5.2. Parameter Control & LCD Display

5.2.1. One set of Controls for 1 or 2 Channels

Whether you have a one- or two-channel SWM6 or 7000 series receiver is apparent by the number of LCD displays on the front panel. However, only one set of control knobs is provided for either one- or two-channel receivers. Note that in a 2-channel receiver, this set of controls is shared, and assigned to a channel by pushing either the A or B **Channel Select button** (see Section 5.2.2). Your receiver uses Sabine's Tweek-n-Peek™ digital control system. Whenever you turn a control knob one click, the associated function is shown on two lines of text display in the LCD. The large numeric display will indicate the current parameter value. Additional turns/clicks change the parameter setting and display the value as the change is made. After a few seconds of inactivity, the LCD will revert to its default display (RF channel).

Sabine's Tweek-n-Peek™

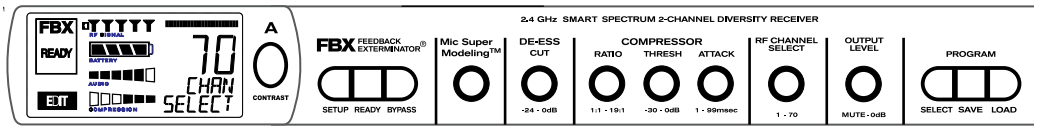


Fig. 5c Sabine Tweek-n-Peek

Whenever you turn a control knob one click, the name of the corresponding function is shown and the current edit setting is displayed on the LCD. This applies for all the front panel knobs.

For example, if you turn the Compressor ratio knob one click, you will see the current compression ratio in the Settings Display. The Text display will show COMP on the first line and RATIO on the second. Subsequent turns will edit that setting up or down, depending on the direction you turn the knob.

Since the control knobs are continuous rotary encoders with no end points, the Relative Position Indicator (RPI) is a handy way of seeing where you are in relation to the full range of the knob in question. In our compressor Ratio example, if you are at a ratio of 9:1, about the middle of the range, the RPI will display about one half of the bar. **NOTE:** The setting range of each control is printed on the front panel below each knob.

5.2.2. Channel Select / Contrast Button.

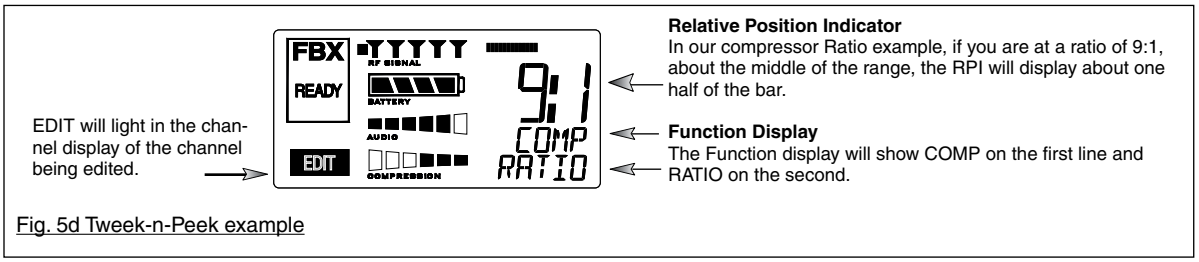


Fig. 5d Tweek-n-Peek example

The elliptical button immediately adjacent to the LCD has multiple functions. First, it adjusts the LCD contrast and viewing angle. Change the degree of angle by pressing and holding the button down. The adjustment range will cycle in a continuously reversing loop — when it gets to the maximum value it reverses and begins to decrease in value. You can stop holding the button down and initiate single button pushes to advance (or decrease) the contrast setting incrementally.

In addition, the Contrast/Channel Select button has another function, in 2-channel receivers only (SWM62 or 72-R or SWM62 or 72-NDR). Such units feature two LCDs and two Contrast/Channel Select buttons. A single (without continuing pressure) push assigns all Parameter Control knobs to the selected channel. The button will light, the associated LCD will brighten, and the word EDIT will appear in the lower left of the LCD, all indicating the active edit channel. For the active channel, turning any Parameter Control knob will first display (one click) and then adjust (subsequent turns) the settings of the function selected, indicating the changes in the Settings Display. For the inactive channel, turning any Parameter Control knob will display the current setting in that channel's Settings Display. **The channel must be activated in order to change settings.**

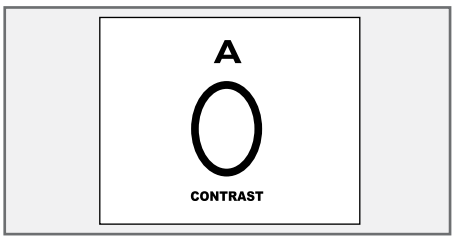


Fig. 5e: Contrast button:

Tap to select which channel to control

Hold to adjust contrast and viewing angle. Range of value is 1 - 30, 15 is default.

5.2.3. Special LCD Display Messages.

In addition to the Status and programmable information discussed above, the text lines of the LCD Settings Display may also (under certain circumstances) automatically override other displays. The conditions when this will occur and the messages displayed are shown on page 19.

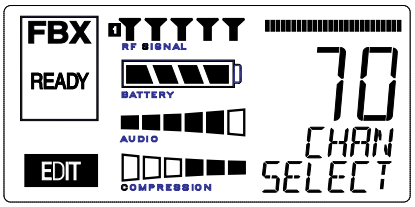


Fig. 5f

5.3. RF Channel Select

Range = 1 to 70 Choose the RF channel for this system. The transmitter must have the same channel selected. Turn the **RF CHANNEL SELECT** knob until the desired channel is displayed on the LCD. See chart (Appendix E) for exact frequency of each channel.

NOTE: Dual channel receivers will not allow you to select the same RF channel for both channels.

NOTE: Front panel RF Signal display will only register Sabine transmitters. It will not show RF interference. Use the RF Scan function in the software to scan for potential RF interference (see Section 13.4.2.5).

5.4. Output Level

Range = MUTE to 0 dB Adjust the output level to match the input characteristics of the downstream component. Each tick of the output level knob adjusts the level by ½ dB. The LCD displays this in 1 dB resolution, so it takes two ticks of the knob to change the output level value on the LCD.

The output level varies from microphone level to line level, so if you are patching the receiver to the mic level input of a mixer, turn down the level to avoid overdriving the mixer input. Minus 15 dB is a good place to start. If you are patching into a line level device, turn up the receiver output. For best results, follow the golden rule of gain structure: maximize gain at early stages in the signal path, to minimize noise that will be accumulated and amplified by adding late-stage gain.

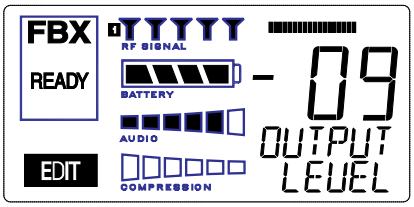


Fig. 5g

5.5. Channel Mixing

Your SWM Series two-channel receiver now has the ability to mix the A and B outputs. In Channel Mixing mode both the A channel audio and the B channel audio are mixed together, and are available on both the A and B outputs.This is an advantage for several applications:

EXAMPLE: *Guitarists who wish to have a spare guitar ready to go without repatching the output of the receiver to their pedal board or other processors*. All you have to do is turn the transmitter off for one guitar and turn on the other. The audio is sent out through the same output of the receiver.

EXAMPLE: *Sound techs who wish to use more mics than they have channels for on their mixer.* For example, you may have a mixer with only 8 inputs, but you really need 12 mics for a show. You can combine the outputs of several pairs of Sabine wireless mics and the show can go on without buying a new mixer.

You maintain separate control over all channel functions except output level. Output levels are the same for both channels when in Channel Mixing mode, and the ouput values appear on the A channel LCD.

5.5.1. How to Toggle Channel Mixing Mode

Press and hold both the A and B Channel Select buttons (the blue buttons) at the same time. After a moment both buttons will be lit. This is your indication that you are in Channel Mix mode. To go back to the standard mode, press and hold the A and B channel select buttons again until the backlight of one of the buttons turns off.

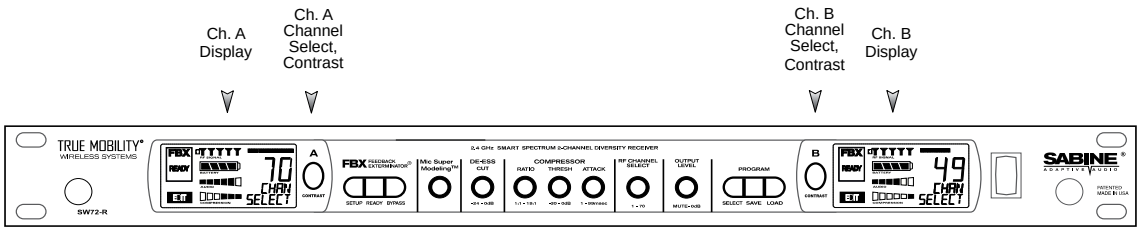
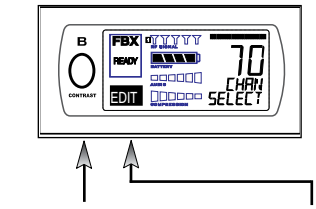


Fig. 5h

LIT-SWM6-7000-OG-EN-090215.indd - rr



Channel Select/Contrast button (selects receiver channel to edit)

EDIT

Fig. 5i

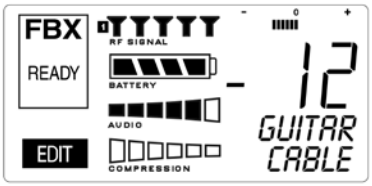


Fig. 5j

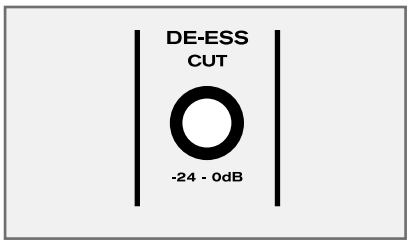


Fig. 5k

5.5.2. Controlling the Receiver in Channel Mixing Mode

All functions are individually controllable for each channel when in Channel Mix mode, except the output level, which is shared. Normally the active channel for control is displayed in three ways: the blue button for that channel lights up, the LCD gets brighter, and the word EDIT is shown. Use the Channel Select buttons to choose the channel you wish to control.

