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# S90 POWER USER

## PLG150-AN

Advanced tutorial for the S90 using the  
**VOICE EDITOR for S90** and the **PLG150-AN  
EXPERT EDITOR**.

Includes a custom AN Board Voice Set w/128 Board  
sounds, 64 PLGUSR finished S90 Voices and details to  
maximize the learning experience

Understanding the architecture of PLG150-AN and its banks versus the Host product (S90) and its banks; How to load and use the data; How to create a hybrid Performance layering PLG150-AN Voices with AWM2 sample playback Voices; How to synchronize the PLG150-AN clock to S90 clock.

Phil Clendeninn  
Technology Products  
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The S90 Voice data is contained in a file set called "ADV\_AN.w4e" and "ADV\_AN.w5e". The ".w4e/.w5e" file set type can be read by the **VOICE EDITOR for S90** program that was included on your S90 Tools CDROM. This file can also be read directly by the S90 from a SmartMedia card. The Custom element AN Board Voice data is contained in a separate file that can be opened by the **AN EXPERT EDITOR** ("an\_orig1.ans"). You will need to bulk this file to the S90 from the AN Expert Editor. Please familiarize yourself with basic S90 and basic PLG operations before jumping in the deep end of the pool (and make no mistake...this is the deep end of the pool). Additional guides concerning the PLUGIN BOARDS can be found online at [www.sninety.com](http://www.sninety.com) in the 'Behind the Manual' section.

An excellent AN Physical Modeling tutorial can be found online at the following web URL: <http://www.digitalmusicworld.com/html/hardware/SynthsTutorial.php> Those of you with Macintosh computers will want to find the AN1x editor (shareware) and set it for PLG150-AN mode.

## Background

This sound set comes in two parts: First the BOARD Voice data, the raw custom waves are loaded to the PLG150-AN's RAM bank 036/002. Second the PLUG-IN voice data that applies S90 parameters and effects to those raw elements and makes a finished PLG\_USR bank Voice. When first understanding how the PLG boards interface with the host S90, it is important to see clearly that certain parameters are saved in the S90 and others will be saved separately because they exist in RAM on the PLG150-AN's own chip.

With this tutorial you actually get 128 Board Voices (which will load into bank 036/002 on the PLG board) from which sixty-four S90 level PLUG-IN Voices are made (in PLGUSR bank). Simply put, the PLUG-IN Voice data *points* to the BOARD Voice data, in much the same way a normal S90 Voice *points* to a particular oscillator wave, the Voice data instead *points* to an AN element on the plug-in board. This custom Board Voice data must be saved/loaded in a separate "bulk" operation. Simply put the PLUG-IN VOICE data is saved with the S90 data, the BOARD VOICE data is saved separately.

When working with the S90 and the PLG150-AN board you will be dealing with the following S90 PLUG-IN banks: PLGUSR **and** PLGPRE1. You will also be dealing with the following PLG150-AN BOARD banks: 036/000, 036/001 and 036/002.<sup>1</sup> Let's look at these banks prior to loading any data...

PLGxUSR (64) S90 **User** Plug-in Voices  
PLGPRE1 (64) S90 Preset Plug-in Voices  
036/000 AN Board Preset1 (128)  
036/001 AN Board Preset2 (128)  
036/002 AN Board **User** bank (128).

The other banks on the Board are the same Board Preset Voice data arranged for use in XG/GM voice selection/substitution schemes.<sup>2</sup> XG follows the GM Voice list but offers substitute sounds at the same Program Change number – you substitute by changing the Bank Select MSB/LSB – in other words GM bank 000/000 sound #88 is Bass&Lead, the PLG150-AN will have several alternate Voices for the Bass&Lead program. They will all be at program #88 but in different MSB/LSB banks.

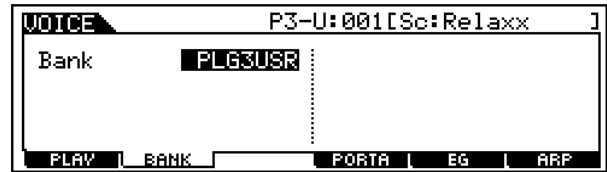
### THE BANKS YOU NEED TO KNOW:

**S90 bank PLG\_USR** – This is where you will eventually load the 64 new Voices that access

<sup>1</sup> Familiarize yourself with Bank selection – found on the main PLG Voice screen at F2.

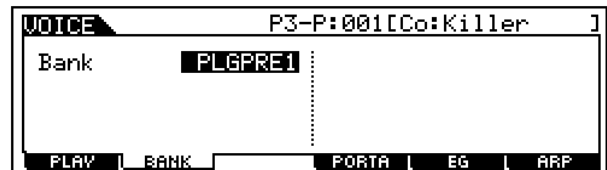
<sup>2</sup> The PLG boards can also be used in Yamaha XG rack modules, and other computer-based products that support XG/GM protocol.

data on the PLG150-AN board. "P3-U" translates to PLUG-IN slot 3 – User bank.



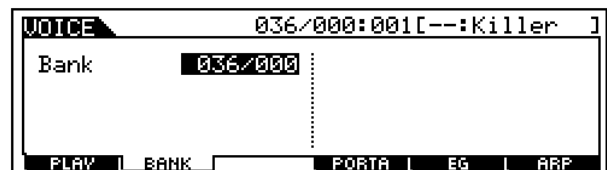
The above diagram shows an AN board in slot 3, thus the PLG"3"USR. Press the PLG button that contains your AN board. You select the BANK from the main VOICE PLAY screen by pressing [F2] Bank and then use the Data Wheel or [INC/YES] or [DEC/NO] buttons to change the current bank. You can then press [F1] Play to return to normal. Initially the 64 PLG\_USR Voices are blank. The Voices that will reside in this bank take advantage of the S90 parameters and effects.

