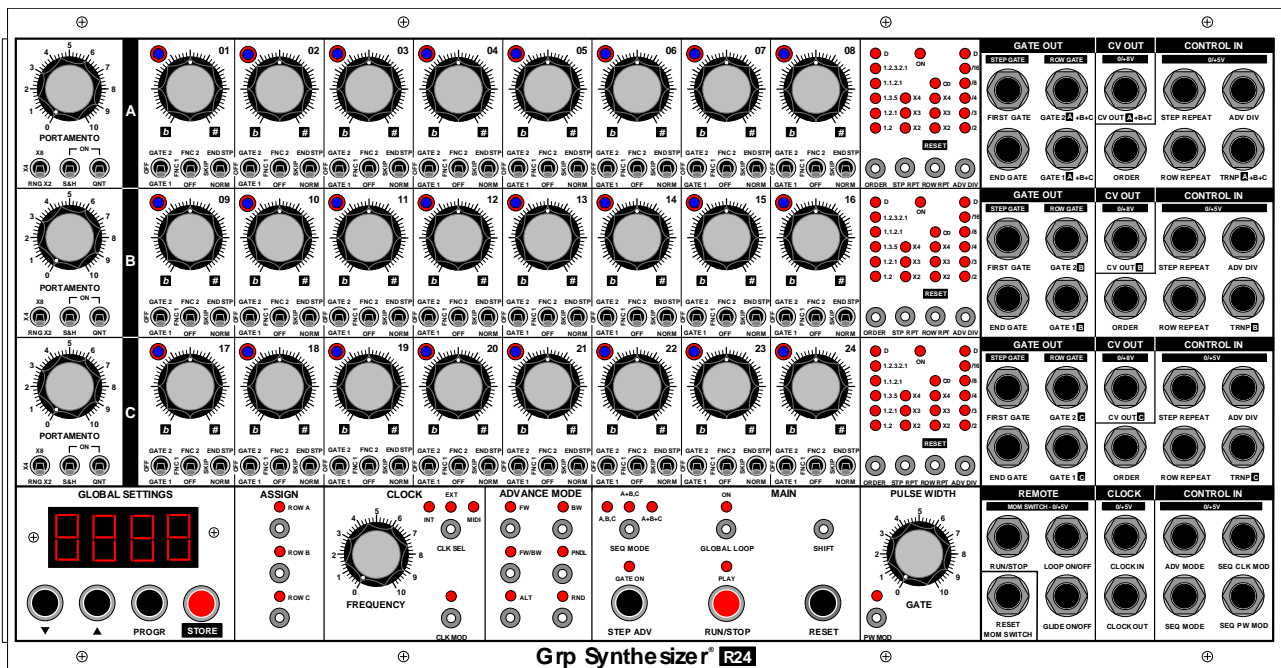# Grp Synthesizer
R24 Step Sequencer
Owner's Manual

Version 1.2

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CONTENTS

FOREWORD
Thank you for purchasing the Grp Synthesizer R24 Step Sequencer: this machine will rewards you with years of sonic satisfactions and, to ensure your instrument will functions properly, please read this manual.

SOME WORDS OF WISDOM
Read the following safely tips carefully! You should always observe some basic precautions when dealing with electronic equipment, for you safety and for safety of your own equipment.

OPERATING CONDITIONS
- Never use the synthesizer under potentially damp/wet conditions such bathrooms, swimming pools, etc.
- Do not use the instrument in extremely dusty and dirty environments.
- Do not place the instrument near heat sources like radiators.
- Do not expose the instrument to direct sunlight; the wooden cabinet is varnished with a traditional and trusted procedure, but ultraviolet rays from sunlight can quickly fade the original wooden colour.
- Do not expose the device to extreme vibrations.
- Save the original crate and boxing for future shipping of the instrument.

POWER SUPPLY
- Your Grp R4 Step Sequencer is already set for the correct AC powering for your area. You can read it on the label in the rear panel.
- Unplug the device when you are not using it for longer periods.
- Never touch the plug with wet hands.
- When unplugging the instrument, always grab and pull the plug, never the cable.

OPERATION
- Although you are a rockstar, NEVER place cans of beer, coke, water (?) or other potentially spilling liquids on or near the instrument.
- The Grp R24 Sequencer is an heavy unit: place it on a suitable solid surface or table.

MAINTENANCE
- Do not open the instrument; do not unscrew the front/rear panels. Inside the instrument, there aren't user's serviciable parts.

PROPER USE
- This synthesizer is designed exclusively to produce audio rate frequency signals for musical purpose. Any other use is prohibited and voids the warranty extended by Grp Synthesizer. Grp Synthesizer is non liable for damages due to incorrect use.

TECHNICAL
Powering:
+15V = 160 mA
-15V = 43 mA
+5V = 110 mA

WARNING
Step Sequencer **R24** is mechanically unsuitable housing in lower row of 5U slanted cabinet.

R24: MAIN FUNCTIONS

Mainly, **R24** can be considered the union of two separate units:

- A **cabinet** with dedicated power, ready to house and powering third party modules in 5U format, in respect of electric and mechanical formats from COTK, DotCom, MoonModular, etc. The cabinet is the same in use with **Grp A2 Synthesizer**; this is the reason for the double writings on MIDI Ports on back panel.

- The **Step Sequencer**, playable in stand alone – with its cabinet – or mountable in a 5U cabinet (DotCom, Moon Modular, etc), in full respects of mechanical and electrical standars. See in the end of this manual for power consumption on +15V, -15V and +5V. With the enclosed rack ears, the Sequencer can be easily mounted in a standard 19" rack.

The structure of Step Sequencer is 8x3, organized in three Rows of eight Steps each one, but you can choose several **SEQUENCER MODE** for work with three separate parallel sequences (max 8 Steps each one), one Sequence max 16 Steps plus one Sequence Max 8 Steps in parallel, or with only one big Sequence of max 24 Steps.

Every Row A, B and C has a several parameters *per Row* and *per Step*; so, the R24 Step Sequencer architecture is organized in an easy structure:

- Step Parameters
- Row Parameters
    - o Row Connections
- Sequence Parameters
- Global Parameters
    - o Sequence and Global Connections.

R24 can do and offers:

- Memorize 64 sequences, each one including all the setting values on front panel or programmed into Display and Menus.
- Organize 24 Steps in three parallel Sequences A,B and C; two parallel Sequences A+B, C; just one Sequence A+B+C; in all three cases, user can define freely the lenght of Sequences.
- Every Step can be enriched with two additional parameters/programmable functions (ratchet bouncing, Portamento On/Off, etc).
- Every Sequence can interpret Step Order with independent rules of density, advance mode, iteration and repetigion, available on front panel and user's customizable from Display.
- Every Step can organize Gate emission on two separate Gate Bus Out, freely assignable, for quick creation of rhythms and structures.
- A huge array of analog connections for control and trasmission allows interaction between multiple sequencers, external CV control on several **R24** parameters and work with several Clock Sources.
- Work in 1V/Oct format standard; Hz/Oct format for CV and Gate will be available in a next soft revision.
- Semitone quantization in 1/12V standard; in a next soft revision, will be covered V/Hz standard.
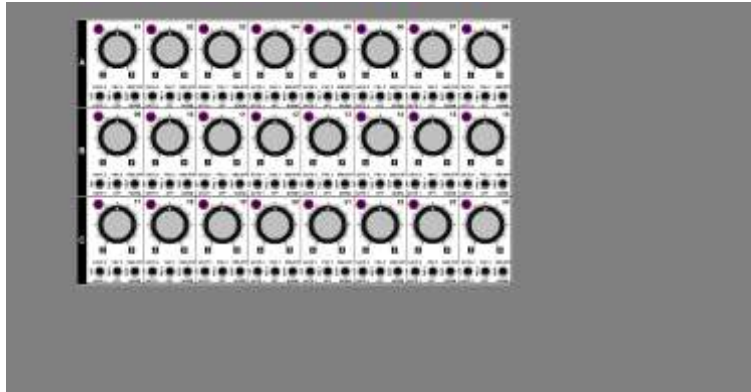
STEP PARAMETERS

Following descriptions are valid for every Step on Rows A, B & C. Each Step on every Row has:
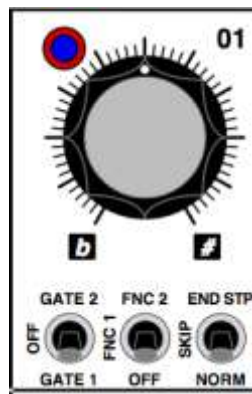
LED

LED turns ON when Step is played; still, the color is red when Step sends its Gate on Gate Bus 1, color is blue when Gate goes on Gate Bus 2. (See below, **Switch Gate1/Off/Gate2**).

