PEDAL 7

Users Guide

III. Operation (Cont..)

I. Panels

Welcome!!
Welcome to the user manual for the (hopefully) intuitive Pedal 7 MIDI Tap Sequencer/Sample player!

What is it? / What does it do?
The Pedal 7 can play any MIDI Song or DrumLoop recorded into it previously. These sequences can be played by either loading a Song and hitting the Play button, or by tapping out a tempo.
The Song/DrumLoop will start playing after the predefined number of taps when using the tap pedal.

Samples
The Pedal 7 also plays samples in 3 part (6 channels) polyphony with the intention of "jazzing up" otherwise monotonous MIDI drums. Other FX and Samples can of course be played. Samples are loaded via SD Card with the SYNC function. The Pedal 7 can hold up to 20 minutes worth of samples. These samples can be organized in "kits" (up to 100) and are organized as "notes" on the sampler MIDI channel (also defined) within a kit. Kits can be selected instantly via the MIDI Program Change control on the sampler channel. Each kit can have up to 99 samples (Note #0 is sampler reset note)

Record
The Pedal 7 can do more! It has 3 different Record modes:
-Song/DrumLoop Record: This is how you load up with MIDI Clocked Sequences
-Clock Free Record: This is great for just recording piano and has it's own clock tick (on Clock out)
-MIDI Mix Record: This can be used to play a sequence into a running sequence, that will loop.

MIDI
In it's simplest mode (standby) the Pedal 7 can be used as a MIDI Splitter and MIDI merger with Channel blocking. MIDI output port 1 is intended to control the TC Helicon VoiceLive Touch 2, and messages related to it will only be sent out of MIDI Port 1. All other MIDI messages will be sent out of both Ports so the Pedal 7 can be used essentially as a MIDI splitter.
MIDI messages coming into the secondary port (TRS jack) will be merged with messages coming into the primary (5 pin) MIDI input, along with the MIDI sequence playing if any.

With so many MIDI options, a loop-back to a piano can be patched and it'll act like a recorder/playback device that can be played along with. More complex chains can be realized as well:
A string of Korg Microkorg->lights->MIDI synth can all be patched from MIDI Port 2, while still having control of the VLT2 and sync on Port 1.

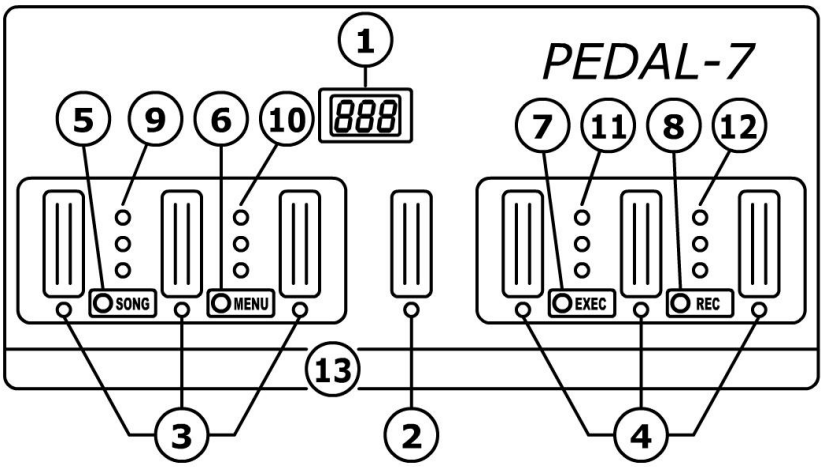
Audio Mixer
Audio can be fed through and equalized (3 band) by running MIDI Songs or external MIDI CC Controller along with a mix with the sample player. Audio input will more be a piano/keyboard source, with the output (also a 3.5mm TRS) patched into the Aux. input on the VLT2 for a mix-down to the amp patched from it. This is useful for fade-outs, de-bassing DJ FX, panning FX, and general level control.

EuroRack Modular I/O
As if this hasn't already been enough, there are several I/O to connect to modular synths and devices. These consist of:
- A pre-defined divided clock output to sync modular sequences or lights
- 2 Trigger/Gate outputs that can be fired via special notes on the Pedal 7 MIDI Channel
- 2 Aux In's for various functions including sample, MIDI percussion/notes, and event triggering
- Play & Stop outputs (MIDI) that can also be assigned to special notes on the Pedal 7 MIDI Channel
- Clock input for keeping time with a modular sequence running
- CV Input for MIDI CC control or 1V/Octave MIDI Notes (used with an Aux input as gate)
- CV Output from direct MIDI CC control (for lighting or filterFX) or tracking MIDI notes (with a T/G out)

Twelve Assignable Pedals of Control
The 6 black pedals can be toggled to provide another 6 by tapping the white pedal, which gives foot control of 12 elements. These elements are completely programmable by default, and can change with a loaded Song/DrumLoop. Some of the functions in this mode include VLT2 controls (vocal FX/select, harmony toggle, guitar FX, Looper control), manual drumLoops / Song positions/Looping/Pause control, play a sample, Song (or favorites) Up/Down select, MIDI Record Looper, Play a MIDI Percussion.

All of these settings can be made by altering (in text editor) the DDEFAULT.SYX file and Song/DrumLoop SysEx's on an SD Card once the Song/DrumLoop has be recorded in. Have Fun !!! S*

A. Top Panel



(1) 3 Digit Display: Uses Alpha-numeric7 for menu items and functions/steps display
(2) Center Pedal: Toggles Low/High Pedals. Hold to switch to VLT2 Basic Switch-6
(3) Pedals 1,2,3 and RGB Mode / Status LEDs
(4) Pedals 4,5,6 and RGB Mode / Status LEDs
(5) Song/DrumLoop Select: Toggles Song/DL. Hold for Favorites. Pedal 1 & 2 = Up/Down
(6) Menu Button: Select Main and Submenus. Use with <Exec> Button (Enter)
(7) Exec Button: If Menu Active, is "enter". If not, then Play/Stop loaded MIDI Song/DL
(8) Record Button: Used only to Record new MIDI Song or DrumLoop. Hold=Self Clock
(9) Indicates Record/Arm/Play Status of MIDI Loop Recorder. Red, Amber, Green
(10) Indicates 4/4 time steps. DownBeat flashes all 3. Blue
(11) Indicates 4 Bars. All on = Bar 1
(12) Indicates Record/Arm/Play Status of MIDI Sequencer. Red, Amber, Green
(13) Guard Rail to protect wood edge.

The White Pedal LED indicates the Tap Pedal status by flashing Green on taps and glowing red while Tap Pedal(s) are in focus. Once the the Center pedal returns to Blue, any Tap will be considered a new one (Tap # 1) which will execute "commands" by a new Count. i.e.

Song Playing: 2 Taps will turn on "Inner Loop" function, but a 3rd will set to Pause. If there is too much time between the 2nd and 3rd tap the "Inner Loop" is turned off again (1 Tap)

The Time-Out is 1.5 beats to make it easy to Tap along with the beat!

Pedal LED Colors:

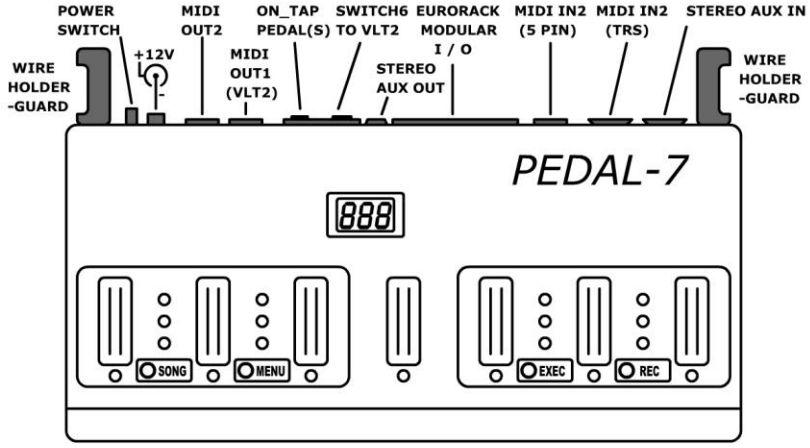
The color of Pedal LED's (3 & 4) indicates which group the Pedal function is in, and also the status of the assigned function (i.e. on/off, waiting, armed etc) See Section III. A. 1. a. for more on colors.

Panel Brightness:

The LED's can be very bright if the surrounding conditions are bright, or very dim in the dark. This is a photo sensor controlled level. Brighter conditions will consume more power / Batteries.

B. Back Panel

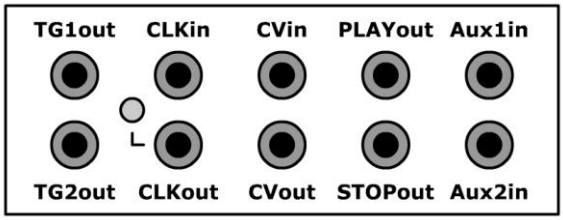
The back panel houses all jacks for MIDI I/O, power, modular I/O, Stereo Audio I/O, VLT2 Switch-6 jack, wire holders, and the power switch as shown below. The modular jacks (delicate 3.5mm TS) are recessed some for extra protection. The Clock LED indicates modular clock output pulses. The TRS MIDI input is isolated sleeve style (tip/ring active).



This diagram shows the back panel from a more useful point of view than from the back as this is where you'll be patching from (except for the modular jacks!).

The patches to the VLT2 remain fairly close together intuitively; MIDI Out 1, Switch 6 Output, and the Stereo AUX Out which patches over to the VLT2's AUX Input jack.

The 2 MIDI inputs are also close together, with the secondary (for keyboard input if primary is used) is recessed for protection so will always be the second from "main" MIDI input. The main MIDI input should be used for recording MIDI as it has a faster path to the Recorder.
Finally, the Wire holders, useful for "quick carry" situations, also add some protection.



The Modular panel (back view) is shown here.
The small circle between the two Clock I/O jacks is a Clock Output pulses indicator.
For another Modular indicator Look to the top panel's center Yellow LED which indicates most actions.

All of these jacks are mono (TS) types.

C. Bottom Panel

The bottom of the Pedal 7 has an access to the PCB (for updates) and SD Card slot. The SD Card must but pushed in to insert and remove. The profile is low enough to leave the SD Card in place but I don't recommend it as it could fall out eventually. Besides that, the whole unit will perform slightly faster when loading Songs/DL's with SD Card out.

The Arduino programmer access is under the Flash-8 PCB. To update the Flash-8 PIC the Flash-8 must be removed carefully and powered from the PIC-Kit3 Programmer. It cannot be programmed in-circuit.

II. Setup (SYSEX+MENUS)

As the Pedal-7 is a very complex beast, there are a lot of settings and options to create and control music in a live setting. When a Song or DrumLoop is recorded into the Pedal-7, the default options are used to create a SysEx (.syx) file on the SD Card. If the SD Card isn't present, they will be created later during a "SYNC" session. (See menus)

SysEx files can be edited using a raw text editor (no frills or inserts!) like Windows NotePad. If there is a doubt, use a program like HEXEDIT to view a file you are editing. Any funky characters (other than the very first and very last will indicate there are other codes inserted and Pedal-7 won't read them.

This section will break down the components of a typically "all inclusive" default SysEx. **(DDEFAULT.SYX)** It is also important that all characters in the .syx's are capital letters and that there are no spaces (except after a "commented area". To add comments after a line, use the // delimiter.

Updates From DDEFAULT.SYX
During a SYNC command execution this file (always in Root Directory) is checked for changes in length and if it is different than before will be loaded. This can be good and bad: Good in that setting remain current, but Bad in that some settings made from the panel will be overwritten. Re: Song and DrumLoop Fav's. All of the rest are Song & DrumLoop SysEx controlled.

A. Global Options Setup

In the **DDEFAULT.SYX** file, the heading must be exactly as follows:

ðSYSEX>
DDF

The character before SYSEX is an 0xF0 and can be copied from here or any created SysEx file. "DDF" defines that this is a default SysEx. This file must reside in the SD Card's root directory.
At the very end of the file the following must also be added or the Pedal-7 will stop responding to MIDI input until powered up again:

/SysEx
÷

Notice the characters here are not capitalized. The divide sign is an equivalent for 0xF7, another special character. Once again this must be exactly as shown.

Required Folders on SD Card:
This is covered elsewhere but will be added here for continuity. There must be 3 folders created on the SD Card. The Pedal-7 will not create these folders.
SAMPLES SONGS DRUMLOOP

Now it's time to insert setup values.
If you want a similar template on a blank SD Card, try recording a song (even a short one) into the Pedal-7 (hit REC button to arm, them play MIDI in) and an almost complete SysEx will be created in the SONGS folder. Create a new .syx in the root directory **DDEFAULT.SYX** and copy and paste the text. Change the "DDs" to "DDF" and Bob's your uncle!

1. On_Tap Sequencer Setup

Keep in mind that these Settings are for the Default Setup and will be the first settings set when creating a new Song or drumLoop!

Here are command examples associated with the On_Tap Sequencer:

ON_TAP_START_MIDI_AFTER_BEATS=16	**This is the main sequencer "Taps before Play" setting. If there is a bar of lead-in before the main downbeat, this number may be 12 or 4.. as with all DrumLoops. The larger the number, the more accurate the BPM will be.**
ON_TAP_START_MIDI_CLOCK_AFTER_BEATS=8	**This is where the MIDI Clock starts to send (before the actual PLAY command is sent) which can be useful for VLT2 Looper control, but keep in mind "Play" could re-align the Loop.**
ON_TAP_START_CLOCK_JACK_AFTER_BEATS=8	**This is to set the beginning of modular clock output. Ideally it should be set at the same as START_MIDI_ but may require another for certain songs.**
ON_TAP_START_INSTR=040	**This is the instrument (on MIDI Channel 10 - percussion) that will (or not) be heard on each stomp of the Tap Pedal.**
ON_TAP_START_INSTR_VELOCITY=30	**This is the Default Velocity of the above instrument. It's important to hear, but not too much louder than a foot stomp!**
SWING=70	**This is to set the Swing (shuffle) of a Song or DrumLoop. This parameter can also be set via CC#19 in the Song/Drum Loop. * This parameter is ignored in DDEFAULT.SYX and is zero.**
DEF_BPM=130	**This is the BPM a Song or DrumLoop Recorded into the Pedal-7 with fall to *if* the MIDI was recorded at >199 BPM. Otherwise the original Song/DL BPM will be used. *Note: This is not used if Song/DL started with Tap Pedal!**

2. Default EQ Audio Setup

Even though the EQ Bands, Level, (and Pan) can be directly controlled from a Song or DrumLoop through Pedal-7 Channel, some situations may require default values, i.e. Recorded Song Played Live via a Keyboard, an externally sourced MIDI song from .mid file.

