PRODUCT DATASHEET

Notecarrier Datasheet

Notecarrier XM v1.2

Notecarrier XM is the most minimal Notecarrier, containing essential circuitry for Notecard and a USB-C port for USB Serial access. Designed as a low-cost companion to Notecard for LoRa and Notecard WiFi, it can be used with any Notecard. Unlike other Notecarriers, it does not include an external SIM slot.

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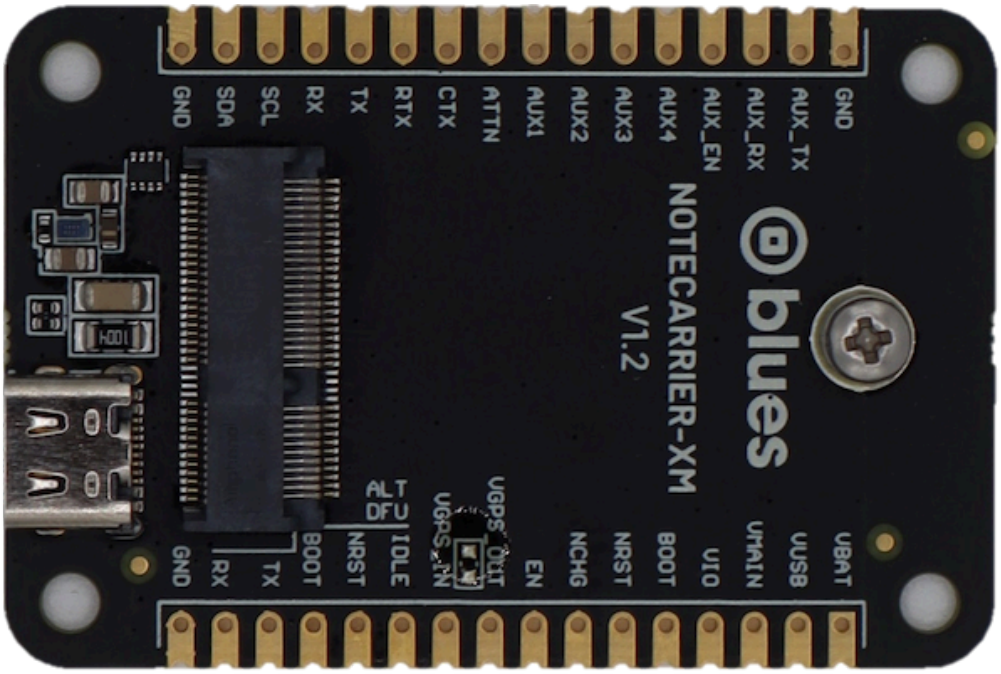
Blues Notecarrier® Datasheet: Notecarrier XM v1.2



Functional Description

Notecarriers are available in multiple form factors to support rapid development across a range of use cases. Depending on the variant, a Notecarrier may prioritize direct host integration, compact size, integrated cellular/WiFi and GNSS antennas, or the ability to be soldered directly into a low-volume production design.

Notecarriers are explicitly designed to bridge the gap between early prototyping and a production-ready Notecard-based solution. In a final product, the Notecard is typically socketed directly onto a custom PCB via an edge connector, alongside the customer's MCU, sensors, and supporting circuitry. While this approach provides maximum flexibility and modularity, it can significantly increase the effort required during initial development and validation.

To simplify this process, Notecarriers expose the Notecard's interfaces through convenient breakout connections and integrate essential supporting circuitry, including power regulation, protection, and signal conditioning. This allows developers to focus on firmware, connectivity, and system behavior without first designing a complete custom carrier board.

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Features

- **Simple.** Provides breadboard compatible pins or solderable mask for direct connections.
- **Compatible.** Breaks out Notecard's I2C and serial interfaces for direct connection to a host MCU or single-board computer.
- **Convenient.** Powered by a USB connector (requires 2A supply).
- **GPS Ready.** Models are either active GPS compatible, or feature a built-in antenna to enable GNSS connectivity.

