Vortex 3 Real-Time Voice Changing Module
Protocol Droid Version

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This document explains how to setup your Vortex 3 voice changer, operate it correctly, and use all the features available on the unit.

This package includes:
1) Programmed Vortex 3 voice effects interface board stack + processing board
2) 1/8" remote pushbutton cable
3) 1/8" stereo output cable
4) 9V 6AA battery holder
5) Project box enclosure and optional heatshrink
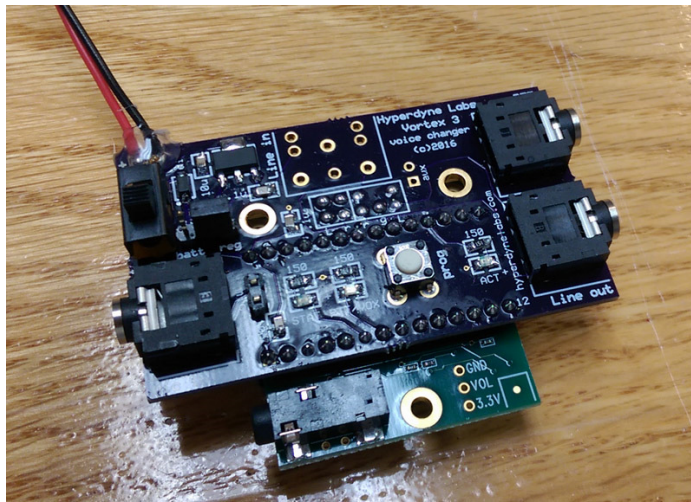
NOTE: Handle your board as you would any piece of delicate electronics! Do not get it wet and do not handle it without grounding yourself first! Even a static shock can destroy the delicate components on the board. I suggest when installing the board, insulate it with non-static foam, hot glue, or other material. Handle the board around its edges when moving it. We are not responsible for boards that are rendered useless by improper handling.

If you are not familiar with static electricity handling procedures, please refer to ESD procedures. Basic information on ESD can be found here: *http://en.wikipedia.org/wiki/Electrostatic_discharge*

SECTION A. - OVERVIEW

Your voice changer transforms your voice in real time to sound like a protocol droid - adding compression, filtering, and phasing so it replicates the effect heard in the movies.

This Vortex 3 voice changer features several innovations not found in any other voice effects unit in its class:

1) 16-bit CD quality output and DSP technology.
2) Different pitch settings to fine tune your voice effect.
3) Programmable breath volume and silence time between breaths
4) Push-to-talk mode, enables voice so you can talk at will.
5) Auto VOX mode for hands free operation

6) Programmable microphone gain
7) FX mode to access onboard music files.
8) 6' remote pushbutton cable to control sound features with a single fingertip
9) Compatible with all portable stereo speakers, Aker, OnTour Ipod speakers, PA speakers, etc
10) Uses any electret mic – board even supplies phantom mic power
11) Interchangeable processing cards so multiple voice effects can be used with one unit

The voice board will run off any DC power supply from 7V-12V. A 9V battery is sufficient to use, but may not last long. Use alkaline batteries or lithium batteries for added life. You can also use a 6AA battery pack for extended costuming sessions. *When the batteries are getting low, the board may misbehave.* This is your cue that the batteries need replacing soon!

LOW VOLTAGE MONITOR**

STARTING WITH FIRMWARE REV V1.1, a low-voltage monitor has been added to the feature list. This tells the use when the batteries are too weak. If the battery is too low for reliable operation, the Vortex 3 board will play out a warning tone! The LEDs on the board will also flash quickly in unison. The tone will continue to play as long as the battery has too low a voltage.

If the tone plays out, PLEASE TURN OFF THE UNIT AND CHANGE BATTERIES ASAP. A more rare critical tone will play out if a critical voltage is encountered, but normally the warning tone will play out when the batteries need to be changed.

Note, the sound files on the microSD card named "*warn.wav*" and "*critical.wav*" are necessary for this feature – DO NOT DELETE THEM OFF THE SD CARD. (You can certainly replace the sounds with your own if you like, just keep the same file names)

This unit contains very sophisticated software that requires you to follow the setup procedures in order to get the best performance from the voice unit. ***PLEASE READ FULLY!!!***

BOARD DIAGRAM

The dimensions of the Vortex 3 module are (not including battery or cables): 2.75" L x 2" W x 0.75" H.

