WatsonMIDI

MAESTRO

by Watson Pipe Organ Co.

Professional Guide

Organ Profiling · Translation Engine · Professional Tuning

v1.10.0 · iOS 17.0+ · support@watsonpipeorgan.com

Capture the Music. Share the Ministry.

PART ONE · ORGAN PROFILING

Organ Profiling is the foundation of the Maestro tier. Church organists and organ technicians alike use the Learn Stops workflow to capture a complete digital representation of any pipe or digital organ — its stops, divisions, channels, and MIDI system behavior. Before you can translate recordings between instruments or use MIDI-connected tuning with named ranks, a profile must exist for each instrument. Every other Maestro feature depends on an accurate profile.

▲ A Note on Organ Profiling

Organ Profiling is designed for church organists and organ technicians alike. Organists who are familiar with their instrument's stop list and MIDI system can complete the profiling process themselves. Each stop must be drawn individually, correctly identified by family (Principal, Flute, String, Reed, Mixture, Percussion), and assigned its correct footage and division. A profile only needs to be created once per organ.

For organists who prefer assistance, a qualified organ technician or knowledgeable colleague can create the profile on your behalf. Whoever completes the profile, accuracy matters: an inaccurate profile will produce imprecise translation results. The quality of every downstream Maestro feature depends entirely on the quality of the profile.

For technical questions about WatsonMIDI, contact support@watsonpipeorgan.com.

1. What is an Organ Profile?

An organ profile is a structured map of one instrument's complete MIDI layout. It records how every stop is identified (by Note, CC, or SysEx), which MIDI channel each division uses, the footage and family of each stop, expression pedal assignments, and the type of MIDI system the organ uses (Peterson, Syndyne, Matters, Rodgers, etc.).

Profiles are stored on your device and travel with you. A profile created at one church is instantly available when you walk into another.

What a Profile Captures

- Stop names and family classification (Principal, Flute, String, Reed, Mixture, Percussion)
- Footage per stop (64', 32', 16', 10-2/3', 8', 6-2/5', 5-1/3', 4', 3-1/5', 2-2/3', 2', 1-3/5', 1-1/3', 1', Mixture)
- Division layout — Great, Swell, Choir, Pedal, Solo, Positiv, and custom divisions
- MIDI channel per division (how the organ routes keyboard and pedal signals)
- Stop-control MIDI events: Note On/Off, CC messages, or manufacturer-specific SysEx packets
- Expression pedal (swell shoe) assignments per division
- Couplers, tremulants, and extended rank compass data
- Builder, year built, location, MIDI system type, technician installation notes

2. Prerequisites & Hardware

You must have a live MIDI connection to the organ console before profiling. The Learn Stops wizard will warn you if no connection is detected. Two connection methods are supported:

Connection Method	What You Need	Best For
Wired USB-MIDI	USB-MIDI cable (5-pin DIN to USB) + USB-C or Lightning camera adapter	Organs in fixed installations; most reliable
Wireless — CME WIDI Jack	CME WIDI Jack plugged into organ MIDI OUT; Bluetooth enabled on iPad	Chamber tuning, portable use, hands-free profiling

Peterson ICS-4000 Note

Peterson organs require "Sequencer On" to be enabled in the organ's MIDI menu before the MIDI ports will output stop-change data. Without this setting, stop events will not appear in the Learn Stops wizard.

Peterson stop control uses a multi-byte system command format. WatsonMIDI assembles each complete stop message before recording — do not interrupt a stop draw mid-packet.

3. Learn Stops Workflow — Step by Step

Access the Learn Stops wizard from Settings → Profiles → Learn Stops. The wizard walks you through each step sequentially. You can cancel and resume later — stops learned so far are preserved.