Compatible Notecards

Due to differences in the physical size of Notecards, certain Notecarriers are only compatible with certain Notecards. However, the **Notecarrier XM v1.2** is **compatible with all available Notecards**:

- Notecard Cell+WiFi
- Notecard Cellular
- Notecard Cellular (Legacy)
- Notecard WiFi
- Notecard LoRa

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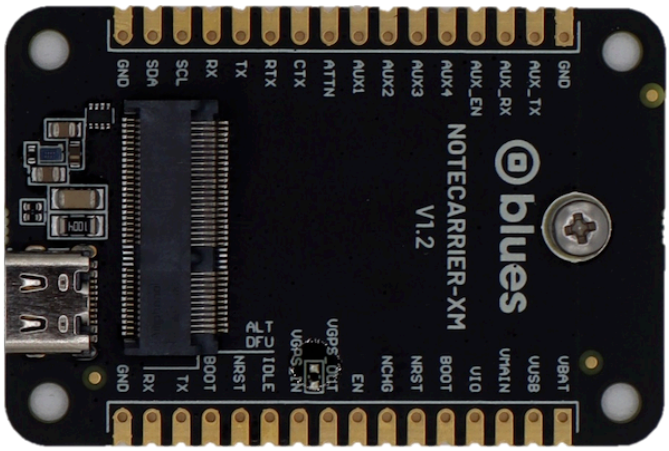
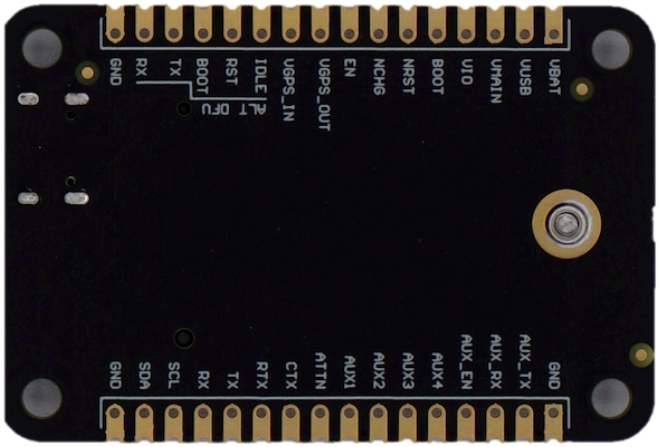
Package Configuration

Notecarrier XM v1.2

Notecarrier XM is a small form-factor Notecarrier, only slightly larger than the Notecard itself. The Notecarrier XM is our most minimal Notecarrier, containing essential circuitry for the Notecard and a USB port for USB Serial access to the Notecard. The Notecarrier XM was designed as a low-cost companion to the Notecard LoRa and Notecard WiFi, though it can be used with any Notecard. Unlike other Notecarriers, the Notecarrier XM does not include an external SIM slot.

View in Store

Front	Back
	

- Notecard edge connector socket and mounting screw receptacle.
- USB-C port to power Notecarrier and provide a USB Serial command interface to Notecard.
- Requires user provided U.FL cellular/WiFi antenna and optional U.FL active GPS antenna.
- PCB Dimensions: 57mm x 38mm
- Center of Mounting Holes: 53mm x 34mm (measured from the edge of the PCB to the center of the furthest mounting hole)

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Power Information

All Notecarriers can be powered by connecting directly to the USB port. However, most installations will not have USB power available, so several alternate power options are provided by the various Notecarrier models:

- Applying 2.5-5.5VDC to the `VBAT` or `VMAIN` pins.

  Commonly provided via DC power supply or non-rechargeable battery.

Warning

Typical USB ports may only be capable of supplying 500 mA of current, which might not be enough to power Notecard during a cellular connection to a GSM network (which can spike to 2A). In this situation, you're advised to supplement power to your Notecarrier with an external source.

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GPS (GNSS) Antenna Requirements

All Notecarrier models are designed to support active GPS, and several Notecarrier models provide built-in antennas ready to be connected to a Cellular Notecard using the included u.FL cables.

