Desert Moon Audio

NEBRASKA 144

N - 1 4 4

Cassette Four-Track Emulation



USER MANUAL

VERSION 1.0.11

Contents

Nebraska 144 is a four-track cassette four-track condensed onto a single channel. One input module feeds one stereo pair of tape tracks running at 3-3/4 ips through dbx type-II noise reduction: narrow tracks, a low-mid head bump, treble that gives out around 13 kHz, an unsteady capstan, and a noise floor that breathes with the music.

1	Installation, Trial and License	3
2	Quick Start	3
3	The Panel at a Glance	5
4	Input and EQ	6
5	The Tape Section	7
6	Output, Transport and Metering	9
7	Behind the Door	10
8	Presets	11
9	Getting Sounds	12
10	Parameter Reference	13
11	Specifications	14

TWO THINGS WORTH KNOWING FIRST

STOP is a tape stop, not a bypass. It winds the capstan down over about half a second, dragging the pitch and the level with it, and leaves you in silence — the same as a cassette four-track. If you want the signal to pass through untouched, use **POWER**.

dbx type-II is the noise reduction, not the tape. It has nothing to do with the TAPE TYPE I/II switch. Two unrelated things that both ended up called Type II.



The deck is a single-channel insert. It is not a four-track recorder, and there is nothing to arm or rewind.

1.1 What Gets Installed

FORMAT	LOCATION
Audio Unit	`/Library/Audio/Plug-Ins/Components/Nebraska 144.component`
VST3	`/Library/Audio/Plug-Ins/VST3/Nebraska 144.vst3`
AAX	`/Library/Application Support/Avid/Audio/Plug-Ins/Nebraska 144.aaxplugin`
VST3 (Windows)	`C:\Program Files\Common Files\VST3\Nebraska 144.vst3`
AAX (Windows)	`C:\Program Files\Common Files\Avid\Audio\Plug-Ins\Nebraska 144.aaxplugin`

Universal binary, Apple Silicon and Intel. The plug-in appears under **Desert Moon Audio** in your host's manufacturer list.

1.2 First Launch

Most hosts scan for plug-ins only at start-up. If Nebraska 144 does not appear, quit the host completely and reopen it — it will not be found while the host is already running.

1.3 Latency

The transport delays the signal by 6 ms, which is reported to the host and compensated automatically. The dry path used by **MIX** is delayed to match, so the mix control is a real blend rather than a comb filter.

For playing or singing through the deck live, choose **Tracking mode (low latency)** from the preset menu. The transport then keeps only the room the wobble needs to swing both ways, so the pitch movement sounds exactly the same: with **WOBBLE** at zero the delay is a single sample, and at full **WOBBLE** the tape sits at most 4 ms behind. MIX stays aligned either way. Switching fades out for a moment; the setting is saved with the session, never in presets. Your host's bypass passes the signal straight through without winding the tape down the way **POWER** does.

2.1 Thirty Seconds In

Drop it on a track and it is already doing the thing. The defaults are the deck running properly: tape rolling, noise reduction in, ferric tape at the fast speed.

- **DRIVE** is the main control. Up for compression and grit, down for a cleaner pass.
- **WOBBLE** is the second. It is the pitch instability, and a little goes a long way on anything sustained.
- **NOISE** sets the tape hiss. With the noise reduction in, it breathes with the music rather than sitting under it.
- **MIX** blends the tape against the dry signal if you want the character underneath rather than in front.

If it sounds too polite, pull **BIAS** down: under-biased tape is brighter and dirtier. If it sounds too rough, push it up.



The preset rail. Step with the arrows, pick from the menu, save your own with the disk. A dot beside the name means you have changed something since it loaded; the loop arrow puts it back. The lettered key flips between two working states, A and B, for comparing settings; the curved arrows are undo and redo for every control on the panel.

> **WHERE YOUR PRESETS LIVE**
>
> Presets you save are files in `~/Library/Application Support/Desert Moon Audio/Nebraska 144/Presets`. They are files rather than entries in the plug-in's state because they have to outlive the session that made them.

1.4 The 14-Day Trial

Nebraska 144 runs **fully featured for fourteen days** from the first time it loads — every control, every preset, nothing muted and nothing held back. The strip along the bottom edge of the panel — **TRIAL – 14 DAYS** — counts the days down. When the trial ends the plug-in stays in your sessions but passes audio through dry until a license is entered, so a session opened later is never damaged — just dry. Licenses are sold at **desertmoonaudio.com**.

