BM 2024 Notes - JKB

Brain dump on what we did, what worked and didn't work, and ideas for improvements.

Highlights

- [ ] Software stability. Chromatik was solid on both cars.
- [ ] Audio Stems was amazing and stable.
- [ ] Mothership is a REALLY nice folding table.
- [ ] New patterns are great.
- [ ] Director position was a great addition.

Mothership Desk

- [ ] New desk is amazing and high end despite being a last minute add from Brian.
    - [ ] Liked: height, space between desk and window for fishing wires, room to crawl underneath and sit up behind the computer trays while sorting cables.
- [ ] We didn't get the front covers installed on trays. Bandwidth limited.
- [ ] Operator positions and monitor contents seemed great. We did:
    - [ ] 4-5 operators: MShip LED; TE LED; Director; Laser 1; Laser 2?
    - [ ] 5 monitors: MShip Chromatik; TE Chromatik; DJ waveforms; Laser 1; Laser 2
- [ ] Standing seemed fine for operators. (Add to post-burn survey?) The two folding director-height (tall) chairs were a nice amenity.
- [ ] There are two storage bays under the desk. We used left side for TE LAN items and right side for Mothership LAN items.
    - [ ] Two power strips were needed in each side. Ideally the switches on them would be better protected.
    - [ ] Could use an additional shelf/mini-rack on left (TE) side.
    - [ ] Could be nice to have power routing for bays built into the desk. As in: it would be better to not need to run an extension cord from the bays to the [yellow contractor box]

Mothership Desk Components

- [ ] Driving Mothership rattles the bejeezus out of the desk. Everything including monitors, controllers, and computers are haywire on arrival. Plugs rattle loose and there are a LOT of things plugged in so it's hard for a non-expert to troubleshoot why things aren't working.
- [ ] Monitor stands (Humanmade) were great when not driving but they don't lock and are designed to mount on a perfectly level desk. They swing around in transit.
    - [ ] Idea: build a monitor cabinet that holds them in one position, or
    - [ ] Get monitor stands that lock
- [ ] Monitors were nice quality, 28" 1080p. IMO they were too big. I think we would be better off with smaller (24") higher resolution (4K) monitors. The 28" consume a lot of

the visual field.

- [ ] We ran the standard midi setup (APC40 + two twisters) at the MShip-LED station. This wasn't the plan but people had a great time running it and it usually had an operator. Would do again.
- [ ] We added a power strip + phone adapters at the leftmost end of the desk for a crew phone charging station. That worked great.
- [ ] MX Master 3S mouse performed great. Maybe is more dust resistant than other models?
- [ ] Wireless mechanical keyboard was great although spacebar got dislodged on the first day. Maybe crashed into something while driving? Reinstalled key, maybe is ok.
- [ ] Could benefit from a system to prevent devices from sliding around too much. Anti-slip pads? Full gridfinity desk surface? Metal desk with magnets glued to the bottom of every device/stand?
- [ ] Too many components to assemble for FOH setup. How to fix?
    - [ ] It took me (JKB) 7 hours to plug it all together while trying to keep the wires tidy.
    - [ ] Sooo many different controllers and components on the desk.
    - [ ] We didn't run the iPads. We were saturated with components and they weren't stable for driving.
    - [ ] I (JKB) am revisiting design ideas about a dedicated Chromatik midi console.
- [ ] Need more USB-C extensions, 4x 6'. With the iPads not in use their extensions got hijacked for other things, like extending USB hubs for the end stations.
- [ ] Laser components all need extensions, they are all further from the bay than normal cord length.
- [ ] Smashed a HDMI cable on the first drive. And one or more monitors was run with a USB extension + Hub with HDMI + short HDMI cable. Need more HDMI cables and they should all be at least 6' and a few at 10-12'.
- [ ] Need more length on C13 monitor power cables too.
- [ ] Hubs hanging free behind the desk due to short cable lengths were vulnerable to pulling apart (unplugging) during drives. Hubs need to live in bays or on a special shelf just under back edge of desk.
- [ ] USB-C plugs rattled out of Mship-LED at least once.
- [ ] Laser NUC rattled onto power strip switch at least once.
- [ ] One of the monitors is washed out (too bright), needs replaced. We found it easier to see with Light theme in Chromatik.
- [ ] 3D-printed midi controller stands from Jeff were excellent.
    - [ ] Iterative improvement ideas:
        - [ ] Could the midi controller be flipped over so the stand doubles as impact protection during transport?
        - [ ] Or, could stand disassemble to save space in transit? Or maybe the space isn't a big deal and it's nice they're already assembled.

