microwave II/XT - cookbook

waldorf

This booklet is a quick introduction to the MicroWave II/XT and the XTk, and is designed to give you a first impression of the endless capabilities and the uniqueness of our synthesizer.

More detailed explanations as to the operation of the machine can be found in the regular manual included with each unit.

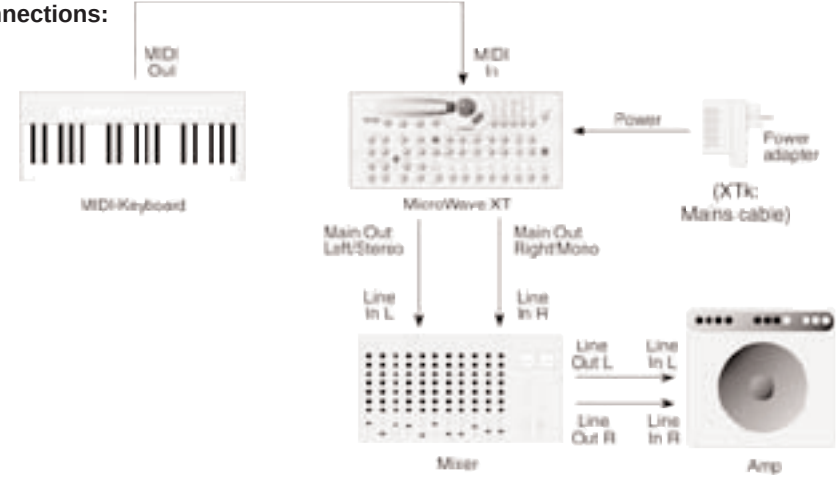
Whenever the name MicroWave II/XT turns up in the text, it is referring to all models (MicroWave II, XT, XT Black, and XTk).
Should the operation of the models differ, this will be explicitly pointed out.

Should technical terms turn up in the text, you will be referred to the glossary at the end of the booklet.

Ingredients:

- 1 MicroWave II or XT/-k and a power supply
- 2 Audio jack cables connected to a sound system or
- 1 Headphone
- 1 Power socket
- 1 MIDI Masterkeyboard and 1 MIDI-cable (except XTk)
- 1 Pair of ears to listen with
- 1 Pair of hands to turn the knobs with

Connections:



- 8-times Multi-Mode
- 10 voices (expandable to 30)
- 256 Sounds, 128 Multis
- 64 ROM-, 32 RAM-Wavetables
- 64 Waves per Wavetable
- programmable Arpeggiator (Can be synced to MIDI-Clock)
- 4 integrated effect units
- all parameters are MIDI-controllable
- optional editing software allows you to create your own Wavetables
- simple updates for the operating system via MIDI

Per Voice:

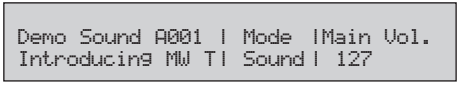
- 2 Oscillators with sync and FM
- 2 Wave-Generators
- mixer with Ring-Modulator and noise
- 2 Multimode filters with numerous types of filters (presently 15 types)
- ADSR Filter- and AMP-Envelopes
- 8-level Wave-Envelope with loop
- 4-level Free-Envelope
- various Glide and Trigger-Modes
- LFOs, syncable to MIDI-Clock
- Extensive Modulation-Matrix with 16 slots
- 4 Modifiers with various algorithms
- 44 Endless rotaries to enter parameters (only XT/-k)
- 2 x 40 character display, backlighted
- 2 Stereo-Outs
- 1 Stereo-In (only XT/-k)
- MIDI In/Out/Thru

To give you a better idea of the numerous sound capabilities, we have developed a Demo-Mode that can be entered by pushing the **Play/Shift** and the **Power/Standby** button at the same time.

On the XTk you can also get into Demo-Mode by pushing the "0" and "9" buttons simultaneously (Demo).

The various Demo-Sound-Programs can be selected by turning the red dial.

After entering Demo-Mode, the display should read:



On the XT and the XTk you can change a lot of the parameters directly. On the MicroWave II, four functions are available on the Play-Access-Page, and can be selected by pushing the **Play/Shift** button.

In addition you can also change the sounds with the "classic" tools (modulation wheel, aftertouch).

Because of its synthesis architecture, the MicroWave II/XT is ideal for creating analog sounds.

Because the behavior of an analog filter is copied exactly, and there are numerous filter types to choose from, you are able to create a large number of classic sounds.