1.5 Entering Your License

Your license key is in the order email: one long line beginning `DMA1-`. Click that strip, paste the key in and press **Activate**. The first activation on a machine takes one quick internet check, which registers this computer against your key; from then on the plug-in runs fully offline, apart from its once-a-day update check. There is no account and no dongle. One key covers every format — Audio Unit, VST3 and AAX — and is kept in `~/Library/Desert Moon Audio/Nebraska 144/` on macOS.

1.6 Seats and Moving Machines

One key activates **up to four computers you personally own** — a studio desktop, a laptop and a couple of spares. To move to a new machine, open the preset bar's menu on the old one and choose **Deactivate This Machine…**; that hands the seat back at once and returns that copy to trial mode. If the old machine is gone — sold, wiped or dead — write to **info@desertmoonaudio.com** with your order number and the seat is released by hand.

1.7 Updates and Support

Updates are free for as long as you own the plug-in. Nebraska 144 checks once a day for a newer version and shows a small notice on the panel when one exists; download the current installer and run it over the top — nothing needs to be uninstalled and your presets stay where they are. Questions, problems or a lost key: **info@desertmoonaudio.com**.

3 The Panel at a Glance



1 **Preset rail** — step, pick, save, revert

2 **VU meters** — reading the tape return

3 **Cassette window** — the reels turn while the tape rolls

4 **Badge** — the model plate

5 **IN rail** — peak-reading input level

6 **INPUT** — TRIM and the MIC/LINE switch

7 **EQ** — TREBLE and BASS faders

8 **TAPE** — DRIVE, BIAS, NOISE, WOBBLE

9 **OUTPUT** — MIX and OUTPUT

10 **OUT rail** — peak-reading output level

11 **Tape switches** — dbx, speed, type, bounce

12 **DOOR** — opens the alignment panel

3.1 The Readout

The line along the bottom of the panel is not silkscreen. It follows the tape type, the speed and the noise reduction, so it always says what the deck is actually set to.

3.2 Resizing

Drag the bottom-right corner. The panel keeps its proportions and stays sharp at any size — everything on it is drawn rather than bitmapped.

4 Input and EQ

The input module is where a good deal of the deck's character comes from. The mic preamps on these machines were cheap and got dirty early, which is most of why records made on them sound the way they do.



TRIM

0 – 100 %

Preamp drive. This is a colour control rather than a volume control: most of the gain is taken back out after the stage, so turning it up gets you dirt without getting you louder. Past about three quarters the stage starts to close its bandwidth as well, which is what a pushed transistor front end does.

MIC / LINE

two positions

LINE is the clean position and roughly unity at the middle of TRIM's travel. **MIC** puts far more gain in front of the stage and finds the rails much sooner. If you want the front end to be the distortion rather than the tape, this is the switch.

TREBLE / BASS

±10 dB

Shelving filters at 10 kHz and 100 Hz, matching the deck's own tone controls. Both faders are centre-detented; double-click either to return it to flat.

The EQ sits *in front of* the tape, so it is committed — boosting the treble drives the record head harder up there rather than lifting what came back off the tape. That is the same order a four-track used while tracking, and it is why a treble boost here also sounds slightly more saturated.

> **LEFT AND RIGHT**
>
> Left and right share one set of controls but keep their own filter state, and they run as two adjacent tracks on the tape. They bleed into each other through CROSSTALK behind the door, which is why hard-panned material narrows slightly — the same as it would on a real four-track.

5 The Tape Section



Everything that happens between the record head and the playback head.

DRIVE

0 – 100 %

How hard the signal hits the oxide. Tape saturates gently and asymmetrically, so this is compression and harmonic colour at the same time rather than a clip. It is the single most useful control on the panel.

BIAS

0 – 100 %, centre detent

Bias trades treble against distortion, in both directions, the way it does on a real deck. **Under-biased** — knob down — is brighter and grittier. **Over-biased** — knob up — is duller and cleaner. Centre is roughly correct alignment.

If a source is too polite, reach for BIAS before you reach for DRIVE.

