Sound System Design 3: Building Guide

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Contents

You can build this system by following the instructions below.

Parts List

The following parts are necessary to build the rack part of the system:

- Gator G-PRO-6U-19 (6U portable rack case)
- Revolabs Executive HD 01-HDEXEC-NM (8 channel wireless microphones receiver)
- TOA M-633D (mixer)
- dbx 215s (2 channel graphic equalizer)
- TOA DA-250FH (4 channel 70V amplifier)
- CyberPower OR700LCDRM1U (uninterruptible power supply)
- Radio Design Labs STM-1
- Penn Elcom R1269/1UK/12 (patch panel with 12 Neutrik D-series holes)
- 2x Neutrik NC3FD-S-1-B (panel XLR female input): Markertek
- 4x Neutrik NC3MD-S-1-B (panel XLR male output): Markertek
- 4x Neutrik NL4MP-ST (panel speakON male output): Markertek
- 4x Neutrik NLT4MX (speakON male connectors): Markertek
- AUKEY PA-U38 (dual port USB charger)
- Cables To Go 03137 (or other short power cord)
- Axis YLCT-10 (or other 3-way grounded outlet splitter)

For the custom 70V transformer boxes:

- 2x Polycase DC-34PMBYR (enclosures)
- 2x Atlas Sound T-20 (70V 30W transformers)
- 8x Neutrik NL4MP-ST (panel speakON male outputs): Markertek

You will also need this cable and these screws:

- 2x 3 ft 1/4 TS/mono unshielded speaker cables: Monoprice
- 2x 3 ft 1/4 TRS/stereo shielded audio cables: Monoprice
- 3 ft RCA audio cable: Monoprice
- 30 ft Belden 9451 22 AWG (microphone/line cable): Markertek (order 40 ft)
- 15 ft West Penn 25225B 16 AWG (speaker cable): Markertek (order 20 ft)
- 50x Machine screws, Phillips flat head, Zinc plated steel, #4-40 x 1 inch: Bolt Depot

- 50x Hex machine screw nuts, Zinc plated steel, #4-40: Bolt Depot
- 2 ft (or longer) extension cord (ground not required)

These accessories are also necessary:

- 4-6x Revolabs 01-HDXLRMIC-11 (wireless XLR adapters)
- Revolabs 02-08HDCHG-C (charger base) with power supply (Revolabs 02-HDPWR-11 or other 24VDC 2A supply with barrel plug size 2.1mm I.D. x 5.5mm O.D. x 9.5mm)
- 4-6x Sennheiser e835 (dynamic wired microphones) and one of the included MZQ 800 microphone clips
- On-Stage Stands MY200 universal microphone clip
- Atlas Sound GN-13E 13 inch flexible microphone gooseneck
- Atlas Sound GN-19E 19 inch flexible microphone gooseneck
- JK Audio BlueDriver-F3 (Bluetooth cell phone interface) and the included mini-USB cable (Monoprice 3896)
- audio-technica AT8202 (adjustable in-line XLR attenuator): Markertek
- 4x 50 ft XLR cables, 20 AWG or larger: Technical Pro CXXF1650
- 4x 50 ft speakON cables, 16 AWG or larger: Technical Pro CSS1650
- 3 ft XLR cable, 20 AWG or larger: Monoprice 4750
- 2x 6 ft speakON cables, 16 AWG or larger: Monoprice 8768
- 2x 1.5 ft XLR female to 1/4 TRS/stereo male cables: Monoprice 4767
- Hosa YXM-101.5 XLR Y/splitter cable
- 2x Neutrik NL4MMX (speakON gender changer for long cable runs): Markertek
- 25 ft power extension cord

You probably already have:

- 4 power cords for the rack equipment
- 24 rack screws and washers for mounting
- 14 regular (5.08 mm pitch) Phoenix/Euroblock connectors, Phoenix Contact part #1757022 (for TOA M-633D mixer and TOA DA-250FH amplifier): Digi-Key 277-1012-ND
- 6 mini (3.81 mm pitch) Phoenix/Euroblock connectors, Phoenix Contact part #1803581 (for Revolabs receiver): Digi-Key 277-1162-ND

Also consider the following (not tested):

