DOEPFER

MIDI Analog Sequencer
MAQ16/3
User's Guide

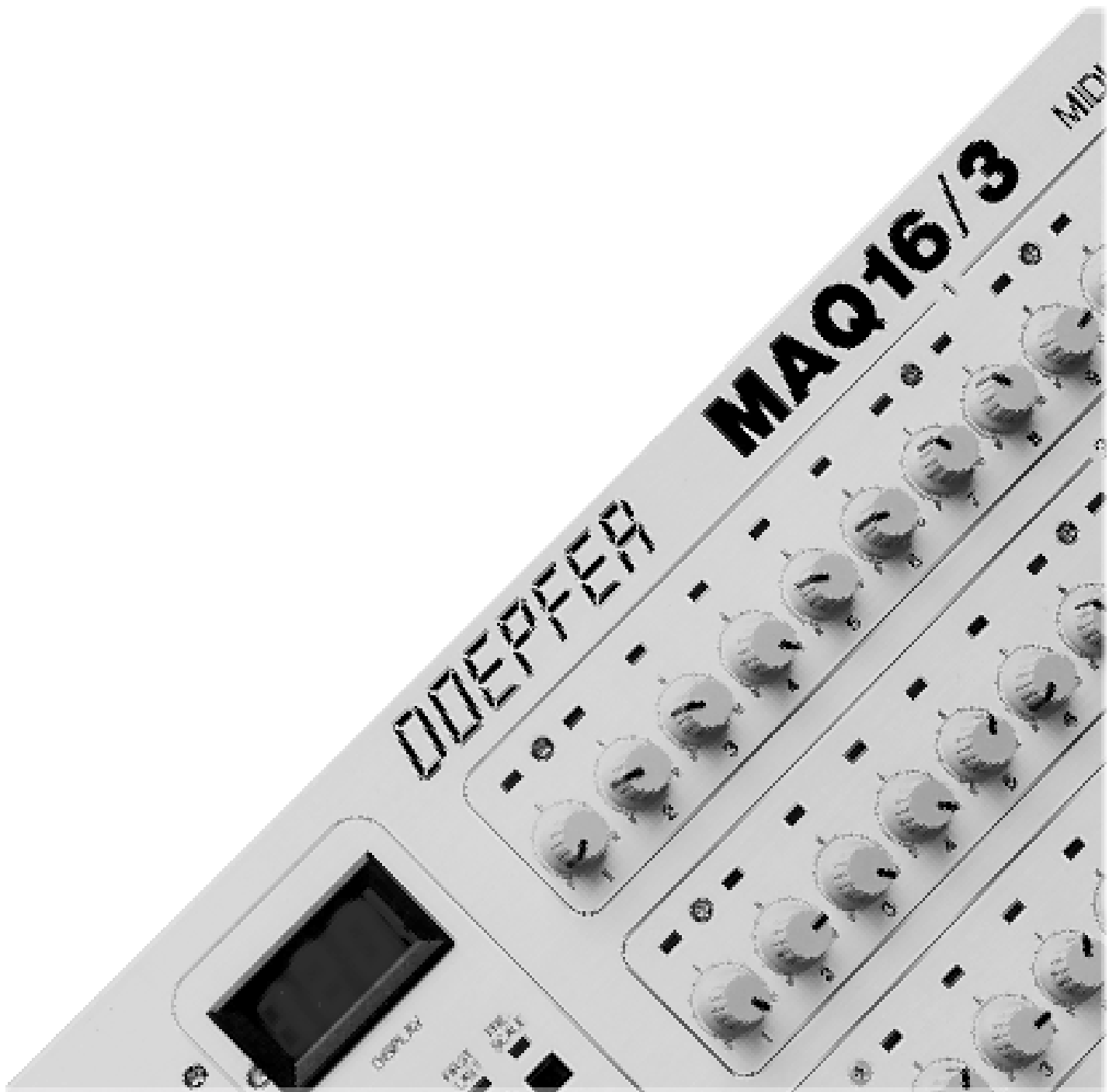Table of contents

Operating and Security Instructions

Please follow the given instructions for use of the instrument because this will guarantee correct instrument operation. Due to the fact that these instructions touch on Product Liability, it is absolutely imperative that they be read carefully. Any claim for defect will be rejected if one or more of the items was observed. Disregard of the instructions can endanger the 6 month warranty.

The instrument may only be used for the purpose described in this operating manual. Due to safety reasons, the instrument must never be used for other purposes not described in this manual. If you are not sure about the intended purpose of the instrument please contact an expert.

The instrument may only be operated with the voltage written on the power input on the rear panel. Before opening the case disconnect the power plug.

All eventual modifications must only be carried out by a qualified person who will follow the valid safety instructions. Every modification should becarried out only at the manufacturer or an authorized service company. Any modification not released by the manufacturer leads to the extinction of the operation permission.

With the introduction of a third person the warranty will be lost. In case of a destroyed warranty seal, any warranty claim will be rejected.

The instrument must never be operated outdoors but in dry, closed rooms. Never use the instrument in a humid or wet environment nor near inflammables.

No liquids or conducting materials must get into the instrument. If this should happen the instrument must be disconnected from power immediately and be examined, cleaned and eventually be repaired by a qualified person.

Never subject the instrument to temperatures above +50 øC or below -10 øC. Before operation the instrument should have a temperature of at least 10 øC. Do not place the instrument into direct sun light. Do not install the instrument near heat sources.

Keep the top side of the instrument free in order to guarantee proper ventilation, otherwise the instrument could be overheated.

Never place heavy objects on the instrument.

All cables connected with the instrument must be checked periodically. If there is any damage the cables must be repaired or replaced by an authorized person.

Transport the instrument carefully, never let it fall or overturn. Make sure that during transport and in use the instrument has a proper stand and does not fall, slip or turn over because persons could be injured.

Never use the instrument in the immediate proximity of interfering electronic devices (e.g. monitors, power supplies, computers) since this could create disturbances within the instrument and corrupt memory data.

The exchange of electronic parts (e.g. EPROMs for software update) is allowed only if the instrument is disconnected from power supply.

The instrument should only be shipped in the original packaging. Any instruments shipped to us for return, exchange, warranty repair, update or examination must be in their original

packaging! Any other deliveries will be rejected. Therefore, you should keep the original packaging and the technical documentation.

Attention:
In each electronic device there is some chance of data corruption (e.g. because of an EMC disturbance). . In most cases a data corruption happens only once and it is not possible to our find the reason. As mentioned above mostly nonrecurring EMC disturbances (e.g. transients in the mains power supply) cause such data corruption and there is no way no chance to protect oneself from them - except the data copy via SysEx.
This is why you should make a copy of all data now and then for the safety of your data. Same is valid for the MAQ data too. For this purpose the MAQ has the dump feature that enables to store your preset data via MIDI SysEx messages e.g. to a computer or MIDI recording device. (APPENDIX A).
Also an backup could be very useful, if you delete or overwrite a preset by mistake.

When using the instrument in Germany, the appropriate VDE standards must be followed. The following standards are of special importance: DIN VDE 0100 (Teil 300/11.85, Teil 410/11.83, Teil 481/10.87), DIN VDE 0532 (Teil 1/03.82), DIN VDE 0550 (Teil 1/12.69), DIN VDE 0551 (05.72), DIN VDE 0551e (06.75), DIN VDE 0700 (Teil 1/02.81, Teil 207/10.82), DIN VDE 0711 (Teil 500/10.89), DIN VDE 0860 (05.89), DIN VDE 0869 (01.85). VDE papers can be obtained from the VDE-Verlag GmbH, Berlin.

Technical specifications are subject to change without notice.