These levels should be on the conservative side, but not left flat! The Pan Control has no SysEx control of course, but is naturally reset to center inside the Pedal-7.
The 4 EQ Levels are +/- 15dB Max, with 0dB at 0, and must be written as in this example:

EQ_HIGH=3	EQ_MID=0	EQ_LOW=-2	EQ_VOL=3

These are the levels set at power-up, but as soon as the default Song/DrumLoop loads they may be changed by the CC's existing in that file.

3. Default Pedal Setup

This is by far the most complex part of setting up the Default SysEx (and Song/DrumLoop ones too) as there are actually 12 Pedals (6 normal, 6 alternate) and 2 possible entirely different sets of these based on whether the loaded Sequence is a Song or a DrumLoop. Each type of sequence has some unique controls.

Setting up the Default SysEx to accommodate an intuitive pattern is quite a challenge and if changed down the road will force all of the Songs/DrumLoops created before it to be changed to match the "new and improved" arrangement. Think long and hard and perhaps don't load to many Songs in before testing the new configuration!

Here's the listing of possible assignments (Next page). Each Pedal *should* have at least one assignment. As mentioned above, some Pedals may not work with DrumLoops or Songs so try to assign an alternate to a "DrumLoop only" or "Song Only" Pedal for maximum efficiency.

*NOTE: DrumLoop Functions must always follow a Song or General Function!

SONG	DLOOP	SYNTAX EXAMPLE	Description, Usage
YES	YES	**PEDAL01=MIDI_REC**	**This Function is to Toggle Record/Play a MIDI Live Loop that plays along with a Song presently sequencing. Arms for next Note on MIDI Channel 1. Hold 2 seconds to stop Play or Record.**
YES	YES	**PEDAL02=VLOOP_RPE**	**VLT2 Looper Record/Play/Erase (hold). Record/End Record & Play action is quantized to nearest bar from moment Pedal pressed (Not the Song or VLT2) *NOTE: VLT2 Metronome must be off***
YES	YES	**PEDAL03=VLOOP_PUNCHIN**	**VLT2 Looper Records as long as Pedal Held.**
YES	YES	**PEDAL04=VLOOP_PAUSE**	**VLT2 Looper Pauses immediatelyon 1st press, then resumes at quantized time (Down Beat of original Loop start) for good sync. If no Song/DrumLoop is playing then starts at any time.**
YES	YES	**PEDAL02=VLOOP_REC**	**VLT2 Looper Simple Record. Must be used with RPE or PLAY.**
YES	YES	**PEDAL06=VLOOP_UNDO**	**VLT2 Looper Undo Send. Removes last Recorded Layer.**
YES	YES	**PEDAL05=VLOOP_PLAY**	**VLT2 Looper Play Re-Triggers if playing, starts play if paused or recording. Re-triggers at any time for start FX or manual re-sync.**
YES	NO	**PEDAL12=SONG_PLAY**	**First Press will play a loaded song. Second Press will pause Song at next bar or at a Magic Note Marker if nearby. Hold for 2 seconds (see "---" in display) to Stop Song.**
NO	YES	**PEDAL12=DL_PLAY**	**Press before DrumLoop Playing and will start Play with Intro and settle on Verse 1. If pressed while playing, will cause a re-start of present DrumLoop. Used for FX or downbeat re-sync. Hold to end play with Outro upon release of pedal.**
YES	NO	**PEDAL06=SONG_LOOP**	**Toggles Inner Loop on/off if Song has Magic Notes Markers. Next Marker or end of Song will Loop back to last Marker. NOTE: This is turned off by Pausing, or a Song Jump.**
YES	NO	**PEDAL08=SONG_PAUSE**	**Pauses Playing Song at next Bar. Resumes play immediately on next press. Will not start a Song playing.**
NO	YES	**PEDAL08=DL_PAUSE**	**Pauses Playing Drum Loop at next Bar. Resumes play immediately on next press. * Will not start a DrumLoop playing.**
YES	NO	**PEDAL07=SONG_STOP**	**Song "Hard Stop" won't wait for a bar but stops immediately with no Down Beat. * Won't stop from a Pause state.**
NO	YES	**PEDAL07=DL_STOP**	**Drum Loop "Hard Stop" won't wait for a bar but stops immediately with no Outro or Down Beat. Won't stop from a Pause state.**
NO	YES	**PEDAL01=DL_VERSE1**	**Jumps to Drum Loop Verse 1 (=1=) through bridge 2**
NO	YES	**PEDAL02=DL_VERSE2**	**Jumps to Drum Loop Verse 2 (=5=) through bridge 2**
NO	YES	**PEDAL03=DL_CHORUS**	**Jumps to Drum Loop Chorus (=3=) through bridge 1**
NO	YES	**PEDAL04=DL_SOLO**	**Jumps to Drum Loop Solo (=6=) through bridge 1**
NO	YES	**PEDAL05=DL_OUTRO**	**Jumps to DrumLoop Outro (or pre-outro down beat point)**
YES	NO	**PEDAL01=SONG_PART:1 PEDAL02=SONG_PART:5 ...**	**Pressing this pedal will jump Song to indicated Marker (0 to 7) at next Bar downbeat. If used in Song SysEx, make sure your Magic Note Markers are sufficient to cover the range of Pedals.**
YES	YES	**PEDAL11=EQ_LOW_KILL_TOG**	**Toggles the EQ Low band to -15dB, then back to original level.**
YES	YES	**PEDAL12=EQ_L'EV_TOG**	**Turns down the level of AUX in and Sample Mix while held. Release and hold again to turn back up to original level. This takes 2 - 3 seconds and falls to -15dB.**
YES	YES	**PEDAL09=SAMPLE_00,060**	**Plays the Sample in .syx specified directory and Note#. A tap on the pedal will play entire sample, whereas holding it will stop a longer sample upon release. There can only be one of these.**
YES	YES	**PEDAL10=VLT2_SEL**	**Selects VLT2 Presets from VLT2 Favorites created in DDEFAULT.SYX and sends them to VLT2 via VLT2 CC Channel**
YES	YES	**PEDAL04=HARMONY_TOG**	**VLT2 Toggles Harmony. Pink indicates off, white is on**
YES	YES	**PEDAL05=DELAY_TOG**	**VLT2 Toggles Delay Effect. Pink indicates off, white is on**
YES	YES	**PEDAL06=REVERB_TOG**	**VLT2 Toggles Reverb Effect. Pink indicates off, white is on**
YES	YES	**PEDAL03=CHOIR_TOG**	**VLT2 Toggles Choir Effect. Pink indicates off, white is on**
YES	YES	**PEDAL02=TALK_TOG**	**VLT2 Toggles Talk Button. Pink indicates off, white indicates on**
YES	YES	**PEDAL01=VOX_FX_TOG**	**VLT2 Toggles Transducer Effect. Pink indicates off, white is on**
YES	YES	**PEDAL09=TG1_NOTE#**	**Outputs 5Volts on T/G1 or T/G2 jack for the duration of Pedal press**

4. Default MIDI Setup

This is perhaps the most important first step to creating the Default Settings. As there are 4 separate elements working in the most basic MIDI chain: The Pedal-7, The Sampler, The VLT2, A Keyboard for Live Performing; there must be at least 4 MIDI Channel Settings.

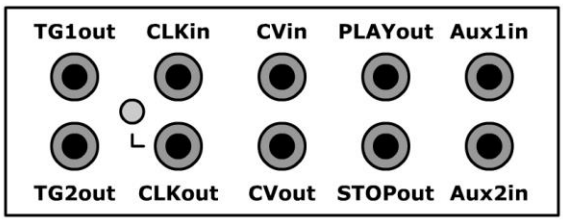
Defining MIDI Channels:
This is one of those default Settings that should not be changed once decided. They can be, of course, even from Song to Song, but for continuity it's best to leave them as is. Unless there is a fixed Channel MIDI component that is required in a certain Song, they should remain unchanged.

Here are MIDI Channel assignment parameter examples:

PED7_CHAN=16	**This Channel should be included in any Song or DrumLoop as it's CC's and Notes: Control Sampler MonoSynth , EQ High/Mid/Bass, Aux Audio & Sampler Audio Level & Pan, Modular CC's and T/G Output Notes (BankSelect Fine CV, Course CV CC, Fine Tune CC), Percussion Swing, Random Level Amount, Percussion Width, Pre-Beat Override CC, VoiceLive Touch 2 VLoop control Notes (send via VLT2 CC Channel), Tap Instrument volume, etc.** **The Ped7 Channel is exclusive (won't be sent out on either Port)**
HARMONY_CHAN=13	**This Channel is to send VLT2 Harmony MIDI Notes either direct or re-routed from assigned MIDI-Thru HARM_IN Channel (below) through "Note Hold" algorithm.** ***This Channel is Exclusive during PLAY (FL Studio or Pedal-7 Sequence) but not while auditioning for the convenience of "writing by ear" when creating the Song!***
VLT2_CC_CHAN=14	**This Channel (if is set as separate in VLT2) is for sending any CC Messages to the VLT2. All CC#'s are as listed in VLT2 Manual.** ***NOTE: This Channel is only sent through MIDI Port 1, the VLT2 Channel*** ****Special VLT2 VLoop Control Notes on Ped7 Channel send the CC's through this Channel***
SAMPLES_CHAN=15	**This Channel and it's Program Change is used to Select Sample Directories and Play the Samples per Note as numerically defined in the Sampler folders .wav name's prefixes. Sampler Rate Control (CC#14), Pedal Sample Velocity (CC#7), Sample Start position Offset (CC#23), are also sent on this channel.**
OUT2_BLOCK_CHAN=17 **OUT1_BLOCK_CHAN=17**	**These Functions can be used to block a single Channel (Only one per port) while Pedal-7 is playing a sequence only. This Channel is still passed through. Mostly used for stopping playback through one port or the other.**
HARM_IN_CHAN=1	**This is the Channel that can be Played Live and forwarded through the Note-Hold Algorithm to the assigned VLT2 Harmony Channel to allow natural playing with harmony control while performing Live. The Channel feeds through to output as well and probably is best left as Channel 1 (All pianos default to Channel 1 !)**
HARMONY_SPLIT _RANGE=048,073	**This is not a MIDI Channel Control but is the Note-Hold Algorithm Harmony Key range limiters. Make Sure the VLT2's Harmony Split Setting is appropriate (above/below etc)**

5. Default Eurorack Interface Setup

The euro rack interface is 5 Volts for digital and +/- 5V for CV (although CV Notes are only 0-5V).
It can be configured from the DDEFAULT.SYX file as well as controlled from within a Song or Drum Loop.



The panel (back view) is shown here.
The small circle between the two Clock I/O jacks indicates the Clock Output pulses. The number of clocks per 1/4 note can be set as well as the PPQN divider for Clocking the sequencer from an external source such as Modular levels.

Notes can be played from the sequence using the CVout jack, or converted into MIDI Notes on a certain channel via the CVin jack (along with a TGout or Auxin respectively for triggering / holding Notes)

The settings elements and syntax examples for the Eurorack Modular interface are listed here:

CLOCK_IN_PPQN=2	**This parameter will set how many pulses are needed to progress the sequencer by a 1/4 note time. Thus set to 2 (a good number!) will require 8 clocks / bar. * The Sequencer will take this input as priority over Tap Tempo or Default Tempo.**
CLOCK_JACK_PPQN=2	**This parameter sets how many Clocks will be produced per 1/4 note of sequencer play. The number can be 1 to 24 as aligns to standard MIDI clock of 24 ticks/quarter note.**
TG1_NOTE#=NOTES_ON_CHAN:8	**TG1 or TG2 output gate will be set on any note played live or in the sequence on defined MIDI Channel. This is to be used with CVin also set to "Notes_on_chan" but doesn't have to be the same channel.**
TG2_NOTE#=013	**TG1 or TG2 will output only on defined note on Percussion Channel (Channel 10). This can be used for driving a modular drum along with a certain MIDI drum.**
AUX1_IN=SAMPLE#038	
AUX2_IN=NOTES_ON_CHAN:03	**A Gate or trigger will send MIDI Notes to defined MIDI Channel. This must be used with CVin set to the same channel to set which notes are played.**
AUX1_IN=NOTE#044	**This Function will play a note (#44 here) on MIDI Channel 10 (percussion) so the drum can be used as a Eurorack Modular drum. Works all of time.**
AUX1_IN=VLOOP_REC AUX2_IN=MIDI_REC AUX1_IN= EQ_LOW_KILL_TOG	**These examples indicate Pedal Control Functions via a trigger or gate on an AUXin. Any Pedal function can be set but Pedal Hold Functions will not work. *Care must be taken to avoid fast pulses, especially VLT2 controls.**
CV_IN=CHAN#02,CC#010 CV_IN=CHAN#16,CC#014	**CV Input can control any MIDI CC (including ones on Pedal-7 Channel) It is not recommended to set CVin as this function in the DDEFAULT.SYX as it may dither and continually send CC messages during a SysEx read or set a CC, etc. *If using CC#7 keep in mind that without a Voltage the MIDI Channel will be muted!**
CV_IN=NOTES_ON_CHAN:8	**This parameter will set Quantized Notes (24 - 84 / C2-C7) to send to MIDI channel defined. This of course requires Gate pulses on AUX1_IN or AUX2_IN.**
CV_IN=BEND01	***This is a Pitch Wheel control (may not be implemented-Feb25 2019)***
PLAY_OUT_BEATS=0 STOP_OUT_BEATS=0	**This first parameter will set the Playout jack to send a short pulse at the time a sequence begins to Play. This can be used for a modular sequencer reset. Similarly Stop Out set to zero will output a single pulse when the sequence stops.**
PLAY_OUT_BEATS=16 STOP_OUT_BEATS=4	**As a secondary function the parameter can be set to non-zero which will invoke an output pulse every x beats. This can be used for a slow clock or stepping etc.**
PRESTART_TG1_OUT=1 PRESTART_TG2_OUT=2	***This was a function similar to Play/Stop but was deprecated so does nothing.***

6. Default VoiceLive Touch 2 Setup

Apart from setting Pedals to control various VoiceLive Touch 2 parameters there isn't much in the way of initialization from a SysEx other than the MIDI Channels setup (previous section.4.) and Harmony Split Range, i.e.: **HARMONY_SPLIT_RANGE=048,073**

The 10 VLT2 Preset Favorites must be set up in the default SysEx though (Next section)

7. Favorites Setup

Each Sequencer Element (Song/DrumLoop) has a set of 10 Favorites that can be set from 00-99.
Only the **DDEFAULT.SYX** file is used to set VLT2 Presets, whereas the Song and Drum Loop Favorites can be set from the panel Menu button.

a. VLT2_FAVn. . . .

