

Drive81

An eight-circuit studio drive: two half-rack saturation units in series, each with four circuits, a blend and its own three-band EQ, in two modes.

A Lab plug-in. The Lab is where new GFX plug-ins are built in the open: they may change sound or controls between versions.



Overview

This Lab copy is the Stable Drive81 with two additions: the OS key (oversampling 1x, 2x or 4x) and MAINS / EQUATOR PROXIMITY in the ? pop-up. At 2x with MAINS OFF and NEAR it sounds exactly like the Stable unit.

Drive81 is studio and broadcast saturation for tracks and buses, not stompbox fuzz. Two half-rack units are bolted together by a central mounting bracket, and each has four circuits to choose from, so there are eight in all.

On the left, DRIVE81 is in the spirit of East German studio lab gear and transistor research: a clean boost into a transformer, a germanium console stage, an op-amp line driver and a transistor matrix. On the right, JDM-81 is in the spirit of Japanese high-end

consoles and broadcast modifications: a console channel overdrive, a transmitter-style clipper, a harmonic exciter-like circuit and a stage on a starved supply.

The two units run in series, in either ORDER. Each one has DRIVE, BLEND (for parallel drive), OUTPUT and a three-band EQ after the circuit. Every circuit is level matched, so turning DRIVE changes the character far more than the loudness, and you can judge the sound fairly. The whole drive runs at twice the sample rate, with anti-aliased clippers, to keep the distortion clean of aliasing.

The MODE switch (VFD / MATRIX) voices both units at once and sets the look and the labels; each unit keeps its own four circuits (see Two modes).

Reach for it for

- Warmth and glue on mix buses and drum buses
- Weight and growl on bass and kick
- Bite and crack on snares and drum rooms
- Console-style colour and presence on vocals
- Parallel crunch, blended in under the clean signal
- Edge and harmonics on synths and keys

Two modes

Drive81 has one MODE switch, the VFD / MATRIX keys in the header. The mode changes the look, the labels and the sound together. VFD stands for vacuum fluorescent display: the glowing cyan and green segment readouts of 80s Japanese equipment. VFD is the Japanese module: a charcoal panel with glowing readouts and English labels. MATRIX is the European module: a battleship-grey panel with LED-matrix readouts and English labels. Switching fades the sound out, changes over at the silent point and fades back in, so it never clicks. The voicing wraps each circuit: an emphasis into it and its exact inverse after it, so mostly what the circuit does changes. The modes are level-matched, circuit by circuit. Old projects load in the mode that matches their old DRIVE81 style.

VFD

Japanese 80s transistor and IC: tighter, brighter and more precise. The lows are kept out of the drive and the presence pushed into it, the output stage clips hard and symmetrically (odd harmonics), a 28 Hz high-pass tightens the bottom and the top gets a little air at 8 kHz. Charcoal faces with glowing readouts, English labels.

MATRIX

European 80s transformer-coupled: warmer and rounder. More low end goes into the drive (the iron's bloom) and the top is held back, the output stage is a transformer with a soft, biased curve (even harmonics) and a touch of compression on peaks, with a little lift at 80 Hz and a gentle top roll-off. Battleship-grey faces with LED-matrix readouts, English labels.

The eight circuits

DRIVE81

1 STUDIO CLEAN BOOST

Transparent op-amp gain into a studio transformer. The transformer core saturates the lows first, so bass thickens and rounds off while the mids and highs stay clean; only the loudest peaks are rounded by the op-amp's rails. The gentlest circuit: use it for weight and a touch of glue on anything.

2 GERMANIUM CONSOLE

An asymmetric germanium stage: one half of the wave bends early and the other late, giving a warm second harmonic. The bias floats with the level and the supply sags a little, so loud passages are softly held down. Warm, round and gluey: good on buses, drums and bass.

3 OP-AMP LINE DRIVER

A studio op-amp pushed out of its rails, with a presence lift before it. Its limited speed turns loud high frequencies triangular and edges into ramps, and then it clips hard on slightly unequal rails. Bright and aggressive: for snares, rooms and anything that needs to cut.

4 TRANSISTOR MATRIX

Three transistor stages in a row, each with its own bias and filtering, sharing the drive between them. The harmonics pile up thick and dense, and the top rounds off stage by stage. Heavy and saturated: for bass, synths and full-on distortion.