The extensive modulation capabilities and the internal effects create a very lively sound.

A001 Introducing MW

This wide Pad sound demonstrates the powerful filter; you can change the filter's curve with the Masterkeyboard's modulation wheel, so that the sounds change as if it were morphing. The same applies to aftertouch (→glossary). Pitchbend provides for an additional spacey effect.

A002 Syncron

The character of this sound is – typical for sync sounds – cutting-aggressive, but can, if necessary, be smoothed with the filter. This is done with of by the modulation wheel. Turn the pitchbend wheel to hear some nice pitch change-effects.

For analog sound synthesis the MicroWave II/XT uses a number of different filter types, e.g. 12dB/24dB Notch-, Low- and Bandpass, 12dB-Hipass, Dual-Lowpass/Bandpass.

In addition it also has all the parameters found in its classic ancestors: Oscillator sync, FM, Analog clipping, ring modulation and fast LFOs and envelopes.

One of the MicroWave II/XT fortes is the Wavetables (➔glossary). "Scanning" them provides you with endless sound possibilities, and offers you a basis for sounds never before been heard.

To control the Wavescanning you can use the Wave-Envelopes and all the modulation capabilities.

The combination of Wavetables, filters and modulation turn the MicroWave II/XT into an unbelievably versatile and powerful synthesizer.

A003 Wavestarter

The modulation wheel closes the filter a bit, so the sounds seams tamer. Aftertouch increases the LFO speed (➔glossary), and adds movement to the sound.

A004 Wave-Premiere

The up and down in this sound is created by the Wave-Envelope, which can be constantly repeated with the Loop function. Turning the modulation wheel shortens the loop, and the sound gets more and more hectic. Aftertouch changes the pitch, so the harder you press the keys, the more the sound "wobbles".

The MicroWave II/XT has 65 ROM-Wavetables, that each have a different sound characteristic; some are gentle because the waves only differ slightly from one another. Others create sudden changes and therefore have a very harsh basic timbre. Simply changing the current Wavetable quickly creates new kinds of sounds.

You should make plenty of use of this. With help of an editing program you can even make your own Wavetables and use these for sound synthesis in the MicroWave II/XT.

The MicroWave II/XT has a very powerful arpeggiator (→glossary), that not only offers you the classic behaviour, but also offers 15 preset and 1 programmable pattern. By playing different chords, you can come up with very interesting sound structures.

What is also interesting is that the arpeggiator directly belongs to a sound, so you can apply up to 8 arpeggios in Multi-Mode.

A005 Hi, Arp!

As soon as the modulation wheel changes the filter parameter and the length of the sound, the sound becomes richer.
On the Play-Access-Page you will find the **"ARP Range"** parameter that determines the arpeggiator's octave range.

A006 Acid Rain

This is a bassline kind of sound, whereby the modulation changes the attack phase of the filter envelope. Noise can be added on the Play-Access-Page to create a percussive sound.

The arpeggiator's speed is set in BPM, and can be synchronized to MIDI-Clock if necessary.

The notes played by the arpeggiator can also be sent to the MIDI-Out plug to control external machines.

The MicroWave II/XT is capable of frequency modulation (FM), which creates sounds with a bell-like ring to sounds with a metallic "flavour".

During frequency modulation the amplitude of OSC2 controls the frequency of OSC1. The higher the FM-amount, the stronger the effect.

A007 Classic FM
This is a typical FM-Piano, whereby only a little oscillator-FM is being used.
Try out the modulation wheel!

A008 FormArp
The vocal character of this sound is created by a special FM-Filter, whereby the filter is modulated by the second oscillator's frequency. This can be heard very clearly if you slowly turn up the modulation wheel. The **"F1 Extra"** parameter on the Play-Access-Page also has a direct influence on the filter's FM-intensity.

FM really gets interesting when you work with Wavescanning or with different Wavetables.

What is important when using FM is to change the oscillators' frequencies, as this produces the best results.

In addition to the classic filter types, the MicroWave II/XT also has additional interesting models. These filters guarantee you a large number of very new sounds.

With the XT and XTk you can even load in external audio material and process it with the filters and the internal effects.

A009 Drowning

The S&H-Filter reduces the sample rate in real time. The modulation wheel controls this process. At first the sound gets a bit rougher, and then it completely loses its original characteristics.