If a pedal is set to select VLT2 Preset Favorites (i.e. **PEDAL10=VLT2_SEL)** then the **DDEFAULT.SYX** file will need to be used to choose the best ones! These presets (1-300) should be the "staples" for Live playing where there is no MIDI Song/DrumLoop to select one. Here's examples:

VLT2_FAV0=02 VLT2_FAV1=4 VLT2_FAV2=102 VLT2_FAV3=233

b. SONG_FAVn. . . .

Song Favorites entries can be added/changed (especially if they are used for a Live performance)
These are accessed from the panel by holding the Song/DL button then selecting which favorites and stepping through them with Pedal 1 or Pedal 2 so can be quite useful for a performance.
The syntax is as follows:

SONG_FAV0=00 SONG_FAV1=12 SONG_FAV2=05 SONG_FAV3=08

Please be aware that if the **DDEFAULT.SYX** file size is changed, the Pedal-7 will be updated from the SD Card at the next SYNC, so make sure it's up to date! Another way would be to omit adding Song_fav entries (or some) to the SysEx.

Default Song Load:
BTW - When powered up, a Song or DrumLoop will be loaded. Which Song/DL can be set using:
DEF_SONG-DLOOP=S00 or DEF_SONG-DLOOP=D00

c. DRUMLOOP_FAVn. . . .

DrumLoop Favorites can also be created on the Default SysEx and will be more likely to remain static as they won't often be used for performing as a Song offers more structure and predictability.
The syntax for DrumLoop favorites is as follows:

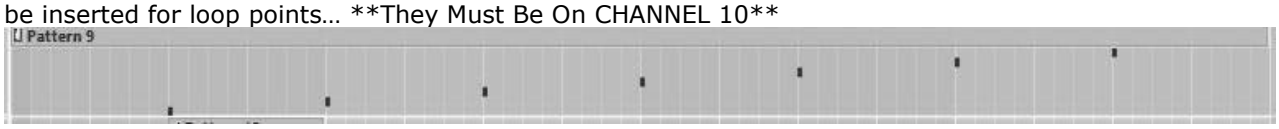
DRUMLOOP_FAV0=6 DRUMLOOP_FAV1=46 DRUMLOOP_FAV2=3 DRUMLOOP_FAV3=0

**One more note regarding Song and DL favorites, they should be kept in order but can have gaps.*

B. Creating MIDI Songs / DrumLoops for the Pedal7

Songs & DrumLoops are played exactly as recorded (save any post mofications via SysEx or MIDI controllers connected during playback) with only the BPM being a variant. If recorded at less than 200 BPM then the true BPM will be kept so a "Play" command will use that BPM.

Songs & DrumLoops differ only slightly in regards to the creation of the MIDI file, but the arrangement of a drumLoop must be carefully considered as will be described in section 2.
DrumLoops require note#8 be entered into the intro. This will designate the MIDI sequence as a drumLoop. Songs require nothing, but 8 "sections", markers, or "Magic Notes" as I like to call them, can be inserted for loop points… **They Must Be On CHANNEL 10**



In Songs, using the same "pattern" for all of these notes might be better. DrumLoops are better arranged with the notes in each defining pattern. I have made a template with the "Intro" at the bottom of the heap so the Pattern numbers line up with Magic Notes.

1. MIDI Song Requirements

Songs can use the 14 free MIDI channels, the Pedal 7 Channel, and the Sampler channel. The designated Pedal 7 & Sample Channels can be changed by the song's SysEx but it's not recommended to drift away from the default. Only do this if there is a different setup to be used with (these) particular songs that require use of the Pedal 7 Channel and/or the Sampler channel.

To insert markers, use notes 1-7. Place these markers only at the beginning of bars (logically) so the loops happen on the bar beginning. 7 markers will effectively create a possible 8 loops within the song.

Recording Live Songs:
A live piano sequence can be recorded, but there absolutely must be MIDI clocks being sent to the Pedal 7 as these are used to keep things in sync and the Record will not start at all.

2. MIDI DrumLoops Requirements

Creating a DrumLoop is a bit more stringent than a Song is. The 8 Sections that *must* be created are: Intro, Verse 1, Bridge 1, Chorus 1, Bridge 2, Verse 2, Solo (Chorus2), Outro

Follow these rules when writing the MIDI song and it'll run perfectly every time:
a) The sequences *ON CHANNEL 10* above must be in order + NOTE 8 must be present (DL FLAG)
b) The Intro and both Bridges should always be 1 bar long.
c) The Outro needs a lead-in Bar for the build toward the last downbeat. It can be longer than 2 bars.
d) The Verses and Choruses (Solo) should be 2 bars or more.

3. Samples In a MIDI Song/DrumLoop

Adding Samples to the sampler channel requires some care & attention.
Most samples (AFAIK) will be percussion, so many can be fit into the Flash memory during SD Sync.
Most types of .wav files will work in the Pedal 7. **(mono/stereo, bext, smple, odd sample rates <48Ks/s)**
Bitwidths of 16 bit & 24 bit are OK, but old ones (12 bit, 8 bit) will cause grief! Avoid these samples!

Installing Samples:
This is not the section (see SD Card) but a brief description will complete this section. Samples can be added by simply putting the into a numbered directory (new or existing) making sure each sample has a unique (within that directory) 2 digit number in front of the filename **(i.e. 36-KICK.WAV).**
To load the samples, transfer your files from the "SD Card" Master directory on your hard drive to the SD Card, plug the SD Card into the bottom panel, Menu Button→"SYN" and EXEC (enter). The Pedal 7 will now sync everything on the SD Card, checking for changes and update the on-board Flash.

In the catastrophic corruption of your on-board Flash, or you want to replace some samples with other, better sounding ones, the entire Sample Flash must be erased and everything re-loaded. Use the same Menu Button→"SYN" but hold EXE button (enter) for at least 5 seconds. "ESS" will appear once held long enough, then upon release "DEL" will appear to confirm erasure is underway. This takes 2-3 seconds. Use the above procedure to re-load all samples. This can take a while (10 seconds/meg appx).

Using Samples in a Sequence:
Because the max. Polyphony is 3 stereo samples, any more than that will cause the sample with the least play time left to be over-run for the new sample to play. Ideally this isn't a problem but if all 3 of the samples are 48 KHz Stereo, there isn't much room for anything else processor time-wise so some skipping may/will occur. Solutions to this are:

a) Don't allow 3 samples to play at once. End one before another starts (include the 1/8 second fade)
b) Slow them down using CC#14 on Pedal 7 channel. If percussion, this can add to the unique sound!
c) Full speed ahead and let the reset conditions occur. This can yield interesting randomizations.
d) Keep Sample Rate CC#14 changes minimal and quick. This CC uses up PIC processor time.

If Changing the Sample Rate, keep in mind a short amount of time, before the next sample is played, must be allowed as FL Studio may send the note, then the CC!

Sample Velocities:
With percussion the levels tend to be high, but the velocity is linear so cutting to half doesn't take the level down much. Leaving them all full up may cause clipping. This can add a desirable "punch" to the drums, but with vocals or tones it may not be OK.

MonoSynth Samples:
Besides playing any sample in any directory and controlling the sample rate to make "notes" with certain samples, there is another (easier) way to turn any sample into a MonoSynth Sample player! Notes C1 to C5 on the Pedal 7 MIDI Channel will play the last entered sample (on Sampler Channel) with rate offsets to match notes.
If the original sample's "note" was a C, then all of these notes will transpose to proper semitones over the 4 octaves. The original sample rate is calculated so no need to worry about non-standard tones *unless* the sample is non-standard (44.1Ks/s, 48Ks/s, 22.05Ks/s, 24Ks/s are standard).
Transposition may be needed for samples that originate as "A" for example.

Hint: Many drum sounds have a pitch and can be re-recorded to match C!
Hint: Selection of a sample beforehand can be done with velocity near-zero.

This MonoSynth isn't really Mono-phonic, it's polyphonic with velocities! Multiple notes on the Pedal 7 channel will continue after a new one has started, even though the rate has switched. This can lead to some very interesting FX if Samples are switch on the sample channel while another is still playing! This mode will add a full octave to the standard sample rate by means of 2X stepping.

4. Special Control CC#'s

The Pedal-7 uses some CC's for controlling various elements of the Sequencer, some on Pedal-7 channel and others on the Sampler Channel. There are of course also the VLT2 controls on it's assigned Channel.

Pedal-7 MIDI Channel NRPN's:

CC #	Controls:	Description of control
CC#07	Tap Instrument Level	Loudness of instrument (Channel 10) only when tapping On_Tap.
CC#10	Sampler/Aux In Pan	Steep Pan / balance. Mostly for effects.
CC#15	Main Volume Level	+/- 15 dB, 64=0dB. 2 - 3 dB produces Line Level Output.
CC#16	EQ High Band	+/- 15 dB, 64=0dB.
CC#17	EQ Midrange Band	+/- 15 dB, 64=0dB.
CC#18	EQ Bass Band	+/- 15 dB, 64=0dB. Low Q
CC#19	Sequencer Swing	0-127: Adjusts 1/8 note True Swing. Can be Menu adjusted also.
CC#20	Drum Velocity Random	0 to -32 Velocity Randomizer for humanizing FX
CC#21	Drum Width (Auto-Pan)	Pans percussion Wider based on 2's sets in Notes on Chan. 10
CC#22	Pre-Beats Override	Adjusts Amount of Taps before Beat 1. Menu Setting overrides this!
CC#24	Direct CV Output	CC controls 0 to 5 volts directly. Momentarily overrides all else.
CC#25	CV Notes Fine Tune	Adjusts +/- appx 1 semitone for Modular VCO alignment or FX
CC#32 CC#0	DAC CVout Direct Fine DAC CVout Direct Coarse	Direct (numerically) DAC control. This was used for setup of the Note Quantizing Tables and has been left in. Leave off.

Sampler MIDI Channel NRPN's:

CC #	Controls:	Description of control
CC#14	Sample Rate Override	Adjusts down 1 octave and a few Notes above (over clocking)
CC#23	Sample Start Offset	Adjusts Start of Sample up to 3 Seconds. Acts as Slicer (sorta!)

C. SD Card

Because the Pedal7 has it's own Flash for storage of samples and Songs/DrumLoops, there's no need to keep the SD Card in all of the time. The only time the SD Card is truly required is to load new samples.

1. File/Folder Structures

The Main Root of the SDC Card should contain a SysEx file called "DDEFAULT.SYX" and 3 folders:
SAMPLES/ This is where the sample directories will be created
SONGS/ This is where up to 100 Song's SysEx's will be
DRUMLOOP/ This is where up to 100 DrumLoop's SysEx's will be

2. Adding Songs & DrumLoops

When a Song or DrumLoop is recorded, and the SD Card is present, a SysEx (nn.syx) is created in either the SONGS directory, or the DRUMLOOP directory. Primarily the file name will be the Song/DrumLoop number only. (i.e. 00.syx) which can be concatenated with a more meaningful name . . .
(i.e. 00_YoursAlways.syx) Anything after the first 2 digits is ignored.

*Note: Any subsequent panel edit (and Save) will destroy the .syx file with a matching number prefix. To prevent this, either don't do any panel edits after the file has been named, or make a copy before editing from panel. This is a limitation of the 8.3 file naming protocol in SD FAT library.

Good to know facts:
1) When a song/DrumLoop is recorded, the created SysEx will contain all pertinent data from the default settings, which can then be changed.
2) Modifying any settings in Menus *then selecting Save* will destroy old nn*FILENAME*.syx.
3) Updates to a song/DrumLoop via the .syx file will not destroy that file.
4) If the SD Card was not present when song/drumLoop recorded or modified, Pedal7 will update or add SysEx once SD Card is present. This must be from a power up.

3. Editing SysEx File for Songs & DrumLoops

The primary purpose of a Song (or DrumLoop) SysEx (.syx) file is to create & change parameters that cannot be set any other way. (i.e. from MIDI Song or Menu's)
Most messages accepted by the SysEx interpreter are listed in **DDEFAULT.SYX but the ones listed here are pertinent to Songs & Drumloops. Settings that may change from Song to Song.**
There is also a Table in V. Appendix and detailed coverage in Section II.A.1. describing each parameter, but I'll cover the simpler ones here.

DEF_BPM=nnn
This value is used to set the BPM used if Song is started with <enter> Play button instead of the tap pedal. If this value is omitted, the default SysEx BPM will be used. (factory is 130 BPM)

ON_TAP_START_MIDI_AFTER_BEATS=nn
This value is how many beats from very first tap until the downbeat (first beat) of the Song or DrumLoop Intro. This will vary with certain Song intros, but with DrumLoop intro is always 4 beats less than the first downbeat because the **Intro** takes 4 beats, even if empty.
By habit I have always used a value of 16 with all songs (not by choice) but if there is to be any instruments playing before the downbeat, this number will be lower.

