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# The UCA Audio Handbook

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by Joe Dull

How to Use:

The Boom Mic & Boom Pole

The Marantz PMD661 Flash Recorder

The Marantz PMD670 Flash Recorder

The Lavalier Mic

Samson Wireless Lavalier Mic

The Shure FP33 Portable Mixer

## The Boom Mic and Boom Pole:

The Boom pole should get checked out to you fully compressed. Check each joint to make sure that it's finger tightened (people return it loose and it might suddenly expand on you!)

Nothing on the boom pole or mic should EVER be tightened more than "finger tightening." DO NOT OVERTIGHTEN you can really hurt the equipment by stripping the threads.

You can adjust the angle that the pole holds the mic by loosening the lever just below the blimp. It should loosen easily and once it does, the mic should tilt without any force.

To open the "Blimp" (which holds the microphone it also helps to keep out unwanted wind noise)- simply unscrew the back portion. Make certain that you're unscrewing the back (the end without the red tape). It should unscrew easily if you have to force it, something is wrong take it back to the equipment room immediately!

Once you have the blimp back open, you can see the mic. To take the blimp completely off, just loosen the two levers at the bottom of the blimp (where it connects to the pole) and slide the blimp forward.

Now you can see the mic itself. The mic is a Sennheiser ME66. This is a good "middle of the road" boom mic. It's good for either interiors or exteriors (it's not specialized for either, though it's a little "looser" in its pickup pattern, so it's *slightly* more of an interior mic).

The mic power button is near the back end of the mic. When you turn it on, you should see the little light flash. If it doesn't flash, the battery's probably dead. You need to replace it with a AA battery. You have to take the mic out of its grips to change the battery (remove the XLR cable, first), and watch out when replacing the battery—the battery compartment is built to hold the battery backwards so follow the diagram (crazy German engineering!).

By the way, the little switch above the power switch (which you need a small screwdriver or paper clip to adjust) is a "Bass Roll Off" if you're getting a lot of low frequency wind noise or other rumbling sound, you might try turning it on and see if that helps. "On" is the setting to the right (the little bent line). Otherwise, leave it off ("Off" is to the left the straight line). In fact, most of the time, leave it off.

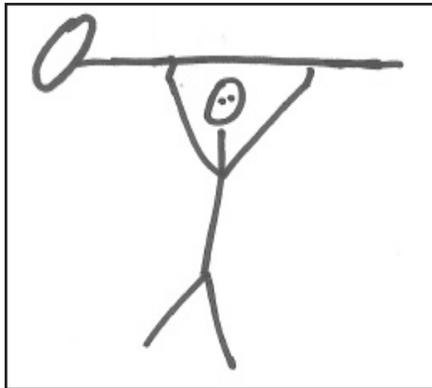
When you put the mic back in the grips, put the mic as far forward on the grips as possible. You want the mic as close to the front of the blimp without actually touching it. If the very back of the mic is flush with the back grip, you should be just about right. Now plug the XLR cable back into the back of the mic.

Replace the blimp (it goes carefully around the base at its thinnest part), and clamp it back down with both levers. Hold it up to the light (so you can see through the blimp) and make sure that the mic is as far forward as it can go without touching the blimp.

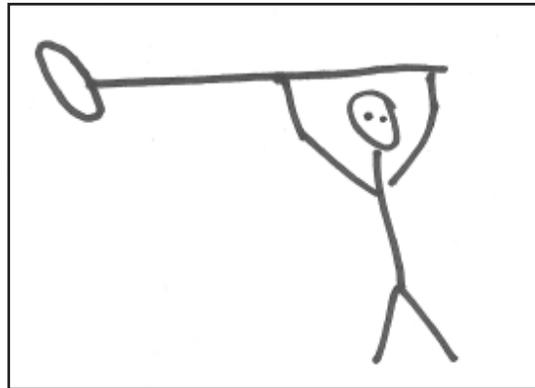
Make sure the XLR cable slips through the little bottom of the blimp seam before screwing the back on (finger tighten!!).

When you're ready to use the boom, plug your XLR cable into the bottom of the pole (it's actually an XLR plug).

Expand the pole completely. That way, you've got a lot of pole to balance, instead of holding it completely from one end. Holding it at one end instead of in the middle puts all the weight on a single side, and is harder to keep steady.

