

Interview Part 2 REV 08 May 2026

Interview of Harald Bode in his home/studio in North Tonawanda, NY on 14 September 1978 by Thomas L. Rhea:

<https://www.drtoMrhea.com/>

Significant additional printed information and audio examples appear in *Electronic Perspectives: Vintage Electronic Musical Instruments* (2023) Tom Rhea's 400 page book with 2 CDs of audio examples:

<https://www.electronicperspectives.com/>

On YouTube:

<https://www.youtube.com/@electronicperspectives/videos>

Significant audio restoration by Matt Traum:

<https://www.patchmanmusic.com/mattstimemachine.html>

Also appreciated are Kim Traum's skills as a German speaker, who cleared up some questions regarding proper names and company relationships that

Harald Bode mentioned in this interview, thanks Kim!

Gracious thanks to Peter Donhauser, author of *Elektrische Klangmaschinen: Die Pionierzeit in Deutschland and Österreich*, and *Musikmaschinen: Die Geschichte der Elektromusik* for guidance during many years regarding developments in German-speaking countries. He served as Curator and then Director at the Vienna Museum of Technology for many years.

This interview and a longer one on 13 September 1978 were part of my research in anticipation of publication of three articles on Harald Bode's instruments that appeared as part of my monthly "Electronic Perspectives" (1977-1981) columns in *Keyboard* magazine—for December 1979, January 1980, and February 1980. All 52 of those columns appear in the book (2023) mentioned above.

Bode's comments appear in **bold** below. Rhea's in regular font.

[I believe that the instruments we start out discussing here was Harald Bode's Warbo Formant Organ. Those with better access to Harald Bode's complete files. e.g. at ZKM might provide access to pictures for the numbered "figures" we discussed.]

**Let me point out one more thing.**

OK.

**You see a lot of curves here. What I did, and this was essentially true for this instrument. I'm sorry, that's not the form I borrowed.**

It's the next page, 6 and 7.

**I had two filter banks. These filter banks, which I used, and which are through the production of controls that I have here, I switched in and out to capacitors, and then I had variable capacitors of rather large values. I had two sliding comments.**

So this was like a bandpass filter that was movable?

**It didn't move with the voices . . .**

From a keyboard . . .

**but it was movable.**

Could you move them as you played, with a pedal or something?

**I could. No, I didn't do it with the pedal. I did it manually. There was one interesting thing. Let's say voice number 1 and 3 are assigned to one filter and voice number 2 and 4 to another filter. Or I could change, well, these switches, this was voice 1, and up position was filter 1. Voice 2, voice 3, voice 4, voice 4 was in this case selected to filter 2. Now, I had two expression pedals, one for the one filter bank and one for the other filter bank. So I could, maybe you should record this.**

I am, I am. We're going, we're rolling.

**So I could spell voices 2 and 4 against 1 and 3, or for that matter, voice number 1 against 2, 3 and 4.**

Oh, yes.

**Or I could now, with manipulation, hold a chord, and when I had voice number 1 emphasized on filter 1, I could now easily manipulate the switches so that number 2 would take over the lead, or voice number 3 would take over the lead, or voice number 4 would take over the lead.**

In other words, become louder.

**Yes, louder. Now, I also described in this paper the effect of complementary tone colors. In optics, you talk about complementary colors, the spectrum of which excludes each other. And the same you can do with tones and get very pleasing sounds by having, for instance, voice 2 and 4 assigned to filters that exclude this spectrum of voices number 1 and 3.**

Very distinct voices, then.

**Yes, there are very distinct voices. You can see it from the sharpness of the filter curves. And I just, I really should translate this for you. So . . .**

Why don't you? Yes.

**Yes. So I relate to figure 16. The filter curves for the production of two voicings with formants, which, if distributed to different tones in the chord, make out a very good combination in a polyphonic setting.**

If those filters were that sharp, what would happen when you played outside the bands of it, that voice would disappear then, wouldn't it?

**It would disappear.**

So you had to be careful where you play on the keyboard.

**Yes, yes. And when you look here, I had a peak here on this voice at, let me see . . .**

About 1500.

**This is a misprint, incidentally. This is supposed to be 1000 cycles. So it's around 1500 cycles. This is 100,000.**

That should have been 10 cubed. Oh, I see.

**Yeah, okay. So this is a misprint.**

It's a log scale.