ON_TAP_START_INSTR=nnn
ON_TAP_START_INSTR_VELOCITY=nnn
Select this Song's / DrumLoop's "Tap Instrument" (0-127) and it's Velocity (1-127) on Percussion MIDI channel 10. These pair should be on their own line as shown, not appended.

OUT1_BLOCK_CHAN=nn & OUT2_BLOCK_CHAN=nn
In certain setups, blocking a certain MIDI channel on one port, while passing to the other port may be required. i.e. Block Channel 10 so drums only on other MIDI port

MORE!
See Section II.A.1. for more detailed information on setting up the Pedal-7 using SysEx Files.

4. Loading Samples

Loading and adding samples is greatly simplified using the SD Card port. Simply load the samples into their directories on a computer, then insert the SC Card into the bottom panel. Wait for "SDC" to appear on the display then use MENU button to select "SYN" and hit EXEC (enter). After a few seconds the updating and loading of samples will begin. The SD Card layout is as follows:

1) Main Root Directory must have a folder called "SAMPLES"
2) Each Directory created inside the SAMPLES directory must start with a 2 digit number, then a name. These numbers will correspond to the MIDI Program Change in your MIDI Sequence.
   *Note: **In any sequence using samples, make sure the PC is active or last known PC will be loaded!**
3) Inside each numbered/named folder the sample names must also be preceded by a 2 digit number. This number will correspond to the MIDI note number on the Sampler MIDI Channel.

Removing Samples
Individual Samples cannot be removed. The entire sample Flash region must be erased and all samples re-loaded. This was to simplify internal Flash organization and speed up playing ability.
To delete all Samples for a fresh install, press MENU button→"SYN" then hold EXEC button over 5 seconds. "ESS" (Erase Samples) will appear. Once button is released "DEL" will appear while erasing. This takes 2-3 seconds. Now insert SD Card and use method above. Depending on the number/size of samples this update can take a while. Go have a coffee! Do not interrupt the power while updating. If so, the update will resume on power-up, but there will almost certainly be 1 sample corrupted.

a. Sample Requirements

Samples to be loaded can be a wide range of RIFF WAVE style samples. 16 bit, 24 bit, 44.1Ks/s, 48Ks/s, 22.05Ks/s, and odd sample rates below 48ks/s will load. "bext", "smpl", and "fact" samples will load. Very old 12 and 8 bit samples may load but will be corrupted and annoying. 32 bit samples will not load (but may in future). "aif", "mp3", "ogg", "wma" encoded files will not load. (they sound crappy anyway!)

A word on 24 bit format:
24 bit samples will only use 2/3 of the flash space compared to the actual file size you see on the SD Card. This is because the file is converted to 16 bits before saving to the flash. The sound quality is generally better in any case, so those are the ones to load. Mono files (24 bit or 16) use the least amount of Flash memory, but can be a bit boring without post processing.

b. Sample Folder Naming Convention

Folders within the root folder "SAMPLES" must be preceded by a 2 digit number (MIDI PC#). The name length after that isn't restricted. Make sure there are no spaces in any folder/filenames! This will confuse the Pedal 7 and things certainly will malfunction (or samples will not load for "no reason").
All Samples must have a 2 digit number also. These 2 digits are Note numbers 01-99 to play the samples. **NOTE: Assigning a sample 00 will never play as this is the PIC RESET Note!*

Any samples without note numbers will be ignored. Any samples (or files) not terminated with ".wav" will also be ignored. SysEx files within directories were deprecated so they are seen, but have no affect.

Deleting / Replacing Samples:
Unfortunately there is no method of deleting or replacing a single sample. This is because Flash Memory is optimized in a Serially added fashion, removing the need for file management and fragmentation thus maximizing efficiency of limited resources.

Memory % Used Display:
When the Pedal-7 is first turned on, the display will flash "Fnn" with nn being the percentage of memory used. This includes all allocated space for Song and DrumLoops so at minimum this will display "F08". The memory can hold appx. 20 minutes of samples which should be ample!

c. Editing SysEx Files for Sample Folders

This function has been deprecated. Unless there becomes a need (special flags) it's gone!
All mono samples play in mono on both channels, while stereo samples play in stereo at 44.1 KHz, 22.05 KHz, or 48KHz. Odd sample rates will be played at 44.1KHz.

III. Operation

A. Pedals

The Pedal 7 really has 7 switches so the name is a bit of a misnomer, but sounds better than "Switch-7" so it stuck! Here's some great points about the pedals:

1) The 6 Pedals (plus Center Pedal) can be turned into 18 by tapping or holding the center pedal.
2) Pedals can be assigned many functions in the Functions list.
3) Some functions have Toggle and Hold modes, while others are simple one-shots.
4) Pedals on either side of the Song/DL button can be momentary Up/Down buttons
5) Pedal on either side of the Menu button can be momentary Adjust Value Up/Down buttons.

1. Center Pedal Functions

The first 6 Pedals (1 to 6) can be set by tapping Center Pedal so the LED below it becomes green. Another tap and you can access Pedals 7 to 12 which turns the LED Red. Holding the Center Pedal will Toggle VoiceLive Touch 2 Switch-6 mode and disconnect the Pedal-7 controls so it can be used as designed for a Switch-6. All LED's will become dark. This state is good to control the VLT2's Switch-6 functions without requiring Power to the Pedal-7 at all!

a. Pedal Function Groups and LED's

Depending on how the Pedals have been assigned (via Default SysEx and later Song/DrumLoop SysEx) toggling to the higher 6 Pedals will change their LEDs. The color scheme is as follows:

Green:	Any VLT2 VLOOP (Audio Looper) Controls
Blue:	Any Pedal-7 MIDI Looper Controls (Inner Looper, Song_Part / DrumLoop Jumps etc)
Blue Flashing:	MIDI Play/Pause/Stop Control. Flashing is StandBy (Stopped/Paused)
No Color:	MIDI Playing: Play/Stop/Pause Pedal
Violet:	Any VLT2 (Vocal) FX Controls (i.e. Harmony, Delay, Reverb etc)
Red Flashing:	Any Record, (i.e. MIDI Record, Vocals Loop Record / overdub)
Red Solid:	Recording Now.
Cyan:	Solid is Inner MIDI Loop, Momentary is an Armed Command (i.e. waiting for Bar)

Actual Pedal Functions can be selected from the function list (See Appendices) and inserted in DDEFAULT.SYX then uploaded from SD Card or via MIDI. All of these functions can be placed into the Song or DrumLoop SysEx created at time of recording (or after a SYNC if SD Card wasn't plugged in at the time).

b. VoiceLive Touch 2 Switch-6 Mode

Holding the center pedal will Toggle the Switch-6 mode for the VoiceLive Touch 2. Pedal control of the Pedal-7 functions will be disabled because a relay physically disconnects the Pedals.

Switch-6 Functions programmed into the VLT2 will become active. Keep in mind the 1/4" patch cord must be connected to the Pedal-7! Another Center pedal hold will toggle back to the Pedal-7 mode. This can be done at any time (during a Song or Loops playing) and will be remembered at power-down as the Relay is a latching style which is handy for zero-power control if set before hand. This is a battery-conscious effort!

2. Assignable Controls

The Pedals can control 31 different elements (if the possible 7 SONG_PART pedals are counted as one!) so are highly flexible and programmable by Default, Song or DrumLoop. Because there are so many options, the most difficult task will be finding a good combination for the Song type, i.e. what needs to be controlled? What could the Alternate Pedals be? Familiarity?

a. Enhanced On_Tap Sequencer Controls

Most Tap Pedal controls can be assigned to a Pedal. As the way the Pedal-7 handles Songs differ from the way it handles DrumLoops with respect to the Tap Pedal, Pedal functions can be "doubled", one function for a Song, one for DrumLoops. This, of course really matters in the Default SysEx as Song and Drum Loop SysEx's will be initially created from the Default settings. Once these SysEx's are edited, the non-pertinent assignments can be removed i.e.

PEDAL07=VLOOP_UNDO
PEDAL07=DL_VERSE1

If this is in a Song SysEx, then the second entry can be removed, even though it will be ignored.
If it's for a Drum Loop then the first entry can be removed although it can be useful to keep to view what the Default settings were at the time of Recording the Drum Loop.

Drum Loop "Transport" and Loop Controls Keywords are:
DL_VERSE1, DL_VERSE2, DL_CHORUS, DL_SOLO, DL_OUTRO, DL_PLAY, DL_STOP,DL_PAUSE

Song "Transport" and Jump (Magic Notes) Marker access Keywords are:
SONG_PLAY, SONG_PAUSE, SONG_STOP, SONG_LOOP (inner loop), SONG_PART: {0 to 7}

*Make sure there are no spaces after "=" as in: PEDAL02=SONG_LOOP and all Caps!
See the Pedal Functions List in **II.A.3.Pedal Setup** for more info on On_Tap Sequencer Pedal controls.

b. MIDI Record Pedal

The MIDI-Loop Record Function is to record MIDI Live that will be in sync with a Playing Song or DrumLoop. Changes in the position of the Song or Drum Loop part won't affect the playback of this new MIDI loop. The intention is to add a live (piano) piece to the running Song/DL that can act as a background to more playing elsewhere on the keyboard or free hands for guitar or other instrument.

Setting a pedal to do this function is as easy as adding **PEDAL01=MIDI_REC** to the Song/DL SysEx.

The Pedal ***(It's LED is Blue but Flashing Red)*** will function intuitively as Follows:

1) Press Pedal to Arm for Recording on First Note. ***Pedal LED goes Red, Orange LED Flashes.***
2) Start Playing your "Piano" Loop. ***Orange LED goes out, Red LED lights***
   HINT: keep track of your entry point as where the next loop will start
3) Just before the Loop would repeat, press the pedal again. ***Pedal LED goes Blue and Green LED on***

The Loop will auto-quantize, not to the playing Beats, but to the nearest 4/4 bar downbeat from your start point. This was done this way to take care of advanced swinging on the piano!
Another Loop can be Recorded by re-arming, or stopped by holding the Pedal > 1 second. The Playback won't stop until the Pedal is released so can be held until the right moment.

c. VoiceLive Touch 2 Controls

The Pedal controls for the VoiceLive Touch 2 are as good as (and better than!) the Switch-6 assigned controls. Here's the pluses:
1) All controls can be on the board at once if desired as there are really 12 pedals.
2) Any non-MIDI (guitar FX switch) controllable VLT2 functions can be accessed by holding center pedal
3) The Record/Play/Clear/Erase sequence can be all on one pedal for easy control of VLooping
4) The R/P/C/E Pedal is real-time quantized to itself, not the MIDI song's bars!
5) While MIDI Sequence can control Harmony & FX, assigned Pedals indicate status and override them.
6) Play Re-trigger is free running so can be used to offset sync or get a groove going!
7) Harmony In Channel uses intelligent algorithm to harmonize with real melodic piano playing

The SysEx modifier commands, syntax, and operation are listed below:

VLOOP_REC **Straight manual (no quantizing) Record Pedal only. Can be used with Metronome**

VLOOP_RPE **Press to start Record, Press again to end Record at next bar equivalent. Following presses will toggle Record overdub. Hold 1 second to clear Loop audio but not size upon release. Display Shows "CLR" then release immediately**
Hold 3 seconds to erase <u>all</u> upon release. Display will show "ERA" then release.

VLOOP_PLAY **Press to play from a stop (pause) or if playing to re-trigger. *Play if Recording***

VLOOP_PAUSE **Press to pause VLoop playing. Press again to resume. *Stop if Recording***

VLOOP_PUNCHIN **Press and hold to Record an overdub mix**

VLOOP_UNDO **Press to undo / recall (if was undone) last Recording. Display shows "Und"**

HARMONY_TOG **Press to toggle Harmony on (white) or off (pink). Display shows "HAR"**

TALK_TOG **Press to toggle "Talk" on (white) or off (pink)**

VOX_FX_TOG **Press to toggle Transducer FX on (white) or off (pink)**

DELAY_TOG **Press to toggle Delay FX on (white) or off (pink). Display shows "DLY"**

REVERB_TOG **Press to toggle Reverb FX on (white) or off (pink). Display shows "REV"**

CHOIR_TOG **Press to toggle Choir FX on (white) or off (pink). Display shows "CHO"**

GUITAR_FX_TOG **Press to Shift up one VLT2 Preset (assuming clone with guitar FX is there!)**

d. EQ & Level Controls

There are 2 Pedal Functions to control the EQ and Level of Audio Aux Input + Samples:

EQ_LOW_KILL_TOG **Toggles Bass EQ to -15 dB, then Back to previous setting on next press.**

EQ_LEV_TOG **Toggles turning down level to near zero, or up to set level (Song or Default)**
Going down display reads "dnn" and up "unn" with nn being the level.
This is useful for fades of MIDI (Aux in) and Samples together.

e. Incidental / Combined Controls

If a MIDI Song / DrumLoop has or is modifying the same function of a Pedal, or a modular Aux Input is changing a status, generally the Pedal's RGB indicator will show the status. *But* …

VLT2:
The present state of the VLT-2 (i.e. harmony on or off, delay on or off) even though settable by Song loaded, may not always be set (hence the convenience of VLT2 Presets) the way the Pedal-7 thinks it is. Therefore it's always a good idea to cycle (by foot) the function you want to use. i.e.

A Song loads and set VLT2 Preset 121. The Delay is on, so is Harmony (even though it shouldn't be!) but the Pedals read pink (off). You tap them on then off to gain control.
*Of course, most proper Songs should turn on these FX at the appropriate time, thus have initial control of them (which will be set near beginning of song, not *at* beginning as Preset may load after these are sent!) but drum Loops may not have any control, being more universal in nature*.

Internal controls of SDS On_Tap machinery and other toggles / triggers will always be known and will pretty much always load in their default state (off) so are predictable to use.
VLoop controls are also going to load in their original (off) state, but a Song may commence a Loop Recording so the LED's will reflect this (in theory!)

f. Sample Play Pedal

The Sample Play pedal uses function **SAMPLE_nn,nnn** assigned during default or Song/DrumLoop SysEx modification. This will play described sample up to 3 times together. If the pedal is held for a second (good for a long sample) it will stop upon release. This is great for giant crash or drum drop, vocal FX!

