



fMod

Multi-Mode Modulation Processor

Product Manual

Build 1.0

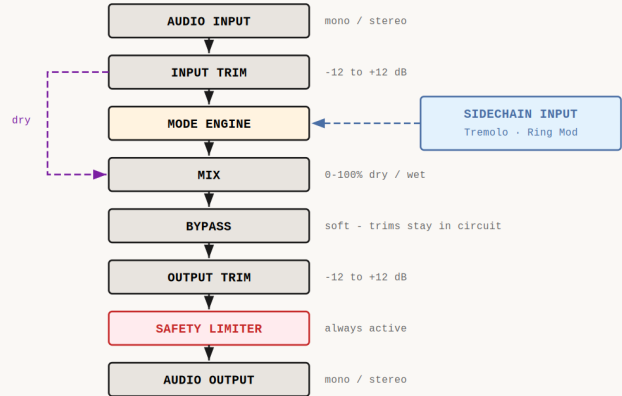
by flakebelly
fboxaudio.com

fMod - SIGNAL FLOW

CHORUS · FLANGER · PHASER · TREMOLO · VIBRATO · ROTARY · RING MOD · UNIVIBE

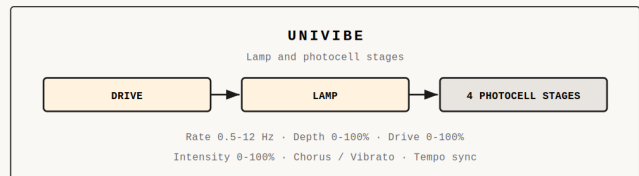
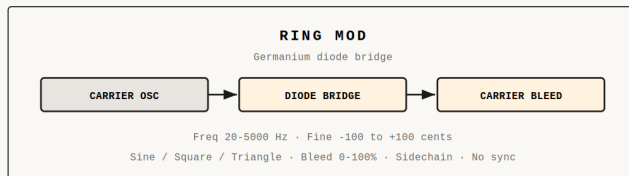
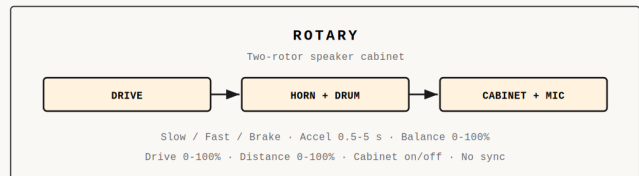
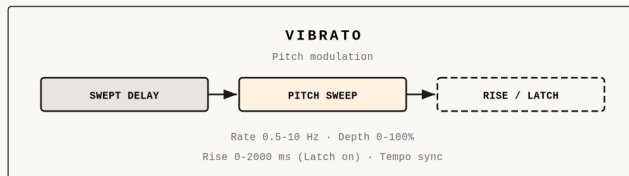
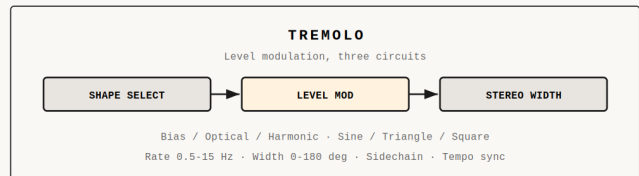
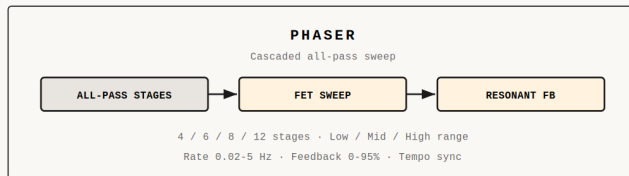
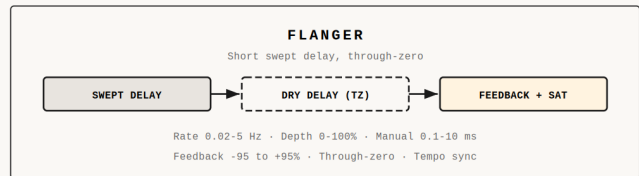
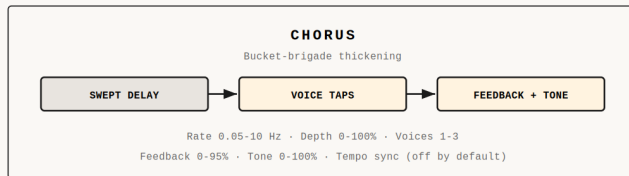
COMMON SIGNAL PATH

All eight modes share this structure

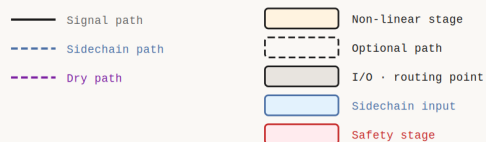


MODE-SPECIFIC ENGINES

Each mode replaces the mode engine in the common path above. All other stages are shared.



LEGEND



NOTES:

1. Eight modes, each keeping its own independent settings.
2. Tempo sync on six modes. Rotary and Ring Mod have no sync - their timing comes from the rotors and from the carrier pitch.
3. The sidechain drives Tremolo (envelope) and Ring Mod (carrier); SC Mix blends it against the internal source.
4. Bypass is soft - the input and output trims stay in circuit.
5. Mono or stereo in and out, with an optional stereo sidechain.
6. Every fMod instance has its own subtle analogue character.

What fBox Is

fBox is a complete analogue mixing ecosystem - individual plugins, a universal rack processor, and a full 32-channel mixing console with built-in tape machine - built around a single idea: every piece of hardware that ever left a factory floor had its own personality, and your plugins should too.

Most plugin companies model hardware. They pick one unit, capture it as accurately as they can, and sell that one model to everyone. Your copy is identical to mine. The compressor on your kick is the same compressor on your vocal. It has always worked this way - and it is the reason in-the-box mixes sound in the box.

fBox is built on the opposite principle. Every plugin instance carries a unique serial-seeded analogue character, generated the moment it is created. Load three fComps in one session and you have three different compressors, each with its own voice. That serial is fixed to the instance forever - it never resets, and it travels with the session.

The choice is yours. Open a fresh instance whenever you like and it is a different unit with its own voice - or find one you love and keep it. Save it, recall it, and mix through it for as long as you like: the same character, every time. Learn how it sounds and it becomes an instrument you know. And a unit you keep is yours alone - its serial exists on no one else's machine, the same way a piece of hardware you buy is one specific unit and no other. Bought once, owned permanently, no subscription.