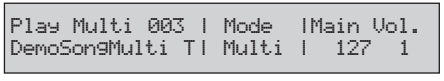
A010 It´s not real

A typical example for a SciFi-effect sound. A bandpass filter, ring modulation and Wavescanning create the individual character. Please use the modulation wheel, pitch-bend and aftertouch extensively.

The MicroWave II/XT combines traditional filters with further sound-changing functions.

With the S&H-Filter the sample rate is also reduced, with the FM-Filter the filter frequency is modulated by oscillator 2, and with the Wave-Shaper/Sin (X)-Shaper the filter's signal is downright distorted.

To get from the Play-Page to Multi-Mode, turn the third knob from the left under the display **(Sound/Multi)** slightly to the right. In Multi-Mode, up to eight sounds can be controlled on eight different MIDI channels simultaneously. Multi-Mode is usually used to play several sounds simultaneously by controlling the MicroWave from an external sequencer. What's special is that an arpeggiator can be programmed for each sound in Multi-Mode, so that eight arpeggiators are running simultaneously (synchronised if you want).



Multi 001 On the Run!

Multi 002 Hit the key!

Both Multis use various sounds in the arpeggiator, and combined they produce an interesting rhythm pattern.
The modulation wheel influences various parameters.

Multi 003 DemoSongMulti

Selecting this Multi automatically starts the Demo-Song.

All the sounds can also be edited in Multi-Mode. To select the corresponding instrument, keep the "Shift" button pressed and select the instrument with the right-hand button under the display. The number in the right side of the display shows the current sound.

The Demo-Song uses 10 of the MicroWave II/XT's voices and plays the Demo-Sounds A013-A020. An optional voice expansion for up to 30 voices is available.

Up to now we have dealt with pre-sets, this chapter is dedicated to creating your own sounds from scratch.

With just a few turns of the knob you will very soon be putting together your very own personal sounds.

To do this we will use Demo-Sound A011. Turn the "Sound/Multi"- knob under the display to switch the MicroWave II/XT into Sound-Mode, and then select sound A011.

In Demo-Sound A011 "InitSound" all the parameters were set to predefined standard values, so it doesn't sound too spectacular.

The XT and the XTk offer direct control of the most important parameters. On the MicroWave II you have to push the corresponding buttons to go to the right Sound-Menu, call up the correct Menu-Page with the red dial, and then change the parameter with the coinciding controls under the display.

Sometimes this process is also necessary on the XT and the XTk, because it is not possible for each of the 200 parameters to have its own control.

To store a sound you have finished programming, push "Shift" and "Store" at the same time, select the memory bank you want to store it in, and push "Shift" and "Store" again.

When in Demo-Mode you can only store sounds in the regular user memory.

- Set **Wave 1 Startwave** to **saw**
- Set **Mix Wave 2** to **000**
- Set **Cutoff** to **90**
- Amplifier-Envelope:

  Attack = 000
  Decay = 020
  Sustain = 000
  Release = 000

- Switch **Arpeggiator Active** to **on** or **hold,** set **Tempo, Clock** and **Range** to whatever you wish.

A Bass-Sound is usually based on a **saw** waveform (sounds sharper) or on a **square** (sounds nasal), whereby only one oscillator is being used, so the sound seams more precise.

The **Cutoff** frequency cuts off the basic waveforms, which makes the sound duller.

The **AmpEnv** shapes the volume changes over time, for a bass it should be short and sharp.

The **Arpeggiator** defines the rhythmic chord patterns.

- experiment with the **Env.Amount** and the **Filter-Envelope** values
- Add as much **Resonance** as you like, the self-oscillation starts at **114**
- Switch on the **Chorus** on the **Amplifier**-page
- Use the **Pan Delay** from the **Effect**-page
- Try different **Wavetables,** and above all, change the **Startwave,** the result will surprise you

- Set Sound **A011** back to its original setting by pushing **Shift + Recall**
- Select **Wavetable 028**
- Set **Osc1** and **Osc2 Detune** to a small positive and a small negative value
- Set **Wave1** and **Wave2 Env. Amount** to **+57**
- Switch on **Chorus** and **Amplifier-Menu**
- Wave Envelope:
  Time 1 000 **Level 1 127**
  Time 2 060 **Level 2 000**
  Time 1 060 **Level 3 000**
  Set all the other values to **000**

The **Wavetable** you are using has a vocal-like timbre in its entire sweep; since both oscillators are slightly detuned against one another, the sound "floats".

Chorus gives the sound additional width. The Wave-envelope "scans" the Wavetable with the selected amount, thereby creating a filter-like timbre change.

