

CFRC's Studio A is a versatile and professional space designed to accommodate a wide range of recording needs, including live or pre-recorded sessions for bands, podcasts, and other group setups.

Today we will take you through a quick walk-through of the studio and CR1, with some basic info on how to get started. For full details on what you can do with the studio, what tech and gear we have on hand and what you need to provide, check out our manual on the Volunteer Resources page.

Why Use Studio A?

Studio A provides a spacious setup to comfortably accommodate larger groups, whether it's a band or a podcast panel. The studio is equipped with diverse tools and technologies that cater to different recording scenarios, making it ideal for capturing complex soundscapes. The studio offers a dedicated recording environment designed to minimize interruptions and distractions, so you can focus on producing great audio content.

What Can You Achieve in Studio A?

- Bands: Record live sessions with multiple instruments and vocalists, capturing the dynamic energy of a group performance.
- Podcasts: Host engaging conversations with multiple participants, ensuring each voice is clearly captured.
- Live or Pre-Recorded Sessions: Tailor the studio's setup to your specific needs, whether you're going live-to-air or recording for later broadcast

Differences Between Studio A and Control Rooms

Studio A is designed for sound production, while the adjacent control rooms are for sound monitoring and manipulation.

Studio A is focused on creating and capturing audio and is equipped with microphones, stands, and other tools for performers or speakers.

Control Rooms are designed for monitoring, mixing, and making real-time adjustments. This is where you'll find mixers, computers, and recording software.

Capacity and Layout

While Studio A is relatively compact (approximately 9' x 9'), it can accommodate up to 9 individuals or small ensembles with careful planning, though we recommend limiting your group to 7 people for optimal comfort and functionality.

Studio A has successfully hosted diverse groups, from jazz bands to theatrical ensembles, proving its adaptability.

Getting to Know the Studio

Understanding the layout and purpose of CFRC's Studio A is essential for making the most of its features and capabilities. The control room serves as the nerve center for audio production. It is equipped with tools and technology that allow you to monitor and adjust recordings in real time without disrupting the session in the studio.

Key features include:

- Mixing and Monitoring: mixers, faders, and audio interfaces
- Recording Software: Computers with pre-installed DAW (Digital Audio Workstation) software
- Communication Tools: Talkback microphones and monitoring systems

What is a Studio? Studio A is dedicated to sound creation and capture. The studio's layout accommodates various instruments, vocal setups, and group arrangements and is arranged for simple setup and teardown.

Microphones, stands, cables, and headphones are readily available to support diverse recording scenarios.

Equipment Overview

Studio A is equipped with a variety of professional-grade tools to meet the demands of both novice and experienced users.

Microphones

- Behringer SL 84C:
 - versatile and budget-friendly
 - Ideal for vocals, instruments, and general-purpose use.the microphone to avoid plosives or capturing unwanted mouth sounds.
- Ashton Stealth:
 - A more advanced microphone with adjustable pickup patterns for specific use cases like recording deep vocal frequencies, guitars, or emulating ribbon microphones.

PreSonus 1824c Audio Interface

- Acts as a microphone pre-amp to enhance low sound sources.
- Located on the wall facing Control Room 1 for convenient access.
- Features phantom power for condenser microphones and gain controls to optimize signal levels.

Cable Snake Box

- Extends the inputs and outputs of the PreSonus 1824c to other areas of the room.
- Facilitates efficient setups for bands or podcast groups who need to position themselves strategically in the studio.

DI Boxes 8

- Converts unbalanced, high-impedance signals (e.g., from guitars) into balanced, low-impedance signals.
- Essential for capturing clean, direct input recordings while allowing musicians to monitor through their amplifiers.
- Includes features like ground lifts to eliminate hum and pads to reduce signal gain.

Cables and Connections

- XLR Inputs:
 - Studio A has 8 XLR-compatible line inputs for microphones and DI boxes.

- Ensure all signals are converted to XLR format for compatibility.
- Headphone Outputs:
 - TRS-compatible outputs designed for use with headphones and amplifiers.
 - TRScables feature two rings (Tip, Ring, Sleeve) for balanced audio.

Headphones and Amplifiers

- Provide clear monitoring for performers during recording sessions.
- Headphone amplifiers allow multiple participants to monitor audio simultaneously, ensuring everyone hears their performance accurately.

Additional Accessories

- Stands and Clips: For securely positioning microphones.
- Room Dividers: To manage room acoustics and minimize sound bleed between sources.

Microphone Placement and Sound Source Positioning

See our Studio A manual for more information.