Preface

While studying this manual one may occasionally get the impression of slightly awkward and/or complicated operating procedures. The reason for this is the fact that the MAQ was initially designed about 3 years ago as a simple analog sequencer in the version 1.00. However, due to user's suggestions we found in the course of software development that MIDI allows many more functional possibilities than would be the case with conventional analog sequencers. In particular, we also incorporated a number of features which had been requested by the well-known German band KRAFTWERK and which had not been planned for originally. Consequently our original concept of a simple analog sequencer turned into a rather sophisticated device which will hopefully satisfy even the most demanding users.

Unfortunately the increased sophistication of the MAQ had to be purchased at the expense of user-friendliness. We nevertheless hope that the broad range of functions and features will compensate our customers for this.

At this point we would also like to express our gratitude to the band **KRAFTWERK** (www.kraftwerk.com) for their cooperation and input during the development of the MAQ16/3.

The software and hardware presently included with the MAQ16/3 is version 3.0x. It was thoroughly tested by our firm as well as several beta-testers and found to be free of bugs.

Nevertheless, it has been our experience that the new version of a software package will eventually reveal some hidden bugs after all. We would therefore appreciate it if our customers would notify us in the event of their encountering a bug. We will then immediately attempt to correct the problem as soon as possible and to release a software update to our customers.

Please contact your local dealer if you need a software update.

If you want to order the update directly from Doepfer a processing fee of 20.- DM (or 20.- SFr, 10.- Euro, 10.- US$, 150.- ÖS) has to be payed in advance (banknotes or stamps). As soon as we receive the processing fee a new EPROM will be sent. Please tell us your current software version and the serial no. of your unit. Otherwise the software update cannot be performed.

Pay attention that the software update requires the exchange of the EPROM on the basic board. For this the unit has to be opened, the present EPROM has to be removed and the new one inserted. If your unit is still under warranty we recommend that the software update should be performed only by authorized service personal ! If you damage the unit while replacing the EPROM the warranty is lost !

Please note that the comment above is not valid for software upgrades which introduce new features not initially included with version 3.X. For such upgrades not only a processing fee is payable.

Connections

All connectors are located at the rear panel.

Power supply

The MAQ16/3 does not have a built-in power supply. Instead it uses a plug-in type external power supply (DC adapter). The connector is labeled „**9V DC**" and is located next to the two MIDI sockets. The primary reason for this feature is the fact that line voltages and plug types vary considerably from country to country. Using a plug-in external supply the MAQ16/3 can be used anywhere with a locally purchased power supply, thus keeping the retail price down.The MAQ16/3 is switched ON by plugging the AC adapter into a wall outlet and connecting it to the appropriate jack on the back of the case. There is no separate ON/OFF switch.

MAQ16/3 sequencers sold in Germany do include an AC adapter for 230V mains supply.

In other countries the power supply is NOT included with the MAQ16/3 and must be purchased locally by the user. The power supply must be able to deliver a voltage of 9-12 VDC (unstabilized), as well as a minimum current of 500mA. The polarity of the connector must be the following: ring = GND, tip = +9V DC. If the polarity of the power supply is incorrect, the MAQ16/3 will not function. However, there is no danger of damage to the circuitry since it is protected by a diode.

MIDI-Connectors

Next to the power supply connector you will find the two MIDI connectors „MIDI-In" and „MIDI-Out".

Connect the MIDI-OUT jack of the MAQ16/3 with MIDI-IN of the device to be controlled (Expander, Synthesizer, etc.) via a suitable MIDI-cable.

The MIDI-IN jack of the MAQ is needed only if the device is to be synchronized via MIDI-IN, if sequences of notes are to be transposed or if the MIDI remote control features are used. Otherwise the MIDI-IN jack remains unused. It should be emphasized that the MIDI-IN jack has no merge-function, i.e. incoming data is not passed on to the MIDI-output.

If the MIDI data controlling the MAQ are required for other MIDI equipment too a MIDI Thru box has to be used.
If the MIDI data coming from the MAQ should be merged with other MIDI data a MIDI merge boxed has to be used (e.g. the Doepfer MMR4/4 with 4 MIDI-Ins and 4 MIDI-Outs).

CV/Gate-Connectors

In the middle of the rear panel you will find 6 miniature jack sockets (3.5 mm) labeled „CV1",
„CV2", „CV3", „Gate 1", „Gate 2" und „Gate 3". For each of the 3 potentiometer rows one CV
output and one Gate output are available. The CV/Gate outputs are compatible with the
DOEPFER A-100 modular system and many other analog synthesizers.
The CV voltage range is 5V with an offset voltage of about 0.25V (i.e. effectiv
+0.25...+5.25V). The offset voltage may be compensated with the tune knob and/or or the
keyboard of the synthesizer or module to be controlled as all control voltages are additive in
standard 1V/octave analog systems.
If „note" is assigned to the corresponding row the CV output follows the 1V/octave
characteristics used by most of the vintage synthesizers (1 semitone = 1/12V = 0.083V). In
all other cases (e.g. controller) the voltage range is about 0.25V (knob full ccw) 5.25V
(knob full cw).
For each CV output there is a trimming potentiometer inside the unit to adjust the CV scale if
necessary. The scale is trimmed in the factory to 1.00V/octave. If you want to change or
correct the setting of the scale see appendix E „Adjusting the CV-Outputs".
The factory setting of the Gate outputs are is voltage trigger 0/+8V. If desired the outputs
can be modified for S-trigger (switched trigger, used e.g. by Moog synthesizers) in the
factory or by an authorised service company.
Every modification must only be made by authorized service. Otherwise the warranty will
become invalid.
Note: Not correctly adjusted CV scale is no reason for warranty. If the only „defect" in a MAQ
unit sent for repair is the incorrect scale this is no matter of warranty.

Operating Manual

Controls at the front panel

The MAQ16/3 features the following controls and displays:

- 3 rows of 16 potentiometers (dials) and LEDs each
- 3-digit LED-display
- 8 MENU-buttons in 2 rows of 4 buttons each
- 8 LEDs (serving as indicators for the MENU-buttons)
- 1 Data-entry dial

The three rows of dials serve to adjust the sequences. The LEDs above the dials indicate the active step in each row.

The 8 MENU-buttons and their indicator LEDs are used to activate the various operating modes. The data-entry dial allows rapid editing of the desired parameters.

Operation

Switching the Sequencer On

After the power supply is plugged-in the display should show the software version (e.g. `350` for version 3.50) and the 8 LEDs light for a short moment.

After that the display shows the tempo in BPM (Beats per minute), which can be altered via the data entry dial. The 8 LEDs above the MENU-buttons will be off (i.e. no menu is selected).

If this is not the case either the MAQ16/3 or the power supply is defective. Please first check the power supply before you return the MAQ. Maybe the polarity of the power supply used is wrong (ring must be GND, pin must be +9...12V, a minimum current of 500mA is required).

After turning the MAQ on preset 1 is called up and you are in the Edit Mode. The positions of the 48 knobs do not correspond to the Midi/CV data sent via MIDI out/CV out if you start the sequencer with the Start/Stop button as the 48 step values are taken from preset 1 (for details see Preset).

Ⱶ   *If you have updated from 2.0 to 3.0:*
The automatic storage of all parameters into preset 1 is no longer available. If you want to store the last configuration you have to store it explicitly into one of the presets before turning the MAQ off. Use preset 1 if the configuration should be available after turning the MAQ.

Menu Structure

There are 8 different menus which can be selected via the 8 MENU-buttons by pressing the appropriate one. The LEDs above the buttons will indicate which one is active at any given time. One can exit a menu at any time simply by pressing another MENU-button. If no menu is selected all LEDs are off and the display shows the tempo in BPM.

