

SOARA

HowTo Jumbo Spot

Documentation

WA6ED, Ed

Parts List (about \$34 + cable & power)

- Jumbo Spot \$20.79
 - <https://www.ebay.com/itm/MMDVM-Hotspot-Support-P25-DMR-YSF-32bit-ARM-Processor-for-Raspberry-Pi-Zero-3B-/173665981427?hash=item286f4c93f3>
- OLED Display \$2.68
 - https://www.ebay.com/itm/0-96-OLED-LCD-Display-Module-128X64-I2C-IIC-SPI-Series-SSD1306-For-Arduino/264060408259?ssPageName=STRK%3AMEBIDX%3AIT&var=563600670218&_trksid=p2057872.m2749.l2649
- Raspberry Pi Zero W \$5
 - <https://www.microcenter.com/product/486575/zero-w>
 - <https://www.adafruit.com/?q=zero%20w>
 - Be sure to get the W. You need W for WiFi.
- SD Card \$3
 - <https://www.microcenter.com/product/486146/16gb-microsdhc-class-10-flash-memory-card>
- USB cable and power supply

Assembly

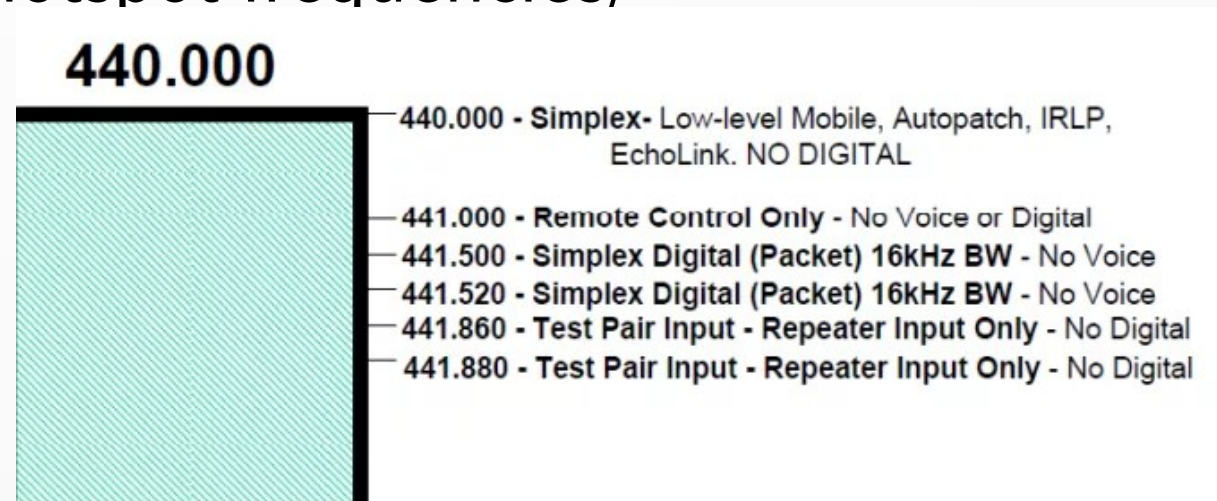
- You may need a connector strip for the Rpi-zero W, microcenter has them.
- Solder connectors as needed
- Solder the RF SMA connector
- Program the SD card per Pi-Star instructions
- Optionally, connect OLED or Nextion display.
- You will need a usb cable and power supply to power the hotspot

Software

- Pi-Star, software and documentation
 - <http://www.pistar.uk/downloads/>
- Jumbo Spot official website
 - <http://jumbospot17.blogspot.com/2018/>
- Follow the Pi-Star setup instructions, setup wifi first.

Radio programming

- Be sure to program Icom DSTAR radio DUP-, offset 0.
- Other settings to follow in separate document
- Frequencies
 - only use lowest power on your radio
 - <http://mrickey.com/2018/03/hotspot-frequencies/>



Dashboard Screen

Hostname: pi-star

Pi-Star: 3.4.17 / Dashboard: 20190310

Pi-Star Digital Voice Dashboard for WA6ED

[Dashboard](#) | [Admin](#) | [Configuration](#)

Modes Enabled

| | |
|-----------|--------|
| D-Star | DMR |
| YSF | P25 |
| YSF XMode | NXDN |
| DMR XMode | POCSAG |