Proper microphone placement is one of the most critical steps in capturing high-quality audio. Whether you're recording vocals, instruments, or a group, following the detailed guidelines in our Studio A manual will help minimize issues such as plosives, unwanted noise, or microphone bleed while ensuring a natural and clear sound.

Tips for Success

- Monitor Levels: Continuously monitor input levels while setting up microphones to avoid clipping or low signal issues.
- Test and Adjust: Perform a quick test recording to ensure the placement captures the desired sound. Make adjustments as necessary.
- Experimentation: Don't be afraid to experiment with unconventional placements to achieve unique soundscapes, especially for creative projects.

Stage Plots

Stage plots are a vital tool for organizing and executing successful recording sessions with bands or large groups. These diagrams provide a visual representation of the layout and input requirements, allowing you to plan effectively, prepare the studio in advance, save time during setup, and avoid last-minute complications.

What is a Stage Plot?

A stage plot is a diagram provided by the band or performers that includes:

- Musician Placement: Where each performer will stand or sit.
- Instrument and Equipment Placement: Locations of microphones, amplifiers, drums, keyboards, and other gear.
- Input List: A detailed list of the audio inputs needed, specifying the type of microphone or DI required for each sound source.
- Monitoring Requirements: Notes about headphones, floor monitors, or in-ear monitoring systems, if applicable.

How to Request and Use Stage Plots

Ask for a stage plot well before the recording session. Provide performers with a template if needed to ensure consistency. Check the list of required microphones, DI boxes, and cables against your available inventory. Address any gaps ahead of time. Use the stage plot to determine microphone placement, cable routing, and the best arrangement for performers in Studio A. Be ready to make adjustments if the actual setup differs slightly from the stage plot due to space constraints or unexpected needs.

Reading and Interpreting Stage Plots

Familiarize yourself with common symbols for microphones, DI boxes, and instruments. Ensure each is labeled clearly to match the input list.

Identify key sound sources, such as lead vocals or main instruments, and ensure these are prioritized during setup.

Arrange inputs logically (e.g., all drum microphones in sequential channels) to simplify mixing and troubleshooting.

Setting Up from a Stage Plot

Use gaffer tape or markers to designate the locations of microphones, instruments, and performers as shown on the stage plot.

Lay out cables efficiently to minimize tripping hazards and avoid tangling.

Ensure that each microphone and DI box is connected to the correct input as indicated in the stage plot.

Confirm that monitoring systems (headphones or monitors) are set up and functioning according to the performers' needs.

Troubleshooting Common Stage Plot Issues (for Volunteers)

- **Missing Information:** If the stage plot is incomplete, ask the band for clarification or adapt based on standard practices.
- **Space Constraints:** If Studio A's compact size limits the setup, prioritize essential inputs and negotiate adjustments with the performers.
- **Unexpected Equipment:** Be prepared to substitute gear if performers bring items not listed in the stage plot.

Signal Flow Setup Microphone to Mixer/Interface

Step 1: Microphones (e.g., Behringer SL 84C, Ashton Stealth) capture the sound from the source (vocalist or instrument). XLR cables connect the microphones to the Snake Box, which routes the signals to the main mixer/interface.

Step 2: The audio signal from the microphone flows through the Snake Box into the PreSonus 1824c interface, which acts as both a mixer and pre-amp. Pre-amp adjusts the microphone's signal level to a line-level signal. The PreSonus 1824c allows for high-quality amplification, ensuring the signal stays clean and strong.

Step 3: If necessary, DI boxes can be used for instruments (e.g., electric guitars, keyboards) to convert unbalanced signals (from instruments) into balanced signals that the interface can handle.

Step 4: After the signal is processed by the interface, it is sent to the DAW (such as Reaper) via AoIP to record and edit the audio.

Step 5: Gain staging is crucial to avoid distortion and ensure clean recordings. Gain levels on both the interface and the mixer must be set so that the signal doesn't clip or distort. Set the mixer's faders to optimal levels and ensure that the signal is strong, but not too loud (avoiding clipping).

Step 6: The signal is sent to headphone amplifiers for monitoring purposes. TRS-compatible headphones are connected to the amplifiers and the control room engineer adjusts the headphone mix to ensure that musicians or hosts hear the right balance of the live recording or previous tracks.

Step 7: If the session is live, the signal is routed directly from the DAW through the mixer for real-time broadcast to CR1 or CR2. For pre-recorded sessions, the signal is captured into the DAW and can be further edited before broadcast.