The following menus are assigned to the 8 MENU-buttons:

Upper row:
1: EVENT
2: CHANNEL
3: FIRST/LAST STEP
4: PRESCALE

Lower row:
5: MODE
6: SINGLE STEP
7: PRESET
8: START/STOP

Menus 1-6 always refer to one of the three rows of dials. Menus 7-8 are global, i.e. they refer to the whole sequencer rather than a specific row.

In the next few paragraphs we shall briefly explain the functions of the 8 menus, prior to discussing them in detail.

Menu 1: EVENT

In this menu a certain type of MIDI-instruction (Event) is assigned to each row. The most important event types are Note ON/OFF, Velocity, Controller, Pitch-bend and Aftertouch. In addition a row can be assigned time function (i.e. duration of the step), dynamic switching of the MIDI-channel or additional transposition of another row.

Menu 2: CHANNEL

This menu is used to assign a row to a MIDI-channel. The row will transmit the MIDI-instructions entered in MENU 1 on the channel selected in this menu, unless dynamic MIDI-channel switching has been activated.

Menu 3: FIRST/LAST STEP

The length of each of the three rows of dials can be limited. In this menu the user determines the first step in which the sequence begins, as well as the last step after which the unit jumps back to the first column. Since first and last step can be adjusted separately for each row, it is possible to generate rather complex sequences.

Menu 4: PRESCALE

For each row the time difference (in units of MIDI-Clock events) between events (MIDI-instructions) can be predetermined. The time difference is a tempo-divisor (always a whole number) which refers to the MIDI-Clock or the internally generated tempo, respectively.

In case of NOTE-events one can also adjust the time between NOTE ON and NOTE OFF (i.e. Note duration).

Among other things one can use this menu to cause different rows to run at different speeds, although always synchronous with the MIDI-Clock.

Menu 5: MODE

For each row one of eight modes can be chosen: Forward, Reverse, Pendulum 1, Pendulum 2, One-Shot 1, One-Shot 2, One-Note or Random.

Menu 6: SINGLE STEP

This menu is used to select single step-mode. It is used primarily to adjust each individual step, for example in cases where the desired sequence is not to be determined experimentally but a prepared sequence is to be entered.

The function can also be used for interesting effects during live performances ("Scanning" of a sequence or single step-improvisation, for example) since single-step mode also runs synchronous with the MIDI-Clock.

This menu allows to mute/demute single steps as well.

Menu 7: PRESET

In this menu the presets are managed. 30 presets can be stored for subsequent retrieval. The manual DUMP-function via System-Exclusive-instructions can be initiated in this menu.

Menu 8: START/STOP

This is not a menu as such, but rather a START/STOP/CONTINUE button.

By pressing the button one alternately starts and stops the sequence. The tempo in beats per minute (BPM) appears on the display in this mode and can be adjusted via the data-entry dial.

If the data-entry dial is turned above the maximum tempo value of 254 (Display shows „**ETC**" or „**ETS**") the synchronization of the MAQ takes place externally via MIDI-IN (i.e. external trigger).

Detailed Description of the Menus

The following general remarks apply to all menus and will not be repeated in the description of each individual menu:

1. A menu is selected by pressing the corresponding MENU-button. The menu selected is visually indicated by an illuminated LED. Exception: In the Preset menu the LEDs 7 and 8 are illuminated.

2. One can exit from a menu by pressing a different MENU-button except the Start/Stop button.

3. In menus 1-6 one can select the desired row by pressing the same MENU-button again, since these menus refer to one of the three rows of dials. The corresponding row is indicated by a glimmering display of all LEDs of the row. Only the step selected lights up with full brightness.

The process is circular 1-2-3-1-2..., i.e. if the button is pressed again while row 3 is selected the program jumps back to row 1.

4. The parameters within the menu selected are adjusted via the data-entry dial beneath the control-panel.

☞ *If you have updated from 2.0 to 3.0:*
The display of the row selected by one of the three decimal points in combination with the toggling of the display has been cancelled to the credit of the more comfortable glimming display. The data potentiometer of V1.0/2.0 has been replaced by an endless rotary encoder (alpha dial).

Realtime Operation

All parameters in menus 1-6 can be altered during operation, i.e. while the sequence is running. However, please note that this may lead to undesired side-effects. So we suggest to change settings in the menus 1-6 only while the sequencer has stopped until you are familiar with the controls.

In particular a change in the type of MIDI-Event (menu 1) or the MIDI channel (menu 2) while the sequence is running may trigger unexpected effects.

For example, if the operating is changed from Note to Controller during operation, notes can get stuck since a NOTE ON-instruction may suddenly be missing its corresponding NOTE OFF-instruction., Another example are undesired controller messages while turning the data-entry dial in MIDI-event mode (Menu 1) while a sequence is running (e.g. Volume/Ctr. # 7 with data = 0 may mute a midi channel / Modulation/Ctr. # 1 with data = 127 may cause high modulation).

It is therefore not recommended to make such substantial changes during operation, especially since they would not make a great deal of sense during live performances anyway.

On the other hand, FIRST/LAST STEP (Menu 3), TIME (Menu 4) or MODE (Menu 5) lend themselves very well to modification during operation, including live performances.

EVENT

In this menu the selected row of dials is assigned the desired MIDI-Event. The assigned MIDI-Event is shown on the display in abbreviated form.

The following MIDI-Events are available:

Display	Type of event	Remark
---	no function	row switched off
number between 0 - 127	free definable Controller (like (9))	(9-1)
nA1 ... nA5	Note on/off absolute 1...5 octaves	(1)
nr1 ... nr5	Note on/off relative 1...5 octaves	(1)
d.Y.n.	Dynamics/Velocity	(2)
C0,C1,C2...	Controller	(9)
PIt	Pitch Bend	(3)
PIP	Pitch Bend positive only	(3)
PI-	Pitch Bend negative only	(3)
At	After Touch (monophonic)	
Prg	Program Change	(4)
Cn1	MIDI channel for row 1	(5)
Ad1	addition to row 1	(6)
A.P 1	Poly-AT/Polypressure for row 1	(7)+(1)
A P .2	Poly-AT/Polypressure for row 2	(7)+(1)
t.4. .	Step-duration 1-4	(8)
t.8. .	Step-duration 1-8	(8)
t.1.6.	Step-duration 1-16	(8)
t.3.2.	Step-duration 1-32	(8)
PA1 ... PA5	note on/off absolute 1...5 octaves mit pause	(1)
Pr1 ... Pr5	note on/off relative 1...5 octaves mit pause	(1)

Remarks to the individual types of event:

(1): Note instructions

If Note ON/OFF is assigned to a row one can choose between the following options:

1. Symbol: Normal (n) or with pause (P)
2. Symbol: Absolute (A) or relative (r) operating mode
3. Symbol: Octave-range (between 1 and 5)

If "Normal" is selected, then the entire dialing range of each of the 48 dials generates Note-events. If "Pause" is selected, turning a dial all the way to the right will generate a pause rather than a Note-event (MUTE-function). The LED of a step muted will not light up while the sequence is running.

If "Absolute" is selected, then the note is entered directly with the dial and will not be altered by incoming note-instructions. In this case the note-values start at MIDI-Code 36 (= the low C on a 5-octave keyboard). In "relative" NOTE ON-instructions entering via MIDI-IN are used for transposition of the sequence, i.e. the note-values entered with the dials are added to those coming from MIDI-IN. In order to be able to implement the TRANSPOSE-function, the MIDI-channel of the incoming note-instructions must be the same as that of the row.

There are 5 different scales ranging from 1 to 5 octaves for both all operating modes. For example, with nA1 the range of notes for a full turn of a dial is 1 octave, with nA5 it is 5 octaves. For the corresponding CV output this means a voltage difference of 1V (nA1) ... 5V (nA5). The reference note for lowest CV (about 0.25V) is the note with MIDI code 36 (C).

