OVERVIEW

- Portable
- Windows 10 compatible
- Zoom compatible
  - Zoom rooms
- Otter.io compatible
- PTZ Camera capability
- Minimum setup time
- Compatible with exiting and future SMU IT Infrastructure

TECHNOLOGIES

AES67 – Audio over IP standard
- Audinate (Dante) – Market share leader
- Merging Technologies/ALC Networks (Ravenna) – Contributed open-source reference
- Axia (Livewire), Others

H.264 or MPEG-4 AVC (Advanced Video Coding)
- Interoperability standard

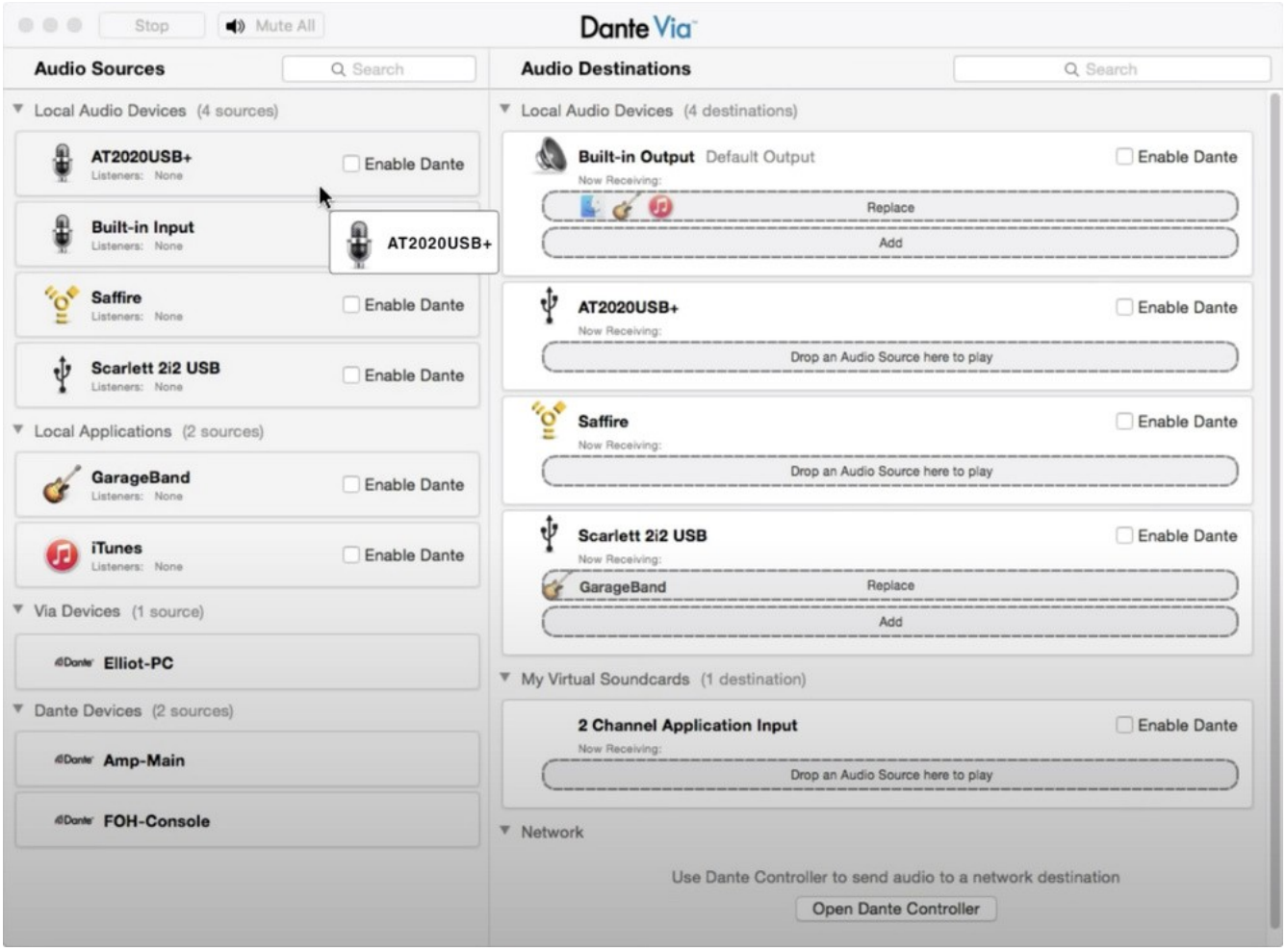
VISCA/PELCO-D Pan/Tilt/Zoom camera motion control protocol
- Crestron (SMU install)
- QSYS (SMU install)

