



wave 2.2

OWNERS MANUAL

ENGLISH

PPG WAVE 2.2

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The PPG WAVE 2.2 is an eight-voice polyphonic Synthesizer that uses sixteen digital oscillators. Nearly two thousand different waveforms in 30 wavetables (each has 64 waveforms) can be generated. This unique device makes it possible to run through up to 64 waveforms within the length of one played note. Beside these wavetables you find one wavetable (UW = upper waves), that contains the most interesting waves of all other wavetables. This UPPER wavetable can be easily entered with one switch function. Simple and complex waveforms are controlled by an envelope generator or passed through an 24 dB lowpass filter and can be modulated by a LFO. All parameters can be stored in one of the 100 programmable memories. Two different sounds can be played at one time, with one key or with keyboard split. The PPG WAVE 2.2 contains a flexible 8-track Digital Recording System, with multiform update possibilities and a 10-function Arpeggio Program. Each track of the DRS can be modified during playback in many parameters (one parameter is storeable). It is possible to play track by track, or polyphonic into the Digital Recording System.

The PPG WAVE 2.2 is built in a stable metalcase and has a five octave keyboard with touch sensor. The controlfield is oblique faced to the player and contains a number of controls, which are placed clear and logical.

Today's keyboard-players use more than one instrument "live" and have to stack their instruments. The PPG WAVE 2.2 is a flat and stackable instrument to become a self-evident part of every keyboard setup.

Please read this Owners Manual carefully and follow the examples. We are going to explain every function of the PPG WAVE 2.2 extensive and understandable to give you the possibility, to use the PPG WAVE 2.2 as you want.

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THE " WAVE " PHILOSOPHY

I would like to name the way of synthesis of the PPG WAVE 2.2 the "digital" synthesis, because all other names for different ways of creating electronic sounds aren't right enough. For the first there is the subtractiv synthesis, which uses low- or highpass filters to change the sound of three or four different waveforms (triangle, pulsewave, sawtooth...), generated by normal voltage controlled oscillators.

The second is the additiv synthesis, which generates electronic sounds by adding harmonics to get a new waveform without the need of filters. The first way of synthesis is very simple and you will have reached the sound possibilities soon. The second form is very effectable. You can create nearly every sound, sounds you have heard once or acustic events which are totally new. Most of these systems work with sinus waves for the harmonics, with the PPG WAVE-TERM you can take every waveform, also abstractiv waves, to work with them additively.

The "digital" synthesis of the PPG WAVE 2.2 works with more than 1800 different wavefoms which are created digitally and stored in 30 wavetables. There is one wavetable, the UPPER WAVES, that contents the most interesting waves from all other wavetables.

The PPG WAVE 2.2 also has a 24 dB lowpass filter in each voice to create the wellknown "subtractiv" sounds, and the typical control elements: 2 ADSR envelope generators, 1 AR envelope, LFO, pitch- and modulation wheel and 8 controls with multiparameter functions.

The PPG WAVE 2.2 is not a preset synthesizer, it is a synthesizer, that can work subtractiv using the sound possibilities of the additiv systems. The result is great dynamic and uncommon sound clearness.

The waveforms can be controlled by an envelope generator, that means, you can create dynamic sound changes by passing through up to 64 different waveforms within the lenght of one played note. This effect could never be done using filters. The sound is more natural, not anymore sounding "electronical". With these waveform- sweeps you also add the relation of space.

How does this new way of creating sounds work ?

First we have to understand the principal "digital" work. Let's take a sinuswave and cut the wave into a number of parts. Every part has a fixed amplitude corresponding to the position of the part. These amplitudes can be

determined in Volt or in digital words (after coding). After decoding the wave will be generated in rectangular steps from one amplitude to the next amplitude (parts of the wave). The more parts the wave has been cut (sampled), the more exactly will be the decoded waveform. This work is called "quantizing" and the speed of "cutting" is called "sampling frequency". The same is done by an "analog - digital - converter". The digital words are set together with the numbers "0" and "1" (binaer code) and they are easily storeable.

The PPG WAVE 2.2 is working with numbers up to eight figures (digits) = bits. "He is working with a 8-bit language", that means, the computer can analyse up to 256 different amplitudes. If a voltage (an example) is quantised in 0.1 V steps, a voltage of 5.7 V would be called " 00110101 " (pict. 1).

The periodical movement of a voltage in a determined frequency is called a "waveform" and that's the same when calling up digital words (for amplitudes) one after the other with a determined sampling rate and decoding them with a "digital - analog - converter". Every "word" has 8 bits and one wave has 128 words. The words are called up from the memory in the speed of the sampling frequency and sent to the digital-analog-converter where they are decoded into voltages (which are amplified and sent to a speaker system)

The PPG WAVE 2.2 contents 30 wavetables with 64 waveforms each.

In every wavetable you will find on the last wavetable positions the wellknown waves:

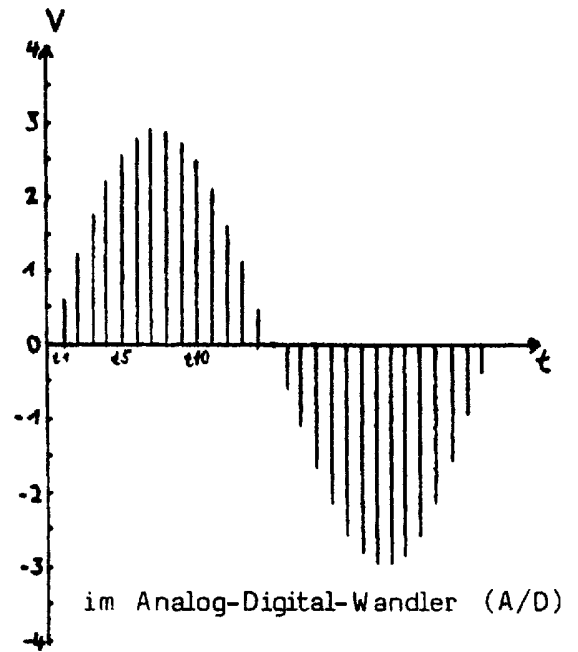
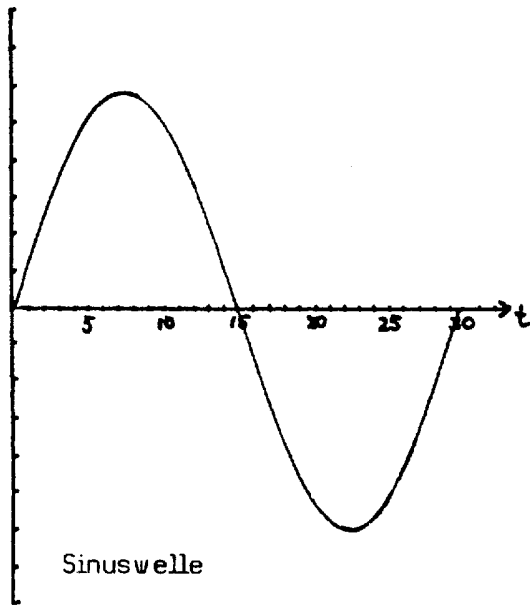
- 60 - triangle
- 61 - pulse wave
- 62 - rectangular
- 63 - sawtooth

For you it is easy to return to conventional synthesizer sounds (sounds like violin or brass) just by turning the waveform controls to the corresponding wavetable positions (look into the "Analog Display").