**S90 bank PLGPRE1** – These 64 PRESET Voices are loaded in every time your PLG150-AN is detected at power up. The S90 detects which slot the board is in then loads the appropriate Preset Voice data for the board that is detected. These Voices remain in FLASH ROM of the S90 and are recalled on power up. "P3-P" – translates to PLUG-IN slot 3 – Preset bank.

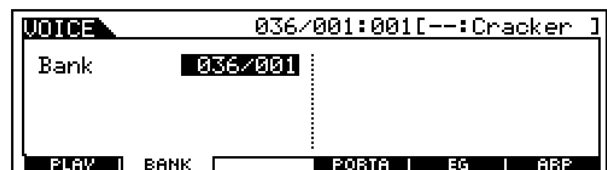


The Voices that reside in the PLGPRE1 bank take advantage of the S90 parameters and effects.

**Board bank 036/000** – These are 128 Preset1 Board sounds (raw data) – these sounds exist on the board entirely and are not assigned to S90 parameters and effects. The numbers are MSB/LSB are used for Bank Select:



**Board bank 036/001** – These are 128 Preset2 Board sounds (raw data) – these sounds exist on the board entirely and are not assigned to S90 parameters and effects. The numbers are MSB/LSB are used for Bank Select:

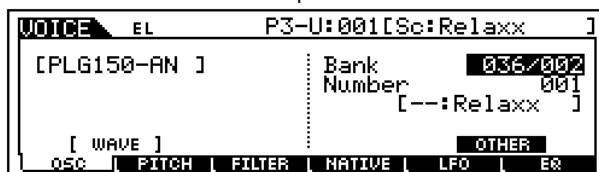


**Board bank 036/002** – These are the 128 User Board locations for custom “from scratch” sounds. This is the bank that the AN Expert Editor communicates with as USER. Initially they contain 128 “placeholder” Voices that will be replaced. We will load this bank with 128 custom elements from the original AN1x synthesizer Keyboard. The numbers are MSB/LSB are used for Bank Select. “P3-B” – translates to PLUG-IN slot 3 – Board bank.



The Voice data provided here are more advanced than our last AN tutorial. These Voices are created in the **AN Expert Editor** and require that you BULK the Board Voice data into the USER RAM bank (036/002) of the PLG150-AN, in addition to loading the S90 Voice data. RAM or Random Access Memory can be thought of as our workspace. When you purchase a Yamaha PLG150 Series board (AN, DX or VL) you can program your own custom, *from scratch* Voice-elements via the provided Editors. The reason these PLG boards are so affordable is that they are synthesizers that literally have no screens, keys, knobs etc. They depend on a host product and software to address the considerable power in the CPU of the board. The RAM area of the PLG150-AN is where you can create new sounds – as we’ll learn later you can back this up in the Editor and/or in a special “PluginAllBulk” type file after you transfer the data to the Board. Each one of the PLG150 synth boards existed as a stand-alone synthesizer at one time.

The Plug-in Voice data (S90 parameters) can be saved to a SmartMedia card in the normal fashion as part of the ALL Data file. Here is the significance of this: the S90 PLUG-IN User Voice data contains S90 parameters, effects, controllers, category prefix, etc., including the OSC/Wave page, which is pointing to the wave data on the PLG150-AN board. If the Board data is not there in the correct slot, with the correct data loaded, then the sound will not be correct. This is the screen where this takes place:



To correctly use this data will require that you select the file for the slot number in which you have your PLG150-AN board installed. The Voice data and the explanations are provided so that you have a guide when exploring the vast possibilities opened by the AN Expert Editor. Make sure the descriptions match what you are hearing. If you are getting started with ANALOG synthesis, you will find exploring these custom Voices, originally programmed for the Yamaha AN1x keyboard, a valuable learning tool.

**THE DATA:** (Before you load this new data SAVE YOUR OWN DATA FIRST)... The provided data will overwrite internal USER data.

#### Files included:

“AN\_orig1.ans” for AN Expert Editor (Custom Board Voice data)

“ADV\_AN.w4e” and “ADV\_AN.w5e”<sup>3</sup> for Voice Editor for S90 (S90 PLUG-IN Voice data) slot specific files

#### How to LOAD the data:

STEP 1: S90 PLUG-IN Voices are contained in the .w4e (and .w5e) file. This can be opened directly by the **VOICE EDITOR for S90** or it can be placed on a SmartMedia card and read directly by the S90. Go to CARD/ F3 LOAD/ VOICE EDITOR type. Because this type of VOICE EDITOR file writes over **all** the internal sounds when loaded from SmartMedia card, this file contains a backup of the 128 factory USER VOICES, the 16 factory USER DRUM kits, **and** the indicated 64 **PLG-USER PLUG-IN Voice** data. If you open this with the Editor you can just select to send the PLUG-IN Voice bank you need. (But when loaded from SmartMedia it will write over **all** the internal sounds.) Click on the TRANSMIT MIDI icon (5-pin cable icon) and then select the appropriate PLUG-IN bank and send it. The S90 screen should indicate that it is receiving the data.

STEP 2: This is just half the battle because without bulking in the custom AN Board Voice data, those S90 Voices will be pointing to the wrong AN oscillator wave element.<sup>4</sup> The Custom Board Voice data can be opened by the AN EXPERT EDITOR (.ans type file). To set this editor up and send the data to the PLG150-AN follow these simple steps.

<sup>3</sup> Although the .w5e file is a ghost file it is an important component. Treat it and the .w4e file as a set, always in the same folder.