Pot VALUE

CV Value on each Step is adjustable in 2, 4 or 8 Volts range (See below, **ROW Parameter**); Step is tunable with the pot Value.

Switch GATE 1 / OFF / GATE 2

Choose if 0/+5V tension of the Step goes to:

- lower position, on bus **GATE 1** on the corresponding out port **GATE 1** (with all the routings available over the three Rows);
- central position, in **OFF**, there's no Gate transmission for selected Step;
- upper position, on bus **GATE 2** on the corresponding out port **Gate 2** (with all the routings available over the three Rows).

By Default, this switch is in lower position, routing to Gate 1.

Switch OFF / FNC 1 / FNC 2

Enables one of two User's selectable Functions per Step (Functions are assigned via Display on a per Row basis, with independent enable Step by Step). By Default, the three position switch has assigned:

- lower position, **OFF**; no function assigned to Step;
- central position, **FNC 1**; Function 1 recalls Ratched with two bounces per Step;
- upper position, **FNC 2**; Function 2 recalls Ratchet with three bounces per Step.

NOTE: *a Step with two or three bounces/Ratchet mantains the same length of other Steps; bounces density is created with brand new Gate On/Off articulations.*

NOTE: *to reach full menu of available functions assignable to both positions of the switch, see below the* **DISPLAY Parameter** *Section.*

Switch NORM / SKIP / END STEP

Defines how to interpret the Step; is it possibile choose between:

- lower position, **NORM**, Step is read in a normal way and Sequence goes to the following Step;
- central position, **SKIP**; Step is skipped, Sequence duration is shortened. Unlike behaviors **GATE 1/Off/GATE 2** seen before, a 4 Step Sequence, with one Step in SKIP mode, *lasts only three Steps;* a four note-Sequence with one Step in GATE OFF, *lasts regularly four Steps*, but plays three Steps with a note and one Step with a pause.
- upper position, **END STEP**; Step is regularly read and played as Sequence's terminal. To obtain a four Step-Sequence, fourth Step should be set on END STEP.

WARNING: *The Default condition, for the "normale" behavior of Sequencer's ROW correspond at lower positioning on all three switches available on every Step; each switch set in middle or upper position will differs from standard "normal" Default.*

ROW PARAMETERS

Each Row has management parameters (on left-hand column) and interpration (on right-hand column) influencing all active Steps. Many parameters are in common for all three Rows A, B and C; on some cases, parameters are available only on certain Rows; the following descriptions highlights on each case parameters available on selected Sequencer's Rows.

Management Parameters (Rows A, B & C)

Define modes used for evaluate Steps values on every Row.

Pot PORTAMENTO

Sets Portamento speed applied on CV programmed in every Step.

*NOTE: If neither **FNC 1** nor **FNC 2** has been assigned to Portamento On/off, the behavior is applied globally on every active Step in a Row (or in a Sequence, if seq lenght and SEQ MODE differs from standard 8-step length). For individual Step setting of Portamento On/Off, see below at **Display Parameter** Section.*

*NOTE: Either if sequence is longest than one Row(**SEQ MODE** on A+B,C or A+B+C), the Portamento On/Off parameter possibily assigned to **FNC 1** or **FNC 2** is active only on its Row. This can drive to a peculiar condition: a 16-Step Sequence can have Steps 1-8 with individual On/Off Portamento setting and Steps 9-16 not, for a different function assigned by the User. It's a fairly powerful capability, but can drive to some confusion. For a list of available functions, see belov the **Display Parameter** Section.*

Switch RANGE X2 / X4 / X8

Sets range for Step CV; you can choose a range of 2, 4 or 8 Volts corresponding to switch positions X2, X4, X8. In all three cases, *zero value* corresponds to full counter-clockwise position of **STEP VALUE** control:

- lower position, **RANGE X2**; Step range covers 2 Volts, e.g. 2 octaves;
- central position, **RANGE X4**; Step range covers 4 Volts, e.g. 4 octaves;
- upper position, **RANGE X8**; Step range covers 8 Volts, e.g. 8 octaves.

Switch S&H ON
Turns on the Sample and Hold circuit on Row CV Out at corresponding analog port **CV OUT** (see below, **Connections** Section). S&H sample new values on each Gate On programmed for every Step with Switch **GATE 1 / OFF / GATE 2**. So, it is possible to prolong the programmed value for one Step to next Step (assuming that next Step is in Gate Off condition).

- with switch **ON**, same value from first Step is prolonged e.g. *latched* over the second Step in Gate Off.
- With switch **OFF**, value programmed in second Step will reach *anyway* its destination, though in absence of Gate articulation. This condition will lead to an unpleasant *yodeling* with oscillators, especially if amplitude envelope has a long release time.

Switch QNT ON
Turns on and off chromatic quantization on Row CV Out; quantization can be handy for tuning a Sequence with 4 or 8 Volts range (e.g. four or eight octaves span over pot **STEP VALUE**).

*NOTE: In the now available Revions 1.0 for Step Sequencer **R23**, there is only one chromatic quantization mask, with octave subdivided in 1/12th of Volt; in a next software upgrade, there'll be a quantization mask especially conceived for work with Hz/Oct standard.*
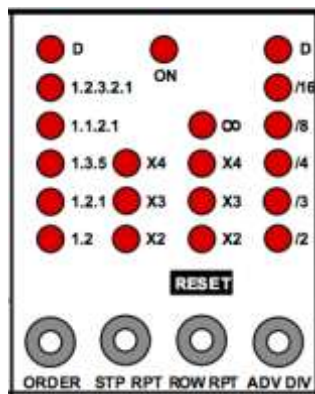
Interperation Parameters (Row A)
They sets the interpretation modes of ordering, reading and executing values programmed on each actie Step of the Row. This section can be considered like a *control unit* for Row piloting.

*NOTE: Each Row has its own independent section, but "which section" is active is displayed by the ON LED and it's decided with the selected **SEQ MODE** in **R24** Sequencer. So, if **R24** acts like a single Sequencer with 24 Steps (Mode A+B+C), there'll be just one control unit turned on for Row A; when **R23** acts like a dual Sequencer 16+8 Steps (Mode A+B, C), there'll be two control units turned on for Rows A (acting over Rows A&B) and Row C; still, when **R24** works like a three-Sequencers in paralle (Mode A,B,C), there'll be all three control units turned on and active on the respective Rows.*

*NOTE: Repeatedly pressing on switches will cyclic "forward" advance in the selection of parameters from lowest to highest option; at the end, selection will start back again from the lowest position. If using combination **SHIFT+Parameter switch**, selection will proceed with inverted advance, e.g. from highest to lowest available position. **SHIFT** button is in **MAIN** Control Section.*

LED ON
Turns On if control unit is active and functioning over corresponding Row(s).