Desk component packing & transport

- [ ] I recommend the DeckSaver cover + laptop sleeve for APC40, and DJTT cases for MFTs. Then the controllers can be thrown in a normal bin and don't need the special Pelican gun case

    - [ ] APC Decksaver: https://a.co/d/ebFt5ju
    - [ ] MFT cases: https://store.djtechtools.com/collections/midi-fighters-midi-fighter-accessories/products/chroma-cases-midi-fighter
- [ ] Need zippered "hardshell" cases for mship-led and lighting-10 computers.
- [ ] Wire organization system from Jeff was great (cables by type). Could use even more zippered cases to minimize chaos in large bins.

Mothership network

- [ ] Mship / TE network division seemed to work great overall, thanks Jeff!
- [ ] BUT: it felt like we couldn't test most of the components without the link to main car, which was bottlenecked behind: build delays → heavy equipment working around main car → waiting for the main generator to be turned on → car network rack to be set up, etc.
- [ ] Could this be improved by VLANing TE lighting & Mship Lighting? IE could we test Director controller's connection to Mship-LED and lasers without link to main car, if the mShip router/switch was aware of the VLANs?

Mothership windows

- [ ] After a couple days "we" (aka AJ) removed the mothership windows in front of VJ station for visibility and audio improvement. IMO it helped a lot. But it did get cold later in the night. Ideally those windows would be hinged.

Software

- [ ] Chromatik stability was excellent. I never saw or heard of a single frame stutter or crash.
- [ ] Audio Stems were amazing. Stability was rock solid.
- [ ] If you're not *exactly* sure when a drop is coming, it works great to run a pattern with heavy Audio Stems modulation. This also frees up your hands for high-fiving people about how awesome you're doing.
- [ ] New 3D engine looks REALLY good on Mothership.
- [x] We ran the 3D branch on mothership and main branch on TE. We decided on playa that we could merge and run the same branch on both, but ran out of time to do it. We already had both cars online with separate branches, before the cars were linked, with config adjustments happening on each car. We left them on their own branch.
- [x] Need to push changes from the two car computers to the two branches, then merge.
- [ ] Last-minute User Presets feature is great but needs midi controller integration. For example: browse the pattern list with the APC top knob, and then browse the presets with another knob or Shift + APC top knob.

    - [ ] Need the pattern's default in the User Presets list. Sometimes you want a clean version of the pattern with no modulation.
    - [ ] Need ability to add/browse user presets in Performance mode
- [x] Need the SuperMod controller for adding audio stems on the fly. We merged the code but couldn't get the controller connected. Need to sort out and document the Bomebox setup for that one. We were attempting to set it up during active shows which makes things harder.

- [ ] Color Palette Manager
    - [ ] Color offsets are a great improvement
    - [ ] Need to add palette transition controls (ui elements) to UIColorPaletteManager
    - [ ] Color crossfade wasn't working. Need to implement or just turn on? Ideally crossfade time would be adjustable from the Director midi surface, measured in number of beats.
    - [ ] I have some in-progress code on color palette manager improvements
- [x] Need multiple OSC destinations, with filters. Likely this could replace Max and reduce our surface area for connectivity problems.

- [ ] SimplifyEffect is awesome. We ran it a bunch the last two nights.