The use syntax is i.e. **PEDAL12=SAMPLE_06,060** which will play sample 60 in PC directory 06

Note:
While this sample cannot be changed on-the-fly by a Song or DrumLoop, its parameters can.
Sample Rate, Start Offset, EQ Levels, Volume Level, are all under the control of the loaded Song.
The Song (or DrumLoop) should consider this if a Pedal has been assigned this function.

B. Buttons

The 4 white buttons are multi-function and respond to holds and multiple presses. The primary function is labeled on the panel. "S/DL" "MENU" "EXEC" "REC"

1. Songs / DrumLoops Selector Button

This button when pressed will toggle between Songs (displayed SNG) and DrumLoops (displayed dLP). It switches the pedals on each side (pedal 1 & 2) to become selectors. The idea is that the button need only be pressed once, then the feet can be used for the longer task of getting to a Song or DrumLoop. The first press will just display the present/last selection, while another press will toggle.
This button function will time-out after about 5 seconds. Tapping a pedal will restart the time-out again.

The display will show "S00" to "S99" for Songs and "d00" to "d99" for DrumLoops. Any empty slots will have all 3 decimal points lit and will flash if left on for a few seconds.
These need to be selected when recording a new song or drumLoop. See Button 4: Record

Hold Function:
Holding the Songs/DrumLoops button for one second will switch to Favorites Mode. The button will work the same way as before, toggling Songs/DrumLoops except the display will show "d-0" or "S-0' as the favorites go from 0 to 9. Favorites can be set via the Menu button or Default.syx file.

2. Menu Button & Menus

The Menu button is the most embedded button. A single tap accesses more changed settings, while holding the Menu button dives into more obscure / less changed variables.
Here is a list of Main Menu functions as the button is clicked:

Menu Item:	<EXEC> Button	<EXEC> Button HOLD	MENU Button Next	<EXEC> / Other
"LOP"	Toggles "LON" / "LOF" Song Loop On/Off	n/a	n/a	
"ALF"	Toggles "AON" / "AOF" Auto-Load Next Song	"APL" Auto-Load Next Song and Play	n/a	Selecting this again and "AOF" Cancels Auto L & P
"EdI"	"SEL"→ Select Edit Sub-Menu. Can Save adjustments or "test drive" before Save	n/a	SEL→ "PRE" # of Pre-Taps "SHUFFLE" - Swing "BPn" - Set New BPM "SAVE…" - Update	Adjust With Pedals 1 & 2: Pre-Taps 1-255 Swing 0 - 127 BPM 001 - 999 Let Timeout or sel. SAVE
"SdL"	"FAV"→ Select Song/DrumLoop Entry Edit		"FAV" Add to Fav's "DEL" Delete Song/DL "CLA" Clear All !	Sel. Fav. w/ Pedal 2 & 3 <EXEC> HOLD: CLS! <EXEC> HOLD: CLA!
"SYN"	"SYNC" ALL With SD CARD (Must be present)	HOLD >5 SECONDS: DEL ALL SAMPLES!	n/a	n/a
"SEN"	"SEN"→ Set sensitivity of On_Tap Pedals	n/a	"SE1" Set Tip Pedal "SE2" Set Ring Pedal	Adjust Sensitivity up/down with Pedals 2&3 <ENTER>
"Son"	Toggles "Son" / "SoF" Sample Play On/Off	n/a	n/a	Time-Out Saves. This is permanent

Deleting Songs/DrumLoops:
As an added precaution once DEL (Delete *this* Song or DrumLoop) or CLA (Clear All Songs/DrumLoops) has been selected, the <EXEC> button must be held for a couple of seconds. The selected Song/DrumLoop will begin flashing in the display as it is now empty.

Editing a Song/DrumLoop:
Setting a new Pre-Taps, Swing, or BPM can be tested before saving. Once saved these settings are permanently Flashed into the Song/DL but keep in mind that any modifications to the Songs/DL's SysEx size on the SD Card will cause an update during the next SYNC which will overwrite these values with previous values. It's a good idea to update these settings (or remove them from .syx file).

Also, if the Song has CC's controlling the Swing or Pre-Taps, these settings will override those, even though Swing could be varied in the Song as an automation of the CC still…

Pre-Taps Setting:
This setting will update Song/DL in Pedal-7 and SysEx, overriding previous, but MIDI CC overrides!

About SYNC…
Make Sure there is an SD Card pushed into the Slot before trying a SYNC or nothing will happen.
Adding Samples:
Depending on the number of Samples to be added, this could take several minutes. Otherwise only a few seconds to check Songs/DrumLoops SysEx's and test directories for new samples.

SAMPLES DELETE: Holding the <EXEC> Button >5 Seconds will erase ALL SAMPLES.
If the button becomes stuck down, and "DEL" appears in the display shut off the power before button is released or all samples will be deleted (which can be catastrophic if there are a lot of samples!)

3. Exec / Play Multi-Function Button

This button acts as an "enter" for the above Menu items, but after a menu or Song / DrumLoop selection acts as a Standard Play/Stop button.

4. MIDI Record

Song/DLoop Recorded: Select→"SAV"→"rEdo"→{"S/d__" if full}→"undo" followed by EXEC button
If the Song/DL # was not selected, or is presently on an occupied slot, then this will be displayed

5. Auto-Load & Auto-Play Feature

A fun little feature, as well as useful, is the "ALF" Auto-Load Songs and the "APL" Auto-Play Songs. These can be used to auto-load / play all Songs in memory, or just Song Favorites. Here's how:

1) Decide if you want All Songs or Just Fav's and tap to choose Song or hold to select Song Fav's
2) Select a start Song with Pedal 1 or Pedal 2
3) Press Menu Button until Displays "ALF":
    a) Tap Enter to Auto-Load Next Song after present ends, or
    b) Hold Enter to Auto-Load Next Song + Auto-Play it
4) Play Song (using enter button, On_tap Pedal, or a Pedal if one is assigned to Song Play)

This can be used to Play all of the songs in memory at their original or default BPM so it can take quite a while (many hours!) to Loop once. DrumLoops will auto-load but need user input so…
**Hint: Using a modular clock will make all of the tempos identical! Great Fast-Forward too!*

C. Tap Pedal(s)

The Tap Pedal input accepts 1 or 2 Tap Pedals (stereo 1/4" TRS Jack). The first, main pedal is on the TRS jack's tip so mono plug can be used. ****Secondary Tap Pedal (ring) is not yet used (Feb 2019)***

The Main Tap pedal, referred to as just tap pedal from here on, always starts a sequence by tapping in at least twice, to set the tempo, and as long as you like to keep stomping.
If the Song or DrumLoop hasn't yet begun (4-3-2-1 on display) and you have paused tapping, a single tap can be hit to abort the start.
After the initial tap tempo is established and the Song / Drumloop begins to play, following taps are used differently for Songs and DrumLoops:

1. Using Tap Pedal With a Song

Depending on the Song's (or default) **ON_TAP_START_MIDI_AFTER_BEATS** setting, the Song will begin to play after X taps/beats. If you pause tapping for 2.1 beats, any following taps will be considered new entries. These tap command entries are instantaneous and are as follows:

1 Tap Turn off "Inner Loop". If Paused: Restart Play immediately.
2 Taps Turn on "Inner Loop" (see below)
3 Taps Pause at Next Magic Note Marker
4 Taps Stop Song on Next Bar (Emergency Stop)
5 Taps Cancel Stop Song
6+Taps Adjusting tempo to following taps

"Inner Loop" is a method to extend the length of a song but adding a loop to play another verse & chorus (or any part of the song i.e. a hold or musical pause). This is achieved by placing Magic Note Markers into the song, in order from Notes 1 to 7 on the Percussion Channel.

When Inner Loop is turned on, the sequencer will proceed through the song until one of these markers are encountered, then jump to the previous marker's position. For optimum control at least two markers should be used, or a marker encountered may loop back to the song's beginning.

If the Magic Notes are not in ascending order and inclusive, then a problem arises as un-assigned Magic Notes are set to beyond the end of the song so will never be found and song will end as usual.
MIDI Songs do not require Magic Notes Markers if there will be no inner loops used.

2. Using Tap Pedal With DrumLoops

Depending on the Song's (or default) **ON_TAP_START_MIDI_AFTER_BEATS** setting, the Song will begin to play after X taps/beats. If you pause tapping for 2.1 beats, any following taps will be considered new entries. These tap command entries are delayed 1.5 beats (for entry) and are as follows:

1 Tap Bridge to next Verse or Chorus loop. If Stop is Armed, jump to Outro sequence.
2 Taps Bridge to Solo Loop
3 Taps Pause on next Loop, play downbeat
4+Taps Arm to Stop (after pause in tapping) then jump to Outro on single tap
5+Taps Adjust the tempo to following taps. Armed to Stop for 16 beats.

DrumLoops control is far more complex than Songs control. Each DrumLoop MIDI sequence must use all 7 Magic Notes, each placed at the beginning of a loop or Pre-Bridge, including Outro sequence (7th) This is so the Drum Sequencer knows where to Loop to, and the tap controller knows where to jump to.

In order to understand the sequencing, heres a standard MIDI Sequence (i.e. in FL Studio):

MN Type	Size
(*)Intro→	1 + Bar(s). Flows to Verse 1
(1)Verse1	Minimum 2 Bars, Max useful 4 bars
(2)Bridge1	2 Bars (Pre-Bridge lead-in & Bridge)
(3)Chorus1	Minimum 2 bars, Max Useful 4 bars
(4)Bridge2	2 Bars (Pre-Bridge lead-in & Bridge)
(5)Verse2	Minimum 2 bars, Max Useful 4 bars
(6)"Solo"	(Chorus2) Minimum 2 bars, Max Useful 4 bars
(7)Outro	Useful 2 Bars (pre-Outro lead-in & Outro Hit) but can trail off longer

To give the drumLoops a realistic sound, the sequence of steps that occur on a Tap (or 2 Taps) can be changed by jumping to Solo Loop (2 Taps) or Tapping during a bridge. The Main Steps through the Loops on each Tap is as Follows:

0x40, 0x01, 0x42, 0x03, 0x44, 0x05, 0x42, 0x03, 0x44, 0x81 (to step 9)
(Int) (Vs1) (Bg1) (Ch1) (Bg2) (Vs2) (Bg1) (Ch1) (Bg2) (->Vs1)

The last digit corresponds to the Magic Notes in the sequence (MN) above. The steps with a preceding 4 will flow through to the next step on their own. The preceding 8 will jump immediately to the step # shown. This is the main sequence that would play as prompted by 1 Tap during Verse or Chorus.

If a single Tap is made during any of these steps and there is < 2 bars left before the next Loop, the next step will merge into the present one and continue on it's sequence. When inside a verse or Chorus, the idea is that if tapped near the end of the loop, some (or all if tapped early) of the pre-bridge will replace the end of the loop playing as a build into the actual bridge, which is always 1 bar long.
A full pre-Bridge and bridge can be achieved by tapping just before the down beat as there is a 1.5 beat delay before the tap becomes active.
If very near the end of playing loop, then perhaps only a small portion of the bridge will be played so care must be taken with verse & chorus loops that are only 2 bars long.

If running inside of a 4 bar loop, a tap that is earlier than 2 bars from the end of the loop will "arm" for the bridge to occur at the 2 bars from end position. This is done by jumping ahead 2 bars.

If all of this isn't confusing enough, the 2-Tap command takes it to a new level! 2 Taps on any step will cause a jump into the Solo (chorus 2) loop…

Verse 1→ 0x42, 0x06, 0x42, 0x85 or Verse 2→0x44, 0x06, 0x44, 0x81
(Bg1) (Solo) (Bg1)→(Vs2) (Bg2) (Solo) (Bg2)→(Vs1)
Bridge or Chorus→ ^

If already in a bridge, then the bridge is modified to merge into the Solo sequence and becomes (possibly) scant, whereas if already in chorus (Solo is also a chorus really) then the remaining part of the original chorus is replaced with the Solo chorus.

Care must be taken to get the "feeling" of each step in the drum sequence correct, by avoiding loud or obvious percussions (like claps) outside of the Solo part…unless they are in the verses & bridges too.

Outro:
Because the must be timed properly at the end of a "song" the method of ending a DrumLoop sequence is different from that of a Song.
Before the song ending arrives begin tapping to adjust tempo and arm for a stop. There needs to be a minimum of 5 taps to arm the Stop/Outro. Then, within 4 bars, tap once to play the Outro. Depending on the timing of this tap, some pre-outro (build) may be heard or Just the Outro downbeat:
Tap @ Beat 1: Pre-Outro is skipped and the downbeat and any following percussion is heard
Tap @ Beat 2: Most of the Pre-Outro will be heard, then the downbeat etc.

Care must be taken to give a full 2 beats after stopping with the "tempo adjust" string of taps to give the execute delay time to act. It feels fairly intuitive and allows an Outro from any sized drumLoop.

3. Response Level & Time

There is a global tap pedal sensitivity setting that can be adjusted from the menu or **DDEFAULT.SYX**. This also affects the time of response in extreme cases. Higher settings may require a harder shoe.

4. Swing, Drum Width, & Velocity Randomization (Humanizing)

The Swing Control (CC#) can add great complexity to a boring 4/4 beat! This can be set /auditioned from the panel by accessing Menu: Edit: Shuffle for testing, then "SAVED…" once found.
**Note: Swing only works when sequenced Playing in Pedal-7 !*

Drum Width (CC#) will put every second drum (notes order) on the opposite side of Pan. This adjustment sets how far the pan will be.

Drum Velocity Randomization (CC#) is exactly as named.

D. MIDI I/O

The Pedal 7 has 2 MIDI inputs and 2 MIDI Outputs (Not duplicates). Outputs 1 & 2 are standard 5-pin DIN style, while the inputs consist of Primary (5-pin DIN) and secondary merge input (3.5mm TRS jack)

1. MIDI Outputs

The MIDI Outputs are *not* grounded case style. This is to avoid ground loop problems with the VLT2 which does (contrary to MIDI spec) have grounded input.

a. VLT2 MIDI Out 1

MIDI Out 1 has been dubbed "VLT2" but does not only send VLT2 Channels/data. A certain channel can be blocked by using OUT1(2)_BLOCK_CHAN=nn message in Song/DrumLoop .syx.
Harmony Channel (and Harmony Input Channel) is only sent out of this PORT though.
Controller messages can source from the Pedal7 sequencer, a DAW or a MIDI controller on MIDI input.