Network Status

| | |
|------------|----------|
| D-Star Net | DMR Net |
| YSF Net | P25 Net |
| YSF2DMR | NXDN Net |
| YSF2NXDN | YSF2P25 |
| DMR2NXDN | DMR2YSF |

Radio Info

| | |
|-----|----------------|
| Trx | TX D-Star |
| Tx | 445.000000 MHz |
| Rx | 445.000000 MHz |
| EW | HS_Hat:v1.3.3 |

D-Star Repeater

| | |
|------|---------|
| RPT1 | WA6ED B |
| RPT2 | WA6ED G |

D-Star Network

| | |
|------|-----------------|
| APRS | sjc.aprs2.net |
| IRC | rr.openquad.net |

Linked to REF001 C
(DPlus Outgoing)

Gateway Activity

| Time (PDT) | Mode | Callsign | Target | Src | Dur (s) | Loss | BER |
|-------------------|--------|---------------|---------------------|-----|---------|------|------|
| 16:51:28 Mar 20th | D-Star | VK5NMG B/800H | CQCQCQ via REF001 C | Net | TX | | |
| 16:50:15 Mar 20th | D-Star | KI4EGQ/7100 | CQCQCQ via REF001 C | Net | 4.8 | 0% | 0.0% |
| 16:49:37 Mar 20th | D-Star | K1LHO/AMBE | CQCQCQ via REF001 C | Net | 1.2 | 0% | 0.0% |
| 16:49:14 Mar 20th | D-Star | ZL1TBE | CQCQCQ via REF001 C | Net | 20.9 | 0% | 0.0% |
| 16:45:31 Mar 20th | D-Star | KN4MXH/MATT | CQCQCQ via REF001 C | Net | 3.8 | 0% | 0.0% |
| 16:45:09 Mar 20th | D-Star | AD3AA/DNGL | CQCQCQ via REF001 C | Net | 18.4 | 0% | 0.0% |
| 16:34:45 Mar 20th | D-Star | AD0EC/ID51 | CQCQCQ via REF001 C | Net | 1.1 | 0% | 0.0% |
| 16:25:32 Mar 20th | D-Star | 2E0BFN/2820 | CQCQCQ via REF001 C | Net | 2.7 | 0% | 0.0% |
| 16:25:19 Mar 20th | D-Star | W2GJW/B | CQCQCQ via REF001 C | Net | 8.0 | 1% | 0.0% |
| 16:22:16 Mar 20th | D-Star | W1PAA/5100 | CQCQCQ via REF001 C | Net | 7.8 | 0% | 0.0% |
| 16:21:51 Mar 20th | D-Star | VE6TV/51LE | CQCQCQ via REF001 C | Net | 1.7 | 0% | 0.0% |
| 16:21:37 Mar 20th | D-Star | KJ4PGD/INFO | CQCQCQ via REF001 C | Net | 0.5 | 0% | 0.0% |
| 16:18:58 Mar 20th | D-Star | G3UEQ/7319 | CQCQCQ via REF001 C | Net | 1.3 | 0% | 0.0% |
| 16:18:27 Mar 20th | D-Star | N9LSY/DNGL | CQCQCQ via REF001 C | Net | 1.5 | 0% | 0.0% |
| 16:15:50 Mar 20th | D-Star | VE6AVK | CQCQCQ via REF001 C | Net | 0.7 | 0% | 0.0% |
| 16:15:26 Mar 20th | D-Star | N5MSD | CQCQCQ via REF001 C | Net | 0.0 | 0% | 0.0% |

Local RF Activity

| Time (PDT) | Mode | Callsign | Target | Src | Dur (s) | BER | RSSI |
|------------|------|----------|--------|-----|---------|-----|------|
|------------|------|----------|--------|-----|---------|-----|------|

Admin Screen

Hostname: pi-star

Pi-Star: 3.4.17 / Dashboard: 20190310

Pi-Star Digital Voice Dashboard for WA6ED

Dashboard | Admin | Live Logs | Power | Update | Configuration

Gateway Hardware Information

| Hostname | Kernel | Platform | CPU Load | CPU Temp | |
|----------------|---------------|---------------------------|-------------------|------------------|---------------|
| pi-star | 4.9.35+ | Pi Zero W Rev 1.1 (512MB) | 1.9 / 1.46 / 1.04 | 44.4°C / 111.9°F | |
| Service Status | | | | | |
| MMDVMHost | DMRGateway | YSFGateway | YSFParrot | P25Gateway | P25Parrot |
| DStarRepeater | ircDDBGateway | TimeServer | PiStar-Watchdog | PiStar-Remote | PiStar-Keeper |