Compare the idea of creating electronic sounds with a film. There are also single pictures, which start to be alive, when moving the film in a determined speed.

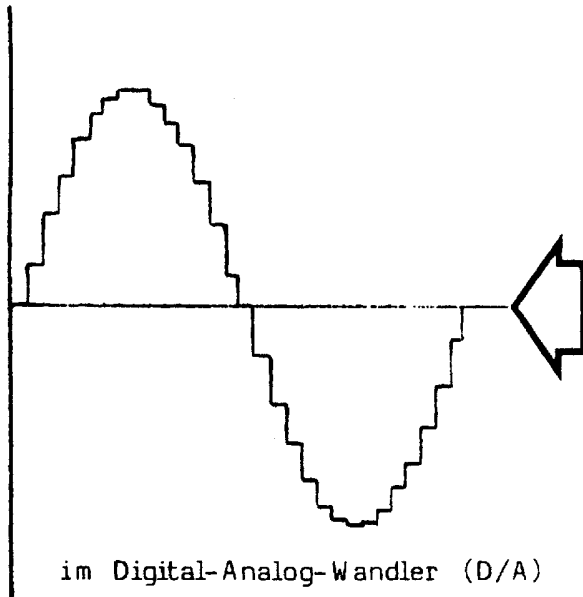
The PPG WAVE 2.2 contents wavetables with soft changings

from one wave to the next. But there are also wavetables with strong differences between the waveforms to get hearable steps when the wavetable is run through by an envelope generator. These hard changings in sound create effects like echo repeatitions or a sample and hold.



Speicher

t1 = 0,6 V *	I I O
t2 = 1,3 *	I I O I
t3 = 1,8 *	I O O I O
t4 = 2,2 *	I O I I O
t5 = 2,6 *	I I O I O
t6 = 2,8 *	I I I I O O
t7 = 3,0 *	I I I I O
t8 = 2,9 *	I I I O I
t9 = 2,7 *	I I O I I
t10 = 2,5 *	I I O O I
t11 = 2,2 *	I O I I O
t12 = 1,7 *	I O O O I
t13 = 1,2 *	I I O O
t14 = 0,5 *	I O I
.....	



The controlsection

The controlsection is splitted into two main parts: the MULTIPLE FUNCTION ANALOG PANEL and the MULTIPLE FUNCTION DIGITAL CONTROL PANEL. To the analog section belong the controls, which you can find on nearly every conventional Synthesizer. These are the controls for the waveform, the cutoff frequency and emphasis of the 24 dB lowpass filter, the two ADSR envelope generators, one AD envelope, the LFO and mastervolume with a control for the stereowidth. In the digital control section you find a Liquid Crisall Display, a ten-key numeric keyboard (0-9 plus cursor left and right) and in the Display Select part another ten-key function keyboard for calling up different displays or often used display positions.

The work with the PPG WAVE 2.2 is based on the perfect communication of analog, and digital input- and controlelements. You select a function with the cursor, and insert a code with the numerical keyboard. You also can change parameters with the analog controls like playing a conventional synthesizer. Using this princip, it was possible, to have the functions of 48 routing controls, 69 switches with up to 99 switch-positions and 22 On/Off switches on the frontpanel of the PPG WAVE 2.2 !

The 8 controls for the two ADSR envelope generators, have two functions. You activite the second function of these controls by switching into the "second panel" with the key PANEL in the section DISPLAY SELECT. The PPG WAVE 2.2 wouldn't be so compact, if the controls of the second panel would have been layed seperatly. Primary the second panel is for the Digital Recording System and not so often in use. By switching into the second panel, the ADSR functions of these controls are switched off, and the new function MULTI PARAMETER MIXING is activited (CH 1 - CH 8).

Under each program number, there are stored always two different sounds. To have a control about which of these two sounds you are just modifying, there are two LED's in the center of the control panel - Group A and Group B. When both are ligthing, you are changing the sounds of group A and B at the same time. You are changing the selected group by pushing the key GROUP in the section DISPLAY SELECT. The third LED below the "Group LED's" lights, when you have switched into the second panel (with the key PANEL in the section DISPLAY SELECT).

All analog controls have are quantised to be understandable for the computer (changed into digital words). After calling up a program, the positions of the control-knobs are not the actual positions of the new heard sound. Finally after turning one control the position of this control becomes actual (by possibly changing the sound). You only modify the sound (workmemory) with the corresponding control without changing the programmed sound (program-memory). By calling up the program again, you return to the original sound, stored in memory.

Now please switch on your PPG WAVE 2.2. You find the power switch on the rear panel. The display shows:

```

PROG: 0 WAVETABLE: 0 DTF:0 KEYB-SPLIT: 0
KEYB:0 TTUNE:440 CASS:0 PPG-WAVE 2.2 VO

```

Behind the first word PROG you will see a line, which gives you the position for inserting codes. This line is called CURSOR and is the adress for communication with the PPG WAVE 2.2. The CURSOR is moveable with the two "arrow" keys (left and right) in the 10-key numerical keyboard. If the Cursor position is behind PROG:, you can insert a number for calling up a program. In the last chapter of the Owners Manual you find the table of presets programed by PPG. All memory places are user-programable, all presets can be overwritten, as you need the memory capacity.

Please move the cursor to the next position in this display. The position WAVETABLE determines one of the 30 wavetables (Numbers 00-29). Each wavetable contains 64 different waveforms which is the basic sound-material of the Synthesizer (a conventional Synthesizer has 3 or 4 different waveforms, the PPG WAVE 2.2 has more than 1800 plus the 4 conventional waveforms). The next input position DTF = DATATRANSFER is a codeword for the internal "Dataflow". At this position you can insert codes which for example mean "Store" or "Transfer only special parts of informations ; parts of a program". The insert position KEYB. defines how many keys of the keyboard activate how many and which voices. KB-SPLIT determines the split point of the keyboard. For tuning all voices (the complete WAVE 2.2) you can insert the "A" frequency between 400 Hz and 499 Hz in the position TTUNE = Total Tuning. Standart tuning is 440 Hz.

The insert position CASS = Cassette activates the transfer of Data to and from a Cassette Recorder connected to the DIN

junction on the rear panel of the PPG WAVE 2.2. The last words in this display will show you the model name, and a version number, which is quite important for later developments of PPG, specially for the combination with components of the WAVE-TERM system.

