

# How To Run A Board: The Audio Mixing Console

*First course, Fourth grading period, Week one*

The mixing console at a radio station or production/recording studio can be an intimidating sight. Some have even looked at it and said, “Gosh, you must be able to fly the Space Shuttle if you can work that!” In truth, a mixing console is a very basic piece of equipment. When broken down to its component parts, it is quite an easy beast to tame.

What we will do in this lesson is start from the ground up, working with one element of the mixing desk, and then move on to put together the rest of the puzzle with the other elements. Soon after, we will move towards a more hands-on approach, allowing students to use the console in ways that are important and necessary to the industry. Whether they decide to pursue a career in broadcasting, journalism or engineering, students will discover just how vital a piece of equipment this is in any of the above professions.

*This lesson is provided by Brian Jarbow, NPR engineer.*



## Enduring Understanding

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The ability to understand how a mixing console is used is essential in broadcasting, journalism or engineering.



## Essential Questions

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How does a mixing console work? How does the signal pass through it? How is it useful in mixing pieces for broadcast?



## Objectives and Outcomes

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- Students will be able to route a signal through the console.
- Students will be able to route multiple sources to mix and control several signals happening at one time.



## Suggested Time

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One to two weeks



## Resources and Materials

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- Drawing or diagram of a basic mixing desk. If you are using a specific mixing board in the class, make an overhead slide of the console from the manual.
- Flow chart indicating a simple signal path
- Mixing Console Input Channels ([www.indiana.edu/~emusic/mixer.html](http://www.indiana.edu/~emusic/mixer.html))

- Introduction to Computer Music: Volume One, Chapter 2, Pt 3. “Mixing Console Basics” ([www.indiana.edu/~emusic/etext/studio/chapter2\\_mixers.shtml](http://www.indiana.edu/~emusic/etext/studio/chapter2_mixers.shtml))
- Mixing Desk Basics (<http://harada-sound.com/sound/handbook/mixers.html>). Contains some sexual innuendos.
- “The Radio Station,” Chapter Two, Radio Production



## Procedure

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1. Teachers should start with the basics. Describe the console and its sections. This should include faders, monitor section, and meters. Describe how the sections work with each other to move signals in and out of the console.

Give each student a copy of the flow chart that illustrates the path a signal takes, how it starts at its origin, is routed through the console, and how it gets to the monitors. Relate the illustration to the console. The console goes by many names: sound console, mixing board, mixing desk, and mixer, among others.

2. Provide students with a diagram of the mixing desk with the parts labeled. As you refer to each part, demonstrate what it does.

Understanding how a mixer works can be daunting, so explain that it is essentially one fader, with the console being a collection of many faders. Describe the different components of the fader, starting at the top, and working down. These should include:

- Auxiliary sends
- EQ (if any)
- Input selectors
- Left/Right/Stereo selectors
- On/Off switch
- Pan-pots
- Phase Reversal
- Program assignment
- Volume control (fader or knob)

3. Show students pictures of various mixing consoles, explaining that many different kinds of mixers are available. These include analog and digital mixers, mixers specifically for broadcasting and mixers for music and music production. Explain their similarities and their differences. Discuss the advantages and disadvantages of each, using examples of at least two different consoles.

4. Allow students to get a hands-on feel for a mixer. Start with one signal from one source. Make sure each student experiences using the mixer. Experimenting with the console will help students better understand how the audio gets from Point A to Point B. While this is being done, the other students can be reading their textbooks, studying for a test on the mixing board and reviewing technical terms.

5. Give students a test in which they are asked to identify the parts of the console and state what each component does.

6. After students have mastered this skill, add other elements such as another microphone, a CD player, a tape machine or computer audio. Let students try to route various signals to see if they can hear them on the studio monitors. Students should, over time, feel comfortable in knowing how each signal is getting to the monitors and be comfortable in using their judgment in creating a pleasant mix of the elements.

Make sure they understand the difference between “cue” and “on air” when they monitor the sounds. Go over meter levels carefully.

Given that most students will not have their own mixer at home, allow them to have as much hands-on time as possible after the first discussion.

7. If students are having trouble operating the console, you might send them to the Indiana University School of Music, Center for Electronic and Computer Music Web site prepared by Professor Jeffrey Hass. He has provided “Mixing Console Troubleshooting Checklist” (<http://www.indiana.edu/~emusic/mxrtrbl.html>).