- [ ] APC device knobs are great for system-wide settings and effects on the Master channel. Need labels. Ideally we keep them the same on both Chromatiks.

Beacons

- [ ] Operated the last few nights. They look great. The combo of adjustable color, gobo, and movement sets them apart from other beacons on playa.

- Photo from other side of the Man burn circle:
  

- [ ] We ran a dedicated Beacon channel on Mothership Chromatik. Worked great and the director fader worked too.

- [ ] We mapped a tempo-synced modulator (2 bars, square wave) to the beacon Tilt parameter.
    - Video of beat sync tilt during Man burn. Note the car is using SimplifyEffect. IMG_4445.mov

- [ ] Gamepad changes were made after George's feedback but we didn't have a window to pull code to Mothership. Should be much easier to handle now with acceleration joysticks instead of absolute position joysticks.
    - [ ] Need Focus to stay at a set position. Use right-joystick Y-axis for focus?
- [ ] We used JKB's gamepad but TE may want to buy one: https://a.co/d/815YR2x

- [ ] Bluetooth range for gamepad wasn't great outside of car. The computer is in a metal

box inside a metal-framed car. Maybe add a bluetooth dongle or locate the computer outside of the metal bay? Would be nice if someone could work through this at the warehouse.

- [ ] Beacon color is currently manual from the gamepad, but in theory we could send it CMY from Chromatik.

- [ ] The power connection (neutrik input) for beacons is very tight against the beacon tray. I had to unsafely unscrew the connector clamp on the neutrik cable to get it plugged in. **Need a right angle cable** or (more space in the bay by moving the mount holes or designing a new side panel?)

- [ ] It's hard to connect cables after beacons are placed, especially during a party. Can't see or reach the back of the beacon when balancing on three FOH boxes. Maybe **use short cable extensions to the tray that the installer can connect when placing the beacon**?

- [ ] Catch-22 with operating the beacon menu and installing the last tray cover to protect our eyes. We need a little door that opens so you can use the device menu.
    - [ ] Our orientation of beacons was good: menu buttons face down aka towards ends of mothership.
- [ ] Software TODO: need to be sure beacons enter Sun Protection Mode at shutdown.
    - [ ] Test behavior on network cable disconnect (such as power loss or hard shutdown)
    - [ ] On clean Chromatik shutdown, send a final frame to beacons to enter Sun Protection Mode.
    - [ ] Also at sunrise when car is still operating (when beacon channel has been turned down for 5 min?)
- [ ] 22.5 degree angle of beacon tray makes it hard to software-enforce a safety zone where beacons don't hit the ground. The latest safety limit allows 45% of range away from straight-up tilt, which restricts them to 15 degrees(or was it 25 degrees?) above horizontal when aimed straight out. But it means we're more limited in the up-direction tilt than necessary.

- [ ] Wish list, obviously: Chromatik visualizer preview of DMX fixtures

Director position

- [ ] IMO: the new position is a great add to our setup
- [ ] High value: director constantly watching the waveforms and calling out changes.
- [ ] We made moderate use of edge/panel faders and (light?) use of laser fader.
- [ ] Need to label the faders pre-event. 3D printed snap cover labels?
- [ ] Add visual indicator of most recently pressed color button? Flash it?
- [ ] Could we arrange the color grid so a particular movement pattern always goes to a complementary color? Would be nice to use the 2D layout to help us less-color-gifted people.

- [ ] Use Scene buttons for color crossfade length? (1 beat, 2 beats, 1 bar, 2 bars)
- [x] On last night, director controller would sometimes stop working. To reset we had to unplug, replug, and cycle off/on in Chromatik. Possibly related to all the mucking around I did in Bomebox trying to get the SuperMod controller working?
    - [x] Also check: did we max out the amount of MIDI power that can be supplied from one Atolla USB hub?
- [x] To consider: Set laser color from software? Benefits:
    - [ ] It would be easier to swap Director controller for an external GrandMA console at an event.
    - [ ] Less bomebox muckery
    - [ ] We could automate everything from software including laser color