1	**Enter Organ Information** Name the organ, add location, builder, year, MIDI system type, your name as profiling technician. Add installation notes for any quirks a future technician should know.
2	**Set Up Divisions** Create each division: Great, Swell, Choir, Pedal, Solo, Positiv, etc. French and German equivalents are shown. Tap "More Division Types" for unusual layouts such as Echo, Antiphonal, or Fanfare.
3	**Set Keyboard Channels** Tap "Set Keyboard Channels" and play a scale on each manual and the pedal. WatsonMIDI detects which MIDI channel each division uses. Required for MIDI-connected tuning.
4	**Draw Stops One at a Time** For each stop: draw it, tap "Capture", enter the stop name (intelligent dictionary suggestions appear), classify its family and footage. The app records the exact MIDI event the organ sends. Draw the stop off to capture the Off event as well.
5	**Continue to Expression Pedals** Assign each swell shoe to its division. The app detects expression pedal events on the relevant channel. Syndyne organs send special shoe identifier signals that WatsonMIDI detects automatically and handles correctly during playback.
6	**Review & Save** The Profile Complete screen summarises: total stops, divisions, expression pedals, couplers, tremulants, and MIDI system type. Tap Save. The profile is immediately available to the Translation Engine and Tuning tools.

4. MIDI System Reference

MIDI System	Stop Control Method	Key Behaviors & Notes
Peterson ICS-4000	Multi-byte system commands (SysEx)	Requires "Sequencer On" in organ MIDI menu. WatsonMIDI assembles each complete stop message before capture — do not interrupt a stop draw mid-packet.
Syndyne	Standard CC / Note	Sends special shoe identifier signals on a dedicated channel — auto-detected and filtered correctly during playback. Do not manually send expression-off commands on the Syndyne expression channel.
Matters	Note On/Off	Stop channel varies by organ size. Provides limited power for some Bluetooth adapters — use a powered USB hub if connection is unstable.
Rodgers Trillium	Note On/Off	3-manual instruments use multiple channels including one shared with live keyboard performance. Ghost note filter runs automatically at stop-recording time to suppress echo artifacts.
Other / Generic	CC or Note On/Off	Standard capture works for any MIDI-compliant stop controller. Contact support for unusual implementations.

5. Managing Your Profiles

Navigate to Settings → Profiles → My Profiles to manage all saved profiles. Each profile card shows the organ name, location, manual count, stop count, MIDI system type, builder, and year.

Action	What It Does
View	Open the full profile detail — see every stop with its raw MIDI events (ON/OFF channel, note, velocity)
Add Stops	Re-enter the Learn Stops wizard to append more stops to an existing division, or add a new division
Set Active	Mark this profile as the active organ — used by the Translation Engine and MIDI-connected Tuning
Share	Export the profile to share with a colleague, organist at another church, or technician — or store as a backup
Delete	Permanently remove the profile from this device

PART TWO · TRANSLATION ENGINE

The Translation Engine is built for church organists and music directors as much as it is for technicians. Record your registrations at home on your own organ. Walk into any church with a WatsonMIDI-profiled instrument — anywhere in the world — and your music plays back with appropriate stops automatically substituted. The engine compares the stop list of the organ where a recording was made with the stop list of the current instrument and automatically maps every stop to the closest equivalent.

6. How the Algorithm Works

WatsonMIDI's proprietary translation algorithm solves a problem unique to the pipe organ world: mapping stop control data between organs whose MIDI systems may have nothing in common — different manufacturers, different control schemes, different languages, different console layouts. The algorithm is deterministic — given the same two profiles it always produces the same base map. Only user-edited overrides are persisted to disk; the base map is regenerated fresh each session.

Match Level	Criteria	Indicator
Perfect	Exact or synonym name match + same footage + same family + same division	Green checkmark
Good	Same stop family + same footage + same division; name differs	Green circle
Possible	Partial name, family, or footage match within division	Yellow question mark
Unmapped	No suitable candidate found within division	Red X

7. Setting Up a Translation

1	**Set the Active Profile** In Settings → Profiles → My Profiles, tap "Set Active" on the destination organ — the instrument you are currently playing.
2	**Select a Profile-Linked Recording** The Translation Map only appears for recordings that are linked to a WatsonMIDI organ profile — either because the profile was active when the recording was made, or because the recording has been manually tagged afterward. Recordings with no profile assigned will play back raw MIDI without translation.
3	**Open the Translation Map** When a profile-linked recording is selected and its profile differs from the active profile, a mismatch banner appears in the transport automatically. Tap the banner or the Translation button to open the Translation Map.
4	**Review & Override** Expand each division to see stop-by-stop mappings. Unmapped stops can be manually assigned. Tap any row to choose a different destination stop from a picker.
5	**Apply & Play** Tap "Apply & Play". The translation is active for this playback session. A translation state indicator appears in the transport during playback.

