



PLG150-AN

Power User Plus Pack:

For the Motif ES/S90 ES & Motif-Rack ES

AN EXPERT EDITOR



A closer look at the PLG150-AN's Free EG and Pattern Generator

_AN Expert Editor file ("Number1.ANS") – loads from AN Expert Editor into bank 036/002 {ALL PRODUCTS use this file}

_Voice Editor for **Motif ES** ("Number1.W7E") – loads into PLGxUSR bank for your PLG150-AN's slot. 'x' is your slot number

_Voice Editor for **S90 ES** file ("Number1.S7E") – loads into the PLGxUSR bank for your PLG150-AN's slot. 'x' is your slot number

_Voice Editor for **Motif-Rack ES** file ("Number1.W9E") – loads into the PLGxUSR bank for your PLG150-AN's slot. 'x' is your slot number

To get into the Free EG and PATTERN GENERATOR use the [DETAIL] buttons from the main screen - circled in red above.

FREE EG (Envelope Generator)

The Free EG function gives you four independent tracks to which you can record complex real-time parameter changes, over a specified length of time, either in measures or seconds. Because you can use Measures, the Free EG can be easily synchronized with the tempo of your music. The Free EG is like the ultimate in programmable envelopes and when placed in LOOP mode it is the ultimate programmable LFO. You can use it to do things as simple as record a filter being swept or you can create complex envelopes to control virtually any part of the analog sound. The Free EG is launched in the AN Expert Editor and opens a window that allows you to create four (color-coded) tracks of control data.

In this window, you can draw a custom Free EG "curve" for each track that controls a single selectable parameter (such as filter, resonance, LFO, etc.) over time. You have options to select different preset shapes or even create random envelopes.

Four of these envelope curves — each affecting a different parameter — can be played back automatically by simply playing the voice. A variety of drawing and editing tools are available for creating unique, continuous parameter changes that would be impossible to achieve with conventional EGs.

Naturally, all Free EG parameters are stored as Voice data, allowing each voice to have its own Free EG settings. The possibilities with this unique tool are truly too many to cover. But it remains one of the many, many "hidden" features you will find in your Yamaha product. Often we are asked how come all the parameters of the PLG board are not accessible from the front panel — well one reason is we didn't want to limit the capabilities of some of these great PLG technologies. Remember many of them were entire products in their own right. The PLG150-AN started as the AN1x — and extremely powerful analog-modeling synthesizer from 1997.

The idea of these 16 Voices is to give you an idea of what is possible and hopefully encourage you to discover the truly endless power within the PLG150-AN. Follow the examples given — then once you get the concept feel free to experiment. I highly recommend that you apply these concepts and ideas to full Voice sets like the "Regenerator" Voices and others. That is the analog way!

PATTERN GENERATOR - The Pattern Generator contains the controls for the **Arpeggio** and **Step Sequencer**. These two powerful features let you trigger complex patterns in real time, at the press of a key.

The **Arpeggio** lets you play perfectly arpeggiated patterns at the simple press of a key. You can have the Arpeggio play across the entire keyboard, or set it so that the left side of the keyboard triggers the arpeggio patterns, while you play the voice normally with your right hand. The Arpeggio features 30 different patterns to choose from, including Up, Down, and Up/Down across one or more octaves, plus various special patterns including Techno, House, Random, and more.

All of the basic arp patterns found in the PLG150-AN (30) are also found in the Motif ES, Motif-Rack-ES and the S90 ES (1787). The PLG150-AN Arpeggiator is a totally separate unit and can only transmit to the PLG150-AN tone engine (it is not available out via MIDI).

The **Step Sequencer** lets you quickly and easily create sophisticated looped patterns. It's also highly interactive, since it can be triggered from the keyboard in a variety of ways, and can be used with the various real-time controls of the PLG150-AN. You can trigger the pattern with the left side of the keyboard and either play normally on the right or transpose the pattern. Each individual step event (Note, Velocity, Gate Time (duration), and Control Change) can be accessed and edited by a specific virtual "panel knob," over a maximum of 16 steps. The Step Sequencer features extensive storage memory as well, letting you save one sequence pattern with **each** Voice (128 total), plus have access to 128 User Patterns.

Both the Arpeggio and the Step Sequencer share a set of "Common" parameters for added flexibility and control. These include a Hold control that keeps the pattern running, even after you release the keys, plus other global controls that give you detailed control over the "feel" of the arpeggio or sequence pattern.

By setting the TEMPO of the PLG150-AN Clock to "MIDI" you will sync it to the clock of the host product. This way you can have the internal Voices of the host follow one arpeggio pattern and the PLG150-AN arpeggio or step sequencer will run in sync with it.