8. At the end of this unit, students should know how to route audio through the console and be ready to produce a simple mix of audio suitable for broadcast.

9. If there is time for a second week of practice, divide students into teams and have them hook up all the equipment and mic each other and perform as many mixes as possible. More advanced students might take the console on a remote if it is small enough and record a game, concert, or panel discussion or do this in the studio/classroom by inviting a group in. Have the entire class set up the equipment and take turns running the board. Record everything and evaluate each student’s understanding of levels and how smoothly each part of the board is used.

Teachers might also set a date for a hands-on, running-the-board quiz. Before the quiz, when students complete other assignments and a board is available, they might practice a sequence or checklist that you provide.



## Homework

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Students should begin by reading Chapter Two in Radio Production, the appropriate chapter in the textbook you are using or one of the Web sites in the resource section for additional information about the workings of a mixer. Test them on the chapter/material. Review and retest these principles throughout the course.

Students should be issued diagrams of a basic mixer layout, and a separate diagram of each of the mixer’s components. Understanding how they all work separately will help them grasp how they all work together. You may handout a diagram without labels to let students practice identifying parts.



## Assessment

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Reading homework and resulting tests on the material.

Make sure that students can name and label parts of a board on a diagram. Students must understand the different components of the mixer and what role each item plays in routing the signal. Make sure that they can correctly identify and describe each section.

Test their ability to physically route one signal through the board. Once done, move up to multiple sources and see how they are able to deal with more than one source coming through. Assess and judge each student's ability to begin and complete a simple mix suitable for broadcast.



## Academic Content Standards

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Comprehend and use reading strategies to learn meaning, technical concepts and vocabulary. (VTECS, Skills Common Across All Clusters, F02.1)

### National

Understand the principles, processes, and products associated with arts and communication media (McREL, Standard 1, Arts & Communication Career)

### National Benchmark

Know skills used in electronic communications (e.g., producing audio recordings and broadcasts, producing video recordings and motion pictures). (McREL, Arts & Communication Career, Grades 9-12)



## Industry Standards and Expectations

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Apply knowledge of equipment and skills related to audio production. (Pathway KS Statement: Audio and Video Technology and Film, States' Career Clusters, National Association of State Directors of Career Technical Education Consortium)

Apply knowledge of running a board shift. (Performance Element, Pathway KS Statement: Demonstrate knowledge and understanding of technical support related to broadcasting, States' Career Clusters, National Association of State Directors of Career Technical Education Consortium)

The National Certification Committee of the Society of Broadcast Engineers suggests knowledge of the following in preparation for the engineering SBE certification examinations: NAB Engineering Handbook; FCC Rules, Code of Federal Regulations, Title 47 (Telecommunications), Parts 0-19, 70-79; and equipment manufacturers' instruction manuals. ([www.sbe.org/Ref\\_Engineer.php](http://www.sbe.org/Ref_Engineer.php)).

Understand content, technical concepts and vocabulary to analyze information and follow directions. (F02.1.2, Comprehend and use reading strategies to learn meaning, technical concepts and vocabulary, Career Cluster Project: Communications Skills)

Whether they decide to pursue a career in broadcasting, journalism or engineering, students will discover the audio mixing console is a vital piece of equipment in any of the professions.

# Running a Board Vocabulary

*By the completion of the "How to Run a Board" unit, you should be able to define the following terms.*

Analogue signal

Auxiliary send/output

Cue

Digital signal

Fader

Input selector

Mixer

Monitor

On-air

Pan-pot

Phase distortion

Routing

Signal

Volume

# And Top of the Hour To You

*First course, Fourth grading period, Week 2*

Every station starts out of the programming gate with a top of the hour format. Often it's glitzy, informational and fast paced. It serves several purposes, including forward promotion of what is coming up. Producing it is a challenge and will build upon students' recently acquired skills of running a board.

Students listen and critique four minutes of audio in this lesson: One minute before and three minutes after the top of the hour – example: 11:59-12:03. This way they hear the station's programming transitions and become aware of what leads up to the top of the hour. They produce three minutes of audio starting at the top of the hour, 12:00-12:03.



## Enduring Understanding

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Stations produce programming that is organized, carefully scheduled and promoted.



## Essential Questions

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What happens at the top of the hour on radio? What are the principles behind the programming? How do you produce a top-of-the-hour segment?



## Objectives and Outcome

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Students will be able to analyze and produce a fast paced, three-minute top of the hour segment.



