YAMAHA Power User

SU700 LOOP FACTORY

SU700 Concepts

The concept of mixing with the SU700 is best summed up this way:
"The SU700 provides many features for editing and adjusting the sound of your songs. You can build up songs one track at a time; and you can Overdub or Replace recording on any track over any selected part of the song. In general, song recording is a repetitive, interactive procedure, as you move back and forth adjusting the sound until you finally achieve the results you want."

Specification - Benefit

- **40 sample tracks –** Each sample has its own track and, unlike other systems, there are no severe limits to the number of samples that can playback simultaneously.
- **64-note polyphony –** maximum number of samples playing back at one time is only limited by the total polyphony. With stereo samples counting as 2 notes, any combination of stereo and mono samples that totals 64 notes is possible.
- **MIDI sync, MTC (slave) –** SU700 allows the user to sync sample loops to MIDI clock with ease. This means that the SU700 works perfectly with external sequencers and digital multi-track recorders.
- **3 Effects processors** – nothing extra to buy here. The 3 on-board effect processors each have 43 effect types including 18 types that can be synchronized to the tempo. Effects can be applied to data at the Audio In and can be applied during resampling.
- **Ribbon Controller –** allows the user to scrub audio samples, "scratch". The Ribbon is also assignable to 16 other real time parameters. Use it as a fader for level, pan, effect sends, sample length, filter cutoff, resonance, etc.
- **32,000-note sequencer –** This 'spec' is bound to be misunderstood. Especially if you are thinking in terms of a "traditional MIDI" sequencer. The SU700 sequencer is **not** a traditional MIDI sequencer. It is a specialized recorder that documents mix automation. Note-ons and note-offs are used on Composed Loop and Free tracks to start and end the playback of audio clips. A single note-on can trigger a single event or several minutes of music. Note usage, therefore, is quite different then on a MIDI sequencer. The 32,000-note specification here goes a long, long way. ***Don't use the specification without the explanation.***
- **Time Compression / Expansion –** the SU700 LOOP tracks handle this in real-time by slicing sample loops in to segments and giving you control over the slices. As tempo is increased or decreased the slices are shifted closer together or further apart, respectively. You can use the Sound/Length parameter to adjust the length of the slices to eliminate overlapping or gaps in the audio. This time stretching means sample loops of various tempos can be used, instantly, in the same song. Some units take as long as 40 minutes to time stretch a 2-second sample. The SU700 automatically calculates the number of beats and the tempo (BPM) of data placed on LOOP tracks. The time stretching is a function of the sequencer tempo, along with the start and end points of the sample loop. Therefore, the time stretching happens only when the sequencer is running.
- **Expandable –** The SU700 is entirely RAM based – there are no preset sounds. (Why? Sounds in this new trend market change faster than the stock market). The unit has 4 MB of RAM right out of the box. Those that are serious about their sampling will want to immediately expand the RAM memory. There are 2 SIMM slots on board capable of holding a pair of 4/8/16 or 32 MB boards. The maximum total RAM is 68 MB. This is over 6 minutes and 48 seconds at the highest resolution and over 101 minutes at the lowest! (The actual amount of sample time will fall somewhere in between). Those that are expanding with RAM will also want the SCSI option. The SU700 can save data to multiple floppy disks but it gets really unwieldy when you go beyond 4 disks per load. The SCSI option is called ASIB1 and

retails for $249. It is a SCSI-2 connector - 50 pin. The SU700 can work with external SCSI devices like CD-ROMs, Jaz, Zip, and other Hard disk devices. Additionally, there is an output expander for those that want more outputs. The unit is called the AIEB1 (MSRP $249) and it adds 6 analog outputs, plus 2 kinds of digital input-output, SP/DIF and CD/Dat Optical. All options are user installable and detailed instructions are in the Owner's Manual.

- **Price – How come the Yamaha is not more expensive?** Take this question seriously. The customer wants to know what allows Yamaha to make such a full-featured product at such a great price. Yamaha has its own computer chip manufacturing facilities. This gives the company an advantage when it comes to processor driven products.

Does this replace the A-series samplers?

No. The concept of the 2 units is quite different. The A-series (A4000/A5000) can be used as a tone module and can be used with an external MIDI controller as a traditional synthesizer. It can receive MIDI data like program changes, and can play instrument voices like piano. In the SU700 samples are attached to tracks and Songs, not Voices. You do not 'play' musical instruments in the traditional fashion, you assemble songs by triggering sample phrases. Targeted as a Dance oriented product the concept of the SU700 is quite different from the A-series type sampler. For example, key to the SU700 is its ability to make sample phrases synchronize with external MIDI devices like multi-track recorders and external MIDI sequencers. The pad/knob user interface will be friendly to those that wish to perform live with the SU700.