This is not emulation. This is character at the instance level.

What fMod Is

fMod is an eight-mode modulation processor from the fBox ecosystem. Each mode is a different piece of modulation hardware with its own controls and its own voice, from a bucket-brigade chorus to a spinning speaker cabinet to a germanium ring modulator. It is not eight plugins sharing a GUI: it is one integrated processor with eight deeply modelled signal paths, each with its own feedback character, saturation behaviour and modulation feel. You pick a mode from the Mode selector in the header and the interface changes to show only that mode's controls.

The eight modes are **Chorus** (bucket-brigade thickening with up to three voices), **Flanger** (short swept delay with bipolar feedback and a through-zero option), **Phaser** (4 to 12 sweeping stages across three ranges), **Tremolo** (level modulation in three circuit flavours, including a harmonic tremolo), **Vibrato** (pitch modulation with an optional swell-in), **Rotary** (two-rotor spinning speaker cabinet), **Ring Mod** (germanium diode ring modulator with its own LFO) and **Univibe** (four lamp-and-photocell stages with resonant feedback).

Everything in fMod behaves like hardware rather than like a well-behaved LFO. Lamps take a moment to come up to brightness. Photocells lag, and they do not all lag by the same amount. Rotors take time to get up to speed, and the heavy one takes longer than the light one. The delay line has its own clock instability. That is where the movement in this plugin comes from, and it is why it does not sound like a modulation matrix.

Every instance of fMod generates a unique serial number that defines its hardware character. Each mode carries its own manufacturing tolerances - one unit's chorus drifts at its own rate, another's photocells let go a little sooner, another's rotors sit at slightly different speeds. No two fMod instances sound exactly alike, just like no two real modulation boxes do. The serial is shown in the top-left watermark and is saved with your session.

fMod works the same everywhere in the fBox ecosystem: as a plugin in your DAW, as an insert in the fBox Console (both the plugin and the dawless Standalone application), and in a slot of the fBox Rack. It registers as an effect and runs in mono or stereo - on a mono track it modulates in mono, on a stereo track it modulates in stereo. The stereo Width control in Tremolo, and the two-microphone image in Rotary, need a stereo track to be heard in full.

Getting Started

Sound working in a minute

1. Insert fMod on a track in your DAW - or on a channel or bus in the fBox Console, the dawless Console Standalone, or a slot in the fBox Rack.
2. Pick a mode from the Mode selector. Chorus is a friendly place to start.
3. Set **Rate** for how fast the movement is and **Depth** for how much of it there is.
4. Set **Mix** to taste, then A/B against **Bypass** to check you have improved things rather than just made them louder.

If you hear nothing happening, check that Mix is above 0%, Bypass is off, and Depth is above 0%.

Tip: Start with Chorus, Rate around 0.6 Hz, Depth 55%, Voices 3 and Mix at 50%. That is a classic wide chorus that works on almost anything with a sustain. Once you are comfortable with the controls, explore the other seven modes - each is a completely different instrument.

New to modulation?

Nearly all of it comes down to two controls. **Rate** is how fast something moves. **Depth** is how far it moves. Almost every mode here has both, and almost every classic modulation sound is a particular combination of the two: slow and shallow for a gentle widening, fast and deep for seasickness, somewhere in between for everything else.

The third control worth knowing is **Mix**. At 100% you hear only the processed signal. Below that you hear the dry signal alongside it, and in Chorus, Flanger and Phaser that blend is not a volume control - it is part of the effect. Those three work by letting a shifted copy of your signal interfere with the untouched one, so Mix sets how deeply they cancel and reinforce each other. Tremolo, Vibrato, Rotary, Ring Mod and Univibe do their work on the signal itself, so for those Mix behaves the way you expect.

Start with one mode and learn it before moving on. The eight here cover most of what modulation can do, and they reward small moves more than big ones. If in doubt, set it where you like it and then take a third off - it will still be there in the mix, and it will not tire the listener over three minutes.

Activation

The first time you load fMod it asks you to activate. Enter your email and click **Send Verification Code** for a 14-day free trial, or paste a licence key (it looks like FBOX-XXXX-XXXX-XXXX). Activation needs an internet connection once; after that fMod opens straight up.

Interface

fMod is laid out as a single wide strip, like a rackmount unit. The controls for the current mode sit in one row across the middle, each in its own labelled box, and switching mode changes that row to match. The serial number and watermark sit at the top-left with the Unit button beside them, and the plugin name is centred. The window opens at Medium; the size button in the bottom-right corner offers Small (75%) and Medium (100%), and fMod shrinks the window if it would not fit your display.

Across the header

Control	What it does
Mode	Choose one of the eight modulation modes. The control row changes to match.
Quality	Eco, Studio or Master (see Quality).
Unit	The unit menu - roll a new unit, save or recall one, and pin a default (see Units and Patch Cards).
RESET (red)	Hidden unless invalid audio is detected. It stays lit until you clear it, so you cannot miss one. Click Reset Engine to clear it.
Reset Engine	Clears all internal DSP state and any fault. Your settings are kept.
Help	Opens the built-in help window.

Action buttons

Button	What it does
Reset	Returns the current mode's controls to their defaults, along with the shared SC Mix control. The mode selector, the Quality tier, the serial and the other seven modes are untouched.
Save Patch Card	Saves the whole plugin to a patch card file.
Load Patch Card	Loads a patch card (see Units and Patch Cards).

Meters and indicators

Stereo input meters run down the left edge (IL, IR) and stereo output meters down the right (OL, OR). An **SC IN** indicator appears in Tremolo and Ring Mod when something is routed to the sidechain input, next to the SC Mix knob that appears with it.

On screen, **Bypass** and **I/O Lnk** - and **TZ** in Flanger, **Latch** in Vibrato and **Cab** in Rotary - are switch-style knobs rather than buttons. They have two positions and nothing in between.