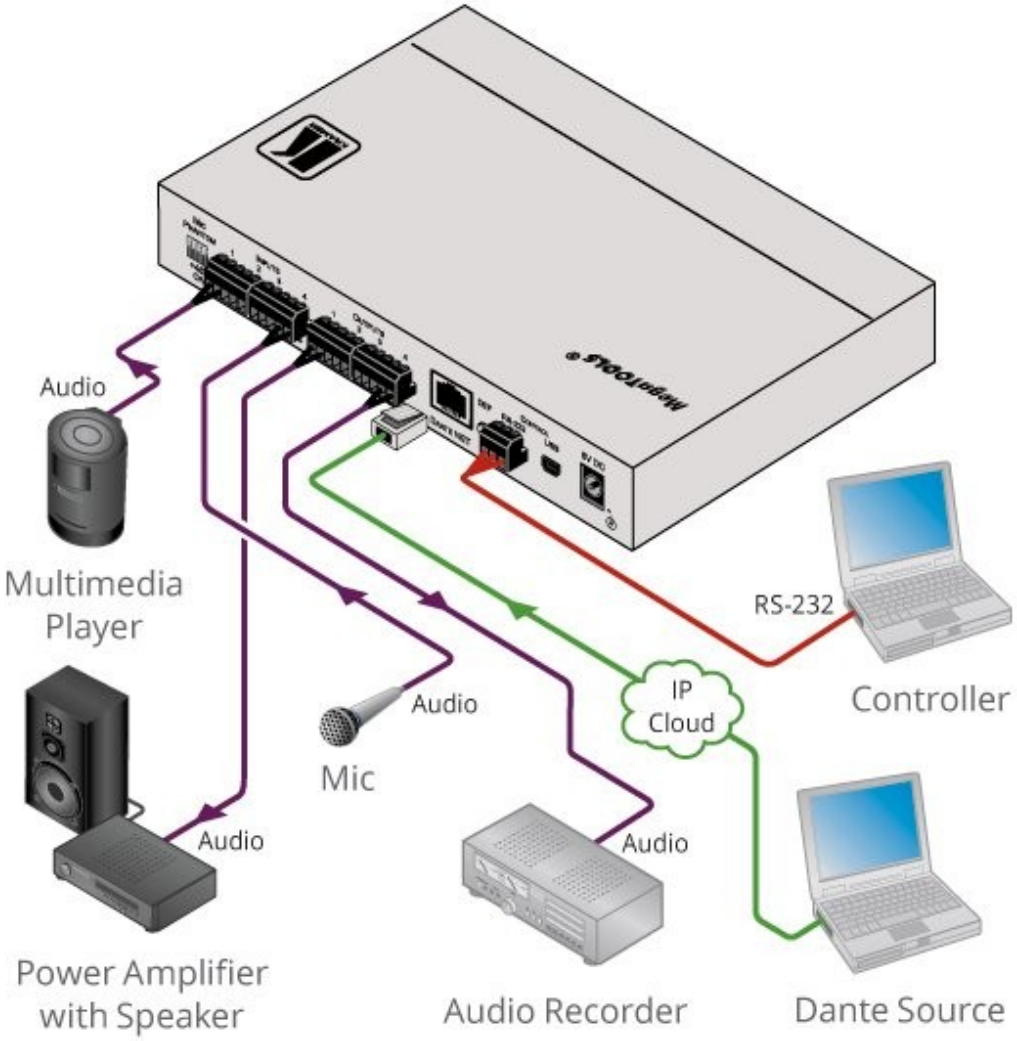
POE (Power over Ethernet)
- IEEE 802.3af – 12.95 W
- IEEE 802.3at – 25.5 W