**Yeah. And so I had the emphasis, but as you also see, there is enough coming up here, energy coming up at the high end. And in this filter, I have an emphasis on two and a half kilocycles or kilohertz. So that is quite a high formant. And at some place, I talk about complementary tone colors, and these are typically complementary tone colors.**

What about keying? Did you have any kind of, other than organ-like on-off keying? In other words, did you have envelope control?

**Yes, I did. Well, it's not described in this article, I think. No, it's not described in this article. It may be described in a later article. Let me see. Just trying. Here, I simply describe it as gates.**

I see.

**Here, I have the tone generators, and here I have gates. But it was included.**

So it was possible to make other than organ-like attacks and releases?

**Definitely.**

Could the notes sustain when you let your finger off of the key?

**I did not have any memory device. So I had to hold down. But I had developed this first instrument in such a way that I, for instance, could make a percussive tone on group number one and a sustaining tone on group number two. It was very crude, but it was there. Now, the figure 17 filter curves for the production of a tone**

**with formants and another tone with highly emphasized high overtones. Both result in a polyphonic combination when distributed over different voices, which is sound-pleasing. It is a little bit difficult.**

I understand.

**And figure 18 filter curves for the production of two different voices with high overtones, which go well together in a polyphonic sound. So one has more a limited formant, and it has really an emphasized dip here at about 2,000 cycles, this one here. But it comes up again, so it does have enough overtone content in order to be usable also at higher fundamentals.**

What other technical details about this particular instrument were important? Obviously, it's got an assignment system. And you're going to have to explain to me once again, I really never understood how the resistors worked. You'll have to show me when you press down one key, this happens, and then so and so. This is figure 14.

**This is figure 14, yes. Let's go to the lowest row here. I have a resistor. This is the . . .**

R4.

**R4 going to bias of 150 volts. Now, this resistor R4 is only a small series resistor to give you the beginning. Then you have additional. This is R4 dash. And then you have a number of resistors which are tappings on this R4, which is the . . .**

Like on a wire wound?

**Yeah, which is shown as a wire wound resistor.**

Is that how it was done?

**It was done, yes.**

So you just touched on that elliptical . . .

**I had, as a matter of fact, I had wire wound resistors on ceramic rods, which were flat. And then I had wipers on these rods.**

So it could be tuned.

**So I could tune, yes.**

Right. So the voices didn't all have to be necessarily an even and equal temperament, did they?

**No, no, you could . . .**

Did you ever try anything other than equal temperament?

**Not at that time, no. I was mainly after stability and being able to . . .**

To be able to get four voices, yes.

**Four voices. So you see you have the whole resistor chain in the lower hole, which means it's a relatively large resistor. Now, the connection goes through all these switches and it's ink-heavy, OK?**

Right.

**The glow discharge, too, which is just an example.**

Now, when you make a contact with the first key, is this bottom one the one that came into effect?

**No. If I make a contact with the first key, right here, OK?**

Right.

**And of course, this oscillation circuit is not . . . I mean, of course, it's not stable. So in reality, I didn't use it. Right?**

No, not the glow lamp. I understand that.

**It was only, again, to repeat myself, done at that time, to not give away my ultimate secrets.**

Right.

**But if I now depress only one key, like it's shown here, then all these are in the up position, OK?**

**Because they're not depressed. I only depress one key.**

Right.

**Then, of course . . .**

Excuse me. It shows other ones being made contact, is that a . . .

**Which means I have depressed four keys here.  
But if I only depress one key . . .**

That would be the only one, OK.

**This would be the only one.**

Each key then has four buses.

**Yes.**

OK.

**Well it's really a little bit more than that. Yeah, it has four buses.**

Four contact points.

**Four contact points to four individual . . .**

But the first one down activates a certain row of resistors, then.

**Yes, yes. So the first one down, in this case, this here now, would activate this oscillation circuit and have this oscillate at a relatively high . . .**

Because there's less resistance.

**Less resistance, yeah. OK. Now, if I only have this depressed and nothing else, then, of course, this would be up. This would be . . .**

Right. Yes, I see it now.

**And so this would really go through and open and be open. And likewise, these would end and be open.**

Yes, yes, I understand.

**So . . .**

That's what I didn't understand before. When I looked at the graphics, I saw other keys down up here, and that represents these.

**Yeah.**

OK. So then when you depress the second key . . .

**Then of course, now, I will activate the second.**

Because the first . . .

**Because the first [garbled audio momentarily] . . .**

The bandleader and everything.

**Well, it's a high voice and the low voice of what you remember.**

Oh, I remember that. It's absolute geography.