Please insert the number of the wished program behind PROG. You can start with number 00 and play all programs up to number 99, to hear some sound possibilities of Your new Synthesizer. After inserting the program number the cursor jumps back to the first digit, to be ready for the next insertion. It is very easy to call up one program after the other (live). In a concert you only need to call up the ready and assorted programs with the ten-key keyboard or just by stepping through the memory with the footswitch connected on the rear-panel-junction "PROGRAM".

Because all functions are storeable and all parameters are directly editable with the analog and digital controls this Synthesiser is easily useable in any live performance. The display shows, which program is activ, which wavetable the sound is using, in which keyboard mode you are working and where the keyboard is splitted. You can directly see, if your PPG WAVE 2.2 is tuned correct. Because the oscillators of the WAVE 2.2 are completely digital it never will detune.

Compare the meanings of the codes with the tables written on the control panel of the WAVE 2.2. A display could look like this:

```

PROG:31 WAVETABLE:24 DTF:0 KEYB-SPLIT: 0
KEYB:1 TTUNE:440 CASS:0 PPG-WAVE 2.2 VO

```

You are in the Program 31. The sounds comes from the wavetable 24. The keyboard is working 4-voice polyphonic with two sounds together on each played key (group A + B). The first modification you could do is to change the keyboard mode to 8-voice polyphonic with one sound under each played key. Enter code "0" behind KEYB. Moving to this insert-position could be done by stepping the cursor, or directly by pushing the key KEYB in the DISPLAY SELECT panel. Now you hear all 8 voices play the same sound. With the LED's GROUP you define, which sound you are hearing (Group A or group B). If both LED's are lighting, you don't hear both sounds, (because of the keyboardmode 0) but the last activated group. Decide, which group you want to modify (Key GROUP in the DISPLAY SELECT section). With the Key GROUP you switch in the succession group A, group B,

groups

A+B. In the last position the analog controls change parameters for both groups parallel.

This GROUP key, the three LED s and the PANEL key are having a central consideration in playing the PPG WAVE 2.2.

- MAIN PANEL -

The main functions of the WAVE 2.2 you find in this panel, which are used after calling up a new programm. These are the shape of the envelopes, the amount of modulation (ADSR) of the filter cutoff and the loudness, the direct control of the sound with the potentiometers VCF-CUTOFF, VCF-EMPHASIS, WAVES-OSC. and WAVES-SUB, the third envelope and the LFO controls. These elements can be used like they are used in any Synthesizer, with the direct hearable result. Always remember the keyboard mode, you play two sounds and have to decide, which one (Group) you want to modify.

Please change the shape of the loudness envelope (envelope 2) with the controls ATTACK Time = the rise time of the envelope (voltage). DECAY Time = first decay down to the SUSTAIN Level = which holds the loudness on a level as long as a key is pressed and the RELEASE Time = the ending decay from the sustain level down to "0" = no loudness. These PPG envelope generators work different to normal envelopes. In the first part of the ATTACK control way, from analog value 00 to analog value 31 (see ANALOG DISPLAY) the ADSR works normal. From value 31 up to value 63 of the ATTACK control the DECAY and SUSTAIN parts of the ADSR are switched off and the RELEASE time is directly activated after the ATTACK time. This gives the function of an automatic envelope, for long attack times. You just hit the key on the keyboard, and the envelope is running through the hole range by itself. The envelope 1 works in the same way but is controlling the CUTOFF frequency of the lowpass filter and the waveform of the oscillators (for dynamic soundchanges during the time of one played note). Up to 64 waveforms can be run trough, corresponding to the position of the control ENVELOPE-WAVES. This effect is new and cannot be done with conventional Synthesizers.

Now you have made a lot of changings in the sound you have first called up. To go back to the beginning (the stored sound), you only need to call up the same program a second time. Press the key PROG (Display Select) and insert the program number. The Display shows again:

PROG:31 WAVETABLE:24 DTF:0 KEYB-SPLIT: 0
 KEYB:0 TTUNE:440 CASS:0 PPG-WAVE 2.2 VO

Decide, which GROUP you want to modify.
 Change the shape of louness control: ADSR-ENVELOPE 2;
 control: ENVELOPE 2-VCA.
 Change the shape of the filter envelope control:
 ADSR-ENVELOPE 1; control: ENVELOPE 1-VCF
 Change the filter cutoff by hand control: FILTER CUTOFF;
 control: FILTER EMPHASIS
 Be carefull in using the filter emphasis. In maximum
 position the filter starts to resonate (Sinuswave).
 Change the waveforms by hand control: WAVES OSC and WAVES
 SUB
 Let the waveforms be controlled by the envelope 1 control:
 ENVELOPE 1-WAVES

After you have changed a program, and found a new
 interesting sound, you can store the new sound in the
 program-memory with its own program number. Press the key
 DTF in the Display Select section and insert code 9 behind
 this position. Now press the key PROG and insert your new
 number behind PROG. Take 99, to store the sound under this
 number 99.

You could go on working with sound 99 or you go back to
 program 31 to start a new modification. You can, of course,
 store a modified sound under the same number but then you
 lose the old sound under this program number.

Before starting to store programs we would like to commend
 you to listen to all preset sounds and to write down free
 memory places. There are also a lot of interesting presets
 which you might use and want to save. Or you first record
 all programs (the memory contents - digital informations) on
 tape. (Read Chapter CASSETTE).

All wavetables contain the wellknown waveforms triangle,
 pulse, squarewave, and sawtooth under the positions 60 - 63.
 Listen to the wavetables by calling them up and running
 trough by hand with the control WAVES-OSC and WAVES-SUB.
 Turn the control ENVELOPE 1-WAVES to "0" for this procedure.

See what the keyboard can do by playing with different
 keyboard modes. Behind KEYB, you can insert the following
 codes:

- 0 - 8-voice polyphonic, all voices are controlled
 by the same group A or B (group switch)
- 1 - 4-voice polyphonic without keyboard split, 4
 oscillators

- under each key (2 + 2 Sub) at one time.
 The oscillators 1.3.5.7 and their suboscillators are controlled by group A.
 the oscillators 2.4.6.8 and their subosc. are controlled by group B.
- 2 - 2-voice polyphonic without keyboard split. under each key 8 oscillators (4 + 4 Sub) at the same time.
 The oscillators 1.3.5.7 and 1 Sub.
 3 Sub.5 Sub.7 Sub are controlled by group A.
 the oscillators 2.4.6.8 and 2 Sub.4 Sub.6 Sub.8 Sub are controlled by group B.
 - 3 - 1-voice (monophon) without keyboard split. under each played key 16 oscillators
 the oscillators 1.3.5.7 and their Sub's are controlled by group A. the oscillators 2.4.6.8 and their Sub's are controlled by group B.
 - 4 - Keyboard split at "SPLITPOINT".above and below 4-voice polyphonic. In the upper part the voices 1.3.5.7 are controlled by group A. in the lower part the voices 2.4.6.8 are controlled by group B
 - 5 - Keyboard split at "SPLITPOINT". the upper part is monophonic with 4 osc.+ 4 sub's (voices 1.3.5.7). controlled by group A. the lower part is 4-voice polyphonic with the voices 2.4.6.8. controlled by group B.
 - 6 - Keyboard split at "SPLITPOINT".the upper part monophonic with 2 voices (1,3) controlled by group A. the lower part 6-voice polyphonic with the voices 2.4.5.6.7.8 controlled by group B.
 - 7 - Keyboard split at "SPLITPOINT".the upper part 6-voice polyphonic with the voices 1.3.5.6.7.8 controlled by group A. the lower part monophonic with the voices 2 and 4. controlled by group B.
 - 8 - Keyboard split at "SPLITPOINT".the upper part monophonic with 4 voices (1.3.5.7) controlled by group A. the lower part monophonic with the voices 2.4.6.8, controlled by group B.