Enabling Active GPS

If using Notecarrier XM v1.2 with an active GPS antenna, add a 0-Ohm 0603 jumper to the unpopulated spot between `VGPS_OUT` and `VGPS_IN`. This will power an active GPS LNA with a 3.8VDC bias voltage on the center conductor of its GPS u.FL connector.

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Header Descriptions

Notecarrier XM v1.2 Dual 16-pin Headers

Pin Name	Direction	Usage		Usage	Direction	Pin Name
GND	IN	Ground		Power input, combined with VUSB through an ideal-diode OR to supply VMAIN	IN	VBAT
AUX_TX	OUT	High-speed diagnostic interface		Direct connect to VUSB pin of the USB connector	IN/OUT	VUSB
AUX_RX	IN	High-speed diagnostic interface		Diode union of VUSB and VBAT sources	OUT	VMAIN
AUX_EN	IN	Enable diagnostics		Digital I/O voltage source with 100mA available	OUT	VIO
AUX4	IN/OUT	API-selectable modes of operation		Access to Notecard boot pin	IN	BOOT

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Pin Name	Direction	Usage		Usage	Direction	Pin Name
AUX3	IN/OUT	API-selectable modes of operation		For development use only: MUST normally be NC or High Impedance and must never be pulled to GND. A VIO-level pulse of >250ms will reset the Notecard	IN	NRST
AUX2	IN/OUT	API-selectable modes of operation		Direct connect to Notecard's `AUX_CHARGING` (charge detection) pin	IN	NCHG
AUX1	IN/OUT	API-selectable modes of operation		For On/Off switching of customer product. Leave NC or connect to a physical switch or Open Drain output. Notecard will be OFF if pulled to GND. Never apply positive voltage to this pin.	IN	EN
ATTN	OUT	Configurable interrupt signal		Active antenna GPS 3.8V from Notecard	OUT	VGPS_OUT

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Pin Name	Direction	Usage		Usage	Direction	Pin Name
CTX	OUT	Clear to transmit		Active antenna GPS bias voltage	IN	VGPS_IN
RTX	IN	Request to transmit		Active LOW when ALTDFU is active	OUT	IDLE
TX	OUT	UART serial transmit request interface		Allows Notecard to toggle host active LOW reset pin ALTDFU	OUT	NRST
RX	IN	UART serial receive request interface (Notecard has onboard 10K pull-up resistors)		Allows Notecard to toggle host `BOOT` pin ALTDFU	OUT	BOOT
SCL	IN/OUT	I2C clock request interface (Notecard has onboard 10K pull-up resistors)		UART serial transmit request interface, specifically used to program the host MCU. ALTDFU	OUT	TX

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Pin Name	Direction	Usage		Usage	Direction	Pin Name
SDA	IN/OUT	I2C data request interface (Notecard has onboard 10K pull-up resistors)		UART serial receive request interface, specifically used to program the host MCU. ALTDFU	IN	RX
GND	IN	Ground		Ground	IN	GND

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Specifications

Electrical Characteristics

DC Characteristics

Description	Minimum	Maximum	Unit
Supply Voltage	2.5	5.5	V
Supply Current	500	2000	mA

Absolute Maximum Ratings

Description	Minimum	Maximum	Unit
Storage temperature	-35	70	°C

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Ordering Information

- Notecarriers
- Development Kits

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Design Files

Open source hardware designs for all Notecarriers are maintained in the note-hardware GitHub repository.