Signal Flow

Understanding the signal order helps explain why certain combinations of controls interact the way they do. Every mode shares the same common path and drops its own engine into the middle of it. The signal passes through these stages in this order:

#	Stage	Notes
1	Audio Input	Mono or stereo accepted
2	Input Trim	Clean gain, -12 to +12 dB; drives the engine harder
3	Mode-Specific Engine	See the table below - this is where the modes differ
4	Mix	Dry/wet blend, 0 to 100%
5	Bypass	Soft: mutes the effect so you hear the dry signal at a matched level (both trims stay in circuit)
6	Output Trim	Clean gain, -12 to +12 dB
7	Safety Limiter	Always active; catches runaway peaks so feedback can never damage your output
8	Output	Mono or stereo, matching the track

Two things follow from that order. The **Input Trim** is applied before the dry signal is split off, so it sets the level of everything downstream - which is why it doubles as a drive control in the modes that have a saturation stage. And because **Bypass** sits after the Mix in the chain, bypassing a mode leaves both trims in circuit, so the level does not jump when you toggle it.

Each mode replaces stage 3 with its own engine. The engines and their key signal-path elements are:

Mode	Engine	Key elements
Chorus	Bucket-brigade delay line	Swept multi-voice taps, feedback with saturation, tone filter, clock noise
Flanger	Short swept delay	Bipolar feedback, optional delayed dry path for through-zero
Phaser	Cascaded all-pass stages	4/6/8/12 stages, three sweep ranges, resonant feedback
Tremolo	Level modulation	Bias, optical or split-band harmonic; stereo phase offset; sidechain envelope
Vibrato	Short modulated delay	Pitch sweep, optional swell-in
Rotary	Two-rotor cabinet	Crossover, horn and drum, drive stage, cabinet body, mic distance
Ring Mod	Germanium diode bridge	Carrier oscillator, fine tuning, carrier LFO, bleed, sidechain carrier
Univibe	Four photocell stages	Lamp with thermal lag, staggered photocells, resonant feedback, drive

The Eight Modes

fMod is eight modulation boxes in one, chosen from the Mode selector. Each keeps its own independent settings, so switching mode never disturbs another mode's setup, and a patch card carries all eight.

Mode	In a nutshell
Chorus	Bucket-brigade thickening with up to three voices. Warm and wide.
Flanger	Short swept delay with deep feedback and a through-zero option. Jet planes and metallic sweeps.
Phaser	Sweeping notches in four stage counts and three ranges. Rounder and less metallic than a flanger.
Tremolo	Level modulation in three circuit flavours, including a harmonic tremolo that wobbles the lows against the highs.
Vibrato	Pitch modulation on its own, with an optional swell-in.
Rotary	A two-rotor rotating speaker cabinet with drive, mic distance and a speed switch.
Ring Mod	A germanium diode ring modulator with fine tuning, its own LFO and carrier bleed.
Univibe	Four lamp-and-photocell stages with a resonant feedback path. The warm, wobbling one.

Common Controls

Every mode shares these controls, in the same place regardless of which mode is selected. Each mode's own controls are covered in its section.

Input

Range: -12 to +12 dB. Default: 0 dB. Input level trim, applied before the engine. Drive it up to push harder into the saturation of the modes that have a drive stage (Rotary and Univibe), or to match levels when you switch mode.

Output

Range: -12 to +12 dB. Default: 0 dB. Output level trim, applied after the mix and the bypass. Use it to match the modulated signal to the rest of your mix.

I/O Link

On/Off. Default: Off. Links the two trims inversely - turn the Input up by 6 dB and the Output comes down by 6 dB, so you can drive the effect harder without the overall level changing. Both trims still move on screen and both are written to your host, so a link move records and plays back the way you performed it.

Mix

Range: 0 to 100%. Default: varies by mode. How much of the effect you hear against the dry signal. Chorus and Flanger default to 50%, Phaser to 80%, and Tremolo, Vibrato, Rotary, Ring Mod and Univibe to 100%. For send/return or parallel setups, set Mix to 100% and control the blend from the send or slot level.

Bypass

On/Off. Default: Off. Bypass mutes this mode's effect so you hear only your dry signal. It is a soft bypass, not a hard one: both trims and the unit's small analogue noise floor stay in circuit, so your gain staging holds and the level does not jump when you toggle it - you are comparing the effect against the dry signal at matched levels. For a fully clean bypass, use your host's own bypass. Each mode keeps its own bypass state.

Most modes also share **Rate** (how fast the movement is), **Depth** (how far it moves) and **Sync** (see Tempo Sync). Their ranges and defaults differ per mode and are listed with each mode.

Tempo Sync

Six of the eight modes - Chorus, Flanger, Phaser, Tremolo, Vibrato and Univibe - have a **Sync** switch that locks the modulation rate to your host tempo. With Sync on the Rate knob no longer sets the speed; the note selector underneath the switch does, and it picks a note division:

1/1, 1/1D, 1/1T, 1/2, 1/2D, 1/2T, 1/4, 1/4D, 1/4T, 1/8, 1/8D, 1/8T, 1/16, 1/16D, 1/16T (D = dotted, T = triplet)

The division is the length of one complete cycle of movement - one full sweep out and back, one full rise and fall of the tremolo. So 1/4 gives you one cycle per beat, 1/8 two cycles per beat, and 1/1 one slow cycle per bar. The default is 1/4 in every mode except Tremolo, which starts at 1/8.

A plain division is a straight beat - a 1/4 cycles once per beat, a 1/8 twice per beat. A dotted division is half again as long, so the movement is slower and its cycle lands just off the beat, giving a bouncing, syncopated feel that drifts through the bar instead of sitting on it. A triplet fits three cycles into the space of two, so the movement is faster and rolls against the beat rather than with it.

Sync needs a host that reports a tempo. If none is reported, fMod works at 120 BPM. The Rate knob keeps whatever value you left it on while Sync is engaged and takes over again the moment you switch Sync off, so you can flip between a tempo-locked movement and a free-running one without losing either setting.

Rotary and Ring Mod have no Sync. Rotary's speed comes from the rotors and the Speed switch rather than an LFO, and Ring Mod's Freq knob sets a pitch rather than a rate, so in both cases there is nothing to lock to the bar.

Tip: Not sure where to start? In Tremolo, 1/4 gives you one pulse per beat, which is the obvious and useful one. 1/8 dotted is the interesting one - the movement weaves across the beat in a three-against-four pattern instead of doubling it, so the part sounds played rather than gated. In Chorus and Phaser go much longer: 1/1 or 1/2 keeps the sweep slow enough to hear as movement rather than wobble, and it still lands with the music.

External Sidechain

Two of the eight modes can take a signal from another track and use it in place of their own internal source. Route a track to fMod's sidechain input in your host and an **SC IN** indicator appears, along with an **SC Mix** knob in the control row.