Remember the LED's in the section PANEL FUNCTION. They show you,which group you are just controlling (modifying) or hearing.

For the keyboard modes 4 - 8 it is necessary to insert a keyboard split position. Call up the display position

KB-SPLIT

and insert a number, where the keyboard has to be splitted. Group A is always played on the upper part. group B controls the lower keyboard part. Keyboard split is useful in many applications, for example: transposing the Digital Recording System (Sequence) with the lower part, while playing a solo melody on the upper keyboard part, or playing a bass line on the lower and polyphonic chords on the upper part.

The DIGITAL Display

The DIGITAL Display controls 16 switch functions, some with only ON and OFF functions, others which work like rotary switches with more positions.

In this display you control the modulation sources and destinations. These are the LFO, envelope 3, the keyboard and the touchsensor. The amount of modulation from the LFO is controlled by the modulation wheel on the left side of the keyboard.

The DIGITAL Display shows:

```

PROG: 0  UWO SWO KWO KFO KLO MWO MFO MLO
GROUP:A  BDO BIO TWO TFO TLO TMO VFO VLO

```

The abbreviations have the following meanings:

SOURCES

K	- Keyboard
M	- Modulation (LFO)
T	- Touch-Sensor
V	- Velocity-simulator
B	- Bender

The keyboard can be used for tracking the Cutoff frequency of the filters, controlling the VCA's (loudness) and the waveforms of the oscillators and suboscillators.

These SOURCES can modulate the following parameters:

DESTINATION

W	- Waves
F	- Filter - VCF lowpass
L	- Loudness - VCA
M	- Modulation intensity

In the digital display you can read what combinations are possible

for example: TM = touch sensor to modulation depth = if you press a key stronger, the amplitude of modulation rises. In this way you can add realistic vibration by pressing a key stronger. For this combination you can insert the codes 1 or 0 (on or off). For some combinations you have more possibilities. In the table you can see, where you can insert which code:

- UW - by inserting a 1, you switch from normal wavetable to UPPER waves. This wavetable can be entered from any program you want and gives you the most interesting waves from all other wavetables. If both groups of the program can use the upper wavetable you should set WAVETABLE to 30. This is just a flag for the computer to know that no wavetable has to be loaded when loading this program. That means: if you select a program with WAVETABLE 30, you will get no delay, because no wavetable has to be loaded.
- SW - here you can insert the codes 0 - 3. You are controlling the waveform of the suboscillator.
- 0 - the number of waveform runs parallel to the number of waveform of the oscillator plus the position of the control WAVES-SUB
- 1 - the waveform of the suboscillator is only determined by the control WAVES-SUB
- 2 - instead of envelope 1 the envelope 3 is now controlling the waveforms of the suboscillator
- 3 - the suboscillator is switched off.
- KW - here you can insert codes from 0 to 7. The keyboard is controlling the waveforms of the oscillators.
- 0 - the effect is switched off. All keys on the keyboard have the same waveshape.
- 4 - middle amount of effect. If you play the lowest C on the keyboard, you hear the waveform, which is set by the WAVES-OSC control. Every key higher calls up one wave backward trough the wavetable. If you put the WAVES-OSC control on waveform 63, you have another waveform under every key.
- 5-7 - stronger amounts
- KF - here you can insert codes from 0 to 7.

- 0 - no effect
 3 - the cutoff increases like 1 V/Oct.
 7 - the effect is like 2 V/Oct.; one octave higher on the keyboard opens the filter for two octaves.
 1.2.4.5.6 - different amounts
- KL - here you can insert codes from 0 to 7.
 4 - no effect - the loudness is the same on every key trough the whole keyboard
 0 - on the highest key you have the full loudness. the keys lower are more silent.
 7 - on the lowest key you have the full loudness, every key higher is more silent.
 1.2.3.5.6 - different amounts
 It is useful to set the ENV 2 - Loudnes control lower then maximum. to get best results.
- MW,MF,ML - here you can insert 1 or 0 (on or off). the amount of modulation is controlled by the modulation wheel. ML is not controlled by the wheel - only switched ON or OFF.
- TW,TF,TL, TM - here you can insert 1 or 0 (on or off) by pressing a key you can control the amount of modulation. shifting the waveform. changing the Cutoff or the loudness
- VF,VL - the amount of this effect is controlled by the touch (pressure) of the keyboard. If a new key is pressed the total touch intensity is assigned to that voice. You can insert the codes 1 or 0 (on/off).
- BD - Bender Destination
 0 - off
 1 - Pitch
 2 - VCF (Cutoff)
 3 - Waves
 4 - Pitch Sub oscillator
 5 - Pitch + VCF
 6 - Pitch + Waves
 7 - VCF + Waves
- BI - bender intervall
 0 - second (1 tone)
 1 - terz
 2 - quinte
 3 - octave

The LFO contains the waveforms triangle, positiv and negativ sawtooth and rectangular wave. The controlles are RATE (LFO frequency), WAVESHAPE and DELAY. The modulation depth is determined by the position of the modulation wheel. The amount of modulation (position of the modulation wheel) is programable, and works in the same way as the controls of the analog panel.

For changing the frequencies (tuning) of the oscillators you have to select the TUNING Display (TUNING key - Display Select).

TUNING Display

The frequencies of each voice can be changed seperatly. Therefor you find 8 insert positions in the tuning display -SEMIT.-. The TUNING Display shows:

```

PROG: 0 DETU:0 MO:0 MS:0 EO:0 ES:0 BI:0
GROUP:A SEMIT:  0 0 0 0 0 0 0 0

```

In the second line you can seperatly tune each voice. This can be done with the 10-key keyboard or directly with the keyboard. The lowest key has the number 0, the highest the number 60. Please notice, that the cursor jumps from one voice to the next voice when inserting the tunings with the keyboard and you have to insert tunings for all voices before this function is finished. Otherwise you detune the remaining voices when playing on the keyboard. When the tuning function is finished the cursor jumps back to the insert position PROG. For tuning all voices you have also to change the groups (the voices 1,3,5,7 are group A, the voices 2,4,6,8 are group B). Very interseting is this function in the keyboard mode 3. The keyboard is monophonic and you can tune the voices to a chord and play this chord with one key.

