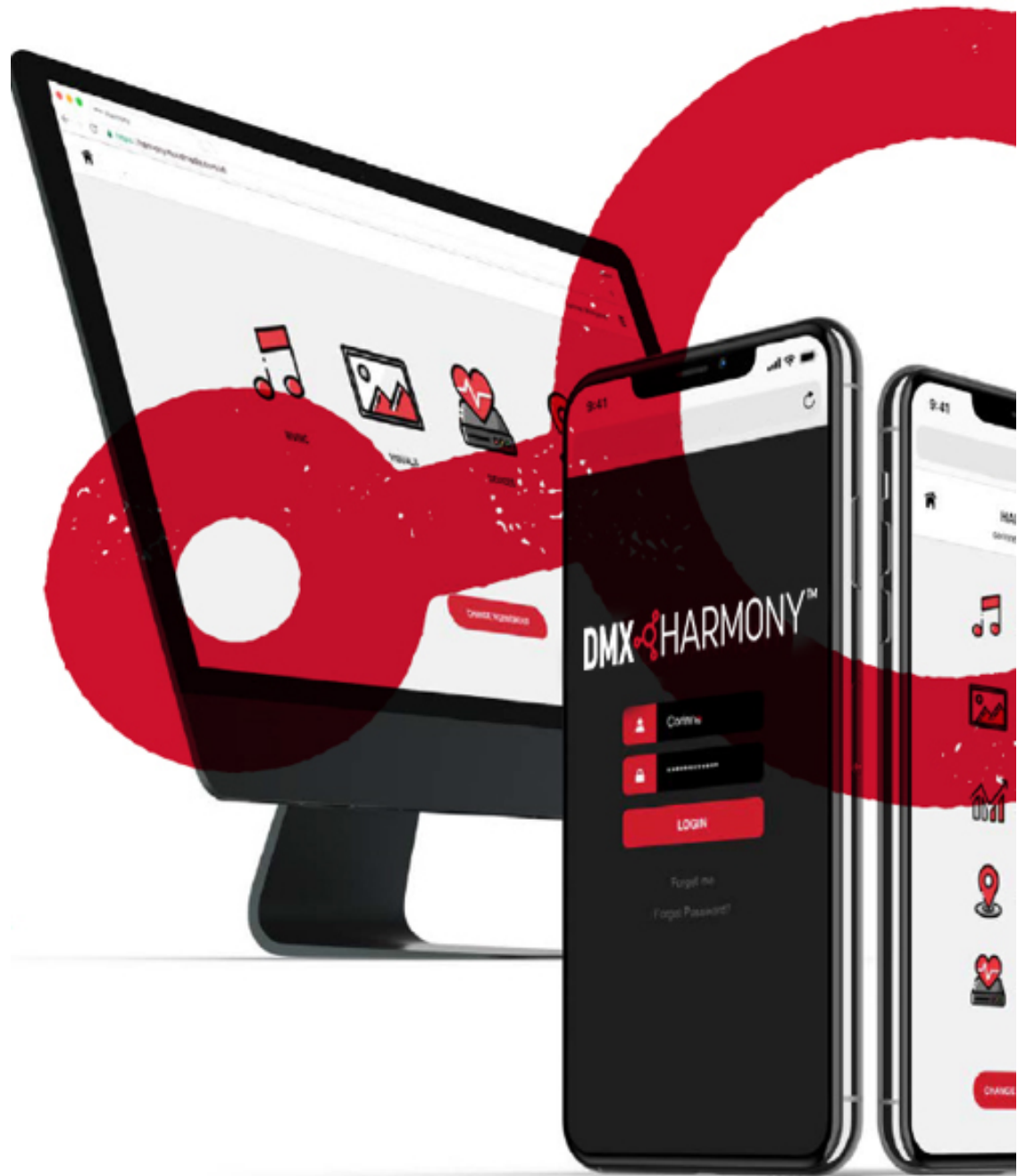


# DMX:HARMONY

Harmony Player Network Requirements



## Introduction

The Harmony player is a compact media device capable of powering HD multimedia content. Its small size, multiple connectivity options and noiseless operation make it a versatile media player that can easily be installed anywhere.

DMX's Harmony is powered by a hardened distribution of Google Android with limited user privileges. Harmony currently runs on Google Android 5.1.1 (Lollipop) from Linux kernel 3.10.0. All non-essential programs and services have been removed and packages are updated to address security concerns.



## Network Requirements

All mandatory network traffic initiates from the Harmony media player: in other words, the traffic is always outbound from the media player, making it safe and easy to operate on a client network. Mandatory traffic includes: content updates (downloaded and stored locally to the device), live feeds updates (e.g. weather, news, etc.), software updates, health reporting and proof-of-play reporting.