Tagging Existing Recordings with a Profile — Unlock Your Entire Library

Recordings made before you had a WatsonMIDI profile can be retroactively tagged — your library is not lost.

How to tag an existing recording:

1. Library → tap recording → Edit (pencil icon).
2. Tap "Assign Profile" → select the organ where the recording was made.
3. Save. The recording is now tagged.

Once tagged, the Translation Engine can map the recording to any WM-profiled instrument. A library recorded at your home church travels to any church in the world.

Tip: Recordings with no profile assigned play back raw MIDI unchanged — stops may not match the destination instrument. Always tag before sharing for cross-organ use.

8. How Profiles Travel with Recordings

When you share a recording in WatsonMIDI format, the organ profile travels with it automatically — no separate steps required. The full end-to-end workflow:

1	**Organist profiles the organ** Complete the Learn Stops workflow once per instrument. The profile is saved to the device.
2	**Record or tag recordings** Record with the profile active — it is embedded automatically. Or tag existing recordings by assigning a profile in the recording's Edit screen.
3	**Share via any WatsonMIDI method** Share as .watsonmidi file, encrypted protected share, or full library backup (.zip). The profile is bundled inside the file in all of these formats.
4	**Recipient imports the recording** The recipient opens the file in WatsonMIDI. The embedded profile installs silently in the background — no action required from the recipient.
5	**Recipient plays the recording** The Translation Engine detects that the recording's embedded profile differs from the recipient's active organ profile. The mismatch banner appears automatically.
6	**Review the stop mapping** The recipient taps the banner to open the Translation Map. They can review and override any stop assignments before playback begins.
7	**Playback translates in real time** Tap Apply & Play. Every stop change in the recording is translated on the fly to the closest equivalent stop on the recipient's instrument.

Important: Standard MIDI (.mid) Files Do Not Carry Profiles

The profile-travel behavior applies only to .watsonmidi files and library backups (.zip). These are WatsonMIDI's native bundle formats and include all metadata.

If a recording is exported via Settings → Import / Export → Export as Standard MIDI, the output is a raw .mid file — a universal format readable by any MIDI software. Raw .mid files contain no WatsonMIDI metadata, no profile reference, and no translation information.

Use Standard MIDI export only when the recipient needs to open the file in a DAW, notation software, or non-WatsonMIDI MIDI player. For all organ-to-organ sharing where translation is desired, always use the .watsonmidi format.

PART THREE · PROFESSIONAL TUNING

WatsonMIDI includes a professional-grade chromatic tuner built specifically for pipe organ tuning. The tuner combines real-time pitch detection via the iPad microphone with MIDI-triggered note playback, enabling one-person wireless tuning from inside the chamber. Pitch detection achieves sub-tenth-cent accuracy using a professional-grade 5-stage hybrid pitch detection pipeline running at 48 kHz with under 50 milliseconds of audio-to-display latency.

Access from Settings → Tuning. The tuner operates in two modes: Standalone (pitch detection only, no MIDI connection required) and MIDI-Connected (requires active organ profile + MIDI connection to trigger pipes).

▲ Important Notice — Professional Tuning Only

Pipe organ tuning and voicing is a skilled trade requiring years of training and hands-on experience with pipe construction, wind systems, and acoustic principles. Pipes are precision instruments made of delicate materials — tin, lead alloys, wood, and zinc. Improper tuning attempts can permanently damage or destroy pipes that may be irreplaceable, particularly on historic or tracker instruments.

Watson Pipe Organ Company strongly recommends that all physical tuning and voicing work on pipe organs be performed exclusively by a qualified, professional organ technician or a licensed organ building company. Do not attempt to physically adjust, move, or open any pipe unless you have received proper training.

The tuning tools in WatsonMIDI are designed for use by trained pipe organ technicians and organ builders. If your instrument requires tuning, please contact a professional pipe organ service company in your area. For technical questions about WatsonMIDI, contact support@watsonpipeorgan.com.