Switch ORDER
Defines the iteration rule used for read the active Steps. An eight-Step Sequence 1.2.3.4.5.6.7.8 will be read in the following modes:

- **1.2.;** 1.2. 2.3. 3.4. 4.5. 5.6. 6.7. 7.8. etc; duplets advancing;
- **1.2.1.;** 1.2.1. 2.3.2. 3.4.3. 4.5.4. 5.6.5. 6.7.6. etc; triplets advancing;
- **1.3.5.;** 1.3.5., 2.4.6., 3.5.7, 4.6.8., etc;
- **1.1.2.1**; 1.1.2.1., 2.2.3.2., 3.3.4.3., 4.4.5.4., 5.5.6.5., 6.6.7.6., etc;
- **1.2.3.2**; 1.2.3.2., 2.3.4.3., 3.4.5.4., 4.5.6.5., 5.6.7.6, etc;
- **D.**, this position (D for *Display*) recalls the User's programmable iteration function; this is freely Row-recallable with **Parameter Display**. See below.

Switch STP RPT (STEP REPEAT)
Sets how many times Steps is repeated before passing to next Step; when LED column is completely turned off, there's no repetition (each active Step is read *only one time*); you can choose between 2, 3 or 4 repetitions, corresponding to LED on **X2**, **X3**, **X4**.

Step ROW RPT (ROW REPEAT)
Usually, every Step Sequencer not set on *One Shot*, repeats its Sequence ad infinitum; **R24** offers fairly complex repetition schemes useful for reorganize in real time playing of two or three Sequences simultaneously (**SEQ MODE** on **A,B,C** and **A+B,C**).
ROW RPT parameter allows you to choose if Row is repeated *ad infinitum* (option ∞) or *a finite number of times* (options **X4**, **X3**, **X2**, corresponding to four, three and two repetitions for Row). On completion of the number of repetition specified, Row playback stops.

*NOTE: This parameter is active only if mode **GLOBAL LOOP** (in the **MAIN** Section of **R24** Sequencer) is in **OFF** position.*

Switch ADV DIV (ADVANCE DIVISION)
Each Row can advance its Steps with a dividing factor applied on *selected Clock Source* (in **CLOCK** Section, with command **CLK SEL**). So, one Row can advance at speed **/2**, **/3**, **/4**, **/6**, **/8**, **/16, D** in respect of original density of clock train of pulses. Last position, marked **D** refers at freely user's adjusted value for each Row. Refer below to **Parameter Display** Section.

*NOTE: Step Sequencer **R24** provides an additional global level of Clock Divider Menu Display. See below on **Parameter Display** Section.*

Mode RESET
By simultaneously pressing buttons **STORE** and **ROW REPT** on selected Row, you'll force restar for the Row from the first active Step.

ROW CONNECTIONS

Each Row has dedicated connections for transmission of analog controls (CV and Gate) and for remote control – from external analog equipment – on most important parameters.
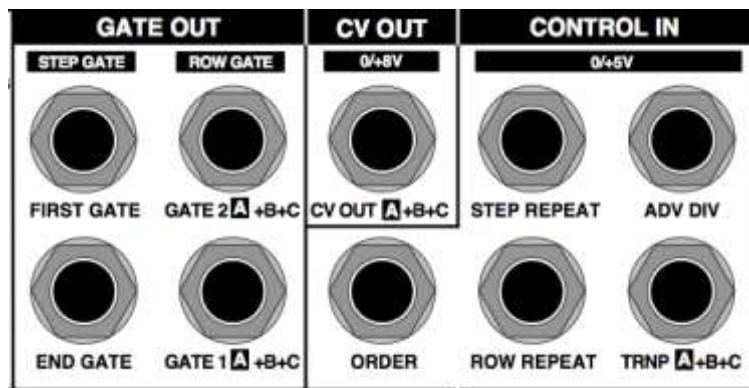
Connections GATE OUT (Row A)

This block contains four connections.

STEP GATE FIRST GATE

This port emits a Gate 0/+5V every time the first active Step is played in the Sequence. Useful for start several generators in parallel or for firing other external events.

STEP GATE END GATE

This ports emits a Gate 0/+5V every time the last active Step is played in the Sequence (the Step on which has been selected **END STEP** behavior with the upper position of switch **NORM / SKIP / END STEP**). Useful for start several Sequencers connected in series.

ROW GATE GATE1 A+B+C

This port emits a train of Gate pulses corresponding at each active Steps in Row A (SEQ MODE in position A,B,C), in Rows A andB (SEQ MODE in position A+B, C), in Rows A, B and C (SEQ MODE in position A+B+C). Useful for start envelope generators or several external events.

At this port, obviously, will appears only Gate tensions relative to Steps assigned on **Gate 1** position with switch **Gate 1 / Off / Gate 2**.

ROW GATE GATE2 A+B+C

This port emits a train of Gate pulses corresponding at each active Steps in Row A (SEQ MODE in position A,B,C), in Rows A andB (SEQ MODE in position A+B, C), in Rows A, B and C (SEQ MODE in position A+B+C). Useful for start envelope generators or several external events.

At this port, obviously, will appears only Gate tensions relative to Steps assigned on **Gate 2** position with switch **Gate 1 / Off / Gate 2**.

*NOTE: The internal normalizaton allows changing **SEQ MODE**, reconfiguring behavior of R24 Step Sequencer, while mantaining physical patch cord connections for Gate Out, thus avoiding repatching every time you'll change mode/length/configuration for the whole Sequencer.*

Connections CV OUT (Row A)

This block contains just one connection.

Connection CV OUT A+B+C

This port emits CV Out (0/+8V in three selectable ranges with Row switch **RANGE X2/X4/X8**) corresponding at the values programmed on each *active or inactive Step* (see *NOTE* below) for Row and Sequence. Will be emitted only CV for Steps 1-8 if Step Sequencer **R24** is in **SEQ MODE A,B,C**; will be emitted CV for Steps 1-16 if **R24** is in **SEQ MODE A+B,C**; will be emitted CV for Steps 1-24 if **R24** is in **SEQ MODE A+B+C**. In this way, as stated before, user can avoid repatching cables when changin configuration of **SEQ MODE**.

*NOTE: Step are always emitting their CVs, either by activation of **GATE1/GATE2**; the only way to avoid CV out from a Step consists in selecting **SKIP STEP** condition for the undesider Step value (this will shorten the sequence).*
*But, if you desperately want a Step not assigned on a Gate bus 1or 2 doesn't transmit its value over CV Out, or if you want to prolong arbitrarily (for multiples of Step duration) the duration of a CV smearing over more than one Step, you can use the **S&H ON** mode (using the dedicated Row switch), for latching the value. In this way, CV Out will be sampled and mantained in memory (hold) until the next Gate enabled. Only Steps assigned on **GATE1/GATE2** will be allowed to transmit Out their CV values. Other CV values from Steps unassigned will be ignored.*

Connections CONTROL IN (Row A)

This block of five ports permits remote control of five parameters thru external CV comprised between 0 and +5V during Sequence playback. Still, is available a Transpose Input for real-time transposing of Step values.

Port ORDER

An external CV, comprised between 0 and +5V, sets **ORDER** parameter, for remote choice of advance type for all the Steps enabled. Choice with external CV turns on the corresponding LED in the **ORDER** LED column.

Port STEP REPEAT

An external CV, comprised between 0 and +5V, sets **STEP REPEAT** parameter, for remote choice of number of repetition for all the Steps enabled. Choice with external CV turns on the corresponding LED in the **STEP RPT** LED column.

Port ROW REPEAT

An external CV, comprised between 0 and +5V, sets **ROW REPEAT** parameter, for remote choice of number of repetition for the Row. Choice with external CV turns on the corresponding LED in the **ROW RPT** LED column.

Port CLOCK DIV

On each Row, Step advance rate is connected at "dimension iso rhythmic" assigned to enabled Steps; starting from an arbitrary Clock density (see below on **Parameter Display** for the dividing factors applyable on Clock signals generated and received by Step Sequencer **R24**), user can choose if Steps will advance with a rhythmic division independent on each Row. Port **CLOCK DIV** is enabled to receive an external CV comprised between 0 and +5V for choosing the selected rhythmic division. Choice with external CV turns on the corresponding LED in the **CLOCK DIV** LED column.