Here is a picture of the Vortex 3 unit with all of the major parts listed on the INTERFACE board.
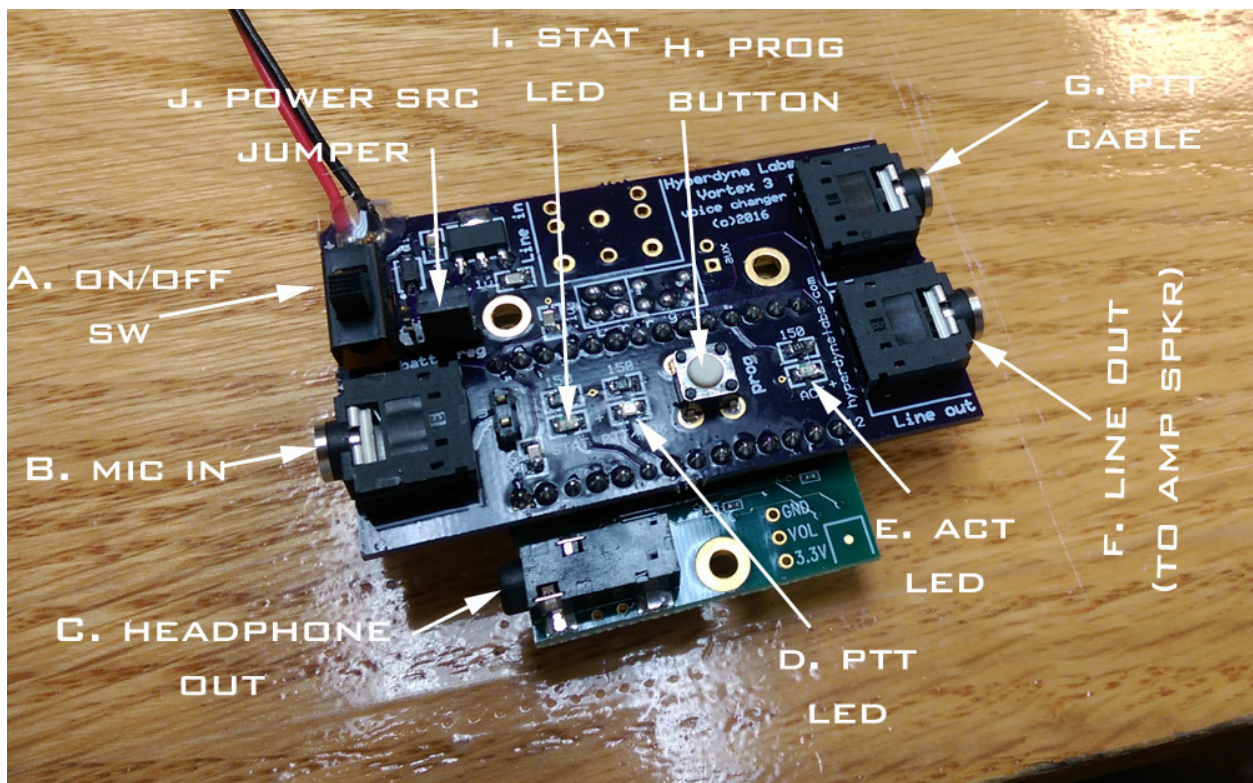
A. On/Off power switch
B. Mic input jack – 1/8" mono input jack for microphone.
C. Headphones out 1/8" jack. Do not use for amplified speakers. Normally left unconnected.
D. Push-to-talk (PTT) LED indicator
E. ACTIVE LED indicator
F. Output line-level jack – 1/8" stereo output jack for voice and sound fx output. Connect to an external amplified speaker.
G. PTT jack – 1/8" mono jack that controls push-to-talk feature. Can be used with remote pushbutton cable.
H. Programming button – Allows user to change board settings for fine tuning effect.
I. STATUS LED indicator
J. Power source header. Allows the board to either use the onboard 5v regulator or direct battery power. NOTE: You should not move the jumper to "batt" mode if your battery supply is over 6V. This will damage the board! If using a 9V battery or any source over 6V DC, make sure the jumper is on the "reg" side of the header pins.

There are also 3 LEDs on the Vortex INTERFACE module for power and status. They operate as follows:

- When PTT mode is enabled, the PTT LED will light up when the mic is "open". The LED will go off when the mic is "closed".
- When PTT mode is disabled, the PTT LED will light up when your voice surpasses the auto VOX threshold.
- The ACT LED will light up each time you depress the programming button or the PTT remote pushbutton. After keying in button presses and when no button presses are detected within 1 sec, the board will update the feature selected and blink this LED to let the user know the EPROM memory onboard has been updated.
- The STAT LED lights up to report the current setting after the user modifies any settings on the board.
- The STAT LED also acts as a heartbeat LED. It flashes once every 5 sec if the board is operating properly.

The Vortex 3 module consists of two board stacks, the upper INTERFACE board stack and the lower PROCESSING board. The board stacks are sandwiched together using header pins. The boards must not be separated, as both are necessary for proper operation!
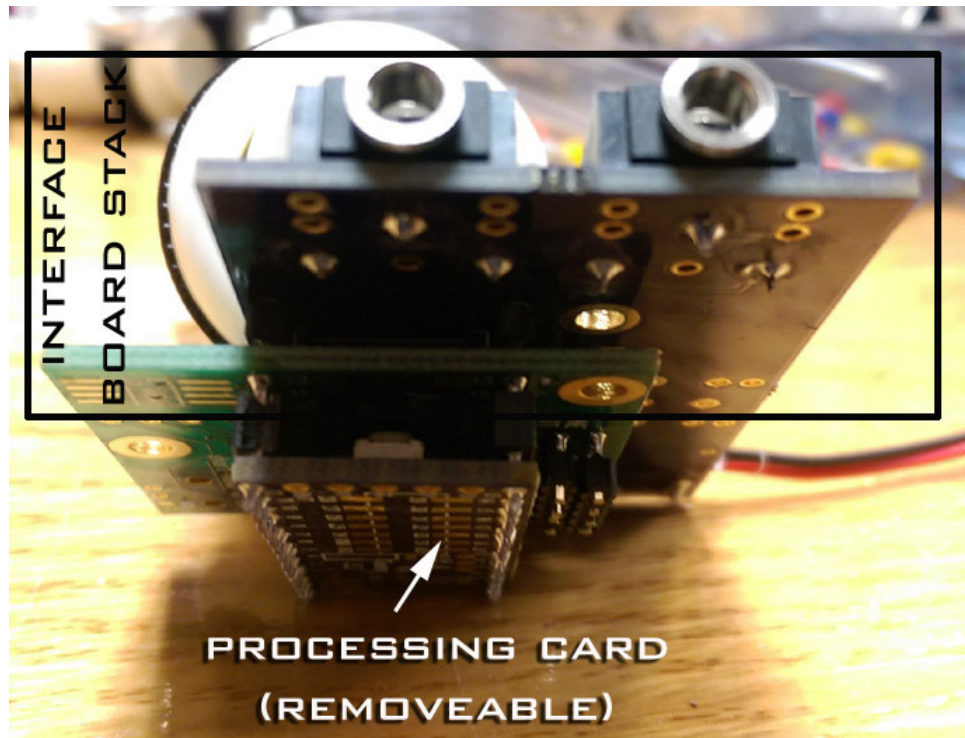
The processing card has female header pins and can be removed from the interface board stack. It is connected via friction fit. This allows you to use other processing cards with different voice effects loaded onto them.