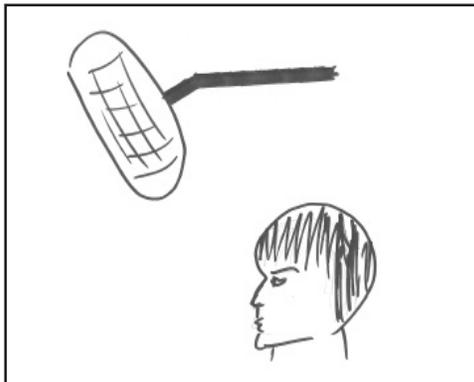


GOOD

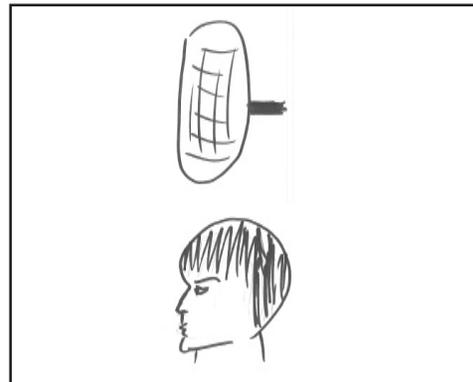


NOT-SO-GOOD (hard to balance)

Always get the boom as close to the mouth as possible without getting into the camera's frame (the boom operator and the camera operator are natural enemies...). Keep the mic in front of the head, angled down towards the mouth,



GOOD



NOT-SO-GOOD (not in front of mouth)

The boom operator should always have headphones (as well as the sound operator). You wouldn't have the camera op work without a viewfinder, would you? Then why would you have the boom op hold the mic without hearing the sound they're aiming for?

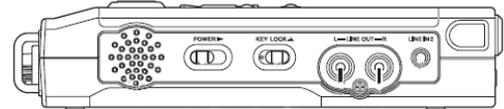
And don't forget to turn the mic off when you're done using it!

# The Marantz PMD661 Flash Recorder

Very similar to the PMD670, the PMD661 is smaller, and actually more powerful than the PMD670. It uses 4 AA batteries or the AC adapter.

You'll also need an SD card to record onto. Make sure you've deleted the card before you start recording, so you have as much recording space as possible. You can't use the recorder without an SD card, which goes in the slot on the left hand side of the unit. The door's next to the USB slot.

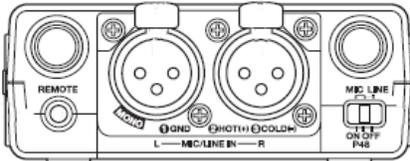
To turn the PMD661 on, slide the power switch on the right hand side. The recorder will boot up pretty quickly and be ready to use.



Before we get into the use of the menus and other buttons on the top of the recorder, let's look at the rest of the stuff on all the edges of the unit. The left and right sides are pretty straightforward. The only of interest

there is the "Key Lock" slide next to the "Power" slide. That slide keeps you from being able to hit any buttons to change any settings. If you're worried about accidentally hitting "Stop" in the middle of a recording, use this slide to keep from doing that.

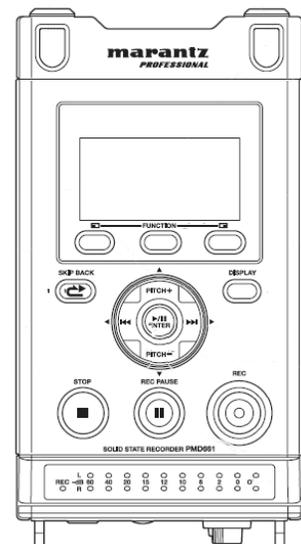
The front side of the unit has the headphones output and the headphones volume dial. Next to that is the record level dial, which we'll discuss later when we actually get to recording.



The top of the unit has the XLR mic plugs, as well as a "Mic/Line/Phantom Power" switch, which you'll normally have set to Mic/Off (the middle setting).

And then are all the front settings. Let's start with the top three function buttons, under the screen. The functions of those buttons will change, depending on what's displayed on the screen directly above them. So the left-most button says "Menu" when you first turn on the PMD661. Press that button, and a list of menu functions will display, and that same left button turns into an "Exit" button, to leave the Menu. You can make selections in the menu using the arrows and selection buttons, which are just below the middle function button. Go ahead and exit out of the menu button – we'll come back to the menu and its settings.

The right-most button at the main screen says "List" – this lets you see a list of everything you've recorded so far. It should be blank right now, but when you record something, it'll let you play it back, rename the file,



delete the file, and other options. Press the “Exit” function button to get back to the main screen. You’ll always want to look to see where the “Exit” button is – it tends to bounce around from menu to menu. Sometimes there isn’t an “Exit” function, but most of the time you can use the “Left” arrow button to skip back out of a menu.

There’s also a “Skip Back” button which lets you skip back during playback, so it’s basically a quick rewind button. And the “Display” button rotates the display to show you:

- Remaining time and how many recordings you’ve made
- Current Date and Time
- Record Setup, with the tech info about how the machine will record

The display also always tells you whether you’re set to Mic or Line level, no matter what screen you’re on. It’s usually in the upper right corner (except in Record Setup, when it’s part of the rest of the info).

