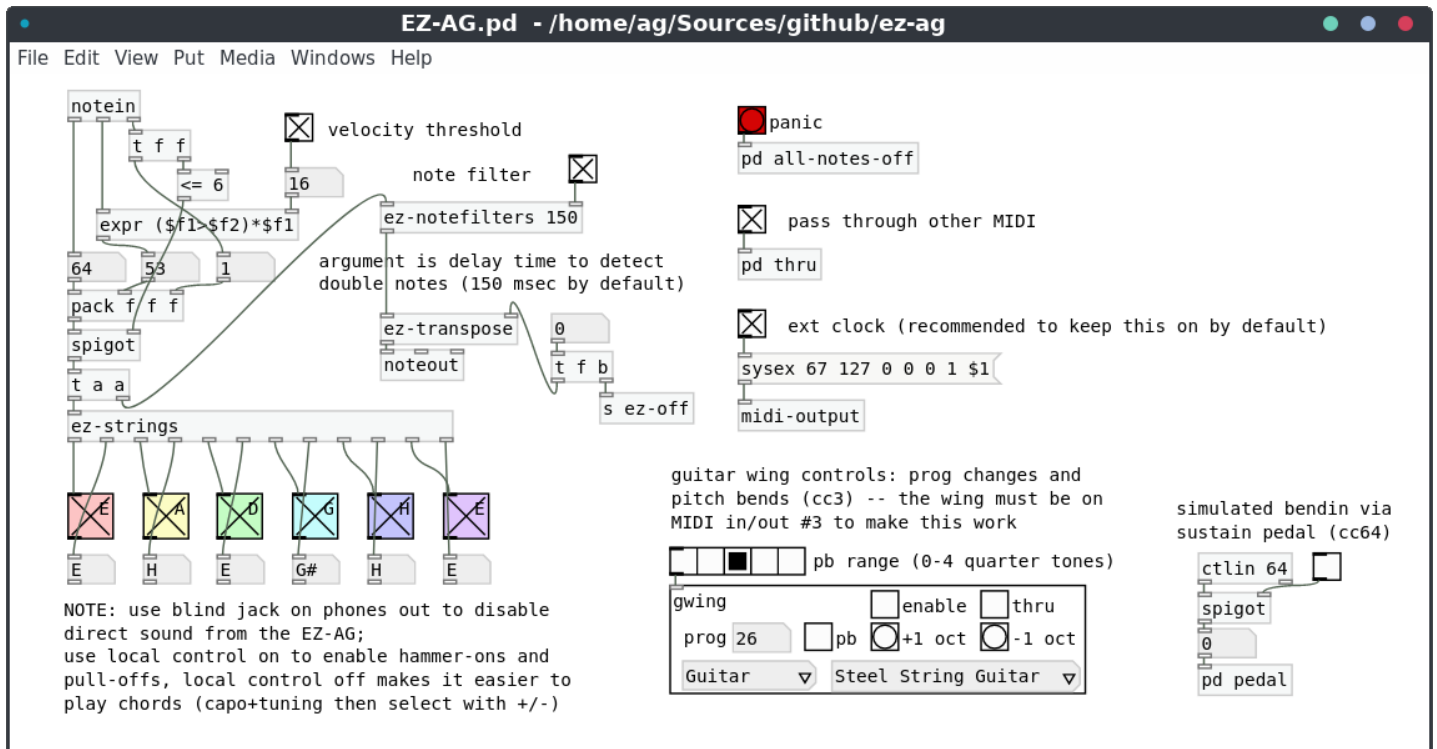


EZ-AG Helper Patch

This is a little helper patch which aims to make it easier to use Yamaha's "learning guitar", the [Yamaha EZ-AG](#), as a MIDI controller. (It should also work with its sibling, the Yamaha EZ-EG, but I haven't tested that since I don't own one of these.) The patch also displays the strings and notes which are currently playing, which should be useful as visual feedback and for checking that the device is connected and working properly.



EZ-AG patch

Note that Yamaha doesn't list (let alone sell) these any more, but with some luck you'll be able to find one on Amazon or Ebay. There's an extensive [KVR thread](#) about the EZ-AG and EZ-EG which you can refer to for further details.

