

NEW PRODUCT ANNOUNCEMENT

SHARi PiHat (Unistorm Case)

Kits for Hams is pleased to announce that a new version of the SHARi PiHat, called the SHARi PiHat (Unistorm Case) is now available for purchase.

SHARi (SA818 Ham Allstar Radio Interface) PiHat (Unistorm Case) is a kit construction project for ham radio operators that implements a Raspberry Pi3 or Pi4 hosted Allstar node using a NiceRF SA818 embedded UHF (420 – 450 MHz) or a VHF (144-148 MHz) radio module. The radio module and interface circuits are located on a custom Raspberry Pi Hat board. A complete Allstar node can be created with a SHARi PiHat Unistorm Case kit, a Raspberry **Pi3 or Pi4** (with power supply and microSD card) and an Allstar image.

There are several options available including:

- Pi3 or Pi4 single board computer.
- UHF (70 cm) **or** VHF (2 meters) ham band.
- Vertical straight antenna or elbow right-angle antenna.
- Optional cooling fan.



Background

The current SHARi PiHat product uses the Neo case from Argon40. This case is only available for the Pi4. There is no Pi3 model of the case. Because of the current unavailability of Pi4's this has led to shortages for this product as a completely assembled kit. In addition, numerous potential kit builders have said, "I have a Pi3 available but not a Pi4. Would you please develop a Pi3 version of the SHARi PiHat."

Our current SHARi PiHat board used with the NEO case was designed to fit the dimensions of the NEO case. In particular, one edge of the board is about 0.14 inches wider than the standard PiHat dimension to allow the LEDs and antenna to be located at the edge of the case. Thus, to design a SHARi PiHat node using a different case it was necessary to modify the SHARi PiHat PCB design.

Product Description

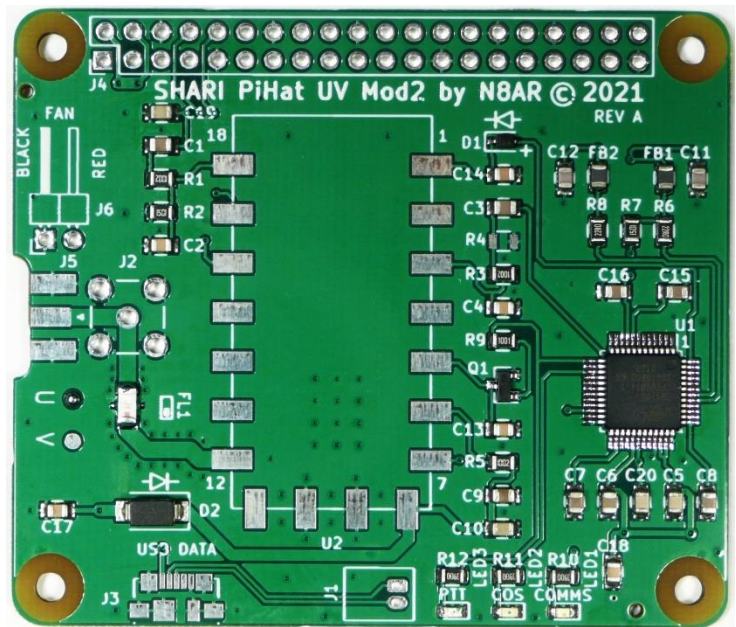
SHARI PiHat Mod2 PC Board

A slightly modified version of our PiHat PCB called the PiHat Mod2 is used in this unit. This board uses the same electronics as the original PiHat board and adds some new features. These added features are especially useful for builders who would like a PiHat board to build into a custom unit using a Raspberry Pi case of their choice. These features include:

- Conforms to the PiHat standard dimensions
- Allows the use of an edge-mounted or vertical SMA RF connector.
- 2 pin right angle male pin header fan connector (now added to the current PiHat also)
- Alternate USB connection path to the Pi via a microB connector using a standard 15 cm USB right-angle cable (not used in PiHat Unistorm product)
- Additional EMI filtering/decoupling components reduces the need for an EMI shielded case.

The SHARI PiHat Mod2 PCB is implemented with surface mount parts, a NiceRF radio module with castellated holes for mounting to the PC board and through-hole connectors. The board is supplied with all the small surface mount parts installed. The kit builder installs two through-hole connectors, an SMA RF connector and the SA818 radio module. J6 is provided with the optional fan kit.

The board is available with J3 installed for those interested in using their own case and a 15 cm external right-angle USB TypeA to microB cable to connect the USB signal from the Pi to the SHARI PiHat Mod 2 PC board



SHARI PiHat (Unistorm Case) Allstar Node

Key Features of the kit

- Uses CMedia CM108B or CM119B USB Audio IC.
- Uses a NiceRF SA818 UHF (420-450 MHz) or VHF (144-148MHz) embedded radio module (www.nicerf.com) with an LTCC lowpass output filter
- 350 to 600 milliwatts RF output power
- Raspberry Pi, power supply and microSD card provided by kit builder.
- Unistorm Pi3 or Pi4 rugged, RFI resistant metal enclosure with perforated top for ventilation.
- RX/TX serial connection from the Pi4 GPIO to the SA-818 radio module to change RF module parameters including RF and CTCSS/CDCSS frequencies.
- Clamp-on ferrite provided to mitigate buzz interference from high RF fields near the Pi power supply.
- Two antenna options (Elbow and Straight Rod).
- Cooling fan option (requires no additional holes to be drilled in the case)

Setting Expectations

- **Operational Issues?**
 - If you use WiFi instead of wired ethernet for your Allstar node, the all aluminum vs. case design may significantly reduce the WiFi range of your node.
- **Degree of soldering difficulty –Medium**
 - Assembly of the SHARI PiHat kit requires standard through-hole soldering of two leaded connectors. The SA818 embedded radio module is surface mounted using castellated holes soldered to very large solder pads on the PCB. (Kits for Hams will install the SA818 module for you for a small increase in price). The SMA RF connector is also soldered to large pads on the PCB. **The builder also solders two small wires to test point pads on the Raspberry Pi4.**
- **Degree of mechanical difficulty – Easy**
 - The kit builder has to drill one 9/32” hole in an aluminum end plate for the elbow antenna option. A 3D printed hole location tool is provided to help in determining the hole location.
 - The required hole through the top cover is provided for the straight antenna option.
 - The case screws together using a small Phillips screwdriver.

Options

The SHARI PiHat (Unistorm Case) utilizes an aluminum case with a vented top to provide excellent EMI shielding while still permitting air circulation.

There are two antenna options available as well as an optional cooling fan option.

The kit builder must decide between a case for the Raspberry Pi3 or the Raspberry Pi4, the type of antenna and the fan option when ordering the kit.

Antenna options:

1. **Elbow 2" Rod Antenna** - An edge mounted SMA connector exits the case through a hole in the endcap drilled by the kit builder. A 3D printed hole location template is supplied with the kit to aid in proper hole location for drilling. A cooling fan option (shown in photo) is also available.



Straight 4" Rod Antenna - A vertical mounted SMA antenna jack exits through a hole in the top cover. The kit is supplied with the hole punched in the case top cover. The cooling fan option is also available with the straight rod antenna option.



Cooling Fan Option:

1. A 30 millimeter fan is installed on the top cover using two screws into existing holes. The fan wires are routed through existing holes in the top cover so no holes need to be drilled. The fan plugs into a 2 position right angle pin header on the PCB which is soldered to the PC board by the kit builder. Other than installing the connector on the PC board, no soldering is required.