D-Star Link Information

| Radio | Default | Auto | Timer | Link | Linked to | Mode | Direction | Last Change (PDT) |
|---------|----------|------|-------|------|-----------|-------|-----------|-------------------|
| WA6ED B | REF001 C | Auto | Never | Up | REF001 C | DPlus | Outgoing | 16:13:30 Mar 20th |

D-Star Link Manager

| Radio Module | Reflector | Link / Un-Link | Action |
|--------------|-----------|--|----------------|
| WA6ED B | REF001 C | <input checked="" type="radio"/> Link <input type="radio"/> UnLink | Request Change |

Gateway Activity

| Time (PDT) | Mode | Callsign | Target | Src | Dur (s) | Loss | BER |
|-------------------|--------|---------------|---------------------|-----|---------|------|------|
| 16:52:28 Mar 20th | D-Star | VK5NMG B/800H | CQCQCQ via REF001 C | Net | TX | | |
| 16:52:12 Mar 20th | D-Star | KN4MXH/MATT | CQCQCQ via REF001 C | Net | 4.7 | 0% | 0.0% |
| 16:50:15 Mar 20th | D-Star | KI4EGQ/7100 | CQCQCQ via REF001 C | Net | 4.8 | 0% | 0.0% |
| 16:49:37 Mar 20th | D-Star | K1LHO/AMBE | CQCQCQ via REF001 C | Net | 1.2 | 0% | 0.0% |
| 16:49:14 Mar 20th | D-Star | ZL1TBE | CQCQCQ via REF001 C | Net | 20.9 | 0% | 0.0% |
| 16:45:09 Mar 20th | D-Star | AD3AA/DNGL | CQCQCQ via REF001 C | Net | 18.4 | 0% | 0.0% |
| 16:34:45 Mar 20th | D-Star | AD0EC/ID51 | CQCQCQ via REF001 C | Net | 1.1 | 0% | 0.0% |
| 16:25:32 Mar 20th | D-Star | 2E0BFN/2820 | CQCQCQ via REF001 C | Net | 2.7 | 0% | 0.0% |
| 16:25:19 Mar 20th | D-Star | W2GJW/B | CQCQCQ via REF001 C | Net | 8.0 | 1% | 0.0% |
| 16:22:16 Mar 20th | D-Star | W1PAA/5100 | CQCQCQ via REF001 C | Net | 7.8 | 0% | 0.0% |
| 16:21:51 Mar 20th | D-Star | VE6TV/51LE | CQCQCQ via REF001 C | Net | 1.7 | 0% | 0.0% |
| 16:21:37 Mar 20th | D-Star | KJ4PGD/INFO | CQCQCQ via REF001 C | Net | 0.5 | 0% | 0.0% |
| 16:18:58 Mar 20th | D-Star | G3UEQ/7319 | CQCQCQ via REF001 C | Net | 1.3 | 0% | 0.0% |
| 16:18:27 Mar 20th | D-Star | N9LSY/DNGL | CQCQCQ via REF001 C | Net | 1.5 | 0% | 0.0% |
| 16:15:50 Mar 20th | D-Star | VE6AVK | CQCQCQ via REF001 C | Net | 0.7 | 0% | 0.0% |
| 16:15:26 Mar 20th | D-Star | N5MSD | CQCQCQ via REF001 C | Net | 0.0 | 0% | 0.0% |

Local BE Activity

| Modes Enabled | |
|---------------|--------|
| D-Star | DMR |
| YSF | P25 |
| YSF XMode | NXDN |
| DMR XMode | POCSAG |

| Network Status | |
|----------------|----------|
| D-Star Net | DMR Net |
| YSF Net | P25 Net |
| YSF2DMR | NXDN Net |
| YSF2NXDN | YSF2P25 |
| DMR2NXDN | DMR2YSF |

| Radio Info | |
|------------|----------------|
| Trx | TX D-Star |
| Tx | 445.000000 MHz |
| Rx | 445.000000 MHz |
| FW | HS_Hat:v1.3.3 |

| D-Star Repeater | |
|-------------------------------------|-----------------|
| RPT1 | WA6ED B |
| RPT2 | WA6ED G |
| D-Star Network | |
| APRS | sjc.aprs2.net |
| IRC | rr.openquad.net |
| Linked to REF001 C (DPlus Outgoing) | |

