



Space / Time Control

Pitch Calibration Manual

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1. Preface

The goal of pitch calibration is to align the pitch signal sent by the software with the actual movement of the carriage lead screw.

Any offset between the pitch signal and the resulting pitch on the disk is too small to measure directly from a groove. The best approach is to drive the carriage at a constant pitch for several hundred revolutions and measure the cumulative error.

This calibration takes some time but is semiautomated, so you don't need to be present throughout the process.

 During these tests, no groove is cut and no audio is sent to the head. The procedure is only meant to move the carriage.

 Read and follow the instructions below carefully. If unsure about a step, please contact our support team. The signals sent to the system during the calibration procedure can potentially damage your equipment. You will perform all calibration steps at your own risk.

1.1 Prerequisites

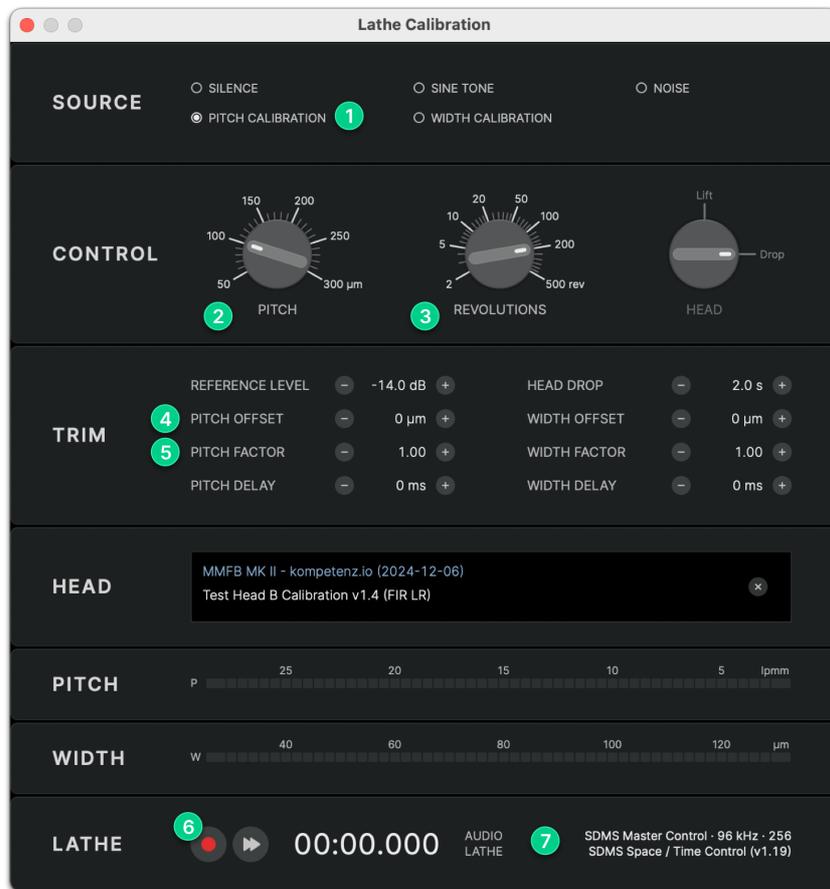
None.

1.2 Abbreviations

SDMS — Sillitoe Disk Mastering System hardware

STC — Space / Time Control software

1.3 References



STC Lathe Calibration Dialog



SDMS Master Control and Space / Time Control Hardware Modules

i All alphabetical and numerical references in this manual refer to the images above.

