

Type ABR Wi-Fi® Module

NXP 88MW320 Chipset for 802.11b/g/n WLAN Module
Hardware Application Note - Rev. 3.0

- Design Name: Type ABR
- P/N: CMWC1ZZABR

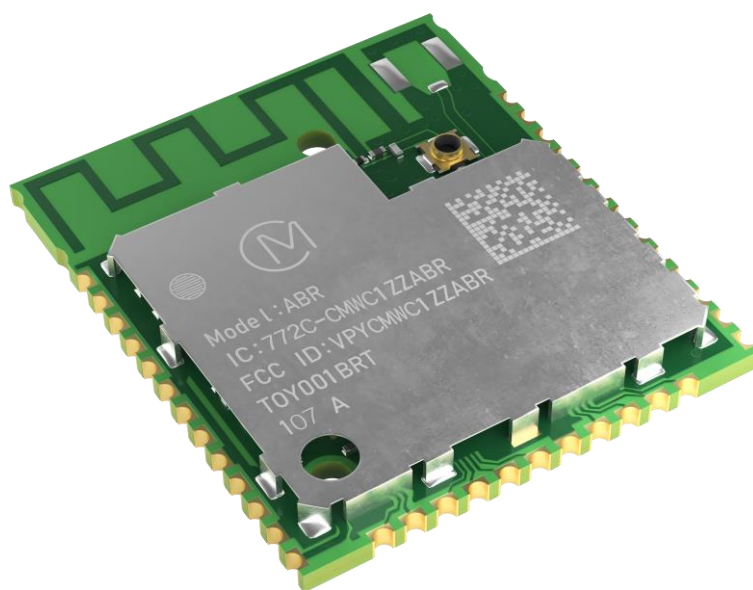


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About This Document

Type ABR is a small module (integrated PCB antenna) based on NXP 88MW320 (wireless microcontroller), supporting Wi-Fi 802.11 b/g/n. This application note provides RF and hardware design guidance. Refer to [Type ABR Datasheet](#)  for module specification.

Audience & Purpose

Intended audience includes any customer looking to integrate this module into their product. In particular, RF, hardware, systems, and software engineers.

Document Conventions

Table 1 describes the document conventions.

Table 1: Document Conventions

Conventions	Description
	Warning Note Indicates very important note. Users are strongly recommended to review.
	Info Note Intended for informational purposes. Users should review.
	Menu Reference Indicates menu navigation instructions. Example: Insert → Tables → Quick Tables → Save Selection to Gallery 
	External Hyperlink This symbol indicates a hyperlink to an external document or website. Example: Embedded Artists AB  Click on the text to open the external link.
	Internal Hyperlink This symbol indicates a hyperlink within the document. Example: Scope  Click on the text to open the link.
<code>Console input/output or code snippet</code>	Console I/O or Code Snippet This text Style denotes console input/output or a code snippet.
<code># Console I/O comment // Code snippet comment</code>	Console I/O or Code Snippet Comment This text Style denotes a console input/output or code snippet comment. • Console I/O comment (preceded by "#") is for informational purposes only and does not denote actual console input/output. • Code Snippet comment (preceded by "//") may exist in the original code.

1 Scope

This application note provides detailed information on schematic/layout design, and references RF performance benchmarks. Refer to [Type ABR Datasheet](#)  for module specification.

2 Module Introduction

Type ABR is a small module (integrated PCB antenna) based on NXP 88MW320 (wireless microcontroller), supporting Wi-Fi 802.11 b/g/n up to 72.2 Mbps PHY data rate, with an integrated 200 MHz ARM Cortex-M4F MCU for host-side applications.