Let’s go back to the menu settings, and we’ll list what everything should be set at for you to record. First we’ll list what settings you need to check and change, then we’ll go back and make explanations for some of the settings that might need explaining.

1. Preset – LOTS of settings – listed below
2. Display – no settings
3. Time/Date – you might want to set this to the current time and date (if it isn’t already)
4. Utility – not much here, though you can erase and format the SD card by selecting (7) Card Format
5. Language – English, normally...
6. F/W Version – no settings

The Preset menu is where you really tell the PMD661 how to record. You can have up to three different presets, so if you need to switch back and forth, say, from recording mono, to stereo, you could have two different pre-sets and just change the presets. For simplicity’s sake, we’ll just program the first preset so you can record.

When you select Preset 1, you’ll get the options to:

1. Select – meaning to use this preset as it is
2. Edit – to edit this preset (which we’ll do in a moment)
3. Rename – to rename this preset to something you can recognize
  - Please, if you rename the preset, rename it back when you’re done so it’s not confusing for the next person who will be using it.

Select Edit to make changes. You'll get a list of 21 different settings you can adjust. You can make adjustments using the arrows: up and down to move from setting to setting, and left and right to change the value of each setting. Here they are with preferred values:

1. Input: Mic/Line
2. Rec Format: PCM-24
3. Rec Channel: Depends – we'll discuss this below. The options are:
  - Mono
  - D.Mono
  - Stereo
4. Sample Rate: 48K
5. PreRecord: Off
6. Level Control: Manual
7. Auto Track: Off
8. Auto Mark: Off
9. Silent Skip: Off
10. Mic Atten: This might vary depending on what you're recording. These settings are for the Boom mic and lav mics.
  - Recording very, very soft sounds: set to -6dB
  - **Normal recording: set to -12dB**
  - Recording very, very LOUD sounds (or recording from the mixer): set to -18dB
11. Low Cut: Off
12. High Cut: Off
13. Skip Back: 3 seconds
14. Key Lock: All
15. Battery: Depends if you're using Ni-MH (rechargeable) or Alkaline (regular) batteries. Set it accordingly
16. Auto Power Off: 15 minutes
17. Beep: Off
18. SP Mute: On (this mutes the speaker while recording)
19. Play Mode: Single (when playing back, it'll only play one track at a time)
20. Machine ID: Leave it as it is
21. Preset Default – select this to reset this preset back to all its default settings.

Once you've made your changes, hit the "Exit" function button to save. A "Store?" window will open, use the arrows to select "Yes" and click the enter button to save.

So the one we said we'd come back to is "Rec Channel" this lets you decide how to record from the two XLR inputs.

- Mono records only the left XLR input onto 1 channel
- Stereo records both the left and right XLR inputs onto 2 channels
- D.Mono records only the left XLR input onto 2 channels, with the 2<sup>nd</sup> channel slightly lower in case the signal overmodulates

Once you've got the settings you want, you're ready to start recording. You can plug in your microphone into the XLR input (if you're only recording 1 mic, make sure to put it in channel 1, the left channel!).

To test your levels, hit the "REC PAUSE" button. This puts the PMD661 into "Record Ready" mode, so it will show you your levels across the bottom of the unit, but it's not recording. If you don't see any levels, check that the mic is plugged into the correct input, and that it's turned on.

You can test your levels now, and change the levels using the dial on the front of the unit, next to the headphone input. The most important thing is to not let the input level hit the "0" mark, which will cause the sound to overmodulate and break up (meaning it'll sound bad). You'll know you overmodulated when the light above the "Over" label is lit. It'll stay lit for an extra moment, to make sure you notice it.

Because this is a 24bit recorder (which is good), you can let most sounds hit a level around -15 to -20dB. Anything above that is fine (unless it goes above "0") and sounds below that are OK, but will start to lose quality the lower they go below -20dB. That doesn't mean nothing should be below -20dB, it just means that most of your sounds should bounce at around -20dB, occasionally going higher or lower. This is just a reference point, so don't worry about it too much as you're learning. Mainly be concerned that things aren't too soft or too loud.

Once you've set the level, you should be ready to record. Hit the "Record" button to start, and the "Stop" button to stop. Pretty easy, right? You'll actually want to hit "Stop" twice to get the display back to the normal menu. If you don't, you'll be in a special "Mark" menu that lets you add computer marks to takes.