In Channel Mix mode you still use the Channel Select buttons to choose the channel to control, but you will only see one of these three indicators. The word EDIT will be shown in the LCD of the channel selected for control. Look carefully – this is your only indication of which channel you are controlling

5.6. Guitar Cord Simulator *(Beltpack Transmitter Only)*

This feature allows you to fine tune the sound of your instrument while it is patched into your Sabine wireless beltpack. The wireless sounds of guitars or basses can be very different from the direct (patched with a cord) sounds. Your Sabine wireless solves this problem by using a unique broadcast scheme that gives full 20 to 20KHz frequency response. This results in a much fuller sounding instrument (the bass response is finally there on a wireless!), and sometimes a brighter sound, too.

How can this be? Your guitar cable can actually reduce your high frequency response. We are all quite used to this slight rolling off of the high end, but the Sabine wireless does not roll off, so your instrument may sound brighter then ever before.

Here's where the Cord Simulator can help. Turn on your beltpack transmitter and put it in GUI mode. To select GUI mode, open the beltpack, push the select button a few times until you see the MIC or GUI display. Use the up/down button to choose GUI. (See the Beltpack Quick Guide for detailed instructions). The De-Esser knob on your receiver becomes your Cord Simulator knob. Turn the knob counter-clockwise until your instrument sounds like it does when patched direct.

The Cord Simulator replaces the De-Esser function only when a beltpack transmitter is turned on and set to GUI mode.

5.7. Receiver Antenna Placement

One of the biggest potential problems in any wireless system is RF interference. Understanding wave interference patterns will help you to place and orient your receivers and antennas properly, and thereby reduce the likelihood of RF interference.

Your receiver ships with two standard coaxial bipole antennas. Each antenna picks up in a donut-shaped (toroidal) pattern, more or less equally in all directions, with null points directly above and below.

5.7.1. Multi-path Interference

Like sound waves, radio waves are subject to wave interference patterns produced by reflected or delayed waves combining with direct, unreflected waves, converging upon a receiving antenna simultaneously. In the RF world this phenomenon is called **multi-path interference**. As with audio comb filtering, radio waves can combine additively or subtractively. Thus, mounting an antenna close to a reflective surface can result in poor reception. For example, if weaker than expected reception occurs, and the receptive part of the antenna (the top 3 cm) is close to a reflective surface (wall, large metal objects, etc.), you might improve reception simply by repositioning, or re-aiming, the antennas.

In some situations — for example, those with difficult lines-of-sight, or when transmitters and receivers are separated by a wall, or when receiver placement options are limited — an extension antenna may be necessary to guarantee reliable reception. Please refer to Section 12 for information about the advantages and use of Sabine's SWASS-EXT Extension Antenna Kit.

5.7.2. Receiver & Antenna Placement Tips

1. **When possible, maintain line of sight from transmitter to receiver.** Consider the potential range of transmitter "roaming," and locate your receiver accordingly. If direct line of sight proves impossible or difficult, consider using Sabine's low-profile, active Extension Antenna Kit (SWASS-

EXT), which boosts the signal strength, extends the maximum distance from transmitter to receiver, expands and focuses antenna sensitivity, and allows antenna and receiver to be positioned further apart or in separate rooms.

2. **Decide on front or rear panel antenna mounting (to maintain line-of-sight path).** Antennas typically mount on the rear panel of your receiver, but the included accessory SWA700 front mounting kit can be screwed onto the front and connected via jumper to the back panel terminals. When mounting receivers in a rack that is deeper than the receiver, move the antennas to the front for improved reception. For any rack mounted receiver, try to keep the top 1.25 " (3 cm) of both antennas extended outside the sides of the rack (see Fig. 5h). Non-rack mounted receivers should be oriented so that the antennas face the transmitters.
3. **Maximize the distance between the receiver and light sources,** such as fluorescent bulbs or neon signs, which may emit very short-range, broadband interference. These light sources should not be a problem in normal circumstances, but, as a cautionary preventative, we recommend a minimum distance of 3 meters (10 feet) between them and any receivers or extension antennas.
4. **Note the placement of any microwave ovens in the immediate vicinity**. Place any receivers or extension antennas as far away as is practical from microwave ovens.
5. **Mount receiver antennas at 90 degrees to one another,** leaning away at 45 degree angles, in the same plane. This will decrease the likelihood that one antenna will be susceptible to the same orientation-specific directional or multi-path problems that may affect the other one.
6. **When using multiple receivers, try to maintain at least 1 foot (30 cm) distance between antennas from different units.** If you are rack-mounting multiple receivers, you may want to avoid spacing them in adjacent rack spaces, to maintain distance between antennas. When such antenna spacing proves difficult or impossible, we recommend using Sabine's Antenna Distribution Amplifier (Sabine SWA6SS), which can help manage antenna configurations and, more importantly, improve system-wide interference rejection. The SWA6SS works with up to six receivers.
7. In very rare instances, **poorly shielded or malfunctioning computers or digital effects units may cause RF interference.** You can test whether such units are the sources of such interference by switching them off one at a time, and determining if interference rejection improves.
8. **Turn on your system one component at a time, beginning with the first receiver.** If you don't have a computer handy, keep all other receivers and transmitters switched off for the time being.
9. **Use the RF Scan function included in the Remote Control Software.** This will give you a picture of the potential interference in your area, both real-time and over time. Please refer to Section 13.4.2.5. for information on Sabine Remote Control Software's Automatic RF Scan function, which will automatically determine the best RF channels to use.
10. **Maintain a minimum distance of at least 3 meters (10 feet) between transmitters and receivers or extension antennas.** This can solve many anomalies.
11. **Be careful not to set more than one transmitter to the same channel**; each paired transmitter and receiver should be set to unique corresponding channels, until all channels are receiving clearly and cleanly.
12. **Once the physical placement of your receiver(s) and antenna(s) is decided**, proceed with the remainder of the setup process.

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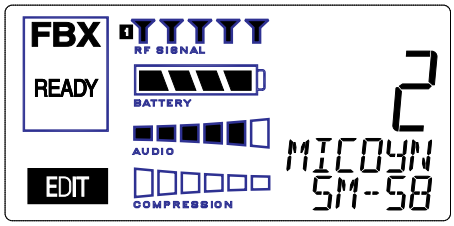

Fig. 6a

6. MIC SUPERMODELING™

6.1. Introduction

Microphones come in a dazzling variety of shapes, sizes, polar patterns, frequency response curves, phase response curves, etc. Few things arouse as much passion amongst audio engineers as discussions about what microphone to use in a given application. Sound rental companies and recording studios proudly tout their impressive microphone collections, and singers frequently favor a certain brand and model number as "perfect for my voice."

The only viable "please everyone" strategy is to stock a wide assortment of microphones. This is far easier for wired microphones than for wireless. Changing a wired microphone is as simple as disconnecting one mic and connecting an alternative — the same cable and same microphone stand allows easy interchangeability. At worst you might have to exchange microphone clips along with the microphones themselves.

For wireless microphones, however, the situation is not so simple. With different transmission frequencies, different proprietary designs, different types of connectors (microphone to belt pack transmitter), and the matched-set nature of transmitters and receivers, changing a microphone/transmitter is far more complex.

Sabine has a better idea — Sabine's proprietary Microphone SuperModeling™. With digital technology, it's possible to start with the sonic signature of a high quality microphone (such as Sabine's standard condenser and dynamic capsules used in our handheld series systems), and emulate the characteristics of other popular microphones—all at the twist of a knob. You won't have to change microphones, cables, connections, or receivers, interrupt a performance, or even get up from your mixing chair! Best of all, you will have an instant answer to a variety of demands from singers and speakers for their favorite microphone — even if they pass the microphone around.

6.2. Emulation Choices

Each Sabine receiver comes equipped with 7 different SuperModel microphones available per channel. Four of these (Shure SM-58, Shure Beta 58, Audio Technica ATM 41A, and AKG D-3800)* are designed for use with either of Sabine's dynamic handheld microphone/transmitters (SW60 or 70-H13 and H15). The remaining three (Shure Beta 87A, AKG C535EB, and Audio Technica ATM 89R)* are designed for use with Sabine's condenser handheld microphone/transmitter (SW60 or 70-H19). In addition to these SuperModeling choices, you may prefer to use Sabine's high quality microphones "just the way they are;" i.e., without emulation.

