The Ten Harmony Demo Rooms:

1. Play a Ballad

Harmony works as follows: The user or a Player plays Midi notes which don't have to be harmonically organized.

This signal is sent through Harmony and gets changed there, so that it appears "harmonized" at Harmony's output and can be made audible via Midi Out. If the signal does not come from Midi In, but from a T²-Player, Harmony can also work with audio notes. As in most of the Harmony demos, I have added an octave to the live voice - which comes from Midi In - for greater clarity.

You can play what you like, Harmony will always change your playing so that it follows the chords and scales of "My Favourite Ballad", which is used in most demo Rooms. Open the Harmony Editor to look at the chords or change them. The chords of this Lead Sheet are played from HarMonitor. This tells you the basis on which Harmony is currently operating.

Harmonization is carried out here with the function "Smart Harmonize: Keep Intervals". In this mode it works as gently as possible, by not changing the basic intervals (e.g. third, sixth) of your improvisation.

Like in this example, most Harmony demos harmonize not only Player data, but also your live playing. In this room you find only this harmonized live signal.

If you don't hear anything, please refer to the manual on how to make Tango compatible with your Midi- and audio setup. I suggest using a piano sound. It would also be helpful, to first read the chapter on Harmony and the demo Room "Erstes Kennenlernen" (chapter First Steps).

Harmony in general works a lot with chord structures as well as playing chords. You may therefore want to initially concentrate your playing on melodies instead of chords and listen to how these are modified by Tango.

Use melodies you can easily recognize, even when they are being strongly modified by the software.

2. Play a Ballad with Chords

Almost the same setup here, but now the live signal is passed through "Midi Chords" before it gets harmonized. Midi Chords places chords under any melody (without tonal-harmonic intentions), which are then adjusted by Harmony to the ballad's chords and scales. Switch the Harmony's Active button on and off to hear the effect of Harmony in this context.

Harmony initially corrects your live melody based on the ballad chords (as in Room 1: Play a Ballad) and then corrects the chords under that melody with the same interval structure as the original chords that were played by Midi Chords. Obviously, it uses only notes of the ballad-scales. You can see those scales by double clicking on one of the Lead Sheet's chords in the Harmony Editor.

Because of the underlying chords, you should primarily use the keyboard's upper third.
With the Freeze button you can stop the chord sequence and in the Midi Chords Editor you can greatly

change the "raw" chords, e.g. making them more consonant, dissonant, turn off the counter-movement, change voice leading rules etc.

You can find information on the functions of Midi Chords in the manual-section on the Player (look for “Player-Chords”).

3. Chords and Line

Here for the first time a T²-Player is added to your live playing. It plays on two tracks.
Track 1 plays your melodies, but with chords underneath, as you already know from “Play a Ballad with Chords”.

Track 2 also uses your musical phrases, but it adds a note sometimes. No chords here.

Unlike Track 1 which quantizes the chords to the beat of a Metronome, the sounds of track 2 and its ornaments remain rhythmically free.

The “one” of each bar is highlighted by the Metronome turning black. The chord changes also happen on “one”.

I have reduced the Harmonitor to play only the bass note because of the many Player-chords.

And finally: This is all about Harmony, so the Player will ignore all your phrases that contain chords. Therefore, please play melodies instead of chords.

Although Harmony corrects your live-melodies based on the ballad, the Listener still hears your notes the way you played it, that is, without harmonization. The notes go unchanged from Midi In to the Listener and in a second connection to Harmony, where they get harmonized.

4. Chords and Line for Cubase

shows how almost the same room can be embedded in Cubase, in order to (e.g.) have a percussion track run along.
The setup would look like this: Cubase listens to the Midi In of your sound card, synchronizes Tango - and hence Harmony - via MIDI clock and Tango plays the piano sound, which in my setup is a software sampler.

Everything can run simultaneously in the same machine if you use the internal connectivity software "LoopBe30" that allows multiple independent MIDI connections in a computer.

These connections have to be independent in order to avoid MIDI feedback. Only assigning different MIDI channels is not sufficient here.

The setting for T²'s Midi In is done in the Extras menu. Select the connecting “wire” Cubase sends on (you may need to restart Tango after this) and set the connection to the piano sound in the Midi Out module (the wire to which the “pianist” is listening).

So, you need a connection from Cubase to Tango and another from Tango to your tone generator.
In this demo folder I have enclosed a simple Cubase6 project with which everything works if wired correctly. You should also check the sync settings in Cubase (Transport menu).

For the next two rooms we leave the ballad (we will return later) in order to use Harmony in other ways:

5. Erstes Kennenlernen - Floating Harmony + Cantus Firmus

This Room is derived from "Erstes Kennenlernen.room". For a better overview I have pushed all modifiers to the lower left if they have nothing to do with the subject of Harmony. All the old modules work as before, the only additions to the Room are Harmony, a “Time”-Modifier for quantization, a Metronome and as usual the additional octave for the live voice. Here you have all the possibilities of the demo Room „Erstes Kennenlernen.room ", as described in the manual’s first chapter and in the INFO-box of the Room, plus the new possibilities which arise through Harmony.