To add a DETUNE effect between oscillator and suboscillator you can insert the following codes behind DETU:

- 0 - no detuning
- 1 - very soft detuning
- 2 - soft detuning
- 3 - detuning
- 4 - strong detuning
- 5 - interval QUINTE (5 semitones)
- 6 - interval 1 OCTAVE
- 7 - interval 2 OCTAVES

When you are playing without the Suboscillators, and in keyboard mode 1, you can realise an "out-of-tune" effect by modulating the oscillators from group B with the third envelope. - switch off the Suboscillators: Digital Display SW: "3" (for both groups). - enter keyboard mode "1" - switch on envelope 3 to detune the oscillators of group B : Tuning Display: EO "1" - envelope 3 settings: Attack "0", Decay "10", ENV 3 ATT "6".

In the upper line you determine the modulation of the pitch. The abbreviations have the following meanings:

MO	- modulation oscillator
MS	- modulation suboscillator
EO	- envelope 3 to oscillator (pitch)
ES	- envelope 3 to suboscillator (pitch)
BI	- bender interval

The envelope 3 can modulate the pitch of the oscillators and the suboscillators. The shape of this envelope is controlled by a ATTACK and DECAY time. The control ENV 3 ATT determines the amount of modulation. When controlling the pitch, this control has a positive and negative effect and position 5 is a center position with no effect. Turning clockwise increases the positive effect, turning counterclockwise increases the negative effect.

When modulating the waveform of the suboscillator, (parameter SW), the pitch bending effect is switched off. The potentiometer then works normal: position 0 = no effect, position 10 = strongest amount of modulation. You activate this function by inserting a "2" behind "SW".

The ANALOG Display

The analog display shows all control positions of the MULTIPLE FUNCTION ANALOG PANEL. After calling up a program, the stored "positions" of each control are written out. When moving one control of the analog panel, the actual control position will be taken (possibly changing the sound) and written out. You also can change parameters in this display by calling up a position with the cursor and inserting amounts with the 10-key numerical keyboard.

```
P: 0 0 0 0 0 0 0 0 0 0 0 0
GR:A 0 0 0 0 0 0 0 0 ** 0 0 0
```

Datatransfer

DATATRANSFER is a routing function for the internal data flow. With this function you can move parts of a complete sound-program. Use the following procedure:

Before inserting the program number, from which you want to get the part of the program, enter a code (which you can find in the list below) behind "DTF" and go back to the display position "PROG" to call up the programnumber.

The codes behind DTF stay until you insert another code or leave the DTF function by inserting code "0". This is useful for changing sounds while the sequencer is running, or while playing on the keyboard with keyboard-split, and only changing one part of the keyboard-sound. Note that all datatransfer's from 1 till 7 will not change the wavetable, and therefore need very little time. (no delay while changing the sound).

For final storage, of the new created program, insert code "9" for DTF, and enter the new programnumber.

The DTF codes have the following meanings:

- 0 - the complete program will be loaded into the work-memory
- 1 - the data of group A and B are loaded into the workmemory. The wavetable, keyb.mode and splitpoint are unchanged.
- 2 - the data of group A is loaded into the workmemory on group A. Group B, wavetable, keyb.mode and splitpoint are unchanged.
- 3 - the data of group B is loaded into the workmemory on group B. Group A, wavetable, keyb.mode and splitpoint are unchanged.
- 4 - the data of group A is loaded into the workmemory on group B. Group A, wavetable, keyb.mode and splitpoint are unchanged.
- 5 - the data of group B is loaded into the workmemory on group A. Group B, wavetable, keyb.mode and splitpoint are unchanged.
- 6 - the data of group A is loaded into the workmemory on both groups A+B. The wavetable, keyb.mode and splitpoint

- are unchanged.
- 7 - the data of group B is loaded into the workmemory on both groups A+B
The wavetable, keyb.mode and splitpoint are unchanged.
- 9 - The complete program is loaded from the workmemory into the program-memory under the defined programnumber.
With this DTF code you store your own programs.

Sequencer

In the SEQUENCER display, you can activate the ARPEGGIO functions and the 8-track DIGITAL RECORDING SYSTEM. The display shows:

```
PROG: 0 SEQM: 0 LOOPS: 0 RECM:0 TIMCOR:0  
RUN: CH 1:3 2:3 3:3 4:3 5:3 6:3 7:3 8:3
```

The abbreviations have the following meanings:

```
SEQM    - sequence/arpeggio mode  
LOOPS   - determines the number  
          of repetitions  
RECM    - codes for recording  
          and storing  
TIMCOR  - to determine the time  
          correction  
RUN     - start and stop functions  
CH      - the 8 channels (voices)  
          of the DIGITAL RECORDING  
          SYSTEM
```

Behind SEQM you enter a code from the following table to define an arpeggio. The first number determines the mode:

```
1 = normal run  
2 = running with inversions
```

The second number determines the way of chord dividing:

```
1 = up  
2 = down  
3 = up and down  
4 = random  
5 = moving
```

Code 14 means an arpeggio with an random chord dividing. The notes must be played one after the other and hold until all keys for the chord are played. To change the speed you have to go into the second panel and use the control of the LFO frequency which is now called SEQU-rate.

Behind SEQM you can insert also the following codes:

```
99 = returns to the normal keyboard playing mode  
     reassigns all voices to the keyboard  
98 = activates the external control connections  
     TRIG IN and CV IN on the rear panel
```

While listening to a sequence or arpeggio (playback), you can change all parameters of the sound like normal

Synthesizer playing (shape of envelopes, Filter, VCA, Waves and modulations) by using the main panel.

Start the arpeggio by inserting the code 1 behind position RUN. You can use the following codes:

- 0 = stops the arpeggio or sequence
- 1 = starts the arpeggio or sequence from the beginning
- 2 = starts the arpeggio or sequence without reset

The PPG WAVE 2.2 can store up to 10 sequences, each with up to 8 voices. The total storage capacity is 1000 notes. Before starting to store (insert) sequences, we would like to commend you storing all sound Data (the sound programs) first on Cassette to have the sound programs separately from the sequence informations and to save the programs. Please read chapter CASSETTE INTERFACE for this operation.

If you want to go back to normal Synthesizer playing, insert code 99 behind SEQM.

Before inserting the sequencer function, choose the program you want to have the sequence played with. Percussive sounds are more qualified for inserting new sequences to hear each tone separately. The eight tracks of the DIGITAL RECORDING SYSTEM can be recorded track by track monophonic or polyphonic. Note that the length of track 1 determines the total length of the complete sequence.

Monophonic Recording

Recording the first track

Press the key SEQUENCE in the DISPLAY SELECT section. The cursor moves behind SEQM. Enter the number of the sequence you now start to record (00-09).

