

### Here's the technical stuff

#### INSTALLATION TIPS

- Mount the system where it can easily be reached to reboot.
- To access advanced features, the system must be connected to a public internet network ensuring wireless phones can see wired local servers.
- Access points need to be 801.11n or better; dual band preferred.
- If you want a static IP address, please request prior to shipment.
- Avoid mesh or multi-hop networks and avoid crowded wi-fi frequencies.
- Perform a site survey and check interference issues before finalizing the installation.  
*\*2.4 GHz wi-fi has only three non-overlapping channels.*

#### I.T. CHECKLIST

##### Required

- Mount system where reset switch can be reached
- Train venue personnel on how to reset the system
- Train venue personnel on how to reset the router
- Access point (AP) is enterprise grade
- System has good ventilation
- Smart phone can hear audio with Audio Everywhere app
- Smart phone can access internet while app is running in background
- Access point bandwidth is set to 20 MHz on 2.4 GHz, 40 MHz on 5 GHz band
- Router/DHCP server IP address range is at least 200
- IP lease times are less than or equal to 24 hrs = 1,440 min = 86,400 seconds
- Mesh or multi-hop Wi-Fi WLANs are NOT used
- TKIP encryption is NOT used
- Signal-to-noise ratio on the Wi-Fi channel is at least 20 dB
- A dual-band single-radio AP is NOT used
- Check Wi-Fi spectrum with tool like Android's Wi-Fi Analyzer app to make sure there are no channel conflicts

##### Recommended

- Access point is dual-band
- Access point is 802.11 ac or better
- Access point uses "airtime fairness" to favor advanced phones
- Access point uses "band-steering" to favor the 5 GHz band
- BSS minrate set to about 12,000
- Router/Switch is 1000 baseT (Gigabit) connected with correctly terminated CAT6
- Untwisted pair Ethernet wires should be no longer than 1 cm
- Wi-Fi encryption is NOT used, the system is OPEN
- After performing a site survey, the AP frequency is set to a fixed value, or mean time between channel hops is no less than 30 min

# NETWORK GUIDE

## LAN Ports and Services

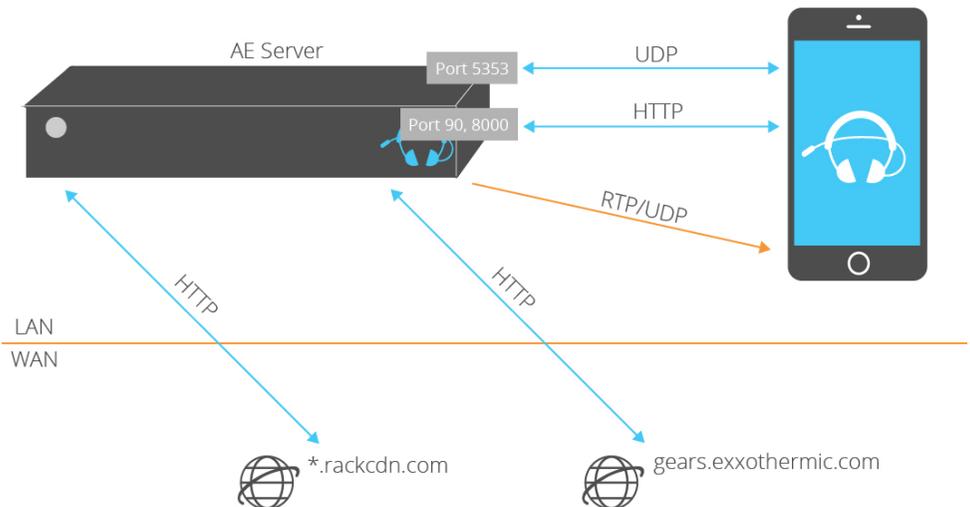
- Servers expose an HTTP server on port 8000. They both receive and originate requests on this port. Protocol HTTP.
- Servers expose a file server on port 90. Protocol HTTP.
- Servers listen on port 16384.
- Servers RTP on port 16384.
- Servers use Zeroconf (Bonjour/Avahi). Multicast UDP (also called mDNS), usually on port 5353 (Typical address 224.0.0.251).
- For enterprise mode operation (via IP address or CNAME), mDNS is not needed.
- The servers send RTP packets using UDP to the apps over a range of ports.
- Service ID are `_ExXothermic._tcp` and `_AsClientExXothermic._tcp`.

## WAN ports and services

- Our Cloud server is `gears.exxothermic.com` (IP address: 108.166.110.178, but subject to change) via Cloud port 1025. Protocol HTTP.
- Media files are stored on `*.rackcdn.com` Protocol HTTP.

## How they look if you scan the LAN

1. MX2's: ExXtractor v.2 (Shuttle)
2. MX3's: Odroid (WIBRAIN)
3. MX3 and MX5 after 2.47 shows Venue Server serial number. E.g., AEL4-43HY-...



## Alerts

- For Cisco equipment, see [audioeverywhere.com/Cisco](http://audioeverywhere.com/Cisco).
- For Aruba equipment, see [audioeverywhere.com/Aruba](http://audioeverywhere.com/Aruba).
- When using guest mode, white list the Venue Servers based on the Venue Server MAC address. Guest modes typically have many security features varying based on vendor. See [audioeverywhere.com/GuestNet](http://audioeverywhere.com/GuestNet).
- ASUS wireless routers are generally incompatible with the Audio Everywhere system, especially when isolated from the internet.