Another MIDI unit can be added to the chain between the Pedal-7 and VLT2 but it must have it's own channel blocking or x-channel only filtering to stop VLT2 Harmony notes from playing it. The Korg MicroKorg (which I usually have on channel 5) is a good example which has a MIDI Thru jack.

i. VLT2 Control Panel Output CC's/PC

Several VLT2 Control Messages can be sent from the Sequence Playing/Loaded in the Pedal7.
These include Looper controls, Setup (Harmony Level, guitar gain, Preset Load, Talk Mode), Effect Block (Harmony on/off, Double, Reverb on/off, Hard Tune etc), Block Edits (Mod Style/Speed/depth, Delay st/lev/fbk, Reverb etc.)
Bank Select selects sets of 128 Presets. Preset Select (PC?) Selects each of those 0-127.

VLT2 Easy Loop Controls:
Loop Controls (may be) are also assigned to certain notes <u>on the Pedal 7 Channel</u>. They can be used in the same way as the VLT2 touch panel (toggles) with the exception of overdub which isn't a toggle but active while held. NOTES: ***reserving 0-11 for possible magic notes duplicates on pedal7 chan*

Note	FL St. Key		VLT Description	VLT CC#=n	Actions
#85	C#7		Choir Off/On (KILL)	(CC113=0/64)	Kills Choir while Note is on
#84	C7	C7	Reverb Off/On (KILL)	(CC110=0/64)	Kills Reverb while Note is on
#83	B6	B6	Delay On/Off	(CC117=0/64)	Turns on Delay while Note is on
#82	A#6	A#6	Harmony On/Off	(CC112=0/64)	Turns on Harmony while Note is on
#81	A6	A6	Undo	(CC44=3)	One-Shot removes last recording
#80	G#6	G#6	Erase All	(CC44=26)	Removes Loop(s) and Resets
#79	G6	G6	Clear (keep loop size)	(CC44=10)	Clear audio in Loop. Loop Continues.
#78	F#6	F#6	2X (size)	(CC44=6)	Double Present Loop Size
#77	F6	F6	Reverse	(CC44=27)	Reverse Loop Playing
#76	E6	E6	Loop Play Retrigger	(CC54=0)	Re-Start Loop (Must be Playing)
#75	D#6	D#6	**OverDub HELD**	(CC57=0/127)	Records for duration held
#74	D6	D6	Stop	(CC44=2)	Stop (pause) loop. Restarts from start.
#73	C#6	C#6	**Record Button Press**	(CC44=1)	First Records, 2nd Plays, then toggles
#72	C6	C6	Play Button Press	(CC44=0)	Used after a Stop.

*Note: Setting [VLT2_CC_CHAN] is required if the VLT2 CC Channel Parameter is different from the "MID Channel Parameter". It is recommended to decide on this early in the game!

ii. VLT2 FX/Level Output CC's/PW

All native VLT2 CC commands can be routed through the Channel assigned by VLT2_CC_CHAN=nn even though some are "taken over but Pedal-7 Notes 82-85 (above).
Delay, Reverb, Filters, Harmony Bend, muting, Levels etc can all be Sequenced reliably. Refer to the VoiceLive Touch user guide (MIDI Implementation) for all of these. A proper listing may be in order!

iii. VLT2 MIDI Notes Harmony Control Enhancement

There are two ways of playing Harmony Notes on the Pedal-7.
1) Directly from a Recorded Sequence on the Channel set by **HARMONY_CHAN=nn**
2) Indirectly and Playing by hand into Channel set by **HARM_IN_CHAN=nn**

The latter uses a special Note-Hold Algorithm allowing regular hand playing within the Harmony Notes Split Keyboard range (**HARMONY_SPLIT_RANGE=nnn,nnn**) by accumulating notes and using timing to decide if there is a new chord or not. Both modes can be used together (assuming the Live playing follows the chording of the playing song!) but it's eventually up to the VLT2 to choose which 4 of the notes will be used to derive a harmony.

The likely setting for **HARM_IN_CHAN** should be MIDI Channel 1 as all keyboards default to this.

Harmony Notes Muting:
During Song Creation (in FL Studio i.e.), the Notes entered into the assigned Harmony Channel will sound as they will be sent through for "tuning by ear" but once the Play begins they are muted to solely control harmonies. In the Pedal-7 Sequencer they of course do not sound.

Note setting of **[HARMONY_CHAN=], must match the "MID Channel Parameter" setting in the VLT2.

b. General MIDI Out 2

This MIDI Output Port sends everything not blocked or configured to be trapped by the Pedal-7.
VLT2 Data is not sent from this port so it's important to use the VLT2 from the other Port, but all clock and sync (transport) data is.

i. What's passed?

Basically everything that is received at either MIDI Input Port is sent on to the MIDI outputs except:
1) The Pedal-7 Channel
2) The Sampler Channel
3) The Harmony Channel (During MIDI PLAY)
4) 0xFE Active Sensing Messages
5) SYSEX'es are not sent through at all.

ii. MIDIPLUS MiniEngine MIDI box

Primarily, besides the VLT2, the Pedal 7 will be used with the MIDIPLUS MiniEngine Pro (Dream Chip) for a very portable light weight "all in a shopping bag" setup that can be patched into any amp(s).
As this box (at this time) is very limited and picky, here's some Do's and Don'ts when making Songs:

Don't use Bank Select (#32 or #00) on any Channel, especially Channel 10. Factory Reset will fix!
Don't Press any of the 3 buttons while playing, again Channel 10 is ruined and needs Factory Reset!
Don't set Pitch Bend away from centered position at start of a song or it's ignored. (FL Studio's fault!)

Do Select a Program change (piano usually) just before a self-tempo'd Live Recording, so it is also saved
Do Set the piano channel (the one to play along) to Max. Level in the Song or drumLoops.
Do tap the power button to cancel any "stuck notes" should they ever occur.

Upon loading a song, all "special" CC's for the MIDIPLUS are reset to what are believed to be defaults. This is to obtain a base-line for all Songs / DrumLoops and won't be changed. These values are reset for all 16 MIDI Channels on Song load.

These CC's are the ones that can be used but are not reset in any way by "Reset All Controllers":

Envelope:	Attack:	CC#73
Envelope:	Decay:	CC#75
Envelope:	Release:	CC#72
Filter:	Cut Off:	CC#74
Filter:	Resonance:	CC#61
Chorus:	Level:	CC#93
Reverb:	Level:	CC#91
Portamento:	Time:	CC#05
Portamento:	Control:	CC#84
Portamento:	On/Off:	CC#65
Vibrato:	Depth:	CC#77
Vibrato:	Rate:	CC#76
Vibrato:	Delay:	CC#78
Mod Wheel:	Depth:	CC#01

Volume (CC#7) and Pan (CC#10) are sent by default, but Expression (CC11) is not. Sustain and Sostenuto pedals are not updated so care must be taken to release them before song ends.
Any Notes left on at end of song will be caught, and also will be at Loops.
**Pitch-Bend: If is used in a song (not zeroed) then change must be done once song is playing as any non-zero PW / Pitch-Bend is not sent if it's not zero.*

2. MIDI Inputs

Besides being the source of MIDI Recording, the MIDI input Ports can be used for MIDI-mixing and tempo control.

Remote Tempo Sync:
A Song or DrumLoop playing will automatically sync to an incoming MIDI clock. If the input has a MIDI Play Message the Song/DrumLoop will re-start to Synchronize. (This cannot be done from pause)

Merge:
The two inputs are merged together to be forwarded to the two Output Ports (save the blocked and unique channels mentioned above) but each has it's differences:

a. Main MIDI In

This MIDI Port has the "beef" and can be used densely for recording new MIDI Songs/DrumLoops, Sequencing a DAW through to the MIDI Synth (MIDIPLUS), simultaneously Sequencing a Song or DrumLoop and chained controllers etc.
For recording complex sequences and best sync alignment this channel is recommended.

b. Secondary MIDI In (TRS)

This MIDI Port has a smaller buffer and must wait for data received on the Main Port plus data any data being sent via the Sequencer so there may be a little latency. Time sensitive applications such as starting a VLT2 Loop Record/Play remotely should be done on the Main Port, not this one because of such delays.

This Port is fine for secondary MIDI controllers or a hand played keyboard though as the latencies are still quite small. Care was taken to make this Port as capable as possible with remaining resources.

E. Audio Aux I/O

Almost an afterthought, the Auxiliary Stereo Audio I/O was added to the Sampler section. Thus, it shares the same Level control and EQ as the Sample Player, but can be used for FX like chopping and Bass-cut seamlessly under MIDI control or Sequencer control.

1. Aux-Sample Mix + MIDI in CC's

The Level (which controls all levels if the MIDI Synth is fed into the Aux In jack) is not the standard CC#7, it is instead CC#15 (NRPN) on the Pedal-7 assigned MIDI Channel. However, the Pan control (C#10) does control the balance.
Level Setting of 75 or so is a good level to stay around (about +3 dB) to keep Song-Song consistency.

Even though the circuit was quite a bit more complex, those features (Samples only, Aux only, Mono-Mix) were not implemented for lack of usefulness in the final design.

2. Aux-Sample EQ + MIDI in CC's

The EQ settings can be extreme and will set the mood of a Song so leaving them flat is a waste!
It's always good to play with the Midrange to brighten things up some too.
The CC's to control EQ Levels (+/- 15dB range) are:

CC#18=Bass CC#17=Midrange CC#16=Treble

** At this time Q-Factor and Frequency settings are fixed but could be implemented if required.*

F. Eurorack Modular Interface

The Eurorack Modular interface is a bit complex in the way it acts while under control of a Song or DrumLoop, or is controlling elements of the Pedal-7 and MIDI outputs from the input Jacks.

1. Clock I/O

The Clock I/O has been integrated as much as possible into the Pedal-7 design to both control and be controlled by Songs/DrumLoops and other MIDI sources/receivers.

Clock Input:
The Modular Clock input can take full control of the tempo as can an external MIDI clock input.
It is important to recall the Default and/or Song/DrumLoop Clock division setting made to make clocking rates predictable. I tend to stick with 2 PPQN (i.e. setting **CLOCK_IN_PPQN=2**) throughout.

The Modular Clock will not start the Pedal-7 Playing, so you're left the Play button (or a Play Pedal) to start the sequence. Take-over from a new Modular Clock is smooth though so Tapping a tempo first then bringing in the Clock pulse after may be a better way to go.
Once the clock disappears the tempo will continue at a slightly slower tempo. A song can be started, played and stopped to the time of a modular clock.

Clock Output:
The Clock Start point is also important if you want modular to start with a Song, or before or after it starts. The Clock Start should match the On Tap Start ideally, for good Play Button alignment, but the On_Tap pedal allows for Pre-Starts. The SysEx Setting syntax is:
ON_TAP_START_CLOCK_JACK_AFTER_BEATS=nn

2. T/G Outputs

The Trigger Gate Outputs can be configured to output a pulse whenever a specified note on MIDI Channel 10 is played, or to output a pulse whenever any Note on an assigned MIDI channel occurs. (This mode would be best used with CV output set to the same Channel). Here are some possible configurations to add to **DDEFAULT.SYX** or any Song/DrumLoop SysEx:

TG1_NOTE#=NOTES_ON_CHAN:8 [will output a Gate on any note on channel 8]
TG2_NOTE#=013 [will output a Gate when Note 13 on MIDI Channel 10 is played]
TG1_NOTE#=NOTES_ON_CHAN:1 (new line) CV_OUT=NOTES_ON_CHAN:1

The last example demonstrates matching the CV output channel with the T/G Output Channel. Of course another Channel could be used for an interesting "third" sequence!

Note Offs:
The T/G outputs are a gate that will remain on until a note ends. If another Note happens before the previous is finished, there will be a short pulse to Low. This will give an edge for the new note.

Chosen Notes_on_Channel:
Any MIDI Channel chosen will work for this feature except the Pedal-7 and Sampler Channels. Note that this is non-exclusive, so notes are still sent via MIDI (unless channel is blocked). If this isn't desired, near-zero velocity notes can be used. Zero velocity will be "seen" as Note-offs so can't be used. Another way is to turn down the Level of that channel (CC#7) so it won't be heard.

Direct Note Control:
There are two Notes on the Pedal-7 Channel to send a pulse regardless of T/G assignment:
C8 (Note#96) = T/G Output 1, C#8 (Note#97) = T/G Output 2

3. Aux1/2 Inputs

The Aux Input 1 & 2 can do just about anything a Pedal can do, plus can play MIDI notes when paired with CV Input=Notes_on_chan:nn, or a single Sample in the present directory.

Using Aux Input(s) With CV:
AUX2_IN=NOTES_ON_CHAN:03 is a good example of assigning any pulses on Aux Input #2 to play notes on MIDI Channel 3. As with T/G Outputs, there should be CV involved to select notes though. **CV_IN= NOTES_ON_CHAN:03** would match channels. This is important as the notes must be from somewhere.

Playing a single Sample:
The Syntax : AUX1_IN=SAMPLE#038 will play Sample #38 in the last chosen Sample Directory without much processor overhead, but the Directory and Sample# can be defined using a Pedal Function (below)
PEDAL09=SAMPLE_00,060 will Play a Sample in Directory 00 (MIDI Program Change 100!)

Pedal Functions With Aux In:
With Aux Input controlling a Toggle Pedal Function, care must be taken to consider the toggle action. There are so many functions it's easier to list the one's it doesn't control, or require care:

1) Will not be able to access any "Hold Pedal" Function.
2) Won't be able to step Main Volume Level Up/Down as this is a Hold function
3) MIDI Loop record will arm and Play but can't be Stopped. Will stop at song/DL end.
4) If Controlling a VLT2 Loop Pedal, timing between pulses (slow!) is important as it reacts slowly.
5) **VLOOP_REC_OVERDUB**: I don't recommend using this one with short pulses!