SECTION B. – BASIC SETUP AND OPERATION

Initial operation:

When you turn on the unit, the voice changer becomes active. The default mode is auto VOX, minimum compression, auto VOX squelch timeout of 6 sec.

Once the board has booted up, the mic by default is "closed". This means the mic is electronically disconnected from the speaker. This feature rids of any feedback that you would normally hear when the volume is up too loud or if the mic were constantly "open".

VOX thresholds (opening and closing the mic):

When you have broken squelch by talking into the mic (the VOX on threshold), the mic will electrically "open" and send your modified voice to the speaker for you to hear. Once you stop talking and have gone below squelch (the VOX off threshold), the unit will close the mic. When you have broken squelch, the onboard PTT LED will also light while you are talking. The PTT LED extinguishes once you are done talking or the VOX timeout has expired.

Microphone setup:

Plug in your microphone and amplified speaker using an 1/8" cable. If you already own an amplified speaker you can use this with your unit. You may have to dial down the output volume or mic gain in order to avoid too much feedback. See Section C on how to do this.

Hooking all the components up:

Here is a diagram of how to connect up all the different jacks to your equipment.
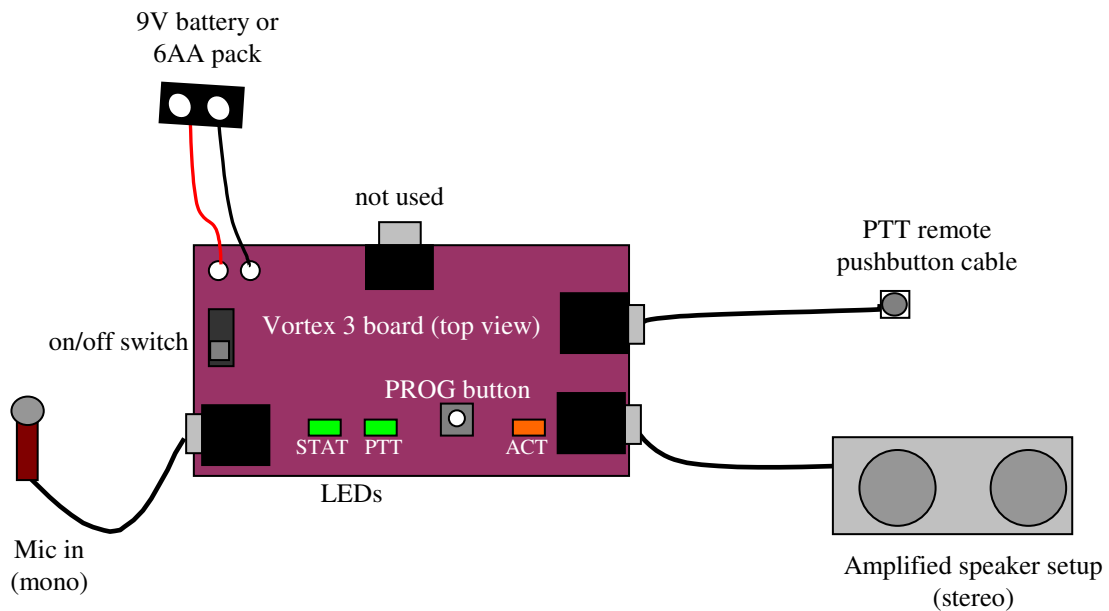
SECTION C. – CHANGING BOARD SETTINGS AND OPERATION

This section outlines how to change any of the settings for tuning your voice effect.

The voice amp has 12 functions that are accessed via the onboard programming pushbutton. These functions are included to help mitigate feedback and to enable different features. The programmable settings are:

(1)   Increase VOX on threshold
(2)   Increase VOX off threshold
(3)   Increase auto talk shutdown time (mic open tim) in VOX mode
(4)   PTT enable
(5)   Change voice phasing effect setting
(6)   Set mic gain dB
(7)   Increase mic gain by 1 dB
(8)   Enable motor FX   (5 motor sounds + 3 music)
(9)   Enable random sound FX (10 sounds)
(10)   Increase time between rand FX playback
(11)   Rand FX volume
(12)   Clear EEPROM

CHANGING SETTINGS

The onboard programming pushbutton allows you to set up and use the features of the board. Each feature on the board is accessed by pressing the programming button the desired number of times. The board will then increment the setting mapped to the number of button presses you entered. Below is a table outlining each feature and the button press mapping.

NOTE: If any of the settings are changed, they are automatically saved in EPROM memory, which is not lost after powerdown. Thus you only need to change the setting once, and the unit will remember your settings upon each powerup.