Port TRNP A+B+C
Adds an analog CV comprised between 0 and +5V to the programmed Step values for real-time transpose of the Sequence.

Signal received at port **TRNP A+B+C** is active on Steps 1-8 in **SEQ MODE A,B,C**; is active on Steps 1-16 in **SEQ MODE A+B,C**; is active on Steps 1-24 in **SEQ MODE A+B+C** avoiding repatching every time **SEQ MODE** will change.
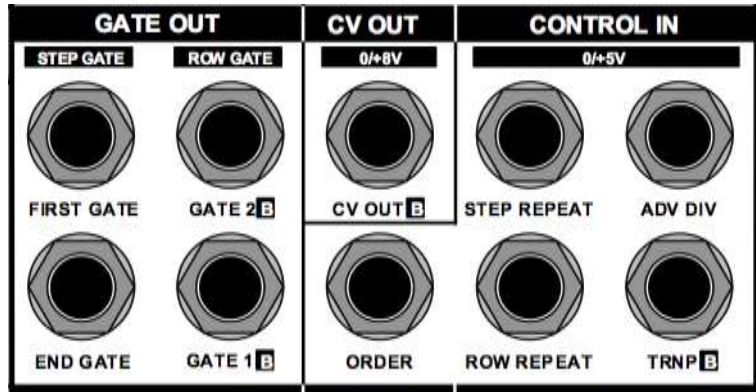
Connections GATE OUT (Row B)
This block contains for ports.

STEP GATE FIRST GATE
This port emits a Gate 0/+5V every time the first active Step is played in the Sequence. Useful for start several generators in parallel or for firing other external events.

STEP GATE END GATE
This ports emits a Gate 0/+5V every time the last active Step is played in the Sequence (the Step on which has been selected **END STEP** behavior with the upper position of switch **NORM / SKIP / END STEP**). Useful for start several Sequencers connected in series.

Port ROW GATE GATE1 Out B
This port emits a train of Gate pulses corresponding at each active Steps in Row B (SEQ MODE in position A,B,C. Useful for start envelope generators or several external events.

At this port, obviously, will appears only Gate tensions relative to Steps assigned on **Gate 1** position with switch **Gate 1 / Off / Gate 2**.

Port ROW GATE GATE2 Out B
This port emits a train of Gate pulses corresponding at each active Steps in Row B (SEQ MODE in position A,B,C. Useful for start envelope generators or several external events.

At this port, obviously, will appears only Gate tensions relative to Steps assigned on **Gate 2** position with switch **Gate 1 / Off / Gate 2**.

Connections CV OUT (Row B)
This block contains just one connection.

Port CV OUT B
This port emits CV Out (0/+8V in three selectable ranges with Row switch **RANGE X2/X4/X8**) corresponding at the values programmed on each *active or inactive Step* (see *NOTE* below) for Row and Sequence. Will be emitted only CV for Steps 9-16 if Step Sequencer **R24** is in **SEQ MODE A,B,C**. In this way, as stated before, user can avoid repatching cables when changin configuration of **SEQ MODE**.

*NOTE: Step are always emitting their CVs, either by activation of **GATE1/GATE2**; the only way to avoid CV out from a Step consists in selecting **SKIP STEP** condition for the undesider Step value (this will shorten the sequence).*
*But, if you desperately want a Step not assigned on a Gate bus 1or 2 doesn't transmit its value over CV Out, or if you want to prolong arbitrarily (for multiples of Step duration) the duration of a CV smearing over more than one Step, you can use the **S&H ON** mode (using the dedicated Row switch), for latching the value. In this way, CV Out will be sampled and mantained in memory (hold) until the next Gate enabled. Only Steps assigned on **GATE1/GATE2** will be allowed to transmit Out their CV values. Other CV values from Steps unassigned will be ignored.*

Connections CONTROL IN (Row B)

This block of five ports permits remote control of five parameters thru external CV comprised between 0 and +5V during Sequence playback. Still, is available a Transpose Input for real-time transposing of Step values.

Port ORDER

An external CV, comprised between 0 and +5V, sets **ORDER** parameter, for remote choice of advance type for all the Steps enabled. Choice with external CV turns on the corresponding LED in the **ORDER** LED column.

Port STEP REPEAT

An external CV, comprised between 0 and +5V, sets **STEP REPEAT** parameter, for remote choice of number of repetition for all the Steps enabled. Choice with external CV turns on the corresponding LED in the **STEP RPT** LED column.

Port ROW REPEAT

An external CV, comprised between 0 and +5V, sets **ROW REPEAT** parameter, for remote choice of number of repetition for the Row. Choice with external CV turns on the corresponding LED in the **ROW RPT** LED column.

Port CLOCK DIV

On each Row, Step advance rate is connected at "dimension iso rhythmic" assigned to enabled Steps; starting from an arbitrary Clock density (see below on **Parameter Display** for the dividing factors applyable on Clock signals generated and received by Step Sequencer **R24**), user can choose if Steps will advance with a rhythmic division independent on each Row. Port **CLOCK DIV** is enabled to receive an external CV comprised between 0 and +5V for choosing the selected rhythmic division. Choice with external CV turns on the corresponding LED in the **CLOCK DIV** LED column.

Port TRNP B

Adds an analog CV comprised between 0 and +5V to the programmed Step values for real-time transpose of the Sequence.

Signal received at port **TRNP B** is active on Steps 9-16 in **SEQ MODE A,B,C** avoiding repatching every time **SEQ MODE** will change.
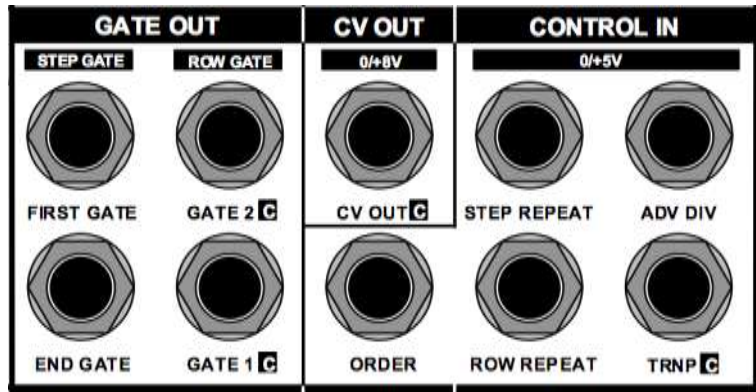
Connections GATE OUT (Row C)

This block contains four ports.

STEP GATE FIRST GATE

This port emits a Gate 0/+5V every time the first active Step is played in the Sequence. Useful for start several generators in parallel or for firing other external events.

STEP GATE END GATE

This ports emits a Gate 0/+5V every time the last active Step is played in the Sequence (the Step on which has been selected **END STEP** behavior with the upper position of switch **NORM / SKIP / END STEP**). Useful for start several Sequencers connected in series.

Port ROW GATE GATE1 Out C (Row C)

This port emits a train of Gate pulses corresponding at each active Steps in Row C (SEQ MODE in position A,B,C. Useful for start envelope generators or several external events.

At this port, obviously, will appears only Gate tensions relative to Steps assigned on **Gate 1** position with switch **Gate 1 / Off / Gate 2**.

Connessione ROW GATE GATE2 Out C (Row C)

This port emits a train of Gate pulses corresponding at each active Steps in Row C (SEQ MODE in position A,B,C.

At this port, obviously, will appears only Gate tensions relative to Steps assigned on **Gate 2** position with switch **Gate 1 / Off / Gate 2**.

Connections CV OUT (Row C)

This block contains just one connection.

