

TED-8 Virtual Synthesizer

User Manual · Version 1.0



Introduction

TED-8 is a software replica of the Oberheim TEO-5. It was modelled from measurements of a real unit: the oscillators, the SEM-style filter, the envelopes, the LFOs, the effects and the reverb were recorded on the hardware and matched in the plugin. The panel follows the layout of the TEO-5, and programs use the same parameters and value ranges as the unit.

Because TED-8 behaves like the TEO-5 in most respects, this manual is short. It walks through the panel section by section and describes what TED-8 adds or does differently. For the details of synthesis, programming and the parameters that work the same way, please read the Oberheim TEO-5 User's Guide, available from Oberheim's website.

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Differences from the TEO-5

- **8 voices** of polyphony (the unit has 5).
- **Poly Unison**: with Unison on, every note gets its own stack of voices instead of one stack for the whole keyboard.
- **Modulation matrix view**: all 16 matrix slots on one screen. Press M or choose Programs > View Modulation Matrix.
- **MIDI learn** on every control from a right-click or hold-click menu. There are no Learn or Clear buttons.
- **Presets and banks** are stored as .fxb banks of 256 programs, with category tags for browsing. OB-Xd presets and banks can be imported.
- **HOLD** works locally: held notes keep playing and the arpeggiator latches.
- **FACTORY** has no function yet, and the unit's TAP TEMPO is not available.
- **TEO-5 link**: TED-8 can connect directly to a hardware TEO-5 over its own MIDI ports. Edits travel both ways, program changes follow, and the 256 user programs can be backed up and restored as .syx files.

Installation and Activation

Formats

TED-8 runs on macOS as AU, VST3 and AAX plugins and as a standalone application, on Windows as VST3 and AAX plugins and as a standalone application, and on Linux as VST3 and LV2 plugins and as a standalone application. In the standalone version, Audio/MIDI Settings at the top of the main menu selects the audio device and MIDI inputs.

Activation

After purchase you receive a serial number from discoDSP. Open the main menu (the MENU button, or a right-click on an empty part of the panel) and choose Register. Enter the serial number in the License Activation dialog, where it is called the Purchase ID. TED-8 checks it with the discoDSP server once, so the computer needs an internet connection for this step. When the license is valid, Buy and Register disappear from the menu.

Files and folders

Banks, presets, MIDI mappings and settings are kept in a TED-8 folder:

- macOS: Library > Application Support > discoDSP > TED-8 (in your user folder)
- Windows and Linux: Documents > discoDSP > TED-8

Banks are in the Banks subfolder, single presets in Presets and MIDI mapping files in MIDI.

Working with the Panel

Drag a knob up or down to turn it. Double-click a knob to return it to its default value. Buttons switch on and off with a click. Display boxes such as the LFO destination, the effect type or the arpeggiator mode open a list when you click them. Where a row of LEDs sits next to a control (arpeggiator octave and repeat, envelope routing), click an LED to select that value.

While you move a control, the screen in the middle of the panel shows its name and value for a moment. Some controls also draw a picture there: the pulse wave for Pulse Width, the Osc 1 waveform under cross modulation, and the filter response for the filter controls. Keep the mouse button held on a control to keep its value on the screen.

Control menu and MIDI learn

Right-click any control, or click and hold it without moving for about half a second, to open its menu. The menu title shows the parameter name and, if one is assigned, its CC number.

- **MIDI Learn:** choose it, then move a knob or slider on your controller. The control is now assigned to that CC. Choose Cancel MIDI Learn to stop waiting.
- **Clear MIDI:** removes the assignment.

MIDI > Show CC Mappings prints the assigned CC number next to every control on the panel. Click anywhere to hide them again.

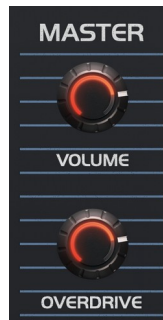
Keyboard and mouse shortcuts

- **M:** shows or hides the modulation matrix.
- **Frequency 1 and Frequency 2:** right-drag or Shift-drag moves in octave steps. A right-click without dragging still opens the control menu.
- **Right-click on the empty panel:** opens the main menu.
- **Appearance:** the main menu's Appearance submenu sets the window size from 0.75x to 2x.