9. Display Modes

Mode	Description	Best For
Strobe	Circular strobe — stationary when in tune; rotates CW when sharp, CCW when flat.	Finest resolution; preferred by experienced technicians.
Strobe Arc	Semicircular arc, similar to Peterson VSAM hardware tuners.	Technicians familiar with Peterson VSAM hardware.
Needle	Traditional analog-style needle showing cents deviation.	Quick visual check; easy to read at a distance.
Spectrum	Real-time FFT spectrum showing harmonic content in real time.	Reading harmonic content; diagnosing beating; celeste tuning.

10. Spectrum Analyzer — Reading Harmonic Peaks

Every pipe organ pipe produces a fundamental pitch plus a series of overtones — the harmonic series. The Spectrum display makes this visible in real time, giving you information that the strobe and needle modes cannot show.

The horizontal axis represents frequency (low left, high right). The vertical axis represents amplitude. When a pipe speaks, you will see a cluster of vertical peaks:

- Fundamental peak (f): The tallest, leftmost peak — the pitch the pipe is nominally tuned to.
- Second harmonic (2f): One octave above the fundamental. Often nearly as strong as the fundamental in flue pipes.
- Third harmonic (3f): A twelfth above the fundamental. Strong in principal-chorus pipes; weaker in stopped flutes.
- Fourth, fifth harmonics and beyond: Continue at regular intervals. Reed pipes tend to show many strong upper partials; covered flutes may show almost only the fundamental and third harmonic.

Task	What to Look For in Spectrum
Confirming the fundamental	Identify the tallest leftmost peak before tuning. On mutation ranks the ear can be confused — the spectrum shows unambiguously which peak is the fundamental.
Detecting beating between two pipes	Beating appears as a rhythmic pulsing of a peak's height — rises and falls at the beat rate. Target a slow, steady pulse for a gentle celeste, or a perfectly still peak for unison.
Verifying mutation rank pitch	Mutation ranks speak at non-octave intervals. Play the corresponding unison note and the mutation together — the mutation peak should align with one of the unison's harmonic peaks. A Quint 5-1/3' aligns with the 3rd harmonic; a Tierce 3-1/5' aligns with the 5th harmonic.
Identifying a ciphering pipe	A cipher shows as a steady peak that persists when no note is being played. Locate the frequency and cross-reference with the rank compass to identify the ciphering note.
Reed pipe harmonic richness	Reed pipes show many strong harmonics across the full display width. A thin or buzzy reed often shows a diminished or shifted fundamental relative to its overtones — indicating a tongue or resonator regulation issue.

11. Chromatic Walk — Detailed Configuration

The Chromatic Walk is the core workflow for hands-free tuning. The app triggers each pipe in sequence via MIDI while you stand in the chamber with the iPad, listening and tuning each pipe as it speaks.

Parameter	Options	Notes
Direction	Ascending / Descending	Ascending (low to high) is most common. Descending useful for verifying octave purity after tuning.
Stepping	Chromatic / Scale	Chromatic walks every semitone. Scale mode steps diatonically — useful for checking pitch in musical context.
Range	C1 to G9 (104 notes)	Narrow to the actual compass of the rank being tuned. Pedal 32' starts at C1; most principal ranks begin at C2 or C3.

Parameter	Options	Notes
Dwell Time	Adjustable; default 8 seconds	Increase for slow-speaking flue pipes or reed pipes with long speech. Decrease for quick progress on harmonic flutes.
Mutation x	x1, x2, x3... multiplier	For mutation and mixture ranks, sets which partial the chromatic walk plays.

Pause to Hold — Essential Tuning Technique

If a pipe is significantly out of tune and needs more time than the dwell interval allows, tap Pause during the Chromatic Walk. The current pipe's MIDI note is held — the pipe continues to speak — and the dwell timer stops.

With the note sustained, adjust the pipe until the strobe steadies and the display reads in tune. Take as long as needed.

Tap Play to release the held note and advance to the next pipe in the walk. The walk resumes from where it paused — no pipes are skipped.

Tip: Pause is especially valuable for reed pipes, which may require several adjustment passes before the tongue settles at the correct pitch.

12. Auto-Advance — Pitch-Gated Tuning

Auto-Advance transforms the Chromatic Walk from a timer-based step sequence into a pitch-gated workflow. When enabled, the walk moves to the next pipe automatically the moment the current pipe is confirmed in tune — no tapping required. The Tuned count increments with each confirmed pipe, giving you a live progress count as you work through the rank.