4. CV I/O

CV input can send to a MIDI CV upon change. If a Song / DrumLoop is loaded then this input can modify CC's to the MIDI machine on any Channel: i.e. **CV_IN=CHAN#nn,CC#nnn**
If the Pedal 7 or Sampler Channel is assigned, internal CC's can be adjusted as well!
**CVout fine tune, course tune, banksel on PED-7 chan*

5. Play/Stop Signal Outputs

The Play and Stop Modular Level Outputs are primarily for start and stop Sync with the Pedal-7 but can have an alternate configuration (set via any SysEx) that will send a pulse every n Beats.
1) To use as and ordinary Play/Stop pulse, set **PLAY_OUT_BEATS=0** and/or **STOP_OUT_BEATS=0**
2) To send every n Beats (n>0) set for example: **PLAY_OUT_BEATS=8** and/or **STOP_OUT_BEATS=16**

G. Sample Player

I tried to make the Sample player as versatile as possible to add some "glitz" to the MIDI percussion and it does work well.. as long as the 2 note rule (i.e. max two samples playing at full sample rate, even though it'll do 3 …mostly!) and some test plays are done.
Changing the Sample directory while a sample is still playing is no problem and re-trigger time must take the fade-out time (about 2mS) into consideration to avoid samples piling up.

Here's some important information on using Samples in the Pedal 7.

1. MIDI Channel, Folder & Notes Assignment

The MIDI Channel for samples must be set using the **DDEFAULT.SYX** file on the SD Card (or in PC and loading via MIDI SYSEX) with the keyword **SAMPLES_CHAN=nn. nn is 01 to 16.**

Folders should be organized in a use-fashion rather than types as switching the Program Change for certain samples can become tedious. The Notes of basic percussive elements should more or less match a similar sound in the percussion GM MIDI set so that a percussion can be copied from a channel 10 pattern into the sampler pattern for editing. This is a better method BTW!

Directories:
Keep in mind that the SAMPLES/nnNAME directory numbers will match the MIDI Program Change value as a user (i.e. 01 is MIDI PC 1, 00 is MIDI PC 100) Any value selected above 99 will be considered 00.

2. Sample Level, Velocity, Start Offset, & EQ

The Pedal-7's Sample Player and Audio Aux Input share the same EQ, Pan, and Level MIDI CC Controls so they must all be sent on the assigned Pedal-7 MIDI Channel. These controls are:

CC#15	Master Level	64=0dB, 0=-15 dB, 127=+15 dB
CC#16	EQ High Band	64=0dB, 0=-15 dB, 127=+15 dB
CC#17	EQ Midrange Band	64=0dB, 0=-15 dB, 127=+15 dB
CC#18	EQ Bass Band	64=0dB, 0=-15 dB, 127=+15 dB

Other Controls include Swing (CC#19), DrumWidth-auto-pan(CC#21), and Drum Velocity Randomization (CC#20)

Start Offset Trim Control:
With CC#23 on Sampler Channel up to 3 seconds of a sample can be chopped off the beginning. This acts as a Slicer of sorts and can be used to get great reverb FX from live recordings or pick out a single word in a vocal sample etc.

3. Sample Play Methods

There are two ways to play samples from a Song or DrumLoop sequence in the Pedal-7:

a. Multi-Sample Notes

This is the standard way to play samples. Each note has a sample (depending on which notes have been assigned a sample in the Program Change Directory selected) that can be played while another sample (or two) is playing. The rate control is global over all samples.
Directories can be switched quickly with MIDI PC 1 to 100.

b. MonoSynth Notes

This exciting mode lets you play a sample as musical notes. This is very useful for synth samples and much easier than editing the Rate CC before every note played. The term "Mono" Synth is a bit of a misnomer as the polyphony is still there, it's just the rate can change with "other" notes played, which can give some great FX and increase the smoothness of samples playing.

Because the sample played is the same sample at different rates, the PIC seems to find it perhaps a little easier to push the envelope with 3 incidences of the same sample playing.
The Monosynth is used as such:

1) Select a Sample you'll be playing in the Sampler Channel Piano Roll
2) Switch over to Pedal 7 Channel.
3) Play the notes in Pedal 7 channel (range=C1 to C5 / Notes 12 to 60)

Note that note samples above C4 are stepped at X2 rate to achieve the higher sample rate required. This may slightly change the sound of high frequency samples (like cymbals or bells) but has a minimal impact.

* The best part of the MonoSynth is that Sampler notes can be changed on the fly.
  If these notes are played with a very low velocity the change can be transparent. The MonoSynth notes obey their own velocities adding another dimension to the method.
* Moving the rate control while notes are played can create some great FX as well
* The effect of a repeating note will give an echo, and two identical notes will phase!
* If a different Sample is played right after they will travel in unison, very interesting effect.
* Changing start offset (CC#23) continuously will modify each note played changing the timbre a lot!

4. Sample Poly Interaction

Because the sample rates of some samples can be 44.1Ks/s and others 48Ks/s and yet others be odd rates like 29.6Ks/s, a rule to control the sample rate of multiple samples playing together had to be set.
*The first sample (after no samples playing) sets the sample rate.
As a result of this, some samples may play faster or slower than they would on their own. If "pushing the envelope" with 3 samples together and the first sample was 48Ks/s, there's a good chance of failure.
**Note that during Playback the Pedal-7 limits sampler sends to 3 notes on at once!*

The solution is to of course set the Rate CC#14 on Pedal 7 or Sampler MIDI channel lower. (below)

5. Sample Rate / Tones

The tone of a drum can be changed using the Rate CC#14 on Pedal 7 or Sampler Channel. This can be done smoothly if only one sample is playing (it would be too weird to do that to two!) but keep in mind the amount of memory that maneuver will use so don't do it too often! This can be a fun effect for a non-percussive sample too.

Some percussion sounds better at a slightly slower or crisper at a faster Rate. The upper end of the Rate control is about +4 semi-tones, and down over an octave. For more range, (+1 octave and -3 octaves) use MonoSynth Notes mentioned before in section 3.b.

Again, as mentioned before, avoid Rate Slides in a song if there are more than 2 samples playing because this uses up PIC processor time and may cause a stutter or complete failure/reset. If it needs to be changed do it quickly!

6. Sampler Reset Strategy

If you want to push the envelope (3 samples at higher rate) a reset can be strategically placed after the risky section in case the sampler fails. The Reset note is **C0** (Note zero on Channel 10) and will tie up the PIC for a good 2mS and chop whatever samples were playing off immediately. This is a harmless method as the PIC is a "dumb" sample player and won't be hurt by it!

A Note on Clipping:
The Sample Player has a soft clip method built in (at great expense of time and timing!) which prevents sharp flat tops in minor situations, but will not stop very loud mixes (i.e. 2 snares full on) from clipping. This hard clip may be desirable in that snares sound very snappy. Just be aware of it.

IV. Project After Thoughts and Notes

Here's some thoughts I tried to elaborate on throughout this manual as the project progressed and changed, plus other thoughts I couldn't integrate anywhere else.

A. Usage Practices

In development I used a variety of very busy, very noisy Sequences to test the Pedal-7 with maximum demands on the system. As a result I experienced "MIDI GM Synth Burn-in" from listening to the same stuff over and over (and over) again, which left me longing for simpler drum loops and song sequences.

The idea behind future "real" compositions will be minimalism and no clutter. That's my main point to this section, but other than that, here's what I have learned…

Simultaneous Instruments:
I don't think there should be too much playing at once and Choruses and Solo's / instrumentals should have a slightly higher level. Compose with the thought that I will be playing melody or accompaniment with the song so it shouldn't be too dense.

Compose As if it will be Very loud!
I mean "as if" it will be *well* heard. As if I will take a break and let the MIDI through my playing. I think this will offer a fine balance of accompaniment, FX, vocals, and tonality. See next…

Changing EQ Levels:
Changing the EQ Bands to accommodate a certain instrument is very useful and should be done quickly when no notes are playing if possible. Just keep in mind this will alter whatever instrument or audio that is coming in through the Audio Aux Input as well!

MIDI Plus FX, Envelope, and Filters:
The MIDI Plus is pretty good for it's price and size. I aim to use it for all Sequencing and performing. It has some really nice controls that will take a regular GM instrument and convert it entirely to sound like a synth. Most GM instruments react differently to these filters and envelopes so it's basically best to just experiment with them.

Sampler Temptation:
With all of the wonderfully diverse drum samples on-board, it's hard not to highlight them all of the time. Don't! Keep the levels reasonable, to prevent aural overload + prevent clipping.

Slow VLT2 Preset Load Complexities:
When a MIDI PC is sent to the VLT2 to switch Presets, there is a delay and CC's for that channel do not update the newly loaded preset. Compensating for this in the Pedal-7 sequencer applies two delays:

One for the PC message (as seems to get cluttered out be following CC's)
A Second, about 1 second later, for the group of CC's on the Harmony Channel. (Max 21 CC's!).

The FL Studio compensation is similar but the delays are a tad longer. This means the way the VLT2 sounds (harmony, delay etc.) immediately after hitting Play in FL Studio isn't the way it will sound in the Pedal-7 as this data is already loaded before the Play button or Tap pedal begins the playing.

Sample MonoSynth Fun!
A Really cool Vocal technique is to have a Sequence of Mono-Synth notes and trigger (set) a Vocal Sample (with offset at the ready) then trigger a "dead" note (or something shorter than the offset) to cause the vocal to play through but being shifted to the melody on Ped-7 Channel! 2 notes works too!

***Serial Monitor:** There is still a decent listing of procedures when doing SD SYNC.

B. Possible Changes

A MIDI-Fix PCB and PIC18F46K22 that will filter Channel 10 from MIDI Port 2 and output it from another jack for the Yamaha V-Drums. The extra plug will have to be either a 3.5mm TRS or use pins 1 & 5 on MIDI out 2 for a special MIDI splitter cord (2 x 5 pin sockets from one) as there is zero space left!

I may replace the secondary MIDI input TRS recessed jack with a standard 5 Pin on a support (3-D printed) as I hate the 3.5mm jack!

I may add a secondary MIDI Port 2 Output (Splitter) for other non-MIDI Thru devices or just to avoid long runs to/from lights etc. These would be signal parallels with pins 4&5 on pins 1&3. Use "Y" adapter.

C. Trouble Shooting & Possible Issues

At completion time (Feb 25th) there are probably still some issues I haven't noticed yet and there are three real issues yet to be completely resolved:

Sampler:
It still hangs momentarily even with simple single samples. Don't know why. I suspect it may be a Note on/off count issue that makes it think there's Samples left to play so TMR1 keeps calling play.
For now, be very careful and test a song over and over.

APL (Auto-Load & Play) plus Long Trailing Samples or MIDI in running:
If there is a very long sample that is longer than the end of a song (+ trailing F8's sent) There could be an issue with the next Song Loading. Even though precautions are in place it can happen.
MIDI input playing Samples Channel while the Pedal-7 is trying to load a Song will almost certainly mess up the Song Load! The Sampler tries to play the sample while a Song is being loaded. No good!

Crashes:
The Crashing problem has returned and I still believe it's the regulator despite dimming LED's. It'll play all day long then crash. I only test with APL on loading/playing one song after another. I have tried with Sampler turned off and same thing. *Put 100pF cap on reset, so far so good. May remove this!!

Secondary MIDI Input Lockup:
The primary (p) pointer gets stuck at 2 disabling secondary buffer dump. There is corruption of the MIDI input on secondary (testing from Kawai so could be 0xFE active sensing corruption) that leaves the p pointer non-zeroed. A possible patch would be to check and if stays != 0 for x time when there is MIDI input from secondary then p is reset. A message on primary MIDI input fixes it immediately.

Trouble Shooting:

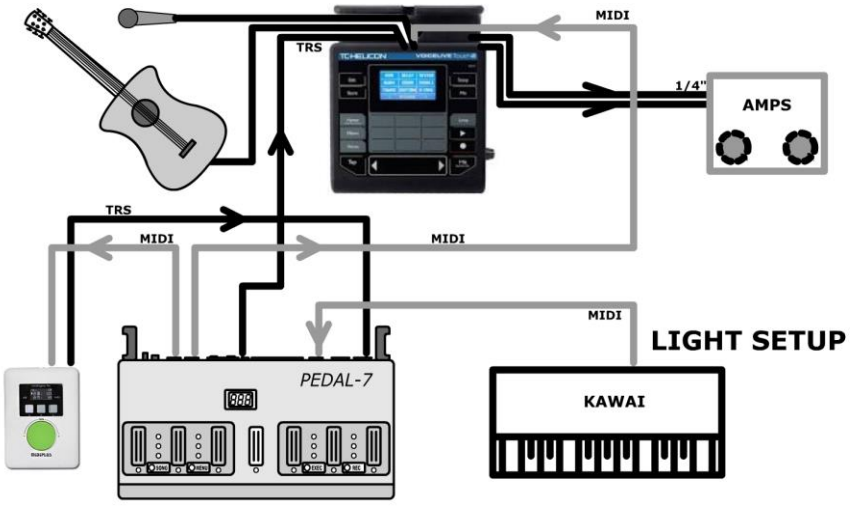
Problem:	Solutions:
One MIDI Channel gets muted (no audio) for no reason, or randomly.	**Possibly the CV input is set to control CC#7. 0 volts = zero level! Check the Channel isn't Blocked in Song's SysEx.**
Channel 10 on MIDIPLUS is piano	**PC or BankSelect was set on channel 10. Hold 2 outer buttons and power button.**
Tap Pedal not working	**Check it's in the left plug! Check SEN level in Menu isn't too high**
Inner Loop Pedal doesn't work	**The Song must have at least 1 Magic Note Marker (Channel 10 Notes 1 to 7)**
Error When Saving New Song (DLoop) (Display shows "ERR")	**Make sure the Song # is selected as SONG. There may be an inadvertently placed DrumLoop Flag Marker in the Song on Channel 10 Note#8 (G#0), or if trying to Save a DrumLoop then the Note is missing. This is the ID Flag.**
Harmony Notes (Indirect) stuck on	**This is a problem yet to be solved as the cause is not yet known. It only happens with Live playing of course. I had suspected the problem at one point but forgot. The only way to fix it is to power down the VLT2 and power up again!**
Newer Samples are corrupted and some old ones are too!	**You did a PIC update and forgot to read the "last Sample Address" into EEPROM. MPASM defaults "Protect EEPROM" to not on, so samples will need to be re-loaded**

V. Appendix

A. Patch Scenarios

There are of course many ways to patch the Pedal-7 into a performance system and varied levels of complexity depending on the venue and setup time required…

Light Setup:
The lightest setup uses the Kawai Keyboard as just a controller (although it could be turned up some for added effect) for the MIDIPlus MiniEngine Synth.