If a row of notes is combined with a velocity-row (see remark 2), then the velocity values are supplied by this second row. If no other row is defined as velocity-row, then the note-instructions are sent with a velocity-value of 100.

If a "note"-row is combined with a poly-pressure row (see remark 7), then the note-row no longer sends Note ON/OFF-instructions, but polyphonic aftertouch-events instead. The note-value of the Poly-AT-instruction is generated by the note-row, the poly-pressure-value is generated with the poly-pressure-row (A.P 1 or A P.2). This approach to combining a note-row with a poly-pressure-row was chosen because "Note"- and "Poly-AT"-instructions are very similar (i.e. 3 bytes in length). In both cases the status-byte is followed by the note-byte and then the velocity-byte (for Note ON/OFF) or the pressure-byte (for Poly-AT), respectively.

(2): Velocity/Poly-Pressure

Under MIDI the velocity-instruction is coupled to the note-instruction. Thus, if velocity has been assigned to one row, it must be combined with a row which generates note-instructions.

The three decimal points of the display are used to indicate which row(s) have been assigned to the velocity-row. For example, if NOTES ON/OFF has been assigned to row 1 and if the velocity-values are to be provided by row 2, then the Event-type "d.y n" is to be entered for row 2, i.e. only the left decimal point may be illuminated as an indication that row 2 and its velocity-instructions have been combined only with row 1. In principle, one can combine the velocity-row with more than one row providing notes. For example, "d.y n." would indicate that row 2 (velocity-row) has been combined with both, row 1 and row 3.

However, the user must make certain that the other two rows provide note-instructions. Furthermore, one should remember that one velocity-row now simultaneously controls two note-rows. It is left to the user to decide on the usefulness of such an arrangement.

If a dial is turned all the way to the left (i.e. Velocity = 0) no note-instruction is generated, instead a pause of the corresponding length will result.

(3): Pitch-Bend

Three seperate ranges were set aside for pitch bend: Full range (0...127), positive values only (64...127) and negative values only (0...64). If the full pitch-range is selected there will be a plateau around the center position of the dial in order to make it a little easier to find the neutral pitch-position.

(4): Program-Change

With this instruction it is possible to dynamically switch sounds during a sequence, provided the expander being used permits this feature. Many expanders have a certain delay time before a new note-instruction actually starts generating a sound after a program-change-instruction. With such expanders the program-change event cannot be properly utilized.

(5): Dynamic MIDI-Channel-Switching

With Cn1 the dynamic MIDI-channel-switching (1...16) for row 1 can be assigned to rows 2 or 3. The sequence running in row 1 will then be dynamically distributed onto the MIDI-channels which have been selected with the dials in row 2 or 3. The MIDI-channel settings for row 1 (see Menu 2) are then suspended. In order for this function to work properly, an appropriatenumber of receivers (Expanders) must be available on several MIDI-channels. MIDI-Multimode-Expanders which can receive on several different channels simultaneously lend themselves particularly well to this application.

(6): Addition/Transposition

Ad1 permits values entered with the dials in rows 2 and 3 to be added to row 1. For example, if row 1 provides note-instructions, then this feature would provide an additional transposition capability. It would permit the alteration of the sequence of row 1, without modifying the sequence itself. Since rows 2 and 3 and row 1 can run at different speeds it is for example possible to let the transposition (Rows 2/3) take effect only after each half or fully completed run of row 1.

(7): Polyphonic Aftertouch

In order to send polyphonic aftertouch (Poly-AT)-instructions, one of the four types of note-events (nA, nr, PA, Pr) is assigned to row 1 or 2. A second row is then assigned "A.P 1" (Poly-AT for row 1) or "A P.2" (Poly-AT for row 2). The note-row is then responsible for the pitch, the AP-row for the poly-pressure values.

The PolyAT-event is very similar to the normal Note-event with velocity. In both cases the first row is used to set the note-values. The difference lies in the fact that with Note-events the second row is used to determine velocity, whereas with PolyAT-events the second row is used to determine pressure-values.

(8): Step-duration (time)

The step-duration is not directly linked with a MIDI-event. It merely provides the duration for the step in question. If step-duration is assigned to a row it can refer to one row, two rows or all three rows. The indication is provided by the three decimal points of the display.

 If, for example, "t.4. ." is entered for the bottom row (Row 3) it means that the settings entered on the dials of row 3 are valid for all three rows. "t 4. ." would indicate validity only for the two bottom rows. In order for the user to be able to control the step-duration on the bottom row, it must also refer to that row (i.e. the third decimal point on the display must be illuminated in our example). Otherwise the time-row will run in constant steps and will pass the step-duration values only to the other row(s) activated.

There are four possible scaling factors for the dials: Base time x 4, x 8, x 16, x 32. The base time results from the (internal or external) MIDI-clock. The step-duration can only be increased in whole multiples of the base time. The digits 4, 8, 16 and 32 refer to the maximum scaling factor (with respect to the clock) which can be reached if a control dial is turned all the way up.

If only small time differences between steps are desired "t4" should be selected, for larger differences one should select "t 8", "t16" or "t32". If a dial in the step-duration-row is turned all the way to the left, then the step in question will be omitted, i.e. this serves as SKIP-function.

The timing of each row is also influenced by an adjustable prescale factor (Menu 4: PRESCALE/TIME). If the step-duration function is assigned to a row the prescale factors entered in Menu 4 are in effect as well. Very complex timing arrangements can thus be programmed, although these will always within the framework of the MIDI-clock.

In principle the step-duration can be controlled with any one of the three rows of dials. However, for technical reasons we recommend that only the bottom row is used for this purpose, since the software has been optimized for this.

(9): Controller

32 different MIDI controllers are available. The currently selected controller no. is shown in the display (e.g. C0, C9, C64, C70). A selection of 32 out of the 128 possible MIDI controllers is available (0-19, 64-74, 84).

(9-1): free definable Controller

(**New since version 3.5**)

At the time the MAQ firmware was basically programmed the possibility to choose one of a selection of 32 fixed controller numbers seems to be sufficient. (9)

By now (after almost 10 years) however most of the 128 possible controller numbers are assigned with useful functions, so that now often the request came up, that you could create all of the 128 controllers with the MAQ.

To keep the compatibility to the previous software versions the fixed controller values (9) are left as they are, though they are now strictly speaking unnecessary.

The new free definable Controller you will find now at the beginning of the EVENT's direct after '---' and before 'nA1' at the up to now not occupied position 2.

Because of space problems in the display only the controller number could be shown (so no 'C' as used for the fixed conbtrollers (9))
To select the number free between 0 - 127 you now have to press additional the 'Presets'-button, which is indicated by lighting the LED of this switch.

Now you can change the controller number with the data entry dial. So the dial is used in this situation not to select the type of the event, but also the number of the free controller event. To fall back to the 'old' edit mode, where you can select the event type, you have to press a different menu button except 'EVENT'. And then select once more the Event menu. Though it's possible to switch between the rows in the new edit mode by pressing the EVENT-button, you could only view the assigned event types, but not change them, because the entry dial is locked for all 'normal' edit operation.

Remark:
For an update of an older MAQ version (3.4 and under) to a version 3.5 or higher.

Relating to receive an 'old' sysex dump (Appendix C) there's now change, because also in the older version the complete memory was dumped. So also the memory which is now used by the free controller numbers, which was only undefined up to now.
Therefore you now have of course to define these values, if you want to use them in a preset.

Relating to a dump of a single preset the 3 new bytes are simply put at the end of the string. So to receive an 'old' dump will work without problems, but will cause the display of an midi-error. (Which is o.k. because realting to the new format, there are really 3 missing bytes.) But you must not pay attention to this, but also simply define the free controllers, if you now use them.