Troubleshooting

If issues arise, check the following:

- No sound: Confirm all cable connections, mic/line input routing on the interface, and fader levels.
- Missing Inputs: Ensure the DAW is set to the correct input channels, and check if any channels are muted.
- Talkback Issues: Make sure the talkback button on the far right of the board is pressed, NOT the ones that are directly on each fader. Also make sure the knob for "Studio" volume is turned up
- Headphone Mixes: Adjust the headphone amplifier output to balance the sound for performers.

Cable Connections in Studio A

Cable management and proper connections are crucial for ensuring high-quality sound and preventing signal issues in Studio A. For full details, refer to our Studio A Manual.

XLR cables are the standard for professional audio equipment, especially for microphones. They are used because they carry balanced signals, which are less susceptible to noise and interference over long distances. Microphones are typically connected to the mixer or audio interface using XLR cables. The microphones send their audio signals through these cables to the mixer or interface, where the signals are amplified and processed. XLR cables provide a balanced connection, which reduces noise and ensures that the signal remains strong and clean, even over longer cable runs.

The Mixer/Interface (e.g., PreSonus 1824c) features XLR input jacks for receiving the audio signal from the microphones. When connecting XLR cables, make sure the cables are firmly plugged in to ensure good signal integrity.

Using DI Boxes for Conversion

- What is a DI Box? A DI (Direct Injection) box is used to convert an unbalanced signal from instruments (such as electric guitars, keyboards, or bass) into a balanced signal that is suitable for use with a mixer or audio interface. DI boxes also provide impedance matching, which improves the quality of the signal.

- How to Use a DI Box: Plug your instrument (e.g., electric guitar, bass) into the input of the DI box using a 1/4" TS cable (unbalanced). The output of the DI box is an XLR connection (balanced), which you then connect to the mixer or 16 interface. Ensure that 48v phantom power is enabled on the Presonus audio interface.

- Benefits of Using a DI Box: Noise Reduction, Cleaner Sound, and Ground Loop Elimination. Connecting Headphones and Amplifiers

- Headphones for Monitoring: In Studio A, headphones are used for monitoring live or pre-recorded audio during the session. These are typically connected to headphone amplifiers or mixer headphone outputs for clear and loud sound. For optimal sound, use TRS-compatible headphones with a TRS connector (3.5mm or 1/4" jack), which is plugged into the headphone output on the mixer or headphone amplifier. The headphone amplifier is usually connected to the mixer's auxiliary send output or the audio interface's headphone output. This connection ensures that each performer hears the mix that is tailored for their needs. These outputs are found on the Cable Snake on the wall. For sessions with multiple performers or crew members, headphone splitters or multiple outputs on a headphone amplifier can be used to send the same mixes to various sets of headphones.

Recording Techniques in Studio A

Recording techniques in a professional studio like Studio A involve careful planning, monitoring, and balancing to achieve the best possible sound.

Live vs. Pre-recorded Sessions

In live sessions, all audio adjustments, such as EQ, volume, and panning, need to be made in real-time. The mixer and engineer must maintain a dynamic balance, adjusting the mix as the performance unfolds. It's crucial to create individual headphone mixes for each performer to ensure they hear the elements they need, like their own instrument or vocal, without unwanted bleed from other sources. Managing latency is another important aspect of live sessions. Latency refers to the delay between the input and output of sound, which can affect timing and synchronization in live performances. The engineer should work to keep latency as low as possible, ensuring that performers hear their inputs and the overall mix in real-time without delay. To achieve this, careful routing of signals and use of low-latency settings on the DAW (e.g., Reaper) and interface (e.g., PreSonus 1824c) are essential. For live broadcasts, whether for radio or streaming, the audio needs to be mixed and sent directly to the broadcast studio (CR1 or CR2) without delay. The master fader on the mixer controls the overall output, ensuring that the live mix is clear and balanced. It's important to continuously monitor the output to avoid any distortion, clipping, or dropouts during the live session.

In pre-recorded sessions, the engineer can take their time adjusting levels, EQ, and effects for each individual track, and adjustments can be made after the recording to enhance clarity and balance.

Balancing Multiple Voices/Instruments

When recording multiple voices or instruments, balancing each element in the mix is key to achieving a polished sound. Each instrument or voice should be clearly audible, but none should overwhelm the others unless it's intentional (e.g., a lead vocalist or solo instrument). Using the faders on the mixer to control the volume of each track is essential for ensuring a balanced mix.