Port CV OUT C (Row C)

This port emits CV Out (0/+8V in three selectable ranges with Row switch **RANGE X2/X4/X8**) corresponding at the values programmed on each *active or inactive Step* (see **NOTE** below) for Row and Sequence. Will be emitted only CV for Steps 17-24 if Step Sequencer **R24** is in **SEQ MODE A,B,C**. In this way, as stated before, user can avoid repatching cables when changin configuration of **SEQ MODE**.

*NOTE: Step are always emitting their CVs, either by activation of **GATE1/GATE2**; the only way to avoid CV out from a Step consists in selecting **SKIP STEP** condition for the undesider Step value (this will shorten the sequence).*
*But, if you desperately want a Step not assigned on a Gate bus 1or 2 doesn't transmit its value over CV Out, or if you want to prolong arbitrarily (for multiples of Step duration) the duration of a CV smearing over more than one Step, you can use the **S&H ON** mode (using the dedicated Row switch), for latching the value. In this way, CV Out will be sampled and mantained in memory*

*(hold) until the next Gate enabled. Only Steps assigned on **GATE1/GATE2** will be allowed to transmit Out their CV values. Other CV values from Steps unassigned will be ignored.*

Connections CONTROL IN (Row C)

This block of five ports permits remote control of five parameters thru external CV comprised between 0 and +5V during Sequence playback. Still, is available a Transpose Input for real-time transposing of Step values.

Port ORDER

An external CV, comprised between 0 and +5V, sets **ORDER** parameter, for remote choice of advance type for all the Steps enabled. Choice with external CV turns on the corresponding LED in the **ORDER** LED column.

Port STEP REPEAT

An external CV, comprised between 0 and +5V, sets **STEP REPEAT** parameter, for remote choice of number of repetition for all the Steps enabled. Choice with external CV turns on the corresponding LED in the **STEP RPT** LED column.

Port ROW REPEAT

An external CV, comprised between 0 and +5V, sets **ROW REPEAT** parameter, for remote choice of number of repetition for the Row. Choice with external CV turns on the corresponding LED in the **ROW RPT** LED column.

Port CLOCK DIV

On each Row, Step advance rate is connected at "dimension iso rhythmic" assigned to enabled Steps; starting from an arbitrary Clock density (see below on **Parameter Display** for the dividing factors applyable on Clock signals generated and received by Step Sequencer **R24**), user can choose if Steps will advance with a rhythmic division independent on each Row. Port **CLOCK DIV** is enabled to receive an external CV comprised between 0 and +5V for choosing the selected rhythmic division. Choice with external CV turns on the corresponding LED in the **CLOCK DIV** LED column.

Port TRNP C (Row C)

Adds an analog CV comprised between 0 and +5V to the programmed Step values for real-time transpose of the Sequence.

Signal received at port **TRNP B** is active on Steps 9-16 in **SEQ MODE A,B,C** avoiding repatching every time **SEQ MODE** will change.
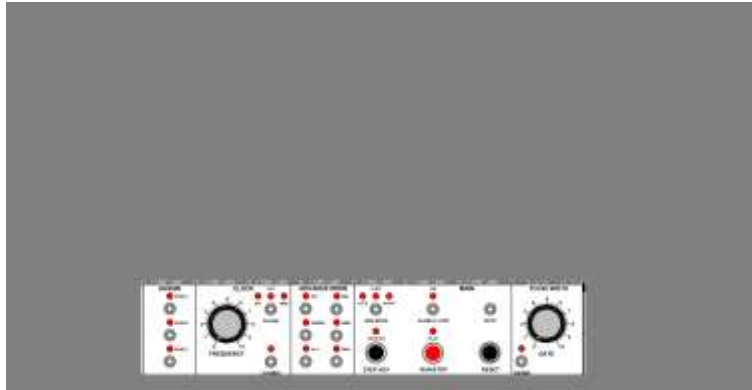
SEQUENCE PARAMETERS

This section comprises all controls and selections that influence the whole functioning of **R24** Step Sequencer. There is a dedicated block of connections for remote control; see below.
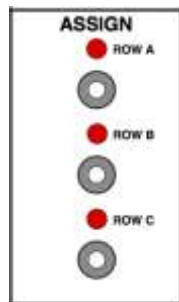
Section ASSIGN

Three selectos **ROW A**, **ROW B**, **ROW C** simplify choosing Row parameters for editing on Display.

*NOTE: in a next soft revision, the three selectors will be used together with **ADVANCE MODE** switches for obtain indipendence between Rows advance.*
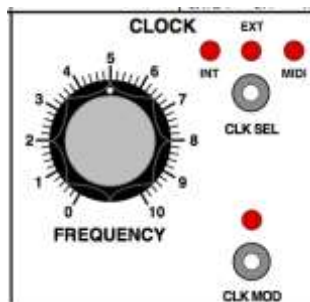
Section CLOCK

Contains selectors for choose Clock source and control for setting playing speed of Sequence.

Pot FREQUENCY
Sets playing speed for Sequence; value is comprised between 30 and 300 BPM, you can read it on the four digit Display.

Switch CLOCK SEL
Allows selection between:

> Internal Clock (position **INT**),
> External Analog Clock (position **EXT**),

MIDI Clock (position **MIDI**).

The EXT Clock signal is received at input port **CLOCK IN** available in CLOCK section of Sequencer Connections. Clock Source chosen is confirmed by corresponding LED.

Switch CLK MOD
With this switch, you can assign values from Steps in Row C to internal Clock modulation.

*NOTE: this parameter is selectable only when Sequencer is in **STOP**.*
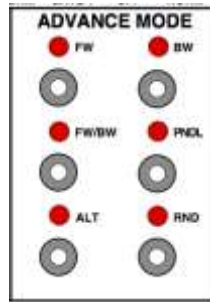

Section ADVANCE MODE

Comprises selection for Sequence advance type. You can choose between:

FW (forward advance, from first till last Step enabled);
BW (backward advance – from last till first Step enabled);
FW/BW (advance forward and backward – from first till last and from last till first Step, with repetition of terminal Steps);
PNDL (advance forward and backward, without repetition of terminal Steps);
ALT (adance alternating Steps, following the **SEQ MODE** previously selected:
>   **A,B,C: ALT** plays active Steps advancing *in vertical columns A1, B9, C17, A2, B10, C18, etc;*
>   **A+B,C**: **ALT** plays active Steps alternating max 16 Steps on Rows A & B with active Steps from Row C;
>   **A+B+C**,**ALT** plays active Steps advancing *in vertical columns A1, B9, C17, A2, B10, C18, etc – same as **A,B,C**.*
RND (random advance).
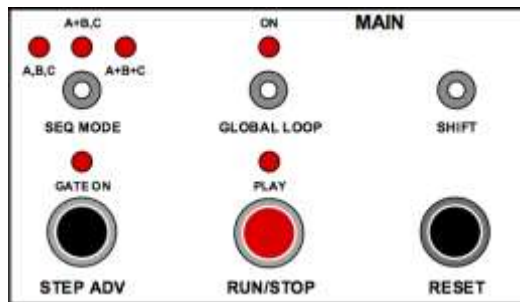
Section MAIN

Contains the following controls:

Selector SEQ MODE
For choosing three different Modes of organizing/playing the Rows:

>   **A,B,C**: the three Rows works in parallel mode, generating simultaneously eight vertical columns, each one containing three voltages for external synthesizers (e.g., Row A on Oscillator tuning, Row B on Filter Cutoff, Row C on Amplifier Gain). Each

Row can – on request – act indipendently with its set of parameters for iteration, ordering, advance speed, or can refers to parameters set from Row A.

A+B, C: Rows are organized in a long Sequence (maximum length: 16 Steps) composed with Steps 1-8 from Row A and Steps 9-16 from Row B; Row C plays always in parallel mode. In this way, you can have 16 separate tunings (Row A and B) with 8 accents programmed on Row C. By Default, Rows A and B shares iteration,and order, and adance speed programmed for Row A; Row C can be set independently.

A+B+C: the three Rows are organize in a single, long, Sequence of 24 Steps. By Default, Rows A, B and C shares parameter settings from Row A.