There is no Lead Sheet in Harmony and thus no predetermined harmonic form. When you open the editor, in the two tracks below the word Tonality Control you can see the settings "Floating" (for the Player) and "Cantus Firmus" for your live input.

Floating Harmony constantly watches the currently sounding notes. If a new note is added, its pitch is changed so that it forms a consonance with the already sounding notes. It may only use unison or the intervals Fifth, Fourth (in contrast to classical counterpoint always consonant), Third or Sixth and their octave-extensions in relation to all other current-sounding notes. Seconds and Sevenths are dissonances, thus forbidden.

How to deal with the Tritone is adjusted to the right of the Harmony tracks and explained in the manual.

Since there is no predetermined chord (as F major), the resulting tonality is constantly changing with new notes, it "flows" and at the same time remains very much confined to triad structures, which in turn can change very often.

The setting "Cantus Firmus" for the live track works similarly, except that the pitches of this track are not altered by Harmony. All other notes have to consider the pitches the live track brings into the overall sound. Therefore, the Cantus Firmus track emphasizes its centrality by the fact that it remains unchanged. The effect is, what you play always remains recognizable, something like an obstacle in an ant trail or in a stream. All the other Players have to take your notes in constant and “consonant” consideration.

You can hear the effect particularly well if you play a long note. Tango's music is continuously moving consonantly around this note. On the other hand, don’t forget that the Listener also hears this long note, which will consequently also be used by the Player soon.

Faster movements of T^2 can be obtained by setting the quantization of 8th to 16th in the Modifier marked "Time". Or turn the Metronome off completely to free the rhythm from the beat.

6. Erstes Kennenlernen - Harmony Follows Input + Variation

This Room is also derived from „Erstes Kennenlernen.room" and there is no harmonically predetermined form either. However, the harmony here is organized completely different from the previous Room:

The Listener here is constantly trying to determine your harmonic intentions from your live input. It's very easy and fast when you play chords, but it also works with melodic material. Decisive here, is your usage of leading tones, triads and other scale tones.
With this information the Listener controls Harmony so that Harmony can harmonize your and Tango's playing by following you. You will find the respective parameters in the Listener's editor in the green area.

Previously I have mentioned that your live input is changed harmonically but at the same time the Listener hears your original pitches. The resulting contradiction between the corrected version (which you hear) the actual pitches of the notes you play, heard by the Listener which ultimately help you control Harmony, may initially be irritating. Get used to that strange loop.

Here you can turn on the Metronome to get time related playing (16th, 8th) from Tango.

If you leave longer breaks between your phrases (only then), after a few seconds the "Variation" of Harmony will kick in to play around with the tonality that the Listener has heard in your playing. On the right hand side of the Harmony editor, you find the Variations section in which you can configure this feature. As soon as you resume playing, the Variation stops working and Harmony only follows you.

The track bars in the Variation edit section set probabilities with which certain harmonic variations will be applied. Here I have permitted movement over diatonic scale steps, partly with secondary dominants, as well as a few diatonic modulations and very rare simple chromatic modulations or free key changes with secondary dominants. These terms are explained (if necessary for Tango) in the manual.

7. Prelude with Chord Changes

Here the chords of the ballad rule again. I called the Room "Prelude" because a pattern of 3 notes for each of your live notes is being played. This gives it the constant motion one often finds in compositions with this title. Technically the length of each live note is divided by three, and in changing pitch-intervals two notes are added to the original. The rhythm of the whole thing depends on the length of the original notes.

The lowest notes are sometimes played an octave lower and they are (only then) harmonized to the root of each chord. Track 2 of Harmony (via RTC) switches only for those notes back and forth between "Keep Intervals" and "Simple Harmonize (Root)", where only notes with the Harmonic Relevance "XL" are used. A "Harmonic Relevance" of XL very often stands for "Use only the chord's root".

Also in this Room the Player ignores live-phrases that contain chords. Play melodic and play slow, recognizable melodies. Let the rapid movement come from Tango.

Try out some Harmony parameters: Set Harmony's track 1 to "Simple Harmonize: (Triad)" to hear only the triads and dominant sevenths of the chords. The result is harmonically much clearer, but this may soon also become slightly boring.

The motion-pattern of the Room is generated by the lower 6 Modifiers (and, of course, the Player). The Modifiers above, control the aforementioned RTC-switching of Harmony and the octave stuff.