We would like to emphasize one more time at this point that not every arrangement possible is also sensible. One could of course assign step-duration or velocity to all three rows, but this would certainly make no sense ! Nonetheless, we deliberately decided not to outright exclude certain configurations, in order to avoid limiting the potential of the MAQ from the start. Since this allows for the possibility of nonsensical configurations, we urge all users to make sure that the configurations programmed do make sense. Otherwise there is a potential for uncontrolled reactions and side effects.

For example, if a velocity-row is combined with an monophonic aftertouch-row, then the velocity-value entered via the dials will overwrite the aftertouch-values!

If on occasion the MAQ behaves in unexpected or undesired fashion, the user should review the configuration entered to make sure it actually makes sense.

CHANNEL

In this menu a MIDI-channel is assigned to the designated row of dials. The channel is selected via the data-entry dial. If a row has been assigned Velocity, Step-duration, Addition (Ad1) or Dynamic MIDI-channel (Cn1) in menu 1, then the MIDI-channel selection of menu 2 is without meaning since in those cases the MIDI-channel is determined by the corresponding row(s).

FIRST/LAST STEP

In this menu the first ("F . . ") and last ("L . . ") active step in each row are selected. Repeated pressing of the MENU-button will allow the first steps ("F . .") of the three rows to be entered first, followed by the last steps ("L . .") of the three rows. After the selected last step of a row has been reached the program jumps back to the selected first step of the row (in forward mode, see menu 5). Since these settings are made separately for each row it is possible to generate very complex sequences which will repeat only after several runs.

Another way to create interesting effects is to combine a note-row with a velocity-row of different length. This will result in the combination of notes and velocity-values constantly being shifted, thus creating a lively accentuation. The same holds true for a step-duration assigned to row 3. If this row is made shorter or longer than the note-row with which it is combined, the step-durations will constantly vary with the notes. One may also change the values while the sequence is running, i.e. lengthening or shortening the sequences during operation. This will substantially enhance live performances and can also be used for improvisations or experimental pieces.

PRESCALE

In this menu the period between two events (in MIDI-clock units) can be adjusted for each row. For note-events the note-duration can be adjusted in addition. The abbreviations "g" and "n" are being used. "g" stands for gate-time, this is the time between two events of the same type. An example would be the time between two Note ON-instructions. "n" stands for note-duration, i.e. the time between a Note ON-instruction and its associated Note OFF-instruction.
The setting of note-duration is relevant only if the row in question has been assigned to note-events (nA, nr, PA, Pr). There is no "switching off" in the fashion of NOTE OFF-instructions with any of the other types of instructions, such as controllers, pitchbend and aftertouch.

Repeated pressing of the menu-button will initially take the user into the gate-time section of the menu, where the gate-times are entered (g . .) for the three row. This section of the menu is followed by that for adjustment of note-lengths (n . .). It should be remembered that note-length must always be less than gate-duration. If note-length is set to "1", it will always automatically be equal to gate-duration and need not be changed separately if gate-duration is changed.

The two-digit numbers displayed behind "g" or "n" refer to the MIDI-clock. For example, a setting of "g06" means that after 6 MIDI-clocks the row in question jumps to the next step. If two rows are to run at equal speed, one must enter the same values for gate-duration in each row.

If one row is to run half as fast as the other, one must enter a value for gate-duration which is twice that of the other row (i.e. 12 for our example). Uneven ratios are also possible.

In MIDI the duration of a quarter note is defined as 24 clocks. If you combine the MAQ with another MIDI-clock controlled unit (drum machine, computer sequencer etc.) you have to ensure that the MAQ is running at the same musical tempo as the other unit(s). In this case we recommend you choose a value of 24, 12 or 6 for the gate time, i.e. to select a musical period of a quarter, a eight or a sixteenth note between two sequence steps.

The separate adjustment of the prescale-factors for each row make extremely complex timing arrangements possible, although these will always be referenced to the shared MIDI-clock. If step-duration is assigned to row 3, the step-duration and the effects of the prescale-factor from menu 4 will overlap. In combination with different "First/Last steps" in the three rows one obtains very complex sequences which no longer appear to have any timing-based relationship, but which always run synchronously via the MIDI-clock.

MODE

There are 13 possible operating modes for each row: forward, reverse, 2 pendulum types, random, 2 one-shot types and single note. Additionally for the first 5 types can be selected between Clock- and Note-Trigger, i.e. whether the advance to the next step is caused by MIDI clock or note events.

Display	Operating Mode	
FOr	vorwärts Clock-gesteuert	(forward)
bAC	rückwärts Clock-gesteuert	(backward)
PE1	Pendelmodus 1 Clock-gesteuert	
rnd	zufällig Clock-gesteuert	(random)
PE2	Pendelmodus 2 Clock-gesteuert	
OnS	Einfach-Durchlauf 1 Clock-gest.	(One Shot)
Onr	Einfach-Durchlauf 2 Clock-gest.	
OnE	Einzelnote Clock-gesteuert	
nFr	vorwärts Noten-gesteuert	
nbC	rückwärts Noten-gesteuert	
nP1	Pendelmodus 1 Noten-gesteuert	
nrd	zufällig Noten-gesteuert	
nP2	Pendelmodus 2 Noten-gesteuert	

The difference between Clock controlled and Note controlled modes is the trigger for the advance to the next step. The Clock controlled modes are triggered by the (internal or external) MIDI Clock. This is the standard mode for sequencers. The Note controlled modes are triggered by an incoming Note event at the MIDI In. The MIDI channel of the incoming Note event must fit with the MIDI channel assigned to the corresponding row.

In Pendulum 1 the first and last step are played twice so that the row has the same timing as another row with the same length in forward/backward. In Pendulum 2 the first and last step are played only once. In this case the effective length of the row is only 15!

In One Shot mode 1 (OnS = One Shot Single) the running stops when last step is reached. Restart is possible only by using the Start/Stop button. In One Shot mode 2 (Onr = One Shot Retrigger) the next row in One Shot mode is started when the last step is reached.
With this feature you may create a 48 step sequencer if all 3 rows the mode „Onr" is assigned. Of course the MIDI event types, channels, tempo and so on should be the same. But it may be possible that each row of the 48 step sequence is running with different tempo or generating different MIDI event types on different channels.

In the One Event mode only one step is played (the same effect as first step=last step). This mode makes sense only in combination with the remote control features of the MAQ. You may scan through a sequence with remote functions (for details see Appendix A „Remote Functions via MIDI In").

SINGLE STEP

This menu selects the single step-mode. It may be used for programming a given sequence step by step or for experimental purposes. Additionally single steps can be muted/demuted.

When entering the menu first time you are in the <u>Global Single Step Mode</u>. This means that you have access to all three rows at a time. The data-entry dial is used to select one of the steps 1-16. The step in question will be selected in all three rows and is indicated by three illuminated LEDs one for each row. Each step is scanned in the previously selected tempo.

For example, if NOTE ON/OFF has been assigned to all three rows in menu 1 one can now easily set the desired triad for each column. If only one or two rows are to be adjusted, then the undesired row(s) can be temporarily disabled in menu 1 (Event-type "---") or by using the mute feature (see below) for a single step.

H   *If you have updated from 2.0 to 3.0:*
The Global Single Step Mode is equivalent to the Single Step Mode of V2.0 with one exception: the display shows the step/column number rather than the data value of a step. In V3.0 the data value of a single setp is displayed only in the Single Step Mode for a Single Row (see below).

If you press the menu button once again you enter the

Single-Step-Mode for a single Row

In this mode one of the 3 rows is glimmering. With the data knob one step within the glimmering row can be selected. Using the menu button the next row is selected. The data value of the step selected - i.e. the MIDI value transmitted - appears in the display. This value corresponds not necessarily to the knob position. If a preset was called up and the knob position was not yet changed the display shows the value from the preset memory (for details see chapter 2.2.3.7. Preset). Consequently the single step mode can be used to display the values of a preset sequence. Only if preset 0 was called up or if the knob was turned the knob positions correspond to the data values displayed !

