How to use the mictrotonal mode of the Tuning Set CTS-32-C V1.30

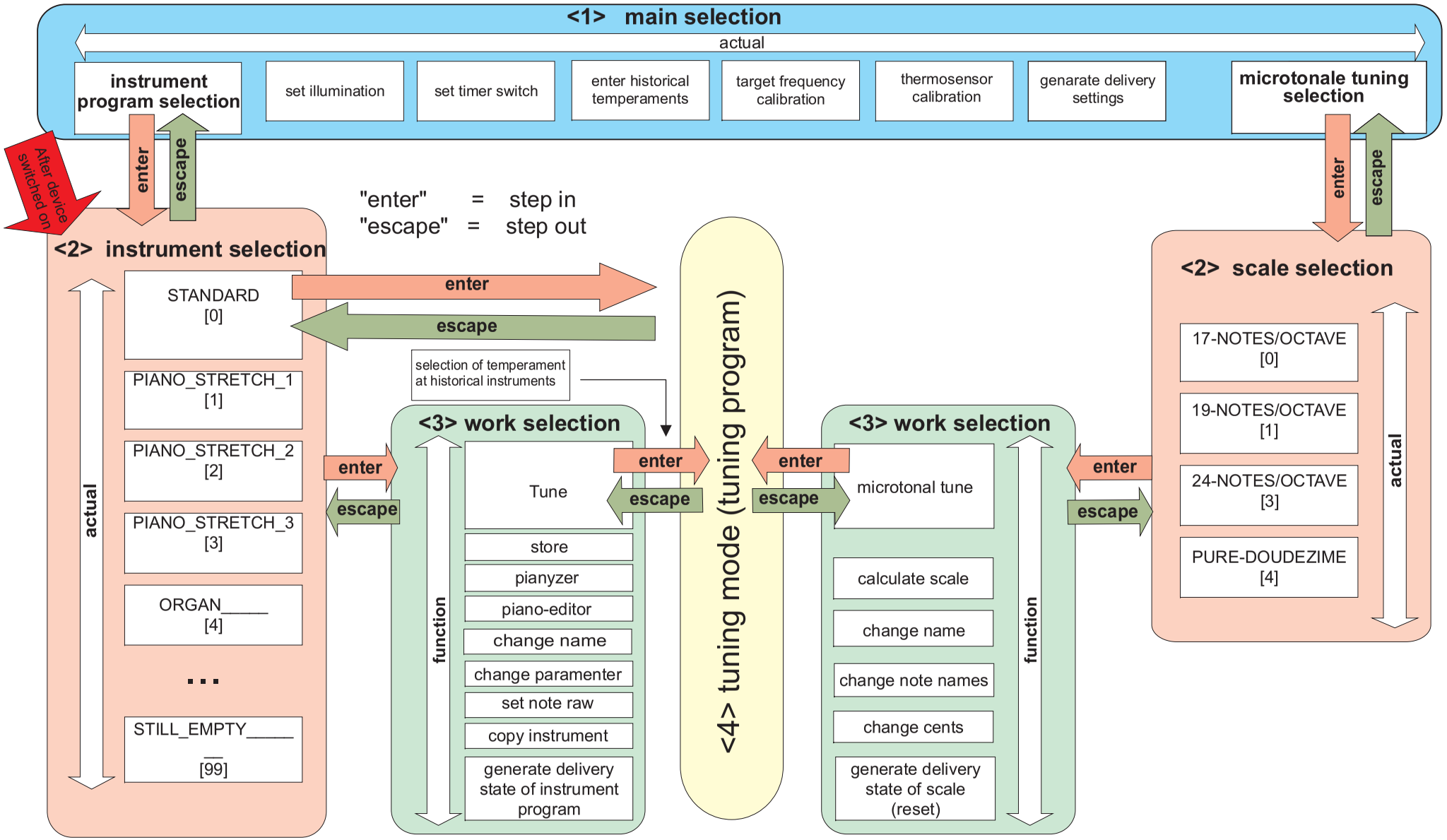


Tuning-Set CTS-32-C

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Operating scheme for Tuning Set CTS-32-C

V. 1.30 with microtonale mode



1 Microtonal mode of the Tuning Set CTS-32 V 1.30

Microtonal music uses microtonal intervals, i.e. intervals that are smaller than a semitone. For example at the quarter-tone music, the octave is divided in 24 quarter tone steps. Many compositions in the 20th and 21 Century use microtones. Here, for example, the octave is divided in 17, 19, 24, 31, 53, 72 temperament-steps or divided asymmetrically in different sizes. The renunciation of the octave as an irrefutable interval is also observed.

The micro-tonal mode has been implemented in the CTS-32-C with firmware version 1.30. This created the opportunity to use different tone systems (tone-scales) or to design your own scales in a convenient manner.

1.1 How to use the mictrotonal mode

Note: The user interface for the micro-tonal mode was only implemented in English language. The knowledge of sections 2.1, 4.1, 4.2 and 4.3 of the manual CTS-32-C is required.