Selected configuration is confirmed by corresponding LED.

*NOTE: here, as in other similar cases, it is worth noting that the flexibility offered by Step Sequencer **R24** can lead to meaningless or useless configurations. Be careful.*

Switch GLOBAL LOOP
Enable or disable unconditioned repetitions for Sequence. In **OFF**, Sequence will play just one time, then Sequencer will stops; but if, in **OFF**, musician sets value **X2**, **X3**, **X4**, ∞ in Row control units (according to **SEQ MODE** previously selected), each Row can repeats independently for "real time remix" of the whole Sequence.
GLOBAL LOOP enable is confirmed by corresponding LED.

Switch SHIFT
For choosing alternative meanings on main panel commands. In software revision 1.0, **SHIFT** inverts scrolling direction of parameter values contained in Rows control units.
SHIFT On is confirmed by corresponding LED.

Button STEP ADV
For adance one Step at time during Sequencer programming and Step tuning; with **STEP ADVANCE**, Step Sequencer **R24** emits Gate Out at 100% of duration, mantaining constantly open envelopes with enough Sustain level, facilitating oscillator tunings and Step value settings.
Step advance and Gate On are confirmed with corresponding LEDs.

Button RUN/STOP
Start playback (**RUN**) or stop playback (**STOP**) for selected Sequence. A second pressure after **STOP** will restart playback from the point where it left off (*Continue* behavior); if instead you press **RESET** button (see below), playback will restart from the very beginning of Sequence.
RUN is confirmed by LED.

Button RESET
Reset Sequence taking back to first active Step for playback. Can be used during program and Step tuning procedure, or during playback for *stuttering Sequence*.
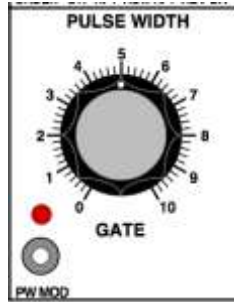
Section PULSE WIDTH

Contains controls for varying simmetry in Sequence PW Gate; by default, Gate has a on/off percentage at 50%, it can vary form full *staccato* (min PW value) to full *legato* (max PW value).

Control GATE

Sets GATE percentage for all active Steps in Sequence.

NOTE: as you can imagine, this command is active only on Internal Clock and MIDI Clock (positions **CLK SEL INT** and **MIDI**); the command is inactive on analog EXT Clock received at port **CLOCK IN**. In this case, Gate percentage is set by default at 50% and cannot be modified – unless not to act directly on external Clock source (e.g., modifying the length of sync pulse used).

Switch PW MOD

For assign values programmeg in Row C Steps to modulate Gate PULSE WIDTH. Assignment is confirmed with corresponding LED.
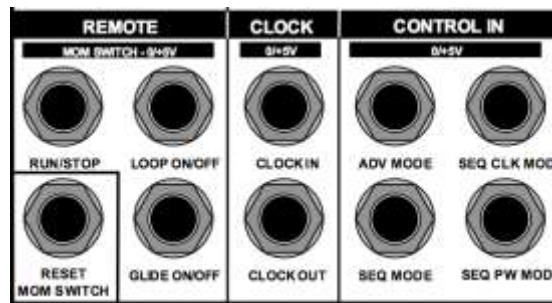
NOTE: This parameter can be enabled only when Sequencer is idling in **STOP**.

SEQUENCE CONNECTIONS

Contains connections for remote control of main parameters of the whole Sequencer.

Section REMOTE

This section contains four ports.

> **RUN/STOP**; Sequence play or stop. Remote control needs a Gate On transient rising from 0 to +5V; this port uses only positive-going transient in Gate On; first Gate On received starts Sequenc, second Gate On received stops Sequence. Negative-going transient (from +5V to 0V will be ignored).
>
> **LOOP ON/OFF**; remote enable/disable for **GLOBAL LOOP**; port reads positive-going transient from 0V to +5V (e.g. Gate On works perfectly). Negative-going transient (from +5V to 0V will be ignored).
>
> **RESET**; remote control for take back Sequence to its first valid Step. This port espects a momentary closing switch (e.g. from Damper Pedal), *not* a Gate.
>
> **GLIDE ON/OFF**; remote on/off for Portamento/Glide on all three Rows. Port espects a positive-going transient from 0V to +5V (e.g. Gate On works perfectly). Negative-going transient (from +5V to 0V will be ignored).

Section CLOCK

Contains two ports for transmitting (**CLOCK OUT**) and receiving (**CLOCK IN**) analog TTL clock signal from an external source, a second Sequencer, a square-wave LFO or whatever. Cl.ck pulses received should be 0/+5V with max 100 msec of duration.

NOTE: when R4 is in EXT CLOCK mode, user can press RUN button in advance – before unit will receive the external clock pulse train – or "press in time" trying to catch the perfect downbeat on Ext Clock. For more stable results and for easyness of in-time start, is strongly recommended to use MIDI Clock

Section CONTROL IN

Contains four ports for receiving external CV (0/+5V) apted to remote controlling the following parameters:

ADV MODE; FW, BW, FW/BW, PNDL, ALT, RND;
SEQ CLK MOD; On/Off;
SEQ MODE; A,B,C; A+B,C; A+B+C;
SEQ PW MODE; On/Off

SECTION GLOBAL SETTINGS – PARAMETER DISPLAY

From here, you'll gain access to functions and parameters on Display, the whol world *under the hood* of Step Sequencer **R24**.
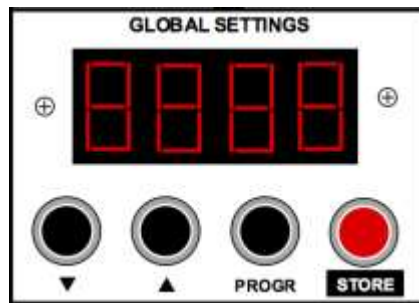
All operations are made with buttons **PROGR**, **STORE** and the couple **INC** (pointing up arrows) and **DEC** (pointing down arrow). Every command has an abbreviated form displayed on the four alfanumeric digits.

From BPM screen to Menus in Parameter Display Section

At power-up, after a brief check, **R24** sets on *BPM screen*, visualizing actual BPM speed; you can vary speed with **FREQUENCY** control in **CLOCK** Section near the Display.

Picture above shows **DISPLAY** at 120 BPM. This screen is *external* to Menu organization of parameters and is visible during the whole standard playback of Step Sequencer.

Navigation

Pressing **PROG** button, you'll leave BPM screen and enter into programming Menus.

NOTE: accessing to Menus is possible only when Step Sequencer R24 is in STOP.

With buttons **INC** and **DEC**, you'll pass thru in cyclic rotation all available parameter's Menus; each Menu contains one or more parameters, each one with its own set of choices.

Once you reach desired Menu, you can enter into with **PROGR** button and, with buttons **INC** and **DEC**, you'll scoll all available parameters in Menu. If necessary, you can specify *which Row* will be set for receive parameter's data; Row **A, B** or **C** is selected with buttons **INC** and **DEC**.

*NOTE: Row desired can be easily selecet with three switches **ASSIGN ROW A, ROW B** and **ROW C**.*

Variations in parameter's value will be programmed with buttons **INC** and **DEC**; you'll permanently write each edit value with **STORE** button and you'll go back to *Menu name*. If you prefer abort operation without save anything, press repeatedly **PROG** button for go back to parameter name.

Exiting from Menu, or changing Menu is obtained with **INC** and **DEC** buttons.

NOTE: Parameter organization and availability will vary with soft revisions. Following description adapts on Rev. 1.0.

Available Menu
In Rev 1.0, there are the followings parameter's Menus:

MIDI
All MIDI parameters separately editable on each Row.

TIME DIVISION
Define how **R24** Step Sequencer will advance against Clock.

FUNCTION
The four function available to be assigned – Row per Row – on position **FNC 1** and **FNC 2** of switch **OFF / FNC1 / FNC 2**.

