

Frequently Asked Questions - Technical

This document answers the most frequently asked questions about AMRX series. It is organized into the following sections:

- A) System Integration
- B) Electrical
- C) Mechanical

A. System Integration

1. Can AMRX series exterior design be customized?

Yes, the top surface of rotary dial (wheel) can be customized and some customization requests are subject to NRE charges which may be amortized into the product unit price or paid up-front by the customers. A set of customization guidelines is available and may be requested through your Avago Sales Representative.

Refer to Application Note: Mounting & Electrical Connection and Customization Guidelines.

2. Can AMRX series scrolling resolution be customized? Are there any NRE charges for such customization?

Yes, resolution can be customized, typically from 12 to 45 cycles per revolution.

Yes, NRE charges are required.

3. What are the main features of AMRX series?

Ultra-slim package in less than 2 mm height profile; Around 18.5 mm diameter; Built-in illumination ring; Resolution of 45 cycles per revolution (CPR); 1.8V CMOS Logic Compatible single-ended output; Single 2.4V to 3.3V supply; Simple Power Down feature; Easy assembly, no signal adjustment required; Connectivity through flexible PCB.

4. What other customization options are made available to customers?

Please refer to customization guidelines.

5. What is the recommended mounting method for AMRX series?

Recommended mounting method is through locating features on the device back plate and securing via two-sided adhesive tape.

Refer to Application Note: Mounting & Electrical Connection.

6. Can SMT (reflow) method be used?

Due to the product offering in module form, the plastic piece parts are not recommended for Reflow process. Alternate methods such as connectivity via FPC connector can be considered, apart from direct soldering method.

7. Apart from adopting direct (manual) solder or FPC connector, what are the possible electrical connections for AMRX series? What is Avago's recommendation on this?

Conductive adhesive is another alternative.

FPC connector approach is the recommended method to avoid direct/manual soldering.

8. What are the recommended direct soldering guidelines (e.g. soldering temperature) for AMRX series?

The soldering temperature used for direct soldering is dependent on the solder wire used. Refer to solder wire manufacturer recommendation.

Contact footprint is as per recommendation in Application Note: Mounting & Electrical Connection.

9. If customers choose to adopt the connector method, can the connector be customized?

It is not advisable to use customized connector. Standard B2B / FPC connectors are sufficient to cater for typical connectivity requirements. Integration of standard connectors to our device is possible.

10. AMRX series offers quadrature signal interface which may not be a common interface for use on some handsets. What do the customers need to do at their end in order to adopt AMRX series? How can Avago help on the implementation at the customers' end?

Typical microprocessor for portable device has limited GPIO with interrupt. Use GPIO in polling mode to detect the level change. Refer to the Finite State Machine (FSM) in the Application Note: Using Quadrature Output.

Depending on the application, Avago could provide firmware support or other technical support to assist the customers in expediting their design activities.

11. Can the Illumination LED color be customized?

Yes, please refer to customization guide.

12. AMRX series offers built-in power down pin for power savings but it does not offer automatic power savings implementation within the device. How do the customers implement this in the phone?

Typically, it is implemented by connecting to the GPIO of the microprocessor. Change of logic state will activate or deactivate the Power Down feature via the PDN pin.

B. Electrical

1. The illumination feature in AMRX series is ideal for target applications such as handsets. How many LEDs are there in AMRX series module?

Only two LEDs are used in order to optimize current consumption and illumination performance.

2. What is the minimum operating voltage required for illumination?

Dependent of type of LEDs used and the illumination brightness. Typically at 2.8V.

3. What is the power consumption for the illumination feature?

Typically, less than 30mA.

4. AMRX series does not offer stand-by mode (which allows lower power consumption during active mode), thus current consumption may be a concern. What is the minimum current consumption for AMRX series during active mode? How can it be implemented?

Minimum current consumption during active mode: (Refer to Datasheet) is less than 10 mA without illumination. In active mode, illumination can be turned off to minimize current consumption.

5. How can power saving be implemented for the illumination?

As the supply voltage for illumination is dedicated via VLED pin, the power saving can be done by shutting down the supply, during rest/standby mode of portable device. Similar to the keypad illumination LED application.

6. How long does it take to get to power down mode?

After within 150ns upon activation of power down mode.

7. How can AMRX series be re-activated from power down mode?

By pulling the PDN pin to a high level > 1.2V.

8. How long does it take to wake-up from power down mode?

After within 1.5µs upon deactivation of power down mode. This is to prevent in-rush current from damaging the device.

C. Mechanical

1. The presented reliability target for key push lifetime at 200K times for each dome switch may not be sufficient for some handset OEMs. Does Avago has any plans to improve this?

For most applications, 200K times key push lifetime is sufficient. For longer key push lifetime, please refer to factory.

2. According to the AMRX series package dimension, there are some protrusions above the phone casing or the surface of the rotating wheel due to the added rib design on the wheel to enable better grip feel when the user rotates the wheel. What is the target thickness of this protrusion? This may affect the implementation of AMRX series on clamshell phones. How can this protrusion be minimized?

The protrusion feature is recommended to be at least 0.25 mm for better grip. Recess of maximum 0.15 mm depth can be implemented to increase the relative thickness of the protrusion, and yet maintain the protrusion height relative to the phone casing. Other alternatives are open for customer's preferences.

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AV01-0699EN - January 11, 2007