Who is the SU700 customer?

The SU700 combines a phrase sampler, with a real time control interface that allows the user to manipulate playback of samples in a fashion that invites real time performance. This interface is also right at home in the project studio doing serious music track production. The SU700 is made to interface with today's arsenal of digital recording options and can be an integral part of a production station. It is targeted for new trend (Dance market customers) but after working with it, you will agree that it has a broader appeal because of the interface.

Is the SU700 a drum machine? How is it different from competing products?

The SU700 can certainly function like a drum machine. But it is so much more. Of the 40 sample tracks per song, 16 of them, the Composed Loop tracks, function like a drum machine. Each of these tracks can be set independently for pattern length, making the SU extremely flexible. In addition you have 8 tracks that house loops and 16 more tracks (Free) where you can place sample events against the song's linear timeline. There are twenty songs. The SU700 differs greatly from competing boxes in that the SU700 is **not** a traditional MIDI sequencer. The sequencer documents all physical gestures performed on the SU700 real time control surface. The front panel interface contains 12 pads, 12 knobs, 22 real time knob parameters (including 3 effects) to alter the playback of samples, and an assignable Ribbon controller. The sequencer records any change to the playback of the samples. It is the real time ***digital mix automation*** that separates the SU700 from the pack. It allows the user to put together songs intuitively. You can create real time remixes of songs. Document your mixes with the same kind of digital accuracy that you would get with today's automated digital mixers, like the 02R.

How does the SU700 LOOP TRACK do time compression and expansion in real time?

In the SU700 time stretching is a function of the sequencer. The SU700 Loop track 'slices' the audio into segments and then can adjust the playback of those segments to match the selected tempo. As the tempo is increased the slices move closer together, and as the tempo is decreased the slices move further apart. You adjust for the difference with the SU700's SOUND/Length parameter, which adjusts the length of the slices to prevent overlapping or any gaps in the sample's playback. Beyond this, the SU700 let's you manipulate the timing of the slices, the volume of the slices and the gate time of the slices: Creating 'Swing'. That's right you can alter the 'feel and attitude' of a sample loop. Loop tracks can be played at various tempos with no pitch change and conversely, can be played at various pitches without tempo change.

How would you use time stretching in a practical production?

A real advantage of the time stretching is you can try creating grooves from samples that would not normally go together because their tempos (or keys) were very different. You can double-time or cut-time (half the time) of any sample loop by changing the [TRACK SET | SETUP] Loop Length parameter. If you change

the length of the sample loop the SU700 will adjust the playback to exactly match the tempo. Time stretching allows you to set the tempo independent of the pitch, and vice versa, the pitch can be changed independent of the tempo. Press the [PITCH] button in the Knob Function area. Use the knob to tune the pitch of a loop sample. Each +/- 005 increments make a musical half step.

An additional benefit of the SU700's time stretching is there is no lengthy wait for the results (some units take up to 40 minutes to render a 2-second sample loop at a new tempo). A key benefit is that you can now easily sync your sample loops to MIDI clock. The SU700 can be either master or slave, to MIDI clock. If you are working with an external digital multi-track recorder (like an MD4 or MD8, Adat, or DA88 etc.) you can slave the SU700 to MTC. This opens the door to fitting your samples to your MIDI sequencer or digital recording with extreme ease.

If you need to adjust the tempo or key of a musical composition you would need to cut the song up into looping segments (maximum length is 32 measures of 4/4) and then make adjustments to the samples. Data can be copied between track types. The process and the result will be dependent on the material sampled.

What is the first important concept to understand about the SU700?

The first thing that you want to become comfortable with is the Track Types. There are 3 types. Each has its purpose. LOOP tracks house sample loops, simple enough, hold the pad down the sample automatically loops; or push play on the sequencer, the track automatically plays back. COMPOSED LOOP tracks require note-on and note-offs to trigger and control the duration of the samples. You *compose* loops by playing the pads – exactly like a drum machine pattern. You set the length of the pattern loop; put the song in record, play the pads and compose a groove. Composed Loop samples can also be set to create seamless looping phrases by matching the note-on duration to the length of the pattern. The FREE tracks also require note-on and note-off events to trigger the samples but the data is recorded into song measures, in a linear fashion. And here again, like the Composed Loop tracks you can create seamless 'looping' phrases by placing note-on events at strategic locations that will retrigger the sample along the linear measure timeline.