After switching on the device, press "Escape" to enter the main selection. There you select with the "Actual" buttons the option "microtonal tuning" and confirm with "Enter ".

It appears on the display:

```
<2> select microtonal scale, then<enter>
▮▮▮17-NOTES/OCTAVE  [ 0]
```

Now you can use the "Actual" buttons, to choose one of four different tone scales:

1. „17 –NOTES/OCTAVE“ (one octave is divided into 17 equal parts)
2. „19 –NOTES/OCTAVE“ (one octave is divided into 19 equal parts)
3. „24 –NOTES/OCTAVE“ (one octave is divided into 24 equal parts)
4. „PURE-TWELFTH“ (one pure twelfth (1902 cent) is divided into 19 equal parts)

These tone scales are for example. You can change them partially or completely. When you press "Enter" again, you can work with the selected tone scale. These options are available:

1. „tune“ Microtonal tuning program,
2. „calculate scale“ Calculate new tone scale,
3. „change name“ Change the name oft the tone scale
4. „change notename“ Change the names individual notes
5. „change cents“ Change cents of individual notes
6. „change paramet“ Reset the scale to state of delivery

1.2 Microtonal tuning program (mode „tune“)

Select with the buttons "Actual" the option "tune" and confirm with "Enter ". The functionality of the microtonal tuner is similar to the tuning program in Section 2.1 already described.

The whole tone scale refers to a concert pitch, just like the 12 tone system. The concert pitch is typically 440 Hz and can be adjusted using the "Function" and "Value " buttons, in steps of 0.01 Hz from 220 Hz to 880 Hz and in steps of 0.1 cent + / - can 150 cents.

In the normal 12-tone system, the target frequency of the the tuner is calculated by a formula using the current tone number, refer section 4.3. To store tunings, a cent value is provided for every

individual note of the instrument programs. This cent values relates to the previously calculated target frequency of the 12-tone system.

Unlike to this, in the microtonal mode it's directly accessed to a table that contains cent-values. Here, the cent-values are directly related to the concert pitch.

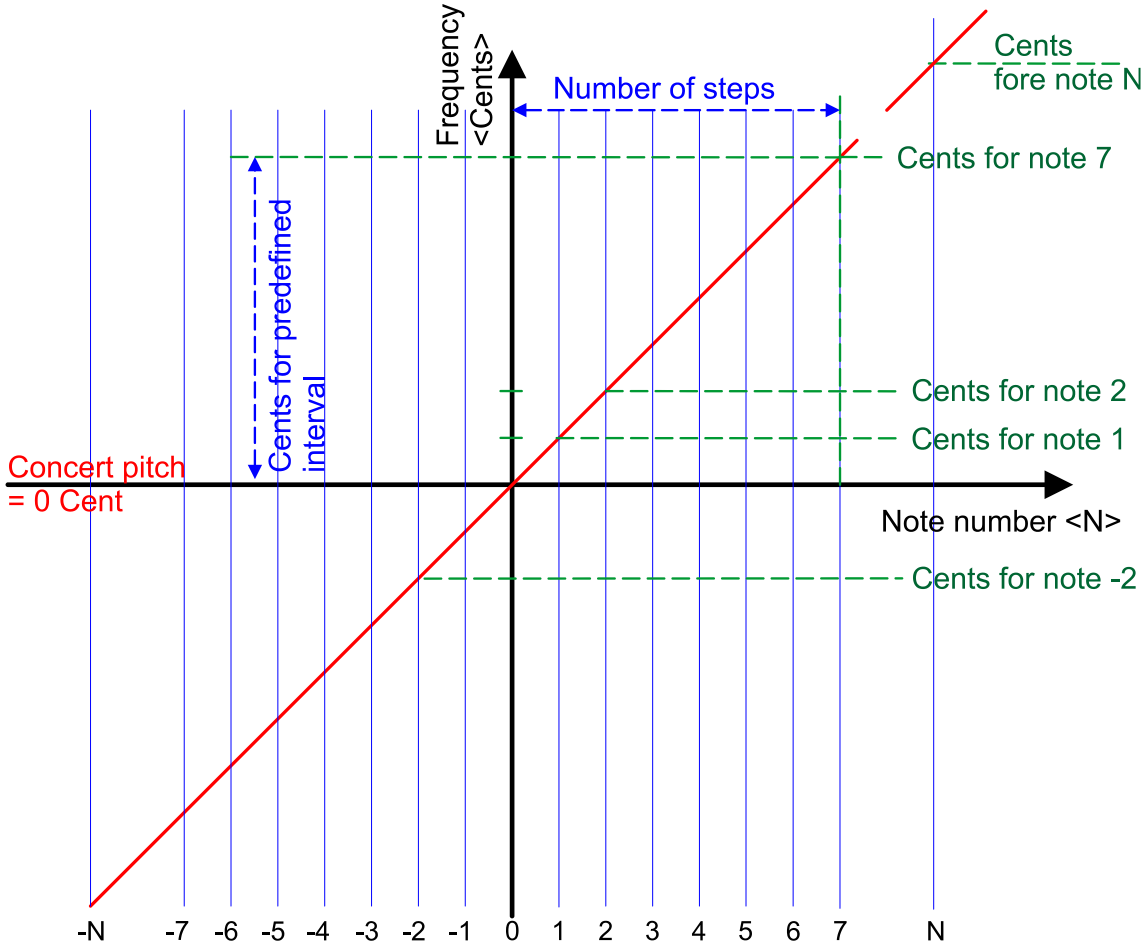
For example, a table with some notes of the quarter-tone scale based on a pitch of 440 Hz:

Note number	Note name	Cent table	Target frequency
….			
-4	g	-200 Cent	392,00 Hertz
-3	g>	-150 Cent	403,48 Hertz
-2	g#	-100 Cent	415,30 Hertz
-1	a<	-50 Cent	427,47 Hertz
0	a	0 Cent	440,00 Hertz
1	b>	50 Cent	452,89 Hertz
2	b	100 Cent	466,16 Hertz
3	h>	150 Cent	479,82 Hertz
4	h	200 Cent	493,88 Hertz
…			

How to create your own table is described in the next chapters. With the CTS-32-C, any tone scale can be realized. While tuning, you can view this table-cents on the display above the buttons "Actual". To do this, select the unit "c" with the "Actual" buttons.

1.3 How to create a microtonal scale („calculate scale“)

…enables you to divide any interval in any number of tone steps..



To do this, select the option "calculate scale" with the "Function" buttons and tap "Enter". Skip the write protection by holding "Shift" and tapping "Function" button.

It appears on the display e.g.:

```
Set cent range then <enter>    1200 cent
                                    ■■■
```

Here you enter a cent value that describes the interval which you want to divide into individual tone steps.

For example: 1200 Cent for one octave, 2400 Cent for two octaves or 702 Cent for a pure fifth.

After entering, press "Enter ", it shows e.g.:

```
Set number of notes then <enter>  24 cent
                                    ■■■
```

Now enter the number of notes for the division of the interval.

Example: If you have set an interval of 1200 cent in the previous entry and enter now 24, then you'll get a quarter-tone scale.

Pressing "Enter" automatically creates the cent-table. The note number "0" is always assigned a value of 0 cent. It's equal to the concert pitch. Starting with the concert pitch, the cent-values for the lower notes will have a negative sign, the higher ones will be positive. It's charged a maximum of 240 note steps. When the cent-value falls below -5700 cents, this minimum value is set. When the cent-value overruns 6300 cents, this maximum value is set. The deepest note-number is -114, the highest 125. For the range limits, using the tuning program, refer section 4.10.

The names of the notes are not overwritten. How to enter the name of the individual notes is described in section 5.5.

1.4 How to rename the tone scale

Select the option „change name". Skip the write protection of this option by holding "Shift" and tapping "Function" button.

Here you can change the name of the tone scale, which appears on the display. The alphanumerical input is described in Section 2.3.2.

1.5 How to rename individual note names

Select the option „change notename". Skip the write protection of this option by holding "Shift" and tapping "Function" button.

Here you can change the name of the individual note names, which appears on the display in the tuning mode.

It appears on the display i.g.:

```
Select note          [a 1]     No:[   0]
                                    ■■■
```

With the "Note" buttons, you select the tone whose name you want to change.

After pressing "Enter" button this appears, now you can change the name. The alphanumerical input is described in Section 2.3.2.

```
Change name        [a  1]     No:[   0]
<-- -->  ■-->------>a
```

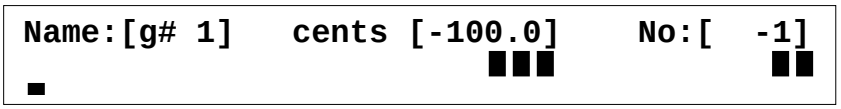
After pressing "Enter", you can switch to the next note. Remark: You can do it faster if you not press “enter” button, but hold the “shift” button pressed, while tapping "note".

1.6 How to enter individual cent-values

Select the option „ change cents“. Skip the write protection of this option by holding "Shift" and tapping "Function" button.

Here you can change the cent-values of the scale, which came with the device or the cent-values of the scale you have previously calculated.

It appears on the display e.g.:



With the „Note“ buttons you select the note. With the „Function“ buttons you can enter the cents.

1.7 Parameters for the microtonal scale

Select the option „ change paramet“. The entry of parameters is referred to Section 2.3.3.

The following parameters can be set here:

- First note (this tone is set when you start the tuning program).
- Thermosensor rate
- Thermosensor reference
- Bar display mode
- Number of tone steps for <shift> + <special> buttons.
- Legth reference for organe pipes
- Write protection

1.8 How to reset microtonal scale to state of delivery

Select the option „reset“. Skip the write protection of this option by holding "Shift" and tapping "Function" button.

After pressing the „Enter“ button, the actual microtonal scale is reset to the state of delivery.

The settings of all other scales will remain.