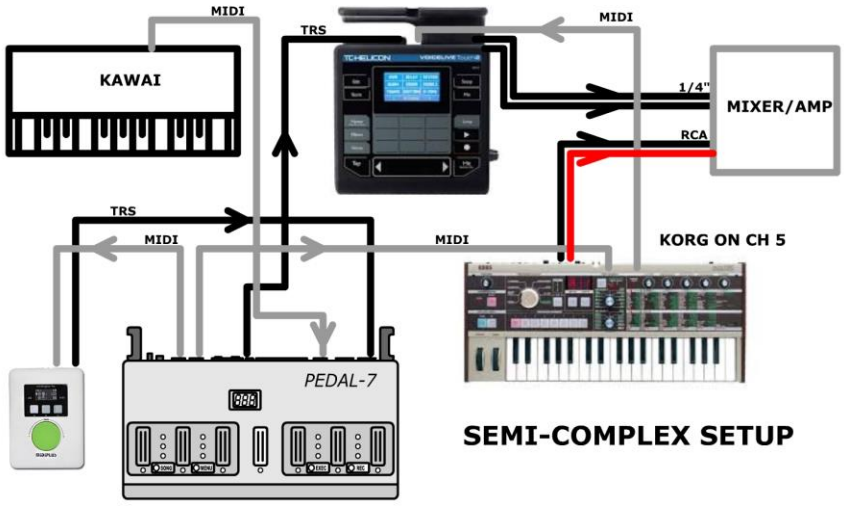


All of the audio flows through the VLT2 and becomes a full mix. If a keyboard is not required, then the simplicity becomes a guitar and Mic setup.

Using Guitar FX (RP-55) would require a Mix, but my Stage monitors would work …
(mix in main, ch1 & ch2) or the 12 channel Mixer expander.

Semi-Complex Setup:
Here's an example of a medium complex setup that adds the Korg Synth. Channel 5 should be intercepted by the Korg, but if not used, the MIDI Channel should try to come close to the desired sound at least at lower levels. This way the melody or accompaniment can still be present in some form.

The guitar input isn't shown as this is an option, but will of course feed into the Guitar input. If there is to be guitar post FX, this would come from the VLT2 as well and not get fed into the AUX mix.(A setting)



This is more complex because the audio from the Korg needs a second input thus requiring a mixer channel extra.

One alternative to this could be to use a small portable mixer (i.e. my 12 channel or the S.I.A.B. if ever gets done!) or add a mix input to the Korg (which may be simple enough)
This of course will take a bit longer to set up than the simple Setup above.

Complex Setup:
The Complex Setup requires a mixer of some sort as there are 3 sets of inputs involved, one from the VLT-2 Main Outputs, one from the Korg Micro-Korg, and one from the RP-55 guitar processor. This will eventually be MIDI controlled via wireless (from CC's and notes/PC on Ped7 channel) so won't need more than the audio lines (and poss. power)

If there are any MIDI controlled lights in-line, or other MIDI instruments with MIDI-Thru, they should be chained on the VLT-2 side (MIDI Port 1). If the Port-2 Y-Adapter is added, then this could be used.

As the variations on a complex system are so great, I skipped a diagram for this but left page blank for drawing one (or more) in.

MIDI Implementation
==========

MIDI IN 1&2 Transport Controls (0xFn):

Message	Function…	Thru?
0xF8: MIDI CLOCK	During P7 Seq. Play: Synchronizes Sequencer to incoming MIDI Clocks *Seq. sends 0xF8's During Standby: Forwards 0xF8's to Port 1 & 2 During Song/DL Rec: Uses 0xF8 for Sequencer Steps and derived BPM (required)	Yes*
0xFA: MIDI PLAY	During P7 Seq. Play: Re-Starts Sequence Playing to Sync with incoming During Standby: Forwards Play Command to Port 1 & 2 During Song/DL Rec: Uses 0xFA to start Recording (Required for non-held Record Button)	Yes*
0xFB: MIDI CONT	During P7 Seq. Play: Only resets internal delay time-out During Standby: Forwards Continue Command to Port 1 & 2 During Song/DL Rec: No unique function	Yes*
0xFC: MIDI STOP	During P7 Seq. Play: Releases Sequence Playing Sync to continue self-clocked During Standby: +1 sec:Sends Reset CC's for MIDIplus. Forwards Stop Cmd. to Port 1 & 2 During Song/DL Rec: Uses 0xFA to start Recording (Required for non-held Record Button)	Yes*
0xFE: Active Sensing	Ignored in all modes. Does not illuminate MIDI light.	

Pedal-7 Assigned Channel: *No Transmit, No Thru

Message	Function…	Thru?
Note On / Note Off: 12-60 72 - 85 96, 97	 Sampler Player Mono-Synth Notes (C1 to C5) (VoiceLive Touch 2 Channel CC Controls (converted) (T/G 1 & 2 Output Gates	No
Control Change #'s: CC#07 CC#10 CC#14 CC#15,16,17,18 CC#19,20,21,22 CC#24,25 BankSel (CC#0,32)	 Tap Instrument Level Control Aux Audio & Sample Player Pan/Balance Control Secondary Sample Rate Control (Primary on Sampler Channel) Aux Audio & Sample Player EQ Level, Treble, Midrange, Bass Levels Swing, Drum Velocity Randomization, Drum Width Auto-Pan, On_Tap Pre-Beats Count CV Output Direct 0-5V, CV Output Quant. Fine Adjust CV Output Coarse, Fine True-Value (For Calibration 0-4096 inverted)	No
Program Change	Not Implemented, Not Forwarded (Future RP-55 wireless control)	No

Sampler Assigned Channel: *No Transmit, No Thu

Message	Function…	Thru?
Note On / Note Off: 0 1-99	 PIC Sampler Reset Note Sampler Player Notes 1-99	No
Control Change #'s: CC#07 CC#14 CC#23	 Sample Player Pedal Velocity only Primary Sample Rate Control (Secondary is on Pedal-7 Channel) Sample Start Offset 0-3 Seconds	No
Program Change	Sample Directory Select PC 1-100 (0-99)	No

SYSEX KEYWORDS:

Keyword:	Comments:	Keyword:	Comments:
0: PEDAL	**Prefix for 1-28+**	**21: SONG_LOOP**	
1: DL_PLAY		**22: MIDI_REC**	
2: DL_STOP		**23: EQ_LOW_KILL_TOG**	
3: DL_PAUSE		**24: EQ_LEV_TOG**	
4: VLOOP_REC		**25: VLT2_SEL**	
5: VLOOP_RPE		**26: _UP**	
6: VLOOP_PLAY		**27: _DOWN**	
7: VLOOP_PAUSE		**28: SAMPLE_**	**W/Pedal: nn,nn**
8: VLOOP_PUNCHIN		**29: HARMONY_SPLIT_RANGE**	
9: HARMONY_TOG		**30: SONG_PART:**	**Followed w/1-7**
10: TALK_TOG		**31: EQ_HIGH**	**EQ +/- 15…**
11: VOX_FX_TOG		**32: EQ_MID**	
12: GUITAR_FX_TOG		**33: EQ_LOW**	
13: DL_VERSE1		**34: EQ_VOL**	
14: DL_VERSE2		**35: ON_TAP_**	**Prefix for:**
15: DL_CHORUS		**36: START_MIDI_AFTER_BEATS**	
16: DL_SOLO		**37:START_MIDI_CLOCK_AFTER_BEATS**	
17: DL_OUTRO		**38:START_CLOCK_JACK_AFTER_BEATS**	
18: SONG_PLAY		**39: START_INSTR**	
19: SONG_PAUSE		**40: _VELOCITY**	
20: SONG_STOP			

Keyword:	Comments:	Keyword:	Comments:
41: CHAN#	Used w/CV_IN=	**60: CLOCK_JACK_PPQN**	1-8
42: SWING	Song/DL syx Only	**61: PRESTART_TG1_OUT**	
43: VLOOP_UNDO	PEDAL=	**62: PRESTART_TG2_OUT**	
44: DELAY_TOG	PEDAL=	**63: PLAY_OUT_BEATS**	
45: REVERB_TOG	PEDAL=	**64: STOP_OUT_BEATS**	
46: CHOIR_TOG	PEDAL=	**65: CLOCK_IN_PPQN**	
47: CHOIR_TOG	PEDAL=	**66: AUX1_IN**	
48: PED7_CHAN		**67: AUX2_IN**	
49: HARMONY_CHAN		**68: CV_IN**	
50: VLT2_CC_CHAN		**69: CV_OUT**	
51: SAMPLES_CHAN		**70: SONG#~~_NAME**	Not Implemented
52: OUT1_BLOCK_CHAN		**71: DLOOP#~~_NAME**	Not Implemented
53: OUT2_BLOCK_CHAN		**72: SONG_FAV**	
54: HARM_IN_CHAN		**73: DRUMLOOP_FAV**	
55: STOP_TRAILING_BEATS		**74: VLT2_FAV**	
56: DEF_BPM		**75: NOTE#**	Used W/AUXn_IN:
57: TG1_NOTE#		**76: CC#**	Used W/CV_IN/OUT
58: TG2_NOTE#		**77: SDC_SAVE_AS**	Not Implemented
59: NOTES_ON_CHAN		**78: DEF_SONG-DLOOP**	

Other Keywords:
"SAMPLE#" Used with AUXn_IN: , "DDF" Default, "DDs" Song SysEx, "DDd" DL, "DDS" Sample SysEx

Page 37 (next) : Quick Reference Cards (Laminate)
These tables should be hung on the wall or near DAW for refence to CC#s, Note Ranges, and Entry boxes for assigned MIDI channels and some Sample Directories.

PEDAL7 CHEAT SHEET (1)

Pedal 7 Channel CC's:

EQ: LEVEL	**CC#14**	**PERCUSSION: SWING**	**CC#19**
EQ: HIGH	**CC#16**	**PERCUSSION: RANDOM VEL**	**CC#20**
EQ: MID	**CC#17**	**PERCUSSION: WIDTH AUTOPAN**	**CC#21**
EQ: LOW	**CC#18**	**DAC CV: FINE**	**CC#25**
Tap Instrument Level	**CC# 7**	**DAC CV: DIRECT**	**CC#24**
AUX & SAMPLE PAN (BAL)	**CC#10**	**DAC CV: NUMERIC LSB**	**CC#32**
SAMPLE RATE (SECONDARY)	**CC#14**	**DAC CV: NUMERIC MSB**	**CC# 0**

Sampler Channel CC's:

PEDAL SAMPLE VELOCITY	**CC# 7**	**SAMPLE RATE (PRIMARY)**	**CC#14**
SAMPLE OFFSET (0-3 SECS)	**CC#23**	***PROG CHANGE: SAMPLE DIR#***	***PC#0-100***

Pedal 7 Channel VLT2 Looper Notes:

Note	FL St. Key	VLT Description	VLT CC#=n	Actions
#85	**C#7**	Choir Off/On (KILL)	(CC113=0/64)	Kills Choir while Note is on
#84	**C7**	Reverb Off/On (KILL)	(CC110=0/64)	Kills Reverb while Note is on
#83	**B6**	Delay On/Off	(CC117=0/64)	Turns on Delay while Note is on
#82	**A#6**	Harmony On/Off	(CC112=0/64)	Turns on Harmony while Note is on
#81	**A6**	Undo	(CC44=3)	One-Shot: removes last recording
#80	**G#6**	Erase All	(CC44=26)	Removes Loop(s) and Resets
#79	**G6**	Clear (keep loop size)	(CC44=10)	Clear audio in Loop. Loop Continues.
#78	**F#6**	2X (size)	(CC44=6)	Double Present Loop Size
#77	**F6**	Reverse	(CC44=27)	Reverse Loop Playing
#76	**E6**	Loop Play Retrigger	(CC54=0)	Re-Start Loop (Must be Playing)
#75	**D#6**	**OverDub HELD**	(CC57=0/127)	Records for duration held
#74	**D6**	Stop	(CC44=2)	Stop (pause) loop. Restarts from start.
#73	**C#6**	**Record Button Press**	(CC44=1)	First Records, 2nd Plays, then toggles
#72	**C6**	Play Button Press	(CC44=0)	Used after a Stop.

PEDAL-7 CHEAT SHEET (2)

Pedal 7 Channel Other Notes:

TG1 OUTPUT GATE ON/OFF	**[C8]NOTE#96**	**MONO-SYNTH NOTES**	**[C1 - C5] N#12-60**
TG2 OUTPUT GATE ON/OFF	**[C#8]NOTE#97**		

Percussion Channel 10 Magic Notes:

RESET SAMPLER PIC	**[C0]NOTE# 0**	**MAGIC NOTE =4=**	**[E0]NOTE# 4**
MAGIC NOTE =1=	**[C#0]NOTE# 1**	**MAGIC NOTE =5=**	**[F0]NOTE# 5**
MAGIC NOTE =2=	**[D0]NOTE# 2**	**MAGIC NOTE =6=**	**[F#0]NOTE# 6**
MAGIC NOTE =3=	**[D#0]NOTE# 3**	**MAGIC NOTE =7=**	**[G0]NOTE# 7**
		DRUMLOOP FLAG (RQ'D)	**[G#0]NOTE#8**

PEDAL 7 CHANNEL	HARMONY CHANNEL	VLT2 CC CHANNEL

PEDAL LEDS: RED=RECORDING, RED FL=REC PEDAL, GREEN=VLT2 LOOPER, BLUE=ON_TAP