To play back what you just recorded, hit the "List" function button. You'll see a list of everything you've recorded. Select one of the recordings by hitting "Enter." You'll get a list of functions:

1. Play: Plays back the recording. When done, hit the "List" function button to get back to the recording list
2. Information: Shows you some tech info about the recording
3. Rename: Lets you rename the track
4. Delete: Deletes the track
5. Copy: Copies the track (I don't know why you wouldn't just do this on the computer...)
6. Move: Moves the track (again, better done on the computer)
7. Delete Marks: If you set any computer marks on the recording, this will delete them.

While playing back, the forward and back arrow keys work as track select buttons, taking you forward and back a track at a time. If you hold the forward and back arrow keys, you can fast forward or rewind at double speed. It'll take a moment for the FFD or REW to kick in, but it will work.

You can pause by hitting the enter button, then play again with the same button. The up and down buttons let you change the pitch of the recording, which is kinda fun, but make sure and change it back to normal.

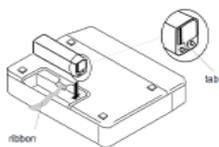
Once you're done recording, you can either pull the SD card out and copy the audio files manually, or you can hook up the PMD661 with a USB cable. Make sure the recorder isn't in the middle of a function (like playback) before hooking it to the computer, or else it won't go into "USB mode."

The SD card (or the recorder in USB Mode) will show up on the computer and will have an "MPGLANG1" folder (or something similar). Your audio files are in that folder. Just copy them to your FireWire hard drive, and you're ready to edit them.

When you're done copying, make certain to eject the card or recorder, just like you would any hard drive.

## The Marantz PMD670 Flash Recorder:

The Marantz PMD670 is a sophisticated audio recording instrument, but can be operated quite simply, once you know a few of its settings.



First, the Marantz uses eight AA batteries (or the AC Adapter), which are held in a cartridge on the bottom of the Recorder.

To turn the Marantz on, just slide the power switch (on the lower left of the top panel) to the right. After a moment, the display on the front panel will show you that it's on.

You might want to erase the Marantz's memory card before using it, so that you're working from a clean slate (and so you don't run out of memory).

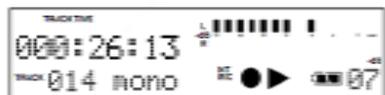
To re-format the card, press and hold the Middle "Edit/Mark" button-- above the REW and FWD buttons on the top of the recorder. The display will start flashing "RENUMBER." Now press the 'Edit/Mark" button repeatedly to cycle through the different settings, until you hit "FORMAT." The FORMAT option will only stay up on the display for a moment, so quickly press the "ENTER" button (it's also the Play/Pause button).



The Marantz will now ask "FORMAT OK?" - press "ENTER" again to verify that you want to reformat, or press "CANCEL" to change your mind.

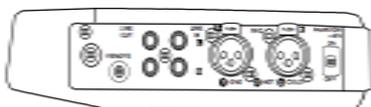
The Marantz takes a moment to re-format, then will display "BlankCard" to let you know that you've now emptied out the card's memory.

By the way, to erase just a single track from the Marantz, hold down the "Edit/Mark" button, then cycle through to the "TrkErase" option. Press "ENTER" to select "TrkErase," and use the REW and FWD buttons to select the track number that you want to erase. Press "ENTER" when the track you want deleted is displayed.



Before you can set levels or record, you need to tell the Marantz to record from the XLR ("MIC") inputs. The photo on the left shows the input set to the "INT MIC," which stands for the internal microphone. You don't want to use this. Press the "INPUT" button (up above the "Track Jump" buttons) to cycle through the many inputs. There are four different Mic inputs, all of which record from the XLR input(s). Here's what they do:

mono	Records only the left XLR input onto 1 channel
LRmono	Combines the left and right XLR inputs onto 1 channel
DLmono	Records only the left XLR input onto 2 channels, with the 2nd channel slightly lower in case the signal overmodulates.
Stereo	Records the left and right XLR inputs onto 2 separate channels



Plug your mic in on the right-hand side of the recorder. Use the "L" (left) XLR input if you're only using one mic. And make certain that the "Phantom +48V" switch is turned OFF.

Plug your headphones into the left hand section of the front panel. You won't hear anything yet, but you can adjust the volume with the control just above the headphone plug.

Now that you've got the mic and your headphones plugged in, you can check your levels. The REC PAUSE button will put the recorder into a Record-Ready mode. It's not recording, but it'll let you hear and see levels for any audio coming into the recorder. The levels show up on the display, with the highest level at "0" - that means there's NO HEADROOM on this. Don't let your recordings go above "0" or they will overmodulate.