Move the cursor to the position RECM = Record Mode. Enter code 1, which means you want to start a new sequence. Behind RECM you can insert the following codes:

- 0 - no function
- 1 - starting a new sequence. The old sequence under this sequence number will be deleted.
- 2 - Update sound and memory during playback of the final-recorded

- sequence. The loudness, filter, waves or pitch can be changed and stored in memory. This function will be automatically stopped at the end of the sequence.
- 8 - For clearing the complete sequence memory, and initialising the DRS. To do this, the 8 has to be pressed two times, for your safety.
 - 9 - The channel update parameters are stored in memory. This applies only to the second update - sound.

After you have inserted code 1 behind RECM, the computer automatically sets TIMCOR to 1, and CH 2 (voice with group B) into recording condition (code 1). Now you are ready to record the first track.

TIMCOR is a function for correcting the played notes which are not in time to the beats of the metronom. If you insert a "0" behind TIMCOR, the correction is switched off. For the first track this is not allowed ! Behind TIMCOR you can insert the following codes:

- 0 - no time correction
- 1 - all played notes are corrected to the beats of the metronom
- 2 - the played notes are corrected to the double speed of the metronom. This time correction you should choose, when you are playing twice as fast as the metronom.
- 4 - the played notes are corrected to a fourth of the metronom beat. This time correction you should choose, when you are playing four times as fast as the metronom speed.
- 8 - the played notes are corrected to the eighth of the metronom beat. This time correction you should choose, when you are playing eight times as fast as the metronom speed.

Behind the CHANNEL positions (second line in the sequencer display) you can insert the following codes:

- 0 - normal playback of the recorded track
- 1 - record, to record notes and to add notes on this channel
- 2 - edit, to delete single notes or a complete track
- 3 - off, to switch off voices from the arpeggio. these voices are free for keyboard playing

- 4=5 - update pitch positiv, to move the pitch of a voice with the multiparameter mixing
- 6 - update loudness
- 7 - update filter
- 8 - update waves
- 9 - update filter-envelope attenuator, for changing the amount of envelope modulation to the filter

The codes 1-3 are functions for recording, the codes 4-9 are functions of the multiparameter mixing and sound-updating.

Press the RUN/STOP button in the section display select. Enter code 1 to start the sequence. Now you hear the beats of the metronom. Play 4 notes now, which will not be reproduced in playback, but will be heard in every following recording procedure. These 4 notes will help you finding the beginning of the sequence. It is also commendable, to play the 4 notes on a totally other part of the keyboard than the sequence, to easier identify the prebar. Directly after these 4 notes the sequence recording begins. Now play your sequence and end the recording with pushing the RUN/STOP button in time (in the rhythm). This marks the end of the sequence. If the sequence is played back with loops it is important that the end is defined proper. Therefore you should press the RUN/STOP button directly on, or short before the metronome beat of the next bar.

All following tracks can only be as long as track 1. The recording of track 2 - 8 are stopped automaticly at the "end" mark you've set by pushing RUN/STOP. During playback you can change the speed of the sequence. It is easier to record a sequence with a lower speed and playback with the wished speed. The recorded tracks (CH) show the code "0". Also RECM becomes "0" when the recording of track 1 is finished. To record the tracks 2 - 8 don't insert a 1 behind RECM again, you would delete the first track again. Go directly behind the next CH position and insert code 1 to record the next track. Start the sequence again, the "prebar" can be heard and start recording the new track.

Playback of a sequence

Choose the sound program you want to hear the sequence played with. Choose the sequence by inserting the number behind SEQM. Enter the number of repetitions behind LOOPS (00-99). You can insert the following codes:

- 1- 98 - the wished number of repetitions
the remaining number will be read out
when you push RUN/STOP or SEQUENCE.

99 - the sequence will be repeated endless

The sequencer internally counts backwards the number of repetitions. If you want to know the remaining number you have to push RUN/STOP or SEQUENCE and the number will be shown behind LOOPS.

Deleting a complete sequence

If you don't like the complete sequence and you want to start new, insert code 1 behind the position RECM. All CH position show the code 3 again and you can start from the beginning.

Deleting single tones or a complete track

If you don't like a track in a sequence insert code 2 (edit) behind the channel and start the sequence. For deleting tones start the sequence, and while it is running, push the RUN/STOP button just for the time the tone, you want to delete, is playing. To delete a complete track hold the button RUN/STOP through the total time of the sequence length. Note that you first have to start the sequence by inserting a "1" on the RUN position, and then you may start deleting, by holding the RUN/STOP button. It is not allowed to press the RUN/STOP and the "1" at the same time.

Posibilities with TIMCOR and CHANNEL MODE 1

Channel mode 1 is always a recording mode. This mode makes it also possible to record more than one time on the same channel. Here is an example: After you have recorded a track, you can add tones between the first recorded notes by inserting code 1 behind the CH and starting the sequence. Into the breaks between the recorded notes you can now add tones. You can't add tones on positions, where already notes exist. For changing a note, you have to delete the tone by inserting code 2 (edit) and pushing the RUN/STOP button in the above explained way. Then you can add the new note.

Using an external sequencer

Via the connections C.V. IN and TRIG IN you can let the voices of group B be controlled by an external sequencer. Follow the steps in the same succession:

-Connect the PPG WAVE 2.2 to the sequencer:

PPG WAVE 2.2	-	SEQUENCER
C.V. IN	-	CV OUT
TRIG IN	-	TRIG OUT (GATE OUT)

-Switch on the sequencer first and then the PPG WAVE 2.2. The WAVE 2.2 analyses the kind of trigger, the sequencer is working with (Switch- or +/- Voltage Trigger) only in the power-on moment. Make shure, that a "0 Volt Ground" is exactly "0 Volt", to get a perfect function. Enter the SEQUENCER DISPLAY and insert the following codes:

- behind SEQM : "98" ; automaticly the keyboard split is set to "24" and all CH (voices) are set to "0" (Sequencer Display - lower line).

- behind KEYB : "4", "5", "6", "7", or "8" ; the sequencer can only ccontrol the voices of group B (see keyb.modes). These voices are played in the lower part of the keyboard and you can transpose the sequencer with these keys. (you can self-evident take another split point, if you need).

- behind the CH positions of the group B-voices insert code "3" to decide, which voices have to be controlled by the external sequencer. The remaining voices of group A can be normaly played on the upper part of the keyboard.

Start the external sequencer (by pushing the start knob). Make the pitch settings while the sequence is running. A "single-step" function to tune the steps is not possible, because the ANALOG-DIGITAL-CONVERTER (at the input of the CV and TRIG) takes only the voltage from the sequencer in the moment of an active trigger pulse.

The UPDATE functions, described in the next chapter, are not useable when an external sequencer is connected.

SOUND UPDATE

(Multiparameter Mixing)

After you have finished to program a sequence you can change any parameters individuelly and seperatly for each track using the eight analog controls CH 1 - CH 8 of the second panel. If you want to have these changings stored into the sequencer memory, you use the "main update". If you don't

want to fix the update function in the memory, use the "sound update". While you can use different parameters for the different channels, the function is called: "multiparameter mixing". The main- and sound update function can be used for each one of the eight tracks.