Tremolo - the sidechain's envelope replaces the internal LFO. Instead of an oscillator deciding when the volume dips, the other track's level does it, so a kick drum ducks a pad in time with the kick with no LFO to keep in step and nothing to re-align when the tempo changes.

Ring Mod - the sidechain replaces the internal carrier. Instead of multiplying your signal by a generated sine or square, you are ring-modulating one track with another. Two pieces of music multiplied together is a strange and genuinely useful sound, and it is the classic route to vocoder-adjacent textures.

SC Mix

Range: 0 to 100%. Default: 0%. Blends between the internal source and the sidechain. At 0% you hear only the internal LFO or carrier, at 100% only the sidechain, and in between a mixture of the two. It is shared between Tremolo and Ring Mod, so both modes see the same setting, and it is the one control Reset clears alongside the current mode.

Important: *SC Mix defaults to 0%, so routing a sidechain on its own changes nothing at all. You have to bring SC Mix up before you hear the other track. If you have routed a sidechain and nothing seems to be happening, that is almost always why.*

The other six modes ignore the sidechain input entirely.

Meters

Stereo input meters sit on the left (IL, IR) and stereo output meters on the right (OL, OR), showing the levels in real time. The input meters read after the Input trim, so they show the level actually going into the effect. Click a meter to switch it between Peak and RMS - the label reads PK or RMS to show which mode it is in, and the reading in dB sits underneath.

Peak follows the instantaneous highest sample level, so it jumps with every transient and shows the true maximum the signal reaches. **RMS** shows the average energy over a short window, so it sits steadier and reads much closer to how loud the signal actually sounds - the classic VU-style reading.

Tip: Use Peak to watch headroom and make sure nothing is clipping - keep the peaks below 0 dBFS. Use RMS to judge loudness and to balance one part against another by how loud they actually sound, since two sounds can share the same peak but sit at very different loudness. Peak for safety, RMS for balance. Aim to keep the input meter around the middle, peaks short of the top; if it is pinned, pull Input down, and if it is barely moving, bring it up.

Modulation moves the level about by design, so expect the output meter to move with it - a deep tremolo swings it by exactly as much as you have dialled in. Comparing input against output is the quickest way to check you have not quietly changed the level of the track: with Mix low and both trims at zero they should sit close together.

Chorus

Warm, shimmering doubling built on a bucket-brigade delay line. Your signal goes into a short delay whose length is swept by an LFO, and the swept copy is blended back against the untouched one. Where the two agree they reinforce, where they disagree they cancel, and because the sweep never stops moving neither does the interference. That is the shimmer.

The delay line has its own clock instability, so the sweep is never quite as steady as a digital one - it drifts slowly around the rate you set. That drift is not an imperfection to be tolerated; it is the difference between a chorus that sounds like a circuit and one that sounds like maths.

Controls

Rate - Range: 0.05 to 10 Hz, or a note division with Sync. Default: 0.8 Hz. How fast the sweep moves. Most classic chorus lives below 2 Hz; above about 4 Hz it stops sounding like thickening and starts sounding like an effect.

Depth - Range: 0 to 100%. Default: 60%. How far the sweep travels. Past about 70% you start to hear the pitch move rather than just the thickening, which is a fine thing to want but a different sound.

Voices - Range: 1 to 3. Default: 2. How many copies are taken from the delay line, spread evenly around the sweep. One is a simple doubling, two is the classic, three is lush and wide. The voices are level-matched, so turning it up thickens the sound without making it louder.

Feedback - Range: 0 to 95%. Default: 15%. Feeds the delayed signal back into the line. Low settings add body and a little resonance; high settings tip the mode into flanger territory, where the comb filtering becomes the main event.

Tone - Range: 0 to 100%. Default: 70%. Darkens or brightens the chorused signal only - your dry signal is untouched. Turn it down for an older, warmer box that sits behind the source; turn it up for a modern sheen on top of it.

Mix - Range: 0 to 100%. Default: 50%. **Sync** - off by default, 1/4.

Character

The classic chorus blend is around half and half, where the dry and swept signals have equal say and beat against each other most strongly. Push Mix towards 100% and the beating weakens rather than strengthens, because there is less dry signal left for the swept copy to interfere with - which is why a chorus at full wet often sounds less choral, not more.

Tip: On electric guitar or Rhodes, Rate around 0.6 Hz, Depth 50 to 60%, Voices 2 and Mix at 50% is the sound everyone means by chorus. For a vocal double, drop Depth to 25% and Mix to 30% so it widens without wobbling. On bass, keep Depth low and Tone down so the low end stays solid. And try Depth 30% with Feedback at 80% - hollow, resonant and metallic, halfway to a flanger, and lovely on electric piano.

Flanger

A flanger is a chorus with a much shorter delay and much more feedback. The delayed copy sits close enough to the original to comb-filter it - a stack of evenly spaced notches right through the spectrum - and the sweep drags that comb up and down. It is the jet-plane sound, and it is far more aggressive than a chorus because the notches are regular and the feedback sharpens them.

Controls

Rate - Range: 0.02 to 5 Hz, or a note division with Sync. Default: 0.3 Hz. Slow rates give the long sweeping jet; fast rates get seasick quickly. Give it a whole bar or more to travel and it sounds like an event rather than a wobble.

Depth - Range: 0 to 100%. Default: 70%. How far the comb travels.

Manual - Range: 0.1 to 10 ms. Default: 2 ms. Where the comb sits before the sweep moves it. Short settings are thin and metallic, longer settings are hollow and vocal. It also sets how much room the sweep has: at very short Manual settings the sweep is naturally smaller, so if you want a wide sweep at high Depth, raise Manual to give it somewhere to go.

Feedback - Range: -95 to +95%. Default: 60%. This one is bipolar, and the two halves are different effects. Positive feedback emphasises the peaks between the notches and gives the classic resonant whoosh. Negative feedback inverts the comb and hollows the sound out instead - thinner, more nasal, and very effective on drums where the whoosh would be too much. Zero is a plain sweep with no resonance at all.

Through-Zero - On/Off. Default: Off. Normally a flanger sweeps a delayed copy against the untouched signal, so the two can get close but never actually meet. With TZ on the dry path is delayed too, so the two copies can cross and cancel completely. That gives the deep, momentary silence at the centre of the sweep that tape flanging is famous for - the sound of two tape machines running in step and one of them being slowed by a thumb on the flange.