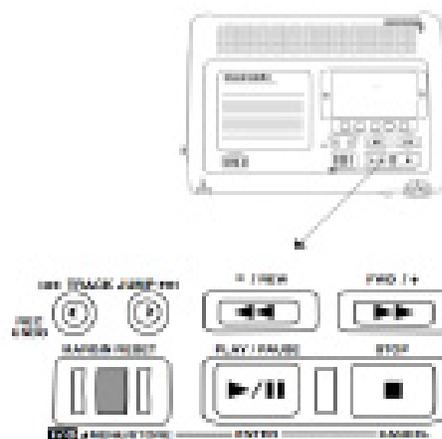
In REC PAUSE mode, the little "Record" Triangle will show up on the display next to the "Play" circle (which will flash because you're in pause mode), along with two Pause lines next to the triangle.

You can adjust the audio levels with the dial on the right portion of the front panel. There are actually two dials, one inner and one outer. The outer dial is for the left channel (channel 1), and the inner dial is for the right channel (channel 2). They will turn in unison unless you hold the dials and actually turn them separately.

Once you've got a level set, you can start recording. The red "RECORD" slider on the top starts the recording. The Record Triangle will show up in the display, now without the pause lines. Note the track number on the display - that's the track you're recording right now. The display also tells you the length of your recording so far.

When you're done recording, press the "STOP" button. While in STOP mode, the display will show you how much recording time is left on the Marantz.

To play back what you just recorded, press the "PLAY/PAUSE" button. It'll automatically start playing back track 1, so use the "Track Jump" buttons to move from track to track. The RWD and FWD buttons let you fast forward or rewind within the track.

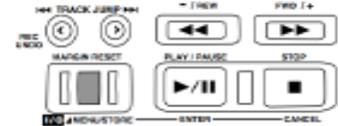


When you're done recording, turn the Marantz off by sliding the Power button, just like you did to turn it on.

The Marantz is like a computer - it records Audio files that you can transfer to the computer via a USB cable (which the equipment room gives you).

To transfer audio files to a Mac, first start with the Marantz turned off. Hook it up to the Mac with the USB Cable (the USB port is on the left side of the Marantz).

This is a little tricky, but find the "I/O" button, to the left of the Play/Pause button (it's also the "Menu" button). Hold the "I/O" button down while sliding the power button. The Marantz will turn on, and the display will show "I/O Online" if you've done this correctly, and the recorder will now act as an external hard drive for the Mac.



After a moment to recognize the recorder, the computer will show the Marantz as an "Untitled" hard drive in the finder, and your files will be on that "Untitled" drive, usually in the "MPGLANG" folder. Copy all the files to your FireWire drive. Just to be safe and have a backup, I usually copy the files twice, the second time to a backup folder.



When the computer is finished copying, make certain to eject the Marantz, so the recorder gets unhooked from the Mac properly. If you don't eject the drive (or any removable drive, for that matter), you can corrupt it and lose data.

After ejecting, you can unhook the Marantz from the Mac. You might want to format it before returning it to the equipment room, as a courtesy to the next user, and if you're worried about anyone else listening to your audio files.

# The Lavalier Mic

Lavalier mics generally have two functions: as a body mic or as a plant mic. A body mic has a very tight pickup pattern (because it's meant to be close to the mouth). The plant mic is usually hidden somewhere on the set, and has a much looser pickup pattern so it can pick up sound from a distance.

The standard UCA lavalier mic is the Sony ECM-44B. It's a good, middle of the road lavalier mic somewhere in between a body mic and a plant mic.

It's a pretty simple mic to use. The big metal base is actually the battery pack. You turn it on simply by unscrewing the pack and putting a battery in. Unfortunately, there's no battery light to tell you that the battery's good. If the mic isn't picking up any sound, the first place to look is in the battery pack. Always bring extra AA batteries to the set invariably, the battery in the pack will go bad just when the dialogue is most important.

The bottom of the battery pack plugs into your XLR cable.

The little windscreen included in the mic case is only for outdoor use in the wind. Most of the time you don't want it or need it, unless you want the mic to be seen for some reason.

To use the mic as a plant mic, simply hide it somewhere on set and you're ready to go. The old story (which probably isn't true) is that a plant mic is called that because you hide it in a plant that sits in between the two characters who are talking to each other. Because the plant's in between them, the plant mic should pick up everything perfectly.

Usually, in a documentary or interview show, you can let the audience see the mic. In that case, you can just use the "Alligator Clip" that's in the case to hold the mic to the person's shirt. Put the mic either as close to the middle of their chest as possible (if they're going to be moving their head back and forth) or on the side that they'll be speaking to (if they're just talking in one direction).

Using the mic as a body mic is harder if you're creating a fictional piece. You have to hide the mic somewhere. There are a number of ways to do this. The most obvious place is somewhere near the middle of the chest, under the person's clothes. The mic is pretty small, so it can hide pretty easily.