## Suggested Time

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Four to five days



## Resources and Materials

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- Various taped examples of top of the hour broadcasts to hear in class. Pick several very different commercial and public station examples, and the top of a show and a top of the hour segment from a TV newscast.
- Next Generation Intern Edition ([www.nextgenerationradio.org](http://www.nextgenerationradio.org))
- Morning Edition ([www.npr.org](http://www.npr.org)) or tape local stations for examples
- Guest speaker



## Procedure

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1. Begin by introducing students to several top-of-the-hour station segments. Listen to four minutes of each.

Important: Tape four minutes starting at one minute before the hour through three minutes after. This will allow students to hear the transitions that happen between shows and across the top of the hour including coming in and going out.

As they listen, have students list what material is presented and what sounds are introduced. Consider the following questions:

- Was an upcoming program forward promoted? How?
- Was there a station ID?
- Was there music behind the segment? Theme music?
- What mood was set as the minutes progressed? Urgent? Intense? Laid-back?
- Was there a hole created for a newscast to be dropped in?
- How many different elements and topics came up? List each element.
- Were there commercials and or funding credits?
- Were weather and traffic included?

Discuss each of these categories. You may want to listen to each sample again after the discussion and have students use their stopwatches to time what they are hearing as they listen again, clocking in and listing each change of ideas. You want them to hear the segments as they stack up for the four minutes and break them out clearly to be able to explain their programming functions.

2. After being introduced to the concept and content of the top-of-the-hour segment, students should meet someone who produces these segments to get more insight into the pacing, the background information and skills required to produce these daily. The guest ideally will be an on-air talent or producer who programs the top of the hour on a fast paced, local station. If you cannot get someone in person, maybe that person can speak to the class by speaker phone. Record what is said by the guest.

The guest describes his station and what is involved in the production of the top of the hour he produces:

- Who writes the lines that are aired?
- Who chooses the music?
- What points does he/the station want to get across to the audience?
- How important is it to mention what will be coming up?
- Does he produce the top of the hour ahead of time? If so, how far and why?
- What pacing is used to read the information? Is it in keeping with the station's image or the shows that follow the top of the hour?
- Does he follow a format clock?

3. Students pick a station to emulate for a top-of-the-hour segment and list what they will need as resources to produce a fast paced, three-minute segment. For homework, they will write a top-of-the-hour segment.

4. Students record their copy and put together their top-of-the-hour segments in groups. Using their skills with the mixing board, have each group produce the best two written examples using tape, records, CD's recorded lines, news, and whatever else they have sketched out to create the three-minute top-of-the-hour segment.

It must have clear breaks – at the one-minute mark, two-minute mark, and wrap-up at three minutes. It must have a clear programming plan. (Do not produce the one-minute leading up to the top of the hour. Students are to produce only the top.)

5. On the project due day, the class discusses and critiques each other's top-of-the-hour segments.



## Homework

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Students listen to two station's top-of-the-hour formats and critique them as they did in class. They listen to a four-minute segment starting at one minute before the hour through three minutes after.

Students sketch out what they will produce for their three-minute segments. They will write scripts for three minutes that start at the top of the hour and goes for three minutes, not the minute before the hour. If, for example, there is 30 seconds of weather, they write a forecast. If it is news, they write headlines; a program, they promote it.



## Assessment

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Give students credit for completing all homework assignments and participating in class activities.

Evaluate how well students meet the requirements of the top-of-the-hour segment. Is it within the specified time? Are one- and two-minute breaks clear? Is the music appropriate for the station and programming that follows? Is there a clear programming plan?



## Academic Content Standards

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### National

Understand the principles, processes, and products associated with arts and communication media (McREL, Standard 1, Arts & Communication Career)

### National Benchmark

Know skills used in electronic communications (e.g., producing audio recordings and broadcasts, producing video recordings and motion pictures). (McREL, Arts & Communication Career, Grades 9-12)



## Industry Standards/Expectations

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Use correct grammar, punctuation and terminology to write and edit documents. (F02.3, Career Cluster Project: Communications Skills)

Apply knowledge of running a board shift. (Performance Element, Pathway KS Statement: Demonstrate knowledge and understanding of technical support related to broadcasting, States' Career Clusters, National Association of State Directors of Career Technical Education Consortium)

Students adjust their use of spoken, written, and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes. (Standard 4, NCTE/IRA Standards for the English Language Arts)