<sup>4</sup> A S90 Plug-in Voice will point to a specific Board bank location. This can be viewed from VOICE mode: Press EDIT/ Use Track [1] button to view the Element level edit parameters/ F1 Osc/ SF1 Wave

- Ensure all USB(MIDI) or MIDI IN/OUT connections to the S90.
- On the toolbar of the AN EXPERT EDITOR find the 3<sup>rd</sup> icon, the SETUP icon (a little checklist) and click it and set your INPUT and OUTPUT communication.<sup>5</sup>
- Select the tab that reads INSERT & TRANSMIT
- Select the ALL VOICE button and set the range from 1 to 128. (Although only 64 S90 PLUG IN VOICE were loaded to the PLG\_USR bank, there are 128 AN sounds in a Board user bank 036/002 – so there is plenty of extra data for you to play around with when you're ready.) Feel free to make your own S90 PLUG IN Voices from this data and replace those that don't suit you in the PLG\_USR bank.
- On the S90 select PLG button for your AN board and select the A01 location.
- "Click" on the MIDI transmit icon to send the bulk file. It will arrive in bank 036/002 – this is the Board Voice bank to which the S90 PLUG-IN Voices point. Notice that the S90 screen does **not** indicate it is receiving – this is normal. The PLG150-AN is deep within the S90 and does not have a screen of its own. It will use your computer's screen to give you progress. The PLG150-AN can do nothing now but receive – the data is going directly to the board (not the S90). That is why the progress report is in the software not the S90 screen as it was with the PLG\_USR Voices.
- Close the editors and PLAY. We will get back to them later. If you leave one of the editors open you will need to turn LOCAL CONTROL = OFF on the S90 to avoid a loop; If you close the Editors you will need to turn LOCAL CONTROL ON. UTILITY/ F5 MIDI/ SF2 Switch

Make sure you select the PLGxUSR **bank**, where x is your board slot. To select banks go to the main Voice PLAY screen by pressing the [PLG] button for the AN board, if necessary, press [F2] Bank and use the [INC/YES] /[DEC/NO] buttons or the DATA WHEEL to switch banks. Then select sound A-01 "Sc: Relaxx". If your board is in slot 3, your main VOICE screen should read:



P for PLUG-IN  
3 for slot 3 (or your slot number)  
U for User bank

<sup>5</sup> Remember there are two MIDI Setups in the program: MIDI Device IN/OUT and MIDI Port IN/OUT

NOT:



It is important you see the difference. The top screen is a Px-U (User Voice with S90 parameters). The bottom screen is a Px-B (Board Voice without S90 parameters).

The Voices in this set are variations of those that were in the Yamaha AN1x analog physical modeling keyboard synth (1997). As you go through these sounds, remind yourself that these are not made from samples...there are NO SAMPLES in the AN technology. This is 'pure synthesis' using a physical model of analog synthesizer circuitry. The tones are pure and "in-your-face". Read through these Voice descriptions as you play – they show off some of the more radical things that can be done with the AN engine. Not all of the sounds are constructed to be played like a piano – some are constructed for a specific purpose that may require an explanation. Please read the description - It will not be a waste of time, promise. Be sure to select the PLGxUSR bank.

#### S90 Voices PLG\_USR A:01 – D:16

##### 001: Relaxx (arp; 5-note poly)

This is part of the very first sound in the AN1x synth keyboard. There it was layered with strings. Here, since the PLG150-AN is one engine, where the AN1x had a dual AN engine, just the arpeggiated segment (SCENE 1) appears. When converting AN1x Voice data on SCENE 1 data is loaded. We will layer this with S90's luxurious strings later in this tutorial and sync the PLG150-AN's arpeggiator with the S90 clock so we can add drums.

##### 002: Terraform (mono/step seq)

This is a special AN split mode called "Pattern Select & Note Shift". Each note on the left side of C3 *selects* a different step-sequence (pattern) and notes C3 and above transpose the step sequence up or down with C4 being the normal octave. Try this to get the idea: Hit the Ab below middle 'C' – it plays a familiar riff from that first Eddie Murphy movie in Beverly Hills. Now hit the 'C' above middle C – this is the normal octave. Hit C3 – it drops an octave. Hit C5 it goes up an octave from normal. Use the S90 [CONTROL FUNCTION] button to select the Cutoff and Resonance parameters to alter the sound of this Voice. Remember when a slider icon in this area is 'clear'

it is not yet active. You must move it to 'pick up' or hook the current value – this is to prevent the parameter value from jumping to the current value, you can smoothly go 'get' or 'hook' the value. When the control (slider icon) goes dark you have control. You will discover when you begin to explore, that the PLG150-AN has its own unique physically modeled filters, that you will be able to assign to specific control numbers (via AN Expert Editor) in the AN's Control Matrix. There are some 15 Control Sets in the AN Expert Editor – you can set a range for the control or assign it "Direct" control. Direct control makes the assigned controller a minimum-to-maximum control range. This Voice is velocity sensitive.

### 003: Celluloid

The Celluloid bass sound gives that ripped speaker sound that so many people love, and it does it without actually ripping your speakers.