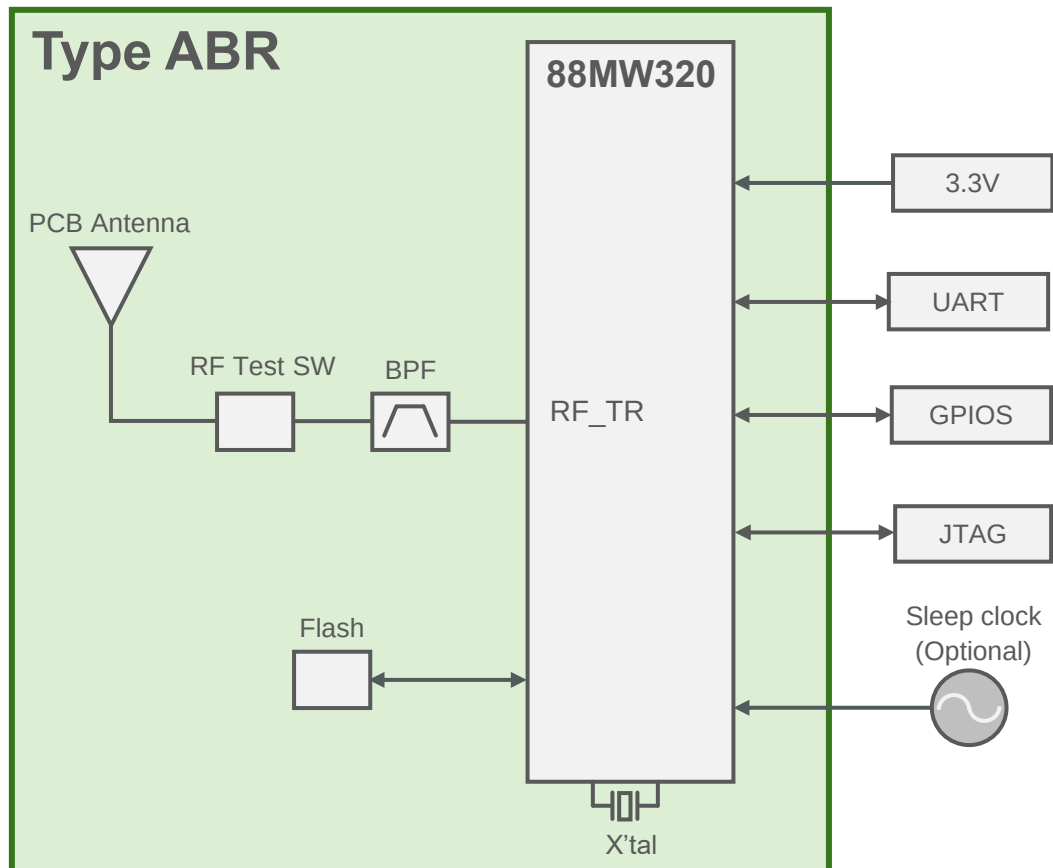
2.1 Features

- WLAN 802.11b/g/n SMD module with NXP 88MW320
- Small size LGA package with metal shielding
- UART as the host interface
- MAC address is stored in OTP
- Integrated PCB antenna
- SPI Flash on module (2 Mbytes)

2.2 Hardware Block Diagram

Figure 1 shows the block diagram of Type ABR module.

Figure 1: Block Diagram



3 Reference Design

This section has the reference design for Type ABR and external BOM list.

3.1 Reference Circuit

Figure 2 shows the Type ABR reference circuit.