- 2x TOA SR-H2L (line array speakers)
- 2x TOA MT-S0301 (matching 70V 30W transformers)
- 2x TOA SR-SA3 (stand adapters)
- 2x TOA ST-33B (speaker stands)

Building the Main System

1. Install the CyberPower power supply in the bottom space of the rack. Connect four power cables (for the other devices) to the first four (black) outlets on the rear.
2. Open the DA-250FH amplifier and set the input sensitivity and high-pass filter jumpers. Input sensitivity should be set to −10 and the high pass filter should be set to ON. See page 13 of the manual. The three rear switches (near the inputs) should be OFF (out).
3. Install the DA-250FH amplifier above the power supply, and connect the power cable.
4. Install the dbx equalizer above the amplifier, and connect the power cable.
5. On the rear of the M-633D mixer, switch all 6 input selector switches to LINE.
6. Install the M-633D mixer above the equalizer, and connect the power cable.
7. On the rear of the Revolabs receiver, switch all configuration DIP switches to the OFF (upward) position.
8. Important: update the Revolabs firmware (base unit and all microphones) using the HD Control Panel software.

9. Install the Revolabs receiver at the top space of the case and connect the power cable.

10. Install 10 Neutrik D-size panel receptacles in rack panel:

    - XLR female (marked with F and has a PUSH release tab)
    - XLR male (marked with M)
    - speakON (twist connector)
    - XLR male
    - speakON
    - XLR male
    - speakON
    - XLR male
    - XLR male
    - speakON
    - (empty)
    - (empty)

11. Cut cable to 60 cm (2 ft) lengths. You need:

    - 14 pieces of Belden 9451 and
    - 6 pieces of Wes Penn 25225B.