2. Calibration Procedure

2.1 Travel Distance Calibration

Prepare STC and SDMS:

1. Launch **STC** and open the **Lathe Calibration** dialog
2. Confirm your **SDMS Master Control** and **Space / Time Control** hardware modules are connected **7**
3. Select **PITCH CALIBRATION** **1** in the **SOURCE** section and set **REVOLUTIONS** **3** to **200 rev**
4. Reset **PITCH OFFSET** **4** to **0 µm** and **PITCH FACTOR** **5** to **1.00**
5. Disable automation for **DEPTH** **H**, **CARRIAGE** **L**, and **HEAD** **P** (LED buttons OFF)

Repeat the following steps for each pitch value in the table below:

1. Disable **CARRIAGE** **L** automation (LED button OFF)
2. Use the **XISOX** **N** switch to move the carriage to the **300 mm** mark on the **RIAA DISK DIAMETER** scale as precisely as possible
3. Enable **CARRIAGE** **L** automation (LED button ON)
4. Set the **PITCH** **2** control to the next pitch value in the table
5. Press **REC** **6** to start the calibration procedure
6. Observe as the carriage moves and the timer counts down from **06:00.000**
7. After the test completes, note the diameter where the carriage stops (or take a picture)

PITCH	# REV	START Ø	STOP Ø
100 µm	200	300 mm	
150 µm	200	300 mm	
200 µm	200	300 mm	
250 µm	200	300 mm	
300 µm	200	300 mm	

Pitch Calibration Test Results

Once all tests are complete, send the results to calibration@spacetimecontrol.com for evaluation of your **PITCH FACTOR** and **PITCH OFFSET** parameters.

 If you are already familiar with the pitch calibration procedure, you can also enter your results into the [Pitch Calibration Utility](#) and find the optimized values for **PITCH FACTOR** and **PITCH OFFSET** yourself.