Network: Car-Car link

- [ ] We ran the hardline link cable every day. I know and am sorry this fell short of Jeff's vision. On the bright side: it worked great, no perceived lag, didn't seem to be an issue for the crew to set up or take down.
- [ ] I never found the dish mount bracket for the main car side of the wireless link. Lots of setup tasks spilled over into the week and I wasn't motivated to continue searching when the wired link was working well.
- [ ] Length of the hardline cable was tight if it was run outside of the Haulle wheels. It was easier to reach when run straight under the car and directly to Mothership.
- [ ] Network cable connectors at the mothership window were not finished so we ran the cable up to the 2nd floor every day.
- [ ] Would be nice if wired+wireless links could be used in aggregate, instead of only one at a time. Would be easier for less experienced people to manage and would create more "automatic" redundancy.

Network: General

- [ ] Aside from physical connection issues, the networking gear ran as designed and did not give us any trouble. It was very helpful all this was set up pre-playa.
- [ ] We had **numerous** physical connection issues, sometimes cables and sometimes ports. Unknown if any of the cable issues were wire damage or if they all were connector problems.
- [ ] Cables with a broken retainer clip should be thrown away. They are a liability, might vibrate loose after the car drives somewhere.
- [ ] The most critical failure (although easier to find than a smaller problem) was the short ethernet jumper from rack switch → rack UDM Pro router. I replaced the cable and used a new port on both ends. I *think* i tested the same cable with different ports but can't remember exactly.
- [ ] NEED: a bin of short patch cables that lives next to the rack for replacing failures. I used the first thing I could find for some fixes and a few uncoiled 10' ethernets in the mix quickly turns to chaos.
- [ ] NEED: an established and widely known tune-up method for failing network ports. Maybe there is a magic combo like power off + canned air + contact cleaner?

- [ ] The rack is exposed to a ton of dust on the back of the car, often existing for long periods of time with the door open as both lighting and audio share the access panel.
- [ ] The rate of physical ethernet connection failures is unsustainable. It too frequently impairs our performance and generates too much maintenance work for the network-knowledgable person(s).
- [ ] PROPOSAL, discussed already with a number of the event crew
    - [ ] Turn the ice lounge into a server / network rack / amplifier room.
    - [ ] The climate control and shielded entry will greatly reduce dust exposure and hopefully will minimize connection problems
    - [ ] This might still be compatible with prior functions of the room

DJ Link

- [ ] DJ network was plagued by problems this year, almost entirely physical connection issues although a little was ShowKontrol bullshit at the beginning. I have a couple proposed changes to deal with this…
- [ ] DJ Link network issues occurred (daily?). They included:
    - [ ] Network cable connection from DJ switch → rack switch, at the rack ethernet plug. Sometimes this needed to be fully reset and one time it just needed to be pushed in further. ::facepalm::
    - [ ] Network cable connection from rack switch (DJ VLAN) to showkontrol-3 USB dongle, on both ends of cable.
    - [ ] Issues with ShowKontrol-3 USB dongle. Eventually it was swapped out.
    - [ ] Suspected issues between ShowKontrol-3 mac mini and USB-A port in the rack. Eventually bypassed and added a new USB-C dongle directly to the back of the mac mini.
    - [ ] Network cable failure on CDJ #2 between CDJ and DJ switch. Easy fix when one of them is not visible on the DJ network, but unsure what exactly had failed in the connection.
    - [ ] Backpacks and coats under the DJ booth pull down on the critical network cable linking the DJ switch to the main rack, sometimes making it not work.
    - [ ] On Friday night someone set a coat/backpack on the yellow extension cord reel under the DJ table, hitting the power switch on the reel and turning the power off to the DJ switch.
        - [ ] I was notified by runner halfway(?) through the night that the DJ network was down. Music was playing on Long Feng at the time. Reading the whatsapp later it sounded like TE may have had audio issues but don't know if this was related.
        - [ ] To fix, I added a personal power strip that didn't have a switch and bypassed the yellow reel. I also jumped at the opportunity to swap out the 8-port DJ switch for a white 16-port switch. I had become suspicious of the other switch's reliability.
        - [ ] DJ network worked fine the rest of the night
- [ ] PROPOSAL, as discussed with Kian:
    - [ ] All DJ Link network cables, switch, connections, and related gear should live in a protected space with cabinet doors separate from where guest coats/ backpacks/anything are stored. Problems caused by physical impact to the