MMDVM Host Config Screen

Pi-Star: 3.4.17 / Dashboard: 20190310

Pi-Star Digital Voice - Configuration

Dashboard | Admin | Expert | Power | Update | Backup/Restore | Factory Reset

Gateway Hardware Information

| Hostname | Kernel | Platform | CPU Load | CPU Temp |
|----------|---------|---------------------------|--------------------|----------------|
| pi-star | 4.9.35+ | Pi Zero W Rev 1.1 (512MB) | 2.06 / 1.65 / 1.15 | 42.8°C / 109°F |

Control Software

| Setting | Value |
|----------------------|---|
| Controller Software: | <input type="radio"/> DStarRepeater <input checked="" type="radio"/> MMDVMHost (DV-Mega Minimum Firmware 3.07 Required) |
| Controller Mode: | <input checked="" type="radio"/> Simplex Node <input type="radio"/> Duplex Repeater (or Half-Duplex on Hotspots) |

Apply Changes

MMDVMHost Configuration

| Setting | Value |
|---------------------|--|
| DMR Mode: | <input type="checkbox"/> RF Hangtime: 20 Net Hangtime: 20 |
| D-Star Mode: | <input checked="" type="checkbox"/> RF Hangtime: 20 Net Hangtime: 20 |
| YSF Mode: | <input type="checkbox"/> RF Hangtime: 20 Net Hangtime: 20 |
| P25 Mode: | <input type="checkbox"/> RF Hangtime: 20 Net Hangtime: 20 |
| NXDN Mode: | <input type="checkbox"/> RF Hangtime: 20 Net Hangtime: 20 |
| YSF2DMR: | <input type="checkbox"/> |
| YSF2NXDN: | <input type="checkbox"/> |
| YSF2P25: | <input type="checkbox"/> |
| DMR2YSF: | <input type="checkbox"/> Uses 7 prefix on DMRGateway |
| DMR2NXDN: | <input type="checkbox"/> Uses 7 prefix on DMRGateway |
| POCSAG: | <input type="checkbox"/> POCSAG Paging Features |
| MMDVM Display Type: | OLED Port: /dev/ttyAMA0 Nextion Layout: ON7LDS L3 |

Apply Changes

Notice DSTAR is on.

Also, the OLED display is enabled

General and DSTAR Screen

| Setting | Value |
|---------------------|--|
| Hostname: | pi-star <small>Do not add suffixes such as .local</small> |
| Node Callsign: | WA6ED |
| Radio Frequency: | 445.000.000 MHz |
| Latitude: | 33.638478 <small>degrees (positive value for North, negative for South)</small> |
| Longitude: | -117.6702 <small>degrees (positive value for East, negative for West)</small> |
| Town: | Lake Forest |
| Country: | U.S.A. |
| URL: | http://www.qrz.com/db/WA6ED <input checked="" type="radio"/> Auto <input type="radio"/> Manual |
| Radio/Modem Type: | STM32-DVM / MMDVM_HS - Raspberry Pi Hat (GPIO) |
| Node Type: | <input checked="" type="radio"/> Private <input type="radio"/> Public |
| System Time Zone: | America/Los_Angeles |
| Dashboard Language: | english_us |

Apply Changes

| Setting | Value |
|-------------------------|--|
| RPT1 Callsign: | WA6ED B |
| RPT2 Callsign: | WA6ED G |
| Remote Password: | ●●●●●●●● |
| Default Reflector: | REF001 C <input checked="" type="radio"/> Startup <input type="radio"/> Manual |
| APRS Host: | sjc.aprs2.net |
| ircDDBGateway Language: | English_(US) |
| Time Announcements: | <input checked="" type="checkbox"/> |
| Use DPlus for XRF: | <input type="checkbox"/> <small>Note: Update Required if changed</small> |

Apply Changes

I changed my Host-name to something different for each hotspot. This is nice if multiple hot-spots are close by. Otherwise confusion. Be sure to reboot the jumbo-spot and use the new name to access the browser screens. Login still uses pi-star. Seems like a bug.

Use a simplex frequency allowable in your area. Make sure to only transmit the **lowest power** possible on your HT. You only need enough power to communicate with the hotspot, not the universe. 441.500 or 441.520 should be good.