Telemetry information sent by the handheld transmitter to the corresponding receiver (or receiver channel for a 2-channel unit) identifies the type of transmitter, and loads the appropriate emulation library. Note that beltpack transmitters also send telemetry that turns off the Super Model option, as this feature is designed to work only with handheld microphone/transmitters.

6.3. Mic Modeling Front Panel Control

Simply turn the parameter control labeled "Mic SuperModeling™" to scroll through and select the microphone you wish to emulate. The first click of the knob will show the current setting, without changing it; additional turns will change the emulation that is active. The top text line of the Settings Display will read either MICDYN (dynamic) or MICCON (condenser) depending on the telemetry information sent by the handheld; the bottom line will display the microphone being emulated. Note that one choice is to bypass modeling, and simply utilize the excellent quality of the Sabine microphone capsules. In this case the bottom text line will simply read OFF. Finally, whenever telemetry information indicates that a belt pack transmitter is the RF source, or if a handheld transmitter is replaced by a belt pack with the same receiver (or some such other unpredictable event transpires), the Settings Display will read MICMOD/OFF whenever the Mic Modeling knob is turned.

Sabine Mic SuperModeling™

SuperModeling™ Dynamic Models*:

- Shure SM-58
- Shure Beta-58A
- AKG D-3800
- Audio-Technica ATM 41a

SuperModeling™ Condenser Models*:

- Shure Beta 87A
- AKG C535 EB
- Audio-Technica ATM 89R
- Crown CM200A

**Company names, product names, and trademarks listed as modeled are the property of their respective owners and are used only to identify evaluated microphones used to develop digital processing; they in no way imply association, endorsement, or approval by any named manufacturer.*

There are no modeling settings for lavalier or headset microphones — mic placement makes these an unrealistic choice for modeling. NOTE: other lavalier microphones can be used with the Sabine Beltpack Transmitter.

NOTE

A very short crossfade of the audio signal occurs when switching between mic models. This ensures no digital artifacts will occur when you change the sound of the mic.

6.4. Future Microphone Modeling Choices

When Sabine adds to the library of "virtual microphones" that are modeled by the receiver DSP, these will be made available as a firmware upgrade from the Sabine web site, www.Sabine.com.

6.4.1. Mic Model Upgrade Instructions

New Mic SuperModeling™ "virtual microphones" can be downloaded easily using the remote control software on your PC. NOTE: The Mic SuperModeling Update Wizard **can be accessed only from the initial software startup menu** (prior to connecting to a receiver or entering Demo/Edit Mode). If you have already connected and attempt to access the Upgrade Wizard, the message box at right will appear (Fig. 6b):

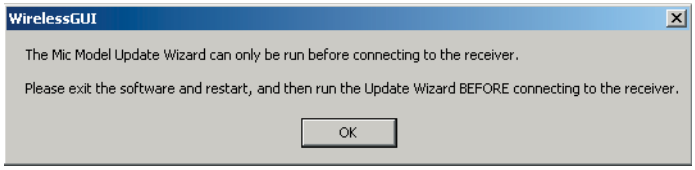

Fig. 6b

To download new mic models:

1. With your PC connected to the Internet, pull down the Sabine Online menu in the software menu bar and select "Add New Mic Models."
2. Click the "Download Mic Models from Sabine" and follow the dialog box instructions.
3. The last dialog box will allow you to either connect to a receiver and update the mic models on that receiver, or cancel and complete the upgrade process at a later date. Note that this dialog box will show the actual file path of the new mic model file.

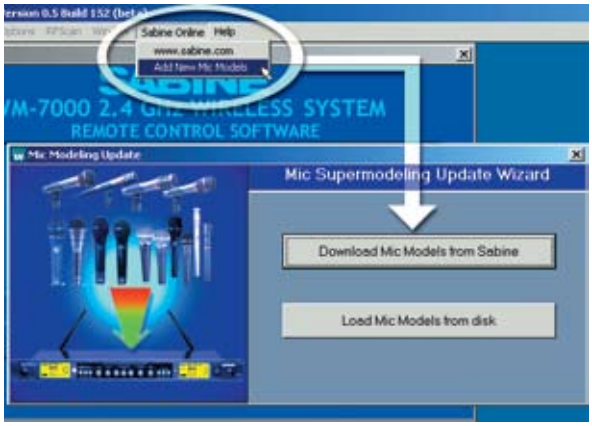

Fig 6c

Upgrading from a disk or previously downloaded files:

Mic SuperModeling™ files already downloaded can be flashed into your receiver using the second option "Load Mic Models from disk." Clicking this button opens a dialog box (default directory is your "Sabine" directory).

NOTE: File name will always be "micmodels.smm" **and will include all mic models available up to the date the file was downloaded.**

NOTE

Mic SuperModeling™ is not available using beltpack transmitters.

CHANGING CAPSULES

Sabine's Mic SuperModeling™ function requires a baseline characteristic for the capsule in use. Therefore, after changing capsules, you will need to "tell" the transmitter which capsule is now attached.

NOTE: this is only necessary when the capsule is changed.

See **Appendix G** for instructions on how to reset your transmitter after changing capsules

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7. FBX FEEDBACK EXTERMINATOR®

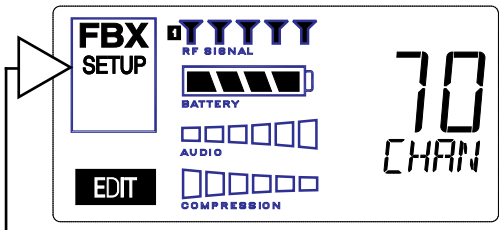

Fig. 7a

SETUP Indicator

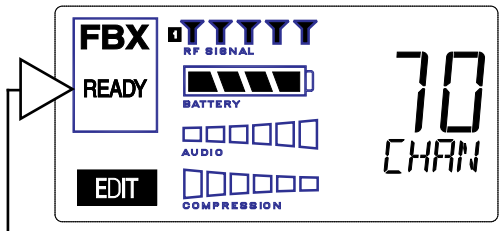

Fig. 7b: READY Indicator

NOTE: make sure READY is displayed before using your system for a performance.

FBX SETUP NOTE

LCD "READY" Flashing

As you get close to the end of the setup procedure, READY will begin to flash on the LCD. **Stop raising the gain!** The FBX will now go into Ready Mode.

7.1. FBX Introduction

There are two types of FBX filters, fixed and dynamic. Both operate automatically. There is no audible difference between fixed and dynamic filters in terms of sonic purity; the difference arises in their application.

7.1.1. FBX Fixed Filters

Fixed filters are set automatically during the FBX SETUP and will not change frequency until manually reset.

7.1.2. FBX Dynamic Filters

Dynamic FBX filters also set automatically, but can change frequency, on a rotating basis, as the need arises.

7.1.3. Balancing Fixed & Dynamic Filters

Each channel of your receiver offers a total of 10 FBX filters (combined fixed and dynamic), which can be used as needed to exterminate feedback. The default setting of 7 Fixed and 3 Dynamic can be changed to 8 Fixed and 2 Dynamic using the DIP switches on the back of your receiver (see Appendix D FBX Configuration DIP Switch), or to any configuration using the Remote Control software (see Section 13).

If you follow setup instructions for setting FBX filters, your receiver will automatically exit SETUP mode (enter READY status) after all Fixed filters, and the first Dynamic filter, have set. In the default condition, this means you will have set eight filters (seven Fixed and one Dynamic), with two Dynamic filters still unset and remaining on standby alert. If you wish to set fewer filters, press the READY button before SETUP automatically exits, after you have set enough filters to safely achieve your desired gain level. In that case, in the factory default condition, you will reserve three unset Dynamic filters for standby.

7.1.4. FBX Filter Width

Sabine's experience and testing with filters and sound quality along led us to decide upon a default FBX filter width of .10 (one-tenth) octave as the optimal notch width, able to eliminate feedback without affecting music programs. If, with all filters properly set, feedback is still a problem, FBX filters may be set to .20 (one-fifth) octave width. This wider filter setting will help to better eliminate feedback trouble areas, but may also affect music programs slightly. Therefore, the wider setting is generally considered to be appropriate where speech (less demanding than music) is the primary application of the Sabine Wireless system. You can globally change FBX filter width by repositioning a rear panel DIP switch, to change from .10 to .20 octave (see Appendix D FBX Configuration DIP Switch), or by adjusting filter width using the True Mobility® Remote Software (which allows a range of widths from .01 to 1.0 octave). You may also mix filter widths, either by adjusting individual filter widths using the Remote Software, or by changing the DIP switch position during setup. The width of any set filter will always be determined by the position of the switch at the time the filter is created.

7.2. FBX Set Up

Follow these easy steps to obtain the maximum gain and protection from feedback. Sabine FBX employs a very fast and quiet setup mode to make it easy to use.

1. Place the speakers in the positions where they will be used during the program.
2. If there is any equipment with a noise gate in the signal path, you MUST DISENGAGE the noise gate(s) prior to the setup procedure. You may reengage these noise gates upon conclusion of your FBX setup.
3. Patch your Sabine receiver into the mixer or amp channel. Set the amp master output gain to a normal operating position.