The data range is different for different event types (e.g. nA1 = 36...48, nA2 = 36...60, nA3=36...72, nA4=36...84, nA5=36...96, Controller = 0...127 and so on).

Mute-Programming

The Start/Stop button is used to mute/demute the step selected. The function is toggling i.e. repeatet pressing the Start/Stop button performs mute-demutes-mute..... and so on. In case a step is muted the corresponding LED remains dark.

Attention: The Start/Stop button has a special function in this mode and cannot be used to leave the menu or to start/stop the sequence!

Using the menu button to select a row and the data knob to select a step within the row each single step of the MAQ can be adressed and muted/demuted with the Start/Stop button.

The mutes remain effective after leaving the Single Step Menu. Thus you have a tool to program the mutes within the MAQ without using the remote control functions via MIDI In (see Appendix A).

To reenter the Global Single Step Mode when beeing in the Single Step Mode for one Row first you have to leave the menu by pressing another menu button (except the Start/Stop button) and enter the Single Step menu again.

The single step-mode can also be used for live performances and experimenting. For example, once a sequence or chord-combination has been completed, then each of the 16 steps can be selected in realtime via the data-entry dial (i.e. each step can be dynamically "scanned"). Output continues to occur in step with the internal or external MIDI-clock. It is also possible to achieve spontaneous changes by turning the dials of the currently selected step.

Use of the single step-mode should definitely not be limited to the input of a sequence, but should also be used for experimentation during live performances.

PRESET

This global menu is used to manage the 30 available presets and to manually trigger the DUMP-function. Up to 30 complete sequences can be stored and retrieved (i.e. all parameters and the settings of the 48 dials). Preset 1 has a special status here. When the MAQ is switched ON all parameters including the data values of the 48 potentiometers are retrieved from Preset 1. Thus when turning on the MAQ the 48 knob positions do not necessarily correspond to the MIDI data sent when starting the sequence.

☐   *If you have updated from 2.0 to 3.0:*
Starting with V3.0 the 48 data values of each preset can be edited as well. The automatic storage of all parameters into preset 1 is no longer available. If you want to store the last configuration you have to store it explicitly into one of the presets before turning the MAQ off. Use preset 1 if the configuration should be available after turning the MAQ.

When the MENU-button is pressed the LEDs 7 (Preset) and 8 (Start/Stop) will go on to indicate the exceptional position of the global Preset menu with 2 LEDs.

Calling up a Preset

A preset number from 0-30 can be selected via the data-entry dial. To call up the preset the Start/Stop button has to be pressed. The Start/Stop button has the „Enter" function in the Preset menu.

Preset 0 has a special status. It corresponds to the actual current setting of the 48 dials on the front panel. Preset 0 can be chosen to start the programming of a new sequence as in this special case the 48 knob positions really reflect the MIDI /CV data sent via MIDI Out and/or CV/Gate. The other parameters of preset 0 are predefined as follows: event type nA1 for all rows, MIDI channel 1/2/3, first step = 1, last step = 16, gate/note divider = 6, mode = forward.

Preset 0 can also be used as an „emergency brake" if the parameters of the sequence are completely disarranged and a new start seems to be easier than readjusting each single parameter.

Presets 1 - 30 refers to any previously stored presets.

If one exits the menu in this mode by pressing another button except Preset and Start/Stop the preset displayed is not called up.

Edititing a Preset

After calling up a preset as described above it can be edited. To edit one of the 48 potentiometer values you only have to turn the knob in question. The software recognizes if a knob was turned and takes in this case the value from the front panel knob and no longer from the preset memory. If you turn one by one all the 48 knobs the complete frontpanel setting corresponds to the data sent via MIDI/CV.

The other sequence parameters (event, channel ....) may be adjusted as described in the chapters 2.2.3.1. - 2.2.3.6. The modified sequence may be stored in one of the preset memories as discribed in the following paragraph.

Storing a Preset

If the Preset button is pressed a second time, all 8 LEDs will go on as a visual warning of the impending storing procedure. If a preset-number (1-30) is now entered via the data-entry dial and the Start/Stop button („Enter") is pressed, then the current settings of the 48 dials and the current parameter-values are stored in the selected preset. Any sequence previously stored in this location will be overwritten and is thus irretrievably lost!

Manual Dump

If preset "0" is selected for storage, then the manual DUMP via MIDI-OUT of the actual preset is triggered. In this case the data is not stored, instead the entire content of the actual preset is dumped via MIDI in form of System Exclusive-instructions. The dump of the complete memory is described in Appendix C.

Initialisation the Preset memory

In order to initialize one preset or the whole preset-memory it is necessary to press and hold the Preset button for a few seconds while the MAQ is switched ON (i.e. when plugging in the power supply cable). In this case the MAQ starts the initialising routine rather then the normal software. The LEDs 1-6 are illuminated to indicate this special mode. The display shows „000" and can be adjusted with the data dial between „000" and „030". The initialisation is triggered by the preset button and depends upon the display before pressing the preset button:

0   ⇨ the whole preset memory is initialized
                   (30 presets)
1...30   ⇨ only the preset displayed is initialized

In case „0" the LEDs flicker like a binary counter to indicate the initialisation. This function will irretrievably erase the preset(s) and should thus be used with caution! After initialisation the MAQ must be turned off and on again to enter the regular mode.

Presets initialized imply the parameters from preset 0 (i.e. event type nA1 for all rows, MIDI channel 1/2/3, first step = 1, last step = 16, gate/note divider = 6, mode = forward). The data values are taken from actual front panel setting of the 48 potentiometers. So you have to turn all knobs full ccw if you want to initialize all data with 36 (minimum value of event nA1).

START/STOP

This is not a menu but a Start/Stop-button. Pressing this MENU-button will alternately start or stop the sequence. The appropriate MIDI-instructions START, STOP or CONTINUE are sent along with MIDI-clock via MIDI-OUT.

In case of START the sequence starts from the last configuration (no resetting of the three rows to step 1, MIDI-OUT: CONTINUE / $FB). If all three rows are to start with step 1 (Reset) then the START/STOP-menu must be briefly exited and reentered (MIDI-OUT: START / $FA).

In this menu the display will show the tempo in beats per minute (BPM), the tempo can be adjusted with the data-entry dial.

External Synchronisation

In order to synchronize the MAQ16/3 with an external MIDI-clock via MIDI-IN, one must turn the data-entry dial all the way over the maximum (254) or minimum value (50). The display will then show „EtS" or „EtC" .

In case of „EtS" (external trigger start mode) only an incoming MIDI Start event resets the 3 rows to first step. An incoming MIDI Continue the sequence continues from the last position.

In case of „EtC" (external trigger continue mode) incoming MIDI Start or Continue resets the 3 rows as well.

When „EtS" or „EtC" is selected no longer the internal Clock generator is used but only incoming MIDI Clock data as timing basis.

APPENDIX A: Remote-Control of MAQ-Parameters via MIDI-Events

PLEASE NOTE: This type of remote control "alienates" the MIDI-specification from its original purpose and does therefore not conform to MIDI. If channels XX and YY are to be used for other purposes without addressing the MAQ, then corresponding MAQ function must be turned off (MIDI channel 0).

The remote control feature was deliberately not implemented via SysEx since the required MIDI-Events are difficult or impossible to generate with a normal synthesizer/masterkeyboard, whereas it was our intention to allow the user to play the MAQ via a keyboard/synthesizer, much like any ordinary expander. However, the MAQ does not interpret PRG-Change and Note-events on the channels XX and YY as an expander would. Instead, the MAQ's main parameters which can be viewed as events which make musical sense are controlled via PRG/Note.