CLOCK
Pulse clock density for each Step, freely adjustable for **CLOCK IN** and **CLOCK OUT**.

MEMORIES
Writing and reading procedures for 64 internale memories.

ORDER
User's programmable law for reading Steps in a specific order. There are 24 available memory locations.

CLOCK DIVISION
Dividing Clock factor separately adjustable on each Row.

FACTORY
Servicing routines not available for user.

Menu MIDI

Parameters and settings are independent on each Row A, B or C. MIDI Menu is reachable with **INC** and **DEC** buttons; with **PROGR** button, you'll enter into the Menu and, once inside, you'll scroll available parameters with buttons **INC** and **DEC**; choosed parameter is confirmed with **PROGR** button; parameter's value will be edited with **INC** and **DEC** buttons. Still, with **STORE** button, you'll confirm all your edits ad, with **PROGR** button, you'll go back to Menus architecture.

Parameter Channel Transmit
(Row A, B, C; Value 01-16)
Select independently on each Row A, B or C, MIDI Channel for transmitting Step values.

- After confirming parameter (**PROGR** button), you should select Row desiderd (select A,B or C with buttons **INC** and **DEC**).
- Confirm you Row choice with button **PROGR**.
- With buttons **INC** or **DEC**, choose desired MIDI Channel (from 01 to 16).
- Write your choice with **STORE** button, *go back to parameter heading* (picture above).

Parameter Channel Receive
(Row A, B, C; Vale 01-16)
Select independently on each Row A, B or C, MIDI Channel for receiving MIDI Notes Step values used like real-time transpose of programmed sequences.

- After confirming parameter (**PROGR** button), you should select Row desiderd (select A,B or C with buttons **INC** and **DEC**).
- Confirm you Row choice with button **PROGR**.
- With buttons **INC** or **DEC**, choose desired MIDI Channel (from 01 to 16).
- Write your choice with **STORE** button, *go back to parameter heading* (picture above).

*NOTE: From parameter display (as pictured above), you can go back at available parameters Menu with **STORE** button. Every time you'll prefer to abort edit, from parameter's value window, just press **PROGR** button for go back to parameter display.*

Parameter Velocity
(State On/OFF, Fila A, B; Value 0-127)
You can use programmed Step values in Row C like *Key Velocity values* (e.g. second Data Byte) applyable to programmed note in Rows A, B or A&B. This can be handy when Sequencer is in **SEQ MODE A,B,B** or **A+B,C**. When Sequencer is in Mode **A+B,C**, key velocity data programmed on Row C will be applied on both Steps 1-8 and 9-16, with respect for Offsets programmed on each Row. See below.

- After confirming parameter (**PROGR** button), choose Velocity On or Off with buttons **INC** and **DEC**.
- *When **ON**, Row C stops transmitting MIDI Notes and translates programmed Step values as Key Velocity applyable on Row A, B or A&B.*
- Once reached **ON** for Velocity with button **PROGR** (you can choose On or Off on DisplayA), confirm with button **STORE**.
- With buttons **INC** or **DEC**, choose Row A, B or A&B for Velocity; confirm choice with button **PROGR**.
- Set the *maximum velocity value* (between 0 and 127) applied to Step 17-24 fully clockwise; otherwise, exit with button **PROGR** for go back to parameter name.
- Confirm and write your edit with button **STORE**.

NOTE: With this parameter, is it possibile to subdivide MIDI Note On programming over two Sequence Rows: Rows A and B will produce always first data byte, with MIDI Note number for each Step (with user's selectable MIDI Channel); Row C will produce only the second data byte. As you can imagine, if for some reason, Rows A or B doesn't transmit MIDI note, Key Velocity alone is useless. Be careful.

Parameter Low Note
(Row A, B, C; Value 12, 24, 36, 48, 60, 72)
Sets lowest MIDI note assigned independently on each Row for fully counter-clockwise position of Steps. This is a *double* parameter: it works on both MIDI In (real-time transpose) and MIDI Out (Sequencer outputted value). Parameter's values available allows choosing between "C note" values on keyboard expressed in decimal numbers. So, is it possibile to select C1 (MIDI Note 12), C2 (MIDI Note 24), C3 (MIDI Note 36), C4 (MIDI Note 48), C5 (MIDI Note 60), C6 (MIDI Note 72), C7 (MIDI Note 84).

- After confirmed parameter with button **PROGR**, select working on MIDI receiving data (**IN**) or MIDI transmitting data (**OUT**); select with buttons **INC** and **DEC**.
- Then, select desiderd Row with buttons **INC** or **DEC** *or* with switches **ROW A**, **ROW B**, **ROW C** on the front panel. Confirm your choice with button **PROGR**.
- Select desided numeric value (12, 24, 36, 48, 60, 72, 84) with buttons **INC** or **DEC**.
- Confirm with button **STORE** (go back to parameter's name) or abort with button **PROGR** (and go back to Row selection).

NOTE: this "offset" parameter for lowest note is active only on MIDI port ad has absolutely no value over analog ports CV OUT. Analog CV emitted when Step value is in full counter clockwise position is always 0 Volt.

Parameter Transpose
(Mode 1 / Mode 2)
Select the way **R24** works with incoming MIDI Notes for real-time transpose.

- In **MODE 1**, **R24** should receive MIDI Notes on all *three* channels corresponding at Rows A, B and C (See above, parameter **MIDI/Channel Receive**).
- In **MODE 2**, the three Rows A, B and C, will be simultaneously real-time transposed using just MIDI Notes received on Row's A MIDI Channel.

Selection, editing and confirming for parameter is as usual:

- Once confirmed MIDI Menu (button **PROGR**), select with **INC** or **DEC** the Transpose parameter; Display reads like picture above.
- Confirm parameter choice with button **PROGR**.
- Chooose Mode 1 or 2 with **INC** or **DEC** and confirm with **STORE**.

MENU TIME DIVISION

Contains only one parameter for defining – *in common for all three Rows* – rhythmic value of Steps evaluated *against Clock MIDI, INT or EXT.*

*NOTE: To obtain an independent advancing speed on each Row, use **CLK DIV** parameter, available on each Row's control unit (Front Panel, column at right of Steps):*

Parameter Time Division
(1, 1t, 2, 2t, 4, 4t, 8, 8t, 16 default, 16t 32)
The dividing factor/rhythmic value for Step applied to Clock sources is valid for all three Rows.

- Confirm MIDI Menu (**PROGR** button); select parameter Time Division (buttons **INC** or **DEC**).
- Confirm parameter with **PROGR**.
- Choose dividing factor/rhythmic value for Step with **INC** or **DEC**, confirm with **STORE**.

MENU FUNCTION

Contains a menu of *functions* applyable independently on Rows A, B and C. Each Row can have *a couple* of functions freely user's selectable and assigned on both physical position of switch **OFF / FNC1 / FNC2** available on each Step.

Parameter Function
(Row A, B, C, Function # 1, 2, 3, 4)
In Rev 1.0, there are *four* functions available:

- Function 1 = Portamento On/Off independent on each Step.
- Function 2 = Double Ratchet on each Step.
- Function 3 = Triple Ratchet on each Step.
- Function 4 = Quadruple Ratchet on each Step.

*NOTE: When selecting individua Portamento On/Off, each Step can have or not have the typical "slide" behavior. Portamento speed is always defined with **PORTAMENTO** control independently available on each Row.*

NOTE: Step duration will remains the same, on every density of Ratchet/bounces. E.g., if a Step lasts one quarter note, dual Ratchet will create two eigth notes; triple Ratchet will create three tripleted eight notes; quadruple Ratchet will create four sixteen notes.

This is the procedure for reach the parameter, choose desired Row and select, on each Row, *the couple* of functions available.