12. Connect the first 6 Revolabs outputs to the corresponding M-633D mixer inputs.

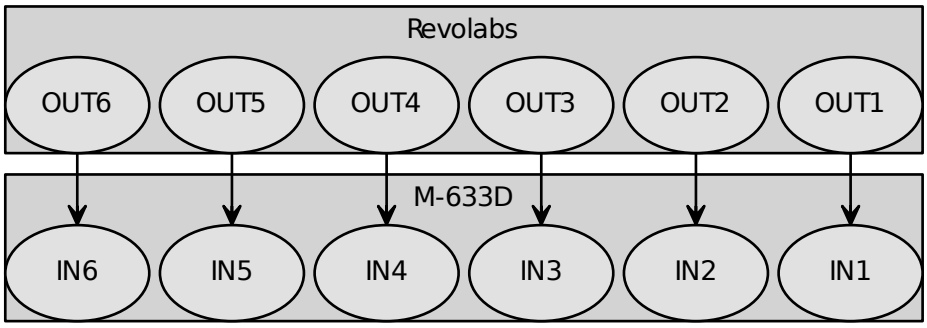

Figure 1: Signal Connections

13. Use cables to connect equipment according to the following signal diagram.

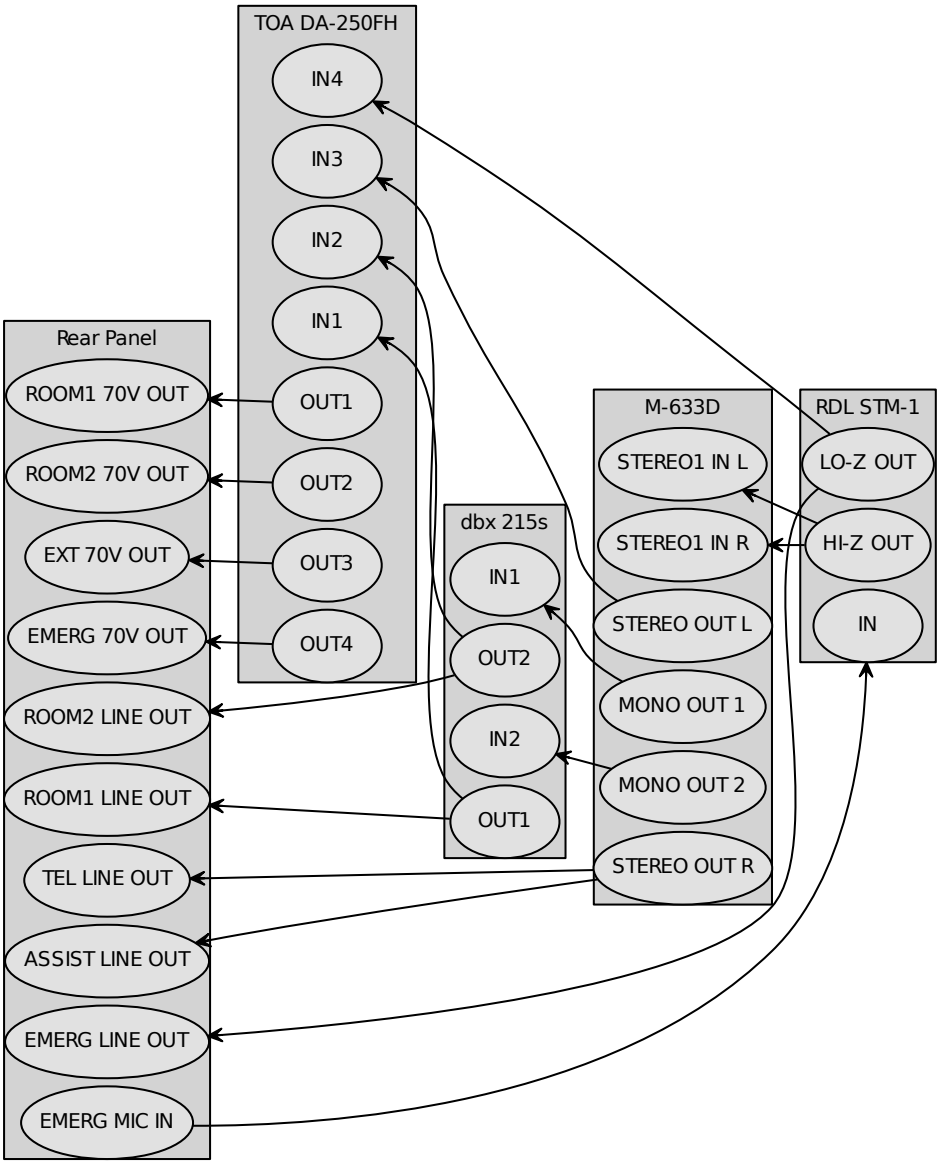

Figure 2: Signal Connections

14. Use power cables to connect equipment according to the following diagram.

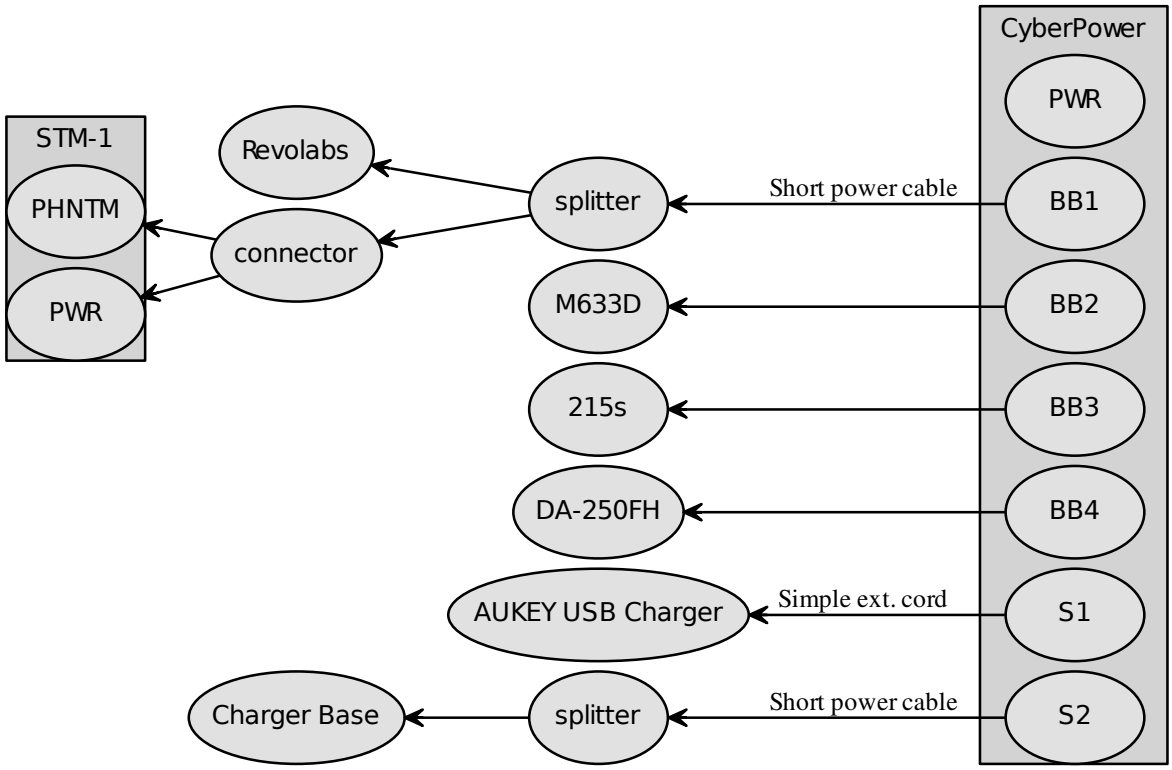

Figure 3: Power Connections

Todo

- XLR: 1=earth/ground, 2=hot, 3=cold
- BlueDriver-F3: set to PHONE mode and set the MIC TRIM to the fully clockwise position.
- Labels (PDF) (Inkscape SVG source)

Building the Custom Transformer/Splitter Boxes

Follow these instructions once for each of the two transformer boxes.

1. Screw the top cover onto the Polycase enclosure, if it is not already.
2. Use this template (PDF) (LibreCAD DXF source) to drill six small holes and three large holes on the front side of the Polycase enclosure. It may help to print extra templates, and to tape the template onto the enclosure while drilling.