Here are the design files available for the **Notecarrier XM v1.2**:

- Schematic (`.pdf`) — the full circuit schematic. Use it to understand how the Notecard, power, and I/O are wired together when designing a host or debugging a connection.
- Bill of materials (`.xlsx`) — every component with its reference designator and manufacturer part number. Use it to source parts or build your own board.
- Assembly drawing (`.pdf`) — shows component placement and reference designators. Use it to locate parts during assembly or rework.
- Dimensional drawing (`.pdf`) — board outline, mounting-hole locations, and connector positions for enclosure and mechanical fit.
- Fabrication package (`.zip`) — the Gerber/ODB++ and drill set. Send this package to a PCB manufacturer to have bare boards produced.
- Pick-and-place (`.pnp`) — component centroid (X/Y/rotation) data used to program automated SMT assembly.
- 3D model (`.step`) — a STEP 3D model. Import it into mechanical CAD to check fit and design enclosures.
- 3D view (`.pdf`) — an interactive 3D view you can rotate and inspect in Adobe Acrobat, no CAD software required.
- KiCad project (folder) — the complete, editable KiCad design (schematic sheets, PCB layout, and libraries). Open it in KiCad to modify the design or generate your own outputs.

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Board Errata

No board errata are currently documented for the **Notecarrier XM v1.2**.

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Revision History

Author	Date	Summary
Ray Ozzie	2019-2020	Document drafted
John Wiedey	2020	Various improvements
Sean Taylor	2020	Various improvements
Zachary J. Fields	01 OCT 2020	Updated information and translated to markdown
Brandon Satrom	04 JAN 2021	Added link to design resources
Greg Wolff	13 JAN 2021	Added BAT pin information to Notecarrier AF datasheet
Brandon Satrom	07 APR 2022	Added Notecarrier A information
Zachary J. Fields	20 JUL 2022	Added Notecarrier F information
Zachary J. Fields	24 OCT 2022	Added Notecarrier B v2 information
Rob Lauer	28 OCT 2022	Added versioning for Notecarrier B v1/v2
TJ VanToll	05 JAN 2023	Added Notecard Outboard Firmware Update information

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Author	Date	Summary
Rob Lauer	28 FEB 2023	Re-labeling Notecarrier B as "Basic"
Rob Lauer	01 MAR 2023	Added PCB/Mounting Hole Dimensions
Rob Lauer	07 SEP 2023	Added Notecarrier F v1.3 information
Rob Lauer	16 NOV 2023	Added Notecarrier Pi v2.0 information
Rob Lauer	14 MAR 2024	Added Notecarrier B v3.1 and Notecarrier R v1.0 information
Rob Lauer	05 JUN 2024	Added Notecarrier XS v1.1 information
Rob Lauer	10 JUN 2024	Added KiCad schematics to A, B, F, and Pi Notecarriers
Rob Lauer	18 JUL 2024	Added Notecarrier XS v1.2 information
Rob Lauer	22 JUL 2024	Updated Notecarrier pin descriptions
TJ VanToll	19 AUG 2024	Added Notecarrier X v1.2, XM 1.2, and XP 3.1 information
Rob Lauer	14 JAN 2026	Added Notecarrier CX v1.3 information

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Author	Date	Summary
Rob Lauer	11 FEB 2026	Added Notecarrier A v2.3 information
Rob Lauer	22 MAY 2026	Added Notecarrier CX v1.7 information
Rob Lauer	11 JUN 2026	Added Notecarrier XI v1.4 information
Rob Lauer	16 JUL 2026	Corrected Notecarrier XI DC specifications and Starnote for Iridium antenna details
Rob Lauer	03 AUG 2026	Add newly updated KiCad schematics
Rob Lauer	19 AUG 2026	Added Notecarrier XI v1.4 board errata
Rob Lauer	16 SEP 2026	Added Notecarrier F v1.5 information
Rob Lauer	18 SEP 2026	Replaced the Notecarrier F v1.3 KiCad schematics with the validated Altium conversion
TJ VanToll	21 SEP 2026	Updated Notecarrier F v1.5 pins for Notecard Outboard Firmware Update
Rob Lauer	21 OCT 2026	Corrected power input, header pin, and active GPS details for Notecarrier Pi, B, R, X, XS, XI, XM, XP, and CX

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Contact Information

Blues Inc.
https://blues.com
50 Dunham Ridge Suite 1650
Beverly, MA 01915
support@blues.com

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