NOISE

0 – 100 %

The tape's own hiss. It is injected between the noise reduction's encode and decode stages, which means the expander on playback modulates it: loud passages bury it and gaps let it swell back up.

That breathing is the sound of dbx on a cassette. It is not a defect to be designed out, and it is the reason the noise here behaves differently from a hiss generator laid over the top.

WOBBLE

0 – 100 %

Master depth over wow and flutter. Both tracks share one capstan, so they drift *together* — that coherence is why cassette smear sounds like tape rather than like a chorus pedal.

The balance between slow drift and fast wobble is set by WOW and FLUTTER behind the door; this knob scales both.

dbx

in / defeated

Type-II companding. Engaged, it halves the programme's dynamic range in dB before the tape and doubles it again on the way back, which is what makes a cassette quiet enough to be usable — and what makes the noise floor breathe.

Defeated, you get the raw tape: about 40 dB more hiss, but steady instead of pumping, and no companding artefacts on transients. Try it on drums.

TAPE SPEED

3-3/4 or 1-7/8 ips

The four-track ran its cassettes at double the normal speed to get four tracks' worth of quality out of them. Dropping to **1-7/8** halves the tape going past the head each second: the treble corner and the head bump both halve, the wow and flutter rates halve with them, and the hiss goes up.

It is a mechanical speed choice, not a transposition. Record and playback move at the same rate, so nothing is pitched.

TAPE TYPE

I ferric / II chrome

Type I is ferric: it runs out of headroom sooner and keeps more of its energy in the mids. It is what most of these machines actually ran, and it is the default.

Type II is a higher-coercivity chrome formulation. It holds noticeably more treble, takes about a quarter more level before the saturation gives way, leans less on the head bump and hisses slightly less. The cassette in the window changes with the switch.





2ND GEN

off / on

Bounces the signal through the tape a second time, within the same sample. On a four-track you bounced tracks together to free up space, and every bounce cost you a generation. This is that cost: more saturation, more noise, less treble, more smear.

It is a large part of why records made this way sound the way they do.

6 Output, Transport and Metering

MIX

0 – 100 %

Blends the tape path against the dry input. The dry path is delayed to match the transport, so this is a true blend and not a comb filter. Around 40–60 % puts the tape underneath a source rather than in front of it.

OUTPUT

±18 dB, centre detent

Final trim. The defaults are calibrated so the deck sits at unity with this centred.



TRANSPORT — PLAY / STOP

two keys

STOP is an effect, not a bypass. The capstan winds down over about half a second and drags the pitch and the level down with it; PLAY sweeps it back up. With the tape stopped you get silence, exactly as you would standing in front of the machine.

Automate it for a tape-stop at the end of a phrase. If what you want is the signal passing through untouched, that is POWER.

POWER

on / off

Switching off passes audio through untouched and still delay-compensated, so the plug-in stays in time with the rest of the session. The transport winds down and the meter lamps go out with it.

6.1 Metering

Three taps, because they answer three different questions.



The **IN** and **OUT** rails down either side are peak-reading, for whether you are feeding the deck sensibly and whether it is coming back too hot.

The **VU meters** on the bridge read the tape return with proper VU ballistics — about 300 ms to settle. That is what a four-track's meters showed, and it is the one to watch when setting DRIVE. Their scale is a linear voltage scale, which is why the marks crowd together at the bottom end.



Nudging into the red is the point. These meters are slow, so peaks well past 0 VU pass without the needle ever showing them.

7 Behind the Door

The **DOOR** key opens the alignment panel. None of this was ever a front-panel control — it is where you would have gone with a screwdriver — but every one of them is a full host parameter and automatable like any other.



The panel rises out of the bottom of the unit and dims the deck behind it. CLOSE puts it away, and so does clicking anywhere outside it.

CONTROL	WHAT IT DOES
HEAD BUMP	The low-mid lump around 86 Hz that makes cassette multitrack sound bigger than it has any right to. Halves with the slow speed.
AZIMUTH	Head alignment error. Smears the treble and pushes the two tracks slightly out of time with each other.
CROSSTALK	How much the two tracks bleed into each other across the tape width.
DROPOUTS	Oxide loss. Treble goes first, then level, in short random dips.
PITCH	Varispeed — see the note below.
WOW	The slow component of the instability, roughly 0.4–2 Hz.
FLUTTER	The fast component, 7–30 Hz and scrape above it.
ECHO SEND	How much signal feeds the echo.
ECHO TIME	40–500 ms. Moving it slides the head, so it chirps.
REPEATS	Feedback. Tops out short of self-oscillation.
ECHO TONE	How dark the repeats are. Each pass loses more treble.
ECHO RTN	How much comes back into the mix.