Number of programming button presses	Voice board feature (PROTOCOL DROID)	Default setting
1x	Increase VOX on threshold (4 settings, 0 default) Table values: ([Lowest], low, medium, high)	Lowest
2x	Increase VOX off threshold (4 settings, 0 default) Table values: ([Lowest], low, medium, high)	Lowest
3x	Auto talk squelch timeout (mic open time) in VOX mode Table values: (3, 4, 5, [6], 7, 8) sec	6 sec
4x	PTT enable/[disable] PTT enabled: Must use remote button to open mic PTT disabled: VOX mode is active and will open mic	Disabled
5x	Change voice phasing amount (larger number is greater effect) Table values: (3, [6], 9, 15, 21, 27) ms	6 ms
6x	Change bulk mic gain Table values: (15, 20, [25], 30, 35, 40) dB	25 dB
7x	Change fine mic gain Table values: (0, 1, 2, [3], 4) dB	3 dB
8x	Motor/music FX playback [enable]/disable Allows playback of tracks via PTT button (5 motor sounds + 3 music)	Enabled
9x	Random FX track playback enable/[disable] Allows random playback of tracks via timer (10 random sounds)	Disabled
10x	Change the cooldown time between rand FX playback Table values: (10, [30],60,120 sec)	30
11x	Change the volume mutiplier of the random FX tracks Table values: (0.25x, 0.5x, [1x], 2x, 3x)	1.0x
12x	Reset all parameters to factory defaults	Reboots board on completion

NOTE: For every programming change, the board will report back to you in the following manner:

1) the ACT LED will acknowledge the number of presses you entered by blinking the number of presses back to you.
2) the STAT LED will report the index of the table value that is currently selected.

By looking at the table values above, the STAT LED will blink accordingly between 1 time and the max table size. For example, pressing the PROG button 10x will change the breathing silence time gap. The board will respond by blinking the ACT LED 10x, then the STAT LED will blink 2x (assuming you started at default values) to denote that 3 sec has been selected. So in order to find the setting, reference the TABLE VALUES above - using the number of times the STAT LED reports back. One blink from STAT is the first value, 2 is the second value, and so on...

DETAILED DESCRIPTIONS OF ALL SETTINGS

Setting 1: Changing the auto VOX "ON" threshold

Pressing the programming button 1x will increase the VOX voice threshold. This is also known as the squelch point. When you talk into the mic, you voice volume must surpass this threshold before the external breathing/sound effect is automatically disabled (see Setting 8).   This is only used if VOX mode is active.

The higher the VOX threshold setting, the more voice volume you need to trigger the auto breath fade out. The default setting is the lowest VOX threshold. If background noise is cutting the external sound effect in and out, increment this setting by one level and try again. There are 5 VOX threshold values you can cycle through, each one is higher than the last one. After the last value is selected, the next VOX threshold change cycles back the lowest in the table. This way you can cycle through all values to find the best threshold for your mic.

NOTE: You can tell if the auto VOX is picking up any mic activity by observing the PTT LED. If you blow into the mic with PTT mode disabled, this LED will light up when the mic input surpasses the current VOX threshold. The LED will go off when no voice input is detected. If the LED is always on then your mic is too sensitive and you should try and increase the VOX threshold. If the LED is never on, the VOX threshold may be set too high or you may have a faulty mic, input jack, etc.

Setting 2: Changing the auto VOX "OFF" threshold

Instead of using one squelch point (like in a CB radio), your voice board uses a dual squelch. After you have triggered the mic using the VOX on threshold, the board monitors your voice volume until it goes below a second (lower) threshold. Once your voice volume tapers off below the VOX off threshold, the board determines that you are done talking and proceeds to automatically output a random click/static sound effect.

The default setting is the lowest value, which is a nominal VOX off level. If the mic is never closing after saying a couple words, increment this setting by one value by pressing the PROG button 2x.

Here is a diagram of how the squelch works. Once your voice volume surpasses the VOX on thresh, the mic is opened. The mic stays open until your voice volume goes below the VOX off threshold. You can see if you make the VOX off thresh greater than the VOX on thresh, the unit will always keep the mic opened once triggered.
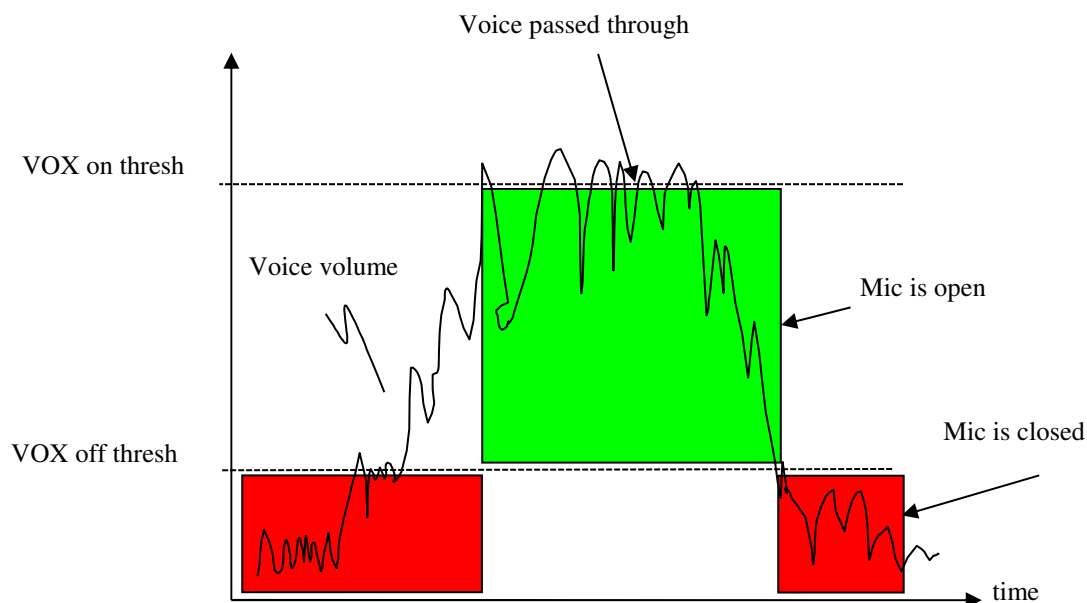
Setting 3: Changing the VOX auto timeout squelch