**Yes.**

One, two, three, and four occur from the highest no matter what.

**Yeah.**

That's the priority.

**Yeah, go ahead.**

OK. Priority being such that if you play the highest note, that's oscillator one. You play the lowest note, that becomes oscillator two. And the in-between note becomes oscillator two.

**Yeah.**

And two is replaced by three.

**Yeah.**

So it's absolute high note priority geographically.

**Yeah.**

No?

**I just want to say this. Are you already recording?**

Testing. Yes, we're recording. Test, test.

**Oh, I just want to add one more thing. I mean, there are quite a number of things. But let's assume you have a chord with four notes. And now you lift up the highest note. And then, of course, the leading note, if you made the first one, the leading note . . .**

Becomes number one.

**It's now the second. What was the second note?**

Becomes the first oscillator.

**Becomes the first oscillator.**

So no matter . . .

**And becomes the second, and so forth. So . . . and you can . . . this way, if you alternate the voices, as I pointed out before, that is, if you assign one and three to filter number one and two and four to filter number two, you can get very interesting orchestral effects, like a set of saxophones, you know, de-do, de-do, de-do, just by lifting up one with the highest key, for instance.**

Right, because it'll change all of the voices.

**Yes, yes.**

All of the voices will jump up a voice . . .

**Yes, by a channel.**

Or jump up a channel . . .

**Yes, yes.**

As you change that up and down.

**Yes.**

Two becomes three, and three becomes four, and one becomes two.

**Yes.**

So . . . Two becomes one the other way.

**Yeah.**

Two becomes one, three . . . four becomes three. It always works to the highest note.

**Yes, right, right. So . . . and so if you use this instrument right, you can achieve quite some interesting orchestral effects. Now, we were talking about Warnke, and I think the Warbo . . . Formant Orgel. First of all, the Warbo is the combination of Warnke, W-A-R-N-K-E. His first name was Christian.**

Christian, right.

**And Bode, the last syllable of the group. And we called it the Warbo Formant Orgel because it was working with formants. And so he used it . . . he**

**was a bandleader in an entertainment band, and he used it in his band.**

That was in the fall of 1937 . . .

**Yeah.**

When he actually started using it.

**Yes, yes. And then he wanted to have a bigger organ, so we built a bigger organ; that was close to the war. The bigger organ is also shown in this publication. It had two manuals.**

Aha. Did this use the same assignment principle?

**The same assignment principle.**

With four on each manual?

**This was used with a single melody manual up . . . the upper manual . . . accompaniment manual with four voices, and a pedal of course, single voice.**

Right.

**This, incidentally, is the interior of the experimental organ, which is shown on figure 13.**

13.

**So 13 is the exterior, and 19 is the interior.**

Right, and 20 is the later model. Which model is the later model. What did you call that?

**Also, the same thing. It was just a bigger model. And that was so close to the war that work couldn't be continued because of other priorities .**

..

Right.

**... in general. So I then, in the meantime, had worked on a melody instrument, which used the same oscillator because I liked that oscillator quite well. And that instrument was called the Melodium, a single voice instrument. And the**

**Melodium, I think, is shown here in the same publication, yes, on figure 7.**

That was after the Warbo?

**That was after the Warbo organ, because it was not as involving with maintenance and stability problems and so forth.**

So what became of Warnke and the Warbo Organ? Did He . . . It was because of the war that essentially production . . .

**It died down because it couldn't be pursued any further. I mean, there was evidently some more work required to perfect the idea. He used it, but to a limited extent. And eventually, after the war, because of our friendship, he got a bigger organ, which was built from the synchronized Hartley oscillators, which was the predecessor of the Estey Organ, which I told you about before.**

But that was not an assignment.

**That was not an assignment.**

Right. But that must have been in the late 40s then.

**That was, yes.**

Or the mid 40s by then.

**No, no, no, that was even in the early 50s.**

I see.

**Yes. And now, getting back to the Melodium, the Melodium was really the predecessor of the Melochord. Only the Melodium was built rather simple. It had a pressure-sensitive keyboard. The individual keys were constructed as seesaws. So if you replace . . .**

So the fulcrum was in the middle of the key?

**Middle of the key, yes. So if you depress the key in the front, it lifted up in the rear. And across all the keys in the rear was a light aluminum rail, which was lifting up and actuating a volume**

**control. So this way, I had touch-sensitive playing, and the more I depress the key . . .**

Is figure 10 a detail of that?