Mix - Range: 0 to 100%. Default: 50%. **Sync** - off by default, 1/4.

Character

With TZ off, the cancellation depends on the blend between dry and delayed, so Mix sets how deep the notches cut - it is a depth control as much as a balance. With TZ on the cancellation happens inside the effect itself, so Mix behaves more like a straight dry/wet and full wet is where the drama is.

Tip: For the classic sweep, Rate 0.2 Hz, Manual 3 ms, Feedback 75% and Mix at 50%. For the tape swoosh, turn TZ on, slow the Rate right down and push Mix to 100% so you hear the null. On drums, try Feedback around -60% with Depth at 40% - it thins the kit rhythmically without the obvious whoosh, and it sits under a mix where a positive-feedback flanger would take over. Automating Manual by hand with the sweep turned off is the old trick of flanging by hand, and it still works.

Phaser

A phaser shifts the phase of your signal through a chain of all-pass stages and then adds the result back to the dry signal. Where the two disagree you get a notch, and sweeping the stages drags those notches around. Unlike a flanger, the notches are not evenly spaced - which is exactly why a phaser sounds rounder, warmer and less metallic than a flanger doing the same job.

Controls

Rate - Range: 0.02 to 5 Hz, or a note division with Sync. Default: 0.5 Hz.

Depth - Range: 0 to 100%. Default: 80%. How far up and down the notches travel. At 0% the notches park in one place, which gives you a static filter you can automate by hand.

Stages - Range: 4, 6, 8 or 12. Default: 8. More stages means more notches and a thicker, more obvious effect. Four is the classic pedal sound, eight is rich, and twelve is dense and almost vocal.

Feedback - Range: 0 to 95%. Default: 40%. Sharpens the notches into resonant peaks. High settings ring, and on a sustained source they will sing.

Colour - Range: Low, Mid or High. Default: Mid. Sets where the sweep lives. Low keeps it down in the body of the sound, which suits keys and anything you want to feel rather than hear. Mid is the classic range. High takes it up into the presence and air, which suits cymbals, hats and synth pads - it adds movement up top without touching the low end.

Mix - Range: 0 to 100%. Default: 80%. **Sync** - off by default, 1/4.

Character

The stages do not all sit at exactly the same frequency, and the sweep is not a straight line - it lingers at one end of its travel rather than moving evenly, the way a real analogue sweep does. The result is that the notches never cancel perfectly and never move in perfect formation, which is what stops it sounding like a filter being automated.

Tip: For guitar, 4 stages, Rate 0.5 Hz, Feedback 40%. For a slow pad sweep, 12 stages, Rate 0.05 Hz, Depth 100%, and then leave it alone for the whole song. On drum loops, Colour High with a faster rate adds life to the cymbals without smearing the kick. And try Depth at 0 with Feedback high - a fixed resonant peak you can ride by hand or automate as a filter sweep.

Tremolo

Tremolo modulates level rather than pitch or phase, and fMod gives you three different circuits for doing it. They are not three curves on the same modulator - they behave differently, and two of them do something a volume control cannot.

The three shapes

Bias - the amplifier-style tremolo, where the modulation pushes the circuit's bias about. The modulation shape is asymmetric rather than a clean wave, and it responds to how loud the signal is, so it breathes with the part rather than simply ducking it. This is the only shape that responds to the Square wave.

Optical - a lamp behind a photocell. The lamp cannot change brightness instantly, so the level moves smoothly however sharp the waveform you feed it, and the fall is slower than the rise. It also takes the first few cycles to come up to full brightness after you start playing, exactly as a real one does, so the first bar is a touch gentler than the rest.

Harmonic - the interesting one. The signal is split into lows and highs and the two bands are modulated in opposite directions, so as the bass ducks the treble swells and back again. The overall level stays roughly steady and the tone wobbles instead, giving a breathing, swirling quality that no amount of volume modulation can imitate. On electric piano, clean guitar and organ it is gorgeous.

Controls

Rate - Range: 0.5 to 15 Hz, or a note division with Sync. Default: 4 Hz.

Depth - Range: 0 to 100%. Default: 65%. How far the level drops at the bottom of each cycle.

Shape - Range: Bias, Optical or Harmonic. Default: Optical.

Wave - Range: Sine, Triangle or Square. Default: Sine. Sine is smooth, Triangle is more linear with a harder turn at the top and bottom, and Square chops. Square applies in Bias shape only - Optical and Harmonic have their own response and will give you Triangle if you select Square there.

Width - Range: 0 to 180 degrees. Default: 0. Offsets the right channel's modulation from the left. At 0 both channels dip together. At 180 they alternate, which turns the tremolo into auto-panning. Anything in between is a rolling stereo wobble that moves rather than jumps.

Mix - Range: 0 to 100%. Default: 100%. Below 100% the untouched signal fills in the dips, which softens the effect without changing its speed. **Sync** - off by default, 1/8. **Sidechain** - supported, see External Sidechain.

Tip: For the classic amp sound, Bias shape, Sine wave, Rate 5 Hz, Depth 60%. For hard chop, Bias with Square and Depth at 100%, then turn Sync on and lock it to 1/8 or 1/16 - set Shape to Bias first or the Square will come out as a Triangle. For auto-pan, Width 180 and Depth 100 with Sync at 1/4. On a Rhodes, Harmonic with Depth around 70% and a slow rate. And if the tremolo is fighting the groove rather than driving it, try 1/8 dotted before you try a different rate.

Vibrato

Vibrato moves the pitch, not the level. It is a chorus without the dry signal: the delay line is swept and at Mix 100% you hear only the swept copy, so the pitch rises and falls instead of beating against itself. Pull Mix below 100% and the dry signal comes back in, at which point you have built a chorus - which is a perfectly good thing to do on purpose.

Controls

Rate - Range: 0.5 to 10 Hz, or a note division with Sync. Default: 5 Hz. Around 5 to 6 Hz is where vibrato sounds most like a human performer; below 2 Hz it starts to sound like a machine with a fault, which is its own useful sound.

Depth - Range: 0 to 100%. Default: 50%. How far the pitch moves. Small values are expressive, large ones are unmistakably electronic.

Rise - Range: 0 to 2000 ms. Default: 200 ms. How long the vibrato takes to swell in from nothing to full depth. This control does nothing unless Latch is on.

Latch - On/Off. Default: Off. With Latch off, vibrato is at full depth from the first note. With Latch on, it swells in over the Rise time instead - the way a player leans into a note and then adds vibrato to it - and it swells in again each time the transport starts, so it arrives fresh at the top of every take.