PTP (Precision Time Protocol)
- Dante/Ravenna provide PTP clock service
- AES67 will work with external PTP master/grand-master clocks
- PTP aware network hubs/switches recommended

INTERFACE

Dante




Audio
Multimedia Player
RS-232
Controller
IP Cloud
Audio
Mic
Audio
Audio
Power Amplifier with Speaker
Audio Recorder
Dante Source

GOALS

1. Demonstrate minimum viable product
    1. Zoom
        - connect to AES67 output/input
            - audio quality must be acceptable
            - audio synchronization acceptable

        - connect to RTSP video stream from IP
            - H.264
            - video quality (1024x768) acceptable for whiteboard

    2. Otter.io
        - connect to AES67 output
            - transcription accuracy equivalent to current process
            - text output latency equivalent to current process

    3. Packaging
        - mock-up portable container
        - demonstrate setup/config/operation
            - configuration storage/recall
        - demonstrate minimum cabling

HARDWARE

PC – Windows 10, Intel Core I5 equivalent ACQUIRED
- 1 – Lenovo M93p-tiny (awaiting replacement CPU)

Tablet – Optional ACQUIRED
- 1 – Windows 10, 8 inch

Raspberry Pi – 3 ACQUIRED
- 1 – Audio in/out (line level)
- 2 – Audio out (loudspeaker)
- 3 – WIFI Video capture (whiteboard)

POE (Power Over Ethernet) switch – 5 port unit (65 Watt capacity) ACQUIRED
- 1 – Campus Network
- 2 – PC
- 3 – Network device – Audio (microphone)
- 4 – Network device – Audio (powered loudspeaker)
- 5 – Network device – Video (future PTZ IP camera)

POE adapter – 2 ACQUIRED
- 1 – prototype complete/tested
- 2 – assembly required

AUDIO – 2 cables ACQUIRED
- 1 – RCA to 3.5mm mono (Polycom)
- 3 – 3.5mm to 3.5mm stereo

VIDEO – 1 rpi camera v.2 ACQUIRED

SOFTWARE

OS – Linux
- Yocto https://www.yoctoproject.org

AUDIO – AES67
- https://github.com/bondagit/aes67-linux-daemon
- https://bitbucket.org/MergingTechnologies/ravenna-alsa-lkm/src/master

VIDEO – RTSP (Real Time Streaming Protocol)
- https://github.com/mpromonet/v4l2rtspserver
- https://github.com/umlaeute/v4l2loopback/wiki/FFmpeg

TASKS

1. Research marketplace and current standards COMPLETE
2. Investigate implementations within Canadian Universities COMPLETE
3. Investigate promising vendors
    1. Shure (Professional audio product line) COMPLETE
    2. Rode (Microphones) COMPLETE
    3. Audinate (Dante) AES67 Solution provider COMPLETE
    4. ALC (Ravenna) BUILD DEMO
    5. Cisco (Network products) COMPLETE
4. Build Demo
    1. Build tool-chain
        1. git project https://github.com/hfxdanc/hybridClassroom COMPLETE
        2. Docker/Podman compute COMPLETE
        3. Yocto IN PROCESS
            1. Raspberry Pi tool-chain (hello world example) COMPLETE
            2. AES67 IN PROCESS
            3. H.264
    2. Test
        1. POE COMPLETE