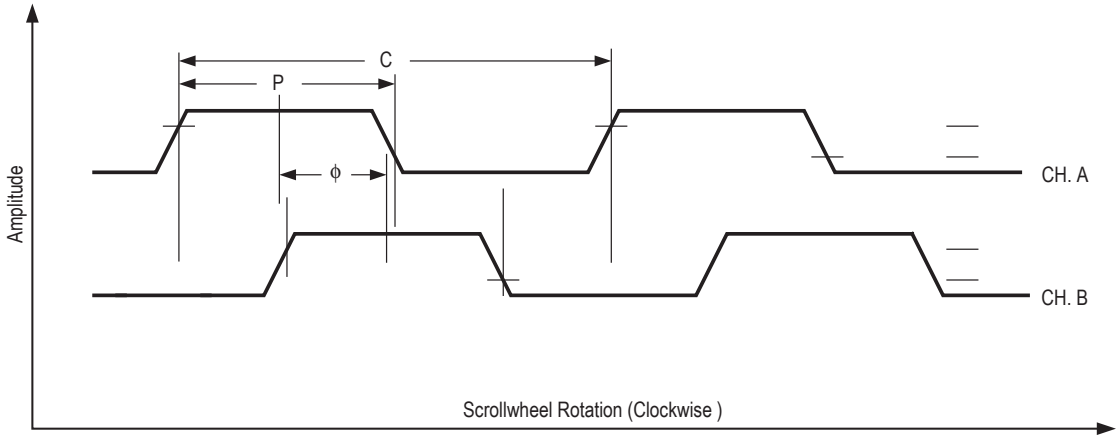
Package Dimensions



Notes:
1. 3rd Angle Projection
2. Unless otherwise specified, all dimensions are in mm.
3. Other mounting options available

Figure 11. Package Dimension

Scrollwheel Waveform Output



Notes:
1. CH A = Channel A; CH B = Channel B ; C = electrical cycle ; P = pulse width ; ϕ = phase.

Figure 12. Waveform output

Electrical Connections

Pin	Symbol	Description
1	VLED	LED Anode
2	PDN	Pown 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

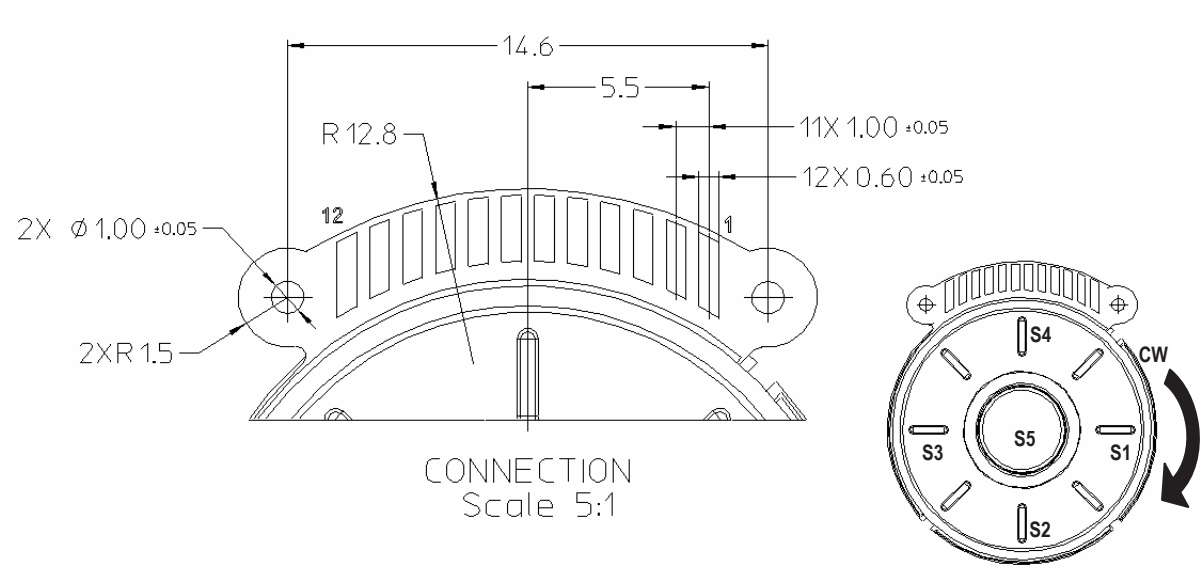


Figure 13. Electrical Connections

For product information and a complete list of distributors, please go to our web site: **www.avagotech.com**

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