The Panel

The panel is divided into sections in the same order as on the TEO-5. Most controls work as on the unit, so the descriptions below are brief.

Master



- **Volume:** output level of TED-8.
- **Overdrive:** drive applied to the sum of all voices, before the effect and the reverb.

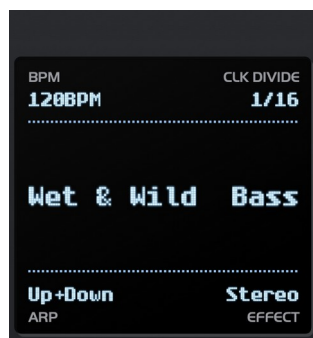
LFO 1: Mono and LFO 2: Poly



TED-8 has two LFOs with the same controls. LFO 1 is a single LFO shared by all voices. LFO 2 runs separately in each voice, so every note can have its own LFO phase. The mod wheel adds vibrato at the rate of LFO 1.

- **Sync:** locks the LFO rate to the tempo. The note value is chosen in Programs > Sync Rates (8 bars to 1/64).
- **Destination:** click the box to choose what the LFO modulates.
- **Shape buttons:** triangle, sawtooth, reverse sawtooth, square and sample and hold.
- **Freq:** LFO rate, from very slow to audio rate.
- **Amount:** modulation depth. The knob is bipolar: turn it left of center for inverted modulation.
- **Slew:** smooths the LFO output, which rounds off the square and sample and hold shapes.
- **Reset:** restarts the LFO with every new note.

Screen



The screen shows the tempo and clock divide at the top, the program name in the middle and the arpeggiator mode and effect type at the bottom. Each of the five fields opens a menu when you click it:

- **BPM** (top left): turn Sync on to follow the host tempo, or pick a tempo from 40 to 240 BPM. Picking a tempo turns host sync off.
- **Clock Divide** (top right): the step length of the arpeggiator and the sequencer, from 1/2 to 1/64 including triplets.
- **Program name** (middle): lists all programs by bank and by category tag.
- **Arp** (bottom left): arpeggiator on, mode, octave range, repeat and relatch.
- **Effect** (bottom right): effect on, effect type, clock sync and sync rate.

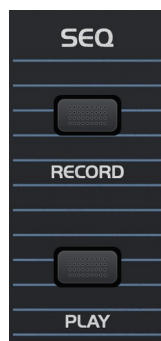
Arpeggiator



- **On**: switches the arpeggiator on.
- **Relatch**: with HOLD on, a new chord played after all keys are released starts a new arpeggio instead of adding notes to the old one.
- **Octave**: range of 1, 2 or 3 octaves, shown by the LEDs. Click an LED or turn the knob.
- **Mode**: Up, Down, Up+Down, Random or Assign (the order in which the keys were pressed).
- **Repeat**: plays each note 1, 2 or 3 extra times before moving on.

The step length comes from Clock Divide on the screen, and the tempo from BPM.

Seq



The sequencer records up to 64 steps. Each step holds a single note or a chord of up to 5 notes, with velocity, or a rest or a tie. The sequence is saved with the program.

- **Record:** press RECORD and play. Keys pressed together make one step, and the sequencer moves to the next step when you release the last key. While recording, the bottom fields of the screen turn into REST and TIE: click them to enter a rest or to tie the previous step into the next one. A new recording starts at step 1.
- **Play:** ends recording and plays the sequence from step 1. Press it again to stop. Step length follows Clock Divide.
- **Transpose:** while the sequence plays, switch on RECORD or UNISON and play a key. The sequence is transposed by the distance from middle C (C4) to that key.

| Playback is started and stopped from the panel. It does not follow the host transport yet.