   NOTE: The level of your power amplifier should be set to a level that allows a healthy gain structure prior to the amplifier. If your amplifier is turned up

fully, and your mixer meters show little movement when signal passes through, then your amplifier will have to work harder to process the weak signal. You will improve the performance of your sound system and lower system noise by reducing the gain on your power amp and increasing your mixer gain. FBX response time will also be better with proper gain structure.

4. First, turn on your receiver and select a clear channel (no RF Signal bars showing). Then turn on your wireless transmitter or handheld microphone and select the same channel, Now turn on the mixer (gain low), then any other accessories, and finally the power amp. If you are using a graphic EQ, adjust only for the desired tonal qualities, but **do not notch for feedback!**
5. With the microphone turned on, raise the Output Level of the receiver slowly until a strong input signal at the mixer is apparent. The microphone should now be audible.
6. Now you are ready to set FBX filters. Press and hold SETUP (far left button) on the wireless receiver, until the word SETUP in the channel LCD flashes 4 times, then stops flashing. This will clear any FBX filters already in place. NOTE: You should do this each time you move your sound system, change a sound system component, or relocate your microphone. Your Sabine True Mobility Wireless System will remember its settings from the last time you turned the unit off.
7. During Setup mode, do not talk into the microphone or pass audio program through a transmitter. This may cause the Sabine True Mobility™ system to set inappropriate filters. The only appropriate use of the setup mode is to create and filter feedback. SETUP must be exited prior to normal microphone usage. This happens automatically after setting FBX filters, or you may exit manually by pressing READY at any time.
8. Identify the primary usage positions, and likely feedback-prone locations, in the potential movement range of the wireless microphone. Take the microphone to the first of these locations.

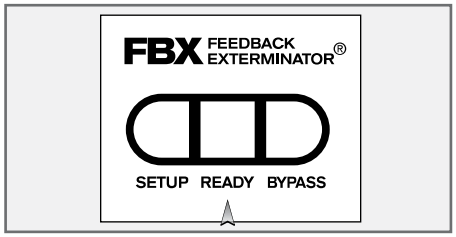

Fig. 7c: READY Button

Tech Tip

READY & Locked Fixed

READY = Lock Fixed on other Sabine FBX products

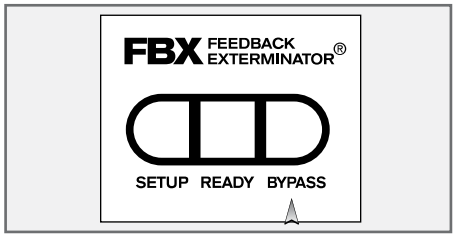

Fig. 7d:BYPASS Button

9. Slowly raise the mixer channel gain to the point of feedback — and then slowly beyond, until you hear the chirping tones of feedback quickly being eliminated by FBX filters setting. Stop raising gain after 2 or 3 feedback tones have chirped and corresponding FBX filters have set. Rest assured that any feedback that occurs will be at a quiet volume, and very short in duration.
10. Move the microphone to another area of use and slowly raise gain until FBX eliminates a few more feedback tones (2 or 3). Repeat this step until the word Setup automatically disappears and the word READY appears. This indicates your unit is ready for operation. The total number of filters available for feedback filtering is 10; in the factory default setting, your unit will automatically enter READY mode when the eighth filter is set. Alternatively, you may enter READY status with fewer fixed FBX filters in place, simply by pressing the READY button at any time. NOTE: Be sure that the word READY appears in the FBX section of your receiver LCD during performance or any normal operation.

    Any feedback that occurs after setup will be eliminated by dynamic filters, which remain in reserve to catch surprise feedback if it occurs during performance/operation.

    In most instances you will experience an additional gain of 6-9 dB before feedback when using the Sabine True MobilityTM System. Precise results will depend on system and acoustical considerations.

    All fixed filters in place will remain set until the Setup button is pushed and held as described in step 6. All dynamic filters will remain in place until new feedback occurs (when they will move to the new frequency), or until the Setup button is pushed and held. Your True Mobility receiver will remember its FBX (and all other) settings even if the power is turned off. See Section 14 for a complete discussion of Sabine FBX Feedback Exterminators®.

7.2. FBX Bypass Button

The Bypass button bypasses only the FBX Section, and not the additional signal processing (Parametric Filters, Hi/Lo Cut, De-essing and Compression) available in the Targeted Input Processing section of the Sabine True Mobility™ Wireless Receiver.

NOTE: You can easily bypass Compression signal processing by turning the Compressor Ratio knob counterclockwise until you get to 1:1 ratio, and the De-esser signal processing by turning the De-esser knob clockwise until you get to 0 cut.

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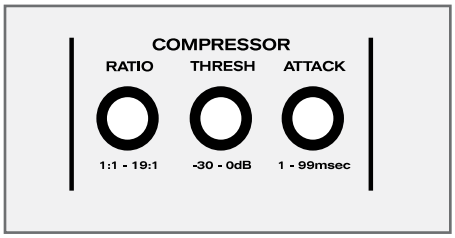
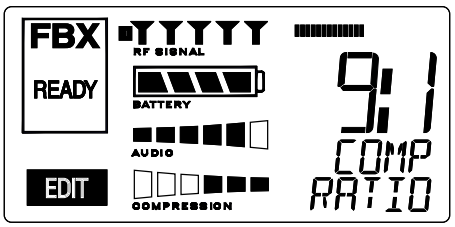




8. COMPRESSOR/LIMITER OPERATION

8.1. Basics of Compression

The dynamic range (how loud we can hear to how quiet a sound we can detect) of the human ear is far greater than the capability of sound systems to reproduce. Although some of this equipment limitation is at the upper extreme of the dynamic range (where too loud a signal will produce distortion), much of the restriction occurs at the low level end, where the signal disappears below the "noise floor" of the circuitry.

A compressor (or in its most powerful form, a limiter) is the most widely used tool for controlling dynamic range. In the simplest terms, a compressor is designed to squeeze the dynamic range of an audio program; i.e., to make quiet signals louder, and loud signals quieter. A compressor becomes a limiter when the compression ratio (the ratio of the input gain change to the output gain change) is so high that the output level effectively won't rise above a "brick wall" ceiling, regardless of how much the input gain increases (typically a ratio of 10:1 and greater).

A compressor acts like an "automatic mix engineer" with a hand on the fader and an inhumanly fast reaction time. When the input level increases, the "engineer" drops the fader; when the level decreases, the fader is raised. When the amount of fader compensation equals the variation in signal level, the output level of the audio program will sound consistent.

The practical benefits of compression and limiting include:

1. **Speaker protection.** A compressor will control sudden level peaks and prevent your speakers from damage. Most often in this type of application, the compression ratio is high enough to qualify as a limiter.
2. **Perceived increase in loudness.** Because compressed peak levels are kept from rising as high as uncompressed signals, you gain headroom for your audio program and can raise its overall average gain. Compression is often added to the entire audio mix, both in live sound and recording, to increase its perceived loudness.
3. **Achieving more consistent levels**. For expressive instruments or vocals, which may have a large dynamic range, compression can help maintain more consistent mix levels. So a speaker who varies from a whisper to a shout will not disappear or stand out in the mix, relative to other less dynamic instruments or vocals. Vocal level variations are also common when multiple users share a single microphone, due to differences in voice volumes and mic-to-mouth positions from one user to another. Compression will help even out such variations as well.

8.2. Using the Compressor

Compressor knobs are located immediately to the right of the FBX and De-Esser controls. The controls consist of standard Ratio, Thresh (threshold) and Attack knobs, and a horizontal gain ladder in the LED display shows compressor gain reduction.

Ratio: Compression ratio is the ratio of the input gain change to the output gain change. The compression ratio on your Sabine Wireless ranges from 1:1 to 19:1, in increments of 1 dB. Set Ratio to 1:1 to bypass Compressor.

Thresh: Compression threshold sets the input level at which the compressor/limiter begins to act on the signal. The input level threshold at which compression is engaged can be adjusted from -30 dBv to 0 dBv, in increments of 1 dBv.

Attack: Compressor attack time sets the speed with which signal compression begins once an input signal exceeds the threshold level. The range may be adjusted from 1 to 99 mS, in 1 mS increments.

Gain: (Output Level) Since the output gain is attenuated whenever the input gain exceeds the compression threshold, the overall output level of a compressed signal will be reduced. Commonly, this reduced output gain is compensated for by raising the level of the output signal (the term is "gain make-up"). Output Level range may be adjusted from mute (minus infinity) up to +20 dB, in increments of 1 dB (depending on input).

8.3. Suggested Compression Settings

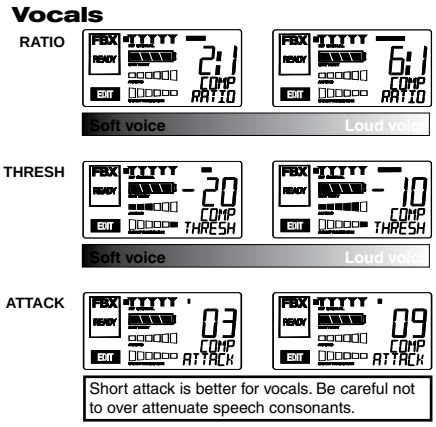
8.3.1. Vocal Settings

The renowned expressiveness of the human voice is due in large part to its dynamics. A vocal that varies from a whisper to a scream has a strong emotional impact, but those same dynamics present a challenge to the sound engineer. Ideal vocal compression maintains some dynamic range while keeping the vocal the focal point of the mix.