Adjusting the MIDI channels XX and YY

In order to adust the MIDI channels XX and YY it is necessary to press and hold the Channel button while the MAQ is switched ON (i.e. when plugging in the power supply cable). In this case the MAQ starts the routine for adjusting the MIDI channels XX/YY rather then the normal software. The MIDI channel of row 1 (upper row) corresponds to MIDI channel XX (channel for preset calling up via MIDI Program Change), the channel of row 2 (middle row) corresponds to MIDI channel YY (remote channel).

The channel is adjusted as in the normal software mode. In this special mode even MIDI channel „0" can be chosen and means that the corresponding function is turned off.

After adjusting the channels XX/YY the MAQ must be turned off and on again to enter the regular mode.

Program-Change Remote-Control

Function	Midi-instruction	Hex-Code (Midichannel 16 = F)
select row 1	PRG-Change 1	CF 00
select row 2	PRG-Change 2	CF 01
select row 3	PRG-Change 3	CF 02
entire row active	PRG-Change 4	CF 03
entire row off	PRG-Change 5	CF 04
All steps of a row active individually	PRG-Change 6	CF 05
All steps of a row off individually	PRG-Change 7	CF 06
Betriebsarten:		
Forward (FOr)	PRG-Change 9	CF 08
Backward (bAC)	PRG-Change 10	CF 09
Pendulum 1 (PE1)	PRG-Change 11	CF 0A
Random (rnd)	PRG-Change 12	CF 0B
Step 1 on	PRG-Change 17	CF 10
Step 2 on	PRG-Change 18	CF 11
...	.....	.....
Step 16 off	PRG-Change 32	CF 1F
Step 1 off	PRG-Change 33	CF 20
Step 2 off	PRG-Change 34	CF 21
...	....	......
Step 16 aus	PRG-Change 48	CF 2F
First Step = 1	PRG-Change 49	CF 30
First Step = 2	PRG-Change 50	CF 31
...	......	.....
First Step = 16	PRG-Change 64	CF 3F
Last Step = 1	PRG-Change 65	CF 40
Last Step = 2	PRG-Change 66	CF 41
...		
Last Step =16	PRG-Change 80	CF 4F
Event Contr. 0	PRG-Change 81	CF 50
Event Contr. 1	PRG-Change 82	CF 51
...		
Event Contr. 31	PRG-Change 112	CF 6F
Event NA1	PRG-Change 113	CF 70
Event NA2	PRG-Change 114	CF 71
...	......	....
Event NA5	PRG-Change 117	CF 74
Event Nr1	PRG-Change 118	CF 75
Event Nr2	PRG-Change 119	CF 76
...		
Event Nr5	PRG-Change 122	CF 79
Event Pit	PRG-Change 123	CF 7A
Event PIP	PRG-Change 124	CF 7B
Event PI-	PRG-Change 125	CF 7C

Event Prg	PRG-Change 126	CF 7D
Event Cn1	PRG-Change 127	CF 7E
Event AD1	PRG-Change 128	CF 7F

Remark:

At first one of the three rows must be selected via PRG-Change 1...3, all subsequent instructions will then refer to that row. The difference between PRG-Change 4/5 and 6/7 is that PRG-Change 4/5 switches the row ON/OFF globally, whereas 6/7 switches each of the 16 steps ON/OFF individually (This is equivalent to 16 individually sent ON/OFF-instructions PRG-Change 17...48).

If a step is switched OFF, Note-OFF-events continue to be sent if the row in question has been assigned to a Note-mode. Only the Note-OFF-events are suppressed. This arrangement was necessitated by programming considerations.

Noten-Event-Fernsteuerfunktionen

(MIDI-Channel YY here f.e. channel 16 = F)

Row 1 Step 1	Note 36	9F/8F 24 XX
Row 1 Step 2	Note 37	9F/8F 25 XX
...		
Row 1 Step 16	Note 51	9F/8F 33 XX
Row 2 Step 1	Note 52	9F/8F 34 XX
Row 2 Step 2	Note 53	9F/8F 34 XX
...		
Row 2 Step 16	Note 67	9F/8F 43 XX
Row 3 Step 1	Note 68	9F/8F 44 XX
Row 3 Step 2	Note 69	9F/8F 45 XX
...		
Row 3 Step 16	Note 83	9F/8F 53 XX

Remark:

Note-ON instructions switch a step ON, Note-OFF instructions switch a step OFF. This allows the ON/OFF-switching of sequencer steps by pressing the appropriate keys of a normal keyboard.

Control-Change Remote-Control

(MIDI-Channel YY)

Controller- Nummer	Funktion
0	Velocity Row 1
1	Velocity Row 2
2	Velocity Row 3
3	Tempo
4	Step Position Row 1
5	Step Position Row 2
6	Step Position Row 3
7	Gate Time Row 1
8	Gate Time Row 2
9	Gate Time Row 3

10	Note Time Row 1
11	Note Time Row 2
12	Note Time Row 3
13	First Step Row 1
14	First Step Row 2
15	First Step Row 3
16	Last Step Row 1
17	Last Step Row 2
18	Last Step Row 3
19	Mode Row 1
20	Mode Row 2
21	Mode Row 3
22	MIDI-Kanal Row 1
23	MIDI-Kanal Row 2
24	MIDI-Kanal Row 3
25	MIDI-Event Row 1
26	MIDI-Event Row 2
27	MIDI-Event Row 3
28	Program Change Row 1
29	Program Change Row 2
30	Program Change Row 3

Remark:
The MIDI Controllers 28, 29 and 30 are translated inside the MAQ into Program-Change-Events on the MIDI Channels of the 3 rows and transmitted at the MIDI out. Thus the sounds of the expanders connected to MAQ out can be programmed.

Of course you may select the sounds at the control panel of the expander or using other equipment sending Program-Change. In the last case the Program-Change data and the MAQ data must be merged using a MIDI merger (e.g. Doepfer MMR4/4).

APPENDIX B: Display of MIDI-Errors

In case of a MIDI error the MAQ shows an error code in the display. You may continue by pressing the Start/Stop button. But as the reason is normally a grave error you should store the actual sequence if required and turn the MAQ off and on again.

The first letter for MIDI error codes is „∏". This letter was chosen as it does not occur during the normal operation.

The following displays may appear:

∏ I O: MIDI buffer overflow

Incoming MIDI data may be lost. This error occurs if the incoming MIDI data cannot be processed by the MAQ. Reduce MIDI data rate and transmit to the MAQ only the data required (i.e. MIDI Clock/Start/Stop for externa Sync, note on/off for transpose or remote control events). You may use MIDI data filters or a MIDI output (e.g. computer) that delivers only the data required by the MAQ.

∏ LE oder ∏ HI oder ∏ TI: Sys-Ex-Error

When receiving a SysEx-Dumps an error happened. Turn the MAQ off and on and try again. The reason may be that the waiting time between two dumps was too short. The MAQ requires about 10 seconds after a complete dump to store the data in its EEPROM. During this time no dump must be sent to the MAQ.

APPENDIX C: MIDI Dump Request

Beside a single dump that can be triggered in the Preset menu also a complete dump (all 30 presets) can be requested when send the following string to the MAQ:

F0, 00, 20, 20, 10, 00, 23, 00, 00, F7   (Hex notation)

If the MAQ receives a string like this it will answer with a Sys-Ex Dump string consisting of exactly **4106** Byte length over all.

Attention:
Please make sure that this string has a length exact **4106 Bytes.**
Otherwise, if you reload such a string with the wrong number of bytes the complete memory structure of your MAQ could be destroyed and then as well as you current presets both the backup of the preset could be lost.

APPENDIX D: Updating MAQs V1.0/V2.0 to V3.0

If your MAQ is still under warranty the update has to be done at the manufacturer (Doepfer) or an authorized service company. Otherwise you will loose your warranty. We will send you a list of all authorized service companies upon request.