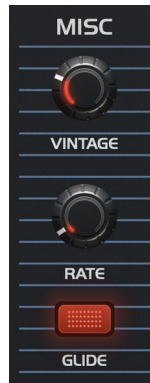
Effect and Reverb



The effect and the reverb process the sum of all voices, after Overdrive. The effect comes first.

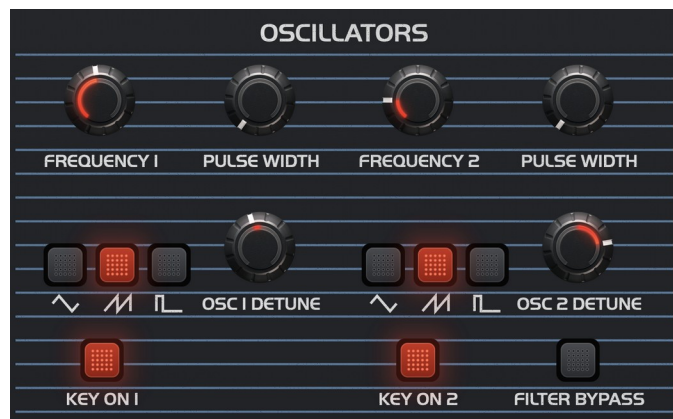
- **Effect On:** switches the effect on.
- **Type:** Stereo Delay, BBD, Tape Delay 1, Tape Delay 2, Chorus, Flanger, Phaser, HP Filter, Distortion, Ring Mod, Rotating Speaker or Lo-Fi.
- **Depth/Mix, Time** and **Fback/Misc:** the meaning of these knobs depends on the effect type, as on the TEO-5. See the TEO-5 User's Guide for each type.
- **Clk Sync:** locks delay times and modulation rates to the tempo. The note value is chosen in the screen's effect menu or in Programs > Sync Rates > Effect (1/16 to 1/1).
- **Reverb On:** switches the reverb on.
- **Size, Mix, Predelay** and **Decay:** room size, wet level, delay before the reverb starts and length of the tail.
- **Tone:** darker to the left (LP), brighter to the right (HP).

Misc



- **Vintage:** adds slow random drift to each voice, like an older analog synth that has not settled.
- **Rate:** glide time for both oscillators.
- **Glide:** switches glide on. Programs > Glide Mode chooses Fixed Rate or Fixed Time glide, each with an option to glide only on legato notes.

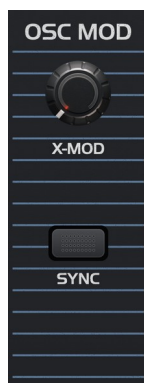
Oscillators



Each voice has two oscillators and a sub oscillator. All three waveforms of an oscillator can be on at the same time.

- **Frequency 1 and 2:** pitch in semitones above the played key. At 0 the oscillator plays at the key's pitch. Right-drag or Shift-drag moves in octave steps.
- **Pulse Width:** width of the pulse wave of each oscillator. As on the unit, the pulse gets thinner toward the maximum and finally goes silent.
- **Waveform buttons:** triangle, sawtooth and pulse.
- **Osc 1 Detune and Osc 2 Detune:** fine tuning, bipolar around the center.
- **Key On 1 and Key On 2:** when off, the oscillator ignores the keyboard and holds a fixed pitch.
- **Filter Bypass:** sends Osc 2 around the filter, straight to the amplifier.

Osc Mod



- **X-Mod:** Osc 2 modulates the frequency of Osc 1. Small amounts add movement, larger amounts give metallic and bell-like tones.
- **Sync:** hard sync. Osc 1 restarts its cycle with every cycle of Osc 2, so the pitch follows Osc 2 while Frequency 1 changes the tone.

Filter



The filter is a 2-pole state variable filter modelled on the Oberheim SEM and calibrated against the TEO-5. The mixer in front of it sits in the same section.

- **Resonance:** emphasis around the cutoff frequency.
- **Cutoff:** filter frequency. The ring around the knob follows the cutoff as it is modulated.
- **State:** sweeps from low pass (left) through notch (center) to high pass (right).
- **BP:** switches the filter to band pass.
- **Osc 1, Sub, Osc 2 and Noise:** mixer on/off buttons. The knobs in the bottom row set their levels, in the same order.
- **Noise Type:** White, Pink or Violet. Violet sounds the same as Pink, as on the unit with its current firmware.