Wireless Screen

Firewall Configuration

| Setting | Value |
|-----------------------|---|
| Dashboard Access: | <input checked="" type="radio"/> Private <input type="radio"/> Public |
| ircDDBGateway Remote: | <input checked="" type="radio"/> Private <input type="radio"/> Public |
| SSH Access: | <input checked="" type="radio"/> Private <input type="radio"/> Public |
| Auto AP: | <input checked="" type="radio"/> On <input type="radio"/> Off Note: Reboot Required if changed |
| uPNP: | <input checked="" type="radio"/> On <input type="radio"/> Off |

Apply Changes

Wireless Configuration

Refresh Reset WiFi Adapter Configure WiFi

Wireless Information and Statistics

| Interface Information | Wireless Information |
|---|---|
| Interface Name : wlan0 Interface Status : Interface is up IP Address : 10.0.1.30 Subnet Mask : 255.255.255.0 Mac Address : b8:27:eb:13:57:8c | Connected To : freckles AP Mac Address : f0:99:bf:0d:2a:c0 Bitrate : 72.2 MBit/s Signal Level : -35 dBm Transmit Power : 31 dBm Link Quality : 70/70 |
| Interface Statistics | |
| Received Packets : 72962 Received Bytes : 6681330 (6.3 MiB) Transferred Packets : 17547 Transferred Bytes : 10136057 (9.6 MiB) | |

Information provided by ifconfig and iwconfig

Remote Access Password

| User Name | Password |
|---|---|
| pi-star | Password: <input type="text"/> Confirm Password: <input type="text"/> <input type="button" value="Set Password"/> |
| WARNING: This changes the password for this admin page AND the "pi-star" SSH account | |

Expert Screen (1-3)

Pi-Star: 3.4.17 / Dashboard: 20190310

Pi-Star Digital Voice - Expert Editors

[Dashboard](#) | [Admin](#) | [Update](#) | [Upgrade](#) | [Backup/Restore](#) | [Configuration](#)

Quick Edit: [DStarRepeater](#) | [ircDDBGateway](#) | [TimeServer](#) | [MMDVMHost](#) | [DMR GW](#) | [YSF GW](#) | [P25 GW](#) | [NXDN GW](#)

Full Edit: [DMR GW](#) | [PiStar-Remote](#) | [WiFi](#) | [BM API](#) | [DAPNET API](#) | [System Cron](#) | [RSSI Dat](#) **Tools:** [CSS Tool](#) | [SSH Access](#)

General

| | |
|-------------|---------|
| Callsign | WA6ED |
| Id | 1234567 |
| Timeout | 240 |
| Duplex | 0 |
| RFModeHang | 300 |
| NetModeHang | 300 |
| Display | OLED |
| Daemon | 1 |

Info

| | |
|-------------|------------------------|
| RXFrequency | 445000000 |
| TXFrequency | 445000000 |
| Power | 1 |
| Latitude | 33.638478 |
| Longitude | -117.6702 |
| Height | 0 |
| Location | Lake Forest |
| Description | U.S.A. |
| URL | http://www.qrz.com/db/ |

Expert Screen (2-3)

| Modem | |
|-----------------|-------------------------|
| Port | /dev/ttyAMA0 |
| TXInvert | 1 |
| RXInvert | 0 |
| PTInvert | 0 |
| TXDelay | 100 |
| RXOffset | 500 |
| TXOffset | 500 |
| DMRDelay | 0 |
| RXLevel | 50 |
| TXLevel | 50 |
| RXDCOffset | 0 |
| TXDCOffset | 0 |
| RFLevel | 100 |
| CWidTXLevel | 50 |
| D-StarTXLevel | 50 |
| DMRTXLevel | 50 |
| YSFTXLevel | 50 |
| P25TXLevel | 50 |
| NXDNTXLevel | 50 |
| POCSAGTXLevel | 50 |
| RSSIMappingFile | /usr/local/etc/RSSI.dat |
| Trace | 0 |
| Debug | 0 |

Apply Changes

RX & TX Offset is dependent on your jumbo-spot. Typically this value is on a label on your jumbo spot board.

Expert Screen (3-3)

| D-Star | |
|---------------|-----|
| Enable | 1 |
| Module | B |
| SelfOnly | 1 |
| AckReply | 1 |
| AckTime | 750 |
| ErrorReply | 1 |
| RemoteGateway | 1 |
| ModeHang | 20 |
| AckMessage | 0 |

Apply Changes

I needed to set this from 0 to 1. This allowed me to link to K6SOA on the Admin page.