When the unit is turned on, the mic is "closed", meaning that you can turn up your speaker as loud as you like with no feedback. Once the mic "opens", you can hear your voice but also experience feedback if the volume is up too loud. The VOX auto timeout helps combat constant feedback by closing the mic after a specified time period. By default, once you start talking, the VOX auto timeout is set to 5 seconds. If you continue talking after 5 sec, the board will close the mic no matter what. By pressing the PROG pushbutton 3x, you can increment the timeout period. The max timeout is 8 sec, which should cover most long talking conversations.

Rule of thumb: The shorter the timeout period, the shorter sentences you can say before being auto cut off – but you will not experience much feedback with this method since the mic is automatically closed after a short speaking session. The longer you make the timeout period, the longer you can talk in a session – but feedback can start up if you stop talking well before the timeout period. This is a tradeoff you will have to experiment with.

Setting 4: Push to talk (PTT) mode enable/disable

Pushing the PROG button 4x toggles the PTT mode on and off. PTT mode is off by default. When PTT mode is off, the VOX mode is automatically active. When PTT mode is active, it disables the mic output so you will only be able to talk through the speaker when you press the remote pushbutton and hold it in. Now the mic will open and allow you to talk.

When you release the button in PTT mode, the mic is automatically closed.   PTT mode is best used if you are experiencing too much feedback and need to mic to close after talking, or if you just want absolute control of when the mic opens and closes (can be used for secure comm also). Pushing the programming button 4x again will disable PTT mode and enable VOX mode.

NOTE: When the mic opens in PTT mode the external sound effect/breathing sound will be disabled as well. You will hear the breathing fade out when you start talking. This allows you to have maximum voice volume without the breathing sound interfering. When you are done talking, the breathing sound will automatically start back up after 2 sec (unless you have disabled the breathing FX).

TIP: The PTT trigger is run off the second 1/8" jack on the board labeled "PTT". This jack is right next to Line out jack. You can connect your remote pushbutton cable to this jack if you plan to use the PTT mode in your costume. Also, the PTT LED will go on whenever you press the PTT pushbutton while PTT mode is enabled. This will allow you to see when the mic is opened and closed.

Setting 5: Change the amount of vocal phasing

Protocol droid's voice is also delayed and mixed back in with itself. This gives a slight phasing and delay effect resulting in a subtle mechanization (robotic) sound that was used in the original effect. The default setting is 6ms. You can dial in more presence if you like, larger phasing will give a more echo effect. There are 6 total settings for this parameter.

Setting 6: Change the bulk mic gain

Depending on the sensitivity of your microphone, you may need to change the gain on the mic in order to get a good voice output. You can program in the mic gain by using the PROG button on the interface card.

By pressing the PROG button 6 times, you will increment to the next mic gain table setting. The default gain is 35 dB. The table values are as follows: 15 dB, 20 dB, 25 dB, 30 dB, [35 dB], 40 dB.
The [] shows the default value. When you press the PROG button 6x, the board will reply with 6 blinks on the ACT LED, then the STAT LED will report the selected index of mic gain value. That is, LED blinks of 1 = 15dB, 2=20dB, ..., 6=40 dB.

From the default value of 35 dB, if you wanted to program 40 dB of total gain - you would press the PROG button 6x - wait for the report - verify the gain index returned counts 6 blinks. You are now set with a 40 dB of mic gain.

Setting 7: Change the fine tuning mic gain

You will see that the bulk mic gain setup changes by +5 dB each table entry. If you want finer control, say your mic really does the best with 36 dB of gain. When you press the PROG button 7x, this will increment the current selected mic gain by + 1dB. So to get 36 dB of total gain (from the default settings), press the PROG button 7x. This will increment the mic gain 1 dB for a total of 36 dB.

NOTE: Once you increment +4 dB, the fine gain will roll back to 0 dB. You should increment the bulk gain if you need to go up by 5 dB. The table values for fine gain are   [0 dB], 1 dB, 2 dB, 3 dB, 4 dB

Setting 8: Enable/disable the music (sound FX) track playback

Allows playback of tracks via PTT button (5 motor sounds + 3 music). The naming convention and how to access these sounds "on demand" is gone over later. By default these are enabled.

Setting 9: Random FX track playback enable/[disable]

Enabling this setting allows random playback of tracks via timer (10 random sounds). The timeout setting below is the elapsed time before another sound plays out. These can be motor movement sounds, foot sounds, etc.

Setting 10: Change the cooldown time between random FX playback

When the random FX track playback is enabled, this setting is the timeout (elapsed time) that transpires before another random sound is ouput. The default is 60 sec.