Filter key tracking is set in Programs > Filter Key Amount.

Envelopes



There are two envelopes with the same controls. The bracket on the left sets the routing. Click an LED to select it.

- **Env 1 Filter, Env 2 Amp:** the usual setup, with Env 1 on the filter and Env 2 on the amplifier.
- **Env 2 Filter+Amp:** Env 2 drives both. Env 1 is free for its Aux destination.
- **Env 2 Filter+Gate:** Env 2 drives the filter and the amplifier opens and closes like an organ. Env 1 is again on Aux.

Right-click the Aux LED, or use Programs > Env 1 Aux Destination, to choose what Env 1 modulates in the Aux routings.

- **Attack, Decay, Sustain, Release:** the envelope stages. The knob of the stage that is running lights up while you play.
- **Amount:** envelope depth. Env 1 Amount is bipolar for inverted filter sweeps.
- **Velocity:** lets key velocity scale the envelope.
- **Delay:** time before the attack starts.
- **Env Repeat:** Off, Env 1, Env 2 or Env 1+2. A repeating envelope starts its attack again when the decay is done, which turns it into a kind of LFO.

Bottom bar



- **Menu:** opens the main menu.
- **Unison:** stacks voices on a single note. Programs > Unison sets the number of voices (1 to 6), the detune, the key priority (Low, High or Last) and Env Retrigger. Right-click UNISON to turn on Poly Unison, which gives every note its own stack.
- **Hold:** keeps notes playing after you release the keys. With the arpeggiator on, it latches the arpeggio.
- **Factory:** no function yet.
- **Bank:** chooses a TED-8 bank file (.fxb).
- **Program display:** shows the program number as bank and slot, for example 609 is bank 6, program 9. Click it to choose a program from a list.
- **1 to 16:** select a program in the current bank.
- **Manual:** sends all current settings to a linked TEO-5.

Modulation Matrix



Press M, or choose Programs > View Modulation Matrix, to show the 16 matrix slots in place of the lower half of the panel. Press M again to return to the panel. Each slot has a source, an amount and a destination. The amount knob is bipolar, so a slot can also subtract.

Sources: Osc 2, Noise, LFO 1, LFO 2, Env 1, Env 2, Voice Spread, Pitch Bend, Mod Wheel, Pressure, Breath, Foot Pedal, Expression Pedal, Velocity, Note Number, Filter Out, Random, DC and Audio Out.

Destinations are grouped by panel section in the menu: oscillators, cross modulation, mixer, filter, LFOs, envelopes, effect, reverb and voice (volume, panning, vintage and unison detune). The last group, Mod Matrix, lets one slot change the amount of another slot.

Voice Spread gives every voice a slightly different value. With Panning as the destination it spreads the voices across the stereo field. The matrix works like the TEO-5's; the TEO-5 User's Guide covers each source and destination.

Programs and Banks

A TED-8 bank holds 256 programs in 16 banks of 16, the same layout as the TEO-5 user memory. Banks are .fxb files in the Banks folder. Choose one with the BANK button or the main menu's Banks submenu. Programs are selected with the 16 program buttons, the program display, the middle of the screen or Programs > Bank Presets.

Category tags

Every program can carry one category tag: Pad, Lead, Bass, Poly, Keys, String, Pluck, Bell, Arp, Brass, Voice, Organ, Perc, Tuned Perc or SFX. Set the tag of the current program with the first entry of the Programs menu. Programs > Category Presets lists the programs of every installed bank by tag, which is the quickest way to find a sound.

Importing

File > Import Preset and Import Bank load TEO-5 program dumps (.syx) as well as OB-Xd presets (.fxp) and banks (.fxb). OB-Xd settings are converted to the closest TED-8 values. The two synths differ, so imported OB-Xd sounds come close to the originals but are not identical.