On a woman, the best place for the mic is often attached to the middle of their bra. Obviously, tact must be used in applying the microphone, but this is usually the easiest and best place for the mic to hide. Use gaffing tape to secure the mic, and (if necessary) to keep the shirt from rubbing against the mic.

On a man, a similar place (in the middle of the chest) is desirable, but you usually have to secure the mic to the skin. Again, gaff tape is the easiest solution (or moleskin). If you fold the tape into a little triangle "football" so that both sides of the tape are sticky, you can

attach the mic pretty easily. Make the mic head sit right at the top of the tape so that it just sticks out the top.

Also on a man, and occasionally on women, you need to keep the clothes from rustling the mic you're hiding the mic under the shirt, so you have to stop the mic from rubbing against the fabric. To do that, another piece of gaff is required. Use the exact same technique fold it into a triangle, and put it on the other side of the mic. Now attach that tape to the shirt to hold it in place and keep it from rubbing.

Tape the mic cable to the skin just below the mic to keep it from rubbing against anything or from knocking the mic loose, and run the rest of the mic cable out the back of the shirt, or down the pants or dress if necessary.

It's also a good idea to secure the mic cable at the point of exit from the body either from their back pocket (wrap it around their belt loop or underneath the belt) or tape it to their ankle.

If the talent has to walk while wearing a lav, someone should be just off camera in charge of keeping the mic cable slack so the talent can walk naturally without dragging the mic cable.

You'll be surprised how well the tape trick works. The mic is close to the mouth, so you get great sound, and the rustling can be completely eliminated (or at least minimized) if you play with the placement of the tape.

Don't forget to take the battery out of the mic when you're finished!

## The Samson Wireless Lavalier Microphones:

A wireless mic can be a great way to get a microphone where you can't get a cable, though it also can have some hazards. The two main problems with wireless mics are quality and interference. The audio from a wireless mic is almost never as good as a wired mic of equal quality, because the wireless transmission causes the signal to be processed and compressed.

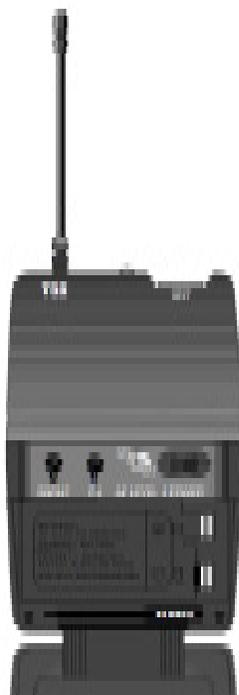
Wireless transmitters also have the difficulty of sharing the airwaves with cell phones, TV and radio stations, and any other devices that send out a wireless signal. You will occasionally get interference from any of these sources. Sometimes the interference will actually let you hear that other signal, and sometimes your audio signal will just disappear or modulate strangely or be static-y.

But when there's no wired solution that will work, wireless mics can be quite effective.

The Samson Wireless microphone system is made of three parts: The Microphone, The T32 Transmitter, and the M32 Receiver.

Let's start with the mic, because basically everything that was said in the last chapter about the wireless Lav mic applies here. The differences are that the wireless lav mic doesn't have an on/off or batteries. It gets its power from the transmitter. The other difference is that it has a mini-XLR plug that plugs into the transmitter. Mini-XLRs are pretty common with wireless Lavs.

The T32 Transmitter is what actually sends the wireless mic's signal through the air, to be picked up by the M32 Receiver. The receiver then hooks into your mixer or recording device.



Both the Transmitter and Receiver use 9V batteries, and both are contained in the hinge covers on the front of the devices. Make **CERTAIN** that you put the batteries in correctly reversing the battery can damage the equipment.



Let's set up the T32 Transmitter. There are a number of dials and switches on the Transmitter, most of which you shouldn't touch. Buried in with the battery are a number of dials that tell the Transmitter how to work with the mic and the receiver. **DO NOT TOUCH THESE DIALS.** They are set specifically to work well with the mic we have and the Receiver.

Also inside the battery cover is the master power for the unit. You turn that on by flipping it to the left (instead of to the right, like any other switch you've ever used...).



You'll notice there's also an on/off switch on the top of the unit. Don't get that confused with the power switch (people do it all the time... including the audio guy at my wedding!). This top switch is just a "mute" switch for the microphone. It lets the microphone wearer turn the mic on and off without affecting the transmission.

If the master power is on, you'll see the LED light next to the mute switch turn on. That light also tells you about the battery - it's green for a high strength battery, orange for mid, and red when the battery's running low.