The EZ-AG is in fact a full-blown MIDI guitar controller, but in its default mode it is a bit hard to play in this way unless you have a very clean playing style. This Pd patch makes that a bit easier by filtering out low-velocity notes and spurious double notes which often turn up in the EZ-AG's MIDI output when pushing fret buttons and picking strings at the same time.

Another minor shortcoming of the EZ-AG is that, unlike the EZ-EG, it doesn't have a facility to do pitch bends. The patch makes up for that by making it possible to simulate pitch bends via a sustain pedal (note that you'll have to hook up the pedal through a MIDI keyboard since the EZ-AG itself doesn't have a sustain pedal input).

If you have the [Livid Guitar Wing](#), you can also do pitch bends using either the Wing's big fader (cc 3) or the uppermost drum pad (cc 36). The Wing will also let you change instruments (GM patches) and transpose by octaves up/down using some of its buttons (see below for details). Optionally, it is also possible to pass through all control data from the Wing so that you can route it, e.g., to your DAW program instead.

The EZ-AG and the Wing actually make for a very nice combo, since the Wing will give you the button and fader controls which the EZ-AG lacks. If you don't have the Wing, then you should still be able to do all these things by operating the corresponding GUI controls in the gwing subpatch, but it will be less convenient. Note that instrument sounds can also be changed using the corresponding buttons on the EZ-AG itself (press SOUND SELECT and then +/-), but this will not show in the GUI controls of the patch.

Setting Up

You'll need the [Purr Data](#) flavor of Pd to run this patch. You'll also need [Pd-Lua](#) since some of the internal functionality of the patch is currently written in Lua. (There's a good chance that most of the essential functionality of the patch will work in vanilla Pd, too, if you have Pd-Lua installed, but this hasn't been tested. In any case making the patch work flawlessly with vanilla will most likely require some changes.)

For starters, use Pd's preferences and/or your MIDI patchbay to hook up the EZ-AG to Pd's MIDI input and output #1, the control input of your DAW (if needed) to Pd's MIDI output #2, and finally the Guitar Wing (if you have it) to Pd's MIDI input and output #3. The patch is hard-wired to work like this, so unless you're prepared to edit the patch you'll need to follow this connection layout.

The patch doesn't generate any sound of its own, it just outputs MIDI, so you'll also need a GM-compatible synthesizer which should be hooked up to Pd's MIDI output #1. I recommend Qsynth/Fluidsynth for that purpose, but of course you can also use any GM-compatible synthesizer or a GM-compatible synth plugin in your favorite DAW. In the latter case you will want to route Pd's MIDI output #1 into your DAW (note that output #2 only carries the control data from the Wing if it's being passed through).

For a minimum setup (no DAW control, no Guitar Wing) you can just hook up the EZ-AG and your MIDI synthesizer to Pd's first MIDI input and output, respectively, and be done with it.

EZ-AG Setup

You will probably want to leave local control enabled on the EZ-AG (it's the default) to get naturally-sounding hammer-ons and pull-offs. (Note that the EZ-AG doesn't do pull-offs to empty strings. That's a limitation of the device and so there's nothing the patch can do about it.) On the other hand, it may become easier to play chords if you turn local control off; this can only be done manually on the device by pressing the CAPO and TUNING buttons at the same time and using the “-” button so that the EZ-AG's LED display shows “Off”. This disables hammer-ons and pull-offs and also turns off the EZ-AG's local sound generation. (Note that you can also use a blind jack on the EZ-AG's phones out if needed, in order to disable direct sound from the guitar with local control enabled.)

Another important configuration item on the EZ-AG is the clock setting. The EZ-AG should be set to use an *external* clock (the internal clock is the default), if you do not want to run the risk of accidentally hitting the DEMO START/STOP button and have the device conveniently start playing one of its demo songs when you're in the middle of a guitar solo. The patch will try to set this automatically for you by sending the appropriate sysex message on Pd's MIDI output #1, but this requires that it is connected to the EZ-AG and the device is on when the patch is loaded. In any case, you can also do this manually by pressing the TEMPO and VOLUME buttons at the same time and using the “-” button so that the EZ-AG's LED display shows “Etr”.

Usage

With those preparations all done and the EZ-AG turned on, just load the patch and start playing. You should see the strings and notes being played in the GUI, and hear the output from the patch through your MIDI synthesizer.