Main menu reference

Menu	Contents
File	Reset, Rename and Save Preset. Search Presets and Clear Search. Copy, Paste and Reload Preset. Import and Export Preset or Bank (.syx, .fxp, .fxb). New, Rename, Reset and Delete Bank. Backup TEO-5 and Restore TEO-5 when a unit is linked.

Programs	Category Tag, Bank Presets, Category Presets, Poly Unison, View Modulation Matrix (M). Settings with no knob on the panel: Pitch Bend (up 0 to 12, down 0 to 24 semitones), Glide Mode, Unison (Voices, Detune, Key Mode, Env Retrig), Filter Key Amount, Voice Volume, Transpose (± 2 octaves), Sync Rates (LFO 1, LFO 2, Effect), Env 1 Aux Destination, Key Split.
Banks	All bank files in the Banks folder.
MIDI	Mapping files (Save As, Rename, Delete, Import, Export), MIDI Out, Channel, Show CC Mappings, and ready-made mappings for many hardware controllers and synths.
TEO-5	Shown when a TEO-5 is connected to the computer. See the next chapter.
Appearance	Window size from 0.75x to 2x, Small Popup font.
Help	Open User Manual, Check Updates and the version number.

Key Split is stored with the program and sent to a linked TEO-5, but TED-8 does not play splits yet.

MIDI

By default TED-8 answers the same CC numbers as the TEO-5, so the CC chart in the TEO-5 User's Guide applies. The MIDI menu holds mapping files for other controllers, and any control can be reassigned with MIDI Learn. The mod wheel adds vibrato at the LFO 1 rate. The pitch bend range is set in Programs > Pitch Bend. MIDI > Channel selects the receive channel.

Connecting a TEO-5

If you own a TEO-5, TED-8 can work as its editor and librarian. Connect the unit to the computer by USB. TED-8 looks for MIDI ports with TEO-5 in their name and talks to the unit through them directly, separate from the MIDI routing of your DAW. When a unit is found, a TEO-5 submenu appears in the main menu.

Linking

Choose TEO-5 > Link to TEO-5. The menu entry shows the unit's operating system version once the unit has answered. While linked:

- Edits made in TED-8 are sent to the unit, and knobs turned on the unit move the controls in TED-8.
- Program changes can follow in both directions (see Send Program on Change and Follow Unit Program Changes below), so the unit's display and TED-8 show the same program number.
- Sequencer recordings stay in step: a sequence recorded on the unit is written into the TED-8 program, and one recorded in TED-8 is sent to the unit.
- The MANUAL button sends all of TED-8's current settings to the unit.

TED-8 talks to the unit on MIDI channel 1.

TEO-5 menu

Item	What it does
Link to TEO-5	Switches the link on or off.
Get Edit Buffer	Loads the sound currently playing on the unit into TED-8.
Send to Edit Buffer	Sends the current TED-8 program to the unit for playing, without storing it.
Get All User Programs	Loads the unit's 256 user programs into the current TED-8 bank.
Write Program to User...	Stores the current program in the matching user slot of the unit.
Write Bank to User Memory...	Stores all 256 programs of the current bank in the unit's user memory.
Cancel Transfer	Stops a transfer in progress.
Send Edits as NRPN / CC	How edits are sent. NRPN covers every parameter at full resolution. CC is coarser and covers fewer parameters.
Do Not Send Edits	TED-8 receives from the unit but does not send edits.
Send Program on Change	When you select a program in TED-8, the unit switches to the same slot and receives the TED-8 program in its edit buffer.
Follow Unit Program Changes	Selects the matching program in TED-8 when you change programs on the unit.

Backup and Restore

With the link active, File > Backup TEO-5 saves all 256 user programs of the unit into one .syx file. The TED-8 bank is not changed. File > Restore TEO-5 sends such a file back and writes the programs into the unit's user memory, replacing what is there.

| *Restore and Write Bank overwrite the unit's user programs. Make a backup first.*

Support

For questions, bug reports and license matters, contact discoDSP support at <https://www.discodsp.com/contact/>