Ratio: A soft voice might require a ratio of 2:1, whereas a loud voice might require a ratio setting of 6:1.

Thresh: The higher the threshold setting, the more signal is required to initiate compression. Ideally this should be set to reign in peak levels, and allow signals of lower gain to pass uncompressed. Threshold settings will depend on the nature and variety of the signal source. Strong vocalists will require a different threshold than quiet speakers or singers.

Attack: Short attack times usually work well for voice. However, too strong a compression ratio, too low a threshold, and too fast an attack may attenuate speech consonants, which provide important intelligibility cues to the audience, thus compromising clarity.



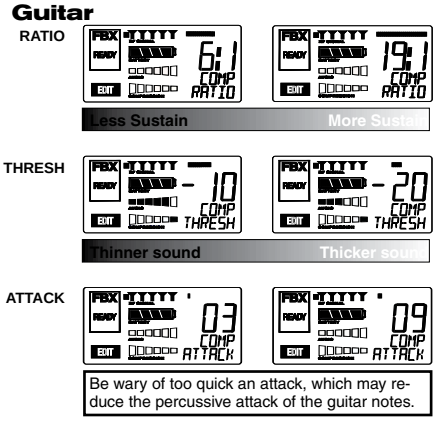
8.3.2. Guitar Settings

Ratio: A high compression ratio (with gain makeup) will add sustain to held notes and chords.

Thresh: Moving the threshold will change the audible thick/thinness of the guitar tone, but generally you want to compress all the notes played.

Attack: Be wary of too quick an attack, which may reduce the percussive attack of the guitar notes.

In general, be wary of too much gain makeup, and too high a compression ratio, which may make a noisy guitar amplifier more objectionable. Ratio settings might range from 6 to 20:1, threshold variable, slower attack, soft knee, output gain boosted slightly to significantly depending on amount of compression.



8.3.3. Bass Guitar Settings

Bass players use a variety of techniques, often in the same song, that can benefit from compression. Compressing bass evens out peaks and keeps the bass level in the mix.

Ratio: Set to 4:1

Thresh: Set to compress peaks only

Attack: Quick attack, medium release, hard knee (try various release settings, depending on the speed of notes played)

Gain: Output boosted slightly

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8.4. Possible Compression Trouble Areas

Like any signal processing, compression can be misused, and improper application may cause undesirable side effects in the audio signal. Some of these problems include:

1. **Noise.** If the threshold for compression is set too low, and the output gain is raised substantially to make up for the gain loss of compression, the resulting output signal can be noisy. This is because the overall signal must be raised significantly to produce the same audible level, and the noise floor of your equipment will be amplified unnecessarily. This problem will be exaggerated if the input signal level to the compressor is very low (which will already degrade the signal-to-noise ratio).
2. **Breathing**. In situations where the compression ratio is high, the threshold is low, and the release time of the compressor is short, the noise floor will modulate up and down as the audio signal rises above and falls below the threshold.
3. **Over-compression**. Applying too much compression to a mix can sometimes result in such evened-out dynamics that the "life" of the music or speech has been removed or curtailed. Dynamic variation may be a major component of a performer's message and command of the audience; don't remove dynamics, just control them. This may be particularly true for percussive musical instruments such as drums.

8.5. Release & Knee Settings

Two other important compressor variables are ***release time*** and ***knee***. Release time adjusts the speed with which compression stops and output gain returns to unity with input gain, once the input signal falls below the compression threshold. Knee refers to the degree with which the full ratio of compression is imposed once the input level threshold is approached and exceeded. A "hard knee" changes from no compression to maximum compression exactly and immediately at the threshold crossing; a "soft knee" gradually imposes the full compression ratio as the input gain approaches and exceeds the threshold. In Sabine products, the "softness" of a knee can vary from 1-40, with the higher level representing the "softest" character. In such a setting, slight compression will begin well below the compression threshold, increase as the input gain crosses the threshold, and reach full compression well above the nominal threshold.

Values for release time and knee are set at the factory: default release time is 250 mSec, and the default knee setting is a "soft" setting of 20. These defaults can be temporarily changed or reprogrammed using the Sabine True Mobility™ Remote Software (see Section 13 for details).

9. DE-ESSER

9.1. De-mystifying De-essers

Certain consonant sounds produced by the human voice contain more energy than others, and have the potential to overload a microphone capsule. This can produce a disproportionately harsh result when amplified through a sound system, and/or recorded to analog or digital storage media. The most common and obvious of these sounds (in English and many languages) is the “ssss” sound, associated with pronunciation of both “s” and soft “c” consonants, also the consonants “t,” “f,” “x” and sometimes “d.” The technical term for this particular vocal sound is “sibilance,” and the devices that control such sounds are typically called “de-essers” (or sometimes sibilance controllers). The frequency range of sibilance will vary depending on the singer/speaker, the consonant involved, the orientation to the microphone, the microphone itself, and the normal variations in human vocalization. Cardioid- pattern condenser microphones are especially susceptible to sibilance problems, but the problem can also occur with other types and patterns of microphones. The range of frequencies affected by sibilance starts above 2 KHz, and generally tapers off above 10 KHz; in other words, sibilance is primarily a problem associated with higher frequencies (though not the upper octave of human hearing).

9.2. The Sabine De-esser

The Sabine De-esser is essentially a type of frequency-band compressor, active in the 2-10 KHz range, and inactive below 2KHz and above 10 KHz. Sabine’s algorithm works by dynamically comparing band-specific and associated harmonic energy levels to the total signal energy. When spikes are detected that correspond to sibilance, a shelving filter is imposed on the appropriate frequency bands, and remains in place only for the duration of the sibilance. High frequency energy levels that remain below the comparison threshold do not trigger de-essing, and lows and highs outside the sibilance range are also passed unprocessed and unaffected. This means the Sabine De-esser is effective but transparent.

9.3. Using the De-esser

Using the Sabine De-esser is simplicity itself. Turning the knob labeled “DE-ESS CUT” counterclockwise will increase the amount of sibilance reduction, by increasing the maximum depth of the shelving filter. The maximum allowable cut is 24 dB.

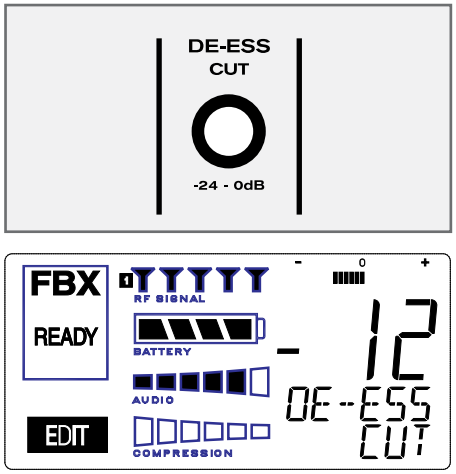

Fig. 9a: De-esser

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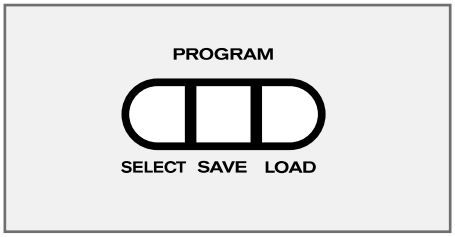

Fig. 10a: Program Front Panel Buttons

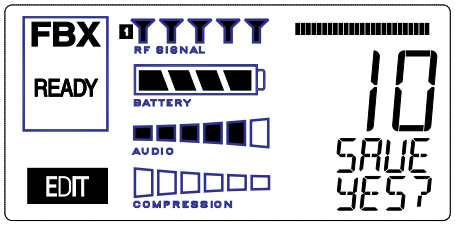

Fig. 10b: Program SAVE YES?

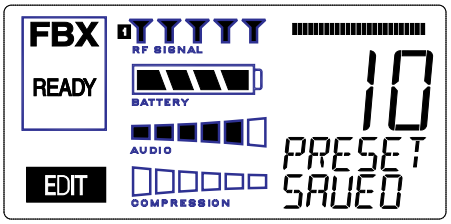

Fig. 10c: Program PRESET SAVED

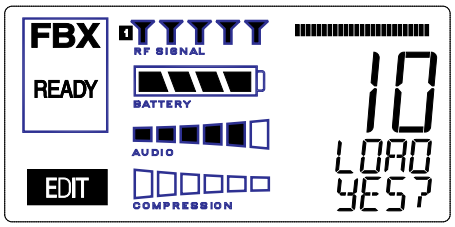

Fig. 10d: Program LOAD YES?

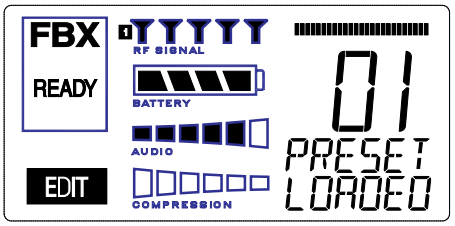

Fig. 10e: Program PRESET LOADED

10. PROGRAM SAVE & RECALL

Most wireless microphone systems provide control of one or two settings (RF channel and maybe gain). With so little to remember, the ability to save and recall system settings has not been necessary. With the Sabine Smart Spectrum® series, however, you get a very sophisticated processor with a variety of adjustable parameters. The ability to save and recall your carefully programmed setups can be a tremendous time-saver. Your Sabine receiver allows you to store and recall up to 10 different presets.