**This is figure 10, which shows the detail of it.**

Where's the aluminum rail?

**This perforated . . .**

Oh, the ones, the holes in it, yes.

**On the front. And evidently, it looks like this key where the shadow is, it's pretty much in the middle of the picture.**

Is raised.

**It's placed to lift up this rail.**

Very interesting. A force-sensitive instrument in . . .

**Yeah, of course.**

When was the Melodium then?

**1939.**

Very interesting.

**‘38, ‘39.**

But then you consider that the predecessor of the Melochord. Perhaps that should be on the second article.

**Yeah. And the Melochord, also, the first Melochord, which I built, had a force-sensitive keyboard. And that had a single five-octave keyboard, which was split up into two ranges. A bass range, which had two octaves, and the treble range, which had three octaves.**

By this time, you had extended the formant concept to actually move along with the keys.

**That was then in a later model, which was built around ‘54 Köln.**

Well, I really don't want to get into that because I want to do that on the second article.

**Yes, yes.**

And I just want to center in on this. You started to make a comment last night about history and the distortion of history. And I wonder if you would pursue that, the concept of what happens, why it gets distorted.

**Well, first of all, history may not always be distorted willfully. It is just ignorance. Of course, people don't go to libraries and don't read. And so they don't know what is known. And we have a typical example of distortion of history here when we talk about the assignment principle, which now is something new, and it really was nothing new. It was done in the late 30s. We can go further, of course, and I'm not the kind of guy who wants to step on anybody's toes. So I understand that this is not being broadcast.**

Yeah. But I do want to quote you in the article.

**Yeah. Yeah. And things have to be put into perspective. We can go even so far as to saying, who introduced the modular synthesizer?**

Let me turn this. Yeah, you were discussing the introduction of the modular synthesizer.

**Yes. Well, here, things have to be put into perspective. I take credit for being a vital part in introducing the modular synthesizer concept. And I set up a modular, created a modular system in early 1960, on which I recorded the same year, in the fall of the same year, at the Convention of the Audio Engineering Society.**

Yes, a paper in 1960?

**Yes.**

Well, how did you, what did you name it? A novel instrument for the production of . . .

**Wait a minute. Another instrument or so for the explanation of unknown electronic music performances. You better look it up.**

Yeah, was it the Subharchord?

**Pardon me?**

Did you call it the Subharchord?

**No.**

No, or something else. I just, I think I am going to have to flip this now. Okay. We're on the air.

**You hopefully have that reprint.**

That'll come later, though.

**Yeah.**

Let's do that. Hold on. I mean . . .

**I'm just on the subject of distortion of the history.**

Right.

**I mean, I'm sometimes a little bit sensitive about things when they're being put out of perspective. As far as the contribution of Moog is concerned, his major contribution was the production of the voltage-controlled modules . . .**

Absolutely. Absolutely.

**. . . and of creating the exponential interface so . . .**

**.**

Ratios.

**. . . instruments put the keyboard control. And the introduction of the various modules as oscillators, filters, those were the main components. Mm-hmm. As far as introducing the modular concept, synthesizing concept, that was taken over from where I started in 1960. But, I mean, if we put this in this perspective, then it's fine.**

Right. I understand. I understand. You mentioned something, though, about the commercial aspect of distortion, not the ignorant aspect, but the other part.

**Yeah. Of course, the commercial aspect of distortion is so that sometimes innovators are being downplayed and being kind of deprived of their credits. And it is hard for me to go into details. I would really have to think in order to . .**

**.**

Before you got quoted.

**Before I get quoted.**

That's all I'll say. You'd have to think further about it before you get quoted.

**Well, I don't know if we should jump the gun. I don't know. I mean, you'd be the judge, you know enough now about my background.**

No, I think people should be told the truth, Harald.

**Yeah.**

I don't think it ever hurts to tell the truth, even if it hurts for a little while.

**Yeah.**

But I think the fact of the matter is that there are a lot of charlatans in the field now.

**Yeah.**

A lot of marketing people that are blowing up firsts that weren't really first. And I . . .

**Yeah.**

You know, it's one thing to do . . . Shakespeare said it right. He who steals my purse steals trash.

**Yeah.**

You know? When you steal a person's accomplishments. That's really all we have.

**Yeah.**

And that bothers me very much.

**Yeah.**

Were there any other comments that would be appropriate for this article, like your earliest training or any other things? I want to center mostly on this Warbo Organ because I think it's very interesting how it relates to the assignment thing today.