Setting 11: Change the volume multiplier of the random FX tracks

If you want the random FX sounds to be louder or softer than the voice and other music tracks, you can set the volume multiplier accordingly. Table values: (0.25x, 0.5x, [1x], 2x, 3x)

Setting 12: Reset all settings to factory defaults

Pushing the PROG button 12x will reset all the saved settings back to their default values. If you ever want to reprogram the user settings for your board (as outlined in Section C), or just go back to the default settings, this feature allows you to do that. Reference the table above for all default settings.

Section D. On-Demand FX MODE

The PTT remote pushbutton has a dual purpose. If PTT mode is enabled, when you hold the PTT button down for 1 sec, the mic will open and you can start talking. If VOX mode is enabled, the mic will not open if you hold the PTT button down. This 1 sec delay allows for other features to be accessed using the PTT button cable with shorter button presses. It also prevents unwanted PTT triggering.

If you key in multiple short PTT button presses that are < 1 sec apart, the unit will automatically access a sound FX mode that allows you to play out sounds on demand (and also change some of the unit's sound parameters). That way, even if you are not using PTT mode, you can still use the remote pushbutton cable to access these added sounds/features.

The following table outlines what the PTT pushbutton does in FX MODE. Note that a single button press is defined as a momentary depress and release (< 1sec):

Number of PTT button presses	Board responds with… (PROTOCOL DROID)
2	Plays out "PSNDFX1.WAV"
3	Plays out "PSNDFX2.WAV"
4	Plays out "PSNDFX3.WAV"
5	Plays out "PSNDFX4.WAV"
6	Plays out "PSNDFX5.WAV"
7	Play out "PMUSIC1.WAV"
8	Play out "PMUSIC2.WAV"
9	Play out "PMUSIC3.WAV"
12	Toggle PTT mode for voice
Hold button in > 1 sec	Opens mic if PTT mode enabled

In FX MODE, you can also enable/disable the PTT mode at will so you don't have to access the unit to change from VOX to PTT mode while in costume. This is useful if you are in a very noisy environment and want to better control your voice output by enabling PTT mode on the fly.

PTT presses of 2-6 access sound fx/music tracks. Again these can be stereo or mono wav files with 44.1kHz sample rate and 16 bit sample depth (standard CD). These can be music or sound fx tracks, depending on what you prefer.

NOTE: If you are playing out a long music track, you can stop the playback at any time if you press and release the PTT button 1x.

ACCESSING THE SD CARD

The microSD card is found under the interface board on the 2nd card. It is a friction fit connector. You can remove the SD card with some needlenose pliers if you want to change any of the sound files.

You must use the proper names for the files as listed previously (for breath sounds or FX/music). You can use a free audio editor tool like Audacity to create/convert wav files to 44.1kHz and 16 bit.
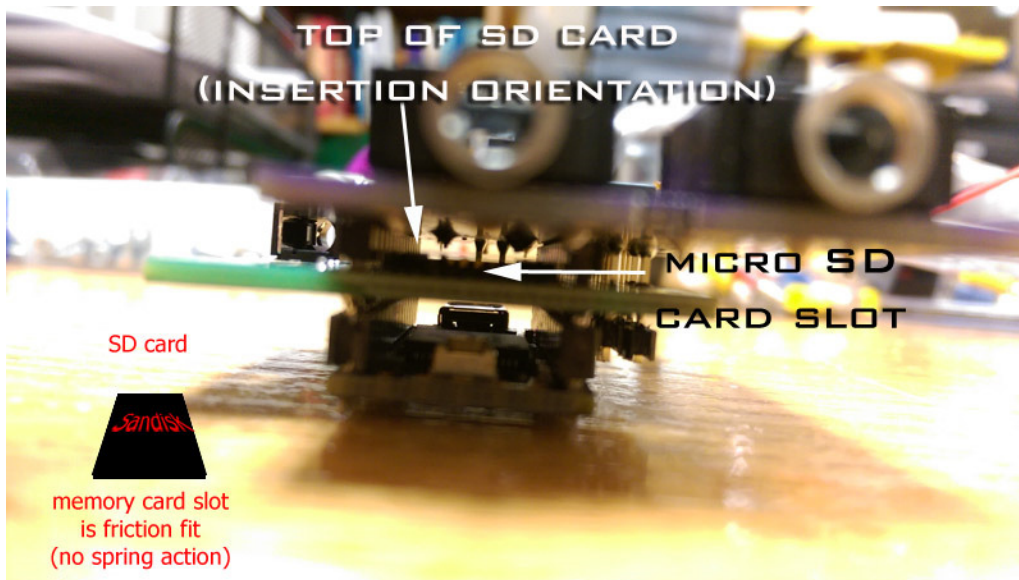
The file names expected: PSNDFX1.WAV
PSNDFX2.WAX
PSNDFX3.WAV
PSNDFX4.WAV
PSNDFX5.WAV
PMUSIC1.WAV
PMUSIC2.WAV
PMUSIC3.WAV

Note if any of the files are missing, the board will just skip over them and not play that sound.

SD CARD NOT INSTALLED

If the SD card is missing, on powerup the unit will blink all of its LEDs for 5 sec. This tells the user that the board is unable to locate an SD card. After 5 sec, the board will continue booting up. The SD card does not have to contain files on it, just reside in the card socket.

If the SD card is installed and the LEDs are blinking, the card may not be making good contact in the socket. Remove the SD card and reinstall it into the socket. It is a friction fit housing!

