Wenzellabs — NSA Selector

- Manual PDF

Manual PDF / Source

the NSA selector — melodic use in a Eurorack system

As a Eurorack musician, I'd treat **the NSA selector** less like a conventional voice module and more like a **data-to-audio sound source / network instrument**. Based on the manual, it is:

- a **4HP** module
- with **2 Ethernet ports**
- **1 audio output**
- internally a **100 Mbps fast ethernet switch**
- with a mirrored internal port feeding a **4-bit DAC + low-pass filter**
- outputting the sound of **raw network traffic**

So this is not an oscillator, sampler, or audio interface in the normal sense. It literally turns packet activity into audio.

What the module does musically

The key sentence in the manual is essentially:

> any bit on the network will be sent to the audio output

That means your "melody" does not come from pitch CV going into a VCO. Instead, melody emerges from:

- the **timing** of packets

- the **size** of packets
- the **structure** of protocol headers
- the **payload data** being transmitted
- the **rate / density** of traffic on the link

In practice, this gives you a module that can produce:

- clicks
- pulses
- harsh digital tones
- noisy pitched bands
- rhythmic bursts
- repeatable patterns if the network traffic is controlled carefully

Best ways to create melodic material

1. Use the included sequencer script as a pitch/rhythm source

The manual mentions a **sequencer/** folder containing a shell script that "mimics a sequencer by network pings of different size."

This is probably the most direct melodic use.

Why it works

Different ping packet sizes create different bit patterns and durations on the wire. Those become distinct audio events at the output. If you send them in a repeating order, you get a crude stepped note sequence.

Patch idea

- NSA selector audio out → **VCA**
- VCA → **filter** or **wavefolder**
- trigger/gate source → VCA CV input
- optionally NSA selector → **clocked delay / reverb**

Musical result

- packet sizes become “notes”
- repetition creates a sequence
- VCA gating can sharpen events into plucks
- filtering can emphasize certain resonances, making the sequence feel more tonal

Performance tip

If you make several ping sizes correspond to several recognizable timbres, you can compose phrases by ordering those sizes like notes in a scale.

2. Convert WAV audio into the module’s native network format

The most explicitly melodic feature in the manual is the **upconverter/** tool. It converts a **mono 16-bit 48 kHz WAV** into a **4-bit 25 MHz .nsa file** using delta-sigma style conversion.

This is huge for melody, because it means you can prepare pitched material externally and then “play it” over the network.

Why it works

Instead of hoping random traffic sounds musical, you intentionally encode:

- single notes
- scales
- arpeggios
- basslines
- melodies
- drones

Then transmit those files over the network so the NSA selector outputs them as audio.

Strong melodic workflow

1. Create a simple melody in DAW or audio editor
2. Render as mono WAV
3. Convert to `.nsa`
4. Serve/transmit it over the network
5. Patch the output into your Eurorack system

Patch ideas

- NSA selector → **low-pass filter** → VCA → mixer
  for taming the harshness into a more playable lead
- NSA selector → **resonant band-pass filter**
  to isolate partials that behave like a stable pitch center
- NSA selector → **quantizer is not needed on audio**, but use:
- **envelope follower** from the audio
- envelope follower CV → filter cutoff or VCA
- this creates dynamic articulation from the traffic itself

Musical result

This is your best route to actual recognizably melodic phrases. The quality is intentionally lo-fi and packet-corrupted, but that can sound beautiful in an industrial / glitch / electroacoustic context.

3. “Listen to images” for stepped or scanned pseudo-melodies

The manual says uncompressed, unencrypted **BMP** image transfers can be heard, effectively letting you “hear the pixels.”

Why that matters melodically

Images are organized data. Repeated structures in an image can create:

- repeating frequency zones

- stepped transitions
- scan-like rises/falls
- motif-like bursts

A striped or patterned image can generate surprisingly sequence-like audio.

Creative melodic trick

Design BMPs intentionally as “graphic scores”:

- horizontal stripes for repeated note-like bands
- diagonal lines for rising/falling gestures
- checkerboards for alternating intervals
- blocks of different brightness for phrase sections

Then transfer the BMP and process the result through your modular.

Patch idea

- NSA selector → **slew-ish LPG or low-pass gate**
- then into **reverb**
- optionally layer with a tuned oscillator tracking the envelope of the output

This won’t produce equal-tempered notes directly, but it can generate melodic contours and motifs.

4. Use traffic saturation and retransmission as ornamentation

The manual notes that saturating the link introduces artifacts, retransmissions, and extra texture.

Melodic interpretation

Think of this as ornament generation:

- retransmissions = repeats/flams

- congestion = distortion/smear
- header overhead = transient attack content
- link saturation = sustained noisy tone bed

So a clean encoded melody can become expressive when pushed into overload.