Microphones should be positioned to capture the best tonal quality of each instrument or voice while minimizing unwanted noise and interference. For vocals, place the microphone at a distance that captures the full range of the voice, while for instruments, experiment with mic positioning to capture the desired tone without introducing too much room sound or distortion. For more information on faders, panning and EQ adjustment, mic placement, gain, reverb, delay and other tips, see our manual.

Using the DAW

The DAW (Digital Audio Workstation), in this case, Reaper, is the heart of your recording and mixing workflow in CR1. It is used to capture, edit, and mix audio from the studio's equipment. The Studio A setup has a preconfigured template in Reaper with channels 1-8 set up to correspond with the inputs from the Wheatstone DMX 16 mixer.

Open Reaper and select the preconfigured template for CR1. This will automatically load a session with tracks 1-8 assigned to the appropriate input channels.

Ensure that each track in Reaper is assigned to the correct input channel. The first 8 tracks in Reaper should be set to inputs 1-8, matching the corresponding mic channels on the mixer (mic 1 to track 1, mic 2 to track 2, etc.). Click the Track Input button on each track and verify that it is set to the correct input from the mixer.

Make sure the tracks you want to record on are armed in Reaper by clicking the Record Arm button on each track. This allows the track to receive the signal from the mixer. Once armed, you should see the signal levels moving on each track in Reaper as sound is picked up from the corresponding microphone.

Check that the levels from each mic are neither too low nor too high. Set each track's input gain in Reaper, ensuring the signals are loud enough without clipping. Use the meter to monitor the input levels.

The Wheatstone DMX 16 mixer is where you control the input sources and direct them to the corresponding channels. The mixer has knobs on the faders that are used to choose which source is routed to that particular channel. For Channel 1, you'll use the knob to select Mic 1 as the input source. Repeat this for all 8 channels, Mic 1 to Channel 1, Mic 2 to Channel 2, etc. Check the signal flow by watching the faders on the mixer. As the sound from the microphones is picked up, the faders should move, indicating the signal is being received. The levels on the

mixer should match the levels you're seeing in Reaper. If there's no signal, double-check the fader settings and input selection knobs on the mixer.

If the signal is too weak or too strong, adjust the input gain knobs on the preonus pre-amp.

This will also affect the levels in Reaper, so make sure to monitor both the mixer's meters and the Reaper track meters for proper level alignment.

Be mindful of clipping—if the signal is too hot (too loud), it can distort. Watch the mixer and the Reaper track meters for any signs of clipping. If necessary, reduce the gain using the gain knobs on the pre-amp.

You can use the talkback mic feature on the mixer to communicate with the performers during the session. The talkback button is labelled TB and is found on the far right of the mixer.

Additional Tips for Efficient Setup

If you make any custom changes to the template, such as adjusting input routing or adding specific effects, be sure to save it so you can easily recall it for future sessions.

Continuously monitor the signal flow. If you notice any issues, such as no sound from a specific mic, check both the mixer's input selection and Reaper's track routing.

Save your Reaper session regularly, especially before making significant changes to the setup.

This ensures that you don't lose any work if something unexpected happens during the session.

Going Live

When preparing for a live broadcast, seamless coordination between CR1 (the control room for recording) and CR2 (the studio used for the live transmission) is essential to ensure that the broadcast runs smoothly.

The CR1 control room handles the recording and mixing of the audio, while CR2 is used for broadcasting. The fader labeled CR1 in CR2 allows the operator in CR2 to control the level of the audio being sent from CR1. This fader is the key point of control for balancing the live broadcast mix, ensuring that the audio from CR1 is clear and properly leveled when transmitted. The operator in CR2 should use the CR1 fader to adjust the volume of the incoming audio signal from CR1. The fader must be set to a level that ensures the live audio is loud and clear without distortion or clipping.

It's important for both CR1 and CR2 operators to continuously monitor the live mix. The operator in CR1 should ensure that audio levels are balanced and properly routed. The operator in CR2 needs to monitor the output, adjusting the CR1 fader as necessary to match the live broadcast needs, such as accommodating different voices, instruments, or commercial breaks.

Good communication between the operators in CR1 and CR2 is vital for a successful live broadcast. Operators in both rooms should be in constant communication to ensure that the broadcast transitions are smooth, the levels are correct, and any technical issues are quickly addressed.

Before going live, conduct a quick live broadcast check where the operator in CR2 ensures that the audio being transmitted from CR1 is of good quality and is being sent at the right levels. This check should involve testing all audio sources (microphones, instruments, sound effects, etc.) to ensure they are properly routed and balanced in both CR1 and CR2.