There are various settings in the patch you can fiddle with. First and foremost, there are two toggles for the velocity threshold and the note filtering, which should normally be enabled by default. You can turn these off to get the MIDI note data exactly as the EZ-AG sends it. Normally, you will want both of these to be turned on, though, which does two things:

- The velocity threshold causes removal of the “silent” notes that the EZ-AG produces when operating the fret without actually picking the strings.
- The note filter prevents double note-ons for the same note on the same string which often occur if you're pushing the fret button for a note and pick that string not exactly at the same time (which may well happen if you're a lousy guitar player like me).

The latter is only an issue if the EZ-AG has local control on (see above) so that hammer-ons and pull-offs are enabled. The time threshold used to detect these double notes can be set using the delay time argument of the “ez-notefilters” abstraction. The default of 150 msec works for me, but if you have a very clean playing style then you might want to reduce this value. On the other hand, if your technique is even worse than mine then you might have to further increase the delay time.

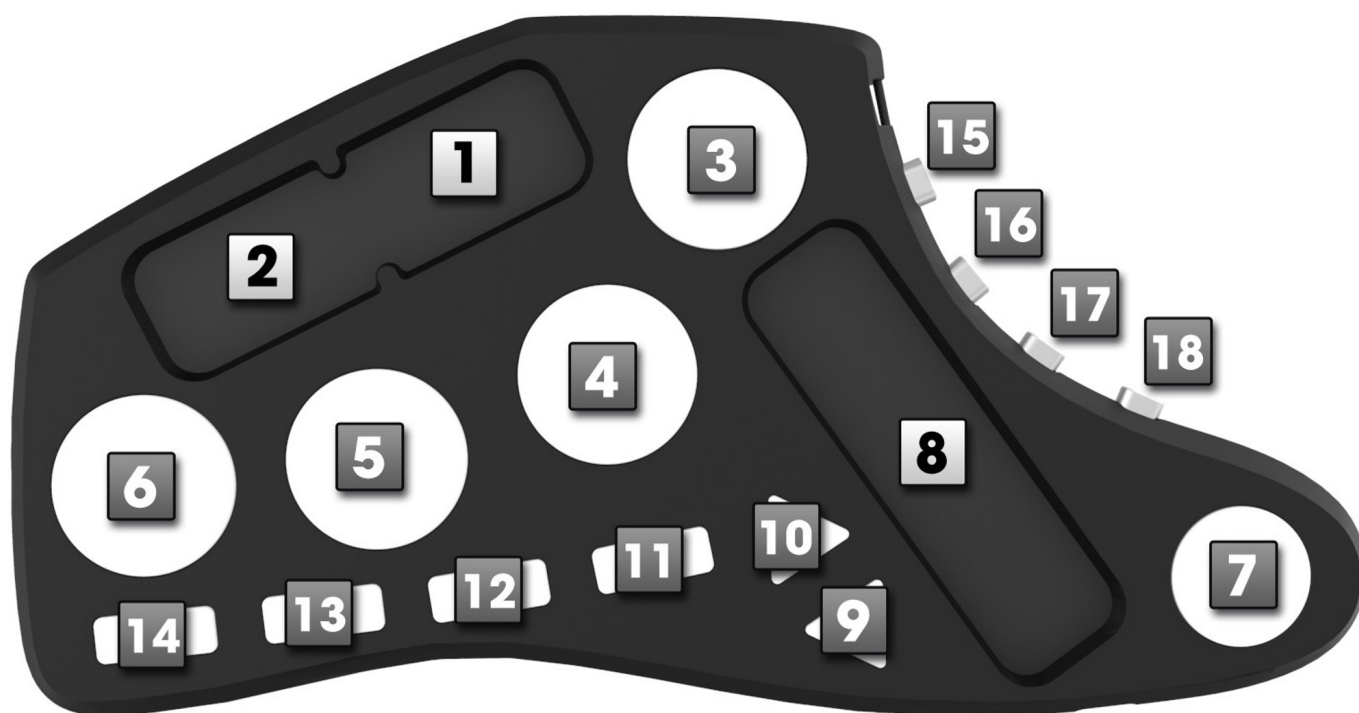
The “pass through other MIDI” toggle causes all control and program change messages emitted by the EZ-AG to be passed through unchanged. In particular, this lets you use the buttons on the EZ-AG to change the selected instrument sound.

The “panic” button lets you stop all sounding MIDI notes immediately, provided that your MIDI synthesizer properly implements cc 123 (Fluidsynth does). This is most useful for killing off hanging notes, should you run into these.