Mix - Range: 0 to 100%. Default: 100%. **Sync** - off by default, 1/4.

Character

The delay line adds a little analogue colour to the pitch modulation - warm and slightly gritty rather than clinically clean - and each unit has its own pitch accuracy, so the depth you dial in is not quite the depth you get. That is deliberate, and it is why two instances at the same setting drift against each other rather than locking together.

Tip: For a vocal or a lead line, Rate 5.5 Hz and Depth 20 to 30% is about right - enough to hear, not enough to notice. For classic organ vibrato, Rate 6 to 7 Hz and Depth 40 to 60%. For the swell, turn Latch on and set Rise around 600 ms, then play a held note and listen to it arrive. For a broken-tape wobble, Rate 1 Hz and Depth 80%. Remember that Rise does nothing at all with Latch off, so if the swell is not happening that is the first thing to check.

Rotary

A rotating speaker cabinet: a horn spinning at the top for the highs and a drum rotating below it for the lows, picked up by two microphones. The movement you hear is three things at once - the pitch shifting as each rotor swings towards and away from the mics, the level changing as it points at and away from them, and the tone changing as the horn's mouth turns. The two rotors run at different speeds and take different amounts of time to get there, so the pattern never quite repeats.

Controls

Speed - Range: Slow, Fast or Brake. Default: Fast. Slow is the gentle chorale setting, Fast is the fluttering one, and Brake stops the rotors. The famous sound is the change between them rather than either one on its own.

Horn Trim / Drum Trim - Range: -50 to +50%. Default: 0%. Trims each rotor's speed away from its nominal rate, in either direction. Pulling the two apart makes the cabinet less regular and more characterful; pushing them together makes it tighter and more mechanical.

Accel - Range: 0.5 to 5 seconds. Default: 2 seconds. How long the rotors take to reach a new speed after you change the switch. The horn always gets there before the heavier drum, so the sound pulls apart while it changes and then knits back together. Short times are abrupt; long times are the slow spin-up you hear on records.

Balance - Range: 0 to 100%. Default: 50%. The blend of drum and horn. 0% is all drum, dark and thumping; 100% is all horn, bright and fluttering.

Drive - Range: 0 to 100%. Default: 0%. Valve-style saturation before the rotors, so the distortion spins with the cabinet rather than sitting on top of it - which is the whole point, and the thing that separates this from putting an overdrive after a rotary. The level is held roughly steady as you turn it up, so you can judge the colour rather than the volume.

Distance - Range: 0 to 100%. Default: 30%. How far back the microphones are. Close is bright, direct and punchy with strong movement; further back is darker and more diffuse as the top end is absorbed. 30% is a typical studio close-mic position.

Cabinet - On/Off. Default: On. The cabinet itself - its body resonance, its limited top end and its rolled-off bottom. Turn it off for a cleaner, more modern rotary that keeps the movement without the box.

Mix - Range: 0 to 100%. Default: 100%. A rotary cabinet is the whole sound rather than an effect over the top, so 100% is usual. **No Sync.**

Character

The speed transition is the signature sound. Because the horn is light and the drum is heavy, they accelerate at different rates, so during a change the stereo image shifts and swirls in a way that neither steady speed produces. Each unit has its own rotor speeds, its own cabinet resonance and its own microphone placement, so no two fMod rotaries sit in quite the same place.

Tip: *On organ, leave Balance at 50%, Cabinet on, and automate Speed between Slow and Fast - that transition is the instrument, and Accel at 2 to 3 seconds gives the most convincing one. On electric guitar, Drive around 40% with Distance low gives the small-amp-in-a-room sound. On a synth pad, Speed Slow, Balance 70%, Accel long and Cabinet off adds movement without boxiness. And Brake is worth automating too: dropping to Brake at the end of a phrase and letting the rotors coast to a stop is a real performance move.*

Ring Modulator

A ring modulator multiplies your signal by a tone it generates itself. The output is not the two signals mixed but the sums and differences of every frequency in both - which is why it sounds clangorous and metallic, and why the result is rarely in the same key as what you put in. This one is built around a germanium diode bridge, with the mismatch between the diodes left in place.

Controls

Freq - Range: 20 to 5000 Hz. Default: 200 Hz. The pitch of the internal tone, and the single control that decides what this mode sounds like. Low settings give a tremolo-like throb, the middle gives bell and robot tones, and the top is pure clang.

Fine - Range: -100 to +100 cents. Default: 0. Fine tuning, one semitone in either direction, for when you want the result to sit in the track rather than fight it.

Wave - Range: Sine, Square or Triangle. Default: Sine. Sine is the cleanest and most musical, Square is the harshest and most aggressive, Triangle sits between them.

LFO Rate - Range: 0 to 10 Hz. Default: 0. Sweeps the tone's pitch up and down.

LFO Depth - Range: 0 to 100%. Default: 0%. How far that sweep goes. Both LFO controls sit at zero by default, so you need to raise both before anything moves - one alone does nothing.

Bleed - Range: 0 to 100%. Default: 10%. Lets some of the raw tone through on its own. A real ring modulator never cancels its carrier perfectly, and that leakage is part of the character; turn it up and you get an audible drone under the effect, which is useful as a synth-like layer in its own right.

Mix - Range: 0 to 100%. Default: 100%. **No Sync. Sidechain** - supported, see External Sidechain.

Character

The germanium diode bridge has natural nonlinearities that add a subtle warmth and asymmetry rather than a clean multiplication, and the two sides of the bridge are not perfectly matched. Each unit has its own diode character, so each ring modulator has a slightly different harmonic balance.

Tip: *Freq around 100 to 300 Hz with a Sine carrier is classic ring mod. For robot voice, 300 to 800 Hz at full wet. For bell tones on percussion, go high and switch to Square. For something much subtler, drop Freq to 20 to 40 Hz and pull Mix back to 30 to 50% - down there it stops sounding like pitch and starts sounding like a rough tremolo. And use Fine: the difference between a ring mod that clashes with the track and one that sits in it is often twenty cents.*

Univibe

Four phase-shift stages, each controlled by its own photocell watching a single incandescent lamp. Because the lamp has a filament with real mass it brightens quickly and dims slowly, and because the four photocells do not respond identically or at the same speed, the four stages never move together. That staggering is what separates this from a phaser: it sounds like it is breathing rather than sweeping, and no simple LFO reproduces it.