In the following explanation we are working with a four voice sequence using the voices of group A (voices 1,3,5,7). Please record a sequence on these tracks. After you have finished recording you find CHannel code 0 on each channel. The remaining tracks show code 3 and these voices are free to be playable with the keyboard.

Stop the sequence and insert code 6 for the channels 1,3,5,7 for update the loudness. After you have started playback again, you can now mixdown the sequence using the analog controls CH 1,3,5,7 in the second panel. You also can use them in different combinations, for example track 1 update loudness, track 3 update filter, track 5 update wave and so on. When stopping the sequence, the updated parameters are automatically set to normal condition.

Code 4/5 = Update Pitch

This update function makes a pitch control with the analog controls during playback possible. You can work with the analog controls like an analog sequencer.

Code 6 = Update Loudness (explained above)

Code 7 = Update Filter (Cutoff)

The cutoff frequency can be changed by inserting code 7. The analog controls work for this update function positiv and negativ. The neutral control position is the "12 o'clock" (center) position (analog display value 32). Turning clockwise increases the cutoff, turning counterclockwise decreases the cutoff frequency.

Code 8 = Update Waves

The waveform can be changed during playback for each track. Compare this function with the control WAVES-OSC.

Code 9 = Update Filter Attenuator

The amount of the first envelope controlling the filter can be changed with the analog control for each track during playback. Compare this function with the control ENVELOPE - VCF.

Sound / Second Update

Enter the codes (4-9) behind the wished channels and start the sequence. Update with the corresponding CH analog controls in the second panel. The second update is just a manual update and is not stored in the memory.

RECORD MODE 9

To store the update codes for the second-update in memory, you can enter code 9 behind RECM. This operation also stores the sequencer speed, the number of loops, and the keyboard-splitpoint, under the current sequence number. When selecting this sequence again, all the parameters will be loaded from the memory automatically.

Sound / Main Update

Test the wished functions (explained under sound/second update). Insert code "2" behind RECM. Start the sequence and make the update in the second panel. The update value for each tone is now stored in the memory. They can be overwritten as often as you want just changing the update parameter for the voices, setting RECM to 2, and updating again. Note, that a parameter, which is used in MAIN Update (and stored) cannot be used for the same voice in Sound Update.

To leave the sequencer- and arpeggio functions insert code 99 behind SEQM and the PPG WAVE 2.2 will be a normal polyphonic Synthesizer again.

Polyphonic Recording

To record a polyphonic sequence, you first have to record a monophonic reference track like described under monophonic recording. Therefore insert code 1 behind RECM. Channel 2 shows code 1. Start recording by inserting code 1 behind RUN and play the four notes prebar. Record the reference track as long as the polyphonic sequence will be, because the polyphonic recording will be automatically be stopped at the end of the reference track. After you have finished recording of the reference track, you have to decide how many voices you want to record on the polyphonic sequence. This is done by inserting the corresponding code behind Keyboard-mode:

- 8 voices with KEYB: 0
- 4 voices with KEYB: 4 (group A)
- 8 voices parallel at the same time, with KEYB: 3

Now set RECM to 3. The display shows in the second row, the channels which will be recorded. Start recording by inserting code 1 behind RUN and begin playing after the four notes prebar.

Cassette Interface

All sound- and sequencer informations can be stored on a normal cassette recorder to archive complete sets of programs or sequences. On the back panel you find the 5-pin DIN connector called "CASSETTE". Connect a DIN wire to the "RECORD/PLAYBACK" DIN jack of your Cassette recorder and the PPG WAVE 2.2. The digital informations of the sounds and the sequencer can be stored seperatly an cassette.

Dumping data to the cassette recorder

For transferring the digital informations to the cassette move the cursor to the position "CASS" (main display). Start the cassette in recording mode. Enter code 2 behind "CASS" and adjust the recording level a small amount below 0 dB. The tape-source switch should be on position for "normal" tape. Record without Dolby. After about 2 minutes of data recording code 2 behind "CASS" becomes "0" again, showing the end of data transferring function. To transfer the sequencer memory contents onto cassette, insert code 3 behind "CASS".

It is only possible to transfer the complete sets of sound- or sequencer programs. Single programs are not transferable.

The following codes can be inserted behind "CASS":

- 0 - no function
- 1 - the sound or sequencer programs are loaded from cassette into WAVE 2.2 memory
- 2 - all 100 sound programs are dumped onto cassette
- 3 - all sequencer programs are dumped onto cassette
- 4 - the data on cassette are compared with the data memorised in the WAVE 2.2 if an error is detected, the display shows "9".

"test run"

In order to make quite shure, that all digital informations are in the right way transfered onto tape, you have the possibility to compare the recorded data with the WAVE 2.2 memory contents. Rewind the tape and switch the

tape/cassette player to playback. In the moment you are hearing the test tone, insert code 4 behind "CASS". If this code doesn't change to code "9" during playback and goes back to code "0" after the data set has been run through, the digital information is well recorded on tape. If the "9" appears, you have to record the complete data set again after finding the reason of errors: connections, wire, record level ?

PPG WAVE 2.2 CONNECTIONS

All connectors are on the back panel of the PPG WAVE 2.2. It is possible to control functions with a footswitch, to keep the hands free for playing on the keyboard. Have a look to the back panel. On the right side you find the power switch. Beside the switch there is the power cord and the fuse (0.2 Amp. 220 V slowblow, or if the instrument is set to 110 Volts: 0.4 Amp. 110 V slowblow)

From left to right you find the following functions:

- | | |
|------------|---|
| CASSETTE | - 5-pin DIN junction for connection to the cassette recorder for saving sound- and sequence data. |
| PHONES | - stereo standart headphone jack |
| CH 2 | - output 2 (stereo-left), mono standart jack |
| CH 1 | - output 1 (stereo-right), mono standart jack |
| SUSTAIN | - standart jack for connecting a footswitch. Sustainpedal |
| C.V. IN | - control voltage input for external voice control.
Please read chapter SEQUENCER for more information. |
| TRIG IN | - trigger input. standart jack, corresponding to the C.V. IN |
| TRIG OUT | - trigger output from the keyboard for controlling external devices |
| PROGRAM | - standart jack for connecting a footswitch to step from one program to the next |
| CLOCK-RATE | - 8 miniswitches to devide the sequencer clock, corresponding to the DIN output RHYTHM. For changing the clock-synchronisation between sequencer and connected Rhythm-devices |

external 4 miniswitches to define internal or
 external clock modes.
 RHYTHM - DIN jack for the connection to the
 external rhythm device like ROLAND TR-808,
 the jack contains the start/stop signals
 and the clock pulses
 PPG COMMUNICATION BUS - PPG multicore jack
 for the connection to the PPG WAVE-TERM,
 PROZESSOR KEYBOARD and other components
 of the WAVE-TERM system.