### 004: Major Brass

This is a classic analog brass sound. Sawtooth waveforms rule! Work with the CONTROL FUNCTION select to change CUT and REZ parameters to alter the tone. One of the skills in playing the early analog synthesizers, like the Prophet V, was learning to say it all with just 5-notes of polyphony. Of course, with multiple PLG150-AN boards you can double or triple the polyphony using the POLY EXPAND feature. <Not getting 5-notes? Check for a MIDI loop...turn LOCAL CONTROL OFF or turn off the editor>

### 005: Soar (arp)

This Pad voice uses the AN board's arpeggiator to create its rolling cascade. PLG150-AN tempo has been set to 'MIDI' which slaves it to the tempo of the S90. To change the tempo in real time use the [CONTROL FUNCTION] to select the top row of functions, you can store which Functions you want a Voice to default to when you initially recall it. If you do make a change, remember to re-store your S90 ALL file. If you make a change to the PLG150-AN parameters in the Expert Editor, remember to STORE in the Editor, then TRANSMIT to the PLG150-AN and then update your PluginAllBulk file.

### 006: Hardcore Split (mono seq/poly)

A wicked bass sound with a step sequence below middle 'C' and from middle 'C' and above is a playable version of the sound. Trigger a note in the left – solo in the right.

### 007: Uni-Bass (mono Seq)

A funky synth bass Voice. Explore your CONTROL FUNCTIONS: Tempo, CUT/REZ, etc. This is a step sequence created in the AN Expert Editor with a FREE EG applied to make the sound vary over

time. FREE EG is a special user controllable envelope generator that records movements. You can hear the filter cutoff rise and fall here – notice it is clocked to the tempo. You can actually have up to four separate parameters rhythmically controlled. Touching a key transposes the step sequence. Later we will combine this with a S90 drum arpeggio. This is a great one to experiment with when learning about FREE EG in the AN Expert Editor.

### 008: MegaDrone (mono)

Thick lead or bass Voice. This sound has the classic filter envelope that moves as a note is held and has a release sweep when the note is let go. If you want to learn about envelopes, this is a great one to experiment with in the AN Expert Editor. An envelope controls the 'shape' of the sound. There are AMPLITUDE, PITCH and FILTER envelope generators in any analog synth engine. These control the loudness, frequency and tonal quality of the sound over time, respectively. Take note that the filter envelope here is velocity sensitive – the faster a key is played the deeper the filter sweep. A major thing to learn is that if your amplitude envelope ends before your filter (or pitch) envelope, you will not *hear* the results. Or if your filter envelope completely closes the filter before the amplitude or pitch envelopes complete their cycle, you will not hear the full results. Envelopes deal in time.

### 009: SyncLead (mono)

Classic oscillator sync sound. Jan Hammer (one of the pioneers of the MiniMoog) comes to mind and his rippin' lead duels with Jeff Beck and John McLaughlin. The pitch of the second oscillator is forced to the pitch of VCO1. Because the fundamental pitch of VCO2 is tuned higher than VCO1 you get this type of nasal thin result, "oscillator sync" –makes a mean lead sound. Please explore in the AN Editor the signal routing for Oscillator Sync.

### 010: Legato

Analog strings. If you weren't around back-in-the-day, you may not think that this sounds even remotely like strings, but back then, string sounds had this kind of silky pad-like quality. They *functioned* 'like' strings more than they *sounded* like strings. Both strings and brass sounds are built from sawtooth waveforms.

### 011: Mini (mono/seq)

MiniMoog sound with step sequence. Pattern Select & Note Shift. Each note below middle 'C' selects a different step sequence, while notes 'C3' and above transpose the phrase up or down around the center key C4. The Voice is velocity dependent, as well. Tempo is locked to S90 Clock.

Velocity sensitive – remember the original “real” MiniMoogs were not.

**012: Alan** (mono/seq)

This one is a step-sequence that note-shifts and is synced to S90 clock.

**013: Chemical**

Special effect sound. How'd they do that? That is another “FREE EG” in action. The VCA volume is altered rhythmically (it is actually a one bar pattern of volume change). Changing the S90 tempo will also alter the tempo of the AN board clock. This is accomplished on the PLG150-AN when you set the AN ARP/SEQ's tempo = midi. [Control Function] can be set so that a particular Control Slider function row is active. Here CS4 defaults to TEMPO.

**014: SyncSweep**

Polyphonic synced oscillator sweep. You have to have one of these.

**015: Caner**

Bright, buzzy-brassy sound. Full can be a lead or a section type sound. Naturally this is built from a Sawtooth wave.

**016: Chick**

The very basic sawtooth lead sound associated with one of the all-time great (musicians). Chick is a huge fan of Yamaha and any day now he will call and ask how to add the Foot Controller to control the cutoff frequency. One of the true perks of this gig...

**017: Doves** (mono/seq)

Monophonic pattern step sequence.

**018: We All :**

Unique voice experiment where the AN board “talks” to you. Yes, there is a step sequence involved so you can clock this strangeness. In the AN1x the second element (SCENE 2) said, “Die”, as in “We All... Die”. Yikes! Since I transferred only SCENE 1, the “die” part is thankfully left out. Did you realize that analog could talk? Could take a lifetime to master...

**019: Da Padd**

Classic smooth analog pad, with cutoff on *aftertouch*. Very expressive.

**020: Earth**

A vocal-type pad sound. Single note lines can sound ghostly and eerie.

**021: Vinnie** (arp/split)

Polyphonic arpeggio in the left hand – Playable voice in the right hand. Here the arpeggio hold is

set to fulltime on in the Editor. If this is not your cup of tea, you can change this in the Editor.

**022: Detroit** (arp/split)

Polyphonic arpeggio pattern in the left-hand. This time with arpeggio hold off (stops when you let go). A polyphonic playable version of the sound is in the right-hand.

**023: Plastik** (seq)

Noise, in the step sequencer with FREE EG controlling 4 parameters. Great one to explore in the AN Expert Editor and learn from.

**024: ChinaTech** (split)

Noise, in the step sequencer making a definite rhythmic pattern –split with noise hits.