Obviously, the mic plugs into the mini-XLR port on the top, and the antenna is on the other end of this side. Make certain not to damage the antenna. It's pretty fragile and can break without much force. Also make sure that the antenna isn't hidden - when it's hidden, it often won't send out as strong a signal and can cause interference.

By the way, if you can't find anywhere to hide the transmitter while filming, often taping it to the small of the actor's back goes completely unnoticed. A lot of sound recordists carry around surgical tape for just that purpose.

Finally, the M32 Receiver. This gets hooked up to the Mixer, Flash Recorder, or Camera. And it has a bunch of settings, too.

First, make sure the Antennae are folded out from the sides of the receiver, all the way vertical. The Receiver also uses a 9V battery (again, make sure it's installed correctly to keep from damaging the unit), and the power switch is in the battery compartment. And again, don't play with the dial inside the battery compartment - it affects how the receiver distinguishes true audio signal from noise.



Make sure on the right-hand side of the Receiver that the Level switch is set to -30. That sets the Receiver to Mic Level, which is where you want it. If you want Line Level for some reason, that's -10.

The top of the Receiver has most of the stuff you need. First, there's a mini-XLR to full-size XLR conversion cable in the case - you use that to hook the receiver to your Mixer or whatever you're recording on.



To the left of the mini-XLR is a headphone jack so you can monitor the receiver's audio, with a volume dial right next to it.

The switch on the right of the mini-XLR selects what the meter on the front of the receiver shows. Switch it to "BATT" (all the way left) and the meter shows you how much battery power is left (hopefully a lot). Switch it to RF (all the way right) and the meter shows you how strong the connection is from the receiver to the transmitter. Set the switch in the center and the meter just shows you the level of the audio passing through it.

There are also two dials on the back of the Receiver. As with the other recessed dials don't touch them. They're used in conjunction with the Transmitter to tell it what frequency to use. If you change these dials, you'll be telling the Receiver to look for the signal on a different channel than the Transmitter is sending.

And once you've hooked up the transmitter to your recording device (and tested it through the headphones, of course), you're ready to record, just like any other mic.

Don't forget to turn off both the Transmitter and Receiver when you're done!

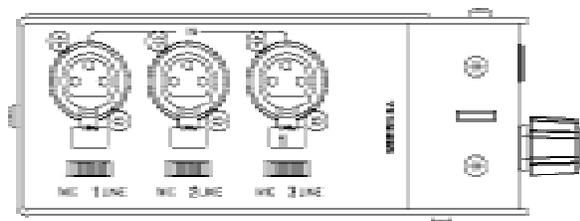
# The Shure FP33 Portable Mixer

This little mixer is a pretty fantastic piece of equipment. It packs a lot into a very small package.

First off, it uses two 9volt batteries, so make sure you keep some spares of those when using this mixer. If you need to change the batteries, they're held in a panel on the top of the mixer.

You can check battery life just by turning the mixer on. The ON switch is in the upper right on the front panel. If the battery's in good shape, the light next to the ON switch will flash green. If it flashes red, you have anywhere from 0-30 minutes of power left, so get ready to change the batteries.

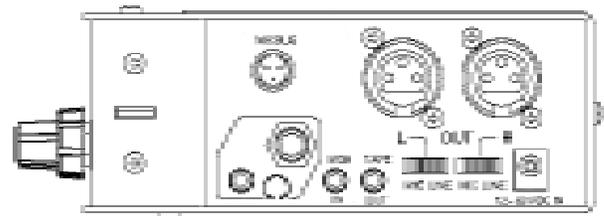
Let's hook the mixer up to the mics and to the Marantz Flash Recorder (or directly into the camera). You'll be going from the mics, through the mixer, and recording onto the Marantz.



Your mics get plugged in on the left hand side. There are three separate XLR inputs, each with its own "Mic" or "Line" switch. Assuming that you're plugging in microphones (instead of, say, a CD player), make sure the switches are set to "Mic" and plug in your mic(s).

On

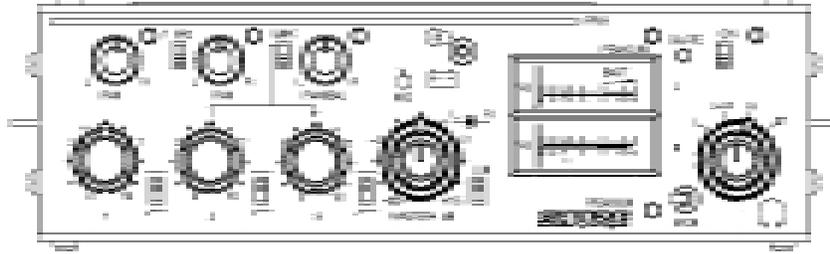
the right side of the mixer are two XLR outputs, where you can hook the mixer up to the Marantz or even to the Camera. If you're hooking into the Marantz, set the to "Mic/Line" switches to "Mic" Level. If you're going straight into the camera, you should set the "Mic/Line" switches to "Line" and make sure and set the Camera to "Line" input as well.