After making the power connections, switch on the PPG WAVE 2.2. Connect your WAVE 2.2 to your stereo amplification system (Amplifier, mixing desk).

The loudness for the headphones are controlled with the volume control on the front panel.

For external control (analog sequencer or external digital sequencer) connect the CV out to the C.V. IN of the WAVE 2.2 and the trigger/gate out to the trigger in. Enter code 98 behind SEQM and decide, which channel shall be external controlled by inserting code 0 behind the channels (sequencer display line two). These channels are then disconnected from the keyboard. Insert keyboard mode "4".

Connect the trig-out of the WAVE 2.2 with the gate-input of an analog system. You can control functions, by playing on the keyboard of the WAVE 2.2.

When you have prepared all programs at home, assort them, how you need them during your live performance and connect a footswitch to the standart jack "PROGRAM". Now you are able to call up one program after the other just by pressing the footswitch and you have your hands free for playing on the keyboard. The 10-key keyboard is still activ in all functions.

DIN connector "RHYTHM" and microswitches "CLOCK RATE"

On the back panel beside the DIN junction RHYTHM you find two switch-boards. the bigger one with 8 switches we call 8-switch-board, the smaller one on the right 4-switch board. With the 8-switch-board you can divide Clock pulses to control an external Rhythmunit or analog-sequencer. Connect the external Rhythmunit with a 3-pin DIN wire to the WAVE 2.2's Rhythm DIN junction. To connect a taperecorder (beginning with serial number 01180) it will be possible to control the WAVE 2.2's sequencer with on tape recorded clock pulses. Use a special 5-pin DIN plug (wire). The pins of

the DIN junction Rhythm are used as follows:

pin 1 = Start/Stop (output of the WAVE 2.2 RUN-function)
 pin 2 = Ground
 pin 3 = clock out (output of the WAVE 2.2 clock)
 pin 4 = reserved
 pin 5 = Clock in (input for a external clock
 like pulses from tape....)

For all PPG WAVE 2.2 beginning with serial number 01100 use the following switch positions:

The PPG WAVE 2.2 controls an external Rhythmunit (Roland TR-808, Linn Drum...) machines which need 48 clock pulses per bar.

Switchpositions:	4-sw.board	switch 1 on switch 2 on
	8-sw.board	switch 1 on switch 5 on

the switches 3 up to 8 of the 8-sw.board divide the clock with the value 2 each. (switch 3 =1/2, 4=1/4, 5=1/8, 6=1/16, 7=1/32, 8=1/64) Note that only on of these switches at the time may be set ON.

An external Rhythmunit (only clocks with 256, 128, or 64 pulses per bar are useful) or sequencer controls the PPG WAVE 2.2:

switchpositions:	4-sw.board	switch 2 on
	8-sw.board	all switches off

For all PPG WAVE 2.2 beginning with serial number 01180 the following switch positions are effectiv:

The WAVE 2.2 controls an external Rhythmunit or clock pulses shall be recorded on tape:

switchpositions:	4-sw.board	switch 1 on switch 2 on
	8-sw.board	switch 1 on switch 3 on

The WAVE 2.2 is controlled by the pulses recorded on tape:

Original-presets for the PPG WAVE 2.2

September 1982

PROG.	KEYB.	WAVET.	INT.	COMMENT
00	0	00	X	Polysynthesizer
01	0	30	-	perc. Polysynth./ Vibra.
02	0	08	-	perc. polysynth./ Pianet
03	0	08	-	perc. Polysynth./ Pianet
04	0	00	-	Vibraphone with Tremolo
05	0	00	X	Polysynth. short /nasal
06	0	08	-	D 6 / perc. with Quinte
07	0	08	-	Polysynth. short, detuned
08	0	00	-	Resonance-bass
09	1	06	-	Poly with wave-nmodulation
10	0	08	-	A=E.Piano B=Click-Piano
11	1	24	-	Organ with Clickattack
12	0	24	-	A=t. Fender-Piano B=sustained, Tremolo
13	1	12	-	Poly ,strong Filtersweep with emphasis
14	0	28	-	perc. "sync-sound",
15	0	13	-	E.Piano ,Spinett.
16	0	13	-	percussiv DS
17	0	08	-	Piano
18	0	13	-	E. piano
19				
20	0	00	X	Synth
21	0	28	-	Synth. with Pulswidthmod.
22	0	14	X	Synth / Hammond
23	0	24	X	Synth percussiv u. contracussiv DS
24	0	28	-	Synth long with Pulswidthmod.
25	0	27	-	Synth long with wavesweep
26	0	09	-	percussiv with Resonance
27	1	13	-	percussiv abstract
28	0	02	-	percussiv bell
29	0	04	-	percussiv hard, bell
30	0	04	-	percussiv clear
31	0	24	-	Space-bell long
32	1	04	-	bell
33	0	00	-	percussiv calm
34	0	02	-	Xylophon
35	1	02	-	Marimbaphon
36	0	02	-	Vibraphon
37	0	09	-	Poly / Poly with wavesweep
38	3	26	-	Akkord Brass
39	0	00	-	percussiv glass-like
40	1	26	X	Brass 1
41	0	26	X	Brass 2
42	1	26	-	Trumpet
43	0	18	-	perc. / DS long
44	1	26	X	Brass 3 dark
45	0	26	X	Brass long Attack

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PROG.	KEYB.	WAVET.	INT.	COMMENT
46	3	26	X	Brass Akkord
47	1	26	X	Brass mixed
48				
49	0	03	-	A u.B Flute
50	1	16	X	Strings 1
51	1	29	X	Strings 2
52	1	29	X	Strings 3
53	1	29	-	Strings 4
54	0	29	-	Strings abstract
55	1	29	-	Strings abstract
56	1	28	-	Poly with sync-Effect
57	0	15	-	Mouthorgan
58				
59				
60	0	14	-	A=Organ B=Hammond with Percus.
61	0	14	-	Organ with Clickattack
62	0	14	-	Hammond with Leslie
63	0	14	-	Chirchorgan
64	0	14	-	Organ
65	0	13	-	percussiv bright
66				
67	0	14	-	Hammond
68				
69				
70	0	27	-	Choir
71	1	27	-	mixed Choir
72	1	21	-	Choir abstract
73	1	23	-	Choir abstract
74	0	14	-	Filter Modulation
75	0	17	-	Spacepoly / with .wavesweep
76	0	25	-	Effect
77	1	16	-	Spacepoly
78	1	20	-	Effectpoly
79	0	26		Spacestrings
80	-	89		are reserved for WAVE-TERM demo
90	0	17	-	Effektpoly
91	0	24	-	Polysynth / Echosynth
92	0	00	-	Poly soft
93	0	00	-	Poly soft
94	0	29	-	Effektpoly
95	0	25	-	Echo
96	0	18	-	sound-sweep
97	3	13	-	Effekt
98	3	13	-	Effekt
99	0	00	-	percussive

Declarations:

INT= If there is a "x" , this sound can be used on
any of the wavetables

DS = Dobbble Sound