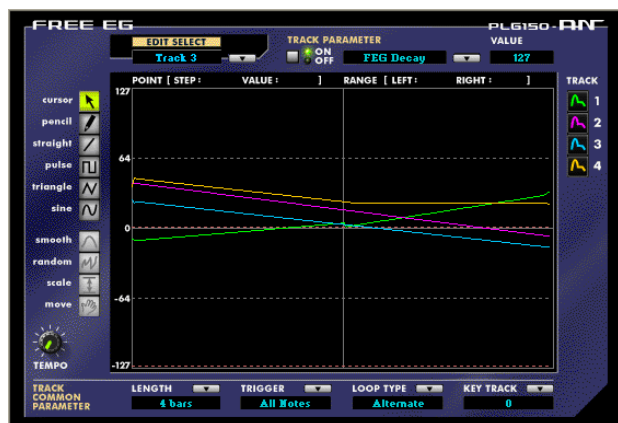
Take the time to read the LOAD INSTRUCTIONS and take care to ensure you have loaded both sets of data for your product — the AN Expert Editor file loads the PLG150-AN board with custom Board data. Then the VOICE EDITOR for your host product creates Voices that then use the PLG150-AN sound as a single Element Voice. Enjoy!

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Dr: No.1 – This Voice is basically Noise set to play a rhythm from the Step Sequencer with lots of movement in the “Free EG”. The *Free EG* is a user programmable LFO. You can “freely” draw or create a controlling envelope – assignable to a selection of real time parameters. In the screen shot below you can see a graphic of the tracks. Track 1 is in green, and Track 4 is amber. Track 1 is controlling a gradually opening VCF Cutoff, while Track 4 is controlling a gradual reduction in VCA Volume. Track 2 and 3 are assigned but not used in this Free EG and are OFF.



The Length is set to “4 Bars” and the Loop Type is “Alternate” (meaning that this envelope will reverse itself when it reaches the end of four measures. The PLG150-AN's clock is set to MIDI so the tempo will adjust to the tempo of the host product (Motif ES). So to alter the playback tempo of the step sequence you need only adjust the tempo of the Motif ES clock itself using the front panel TEMPO knob in the Knob Control Function area (or the ARP tempo – which is the same thing).



If you want to experiment – you can use the EDIT SELECT parameter (upper left) to choose Track 2 and the TRACK PARAMETER (center) to turn ON the EG. Then you can repeat for Track 3. Raise the level of VCO 2 in the AN Mixer (back on the main screen), lower the Noise and change the FEG Decay to see how the Free EG works. It is one of the powerful tools within the PLG150-AN engine.

Ba: Electra – This Voice is a typical oscillator sync sound. On the toolbar of the AN Expert Editor you have 3 overlays (Setup AN Display Option) you can apply to the main screen that can help you see how the routing is taking place.



In the screen shot above the blue overlay, Relation of Oscillator Sync) shows that VCO2 is the Master oscillator and VCO1 is the slave. This means changing the pitch of VCO2 (Master) will retune the Voice, but moving the pitch of the VCO1 slave will change the character (tonality) of the sound. Experiment with the “SYNC PITCH” and the “SYNC DEPTH” parameter just above it to see how this changes the timbre of the sound.

Free EG has two active tracks, again over a four bar cycle altering cutoff and resonance.

Dr: Come Back – The Pattern Generator is right out of the sixties and seventies, when synthesizers “analog” and sequencers had 16 steps! Here you can see that there are four principal parameters: Note number, Velocity, Gate Time (duration) and Control Change.



This is another percussive track and it is easy to see the velocity values making the accents. Along the left side of the screen you can set the “Set Length”, “Base Unit”, and “Loop Type”, experiment to vary the pattern.

Ba: Power X – This is a classic use of the Pattern Generator, a pulsing bass line. Click on the Pattern Generator Detail button and take a look at how this is constructed. You can see how cleverly you can create legato notes by making a step the same pitch, and setting the Gate Time (duration) to 100 – which will bring it right up to the next step. Play with the “Base Unit” setting... This determines the timing resolution for the sequence pattern. This, together with the current Tempo setting, determines the interval between steps.

Ba: Crossfire - By now you can tell this is a Step Sequencer pattern where some of the steps have a very short Gate Time. This can be used to great effect.