**025: Silence**

Not really, just a quiet smooth analog pad sound. Cloud-like

**026: Dog Bass**

Gangsta-type bass sound, with an edge, use MW (carefully) to “bottom out” the sound. Speaker rattler – use with **extreme** caution, or not. If you don't have a sub – you wished you did with this Voice.

**027: Slum**

Urban BIG bass sound

**028: Loud**

As the name says, a loud spikey bass sound.

**029: MiniLow**

Classic MiniMoog bass sound

**030: Kick Bass**

Deep snappy bass ideal for matching with a Kick drum

**031: Sub Sub**

You really cannot appreciate this one without a sub, sub-woofer, that is. If it isn't phat enough, go into the next room and listen! Room shaker...

**032: Hardstep**

A Drum ‘n’ Bass favorite, descending bass. PEG (Pitch Envelope Generator) is used to make VCO2 drop off the table.

**033: Wonder**

Stevland Morris (aka Stevie Wonder) ‘boogie on reggae woman’ type bass sound. Lots of juice on velocity.

**034: Duck Bass**

A variation on the Wonder bass with less spike and more sub tone.

**035: Prophetic**

Classic Prophet V (Five) bass sound.

**036: Harmosync** (seq/split)

Notes below middle 'C' are under control of a legato step sequence – notes middle 'C' and above are a playable version of the sound.

**037: Kangaroo**

Like above, except that arp HOLD is on in the AN engine – right-hand is poly over pattern.

**038: Acid 1**

A split with step pattern sequence in the left with lead in the right. Carefully this sound is Loud and Rude!!!

**039: Acid 2** (mono seq/mono)

A split with step pattern sequence in the left with a lead in the right. This time it is an "either/or" situation because of polyphony assignment (legato). In the AN Expert Editor you can reassign the POLY/MONO/LEGATO parameter to suit what you need to accomplish.

**040: Acid 3**

Nasty noisy distorted bass sound

**041: Soft Brass**

Think Toto and old big analog synths.

**042: Hard Brass**

As advertised

**043: Bronze**

In between the two above

**044: Fatty**

Phat analog brass, can't have enough variety

**045: Quincy**

Brass with a synth flair. The little filter bit gives it a definite "synthy" aire.

**046: CS80**

Over 200lbs in weight the CS80 was "grand daddy" of the analog synths (or at least the heavyweight champ) with its unique grand brass tone. Aftertouch changes harmonic content.

**047: Tangiers**

More Brass with just enough detune to make you think it is truly analog. Yes, tuning was actually a major problem back then!

**048: Brassmorph**

One more Brass sound for good measure. In the AN1x you could morph one sound into another. The AN Expert Editor and PLG150-AN will allow you to set up a Voice that you can MORPH TO. In

other words, you can pick a Voice that is like "home" and you can assign a controller that when moved will "morph" you to your home sound from whatever AN Voice you happened to be playing. Check out MORPH in the AN Expert Editor. You can set this up in the S90 on the UTILITY/F6 PLUG/ NATIVE parameter pages.

**049: Analog**

Analog strings in their shimmering glory. "...more string-like than actual string sounding..." Simple sound but that was what it was about. Do not compare analog strings to sampled strings – you would be missing the point.

**050: Lush**

Analog strings to the max

**051: Chocolat**

Smooth, silky analog strings.

**052: Stringz**

More analog strings

**053: String P**

Poly strings

**054: Billy**

Synth Comping sound – not too phat, cuts through without being too bright either. Sound is reminiscent of the Rhodes (Arp) Chroma.

**055: Fetish**

Unique nasal tone. Use the CONTROL FUNCTION Sliders on CUT/REZ. Long held notes do some wacky stuff. Default CS control for Cutoff and Resonance are CS1 and CS2.

**056: P-5 Comp**

Prophet V comping sound – will sound just like the Prophet V, if you bypass all the effects (wrong decade for effects on synths). Actually this sounds like the Prophet after much work in a \$100,000 studio circa 1978. That's about what it took to get "this" sound "back in the day!!!"

**057: Stakka**

Synth comp sound made from stacking oscillators.

**058: Dust**

Synth comping sound with tempo delays.

**059: WarmPoly**

The sound of mid-eighties, mid-priced synthesizers like the Poly 6 and Juno 6

**060: Rhubarb**

Like having a polyphonic ARP Odyssey (the original ARP Odyssey was 2-note poly, \$995 retail).

### 061: Susy

Heavy lead sound. Susy is no lightweight.

### 062: OB-8

Oberheim OB8 type sound, complex, rich, loud and slightly detuned. Oberheim OB8 were like expensive and big.

### 063: Lucky (legato)

Keith Emerson's simple square wave lead changed everything for synthesizers and rock music.

### 064: Earth Lead (legato)

Soaring synth lead, lots and lots of expression. George Duke, ARP Odyssey-like lead synth sound. Notice the difference between mono mode and legato mode...it has more to do with how notes connect and perform then just "one note" of polyphony (sic).

## Using PLG150-AN Voices in a S90 Performance

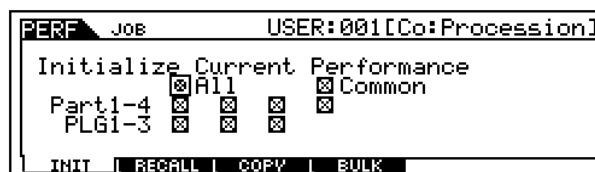
This is extremely cool. The PLG150-AN board has its own clock that runs an **Arpeggiator** or the 'old skool' **Step-Sequencer**. By setting the PLG150-AN's clock to 'MIDI' you will synchronize it with the S90's clock. And, yes, it is possible to use the S90 arpeggiator to affect the AN board and, yes, it is possible to have both arpeggios running simultaneously.<sup>6</sup> You can have both arpeggios running in sync. Setting up Performances in the S90 can be done very easily. All Performances are USER (RAM) – therefore we will be writing over data in the Performance bank. Do not worry you can always recover the original data whenever you wish by doing a Factory Set. You will need to save any changes you make here, however, if you want to keep them long term.