RESETTING THE UNIT

A second (and quick) way to reset all settings on the board is to hold the PROG button in while you power up the unit. When you do this, wait until all 3 LEDS blink quickly in unison. You can let go of the PROG button. The board will reset all saved settings to defaults and boot the voice board using those settings.

VOICE TIPS

When you talk the unit will automatically transform your voice down and also add compression. The amount of phasing, and filtering was carefully researched and calibrated to match the movie voice.

You will find that by fine tuning your own voice, you can achieve the spirit of the movie speech much more readily. Nothing can automatically turn your voice into the movie, but if you study speech patterns, talking speed, and word emphasis in the movies, you too can achieve a near perfect effect that is indistinguishable to most people. Perfecting these intricacies will transform your voice effect from good to great!

BIG WHITE BUTTON

The lower processing card has a white button on it that SHOULD NOT BE PRESSED. It is used for factory programming only. If your unit is powered on and you press this button, it will erase the voice effect program from your board, rendering it useless!!

Access to the button is not easy (on purpose), so this is a proper warning.

When the board is not powered on, the button has no effect. So if you are changing out processing cards for a different voice effect (and the board is off as it should be) this warning will not apply.

CHANGING POWER INPUT SOURCE TO THE UNIT (ADVANCED)

The board is setup to use a 9V battery, or any battery source that is 7-12V DC. When using a battery over 6V, you must make sure the header pins next to the on/off switch have a black jumper on the "reg" side of the 3 pins. This forces the battery to go through the regulator and supply the board power.

If you are using 4 AA or AAA batteries (giving 6V), or even a USB power supply (5V) you can bypass the regulator by putting the black jumper over the "batt" header pins. This powers the board directly from the battery voltage.

NOTE: If you use a 9V battery and do not change the jumper back to "reg", you will destroy the board!! So use this with caution and only if you are experienced.

MIC RECOMMENDATIONS

A headset mic gives you the best flexibility. We recommend the Nady HM-5U headset mic for use with the V3 unit. This can be purchased from many different online music shops.

Orient the mic so you talk directly into the open mic grill. Also use the foam wind guard as this will help too. This gives you maximum sensitivity and loudness. Experimentation on location will give the best results. The Nady mic

is also a unidirectional mic, which will help reduce feedback. If you choose to use an omni-directional mic, feedback can be a bigger issue. You may get better voice pickup but with a helmet on the feedback paths multiply quickly. A uni-directional or cardiod mic is best.

You can use other types of microphones (throat mics, wireless) but they have not been tested with the units. So you may run into compatibility issues.

SPEAKER -> MIC FEEDBACK TROUBLESHOOTING

Feedback will be the biggest issue with some setups. If you are having problems with audio feedback (high-pitched whining), you will have to try one or more of the following:

1) Use PTT mode
2) Move the mic farther away from the speaker
3) Turn the volume down on the amplified speaker
4) Use a uni-directional microphone

TIP: The closer the mic and speaker are, the worse this feedback is. Even if you eliminate feedback in this extreme case, the slightest movement of your head will cause a new feedback path. As the speaker and mic are separated, you will have more "leeway" in your head movement before feedback ensues.

This unit has its own natural algorithmic feedback attenuator. If you turn up the speaker volume too much, or move the mic too close to the speaker, you will begin to hear a reverberant type noise. You must lower the volume or place the speaker farther away from the mic. Otherwise you risk having the unpleasant sounds continue, which is known as feedback.

Feedback is caused by the output of the speaker being picked up by the mic, and that sound amplified over and over, until the amplifier "howls" or otherwise makes unpleasant noises. You should experiment where to place the speaker and mic in order to find the "sweet spot" in your setup. The anti-feedback mechanism in the software can only handle a certain amount of feedback. You must remember that feedback always exists. Physical placement of the mic and speaker are the main variables in combating feedback. Feedback also increases when you put a helmet on your head, so some trial and error is necessary to find the best configuration and mic/speaker placement. Using the boom mic will also help with feedback since it is a unidirectional mic. The easiest way to combat feedback is to lower the volume until it disappears. Also, separating the mic and speaker will reduce feedback immensely.

Also, as a stopgap measure for complete feedback mitigation you can close the mic and open it manually by enabling PTT mode. This feature rids of any feedback that you would normally hear when the volume is up too loud or if the mic were constantly "open".

Remember, feedback is always there, it is just a matter of how much you can attenuate it. Feedback is also directly proportional to volume, so the more you turn up your speaker, the more feedback you will experience. Our Vortex voice amp is the only unit capable of tackling difficult feedback paths by using advanced algorithms.

SWAPPING PROCESSING CARDS

You can purchase different voice effects from us, which come in the form of a new processing card. You can remove the old card from the INTERFACE STACK and insert the new processing card. Keep the old processing card as it will be your other voice board. And it will still have all your tuned settings on it.

Swapping the card involves prying the processing card off the header pins. First make sure power is off to the board! Also follow anti-static procedures!!