### Mandatory outbound traffic:

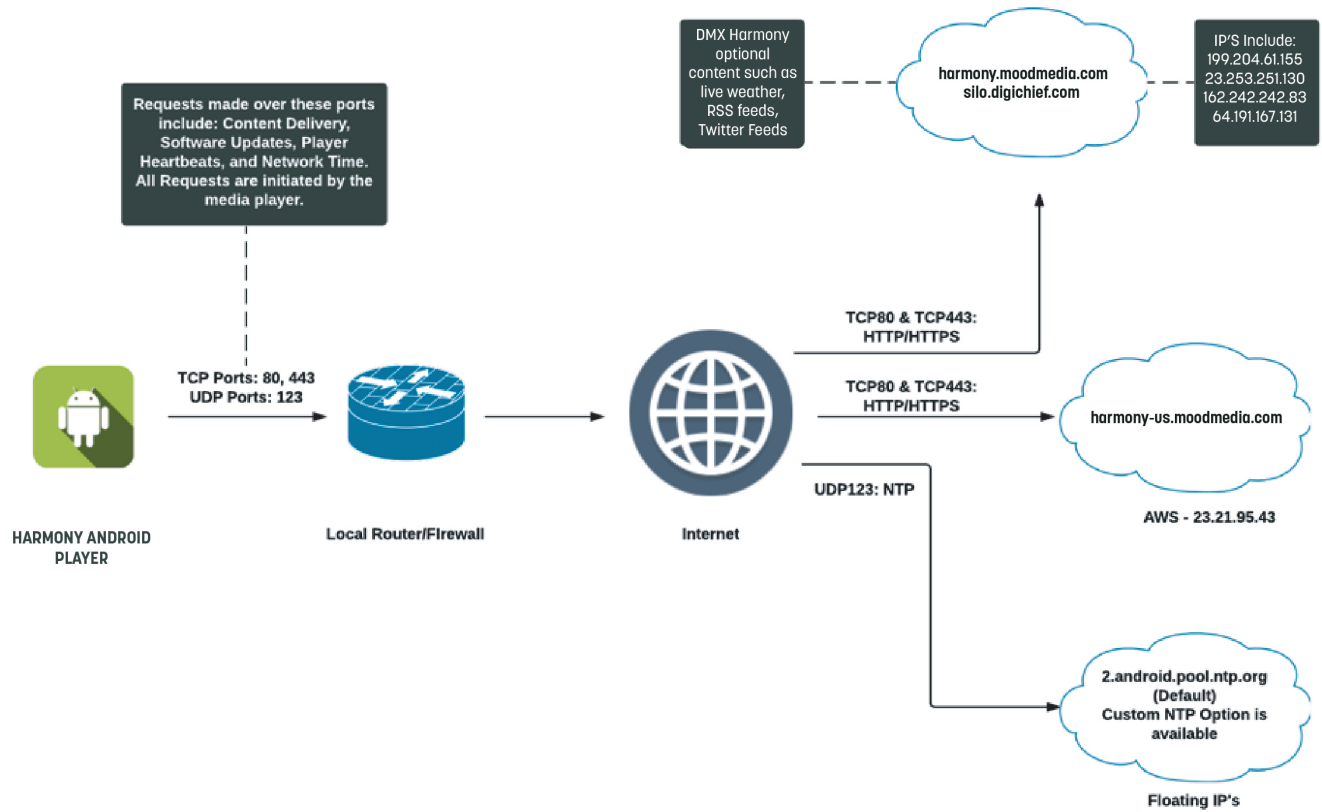
Content, feeds, monitoring, proof-of-play, software and security updates (always favor using the DNS name instead of the IP as the IP is subject to change)

- HTTPS/TCP443
- mvision.moodmedia.com (23.21.95.43)
- Optional: mvision-us.moodmedia.com (199.204.61.155)
- Optional: silo.digichief.com (23.253.251.130, 162.242.242.83, 64.191.167.131) (Mood Media content feeds if needed)
- NTP/UDP123 (floating IPs)
- 2.android.pool.ntp.org
- Custom NTP Address (i.e locally hosted NTP server or Google NTP server)

**NOTE:** additional traffic may be needed to accommodate specific user/content requirements

# Network Diagram

## DMX:HARMONY - Android Media Player Network Requirements



## Explanation of Network Traffic

### Every 5 minutes:

The media player initiates a HTTP/HTTPS connection to the Harmony server to transmit a small amount of data including device status information (aka "heartbeat").

### When new content is available:

The player downloads the content over HTTP/HTTPS. Content is downloaded in chunks: the integrity of each chunk is tested using a sha256 algorithm before the next chunk is downloaded. In addition, interrupted transfers are resumed at the last part to further optimize the network usage.

## Download Windows & Bandwidth Throttling

### Download Windows:

In order to limit the impact of the Harmony player on the network, the device can be configured to download content only during specific hours of the day. Outside of the download windows, the network will only be used to send minimal "heartbeat" information back to the servers: new video or audio content will not be transferred outside the download windows.

### Bandwidth Throttling:

In addition, the Harmony player can be configured to throttle the amount of bandwidth it uses. Bandwidth throttling can be set to different values throughout the day.

## Bandwidth Requirements

In order to fully take advantage of the Video & Audio services, DMX recommends a minimum network speed of 512kbit/s down and 128kbit/s up. Higher bandwidth speeds will provide more consistent service by shortening transfer times and reducing the potential for transfer errors. Higher bandwidth speeds will therefore improve the overall in-store experience.