This guide will only attempt to point you in the direction of the endless possibilities. Please follow it carefully and once you have accomplished what the guide attempts to point out, feel free to explore and create your own path.

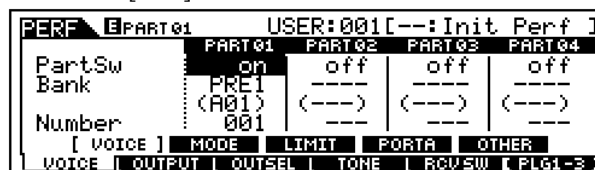
### EXPERIMENT #1:

- Press [PERFORM]
- Initialize a Performance/ Press [JOB]/ [F1] Init
- Set the ALL box/ This will give us a Performance with one internal AWM2 Voice active. Press ENTER/ Yes to execute.

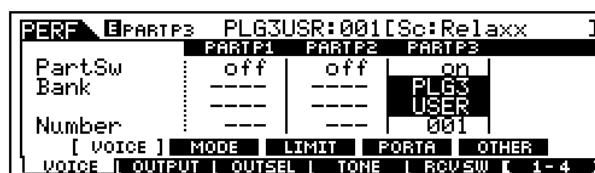
<sup>6</sup> You cannot have the AN arpeggio trigger the internal S90. It is not necessary as the AN patterns are all available in the S90 arpeggiator list.



- From the main Performance screen push [EDIT]
- To select Voices for the first PART press the Track [1] button (selects PART edit)/ [F1] Voice/[SF1] Voice



- Notice Part 1 has its Part Switch set to ON. Move the cursor down to the BANK or NUMBER parameter to select a Voice number.
- Press [Category Search]
- You can use the CATEGORY SEARCH<sup>7</sup> to select appropriate sounds. The category names are written beneath the Memory and Bank Select buttons on the right front panel. Each Category may have a number of sub-categories that can be reached via the "F" buttons directly under the screen. For our experiment here select a STRING sound from the Ensemble sub-category, [F2], for PART 1, like "PRE2 A-11 Ens Mix". Press [ENTER] to lock it in.
- Now press the [F6] button to view the PLUG-IN board Parts P1-P3<sup>8</sup>.



- Move the cursor to the Px slot that represents your PLG150-AN board. (Slot 3 in the example above).
- Turn the PART SWITCH to ON – this will activate the sound. Move the cursor down.
- Select Bank **PLGxUSER** where x matches your slot number. Only the proper boards Voices can be heard through the designated slot (even though you can see the Voice names of other board Voice banks, the

<sup>7</sup> Category Search can be used any time you are on a VOICE or BANK select parameter. Here the NUMBER parameter indicates the Voice number. The name will appear in the upper right hand corner of the screen

<sup>8</sup> Note the difference: **Part 1, 2, 3, 4 etc.**, are AWM2 sampled Voices, while **Part P1, P2 and P3** are Plug-in board parts.



parameters only make sense to the correct technology. Simply match the PLG number to the slot.) Move the cursor down to NUMBER

- It should already be on **Number: 001 Sc:Relaxx**.
- Push STORE/ [ENTER]/ [YES]

**TROUBLESHOOTING:** From the Main Performance PLAY screen [F1] you can select [F3] Voice to see an overview of the sounds in any Performance. Notice that you have a PART column on the extreme left of the screen, with PART 1 and Part Px active. That little Px means that that slot is reserved for the PLG150-AN Voice data, ONLY. When you have multiple boards you need to look for your Voices through the appropriate slot. If you do not see the Px number for your slot you cannot recall a voice there...you must go to edit and turn the PART SWITCH ON.

- On this F3 quick-edit VOICE screen you can set key ranges. By layering the string sound with the AN Relaxx sound, we have created a hybrid sample-playback/analog sound.
- Make any further changes then push STORE/ [ENTER]/ [YES]
- When you are ready to explore on your own, press the EDIT button and go for it. You can work with the S90 parameters, add effects, filters, etc. Remember when in Performance EDIT there are 2 levels: the COMMON button (next to the Data Wheel) gives you upper level parameters. While the Track buttons 1-4 gives you the individual PART parameters and the ability to select from internal S90 sounds Parts 01-04 and Plugin 150 Series boards in Parts P1-P3.
- The INSERTION EFFECTS can be recalled for any single PART in a Performance. This includes the PLUG-IN PARTS, as well.

**EXPERIMENT #2:** Now let's try using an AWM2 Drum kit with arpeggio drum pattern and combine it with a PLG150-AN Voice that is using the board Step Sequencer.

- Initialize a new Performance using the method we used above.
- Push [EDIT]
- To select Voices for PART 1 press the Track [1] button/ [F1] Voice/[SF1] Voice
- Notice Part 1 has its Part Switch set to ON. Move the cursor down to the BANK and NUMBER parameter to select a Voice number.
- Use [Category Search]
- Use the CATEGORY SEARCH to select your favorite DRUM kit.
- Press [ENTER] to return to the EDIT screen.
- Now press the [F6] button to flip the view to the PLUG-IN board Parts P1-P3.