10.1. Saving a Preset

To save a program, press the SELECT button. The last preset used (numbered 01 - 10) will be shown in the LCD Display (see Fig. 10b). If you want to replace an existing program, press SELECT until you reach that program's number. Then press the SAVE button. The function display will show "YES?". If you are ready to save, immediately press the SAVE button again, and your settings will be saved to that program number. The message PRESET SAVED will be shown for four seconds in the text display to confirm this action, as the LCD Display continues to show the number (01-10) of the preset (see Fig. 10c). After four seconds, the LCD Display will revert to an indication of the RF channel.

10.2. Loading a Preset

Loading a program is just as easy. Press SELECT until you locate the program number you wish to load. Press LOAD. The function display will show "LOAD YES?" (see Fig. 10d). Immediately press the LOAD button again and your new program, including all the parameters, will be loaded for that channel. The message PRESET LOADED will appear in confirmation (see Fig. 10e).

10.3. Naming a Preset

Presets, channels and receivers can be named using the Sabine True Mobility Remote Software. Refer to Section 13 for details.

10.4. Power Off Memory

The receiver retains in memory all settings in effect at the time of being powered off, and returns to those settings when powered on.

PRESET NOTES

1. Preset 01 is the System Default (SYSDEF on the front panel) and you cannot save a preset here. Load this setting when you want to return the receiver to the factory default settings.

2. Preset names will appear on the LCD only after you name the preset using the remote control software.

11. MULTIPLE SYSTEMS OPERATION

11.1. Overview

In many circumstances a single wireless microphone system is all that will be in use at any one time. Larger applications (church, concert hall, theater stage, conference room, etc), however, can often require a large array of wireless microphones, all demanding flawless uninterrupted simultaneous operation.

Multiple system operation presents at least two important operational challenges: interference among transmission channels, and setup complexity. Sabine Smart Spectrum provides powerful solutions to both, particularly the interference problems associated with two or more RF channels at work at the same time, at the same location.

11.1.1. Multiple System Interference

Sabine Wireless addresses multiple system interference with two strategies. First, greater available bandwidth in the 2.4 GHz and 915 MHz ranges means more channels can occupy the band, i.e., the expanded range can be divided into a greater number of separate transmission/reception bands. Second, with Smart Spectrum transmission and reception, channels are more tolerant of interference. The net result is that Sabine Wirelss offers the potential for many more simultaneous transmission channels than conventional UHF or VHF systems.

While such performance benefits are one of the major advantages of the SWM, more systems working at the same time leads to a greater potential for complexity. Fortunately, the SWM6000 and 7000 also offer tools to simplify setup and operation.

11.1.2. Setup Complexity

Multiple wireless systems in a large installation are of course more complicated than a single transmitter/receiver. More space is needed, and the sheer quantity of transmitters and receivers that may be in use at a single installation can prove difficult to manage. The SWM series helps manage such potential complexity with four strategies and/or system accessories:

1. First, the dual channel receivers (SW72 and SW62) receivers offer a 50% space-saving advantage with 2-channel receivers that occupy the same 1U space as single channel receivers. Each channel in a 2-channel system shares the true diversity operation of the two antennas connected to the single receiver chassis.
2. Second, the optional SWA6SS (six-system antenna distribution amplifier) greatly reduces the complexities of multiple receiver antenna deployment. Since each receiver has two (diversity) antennas, which can be mounted on either the rear or front panel, multiple receivers at one location can potentially create a forest of antennas protruding from the front or back of a rack. The SWA6SS Antenna Distributor reduces the number of antennas to as few as 1/6 what would otherwise be needed. An added important advantage of using the SWA6SS is its distributed signal boost provided to all the antenna outputs, delivered while maintaining diversity in all attached reception channels.
3. Third, large installations often entail long distances from transmitters to receivers, or the presence of obstacles (walls, for example) in the transmission path that can interfere with clear reception. While the SWM Series series are designed to minimize these kinds of problems without accessories, the SWASS-EXT (set of two extension antennas, shown in figure 12b on page 38) may prove helpful or even necessary in some situations. In addition to providing remote and/or desirable low profile positioning with improved reception, the SWASS-EXT also adds significant gain for even more reliable system performance. The Extension Antenna and Distribution Amplifier components are also designed to operate in tandem, with the Extension Antenna plugged directly into the amp, which can then feed (via cable) the antenna inputs of 6 receivers. A combination of 2-channel receivers, a set (2 pieces) of SWASS-EXT, and one SWA6SS, would reduce the antenna clutter of 12 transmission

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channels to a single pair of extension antennas. See Section 12 for more information about setup and use of the SWASS-EXT.

4. Fourth, software control for the ND series receivers allows up to 70 receiver channels to be controlled from a single computer. This quick and powerful control methodology means you can monitor and change transmission channels, mic modeling, compression and de-essing — in short, all front panel controls — from a remote laptop or desktop. In addition to simplifying multiple unit operation with remote front panel controls, the remote software provides additional features and functions not available from front panel control. See Section 13 for more information about setup and use of the Remote Software.

11.2. Antenna Distribution Amplifier

Sabine's optional accessory SWA6SS Antenna Distribution Amplifier is ideal for simplifying antenna set up when multiple receivers are used, by using a single pair of antennas to replace pairs for up to 6 different receivers. Standard equipment packed with each Antenna Distributor includes an AC power cable, and 6 pairs of 1-meter long jumper cables (RG-58 AU foam core) for connecting the Antenna Distributor to receivers (2 cables provide true diversity reception to each receiver).

For best results, the Antenna Distribution Amplifier should be positioned close enough to the receivers to minimize cable runs. In most applications, you can use the standard Sabine 2.4 GHz or 915 MHz antennas supplied with any of the receivers to connect to the terminals on the Antenna Distributor, and then connect (in matching pairs) the jumpers to all your receiver antenna connections (up to 6 receivers, 1 pair per receiver).

Care should be exercised when using longer cables, due to possible transmission signal loss (approximately 1.7 dB/meter). Using the "rule-of-thumb" that a signal loss no greater than 6 dB will prove acceptable in many circumstances, you may be able to use RG-58 cable up to 3 meters or so in length. However, a better strategy than moving the Antenna Distributor to a better position, and risking excessive transmission loss back to the receivers or requiring an upgrade to more expensive cable, is to utilize a pair of Sabine Extension Antennas (SWASS-EXT). These will connect to the antenna inputs of the Antenna Distribution Amplifier, and offer increased range, better rear-source RF rejection, an expanded 135 degree forward sensitivity, flexible mounting options, and signal boost (see Section 12).

For more details regarding specifications and operation of the SWA6SS Antenna Distribution Amplifier, please refer to the operating guide included with that product.

11.3. Antenna Distribution Amplifier Connection

1 Connect receiver Antenna 1 input to any RF Output 1 connector on the SWA6SS.

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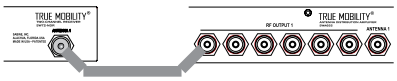
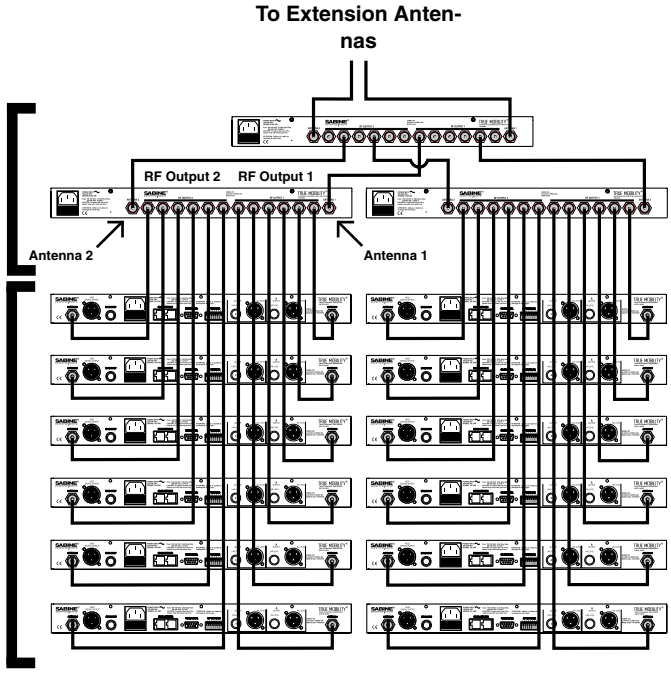


Receiver — Antenna Distribution Amplifier (SWA6SS)

2 Connect any receiver Antenna 2 to any RF Output 2 connector on the SWA6SS.

Receiver — Antenna Distribution Amplifier (SWA6SS)

3 Continue with remaining receivers



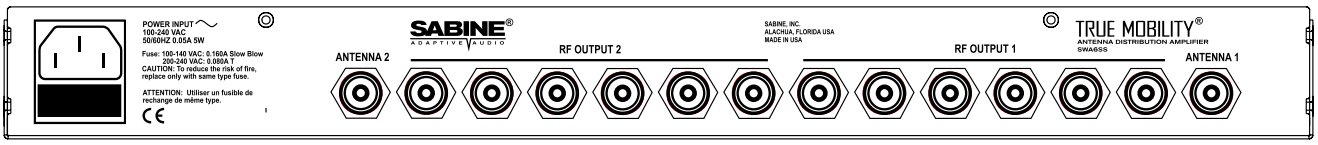


Fig. 12a: SWA6SS Antenna Distribution Amp Back Panel

⚠ IMPORTANT ⚠

Active Electronics Antenna

Sabine wireless receivers provide antennas with active electronics. The inputs to the receiver & antenna distributor amplifier have phantom ower available for this purpose.