There are four tracks in the Free EG:
 Track 1 (green) – VCF Cutoff
 Track 2 (purple) – Sync Pitch (inactive)
 Track 3 (blue) – PWM2/Xmod Dp (Pulse Width Mod VCO2 and Cross modulation Depth)
 Track 4 (amber) – VCA Volume

Ba: Happy Joe – This is another basic step sequence in the Pattern Generator with two Free EG tracks set to control Cutoff (track 1) and Resonance (track2).

Track 1 VCF Cutoff (green)



Track 1&2 shown. Track 2 is Resonance



Let's take a look at some of the other tools in the Free EG. You can select a region of the Envelope by holding the {ALT} key on your QWERTY keyboard while dragging the mouse. Once a region is selected (see how it is gray below) you can use the 'smooth', 'random', 'scale' or

'move' buttons to edit the waveform. Try it. Hold down the ALT button on your QWERTY and drag over the first half of the EG left to right. This will "select" the regions for editing. Click the RANDOM button:



This will give the first 2 measures a crazy wah-wah effect as the VCF Cutoff frequency is randomly changed. Notice how subtle changes in the degree the filter is opened-to-closed are very effective. The VCF Cutoff Value (+56) is the setting for the VCF Filter on the main screen (you cannot change it on the Free EG screen but is there as a reference so that you know how you are altering that setting). The Free EG is adding and subtracting the values you apply on the Free EG graphic. Left to right the graph has 192 points (your current location will be shown at the top: POINT STEP and the offset setting as POINT VALUE. If you click on a point on the graphic line it will identify the Point Step (x-axis left-to-right) and Value (y-axis up/down) that is being applied at that moment. So as a note is played the filter is gradually closing subtracting the value shown from +56. At the end, LOOP TYPE will send it back in opposite direction (Alternate) gradually opening the filter cutoff.

Now try selecting a region and increasing the "SCALE" to intensify the effect (see below inside red oblong). When you select a region the LEFT and RIGHT, the numbers will indicate the area selected. Try out the tools.



Ba: Elitdance



Four Tracks of Free EG applied over an alternating 8-measure loop.

Ba: 90s Line – Use this Voice in the AN Expert Editor to try out the Free EG for yourself. You can select a parameter per track and draw the envelope shape with the Pencil or choose a “straight”, “pulse”, “triangle”, or “sine” tool. You can select a region by holding the ALT button and dragging the mouse left to right. Once a region is selected the “smooth”, “random”, “scale” and “move” tools become available. Experiment also with the PATTERN GENERATOR



Try dropping the first to steps an octave to “C2”. Place the cursor over the Note number. By doing this you can get a real sense of the phrase’s beginning. Try changing the LOOP TYPE. Try using the Control Change knobs to alter the pattern – for example, set to 10, this can be used to dynamically Pan the line left and right or abruptly send a note to the far left (0), or right (127).

Ld: Mappet



Free EG with Track 1 controlling VCF Cutoff (green) and Track 2 controlling Resonance (purple) on an 8 measure sweep, Alternating Half (goes middle to end, then end to middle).



Ld: Last Dance

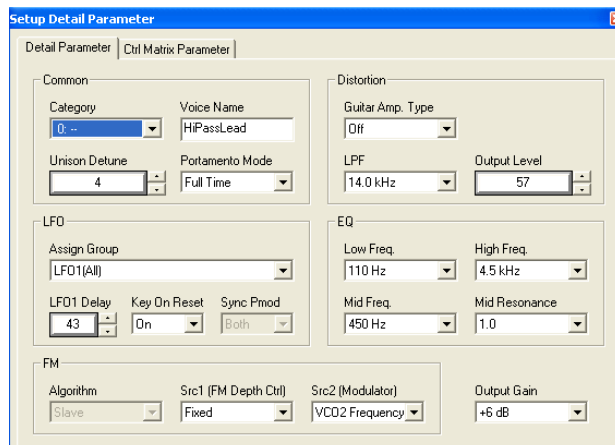


This Free EG has four active tracks:

- Track 1: VCF Cutoff
- Track 2: PWM1/Detune
- Track 3: PWM1/Mix
- Track 4: FM Algorithm

Experiment by turning ON/OFF the various Free EG tracks and altering the shape with the provided tools – create several variations. You may want to put the Pattern Generator on HOLD so that you can manipulate the parameters without having to hold down a key.

Ld: HiPassLead



Explore the Setup Detail Parameter screen to access the Distortion Effect, EQ, LFO and FM parameters. You reach this screen by pressing the "DETAIL" button in any of these areas on the main screen. Shown below is the Display Option for the main signal flow. VCO1 and VCO2 go to the MIXER where they are blended, then they are sent to the VCF (an 18dB/oct Low Pass Filter) and VCF Envelope Generator and then to the VCA and VCA Envelope Generator and finally to the Distortion Effect (not currently active) and Equalizer.