Controls

Rate - Range: 0.5 to 12 Hz, or a note division with Sync. Default: 3 Hz. Slow is the swampy setting; faster gets closer to a fluttering rotary.

Depth - Range: 0 to 100%. Default: 80%. How brightly the lamp swings, and so how far the stages move.

Drive - Range: 0 to 100%. Default: 30%. Transistor-style saturation into the stages. The original was never quite clean and neither is this; Drive changes the character significantly rather than just the level, and the level is held roughly steady as you turn it up. Push it and it starts to sound like a small amp working hard.

Intensity - Range: 0 to 100%. Default: 70%. Feeds the output of the stages back to their input. Low is a gentle wash; high is resonant and vocal, with an almost wah-like peak riding the sweep.

Mode - Range: Chorus or Vibrato. Default: Chorus. Chorus keeps the dry signal alongside the shifted one, which is the familiar throbbing sound. Vibrato drops the dry signal and leaves only the shifted path - thinner, more pitch-like and much less commonly used.

Mix - Range: 0 to 100%. Default: 100%. **Sync** - off by default, 1/4.

Character

The lamp takes a moment to reach full brightness when the effect starts running, so the first few sweeps are gentler than the ones that follow. Each unit has its own photocell response and its own lamp warm-up, which is why two Univibes at the same setting have noticeably different feel rather than just different phase.

Tip: The classic setting is Rate around 1 Hz, Depth 90%, Intensity 70% and Drive 30% - swampy, breathing, and unmistakable. Push Drive to 70% for grit. Vibrato mode with Depth at 100% and a slow rate is the underused one; try it on a clean guitar or an electric piano. Univibe sits well before a distortion rather than after it, which is how it was used originally and why it sounds wrong in an effects loop.

Recipes

Starting points worth trying. Each one lists only the controls you need to change - everything else sits at its default, so press **Reset** first with that mode selected. Reset returns the current mode to its defaults and leaves the other seven alone, so you can reset the chorus without losing your rotary.

Chorus

Recipe	Settings	What you get
Wide guitar	Rate 0.6, Depth 55, Voices 3	Lush and wide without obvious pitch movement. The classic clean-guitar chorus.
Vocal double	Rate 0.4, Depth 25, Mix 30	Widens a vocal and makes it feel doubled. Too much Depth here sounds seasick.
Resonant	Depth 30, Feedback 80, Tone 45	Hollow and metallic, halfway to a flanger. Good on electric piano.

Flanger

Recipe	Settings	What you get
Jet plane	Rate 0.2, Manual 3.0, Feedback 75	The long sweeping whoosh. Give it a whole bar to travel.
Tape flange	Rate 0.15, TZ on, Mix 100	The deep cancellation at the centre of the sweep that only through-zero can do.
Hollow drums	Rate 0.15, Depth 40, Feedback -60	Negative feedback thins the kit rhythmically instead of whooshing over it.

Phaser

Recipe	Settings	What you get
Pedal phase	Stages 4, Rate 0.5, Feedback 45	The four-stage guitar pedal sound.
Slow pad	Stages 12, Rate 0.05, Depth 100	One enormous sweep. Set it and leave it.
Cymbal shimmer	Colour High, Rate 2.0, Depth 60, Mix 50	Movement up top without touching the low end.

Tremolo

Recipe	Settings	What you get
Amp tremolo	Shape Bias, Rate 5.0, Depth 60	The classic combo amp throb.
Chopper	Shape Bias, Wave Square, Depth 100, Sync on 1/16	Hard rhythmic chop. Square only works in Bias, so set Shape first.
Rhodes wobble	Shape Harmonic, Rate 3.0, Depth 70	The lows and highs swap places while the level stays put.
Auto-pan	Width 180, Depth 100, Sync on 1/4	The channels dip in alternation, so the sound walks across the image.

Vibrato

Recipe	Settings	What you get
Player's vibrato	Rate 5.5, Depth 25, Latch on, Rise 600	Swells in like a hand leaning into a note. Rise needs Latch on.
Broken tape	Rate 1.0, Depth 80	A sick, lurching wobble.

Rotary

Recipe	Settings	What you get
Organ chorale	Speed Slow, Drive 20	Then automate Speed to Fast at the end of a phrase - the change is the instrument.
Small amp	Drive 45, Distance 15, Balance 65	Close-mic'd and working hard.
Wide pad	Speed Slow, Balance 70, Accel 4.0, Cabinet off	Movement without the boxiness.

Ring Mod

Recipe	Settings	What you get
Robot	Freq 500	The classic voice treatment. Use Fine to nudge it into the key of the track.
Bells	Freq 1200, Wave Square, Mix 60	Metallic tones on percussion.
Wobble	Freq 300, LFO Rate 0.5, LFO Depth 30	Both LFO controls start at zero, so raise both or nothing moves.
Sub throb	Freq 25, Mix 70	Down at the bottom it stops sounding like pitch and starts sounding like tremolo.

Univibe

Recipe	Settings	What you get
Classic vibe	Rate 1.0, Depth 90	Swampy and breathing. Leave Drive and Intensity where they are.
Pushed	Rate 1.5, Drive 70, Intensity 85	Resonant and dirty, like a small amp on the edge.
True vibrato	Mode Vibrato, Rate 0.8, Depth 100	No dry signal, just the shifted path. Lovely on electric piano.

Tip: If two tracks both have modulation on them, put them at different rates - two effects moving at nearly the same speed fight each other and neither wins. Use Sync when the movement should be part of the rhythm and leave it off when it should not; free-running modulation drifting against the grid is a large part of what makes a track sound played rather than programmed. And load fMod twice on the same track for combinations the single unit cannot make, such as a slow phaser into a fast tremolo - each instance is its own unit with its own character.

Automation

Every on-screen control in every mode is exposed to your host and can be written and read through its automation lanes like any other parameter, including the Mode selector itself. Automating the mode selector is a real technique rather than a curiosity - switching from Chorus to Rotary at a chorus is one gesture in one lane.

That works the same way wherever fMod is running. In a DAW it is your DAW's automation lanes. As an insert in the fBox Console or the Console Standalone, it is the desk's own automation system: the slot records and plays back fMod's controls along with everything else on the channel, so a mode change or a slow Depth ride is part of the mix pass rather than something you have to leave to the host.