> **PITCH IS A VARISPEED, NOT A PITCH SHIFTER**
>
> Moving it glides the tape, the way riding the control on a deck does. Where it sits changes how bright the machine runs and how fast the flutter is, but it does not hold a sustained transposition. A true sustained varispeed would have to resample the whole stream, which a fixed-block insert cannot do without changing the length of what passes through it.

> **ABOUT THE ECHO**
>
> Nobody tracked on one of these dry. A tape slapback into the mixer is a large part of the sound, so the echo unit that lived next to the deck is built in. Its repeats run through their own tape, so they darken and wobble on every pass.

8 Presets

Ten factory presets, level-matched to within 1 dB of each other so you can audition them without the loudest one winning. Between them they reach every control on the deck.

Nebraska
The reference sound. Ferric tape a touch under-biased, moderate drive, the head bump up, a little wear.
DRIVE 52 · BIAS 42 · WOBBLE 52

Fresh Tape
A new Type II cassette in a deck that has just been serviced. Clean, bright, barely any wear.
TYPE II · DRIVE 28 · NOISE 16

Bedroom Demo
Nothing special about the tape and nothing wrong with it. The everyday setting.
DRIVE 40 · BIAS 48 · WOBBLE 44

Worn Cassette
Played to death. Dull, drifting, dropping out, with the wobble weighted towards slow drift.
WOBBLE 76 · DROPOUTS 60 · AZIMUTH 62

Blown Out
Mic input, trim up, tape slammed and under-biased. The front end is distorting before the tape gets a look in.
MIC · TRIM 82 · DRIVE 86

Second Generation
Bounced. Two passes through the tape, with everything that costs.
2ND GEN · TYPE II · DRIVE 55

Half Speed Murk
1-7/8 ips with the varispeed pulled down. Dark, unstable and thoroughly unwell.
1-7/8 IPS · TREBLE −6 · BASS +4

Slapback Deck
The echo unit fed from the send, set short. The Nebraska vocal trick.
ECHO 118 MS · SEND 45 · RTN 55

Raw Ferric, No NR
Noise reduction card pulled. Far more hiss, but steady instead of breathing, and no companding artefacts on transients.
DBX OUT · DRIVE 60 · BIAS 38

Parallel Wash
Tape underneath the source rather than in front of it. Heavy drive and wobble, blended back at under half.
MIX 45 · DRIVE 80 · WOBBLE 85

8.1 Saving Your Own

The disk key on the rail saves the current settings under a name you choose. Yours appear in the menu under **Saved**, below the factory list.

Factory presets sit on the host's own program list at fixed positions and yours deliberately do not. A host stores a program *number* in its session, so letting your presets onto that list would mean a preset saved today silently changes what an old session recalls.

> WHAT A PRESET DOES NOT TOUCH
>
> POWER and the transport are yours, not the preset's. Loading a preset will never switch the deck on, off, or start the tape rolling.

9 Getting Sounds

9.1 Drums

Tape compression is the point here. Push **DRIVE** to 60–75 % and leave **WOBBLE** low — pitch instability on a hi-hat is obvious in a way it is not on a pad. Try **dbx defeated**: the companding is at its most audible on sharp transients, and without it the attacks stay intact while the tape still squashes the body.

9.2 Vocals

The **MIC** position with TRIM around 60 % gets you the cheap-preamp sound. Keep DRIVE moderate so the tape is thickening rather than crushing. A short **echo** — 110–130 ms, repeats low — is the sound of a vocal cut onto one of these.

9.3 Guitars and Keys

Pull **BIAS** down to 30–40 % for the brighter, grittier under-biased tape, and let **WOBBLE** up to 60 % or so. Sustained notes are where wow reads as character rather than as a fault.

9.4 On the Mix Bus

Keep it subtle: **DRIVE** around 30 %, **WOBBLE** under 30 %, **NOISE** low. **HEAD BUMP** behind the door is worth a look — it is the low-mid weight people are usually after when they say a mix wants tape.