Condition	Default Setting	What It Means
Within Tolerance	±0.5 cents	The measured pitch is within the green zone of the target frequency. Adjustable 0.5–2.0 cents in 0.5 cent steps.
Stable	≤1.5 cents drift	The pitch is not drifting. Adjustable 0.5–3.0 cents. Lower values suit steady flue pipes; higher values accommodate pipes that naturally waver slightly.
Held for Duration	2.0 seconds	The in-tune, stable reading has persisted long enough to confirm the pipe has settled past its attack transient. Adjustable 0.5–5.0 seconds.

13. Reference Pitch & Historical Temperaments

Preset	A4 Frequency	Historical Context
Baroque	A=392 Hz	17th–18th century French and German organs
Versailles	A=415 Hz	Common Baroque pitch standard
Classical	A=430 Hz	Mozart / early Beethoven era
Romantic	A=435 Hz	Mid-19th century European standard
Verdi	A=432 Hz	Italian opera tradition

Preset	A4 Frequency	Historical Context
Standard	A=440 Hz	ISO 16 modern standard (default)
Bright	A=442 Hz	Many European orchestras
Euro Bright	A=443 Hz	Some German and Austrian ensembles
High	A=446 Hz	Some historic organs tuned unusually high

Temperature Compensation

Pipe organ pipes are sensitive to air temperature — as the chamber warms up, pipes go sharp; as it cools, they go flat. WatsonMIDI includes a temperature compensation field where you can enter the current room temperature in degrees F.

The app automatically calculates and applies the appropriate cents correction across the tuning target, so the meter reads deviation from where the pipe should be at the current temperature.

Tip: Measure chamber temperature at pipe level, not near the floor. Allow the blower to run for at least 15 minutes before tuning so the wind temperature stabilizes.

14. Tuning Statistics & Session Log

WatsonMIDI records detailed data for every pipe measured during a session. The bottom bar of the tuning screen shows live running totals at all times.

Metric	Meaning
Tuned	Pipes confirmed in tune this session (Auto-Advance confirmed, or manually marked)
Skipped	Pipes passed without tuning — ciphers, notes out of compass, or manually skipped
Avg Dev	Running average cents deviation across all confirmed pipes — 0.5 cents is excellent, 1.0 cents is good
Duration	Total elapsed time for this tuning session

Exporting Session Reports

At the end of any session, go to Settings → Tuning → Tuning History to access all past sessions. Tap any session to view the full report.

Export options:

- Plain text report — paste into a work order, email, or service log
- PDF report — formatted document ready to file or share with a client

Both formats include the complete per-pipe detail, rank summaries, and session header. PDF reports can be shared directly from the standard iOS share sheet via email, AirDrop, or saved to Files.

Tip: Export a PDF report immediately after each tuning visit and file it by organ and date. Over multiple visits the deviation data tells you which pipes drift consistently — a reliable guide for prioritizing future work.

15. Explanatory Notes for Organists

The following section explains the tuning tools in plain language for church musicians and music directors.

What the Chromatic Walk does

The Chromatic Walk sends a signal from the iPad to the organ to play each pipe in the selected rank, one at a time, in sequence. The iPad microphone listens and displays whether each pipe is sharp or flat. The technician tunes while standing at the pipe.

If a pipe needs extra time, the technician taps Pause. The pipe keeps sounding — held by the MIDI signal — while the technician works on it. When ready, tapping Play releases that pipe and moves on to the next one automatically.

This requires no assistant at the console — one person can tune an entire rank working alone.

What a Celeste rank is

A celeste (voix celeste) is intentionally tuned slightly sharp or flat. Combined with a normally-tuned rank, the slight pitch difference creates a gentle wavering sound — characteristic of romantic organ tone. WatsonMIDI's Interval Check mode helps tune celeste ranks to the correct beat rate.

Why does the tuner need a MIDI connection?

In Standalone mode, the tuner only listens — you must play each note yourself, or have someone play at the console.

In MIDI-Connected mode with a Chromatic Walk, the iPad sends the play commands directly to the organ's MIDI system via the Bluetooth adapter. The organ senses these signals exactly as if someone were pressing the keys — pipes speak, and the tuner hears them. This is how a single technician can tune an entire organ alone.