Figure 2: Reference Circuit

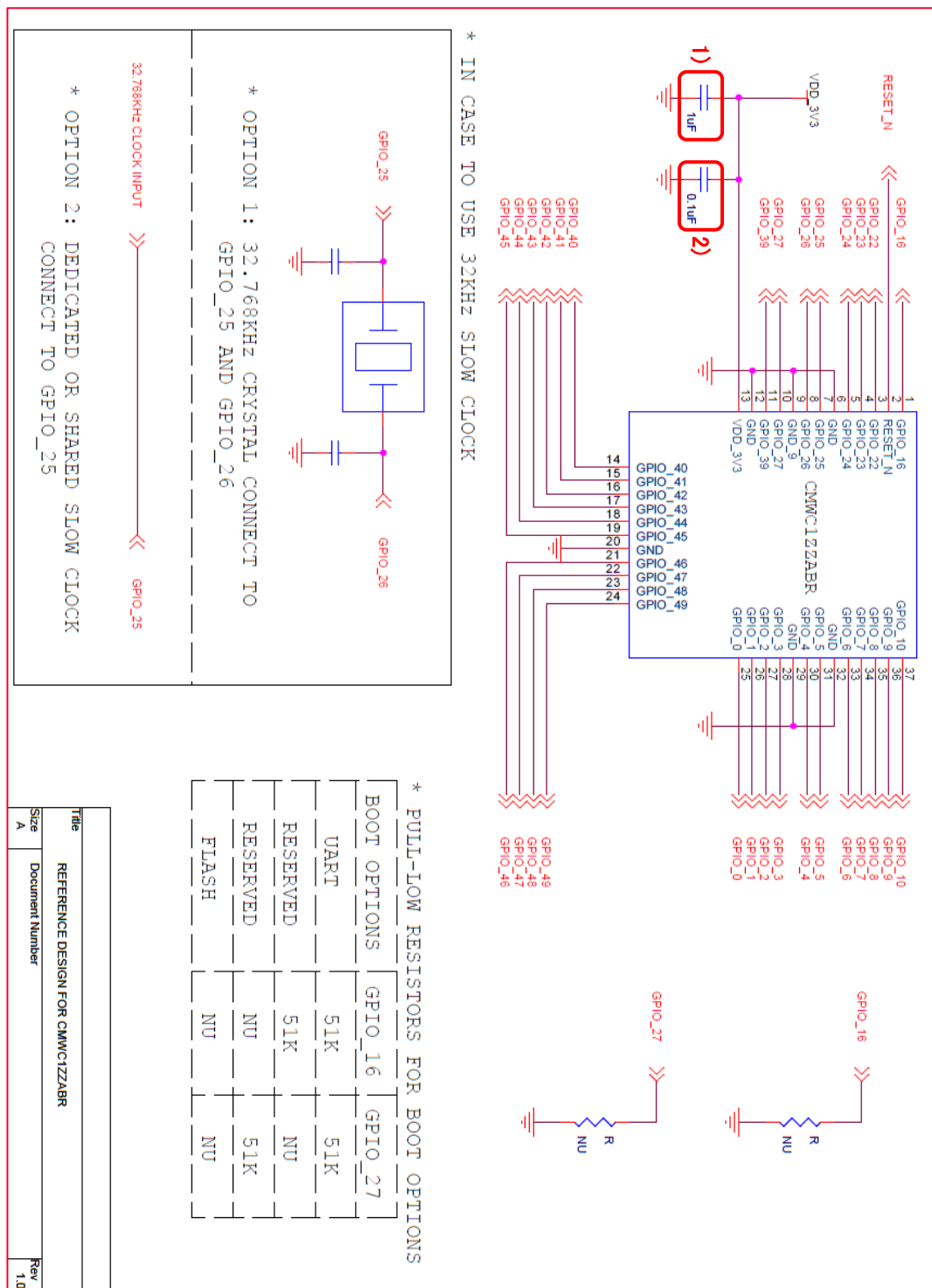
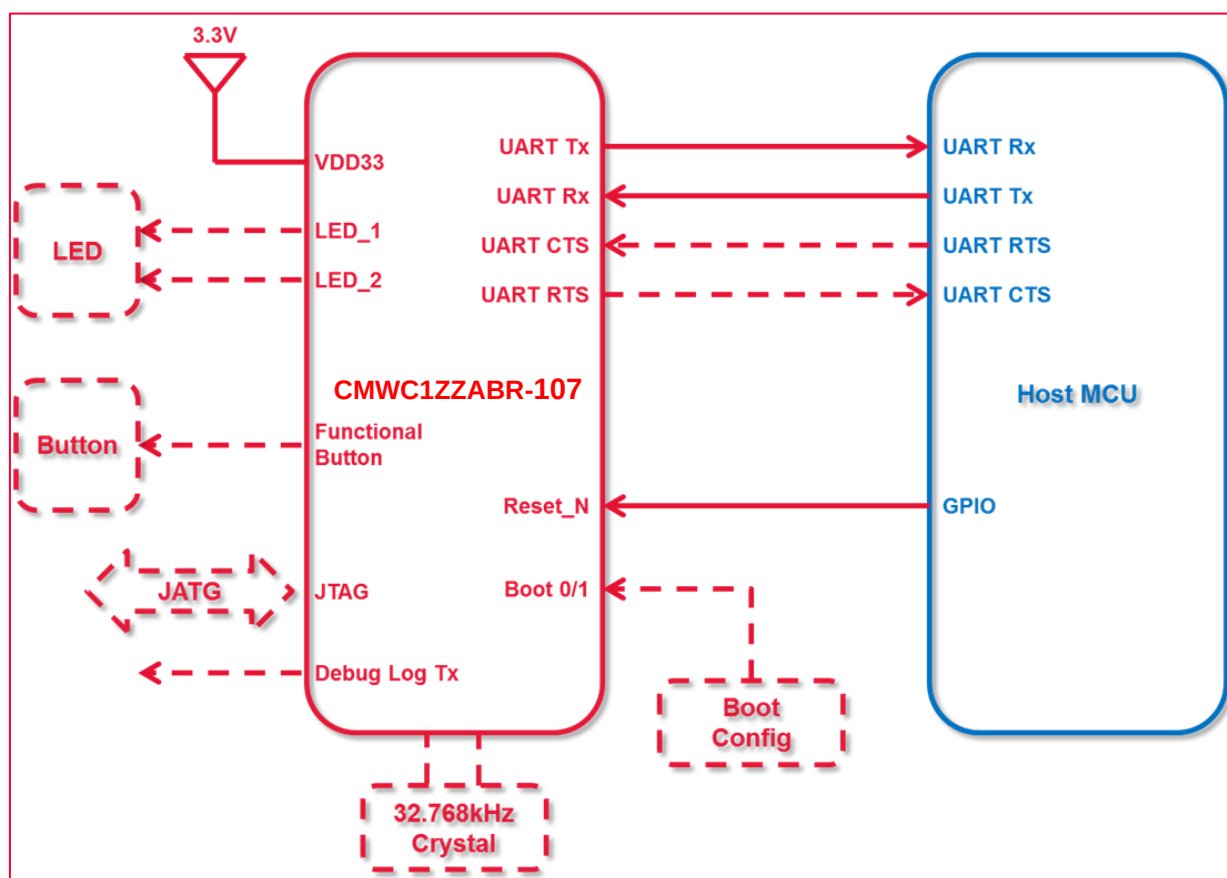