Is there a learning curve with the SU700?

Of course there is. It is very short because the interface is very straightforward. You want to explain to a customer with this fear that like any thing new (that latest video game they just got) once you get used to the physical gestures you must perform, operation becomes second nature. Particularly, working the Pad Function and Track Bank buttons becomes easier as time goes on. These do become second nature after working with the machine a bit.

The SU700 is a creative tool. Therefore they will discover new methods and possibilities shortly after getting their hands on one. But they are up and running in very short order.

What is BPM TRACKING?

This parameter (found in the edit matrix [TRACK SET | SETUP]) determines how a sample behaves when the tempo is changed. Physics dictates that when you speed the playback of a sampled audio clip its pitch also goes up (munchkinization) – like a 33 1/3 rpm record played at 45 rpm. SU700 Loop tracks can be set to either SLICE or CHNG PITCH. Slice allows the Loop track to maintain its original pitch, in spite of tempo changes, overcoming the tendency to 'munchkinize'. While the Change Pitch setting allows the sample loop behave like physics dictates. Composed Loop and Free tracks can have their BPM tracking set to either CHNG PITCH or NORMAL. Composed loop and Free tracks have note-on and note-off events that determine when the sample is triggered. The normal setting will have the note-on events occur closer together or farther apart depending on whether the BPM is increasing or decreasing.

SLICE: takes the audio sample on a Loop track and divides it into slices that can then be altered in terms of playback. The slicing of the audio allows the SU700 to adjust the slices to *just* fill the specified loop length at the current BPM (allowing tempo change without pitch change – defying physics). As tempo increases the slices come closer together. As the tempo decreases the slices move farther apart. You can then adjust the length of the slices via the SOUND/LENGTH parameter.

CHNG PITCH (change pitch): The sample will change pitch in relation to the song's tempo (BPM). If selected for a Loop track this will disable the Sound/Pitch, Sound/Length and all Groove group parameters.

NORMAL: The sample on a Composed Loop track or Free tracks will behave just like a traditional MIDI sequence – as the tempo is faster the note-on events occur closer together,

as the tempo is slower the note-on events occur further apart.

Can I run external audio through the SU700 even while it is loading new data?

Yes. External audio comes in through the stereo input jacks on the back panel. Its level is adjusted by a separate Input control. Audio In is assigned a Knob and a Pad like any of the other 41 tracks. The Audio In can be processed by the on board Effects, you can also automate the level and the pan position.

Can you sample with Effects?

No. The SU700 has stereo ¼" inputs on the back panel. When you set up to sample the signal goes directly into RAM. Once your sample is in RAM you can process it with any or all of the 3 on board effects processors. Once you have the effects exactly the way you like them you can 'resample' that onto another track/pad. In this manner you are able to reuse the effect processors again and again as your creativity dictates.

However, the three effect processors are available when routing signal through the SU700 via its AUDIO IN enabling you to effect external data in a live situation. This also allows you to combine internal data with external audio during the resample process.

How does the Resample feature work?

Resampling is the process of taking data already in the machine and creating a new version of it. Typically this is done after combining it with other samples and/or altering it via the many knob control parameters. You can add effects, filter, EQ, etc., etc., and then create a new version. The resample can be a sample of a *track* or a sample of the *sequencer*. The possibilities that resampling opens the door to are too numerous to outline fully, but with a little imagination you can accomplish most anything. Resampling on the SU700 is <u>always</u> done at 44.1kHz / 16-bit / mono. If you wish to create a stereo resample, you can designate the source as L or R, then take 2 resamples and use them together with one panned hard left, the other hard right.

When Resampling a track you are basically printing a new copy of the data to a new track after altering it in some fashion. When Resampling a sequence you are creating a sub-mix of several tracks. Because the Audio Inputs are 'live' during the Resample process, you can 'overdub' to existing tracks. This means you can rap, sing, or take a guitar solo, in a similar fashion to sound-on-sound recording in an analog tape/bounce situation.

Are the options user installable?

Yes. All that is required is a Philips head screwdriver and a relatively static-free area. Make sure the SU700 is disconnected from the AC before opening the unit. The screws to remove are clearly indicated. Follow the instruction in the Owner's Manual.

What options are available for the SU700?