9.5 Going Further

- **Automate the transport.** A tape-stop at the end of a phrase costs one automation point.
- **Ride PITCH.** Moving it is what you hear; a small move under a held chord bends it like a hand on the capstan.
- **Stack generations.** 2ND GEN once is a texture. Two instances in series is a different record.
- **Use MIX in reverse.** Very heavy DRIVE at 30 % mix is grit you can feel without losing the source.

> **WOBBLE ON ANYTHING TUNED**
>
> Pitch instability is cumulative across a mix. Two or three tracks each with WOBBLE at 60 % will not sound like tape, it will sound out of tune. Pick the instrument that carries it and leave the rest steady.

10 Parameter Reference

Every control is a host parameter and can be automated. Defaults are the deck running properly.

PARAMETER	RANGE	DEFAULT
Trim	0 – 100 %	45 %
Line Input	Mic / Line	Line
Treble	-10 – +10 dB	0 dB
Bass	-10 – +10 dB	0 dB
Drive	0 – 100 %	45 %
Bias	0 – 100 %	50 %
Noise	0 – 100 %	35 %
Wobble	0 – 100 %	50 %
dbx NR	In / Defeated	In
Tape Speed	3-3/4 / 1-7/8 ips	3-3/4 ips
Tape Type	Type I / Type II	Type I
Second Generation	Off / On	Off
Transport	Stop / Play	Play
Mix	0 – 100 %	100 %
Output	-18 – +18 dB	0 dB
Power	On / Off	On
Head Bump	0 – 100 %	55 %
Azimuth	0 – 100 %	25 %
Crosstalk	0 – 100 %	30 %
Dropouts	0 – 100 %	20 %
Wow	0 – 100 %	35 %
Flutter	0 – 100 %	40 %
Pitch	-6 – +6 %	0 %
Echo Send	0 – 100 %	0 %
Echo Time	40 – 500 ms	128 ms
Echo Repeats	0 – 100 %	24 %
Echo Tone	0 – 100 %	40 %
Echo Return	0 – 100 %	40 %

11 Specifications

11.1 Signal Path

Per track, in order:

```
low cut → dbx encode → bias / record loss → saturation → transport (wow, flutter, varispeed) → hiss → dropouts → head bump + gap loss → dbx decode
```

Left and right run as two adjacent tracks and bleed into each other, then sum through a mix amp with the echo return.

11.2 Modelled Behaviour

ITEM	VALUE
Tape speed	3-3/4 ips, switchable to 1-7/8
Noise reduction	dbx type-II, 2:1 compander with pre/de-emphasis at 1.6 kHz
Head bump	86 Hz at the fast speed, scaling with speed
Playback gap loss	-3 dB near 13 kHz on ferric at the fast speed
Record loss	5.2 – 15.5 kHz depending on bias, extended 30 % on Type II
Hiss floor	about -72 dBFS peak with the noise reduction defeated, per track at full NOISE
Wow and flutter	0.61 / 1.43 Hz drift, 7.9 / 13.7 Hz flutter, plus scrape
Tape stop	0.42 s wind-down, 0.30 s wind-up

11.3 Technical

ITEM	VALUE
Formats	Audio Unit, VST3 and AAX on macOS (universal binary, Apple Silicon and Intel); VST3 and AAX on Windows
Architecture	Universal binary — Apple Silicon and Intel
Channels	Stereo, or mono in / mono out
Sample rates	22.05 kHz to 192 kHz, verified
Block sizes	1 to 8192 samples, including sizes that change mid-run
Latency	288 samples at 48 kHz (6 ms), reported and compensated; 1 sample in tracking mode
Processing	32-bit float internally
CPU	Under 1 % of one core at 48 kHz

Desert Moon Audio

Nebraska 144 N-144 · User Manual · Version 1.0.11

Desert Moon Audio · Los Angeles, California · info@desertmoonaudio.com

Made in the USA. The models in this plug-in are original designs informed by the physics of the circuits and mechanisms they reference. They are not sample-matched copies of, and are not affiliated with or endorsed by, any hardware manufacturer. VST is a trademark of Steinberg Media Technologies GmbH. AAX is a trademark of Avid Technology, Inc. Audio Units is a trademark of Apple Inc. All trademarks are the property of their respective owners.