What is remarkable, is that so far no filter has been used.

- Make sure you try out different Wavetables
- Set both **Waves** in the **Mixer** to **127** and set the **Clipping**-parameter in the **Quality**-menu to overflow
- Try out different filter types and change **Cutoff** and **Resonance** at the same time
- Try implementing the various effects (**Mix** should be set to about **50:50**)
- You should experiment with different modulations on the **Mod-Page** (e.g. **LFO 2→+42→Pitch**)

- Set Sound **A011** back to its original setting by pushing **Shift + Recall**
- Set the **Startwave** of **Wave 1** and **2** to **saw**
- Set **Osc1** and **Osc2 Detune** to a small positive and a small negative value
- Set **Cutoff** to approx. **080-090**
- Switch on **Chorus**
- Amplifier-Envelope:
  Attack = 050 Decay = 000
  Sustain = 127 Release = 050
- Activate **Glide** and set the **Time-**parameter to **018**

Thanks to its harmonics, the saw-tooth wave is well suited for pad sounds, the filtering determines the sounds brilliance.

Detune and **Chorus** provide a floating and full characteristic.

The **Amp-Envelope** controls the volume change over time and is responsible for the slow attack and release.

Glide causes the pitch to glide up when a note is played.

- Wonderful Filtersweeps can be created by changing the **Filter Env. Amounts** and the values of the **Filter-Envelope**
- We recommend you use the **Hipass** or the **Bandpass** filters
- Try out different modulations on the **Mod-Page,** e.g:
  Source: LFO1
  Amount: +63
  Destination: your preference
- You should vary the **LFO1 Speed**

After-touch
After-touch data is special MIDI communication that results from holding a key on the Masterkeyboard down and pressing it "more". This can be used to control various functions in the MicroWave (e.g. →Cut-off, →Vibrato).

Arpeggiator
An arpeggiator splits up a pressed chord into single notes and plays them back in a certain rhythm. The MicroWave has numerous patterns built in, but also allows you to create your own. If necessary the arpeggios can also be sent via MIDI-Out to control other MIDI equipment.

Controller (Control-Change)
All parameter changes in the MicroWave can be sent out via MIDI-Out, enabling you to record them with a sequencer. This makes very complex sound changes possible, or you can use the parameter changes to control external MIDI equipment via the MicroWave XT or the XTk.

Filter
The filter is the most important element for creating or changing sounds in the MicroWave II/XT. In addition to the classic filters (Lowpass, Hipass, Bandpass, Notch), the MicroWave has various custom filters that can create very interesting effects.

Frequency Modulation (FM)
During frequency modulation the OSC2 waveform controls the frequency of OSC1. The higher the amount of FM, the stronger the effect, which is usually recognisable by a basic metallic sound.

LFO (Low Frequency Oscillator)
An LFO is an oscillator whose oscillation is not used to create sound, but to modulate various functions such as oscillator frequency, filter cut-off or panning.
The oscillation of the MicroWave's LFOs can even go all the way up into the audible range.

Oscillator sync.
During oscillator synchronisation the Osc2 adjusts the start of its waveform phase to coincide with that of Osc1. This means that every time Osc1 starts a new cycle, Osc2 starts one too, regardless of whether the cycle had been completed or not. This gives the sound an aggressive touch, especially when the oscillators work with different frequencies.

Ring Modulator
The ring modulator uses the signal of two oscillators as source, and outputs the sum- and difference-frequencies of them. The resulting sound contains many disharmonic components and sounds metallic.

Wavetable/ Wavetable synthesis
The sounds in the MicroWave are based on sets of waves, so called Wavetables. You can imagine them to be 64 single waves lined up next to each other.
These can either be played statically or you can sweep through them, to create an interesting timbre change.
If the waves in a Wavetable hardly differ from each other, the sound is smooth and pleasant. If they are very different you get very choppy timbre changes.

This ends our little introduction into the secrets of the MicroWave.

We hope to have provided you with a general overview of the sound diversity of our Wavetable synthesizer, and can promise you that we only scratched the surface.

To hear the regular factory pre-sets you have to return to the normal Play-Mode. Just push the **Play/Shift** *button and the* **Power button** *simultaneously.*
(On the XTk "0" and "9")

For more information please see your music dealer.
We also suggest you read the user manual, where you can find all the necessary fundamental steps you need to control the MicroWave synthesiser.
For further Information please contact our website at:

http://www.waldorf-gmbh.de

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