- Move the cursor to the Px slot 1, 2 or 3 that represents your PLG150-AN board.
- Turn the PART SWITCH to ON. Move the cursor down.
- Select Bank **PLGxUSER** where x is your slot number. Move the cursor down to NUMBER
- Select PLG\_USR 007 Uni-Bass (an AN Voice with a step sequence)
- Press [STORE] and store your work.
- Now from the main Performance Play screen press [F6] ARP.
- Switch the ARP ON
- Check the PART SWITCH box for the AWM2 Part (PART1). Assign the following drum groove arpeggio: from the DR category in PRE 1 find **Dr:BIG BEAT C**
- If you choose to put HOLD = ON it will effect the drums only (not the PLG150-AN sound), you are responsible for starting on time. It is just like playing with a drummer. Try both Hold ON and OFF to see the difference. The PLG150-AN sound is programmed with HOLD OFF for the step sequence. This can be edited in the AN Expert Editor.
- When you adjust the tempo via the CONTROL FUNCTION Slider, both the PLG150-AN Step Sequence and the S90 Drum arpeggio will adjust.
- When you hit, ARP ON/OFF they both stop. Although the PLG sound is under separate orders from its programming.
- Later please feel free to do so and explore all the possibilities.
- If you are not getting any arpeggiation at all check that you have the S90 set to INTERNAL MIDI SYNC and that the CLOCK OUT parameter is ON. These can be found in UTILITY/ F5 MIDI/ SF3 SYNC.

#### Which Editor for what functions?

The **Voice Editor for S90** can be found on the CDROM that comes with your S90 and the **AN Expert Editor** can be obtained for free on the Internet.<sup>9</sup> In a previous Power User, we worked with PLG150-AN Voices that were derived from the PRESET sounds on the board. This Power User/ Voice set can be found in the S-Mart under PLUGIN BOARDS, PLG150-AN FEATURES. What's new about this set is we are loading in custom 'from scratch' Board Voice data making use of the special RAM bank (036/002) on the PLG150-AN<sup>10</sup>. When you want to make an in depth edit to the analog sound itself you would go into the AN

<sup>9</sup> The PC "stand-alone" version of the Editor can be found at [www.yamahasynth.com/](http://www.yamahasynth.com/) Mac versions of editor for PLG150-AN can be found at [www.xqfactory.com](http://www.xqfactory.com) in the DOWNLOADS section.

<sup>10</sup> The RAM Bank 036/002 will always revert back to a default voice set when you power down. Think of those Voices as simply "placeholders".

EXPERT EDITOR. The VOICE EDITOR for S90 (is fundamentally the front panel of the S90 brought to your computer screen) lets you point to any PLUG-IN board that might be installed. And although it lets you program a good number of the board parameters via offsets, the fundamental wave and inner structure of the analog engine must be edited in the AN EXPERT EDITOR. When working with either editor you will need to be aware of the dreaded MIDI loop. The MIDI setup with your computer will require two-way communication.<sup>11</sup> So you may want to work with LOCAL OFF during editing procedures. Each PLG150-AN is 5-note poly so you will quickly begin to recognize when you are getting doubling (it has a distinct sound) and reduces your polyphony. If you have 2 or even 3 PLG150-AN boards and wish to use the POLY EXPAND function, you should bulk the .ans file to each board individually and then turn POLY EXPAND to ON. When Poly Expand is ON the boards will automatically function as one 10 or 15 note polyphonic analog synth.

#### IMPORTANT:

- When working with the Voice Editor for S90, you can double click on the name of the PLUG-IN Voice and its data will open and can be heard in the edit buffer of the S90.
- When working in the AN Expert Editor, you can open the VOICE list and upon highlighting a sound its data will be sent to the PLG150-AN/S90 **edit buffer** and can be heard as you make the edits.

Always work exclusively in the Editors during the editing process. Save your work in the editors. Then you can send (transmit) it to the S90 via the software's bulk send functions. Just because you hear it in the S90 (edit buffer) does not always mean you can save it directly to memory. In the case of the PLG150-AN you will need to BULK the data from the Editor to the PLG150-AN.

Anticipating some questions:

#### **Can you assign controllers separately to the drums (AWM2) and the bass (PLG150-AN)?**

Yes, there are some 15 controller sets available for the PLG150-AN. You will find them in the **AN Expert Editor** under the CONTROL MATRIX detail. With some planning you can figure how to use some other control numbers than the usual, 74 and 71 (which are universally assigned to cutoff and resonance) to work the AN's filters. For example, you could have the assignable Sliders that send cc16 and cc17 control the Filter on the

AN independent from the internal sound. To do this you would go to the Controller Matrix in the AN Expert Editor and assign Cutoff and Resonance to controllers numbers 16 and 17, respectively. Now when you use AS1 you will be controlling the cutoff of the AN bass sound, and AS2 will be controlling the resonance of the AN bass sound. The CUT and REZ of the CONTROL FUNCTION will control the filter overall.

#### **Can the AN sound use the S90 effects?**

Of course, use your common sense and be careful not to overdrive the effect. Analog sounds tend to be unruly, in a good way. Choose your effects wisely. (The PLG150-AN has its own built-in distortion processor and EQ on the board). Go into the VOICE EDITOR for S90. There you can see all the front panel parameters of the S90. You will even see how it points to a PLG150-AN sound (you do have limited editing access to the AN sound via offsets – just like from the S90 front panel). The Voice Editor for S90 is the front panel of the S90.

#### **Will all drum grooves fit with the AN step sequences/arp?**

No, this is a musical thing. Just because two things are in sync tempo-wise does not mean that they will always *work* together musically. The 'feel', the swing, the 'vibe' may be totally different. You will have to use your musical sense to decide what works and what does **not** work.