Finally, if you have a sustain pedal (cc 64) hooked up to your MIDI system (as already mentioned, you’ll have to do that through your MIDI keyboard), then this can be used to emulate pitch bends if you turn on the corresponding toggle in the patch. This is a rather crude emulation (it quickly ramps up one semitone when pressing the pedal, and goes back to nominal pitch when releasing it); better control is provided through the Guitar Wing, see below.

Guitar Wing Controls

The “gwing” subpatch provides support for Livid’s Guitar Wing controller. There is a toggle in the subpatch to enable this functionality, which should be on by default. The provided functions are listed below.



Guitar Wing

- The big touch fader of the Wing (cc 3, fader 8 in the figure above) does pitch bends. It will automatically reset itself to zero as soon as you stop touching that fader. The radio button above the gwing patch lets you configure the maximum amount of pitch bend that you want to have. It

defaults to one semitone but can be set to anything between zero and four quarter tones. If zero, pitch bends are disabled. (This will only bend up right now; if needed, you can change the corresponding logic in the gwing subpatch. E.g., you might want to assign the little faders cc 1 and cc 2 instead and allow for both upward and downward bends.)

- The first white pad on the Wing (button 3) provides an alternative way to control pitch bends. The pads are touch-sensitive, so applying different amounts of pressure on button 3 will translate to different pitch bend values. This is a bit harder to control than the big fader, but may be more convenient to do quick pitch bends.
- The second and third pads (buttons 4 and 5) can be used to transpose the MIDI note input from the EZ-AG (same as the +/-1 oct buttons in the patch). Note that this is independent from the TUNING button on the EZ-AG. Moreover, the EZ-AG automatically transposes notes depending on the instrument sound chosen with the SOUND SELECT button on the device, so that, e.g., if you pick a bass sound on the EZ-EG then the note input from the EZ-AG will already be an octave lower than normal.
- The fourth pad (button 6) is equivalent to clicking the “panic” button in the patch, i.e., it turns off all sounding notes.
- The direction buttons (buttons 9 and 10) can be used to switch between GM patches (instrument sounds). Also, the four little side buttons (buttons 15–18) can be used to change the GM program number in larger increments. The current setting is shown in the “prog” field, as well as the two dropdown lists at the bottom of the abstraction, and can also be changed there.
- The remaining controls on the Wing aren’t assigned right now, but might be in the future.

All this special processing can also be turned off with the “enable” toggle. Finally, you can also route the control data from the Wing to your DAW. To these ends, enable the “thru” toggle in the gwing subpatch and hook up your DAW’s control input to Pd’s MIDI output #2.

Ardour Support

As a bonus, I’ve thrown in an [Ardour](#) MIDI map (Livid_GuitarWing.map in the sources), which can be used to hook up the Wing to Ardour’s Generic MIDI Control, either directly or through the pass-through option of the gwing subpatch described above. To make this work, you’ll have to copy the Livid_GuitarWing.map file to Ardour’s midi_maps directory (on Linux this is under `~/config/ardour5/midi_maps/`, please check the Ardour manual for directions on Mac and Windows) and configure the Generic MIDI Control Surface in Ardour’s preferences accordingly. To do this, open the “Control Surfaces” section in Ardour’s preferences, enable “Generic MIDI”, click “Show Protocol Settings”, pick “Livid Guitar Wing” as the MIDI binding and choose the Guitar Wing for incoming MIDI.

The map assigns buttons 11–14 on the Wing to some of Ardour’s transport controls (at present: start, stop, as well as the metronome click and loop toggles; you may want to adjust this to your liking or employ it as a blueprint for doing your own map for your favorite DAW). The rest of the controls are currently not assigned and may be used with Ardour’s MIDI learn functionality.

When running the Pd patch, instead of hooking up the Guitar Wing directly to Ardour’s control input, you can also switch on the “thru” toggle in the gwing subpatch and use Pd’s second MIDI output as input to Ardour’s generic MIDI control instead. This has the added benefit that it will filter

out the note messages associated with the Wing's touch faders, which may otherwise get in the way of Ardour's MIDI learn facility.

Reporting Bugs

If you have any comments, ideas for improvements or suggested code changes then feel free to mail me at aggraef@gmail.com or toss me a pull request over at Github.