JDM-81

1 CONSOLE OVERDRIVE

A console channel amplifier: perfectly clean up to its knee, then a smooth, slightly uneven soft clip, with the channel's

	faint second harmonic. Polished, expensive-sounding drive for vocals, keys and buses.
2 BROADCAST LIMITER DRIVE	The classic transmitter clipper: the highs are lifted, the signal is clipped hard and evenly, then the highs are put back. Transients and sibilance are slammed first, with odd harmonics. Loud, flat and punchy: for drums that need to hit hard.
3 HARMONIC DISSONANCE	The part of the signal above 700 Hz is folded (rectified) and mixed back in, more with more DRIVE, and the sum is saturated. It adds upper harmonics and a rough, ringing edge: presence and bite on synths and guitars. Use BLEND to set how much.
4 STARVED RAIL	A stage on a weak supply: the rail sags as the signal draws current (it compresses), the bias slides as it sags (asymmetric and dense), and quiet signal round zero is lost in a soft dead zone, so decays sputter out, almost like a gate. Broken and characterful: for kicks, bass and lo-fi effects.

Controls

The header

PRESETS	Opens the full preset list.
◀ / ▶	Step to the previous or next preset (wrapping round).
Preset display	Shows the preset number and name. Click it for the preset list too.
OS	Oversampling for both units: click to go 1x (grey) → 2x (amber, the default and how the Stable Drive81 always ran) → 4x (red). 4x cuts aliasing further on hard drive and costs more CPU; 1x saves CPU. The output dips for 5 ms as it changes. Latency: 31 samples at 2x, 37 at 4x, none at 1x (reported to REAPER).
VFD / MATRIX	The mode: the voicing of both units, the look and the label

	language (see Two modes). Presets set it.
S / M / L	Panel size: small, medium or large. The panel also scales to fit the plugin window.
?	Opens a pop-up with the design credit, the GFX website address, the address of this manual and MAINS / EQUATOR PROXIMITY (see below). Click outside it to close it.

Each unit's top row

ON	Switches the unit in or out (a 10 ms fade). When it is out, the signal passes that unit untouched. Both on by default.
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The display

Shows the circuit's number and name, and two VU bars: IN for the level going into the unit and OUT for the level coming out, scaled -20 to +3 VU (0 VU = a sine peaking at -18 dBFS). The CLIP lamp lights red when the unit's output goes over full scale. The display dims when the unit is off.

CIRCUIT

CIRCUIT switch	A four-way rotary switch: drag it, use the mouse wheel, or click a circuit's name. DRIVE81: CLEAN / GERMANIUM / LINE DRV / MATRIX. JDM-81: CONSOLE / BROADCAST / DISSONANCE / STARVED. Circuit 1 by default. Changing circuit crossfades over 15 ms, so you can switch while the music plays.
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DRIVE, BLEND and OUTPUT

DRIVE	How hard the signal is pushed into the circuit, 0 to +30 dB (+8 dB by default). Because each circuit is level matched, the loudness stays roughly the same as you turn it; what changes is the amount of saturation. In both modes a low-pass that follows DRIVE and a gentle low shelf sit in front of each circuit, so the top end softens and the lows tighten slightly as DRIVE rises (fewer harsh harmonics from the clipper).
BLEND	The mix of the driven circuit with the unit's own clean input, 0 to 100% (100% by default = fully driven). Lower settings give

	parallel drive: the clean transients stay and the saturation sits underneath. The dry and driven signals line up exactly, so there is no phasing.
OUTPUT	The unit's output level, -24 to +12 dB (0 dB by default).

STUDIO EQ / ENTZERRER

A three-band EQ on the unit's output, after the circuit, to shape the driven sound.

LOW	A low shelf at 100 Hz, -15 to +15 dB (0 by default).
MID	A broad bell (Q 0.9) at FREQ , -15 to +15 dB (0 by default).
FREQ	The MID band's frequency, 200 Hz to 8 kHz (1 kHz by default).
HIGH	A high shelf at 10 kHz, -15 to +15 dB (0 by default).

The bracket

ORDER / KETTE	One key: each press swaps which unit comes first, and its legend shows the chain, 81 > JDM (the default) or JDM > 81. ORDER is separate from the mode. Its LED lights while the key is held. Changing the order dips the output for a moment while the units are re-patched.
INPUT	A trim before both units, -24 to +12 dB (0 dB by default). It pushes both circuits at once.
DRIFT	Component tolerance, 0 to 100% (50% by default). See Drift below.
OUTPUT	The final output level, -24 to +12 dB (0 dB by default).
SAT	Band saturation on the way out: only the lows and highs are saturated (the mids stay clean), with a soft curve that loosens as the level rises. 0% by default.
OUTPUT CLIP	A soft clipper on the output (always on) catches overs at the ceiling.

The oversampling adds 31 samples of latency (under 1 ms at 48 kHz), which REAPER compensates automatically.