network connections or power switches are completely avoidable.
    - [ ] In the current setup it looks like the top right shelf (10-12” high?) with the addition of doors would work great for this purpose.
    - [ ] Large bottom left cabinet could remain available for artists’ coat/backpack etc
- [ ] DJ Link software notes
    - [ ] As observed by myself and @Will Drevo, BeatLinkTrigger was a lot more resilient to the physical connection issues than ShowKontrol. A number of times we were able to get waveforms out of BLT but not SK.
    - [ ] We mostly ran BLT except a couple times when the system auto-started to SK and the first shift didn’t know to change it over. I don’t think we got around to modifying the auto-start items.
    - [ ] It feels safe to sunset SK
- [ ] ROADMAP PROPOSAL
    - [ ] BLT is lightweight and could be run on lighting-1. I’ve run it alongside Chromatik/LX Studio on my laptop for years without issue, including on older intel macbooks.
    - [ ] If we can build better OSC routing into Chromatik we could remove MaxMSP from the picture
        - [ ] That would greatly reduce the surface area for broken stuff out of sight
    - [ ] Then we don’t need ShowKontrol-3.
    - [ ] The screen share from lighting-10 to lighting-1 could connect both monitors. Put Chromatik on the left and BLT on the right, as before. It would be less hassle than a different screen share session on each monitor.

Audio Network

- [ ] On [Thursday?] the audio team was having issues with their network. I was told the Mikrotik audio router was using an under-amperage power supply so couldn’t supply the POE for the access points. I didn’t have time to question it but added a ubiquiti POE injector to the rabbit ears AP and they were up and running.
- [ ] On Friday crunch time pre-departure from camp: Audio team was on their wifi and getting an IP (ie connection to router for DHCP was good) but couldn’t reach their devices. In the few minutes as the car was departing camp I swapped out the Microtik audio router for a personal spare GLi.NET, set the IP settings to match the Microtik, but with wifi direct to the router. At the last second they were up and running.
- [ ] TODO: determine WTF with the Microtik power supply. Reconnect audio network to normal devices once the issues are sorted out.
- [ ] Unsure why audio has two APs with different network names. Just put one AP on the bottom side of the upper deck, ie above the DJ’s heads, and the audio iPad will be able to see it from both sides of the car.

Build

- [ ] Build process improvements discussed in design session with @INACTIVE Keegan
    - [ ] Build delays are cumulative, but a lot of the compression gets pushed onto the last steps (things like networking/software/config).

    - [ ] Awareness of overall build flow, especially cross-team prerequisites, generally exists in the heads of only a few experts
    - [ ] It is hard for people to see [and therefore mitigate] the impact of a particular build delay. And if an expert does see a delay, it's hard to distribute that knowledge with all the asynchronous activity happening.
    - [ ] A build gantt chart could help
        - [ ] Anyone could look ahead past the current tasks and anticipate ways to speed things up for the next round of tasks
        - [ ] We could see our current progress relative to where we expected to be

Key improvements

- [ ] Simplify. There are lots of systems, components, and connections. Part of the the normal growth cycle I'm sure. But it would help to optimize and distill them down.
- [ ] Reduce dust/environment exposure to physical network connections
- [ ] Move DJ switch & DJ power strips to protected cabinet space
- [ ] [Continue to] make systems more automatic, more plug-and-play. Reduce dependency on experts to troubleshoot every type of loose connection.
- [ ] Improve Mothership desk components & connections resiliency to vibration