Ld: Fifth – The musical fifth interval is created with the tuning of the two VCOs (Pitch).

Ld: Voco Cry – Tempo Delay added at the Motif ES level makes the Pattern Generator sequence dance. You can have both editors open at the same time. The AN Expert Editor will edit the Board Element. The Voice Editor for Motif ES will edit the Motif ES parameters assigned to the User Voice. Now just so you know: The Motif ES Voice points to the AN Voice and treats it like a single ELEMENT. People always wonder why Yamaha has this *ELEMENT* thing... well, in other synthesizers you may be limited to just sample technology, in which case calling the basic component a multi-sample *always* makes sense. But in Yamaha synthesizers and as is the case with the Motif-line, the basic component might be an analog physical model, or an FM component or a sample. So an ELEMENT can be a variety of different technologies. The Motif ES VOICE will point to the AN sound in a similar fashion to how an internal Voice targets a multi-sample. You will see in the ELEMENT box in the VOICE EDITOR screen shot below, that the VOICE BANK is MSB = 36, LSB = 2, and the VOICE NUMBER is "013: User 13". Also just above the little keyboard icon you will see that the PLUG-IN BOARD NAME is "PLG150-AN".



These parameters are Motif ES parameters that are applied to the source waveform which is from the PLG150-AN board (bank 36/2).

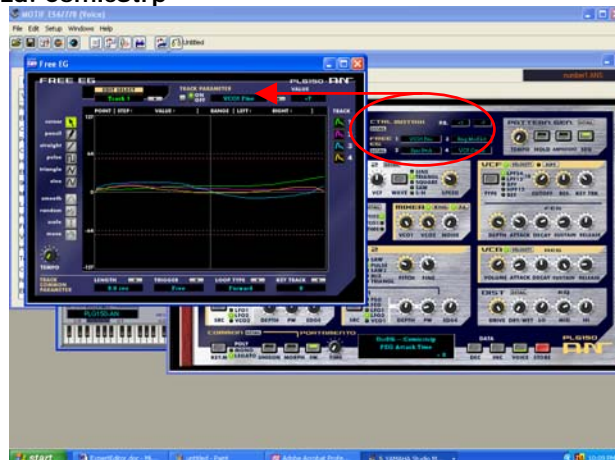
Ld: Hook Time – Dramatic changes to held notes is due to the three track Free EG. Track 1 is VCF Cutoff (green), Track 2 is FEG Decay, which causes a dramatic change in the timbre envelope (purple), and Track 3 is PWM1/Detune (blue).



Ld: Tech Fade – The fade-out is created by the Free EG; Track 1: VCF Cutoff (the filter closes slowly) Track 3: VCO2 Level is altered over time. VCO2 is the oscillator sync master, and VCO1 is the slave. Using the Display Option (shown in blue) you can see the relationship of VCO2/VCO1.



Ld: ComicStrp



The main screen of the program allows you to see at a glance what is going on in the Free EG; when you click "Detail" you get a close up view of exactly what is programmed. Each Track can be ON or OFF.

The next 16 Voices are the same as above but without the step sequence – they are ready to play normally from the keyboard.

Conclusion

The purpose of this small set of Voice data is to encourage you to start to use the very powerful tools available in the PLG150-AN and the AN Expert Editor. Creating your own step sequences with the Pattern Generator will take you back to how the early analog synthesizers worked – and you will have a better appreciation of why they are called sequences – you literally had to manually sequence (place in order) each step to create a musical line. Listen to early analog synth music and you will hear how ostinato bass lines and lead lines were constructed with just 16 steps (compare that to the 226,000 notes you can record, in real time, to the Motif ES sequencer!)

Also spend time experimenting with the four control tracks of the FREE EG tools – *back-in-the-day* you manually had to match the tempo – fortunately the PLG150-AN Free EG allows you to match the tempo by measure using the Board's clock which can be matched to the clock of the Motif ES/Motif-Rack ES. The Free EG is a way for you to automate parameters (with 59 controllable destinations) within a Voice and can be an endless resource in your music composition.

You may now have a better understanding of why all the parameters of the PLG150-AN could not be put into the operating system of the hosting product – there are simply too many (although an attempt to do that was made with the EX5, circa 1997, but you wind up with a limited function analog engine). The AN Expert Editor also allows you to assign up to 15 Control Sets in the Control Matrix... but that is a topic for another Power User Plus Pack. Until then....

Have fun... explore, experiment... and enjoy!!!

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