For those that are serious about sampling there are 2 optional kits for the SU700. The SCSI I/O board (ASIB1 $249.00 MSRP) which allow you to save and load to external devices like Zip[tm], Jaz[tm], or HDs and to load from CD-ROM. The output expander (AIEB1 $249.00 MSRP) includes analog audio outs and 2 kinds of digital I/O. Six analog outs, plus SPDIF in/out; and CD/DAT Optical in/out.

The SU700 comes with 4 MB of RAM on the motherboard. There are slots that can hold a pair of 4/8/16/32 MB JEDEC compatible SIMMs.

How much record time do you get?

Of course, the answer is, "It depends on how much RAM you have in the SU700, at what sample rate you record your samples, and at what bit resolution the samples are stored." The SU700 features 4 MB of RAM out of the box, expandable via standard 72-pin SIMMs to 68 MB. Sampling can be 44.1kHz, 22.05kHz or 11.025kHz with either 16-bit or 8-bit resolution. The higher the resolution the better the sound quality. The trade off is time. Here are some approximate time references:

	4 MB (stock)	**68 MB**
	Time	Time
44k – 16 bit – Stereo =	22.3 sec	379.1 sec
22k – 16 bit – Stereo =	44.6 sec	758.2 sec
11k – 16 bit – Stereo =	89.3 sec	1516.4 sec
44k – 16 bit – Mono =	44.6 sec	758.2 sec
22k – 16 bit – Mono =	89.3 sec	1516.4 sec
11k – 16 bit – Mono =	178.6 sec	3032.8 sec
44k – 8 bit – Stereo =	44.6 sec	758.2 sec
22k – 8 bit – Stereo =	89.3 sec	1516.4 sec
11k – 8 bit – Stereo =	178.6 sec	3032.8 sec
44k – 8 bit – Mono =	89.3 sec	1516.4 sec
22k – 8 bit – Mono =	178.6 sec	3032.8 sec
11k – 8 bit – Mono =	357.2 sec	6065.6 sec

- Maximum record time per sample of a Loop track is 111.0sec at 44.1/16-bit/Stereo

- Maximum record time per sample of a Composed Loop track is 350.0sec at 44.1/16-bit/Stereo
- Maximum record time per sample of a Free track is 350.0sec at 44.1/16-bit/Stereo

Your actual total time will be somewhere between the maximum and minimum, as you will decide what rate and resolution is appropriate for each sample. **Do not record everything at 44k/16bit/Stereo.** It is not practical, nor smart. A bass line is mono to begin with. Each time you switch from 44 to 22, or 22 to 11 you cut the amount of RAM used in half. Likewise, each time you switch from 16-bit to 8-bit, or from stereo to mono, you double your time.

What's in the box?

1 SU700, Owner's Manual, power cord, CD (Sampling Audio), 1 Demo diskette, short 40-pin flat cable and 3-wire cable for use with AIEB1 Output expansion.

What is the best way for a new customer to learn the SU700?

Recommend that they take the time and follow the "Tutorial" in chapter 2 of the manual. Yes, the Owner's Manual. If they follow this exercise through they will have a very good idea of the possibilities and capabilities of the SU700. It takes the reader through most of the processes and skills necessary to master the SU700. It is also easy to follow and gives the reader plenty of ideas as to how to started with the SU700.

Is there a library for the SU700?

This is a very natural question to ask when first seeing a sampler. However, there are no 'traditional voices' in the SU700. There are no key maps. Any edits are stored as part of the current song. The SU700 is a phrase sampler. That said, you can load samples that are in Akai S1000 format (via both disk and SCSI) and you can import AIFF samples via diskette.

How does the SU700 save its data?

The SU700 saves its own data in SU700 ***Volumes*** to either diskettes or via SCSI to an external SU700 formatted SCSI device (Jaz, Zip, HD, etc.). An SU Volume contains ***all the data*** in the machine, including all samples, all songs, and sequenced automation. You can, however, load individual samples from a storage volume. You **cannot** load a song independent of the volume that it is in. You can load its samples, individually. Samples are identified by the song number, type of track, and pad number. For example S01CL04 translates to **S01** is song 01, **CL** Composed Loop track, number 4.

How is the SU700 sequencer different from a standard MIDI sequencer?