All eight modes' controls are in the host's parameter list at once, not just the mode you are looking at, so they are prefixed to keep them apart: **CH** for Chorus, **FL** for Flanger, **PH** for Phaser, **TR** for Tremolo, **VB** for Vibrato, **RT** for Rotary, **RM** for Ring Mod and **UV** for Univibe.

The Quality selector is deliberately kept off the automation list. It is a CPU and character setting for the unit rather than a mix move, and having it in every automation lane list was more clutter than help. It is still saved and recalled with everything else.

With I/O Link on, both trims write to your host, so a link move records properly and plays back as you performed it.

fMod's complete state, including all eight modes, the active mode and the serial, is saved with your session (DAW, Console, Standalone or Rack).

Tip: *The controls worth automating are not always the obvious ones. Rotary Speed between Slow and Fast is the big one. After that: Flanger Manual with the sweep off, for hand flanging; Ring Mod Freq for a rising alien sweep; Phaser Depth from 0 to 100 to open a static filter into a moving one; and Mix on anything, to bring the effect up under a chorus and take it away for the verse.*

Units and Patch Cards

fMod's character lives in its serial number. There are two ways to keep and move your work: units (the character) and patch cards (the whole setup).

The unit menu

A unit is this processor's character on its own - its serial and the analogue voice that serial produces, with no settings attached. The Unit button in the header opens the menu:

Menu item	What it does
New Unit	Roll a fresh unit with a new serial and a new voice.
Save Unit...	Save the current unit so you can recall it later. Saved units live in Documents/fBox Units/fMod.
Load saved unit	Recall a unit you saved, or browse for a unit file.
Recall my pinned unit	Jump back to your pinned default.
Pin this unit as my default	Make this unit the one every new instance opens with - this is how you keep one unit for good.
Use a new unit each time	Go back to a fresh unit on each new instance.

Patch cards

A patch card is a portable copy of the whole plugin - the serial and every setting across all eight modes - written to a single file, so one card carries your entire fMod setup.

Save Patch Card writes the current plugin to a card (a .json file) you choose the home for. **Load Patch Card** reads one back in, and if the card was saved on a different unit it asks how to bring it in:

Option	What it does
Recall Unit	Bring back the exact unit the card was saved on - its character and all its settings.
Apply Settings Only	Keep your current unit's character and drop the saved settings on top.

A patch card carries its identity, so a card saved for a different fBox product is refused with a note. The Reset button, by contrast, clears only the current mode's controls back to their defaults and never touches a card.

Important: *A unit is the character; a patch card is the character plus everything you set on top of it. Both save the serial, so the exact voice comes back with them.*

Quality

The Quality selector sets the processing quality of the analogue stages:

Tier	Use
Eco	Lowest CPU. Sounds great for tracking and dense sessions.
Studio	The sweet spot for mixing. Richer saturation and enhanced quality on the analogue path. The default.
Master	Maximum quality. For final mixes and mastering.

Tip: *Studio is the right choice for normal use. Drop to Eco if your computer is struggling; switch to Master for a final mix or master.*

Performance and CPU

The quality of the analogue stages costs CPU. fMod gives you the same Eco / Studio / Master control the rest of the range uses, so you can mix light and render heavy.

Mix light, render heavy

Mix at Studio, or drop to Eco if your machine struggles - the sound still plays, just at lighter quality. Then, when you bounce, switch to Master and let your DAW render. The render is offline, so it takes as long as it needs and comes out at full Master quality however much the live playback stuttered. Close editor windows you are not using, and freeze or bounce the track when you want the heavy processing to run offline.

What fMod Writes To Your Computer

For transparency, here is everything fMod writes and where. It writes nowhere else, and sends nothing anywhere unless you choose to.

Folder	Contents
Documents/fBox/Diagnostics	Plain-text diagnostic logs, kept so a crash can be worked out afterwards. There is a folder per product; an fMod running inside the Console or Rack logs into that host's folder, alongside the rest of the session.
Documents/ fBox Units	Your saved units, so you can find, back up and share them.
AppData/Roaming/fBoxAudio (Windows)	Your licence, and a small settings file recording which unit you have pinned.

Patch cards go wherever you save them. The plugin's own state lives in your session, not in a file of its own. Nothing is filed away somewhere you did not pick, and nothing is written to your Desktop.

When something goes wrong

Diagnostics are written automatically as fMod runs and survive a crash or freeze. If you hit a problem, zip the whole Documents/fBox/Diagnostics folder and email it to support@fboxaudio.com - send the entire folder, since what else was running alongside fMod often explains the problem. Tell us what you were doing, what you expected, and what happened. The logs are plain text; you are welcome to read them, but you do not need to.

If you hear clicks or dropouts, raise your host's buffer size (Master quality at a small buffer is the most demanding). If a fault ever appears, the red RESET indicator and the Reset Engine button clear it without a reload; if it keeps returning, switch the Quality tier and back, or reload the plugin. If you cannot hear any modulation, check that Mix is above 0%, Bypass is off, and Depth is above 0%. If you have routed a sidechain to Tremolo or Ring Mod and nothing has changed, check SC Mix - it starts at 0%.

Analogue Character

Every instance of fMod generates a unique serial number, shown in the top-left watermark. It defines the unit's hardware character across the whole signal path, and it shapes every one of the eight modes.

On real analogue hardware, no two units from the same line sound identical. The speed of the movement is never exactly what the panel says. The depth of the sweep lands a little differently. Lamps come up to brightness at their own pace and photocells let go at their own pace, so the shape of the movement belongs to the unit as much as the rate does. The rotors sit at their own speeds, the diodes are not perfectly matched, and the noise floor has its own colour.

Put two fMods on the same chorus setting and listen to them side by side: the beating patterns are not the same, and they drift against each other rather than locking together. The rotary cabinet is where you will hear it most - rotating speakers were notoriously inconsistent machines, and each instance has its own.

fMod models these variations across every mode. No single one is obvious in isolation; the cumulative effect is what gives each unit its voice. The same serial always produces the same unit, different serials produce different units, and the serial is saved with your session - whether that is your DAW, the fBox Console, the Console Standalone or the Rack - and with any unit or patch card you keep.

Tip: *You cannot dial a unit's character to order any more than you can a real one - but you can learn it, and you can keep it. Find one you love, pin it, and it is the box you open every time. If you want two identical units, save a patch card from one and load it on the other with Recall Unit - the serial and all its character transfer with the card.*

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