If you are in doubt whether you are capable to install the update you should send the MAQ16/3 to the manufacturer or an authorized service company before you destroy the unit. The installation of the update is not suitable for electronic laymans or beginners.

We cannot guarantee if the update is carried out incorrect by the customer. In this case the MAQ has to be repaired with costs at the manufacturer (Doepfer) or an authorized service company. As a rule this is much more expansive than the price for the installation of the update at the manufacturer or an authorized service company. Please read this installation manual very carefully before you start the installation. If you believe that you are not capable to do the installation after reading this page you may send your MAQ and the V3.0 update set to the manufacturer or an authorized service company. The global amount for the installation ist 100.- DM. This is valid only if the MAQ is in its original state (installation not yet started) and has no faults. Otherwise it is treated as a repair and the costs depend upon the time and parts required for the repair.

Installation of the update does not extend the warranty period. Decisive for the warranty is only the date of purchasing the MAQ itself and not the date of purchasing the update.

Updating a MAQ16/3 with V1.X or 2.X to V3.X requires the following procedures:

❏ First of all you need the following tools:
Different screw drivers (for case screws, for the small screw of the data knob, for removing integrated circuits and eventually for the trimming potentiometers of the CV outputs), special tool for removing integrated circuits with PLCC case, pliers or wrench for potentiometer/alpha dial and CV/Gate mini jack nuts, drilling machine with 8.0 or 8.5 mm drill (for CV/Gate mini jacks)
❏ Remove all connecting cables (MIDI, power supply).
❏ Remove the top cover and rear cover by loosing the case screws (4 on top side, 6 on rear side). On the bottom you will find the old MAQ basic board.
❏ Remove alle connectors from the basic board (one 16 core flat cable leading to the control board and three 10 core flat cable leading to the potentiometer boards).
❏ Remove the knob of the Data Potentiometer (small screw in the knob, very small screw driver required).
❏ Remove the Data Potentiometer by loosing the nut
❏ Remove the 4 screws holding the basic board at the case bottom and remove the old basic board. Remove the 4 distance bolts. They will be used later for mounting the new basic board.
❏ Remove the integrated circuits 80535 (the large square IC) and 74HC573 with suitable tools and insert the two circuits into the new basic board. At the 80535 you will find a marking point that must fit with the arrow of the 68 pin socket for the 80535. Additionally the 80535 has one flat edge that must fit with the flat egde of the 68 pin socket. Regarding the 74HC573 the mark of the IC must with fit the mark of the 20 pin socket for the 74HC573. To Remove the circuits you need suitable tools! In case of doubt you should send to us both basic boards before you destroy the expansive 80535 or the PLCC68 socket. It is also possible to send the old basic board to us if you order the V3.0 update. In this case we will move the circuits from the old to the new board free of charge.
❏ Install the new basic board at the place of the old board using the distance bolts of the old basic board. The 4 drills fit with those of the old board.
❏ Install the alpha dial instead of the Data Potentiometer and mount the Data knob (small screw)

❏ Connect the 16 core flat cable leading to the control board and the three 10 core flat cables leading to the potentiometer boards. The 16 pin connector cannot be plugged in in a wrong way due to the „nose" on the connector. The red cores of the three 10 core flat cables have to point to the front panel if the red cores at the potentiometer boards point to the bottom (in case that the red cores at the potentiometer boards point to the top the red cores at the basic board have to point to the rear panel)

❏ If you want to install CV/Gate board (the MAQ V3.0 works without this board as well) you have to drill 6 holes into the rear panel for the 6 CV/Gate miniature jack sockets (8...8.5 mm diameter, 12.7 mm distance) The holes should be drilled in the same distance from the bottom as the hole for the 9V DC power supply socket. The distance between the first hole and the power supply hole should be about 110 mm so that the analog board does not overlap with the basic board.

❏ Mount the analog board using the 6 jack sockets at the rear panel. Connect the analog board to the basic board using the 10 core flat cable (the two boards are delivered ready connected). The red core has to point at the basic board to the front panel and at the analog board to the right (view from the front), i.e. the red core has to point to the 2 voltage regulators at the analog board (looking like transistors).

❏ Close the case (rear panel with 6 screws, top cover with 4 screws) and connect the power supply, MIDI and CV/Gate if desired. We reccomend to initialize the MAQ16/3 after the installation of the new basic board (for details see „Preset menu").

❏ If you want to readjust the scale of the 3 CV voltages you may find 3 trimming potentiometers on the analog board for the adjustment of the CV voltage scales. Pay attention that there is an offset of about 250...300 mV at the CV outputs (i.e. 0.25 ... 5.25V range for 5 octaves)

APPENDIX E:Adjusting the CV outputs

If your MAQ is still under warranty the adjustment should be done at the manufacturer (Doepfer) or an authorized service company. Otherwise you will loose your warranty. We will send you a list of all authorized service companies upon request. Not correctly adjusted CV scale is no reason for warranty. If the only „defect" in a MAQ unit sent for repair is the incorrect scale this is no matter of warranty.
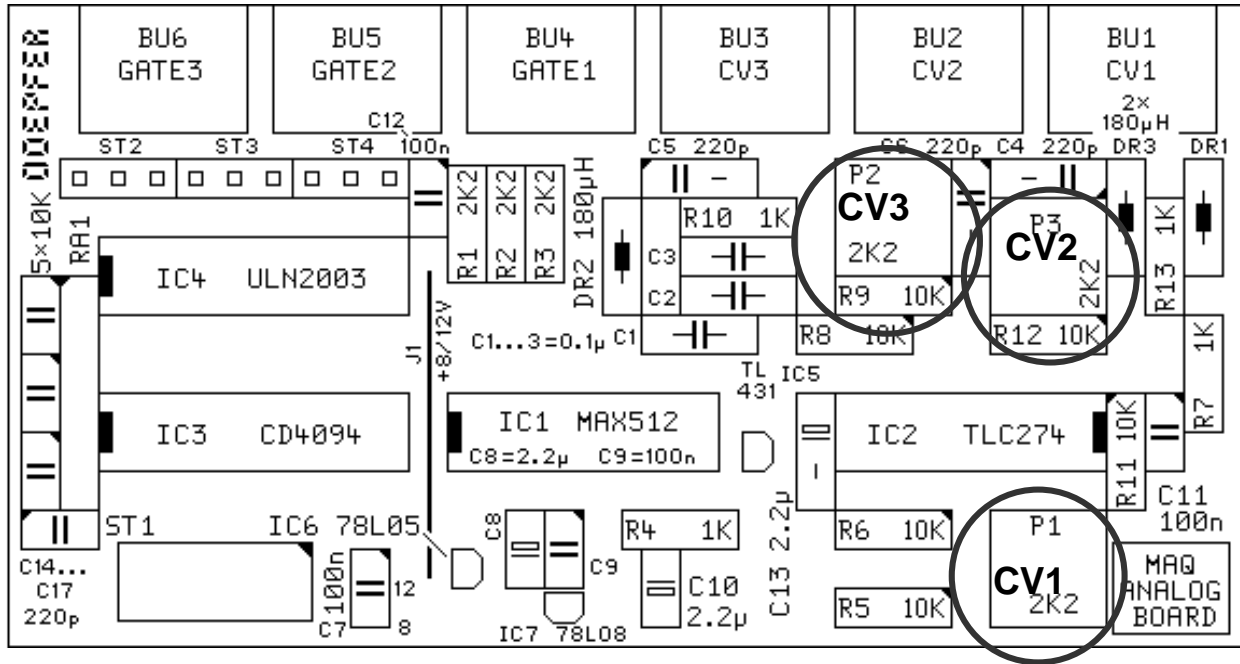
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