**My training is really not related to this. I have a degree in physics, which means I can handle the math part of electronics. I happened to graduate under a professor who was very electronics-oriented, whatever you call that in those days, because that was in the early '30s.**

Sure.

**But I had a good foundation in as much as he already saw, and that was at the time when people were mainly experimenting, diddling around, doing things empirically. And he emphasized that everything that can be done can be formulated mathematically and can be handled scientifically. And that was a good teaching for me. And that was a good foundation.**

**So as far as that is concerned, that is a positive aspect.**

But in your work, I suspect you did some of both.

**Sometimes I had to find the results before I explored how it happened. And so that is one of my backgrounds. My background is really twofold. One is my background of formal schooling, as I just said. The other component of my background is my upbringing, my home. My father was a performing musician and organist, a music theoretician, and a music writer.**

Church organist?

**Yes, church organist.**

Where was this?

**In Hamburg, Germany.**

Hamburg?

**Yes. And so I grew up with hearing good music, good harmonies, and modulations, everything in the home. So this, of course, if you grew up with this, it stays with you, you are talented to start out with. So there was a good motivation from two sides to implement electronics and to do music. And It became a crucial point in my development as a person of my personality when I had to make up my mind what do I want to do. I had so many options. And I decided to make a synthesis out of these two backgrounds and combine my interest and my knowledge in electronics with my motivation and interest in music. And this is how everything came about.**

Do you think there is an argument between technology and music now?

**You mean at this day and age?**

Yes, now.

**An argument of what kind?**

A lot of people say that electronic instruments are “too technological.”

**This always depends on how you handle them. If you handle—I have heard the comment of engineers from users—which is a good term, which really points out it's always possible that the majority of the people does not know how to handle *any* musical instrument, especially an electronic musical instrument. And sometimes it's also the fault of the electronic music designers. They just put a few gimmicks into the instrument, make it sound like it sounded on the popular record, "Pipapo." And off you go and you make—you grind out your merchandise and make your millions, but it doesn't help the music market or doesn't help the expression of the individual. But given the right instrument, which usually has to be more selective instrument, and given the right artist, you can make very expressive and very musical sounding music with electronic means. And I would say, if you handle it right, you have much more freedom of expression, much less limitation to the instrument that is built so or it's built so in the electronic**

**music direction than the conventional instrument. Well, that's my opinion. And on the piano, after all, you can only play piano. You can play piano by dynamic expression, but you are extremely limited, although this is very successful instrument. The violin is something different. On a violin, you have tremendous number of degrees of freedom and of expression.**

Which means you can manipulate the sound in direct contact.

**Yes. It takes quite some manipulation means to make an electronic instrument that expressive, but if you want to, you can.**

That implies, though, that the interface, the thing that the musician puts his hands on, is very important.

**It's very important. You have to have, you should, if you want to move in that direction, have all means of interface manipulation possibilities that you can think of.**

That's why, for instance, on the Melodium, the pressure sensitive keyboard, very early you realized that it's more than just making oscillators.

**Oh, yes. It sounded very musical. I remember that people got tears in their eyes. As a matter of fact, I had a program, a radio program, on radio music. They had an experimental for three weeks in a row, prime time in the morning after the news. And then they canceled it because it was just a pilot—and they had to continue it and they had to take it up again because I had many letters from the listeners.**

Playing the Melodium?

**Yes. That was the *Melochord*. Pardon me. That was the *Melochord*, but that was the same expressive as the Melodium.**

What year would that be?

**That was, that was—it started in 1947. I had programs, radio programs. Again, I want to just backtrack a little bit. I had for the two voices, I**

**had an expression pedal for each voice. And the voices were tuned in such a way that the parts of the keyboard that I could cross voices. They were not really . . .**

Not by crossing your hands, but by playing in different parts of two split, a split keyboard.

**Yes.**

That was on the Melochord.

**That was the first Melochord. That was very expressive.**

On the Warbo Organ, you had this two pedal thing also.

**Again, again.**

That was one in three and two in four. One of the actuals. Not only were the notes assigned by the keyboard, but they were assigned to different filters and the pedals were assignable.

**Yes, yes, but . . .**

Were there any other features? Was it touch sensitive in the . . .

**It was not touch sensitive, but it did have the percussive feature percussion.**

Right, so you could change the attack.

**Yes, I could play a piano and accompanied by strings.**

Uh-huh.

Singing sound.

Well . . .