Level matching

Each circuit has unity gain for quiet signals whatever the DRIVE, and a calibration table, measured on music at -18 dBFS RMS, removes the loudness each circuit gains or loses as it is driven. So switching circuits or turning DRIVE up should not fool you with extra level. Use the units' OUTPUT knobs and the IN / OUT VU bars to fine-tune: when the two bars read about the same, the unit is level matched for your material.

Drift

DRIFT is component tolerance. The bias points and clip thresholds of every circuit wander slowly, the EQ frequencies wander a little, and the left and right channels never quite match (each instance gets its own small differences). This gives a wider, less sterile sound, like real hardware. At 0% the components are ideal and the two channels identical.

Knobs: drag up or down (Shift for fine moves) or use the mouse wheel; double-click to reset a knob to its default. While you touch a knob, its value replaces its name.

Mains and Equator Proximity

The ? pop-up holds the unit's power supply and its climate. Both start OFF and NEAR, where the unit sounds exactly as it always has.

MAINS: OFF / UK / US	The mains the unit is plugged into. UK and US add a mains hum, very faint (about -83 dBFS: at the edge of hearing), at 50 Hz or 60 Hz with its own overtones. Each instance's hum wanders slowly in phase, so many of them never pile up into one note. The supply also sags when you play hard with a faint ripple that grows with the load. UK is tight and recovers quickly; US sags deeper and recovers more slowly.
EQUATOR PROXIMITY	The room's climate, from FAR (a cold northern room) to NEAR (the tropics: always warm). Away from NEAR, the unit starts cold and warms up over a few minutes of use - about five at FAR. A cold unit is a little duller, quieter and grittier; it settles as it warms. Hover over the dial to see how long it takes; double-click (or Ctrl-click) for NEAR.
WARMTH	The lamp shows how warm the unit is. The heat is saved with the project: reopen it a minute later and the unit is still

warm; leave it overnight and it has cooled. While REAPER bypasses the unit, it cools (about a minute to cold at FAR).

Presets

Presets set the mode, both units (ON, CIRCUIT, DRIVE, BLEND, OUTPUT and EQ), ORDER, INPUT and DRIFT. The bracket OUTPUT, SAT and the output stage are left as they are. The list also has Reset all to defaults, which sets every control back to its starting value.

Init	MATRIX: both units on, circuit 1 each at +8 dB, fully driven, EQ flat.
Bus Warmth	MATRIX: gERMANIUM CONSOLE and CONSOLE OVERDRIVE, both partly blended, with a little low lift and a soft top: gentle bus glue.
Germanium Glue	MATRIX: dRIVE81 only: GERMANIUM CONSOLE at +14 dB with a little low lift and a dip at 320 Hz.
Line Driver Snare	VFD: the OP-AMP LINE DRIVER at +18 dB, partly blended, with less low end and a lift at 1.8 kHz and in the highs, then a light CONSOLE OVERDRIVE.
Matrix Bass	MATRIX: dRIVE81 only: TRANSISTOR MATRIX at +16 dB, 80% blend, low lift, mid scoop at 500 Hz and a darker top.
Console Vocal	VFD: a light CLEAN BOOST into CONSOLE OVERDRIVE at +11 dB, with the lows and low mids trimmed and +2.5 dB of air.
Broadcast Slam Drums	VFD: gERMANIUM CONSOLE into the BROADCAST LIMITER DRIVE at +18 dB: loud, flat and punchy.
Dissonant Synth	VFD: tRANSISTOR MATRIX into HARMONIC DISSONANCE at +16 dB, 55% blend, with a lift at 3 kHz.
Starved Kick	MATRIX: jDM-81 only: STARVED RAIL at +20 dB with +3 dB low end and a deep cut at 400 Hz.
Parallel Crunch	VFD: the LINE DRIVER at +24 dB and the BROADCAST clipper at +20 dB, each blended in at about a third under the clean signal.

TKY-Berlin Chain	VFD: ORDER reversed: CONSOLE OVERDRIVE first, then GERMANIUM CONSOLE, both at +10 dB, with a little more drift.
Full Melt	MATRIX: tRANSISTOR MATRIX at +30 dB into STARVED RAIL at +26 dB, with heavy drift: total destruction.

Tips

- Try each circuit at the same DRIVE before tweaking: the level matching lets you compare them fairly.
- For parallel drive, set BLEND to 20 - 40% and push DRIVE high: the punch stays and the colour sits underneath.
- Use ORDER to choose which unit's character leads: the second unit hears the first one's harmonics and saturates them again.
- Use the units' EQ to tame the fizz a hard circuit adds (HIGH down) or to bring back the low end a clipper takes away (LOW up).
- On a mix bus, start with STUDIO CLEAN BOOST or GERMANIUM CONSOLE at modest DRIVE and switch the other unit off.
- Switch a unit off with ON to compare; set its OUTPUT so the loudness matches before judging.

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