To set the camera to "Line" input, simply make sure the XLR inputs on the back of the camera are set to "Line" level. While you're adjusting things on the camera, make sure on the left side (below the audio meters) that both audio channels are set to "Manual" and that both Audio Inputs are set to "Rear." And while we're looking at the camera, the volume dial is the "Monitor" dial on the left side. You should check the audio from the camera with your headphones - just because you're getting a good level doesn't necessarily mean that the audio actually sounds good!

Back to the mixer - The headphone jack for the mixer is also on the right side panel in fact there's a 1/4" jack and a smaller 1/8" jack, so you can plug in whatever size you have (or plug in two pairs of headphones so your boom operator can listen, too).

All right so now let's look at all these dials and switches on the front



First, the meters show you separately the levels on Channel 1 (the Left Channel) and Channel 2 (the Right Channel). On this analog meter, you want sounds to average around “0” and to NEVER go above +5. It’s OK for sound to bounce around in the “red” area above 0, but it can’t go above the red the “Peak/Lim” light will come on and the sound will get compromised (at least) or might even distort horribly. You don’t want that to happen it’ll record distorted.

Starting from the left, the “1,” “2,” and “3” dials are your level adjustments for the 3 microphone inputs. The 4<sup>th</sup> dial is the Master volume. After you set the individual mic levels, you can then adjust all three levels at the same time with the master level. So for instance, you can turn mic 1 all the way up, but then turn the master level all the way down, and no sound will pass through the mixer. Or the reverse: if the Master’s all the way up, but the mics are turned all the way down, nothing gets through that way, either. Both have to be turned up to let sound pass through.

The master level can control the left and right outputs separately. The inner knob that sticks out is the Right channel and the outer knob around the base is the Left Channel. They’re meant to turn together equally, unless you hold them and turn them separately.

The little switches to the lower left of each of the mic levels are for adding a “low cut filter” to each microphone. Occasionally, this filter can help cut down wind noise or low frequency “rumbling” that you might hear. Unless you hear a real improvement with this switch on, leave it off. You can always do the same effect in post-production when the effect doesn’t have to be permanent.

The final little switch next to the master volume is a limiter you can leave that on, and it might help if your audio gets overmodulated. Don’t count on it, but it might make any audio that’s too loud be slightly less unusable.

The dials above each mic level are retractable press on them and they’ll pop out so you can adjust them. These are the pan settings so you can tell each mic to assign to the left output of the mixer or the right output. If you’re only using 1 channel of the mixer, assign everything to that side (usually the left side).

The “Link” switch between mic 2 & 3’s pan buttons lets you link those two channels together, so that channel 3 controls the level for both channels 2 & 3. Only use this setting if you have a need for it (if you don’t understand it, you don’t have a need for it it’s for

recording in stereo, and most of the time you won't need that).

The switch in between the pan controls for mic 1 & 2 says "1 kHz." Turn it on and, depending on the master level setting, you should hear a reference tone. Use this tone to calibrate the mixer with the Marantz or camera. Adjust the master volume so that the tone level sits at "0" on the meter.

Now adjust the Marantz or the camera to read at their version of "0." Both the Marantz and the camera are digital, so their version of "0" is "-12." "0" on a digital meter is the highest point before overmodulating, so "-12" is the point that gives you some headroom, like above "0" does on an analog meter.

When both the mixer and the Marantz or Camera are set to their same version of "0," the mixer and recorder are considered "calibrated." That means that they both will pass through or record audio at the same level.

The switch across the top of the front panel, to the left of the meters, is a light switch it'll light up the meters if you flip it up. If you flip it down, it'll show you how much power is left in the batteries.

The final buttons and dials are to the right of the meters. The "Slate" button sends out a quick 1kHz tone it's generally pressed twice at the end of a take before you stop recording to signify the end of recording for that take.

The Monitor switch (directly below the Slate button) should be set to its center position. Otherwise you may not hear anything in the headphones. The switch is for monitoring other equipment you won't need it.

Finally, the headphone volume is the dial in the lower right corner. The outer dial is the level, and the lower inner dial lets you specify what you want to hear in the headphones: the Left Channel only, the Right Channel only, the Left and Right Channels combined together (both channels are fed to both ears of the headphones), or a Stereo mix (the left channel to the left ear and the right to the right).