Musical use

Start with a simple converted WAV melody, then: - intentionally saturate the network - add simultaneous traffic - let the melody degrade into glitchy harmonization

This works especially well for: - IDM - noise-pop - electro - broken transmission ambient - cyberpunk soundtrack textures

5. Create call-and-response with controlled and uncontrolled traffic

The module has two Ethernet jacks and forwards traffic unmodified while tapping it for audio.

That means you can create layers of musical behavior: - **controlled traffic** = your intended melody - **ambient traffic** = live counterpoint/noise layer

Example setup

- one machine sends your `.nsa` melody or ping sequence
- another generates browsing, pings, tcpdump echo, file transfer, or game traffic

The output becomes a hybrid of: - intentional notes - accidental accompaniment

Patch concept

- NSA selector out → **mult**
- path 1 → dry mixer channel

- path 2 → distortion/filter/delay

Use the dry channel for articulation and the processed channel for harmonic smear. This can make packet melodies feel bigger and more “composed.”

6. Use tcpdump “echo” as a primitive delay for melodic phrases

The manual describes a trick where dumping network traffic to console can effectively double the activity, creating a kind of **echo**.

Musical use

This is especially useful for melodic phrasing.

If you transmit a short sequence or encoded note phrase, then add: - `tcpdump -ni eth0` - or more verbose variants

you can generate repeating or thickened events.

Result

- short notes become doubled
- sparse phrases become denser
- repeated packet observation adds a primitive feedback feel

It is not tempo-locked delay in the Eurorack sense, but musically it behaves like: - slapback - stutter - burst-repeat - data haze

How to combine it with typical Eurorack modules for melody

Because the NSA selector has only **audio out** and no CV inputs, the “using modules together” part is mostly about **what you patch after it**.

Best companions

Filter

A resonant filter is probably the most important partner.

Why: - packet audio is bright and aggressive - filtering can isolate stable spectral areas - resonance can emphasize apparent pitch

Use: - low-pass for smoother lead lines - band-pass for vowel-like melodic tones - high resonance for whistle-like digital notes

VCA + envelope

Helps impose phrasing.

Use a gate source or trigger sequencer to: - chop continuous network texture into note lengths - accent certain events - create rhythmic articulation independent of the traffic itself

Low-pass gate

Excellent if you want the module to feel more “played” and less like a data stream.

Delay / reverb

Turns fragmented packet events into melodic ambience.

Especially good for: - sparse ping sequences - image-data scans - short `.nsa` note phrases

Distortion / wavefolder

Can turn weakly pitched digital noise into richer lead or bass material.

Envelope follower

A sleeper pairing. Derive CV from the audio amplitude and use it to modulate: - filter cutoff - VCA level - another oscillator's FM amount

That creates self-animated melodic movement from the network data itself.

Pitch tracker or PLL-style module

If you have a pitch-tracking utility or PLL, you may be able to extract unstable but interesting pitch CV from the output and use that to drive another oscillator. That gives you: - NSA selector = chaotic melodic source - analog/digital VCO = stabilized harmonic shadow

Practical melodic strategies

Strategy A: Packet melody voice

- create ping-size sequence
- NSA selector out → filter → VCA → reverb
- use external trigger sequencer for articulation

This gives percussive, glitch-melodic phrases.

Strategy B: Encoded lead line

- compose WAV melody
- convert to `.nsa`
- transmit file
- NSA selector → resonant filter → stereo FX

This is the clearest path to actual lead melodies.

Strategy C: Image-score music

- create patterned BMP

- send it through the fileserver setup
- NSA selector → band-pass filter → delay

This gives scanning, abstract melodic contours.

Strategy D: Dual-layer data harmony

- send `.nsa` melody
- simultaneously add web/file/ping traffic
- output → mult
- one clean, one heavily processed

This creates melody plus noisy accompaniment from the same source.

What kind of melodies this module is best at

This module is best for:

- **glitch melodies**
- **lo-fi digital leads**
- **harsh arpeggios**
- **rhythmic data motifs**
- **industrial bleeps**
- **cybernetic drones with melodic contour**
- **corrupted sample-like phrases**

It is less suited for: - clean tonal melodies - precise 1V/oct playing - traditional keyboard-style performance - harmonically pure subtractive synthesis

Overall musical assessment

The NSA selector is basically a **network sonification voice**. To get melodic results, the trick is to stop thinking like “pitch CV into oscillator” and instead think:

- **packet design = composition**
- **traffic structure = sequencing**

- **network load = timbre**
- **modular processing = articulation and tonal focus**

If I were building a melodic patch around it, my first choice would be:

1. generate a simple `.nsa` phrase from a WAV melody
2. run the output through a resonant filter and VCA
3. add clocked delay/reverb
4. layer with a more stable oscillator for pitch reinforcement

That would give the best mix of: - recognizable melody - packet grit - playable modular dynamics

Generated With Eurorack Processor