It may be easier using a screwdriver to leverage the processing card. Do not pull down on one side of the processing card too much or the pins on the interface stack will bend making install difficult.
Also make sure you line up the new board correctly as it has polarity to it. You want to make sure that the processing card side that has the white button is facing the interface board stack side that has the microSD connector slot. Press the processing card onto the header pins with equal force.
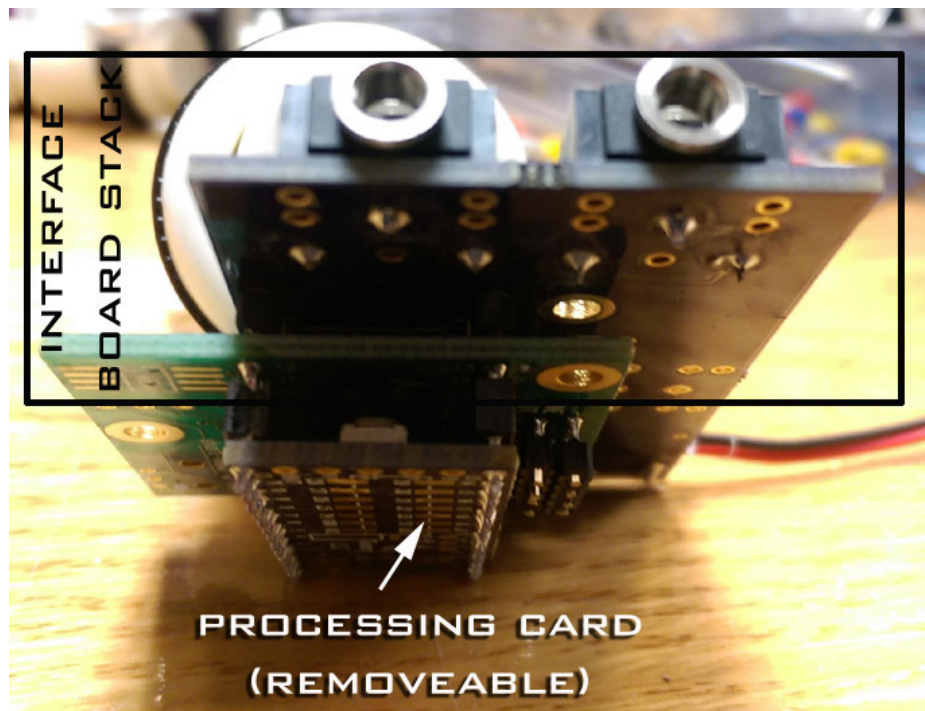
TROUBLESHOOTING FAQ

Q: I am experiencing more feedback than my previous system, why?
A: *Feedback for one system is not the same for a different system. Since the gain for different boards is not constant, feedback can increase/decrease for a given speaker/mic configuration you have set up. That is the nature of feedback. If you want to reduce feedback, try repositioning the speakers and mic, turn down the compressor until you have a 1:1 gain, and use a directional microphone. Feedback is a direct function of gain, which includes the compressor gain, the speaker gain (volume), system gain, and distant between mic and speakers.*

Q: My board is not behaving correctly
A: First try a new battery. This is the main cause of the board stopping to work properly. And use a NEW alkaline or even a 9V lithium battery.

Q: I am not hearing my voice
A: Make sure you have a working mic. Check the mic gain setting. Also check to see that PTT mode is not currently active. You can check that your mic is working by directly plugging it into your amplified speaker if it has a mic input. Also try and resetting the board to use factory defaults, since this will turn off PTT and reset the mic gain.

Q: I dont get any sounds
A: Check to make sure the files are on the SD card and spelled correctly. Also double check the sample rate for each file.

Any questions, email: hyperdyne@hyperdynelabs.com if you are having difficulties setting up the unit. Good luck and enjoy!!!!

NOTICE: There is no warranty on kits. It is your responsibility to install the board. Opened kits cannot be returned. Be careful if you plan to use a battery source that is capable of delivering alot of current. Contact a professional if you need assistance. Hyperdyne Labs assumes no responsibility for the misuse of this kit.

CHEAT SHEET (PRINT OUT)

PROG button presses	Voice board feature (PROTOCOL DROID)	Default setting
1x	Increase VOX on threshold (4 settings, 0 default) Table values: ([Lowest], low, medium, high)	Lowest
2x	Increase VOX off threshold (4 settings, 0 default) Table values: ([Lowest], low, medium, high)	Lowest
3x	Auto talk squelch timeout (mic open time) in VOX mode. Table values: (3, 4, 5, [6], 7, 8) sec	6 sec
4x	PTT enable/[disable] PTT enabled: Must use remote button to open mic PTT disabled: VOX mode is active and will open mic	Disabled
5x	Change voice phasing amount (larger number is greater effect). Table values: (3, [6], 9, 15, 21, 27) ms	6 ms
6x	Change bulk mic gain Table values: (15, 20, [25], 30, 35, 40) dB	25 dB
7x	Change fine mic gain Table values: (0, 1, 2, [3], 4) dB	3 dB
8x	Motor/music FX playback [enable]/disable Allows playback of tracks via PTT button (5 motor sounds + 3 music)	Enabled
9x	Random FX track playback enable/[disable] Allows random playback of tracks via timer (10 random sounds)	Disabled
10x	Change the cooldown time between rand FX playback Table values: (10, [30], 60, 120 sec)	30
11x	Change the volume mutiplier of the random FX tracks Table values: (0.25x, 0.5x, [1x], 2x, 3x)	1.0x
12x	Reset all parameters to factory defaults	Reboots board on completion

PTT button presses	Board responds with… (PROTOCOL DROID)
2	Plays out "PSNDFX1.WAV"
3	Plays out "PSNDFX2.WAV"
4	Plays out "PSNDFX3.WAV"
5	Plays out "PSNDFX4.WAV"
6	Plays out "PSNDFX5.WAV"
7	Play out "PMUSIC1.WAV"
8	Play out "PMUSIC2.WAV"
9	Play out "PMUSIC3.WAV"
12	Toggle PTT mode for voice
Hold button in > 1 sec	Opens mic if PTT mode enabled