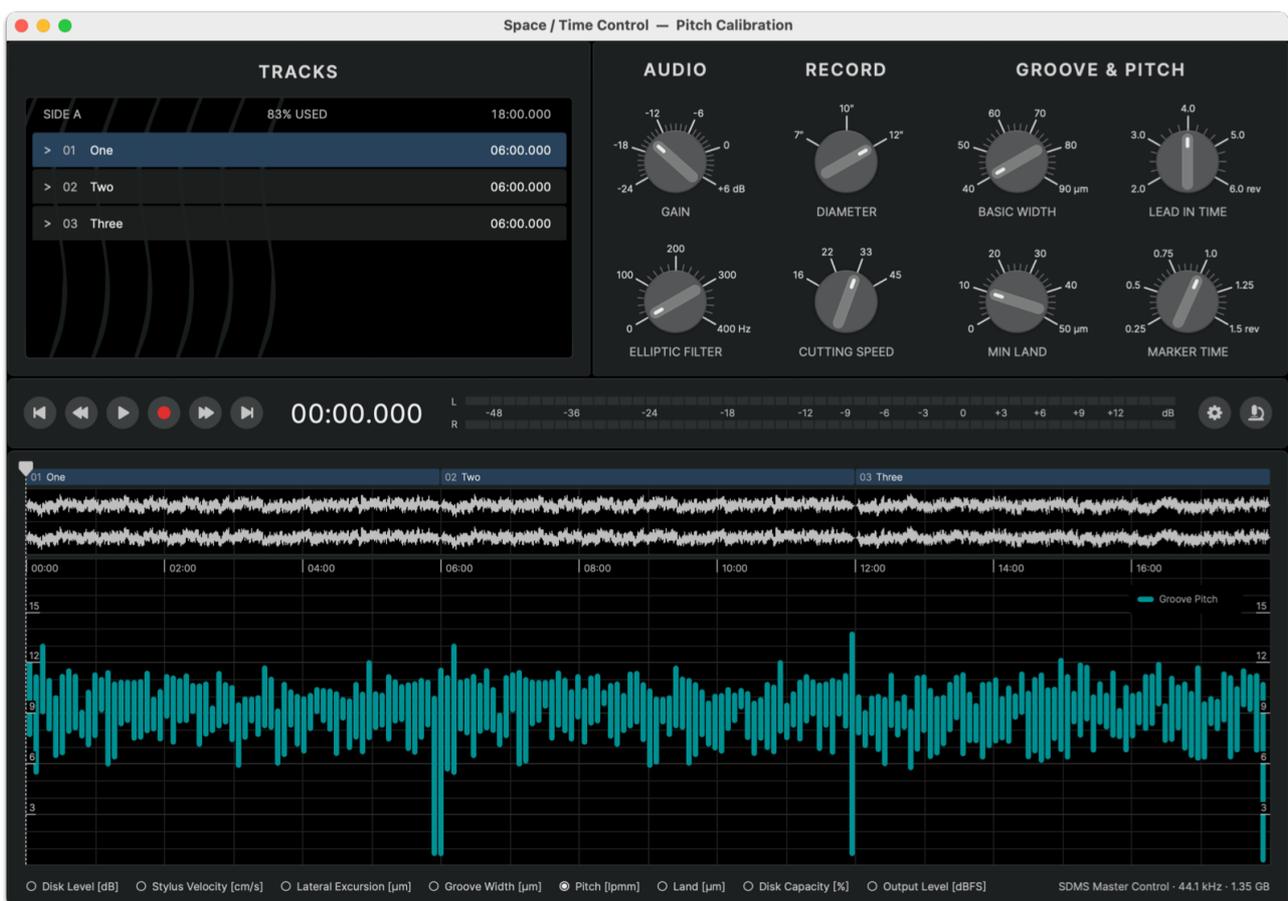
2.2 Pitch Calibration Project

To fine-tune your pitch calibration, use the **Pitch Calibration Project**, an 18-minute test program containing noise with strong low-frequency modulation. This program generates a variable pitch signal representative of typical music cuts.

You can download the **Pitch Calibration** groove file [here](#) (20 MB).

⚠ Ensure the head is muted during this test. The noise contained in this project is not meant for cutting and can damage your head.

i The **RIAA DISK DIAMETER** scale has three marks for each disk diameter: **Ø (DIAMETER)**, **START**, and **PROGRAM**. Whenever you cut a full side with **STC**, make sure to position the carriage at the **START** mark for the diameter of the disk. This is the correct diameter to begin the lead in groove.



2.2.1 Running the Pitch Calibration Project

1. Launch **STC** and open the project `Pitch Calibration.groove`
2. Adjust the **GAIN** control in **STC** until the program uses **83%** disk capacity; leave all other settings at their defaults
3. Disable automation for **DEPTH** **H**, **CARRIAGE** **L**, and **HEAD** **P** (LED buttons OFF)
4. Ensure the head is muted **G**
5. Use the **XISOX** **N** switch to move the carriage to the **12" START** position at **298 mm**
6. Enable **CARRIAGE** **L** automation (LED button ON)
7. Ensure the carriage direction switch **M** is set to **F(oward)**
8. Open the **Cut Project** dialog in **STC** and press **REC** to start the test run
9. After the test is complete, the carriage will stop at the lock groove position
10. If the pitch calibration is correct, the carriage should stop within **±1 mm** of the **12" LOCK** mark (**∅ 106.4 mm**) on the **RIAA DISK DIAMETER** scale

2.2.2 Fine-Tuning the Pitch Offset

If the carriage stop position deviates by more than **±1 mm**, adjust the **PITCH OFFSET** **4** in the **Lathe Calibration** dialog:

- If the carriage stops at a **smaller diameter** (overshoots), **decrease** the pitch offset
- If the carriage stops at a **larger diameter** (undershoots), **increase** the pitch offset

To calculate the adjustment, use the following formula:

$$\text{Pitch Offset Delta} = (\text{Measured Lock Groove Diameter} - 106.4 \text{ mm}) / 1.22$$

EXAMPLE:

Measured Lock Groove Diameter = 100 mm

Pitch Offset Delta = (100 mm - 106.4 mm) / 1.22 = **-5 μm**

You can also use this fine-tuning procedure with any of your own groove projects; the lock groove position should always be identical regardless of the audio content of the program.

3. Troubleshooting

If you experience variations in the stop-groove position in your cuts, double-check these parameters:

- Tension of the pitch motor belt
- Alignment of pitch motor pulley and lead screw pulley
- **PITCH OFFSET** and **PITCH FACTOR** values in **STC**

Whenever you make changes to the pitch motor hardware (belt, pulleys, etc.), it is recommended to check the pitch calibration again.