- Reach the Function Menu with **INC** and **DEC**; confirm with **PROGR**.
- With buttons **INC** and **DEC**, choose desiderd Row, confirm with **PROGR**.
- With buttons **INC** and **DEC**, choose **FNC1** or **FNC2** (corresponding on commands assigned to middle and upper position of switch **OFF / FNC1 / FNC2** available on each Step.
- Confirm with **PROGR**.
- Choose function number desired (1-4; see above); confirm choice with **STORE** or abort and go back to Row selection with **PROGR**.

*NOTE: **FNC1** and **FNC2** selection is independent on each Row for switch Step **OFF/FNC1/FNC2**, with no respect for **SEC MODE** selected. This can lead to extremely flexibility in working condition (Steps 1-8 behavior can be different from Steps 9-16 behavior), but either to a potentially confusing condition. Be warned.*

MENU CLOCK

Sets *density* of Clock pulses transmitted on **CLOCK OUT** port and received at **CLOCK IN** port needed for advance each Step.

Parameter Clock
(Clock Out, In; Density 1, 24, 48
On density 1, each pulse received at port **CLOCK IN** will advance one Step in Sequence; if density selected is 24 or 48, you'll need 24 or 48 pulses to advance one Step in Sequence.

NOTE: Clock density output cannot be superior to density selected for Clock In.

- Select Clock Menu with **INC** and **DEC**; confirm with **PROGR**.
- Select Clock **IN** or **OUT** with **INC** and **DEC**; confirm with **PROGR**.
- Select desired density (1 pulse per Step, 24 pulse per Step, 48 pulse per Step) with **INC** and **DEC**; write with **STORE** (go back to Menu Clock), abort with **PROGR** (go back to In/Out Selection).

MENU MEMORY

Contains commands for write or read data into 64 available memory locations o **R24**. Contains too access to *Panel Mode* (e.g. user works with "the real physical position" of all control on the front panel. Keep in mind that writing memory saves *all* panel and display parameters.

Parameter Read
(Location 1-64)

- Select Memory Menu with **INC** and **DEC**; confirm with **PROGR**.
- Choose READ (for read from memory) with **INC** or **DEC**; confirm with **PROGR**; display will shows **LOAD** briefly.
- Select desiderd memory location – *someone should have save something into R24* – with **INC** and **DEC**; confirm with **STORE** or abort with **PROGR** (go back to screen READ/WRITE).

Parameter Write
(Location 1-64)

- Select Memory Menu with **INC** and **DEC**; confirm with **PROGR**.
- Choose WRITE (for saving in memory) with **INC** ord **DEC**; confirm with **PROGR**.
- Select desiderd memory location with **INC** or **DEC**; confirm with **STORE** (Sequence will be saved) or abort with **PROGR** (go back to screen READ/WRITE).

Parameter Pan(el)

- Select Memory Menu with **INC** and **DEC**; confirm with **PROGR**.
- Choose **PAN**(el) for work with the "physical condition of all the controls in front panel" using **PROGR**; on Display, will appear *Rst?*, confirm with **STORE**.
- **R24** go back to BPM Display and all front panel is active.

NOTE: On power-up, R24 is always in Panel Mode.

MENU ORDER

With this menu, you can customize Row per Row the rules of active Steps advance and iteration. The brand new *law* user's customizable can be recalled later turning on the **D** position in LED ladder segment on **ORDER** parameter available on each Row's control unit.

Parameter Order Read
(Row A, B, C; locations 1-24)

- Select ORDER Menu with buttons **INC** and **DEC**; confirm with **PROGR**.
- Select READ, for read a new sequence/law of iteration with buttons **INC** and **DEC**; confirm that you want to read with **PROGR**.
- Select Row A, B or C for apply new ORDER law with buttons **INC** and **DEC**; confirm with **PROGR**.
- Select, with **INC** and **DEC** buttons, one of 24 available ORDER sequences previously saved. Confirm choice with **STORE**; abort with **PROGR**, going back to parameter Display.

Parameter Order Write
(Row A, B, C; Location 1-24; Listing: Step - # of Step)

- Select ORDER Menu with buttons **INC** and **DEC**; confirm with **PROGR**.
- Select WRITE for writing/programming a new iteration sequence with buttons **INC** and **DEC**; confirm with **PROGR**.
- Select, with **INC** and **DEC**, one of 24 available memory location in which write the brand new rules. Confirm location with **STORE**.

- Now, you are ready to *compile* the brand new ORDER list (each listing is composed with a list of maximum eight individual item pointing at a freely assignable Step number comprised between #1/position1 and #8/position8); Display shows at left the position in the list and at right the contained Step number to be played.
- In the above illustration, first line of the list (01) recalls Step # 1; *in reality,* first line on the list is *always* assigned to play Step #1: so, the real programming procedure starts from list position 02.
- After entered all the seven freely adjustable lines of ORDER program, confirm with **STORE** or abort with **PROGR** for going back to parameter Display.

NOTE: As stated above, each of 24 available ORDERs has a maximum lenght of 8 possible lines; each line contains a reference Step number comprised between 1 and 8.

NOTE: E.G., for programming a new ORDER who plays sequentially Steps 1,2,3,4, then 2,3,4,5, then 3,4,5,6, then 4,5,6,7, etc, you must follow the rules listed below:

- *Select **ORDER** parameter, confirm with **PROGR**.*
- *Select **WRITE** option, confirm with **PROGR**.*

- *Select desired memory location (one of 24 available) with **INC** and **DEC** buttons, confirm with **STORE**.*
- *By default, first line (01 on left part of Display) in ORDER already contains Step 1, so real programming will start from line 02; here, we'll write/select (with **INC** and **DEC**) value **2** (fourth blinking digit in Display).*
- *Go to third line with **PROGR**, write/select value **3** with buttons **INC** and **DEC**.*
- *Go to fourth line with **PROGR**, write/select value **4** with buttons **INC** and **DEC**.*
- *Write everything with **STORE**; Dispay will confirm with "write" for few seconds; then, Display goes back to **ORDER**.*

- *Now, to assign brand new **ORDER** law on **ROW A** – occupying position **D** in Row A's control unit, we'll have to enter in **READ** and confirm with **PROGR** choosing Row **A**; Row **A** is confirmed with **PROGR**.*
- *Select previously recorded ORDER memory location with **INC** and **DEC**; confirm with **STORE**; Display will shows shortly "write".*
- *With a second press on **STORE**, Display will goes back to BPM Mode and **R24** Step Sequencer is ready to play.*

MENU CLOCK DIVIDER

Each Row can have its own Clock Dividing Value, specifying the number of pulses needed for advance one Step against Clock (indifferenty Int, MIDI or EXT). Selected dividing factor will be called with position **D** in LED ladder on **CLC DIV** available on each Row's control unit.

Parameter Clock Divider
(Row A. B, C; Value 1- 64)

- Select Menu CLOCK DIVIDE with buttons **INC** and **DEC**; confirm with **PROGR**.
- Select desired Row with **INC** and **DEC** buttons.
- Inser selected dividing factor with **INC** and **DEC** buttons confirm with **STORE**, abort with **PROGR** to go back to Row's selection.

*NOTE: The combined action of **CLOCK DIVIDER** (especially if set on extreme dividing factors) and **TIME DIVISION** on CLOCK source, can lead **R24** Step Sequencer to extremely sloooooow Step advance behavior. Be warned.*

MENU FACTORY

Gives access to calibration and reset procedures. Calibration routines aren't user accessible, so there is a 4-digit password to avoid undesired tampering.

Parameter Reset
For driving back internal settings on Step Sequencer **R24** to pristine factory condition.

- Select Menu Factory with **INC** and **DEC** buttons; confirm with **PROGR**.
- Select RESET Parameter with **INC** and **DEC**, confirm with **PROGR**.
- Display asks for confirmation of RES(E)T with *OK?*, confirm with **STORE**, abort with **PROGR**.
- Step Sequencer **R24** will execute full Reset and Power-On cycle.

http://www.grpsynthesizer.it/