#### **Can I use the PLG150-AN arpeggiator to trigger S90 sounds?**

No, however, all of the arpeggio types (40) that are available on the PLG150-AN arpeggiator are included in the S90's own arpeggiator (256 types). You only need find it and apply it separately to the S90 Voice in question.

#### **How come the Board Voice data is loaded in a separate operation from the Plug-in Voice data, wouldn't it be easier if they went together? Is Yamaha going to fix this in an update?**

To answer the second question first, no. The fact that the PLG150-AN plug-in board has no screen, no controllers, no LEDs, virtually no way to communicate with you when you take it out of the box, has everything to do with why it is addressed separately. The concept of putting the engines together in one box was done in the previous keyboard workstation from Yamaha, called the EX5. The EX5 combined the sample playback engine (AWM2) and several other synthesis engines in one unit (VL, AN, FDSP). The user was

<sup>11</sup> Use either the USB (MIDI) hookup or if you use standard MIDI make sure you have both IN and OUT from the S90 to your interface.

asked to allocate the use of the DSP<sup>12</sup> blocks that were used to generate the physical modeling synthesis engines. You could, if you used *just* sampled AWM2 Voices, apply Dual Insertion Effects to 4 separate parts out of 16 in a MULTI. Or you could “trade-in” 3 Dual Insertion Effects for a DSP-based physical model Voice (FDSP, AN or VL). It took the power of three dual effects (6 DSP blocks) to generate the computational muscle for the physical modeling engine. Because the EX system required the user “know” the synthesis engine in use, it was way, way too complicated for the majority of the target market. (Add another WAY to that “way, way too complicated”...) All some people ever knew was that they were OUT OF RESOURCES and all they did was add one little ol’ real-time calculated, DSP-based, physical modeling Voice to their mix. By making the alternate technologies available on separate plug-in boards Yamaha is able to make those synthesis engines available with their own DSP resources, which lowers the overall cost of the basic host unit. Of course, you want these synth engines to be fully programmable, and *naturally*, you do not want to pay for unnecessary hardware/firmware that you are not using... Hmm, how did Yamaha solve this? When you buy a PLG150-series plug-in board for your S90, you are not just buying some factory sampled sounds (like other company’s boards) you are buying an entire synthesis engine. In the case of the AN, DX, and VL boards it is a *fully programmable* synthesizer engine that is **not based on samples**. You can make your own, ‘from scratch’ voices in these ‘pure’ synthesis engines (analog physical modeling, FM synthesis and acoustic physical modeling). Technically, the PLG150-PF, PLG150-DR and PLG150-PC boards are not “fully” programmable because they are based on AWM2 sample technology. They would have to have the ability to sample in order to be fully programmable.

To make the PLG150 synth boards programmable, Yamaha could have put the parameters in the S90 – making the operating system even bigger with pages and pages of parameters you would never use until you added the appropriate board. This would be wasteful and cumbersome to deal with. In order for you to create your own Voices, the board must have RAM (a dynamic memory area in which you manipulate data to create new Voices). You communicate to this RAM area of the synth boards via a two-way handshake (system exclusive bulk data). Only the performance-oriented parameters are addressable from the screen of the S90. “Full editing” is done in the

provided computer software, the AN EXPERT EDITOR. If you **do not** want to edit, you can still take advantage of the ability of these boards to import new data that is made by others. Taking the board’s editing parameters “out of the keyboard” made it possible to make the boards the unbelievable bargains that they are. The trade-off is that you can only reach full edit parameters from a computer. For some people this is exactly how they would prefer to edit and sound design. You can edit and archive, assign controllers (the AN board has 15 Control Sets to play with) with the editor. The board can be edited in real time via an edit buffer. In other words, when you click on a Voice in the AN Expert Editor, that data is sent to the special edit buffer so that you can hear your edits as you make them. Please work entirely in the editor, if you make changes on the S90 front panel those edits are not reflected in the software. Often people wonder where the changes they made went when they later try to recall the Voice. Edit in the software then bulk the data to the PLG150 inside the S90. Once you have bulked your custom sounds to the AN RAM bank and have made your Voice edits, back up the Voices to SmartMedia or SCSI and the custom Voices to a PluginAllBulk type file.

All that said, when you have a fully loaded S90 you can automate your boot-up condition. For example, you have a PLG150-DX in slot 1, a PLG150-VL in slot 2 and a PLG150-AN in slot 3, create the following files:

An ALL data file named “**AUTOLOAD.w4a**” This saves all USER Voices (including the PLUG-IN Voices but not the custom, ‘from scratch’ RAM banks of the PLG150 series), Performances, system...*everything* but the PLG150 custom Voices.

Create a PluginAllBulk1 file named “**AUTOLD1.w2b**” to save the 64 custom DX RAM user bank 035/000

Create a PluginAllBulk2 file named “**AUTOLD2.w2b**” to save the 6 custom VL RAM user bank 033/002

Create a PluginAllBulk3 file named “**AUTOLD3.w2b**” to save the 128 custom AN RAM user bank 036/002

If your files are named *exactly* like above, you can then point the startup AUTO LOAD routine to this folder (UTILITY/ [F1] General /[SF4] Other then use GET above [SF5]). One set of auto load files can be in the root directory at a time. Or if you have several different sets of loads, you can make FOLDERS to contain your auto load files. Name the FOLDER something that identifies one auto load from another (since they all will have the same names). If you play live, it would be smart

<sup>12</sup> The same DSP (digital signal processor) blocks responsible for the effects can be used to do the calculations for the physical modeling engine.

to save them in folders designated for each set - i.e., Set1, Set2, Set3, Set4, etc. Now when you power up the S90, it will restore all your work automatically.

Happy programming...

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