DO NOT SHORT TO GROUND

⚠ IMPORTANT ⚠

Antenna Cabling Impedence must be 50 Ohm.

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Fig. 12b SWASS-EXT Mic-stand mount and wall-mount extension antennas

12. EXTENSION ANTENNAS

12.1. Overview

Sabine's receivers are designed for easy interface with Sabine's SWASS-EXT Extension Antenna Kit (figure 12b). This triangular, attractive wood-grained unit is designed to mount easily and unobtrusively on a wall (allowing either a through-the-wall or out-the-bottom connection), or (by threading) atop a microphone stand for a more portable or temporary positioning. Each package contains 2 Extension Antennas, all necessary mounting hardware (screws and mic stand thread connectors) and both right-angle and straight connectors for mating with RG-58 cable (for connections to a receiver or Antenna Distribution Amplifier).

12.2. Antenna Cabling & Cable Loss

While an extension antenna affords the opportunity to increase the distance from transmitter to receiver, there is a loss of signal in the interconnecting cable that limits that distance. The maximum connection length is determined by the type of cable used, and the degree of signal attenuation acceptable.

Sabine's Active Extension Antenna allows for a cost-effective way of boosting signal levels due to its built-in active switchable (+22 or +44) signal boost. In the case of low-cost RG-58 cable, adding an SWASS-EXT to your setup increases the acceptable maximum cable run by more than 4 times, to 14 meters. With RG-8 cable, the maximum length is extended to 88 meters.

Need 915 MHz chart here, too.

Coaxial Cable Attenuation Table - 2.4 GHz

Cable Type	Belden #	Insulation	Center Conductor	10 Meter Attenuation (dB)	Maximum Practical Distance Using SWASS-EXT set for +22 dB boost (meters)	Connector Type
RG58	9203	Polyethylene	#20 Stranded	-16.29	14	TNC
RG58/AU	9311	Foam Polyethylene	#20 Stranded	-11.10	20	TNC
RG212/U	9861	Polyethylene	#15.5 solid, Silver Plated	-6.11	36	N
RG8/U	9913	Semi-solid Polyethylene	#10 Solid	-2.50	88	N
RG142	83242	Teflon	#18 Solid, Silver Plated	-6.54	34	TNC

Fig. 12c Coaxial Cable Attenuation Table

⚠ IMPORTANT ⚠

Antenna Cabling Impedance must be 50 Ohm.

Power for the Extension Antenna is delivered from any Sabine SWM series receiver or SWA6SS Antenna Distribution Amplifier (see Section 11).

An additional advantage of using Sabine's SWASS-EXT Extension Antenna stems from its more focused, directional nature. Sabine receiver's coaxial dipole antennas (standard equipment that mount directly on the front or rear panels of the receiver or SWA6SS) are more omni directional in nature. In contrast, the Sabine's Extension Antenna is sensitive to RF reception in a 135-degree arc in front of its mounted position. It extends sensitivity to the front and off-axis side locations as it increases rear RF rejection.

NOTE: The higher boost level (+44 dB) is only recommended for very long cable runs - at least 50 meters, or you have more than a 12 dB of cable loss. Using this setting without that much cable loss can cause a signal overload and poor RF performance.

The multiple functions (relocation of antenna, boost of signal, directional sensitivity) of Sabine's Extension Antenna mean there are many applications in which its addition to your system can greatly enhance performance. Here's a short list of such applications and operating instructions:

1. **Antenna Repositioning.** Provides solutions when receiver placement options are limited or challenging. Sabine's Extension Antenna's multiple mounting options allow higher placement (wall mount or microphone stand mount).
2. **Barriers interrupting transmission.** Anytime a barrier interferes with transmission and reception, Sabine's SWASS-EXT can be mounted on the transmitter side of the barrier with cable connections made on the receiver side. Perhaps the most common situation of this nature would arise when receiver and transmitter are located in separate rooms.
3. **Expanded or directional sensitivity required.** Sabine's Extension Antenna picks up in a 135-degree arc, focused towards the front. Reception in this arc is enhanced.
4. **Rear RF rejection required.** Because Sabine's Extension Antenna is less sensitive to signals received from the rear, it can be positioned to reject any such directional RF interference.
5. **Extended operational range.** Given a potential maximum cable length of almost 90 meters from Extension Antenna to receiver, Sabine's SWASS-EXT allows more options for extending the distance between transmitter and receiver. (The typical range of Sabine Wireless without the Extension Antenna is already 100 meters in typical circumstances). Consider that RF signal strength through the air is diminished by the square of the distance (twice as far away = ¼ the signal strength), while signal loss through cable is (roughly) inversely proportional (twice as far away = ½ the signal). That means you can use an extension antenna to replace transmission-through-air with transmission-through-cable, to help minimize signal loss.
6. **Placing extension antennas.** The assymetrical pattern of each antenna helps reduce the chance for a null spot in your room. You may use either antenna on the left or right side of your performance space. When you mount the extension antennas on a stand or on a wall, make sure the short end of the triangle is up.
7. In order for the system to be effective, **both extension antennas should be in a good pickup position at all times** but separated by about ten or fifteen feet if the antennas are within 100 or so feet.
8. If you put the antennas too far apart, i.e., at opposite ends of the room, or in separate rooms, to improve coverage, diversity is defeated and you will get dropouts. In other words, diversity is more important that coverage. If you mount the **extension antennas in the ceiling**, the antennas metallic backplane must be orientated parallel to the floor and the antennas must not be blocked by pillars, lights or similar obstructions. Aim the hole in the plastic cover toward the podium.
9. **Do not daisy-chain extension antennas** together in series. Receivers and the antenna distribution amp are only designed to use one left and one right antenna.
10. **Extension Antenna Cables:** Use coax cable to connect the extension antennas to the receiver or to the ADA. See the chart on the previous page for cable specifications. Use the SWATNC-N step-down cable to connect thicker RG8 cables to the extension antenna.
11. The SWASS-EXT extension antennas add either 22 or 44 dB signal strength to overcome cable loss. **Bad crimp connections are a common cause of dropouts**. Check them carefully!

⚠ IMPORTANT ⚠

Active Electronics Antenna

Sabine wireless receivers provide antennas with active electronics. The inputs to the receiver & antenna distributor amplifier have phantom power available for this purpose.

The red LED on the inside of the antenna cover indicates phantom power (3V) is good.

DO NOT SHORT TO GROUND

The SWASS-EXT features:

- Wall or mic-stand mount
- Straight and right angle TNC connectors
- 135 degree reception pattern
- +22 or +44 dB boost in RF
- Matched pairs
- Wood-tone finish
- Phantom-powered from either the receiver or the distribution

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13. REMOTE CONTROL OPERATION

13.1. Overview

In many circumstances you will adjust and control your Sabine wireless microphone system using the front panel controls, as outlined in previous sections of this operating guide. In circumstances where an enhanced level of control over a single receiver is desired, or to enable simultaneous computer-based control of multiple receivers, you will need to install (on either a laptop or desktop computer) the free Sabine SWM Remote Control Software included with your system. Only receivers may be remotely controlled; handheld and belt pack transmitters cannot be remotely controlled.

For online instructions for any function in the software, you may also refer to the Help menu.

NOTE: Only -NDR receivers have a USB port. You can use a USB to RS-232 9-pin adaptor for the standard units if you need to use USB. Go to Sabine.com for a list of suggested adapters.

Is this still true?

13.1.1. Single vs. Multiple Receiver Control

All series receivers have an RS-232 9-pin serial COMM Port and a USB port. Thus, any single receiver can be controlled remotely. Control over multiple receivers from a single computer is possible only with ND-series receivers (SW62 and 72-NDR). These units have additional RS-485 network connections (RJ-45 jacks) for daisy-chain connection from one receiver to the next. Up to 35 receivers (70 transmission channels if all receivers are 2-channel) may be connected in this network, all under the control of a single computer. Single- and dual-channel receivers can be mixed in the same network. The first receiver in such a network can be connected to the computer via an RS-232 9-pin serial cable or USB cable. The remaining units connect via an RS-485 cable.

NOTE: It is not possible to upgrade/retrofit a standard receiver to make it an ND-series unit.