The SU700 sequencer is not a MIDI sequencer, like the RM1x or QY700 that records MIDI data for multi-timbral playback. The recorder in the SU700 is a unique device that documents what happens to your samples and when. At first glance the 32,000-note specification may appear mediocre. But once you understand that the note-on events in an SU700 can trigger samples clips that can be as short as a snare drum hit and as long as song's chorus. One note-on could trigger several minutes of music. So the use of notes is no where near the pace that notes are used in a traditional MIDI sequencer. A main difference between a standard MIDI sequencer and the SU700's is, you don't put a specific track into record. But rather the entire song is in record. Any changes or gestures that are made can be documented by the sequencer, including some twenty-two knob parameters, the Ribbon controller, the Mute status and more. There are 42 tracks of automation. Forty are sample tracks and there is an Audio In and a Master out track.

How does the SU700 work with incoming MIDI data?

Not like you'd first expect. **There are no voices or key maps in the SU700.** There are no traditional drum kits. However, 16 of the possible 40 samples from a song can be triggered via MIDI. The sample is not mapped to an individual note: any note on that MIDI channel will trigger playback of the sample, at its original pitch. Here's how that works:

- In the Edit Matrix under the [SYSTEM | MIDI] heading you will find a CHANNELS selection. Press [OK].
- Use the data wheel to select RECEIVE
- Use the Bank selector and Pads to select each sample and the data wheel to set the MIDI RECEIVE channel for each sample. Each sample is given a unique MIDI channel number 1~16 (no duplications).

How does the SU700 work transmitting MIDI data?

Like you would expect. Each of the 40 samples can send a specific note-on (key) and on any MIDI channel of your choosing (no restrictions). The parameters set up for TRANSMIT work only for outgoing MIDI data.

- In the Edit Matrix under the [SYSTEM | MIDI] heading you will find a CHANNELS selection. Press [OK].
- Use the data wheel to select TRANS

- Use the Bank selector and Pads to select each sample and the data wheel to set the TRANS (transmit) channel and note value for each sample (no restrictions).

How does the Roll Function work? I tried to use it to record a roll into my pattern and it's not there, what gives?

Roll data is recorded differently than the note-on events used to record a Composed Loop. Roll data is not recorded into a looping track but rather into the song at the measure you execute the roll. It is recorded on that track but not into the cycling pattern. For example, you have a 16 beat (4-bar) drum groove on the Compose Loop tracks. While that is looping, the song measure counter moves forward, linearly. You determine that you want to put a 16th-note snare roll as a fill- in at measure 8 going to 9 and not again until measure 49 going to 50. You want a 32nd note roll on the snare in measure 24 going into 25. The Roll function allows you to paint in your fill-ins along the linear song timeline - not into the patterns. If you recorded a Roll and then did not hear it back you probably were unaware of the actual measure the Roll data was documented. Use the Location&Value parameter to locate the ROLL events on an events list. **Roll events are not note-ons,** at all. A Roll has an ON event and an OFF event. The SU700 does not print an individual note event for each. Notice that while a roll is in progress it overrides the data recorded on that track. It is restarting the data again and again, at the resolution set for the Roll. To view the resolution, hold down the ROLL Pad Function button. To change it, select the NOTE button next to the screen, the value flashes, then hold down the ROLL button and use the data wheel to select the resolution.

How does the Loop Restart work?

Like the Roll Function, above, the Loop Restart event is not recorded into a looping track but rather into the song at the measure you execute the Loop Restart. (Not effective on Free tracks). At first users tend to overlook the power of this Restart function. It can be used to offset a track the others that are playing. You can use it to momentarily delay the snare drum as it cycles around in a pattern. But it use can go beyond just offsetting tracks momentarily. Often vocals don't seem to fit exactly into 4, 8 or 16 bars loops. Singers can come in on the beat preceding the downbeat and often their part does not end until well into the next section. The Loop Restart function can be used to cue a loop that by musical necessity needed to start and end on a beat other than the downbeat. For example, if the vocal tracks starts on the 'and of four' and ends on the second beat of the next section 8-plus beats later. The Loop Restart can be used to offset the sample so that it can begin anywhere you wish. Use the gate time (duration) of the note to control how much of the phrase plays back. This can free you from the bar line and opens the door to loops that don't necessarily have to begin and end on the downbeat.

What about the Filters?

The SU700 has a filter for each audio sample track. You can select a filter type for each track, individually: [TRACK SET | FILTER TYPE].
LPF – 12dB/oct low pass filter;
BPF – 12dB/oct band pass filter;
HPF – 12dB/oct high pass filter;
BEF – 12dB/oct band eliminate filter.
Once a filter type has been chosen for a sample you can then apply changes to cutoff frequency and / or resonance via the knob functions. Additionally, there is an LFO that can be assigned to control the filter. The wave for the LFO is selected via [TRACK SET | SETUP] LFO WAVE.

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