8. Prelude with Changes on Rests

The same Room with one important change:
The chords of the Lead Sheet only move on if you take a break. As long as you play, the current chord will remain. In the short time between the end of your phrase and the next Lead Sheet chord the Player briefly slows down its playing, only to fall back to the old speed with the arrival of the new chord. It thus provides some drama.

This process is visible, if you watch in the Player Editor (top center, below the word “Variation”) the parameter “Playing Speed”, shortly after you have finished your last phrase.

9. Lead Sheet Variation Arrangement

is really a small "arrangement" because the instrumentation and harmonization in each run-through of the Lead Sheet (each “chorus”) change, although only one Lead Sheet was defined.
In the Lead Sheet one immediately notices many bars are marked with “Variation” instead of a chord symbol. Harmony can select a chord on its own here - based on the last defined chord. That would mean for the (“Variation”-) bar 2, that it is based on EbMaj7, because that is the definition for bar 1, which is the last defined bar.

Again, I defined the rules/probabilities for this on the right of the editor and this setting may now even change during a chorus: Towards the end of each chorus I added permission for some modulation so that T^2 can move away from the original keys within certain limits.

As so, the harmonic shape may be slightly different in every chorus, however the 32 bar form remains. The changes to the track bar settings can be seen during every chorus in the Harmony editor.

The Player plays with 3 tracks, each activated in sequence after every chorus. In the first chorus only a fast, high piano-“shimmer” can be heard. If you listen closely, you realize these are your last phrases, played very fast, transposed up and, of course, bent according to the chord-changes.

In 2nd Chorus a middle voice in octaves is added, which is relating to the Metronome tempo.
In the 3rd Chorus finally a bass voice appears.

This bass is very close to the harmonized chords. I achieved this by using a Modifier to check whether notes time-wise are close to the Metronome’s “One”, and then harmonizing them to chord roots. All the other notes are harmonized closer to the original pitches. Again, just like in "Prelude", this fast-switching harmonization method is implemented with RTC. You can see this on the bass track of Harmony.

After the 4th Chorus, the Player’s tracks and ultimately also the harmonic form are turned off in reverse order.

10. MfBallad - Changing Between Symmetrical Scales

One last time we come back to My Favourite Ballad, but now in a very different form. I have defined chords and related scales which, although representing the original, alter it substantially.

All scales used here are symmetric in their interval structure. They are not built like regular major and minor scales which consist of whole tones, usually interrupted by 2 semitones at certain intervals.

Symmetric scales also usually include whole- and semitones, but at a regular interval structure so that they can be split into two halves, three thirds or even in 4 equal parts per octave.

All of these parts would then have the same internal interval structure. A simple example is the whole tone scale, which does not contain semitones and can be split into 2, 3 or 6 equal parts.

Since these scales provide little harmonic clarity for our major-minor system (in which the ballad was written), in order to make the fundamental harmonic form still audible I had to use some tricks in the Lead Sheet definition.

This was possible by making use of the settings for "Harmonic Relevance" for each chord (in each chord for every note of the scale).

If you look at the Lead Sheet editor, you will see that I had to work with "Harmonic Relevance" quite extensively. Basically I had to emphasize notes that were part of the scale *and* important for the original chord's basic triads with XL, L or M assignments, whilst others, wrong sounding or otherwise "strange" notes got S or even XS marks to make them passing tones.

After the necessary adjustments were made, I was able to save the chords in "My Chord Types" (bottom of the editor) in order to have them available from now on.

I have entered the ballad three times completely, using three different types of scales:
Augmented Scale (the scale intervals alternate between a minor third and a minor second),
Diminished Scale (whole tone and minor second alternates) and
Whole Tone Scale (the whole-tone scale I mentioned above, consisting only of major seconds).

Since the three Lead Sheets (number 4, 5 and 6) are based on the same ballad form, I can always switch back and forth between the three colors. A particular bar (e.g. bar 17) always refers to/replaces the same bar of the original form. The Room works exactly like this:

If the T²-Player wants to play a new phrase on track 1, one of the three lead sheets 4, 5 or 6 will be selected randomly on the fly and this controls Harmony until the next phrase on track 1 starts. You can see in the Lead Sheet editor how all the chords are completely exchanged after a few bars.

You can hear a bass- and a voice in middle register. To the latter I have added a third (sometimes a minor, sometimes a major third) in order to better illustrate the harmony. The bass will help understanding the harmonic form by again playing chord roots when the note is close to the bar's "one".

Your live input follows the scales of the Lead Sheet as well.

If you want to find out more about the relation of the scale to the original form, you can view each chord with a double click into the Lead Sheet.

Again, the Player ignores phrases with chords.

I hope that Harmony does not attempt to copy a particular jazz, pop or other stylistic model. Instead, it is meant to be an open system in which it is possible to fulfill harmonic needs I did not yet know at the time of programming. This was the central approach in the development for me – for Harmony and for Tango in general.