13.1.2 Features & Controls Added Software

All front panel controls and displays are duplicated in the software. In addition, a deeper level of software control over receiver operation is enabled. These new controls are complete and independent for each transmission/reception channel, meaning there are two sets of controls for dual channel receivers. These controls and displays include:

- **Parametric filter access and control.** FBX filters can be changed to parametric filters, and their width, depth, and frequency can be adjusted. Changes can be made at any time, both before and after FBX filters have been set. Parametric and FBX filters can be mixed in any combination, totaling 10 for each receiver channel.
- **Adjustable FBX parameter control.** Maximum depth of FBX filters can be adjusted globally; filter width can be adjusted globally or individually. Two controls, Sensitivity and Persistence, can be tweaked to tailor the operation of automatic FBX filter placement to match the audio program. Proper settings will optimize the balance between false filtering and delayed response to feedback (the factory default settings should operate excellently in the vast majority of conditions and may never need to be changed).
- **Control over balance of FBX Fixed and Dynamic filters.** Any FBX filter can be set to be either fixed or dynamic.
- **Adjustable high and low cut filters.** (Software only) High Cut Filter, user controllable between 3 KHz and 20 KHz, 12 dB/octave roll-off; Low Cut Filter user controllable between 20 Hz and 1 KHz, 12 dB/octave roll-off.
- **Additional compressor controls.** Aside from adjustments for ratio, threshold, and attack (which duplicate front panel controls), the Remote Software provides control of compressor release time and knee. The effect of compression on the output signal as a function of input signal strength and parameter settings is displayed in Sabine's unique dynamic ColorComp graph, in addition to the traditional opposing-meter indicators.

- **RF Scan and Report,** which measures strength for each of the 70 transmission channels, and displays a hierarchical ordering of the clearest, strongest channels to use during system setup and operation. You can print a copy of the scan results.
- **Additional memory options.** In addition to saving presets in receiver memory, channel configuration settings can be saved to and recalled from disc or hard drive. All parameter settings made with the remote control, including adjustments that are not accessible from front panel controls (e.g., compressor knee and release), are saved with presets. All software settings stored for each of the 10 presets, including settings not accessible from the front panel, will be loaded whether presets are recalled by remote control or from the front panel. Note that all settings made in Off-line/Edit mode can be saved and applied in online operation.
- **Ability to print a report of all parameter settings,** creating hard copy documentation.
- **A receiver channel output mute button.**
- **The ability to custom name each RF channel and receiver.** This name will be displayed in the software only.
- **Display of important transmitter status information.** In addition to duplicating the battery charge status, battery warning message, and transmitter on/off/mute status from the front panel display, the Remote Software displays the number of hours the battery has been in use, the frequency midpoint (in GHz) of the transmission channel chosen, the transmitter pad and low cut filter settings, and a warning indication in the case of low RF signal strength. For handheld transmitters, the software display also shows the type of mic capsule in use.
- **Improved and expanded operational displays.** In addition to organizing all front panel displays on a single computer screen, the Remote Software also displays the exact frequency, width, and depth of FBX filters. The frequency response curve resulting from combined filter settings (including FBX, parametric, and high and low cut) is graphically displayed in the software. Frequency response changes imposed by choosing various microphone models are also shown.
- **Customizable front panel lock settings.** Software control allows you to program selective access to front panel controls to be made available once the Remote Control is disconnected. Customizable front panel lock settings are saved and recalled as part of each receiver's settings. All software-only accessible settings are saved with presets. Careful programming enables some powerful operational features — for example, locking Program Save but enabling other front panel controls (including Program Load) will let front panel users update settings temporarily, yet reload the original settings at the push of a button. Such a temporary adjustment would not permanently alter a setup designed to work in most situations, but would allow tweaking to address unusual situations.

WARNING:
BEFORE DISCONNECTING RECEIVER FROM COMPUTER

Quit all SWM Software functions and close software BEFORE disconnecting the receiver connection to you computer.

Failure to do this may cause the receiver to lock up. In case of receiver lock up, restart receiver.

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13.1.3. Software Multiple Unit Control

The true extent of the power of the SWM Remote Software is realized when it is used to control multiple wireless receivers. When ND-series receivers are connected in a network, the additional controls offered by the Remote Software over the entire system include:

- **Simultaneous multiple channel/system monitoring.** The Remote Software "All Channel View" (figure 13h) shows all important status conditions for up to 70 transmission channels. Color-coded warnings and alerts draw attention to potential problems.
- **Detailed, quick access to a single set of controls.** The "Command View" (figure 13c) displays comprehensive information about a single selected RF channel, and easy adjustment of all its controls. Channels are selected by clicking the appropriate All Channel View button. (NOTE: Each channel display in the All Channel View also allows quick access to parameter adjustments, by using the right mouse button to popup a parameter control menu.)
- **Quick, interactive control of wireless network channels.** All or selected parameter settings for a given channel can be copied to one or more additional channels, using the Copy Parameters option.

USB DRIVERS

Your USB-enabled receiver requires version 2.0 or above software. Installing this software also installs the necessary USB drivers onto your computer. If at any time you need to re-install USB drivers, use the software CD supplied with your receiver, or download them from Sabine.com.

13.2. Software Installation

13.2.1. Requirements & Recommendations

- **PC Minimum Requirements:** Pentium 266 MHZ CPU or AMD Duron CPU**;** 128 Megabytes of RAM; 20 Megabytes free space on hard drive; Windows 95 or higher.
- **PC Recommended Requirements:** Pentium 1.0 GHZ CPU or AMD Athlon CPU; 512 Megabytes of RAM; 20 Megabytes free space on hard drive; Windows 2000 or XP.
- SVGA or greater resolution graphic card and monitor. Recommended minimum monitor resolution: 1024 x 768 pixels (or 800 x 600 pixels for 15 inch monitors). Select "small fonts" and 16 bit color as defaults for monitor display. Windows XP users select 96 dpi screen settings.
- USB or Serial COMM Port.

NETWORK
CABLE CONNECTIONS

Connect the **first receiver** of a network using a USB or RS-232 9-pin connection. All subsequent receivers connect to each other via RS-485 connection.

13.2.2. Connections

There are three types of connections that are used in a remote controlled one- or two-channel Sabine system:

- **Serial port (RS-232 9-pin):** Use this to connect to a single receiver, or the first receiver in a network (multiple receivers). Be sure to use a cable with standard 9-pin D-connectors (male on one end, female on the other) that is a "serial," not a "null modem" cable.
- **USB:** Use this to connect to a single receiver, or the first receiver in a network (multiple receivers).

  NOTE: Some receivers may not have a USB port. In this case, simply use a USB to RS-232 9-pin adaptor. Go to Sabine.com for a list of suggested adapters.
- **Network (multiple -ND series receivers):**

  1. Connect the first receiver in your network to the PC using a USB cable or an RS-232 Serial Cable (not supplied).

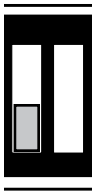
  2. Connect all other receivers as a chain using RS-485 (or standard Ethernet) cables. There are two such jacks on the back of all ND-series receivers. Either jack can connect to another receiver either "upstream" or "downstream" from the computer remote control. As signals travel in both directions (from computer to receiver and back), it is not necessary to connect the last receiver in a network back to the computer (you do not need to make a "loop").

NETWORK
DIP SWITCH SETTINGS

DIP SWITCHES
1 2 3 4 5 6 7 8

UP: All but the first receiver connected to a network. ↑

DOWN: First receiver connected to the network. ↓



See page 55 for a chart of all DIP switch settings.

3. IMPORTANT: Set dip switch #7 on the back of the first receiver to the "OFF" (down) position (default). Set dip switch #7 on all other networked receivers to the "ON" (up) position.

4. When all cable connections have been made, open the SWM Remote Control Software program on your PC. The software will find all the receivers in the network and show them in a dialog box (receiver sequence can be reordered). Click "Accept" to control the network. NOTE: Up to 35 2-channel (or 1-channel, or any combination thereof) receivers – totalling up to 70 transmission channels – can be connected in a single network to a single PC.

How many channels for 6000?

13.2.3. Installing the Software

Follow these simple instructions for installing the Sabine SWM Remote Software on your computer:

1. Insert the Sabine software CD into your PC's CD ROM drive and wait a few seconds for the auto-start software installer to open.
2. Select the SWM Remote Control Software installation icon and follow the instructions given in the dialog boxes that appear. NOTE: For best results, allow the installation program to install the software within the default directories.

13.3. Launching the software

Launching the software produces the Startup Screen (Fig. 13a).

Fig. 13a Control Software Startup window

13.3.1. Off-Line Edit/Demo

Clicking the right button ("Off-Line Edit/Demo") will open the main software screen regardless of whether any SWM receivers are connected. The software functions in Off-Line mode are completely programmable, and may be saved and downloaded to a connected receiver at a later time. Display settings (e.g., level, compression, transmitter settings) which are dependent on the presence of actual signal are simulated, for demonstration only. You may turn the simulated displays on or off using the OPTIONS menu.

13.3.2. Connecting Receivers.

Fig. 13b - Connection Screen

Comm Port: Select the Comm port you are using to connect the receiver(s).

Connect Receiver: Select this and the software will poll the bus on the designated COMM Port to detect connected, powered-on receivers. If no receivers are detected, you may change the designated COMM Port by clicking the appropriate button. If this also proves ineffective, check your cables and connections, and make sure the connected receivers are powered on. In very rare instances you may need to reset your COMM Port settings on your computer.

Once polling is completed, the software will display all the receivers detected, in sequence, and the model of each receiver (ND series or standard, 1 or 2-channel). (See figure 13b for a sample opening display)

You may re-order the receivers here. When multiple receivers are connected a numeric field appears above each one. Enter the new order values and select "Re-Order." You may also verify your receiver selections by clicking on the icons above each receiver. The corresponding receiver's front panel will flash.

Once you confirm that the information reported is correct, choose "Accept" to proceed to the main screen, where you may begin remote control operation.

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