3. Use the same template to drill two small holes and one large hole on the rear side of the enclosure.
4. Remove the top cover and drill two small holes in the bottom of the box for mounting the Atlas Sound T-20 transformer. Be sure to leave room for the speakON connectors; insert a speakON connector in each of the four holes to be sure.
5. Make the following connections. The transformer connections must be soldered. It may be helpful to use a plastic tie strap around the transformer to stabilize the wires during soldering, as well as for handling in the next step. For more information about the Atlas T20 transformer, see the datasheet (PDF).

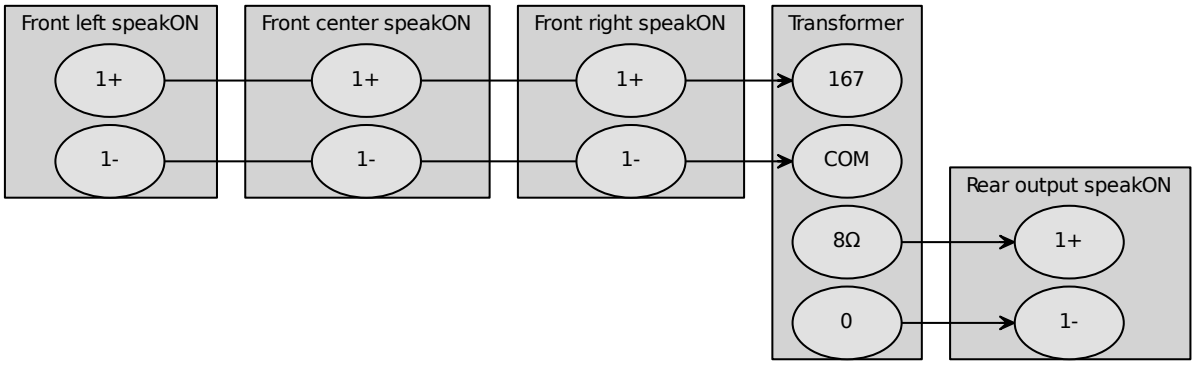

Figure 4: Transformer Box Connections

6. Use the #4-40 x 1 inch screws/nuts to mount the transformer and speakON panel connectors. It might be easier to start with the front left connector and work around counter-clockwise before mounting the transformer last.
7. Screw the top cover onto the enclosure again.
8. Place the label on the top cover. See the Labels (PDF) (Inkscape SVG source).