Figure 3 shows the reference circuit connection diagram for Type ABR module.

Figure 3: Reference Circuit Connection Diagram



3.2 External BOM List (Reference)

Table 2 shows the external BOM list for Type ABR as reference.

Table 2: External BOM List (Reference)

Block	Components	Value	Pcs	Note
1)	C	1.0 μ F	1	1.0 μ F
2)	C	0.1 μ F	1	0.1 μ F

4 HW Design Guideline

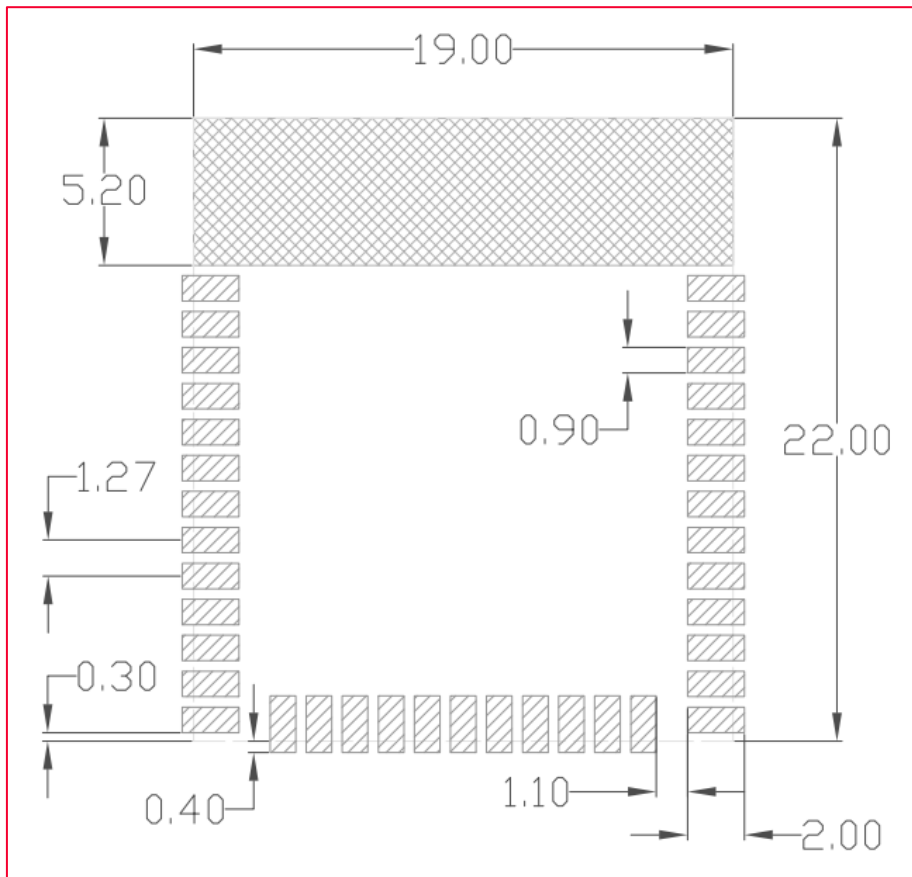
4.1 Requirements for Unused Signals

Any pull-up/down is not necessary (floating) for GPIO [0..49] if these signals are not used.

4.2 Module Footprint Design

Figure 4 shows the Type ABR module footprint design.

Figure 4: Module Footprint Design



4.3 PCB Antenna

This module is certified with internal PCB antenna by regulatory certification body.

To use internal PCB antenna, following guidelines must be followed in order to get best antenna performance

1. Place the antenna area on the corner or edge of the main board.
2. No ground, circuit, component under the antenna area, including the reverse side of PCB. No ground area is as large as possible.
3. Metal component should be at least 10 mm away from PCB antenna.
4. Plastic case should be at least 10 mm away from PCB antenna. If it's metal case, it's recommended to use external antenna.

5 Reference Performance Data

This section describes the typical Rx minimum sensitivity level at module antenna port at different frequencies.

5.1 Typical Rx Minimum Sensitivity Level at Module Antenna Port

This section describes the Typical Rx Minimum Sensitivity Level at module antenna port.

- Condition
 - VDD33 = 3.6V

Table 3: Typical Rx Minimum Sensitivity Level

Mode	Rx Minimum Sensitivity Level [dBm]		
	11b (11 Mbps)	11g (54 Mbps)	11n (MCS7)
Chan 1	-86.9	-72.3	-70.7
Chan 7	-87.3	-72.8	-71.0
Chan 13	-87.5	-73.0	-71.1

5.2 Typical Tx/Rx Current Consumption

This section describes the typical Tx/Rx current consumption.

- Conditions
 - 25 °C
 - VDD33 = 3.3V
 - Tx on continuous mode

Table 4: Typical Tx/Rx Current Consumption

Mode	Rate	VDD33 (mA)
Sleep Mode		
WLAN power save mode (MCU active)	N/A	28.5
WLAN power save mode (MCU power save, DTM1)	N/A	0.253
Active Mode		
Rx active (1024 bytes, 20 μ s interval)	11b (11 Mbps)	83
	11g (54 Mbps)	83
	11n (MCS7)	83
Tx (1024 bytes, 20 μ s interval)	11b @17 dBm	303
	11g @15 dBm	285
	11n @14 dBm	282

5.3 RF Throughput

The RF throughput test configurations are:

- Conditions
 - WMSDK: Version 4.0.27
 - ABR Wi-Fi FW: mw30x_uapsta_14.76.36.p121
 - AP: TL-H29RA (TP-Link)

Table 5 shows the RF throughput data for the module.

Table 5: RF Throughput Data

Test Item	AP Mode	Throughput in Mbps
TCP (iPerf)	11b/g/n mixed mode	24.8
UDP (iPerf)	11b/g/n mixed mode	44.8

6 References

Table 6 reviews all the key reference documents that the user may like to refer to.

Table 6: Reference Table

Support Site	Notes
Murata Type ABR Module Datasheet 	Murata Type ABR module datasheet (typeabr.pdf)
Murata Type ABR Module Footprint 	Murata Type ABR module footprint (typeabr_module_footprint_topview.dxf)

7 Technical Support Contacts

Table 7 lists all the support resources available for the Murata Wi-Fi/BT solution.

Table 7: List of Support Resources

Support Site	Notes
Murata Community Forum 	Primary support point for technical queries. This is an open forum for all customers. Registration is required.
Murata i.MX Landing Page 	No login credentials required. Murata documentation covering hardware, software, testing, etc. is provided here.
Murata uSD-M.2 Adapter Landing Page 	Landing page for uSD-M.2 Adapter. In conjunction with Murata i.MX Landing Page, this should provide the user with comprehensive getting started documentation.
Murata Module Landing Page 	No login credentials required. Murata documentation covering all Infineon-based Wi-Fi/BT modules is provided here.

Revision History

Revision	Date	Section	Change Description
1.0	Sep 15, 2021	-	First issue.
2.0	Nov 16, 2022	Reference design. HW Design Guideline. Reference performance data.	- Added External BOM List (Reference). - Added Module footprint design, PCB antenna, Power Up Sequence. - Added Typical Tx/Rx current consumption, RF throughput.
3.0	Nov 28, 2022	Updated to new format	- Moved section 5.1 (Typical Tx Output Power) to the ABR datasheet. - Removed section 4.4 (Power-On Sequence). It is present in ABR datasheet.



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