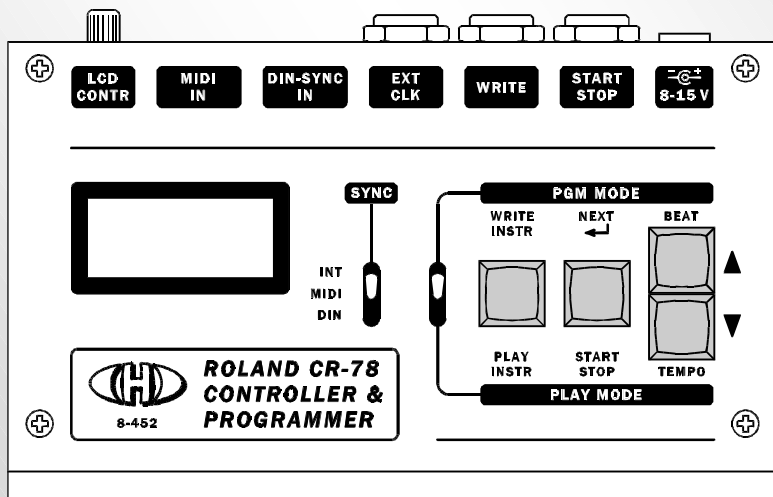


CR 78-PGM

Controller & Programmer for Roland CR-78

Model 8-452
ver. 2.0



USER GUIDE





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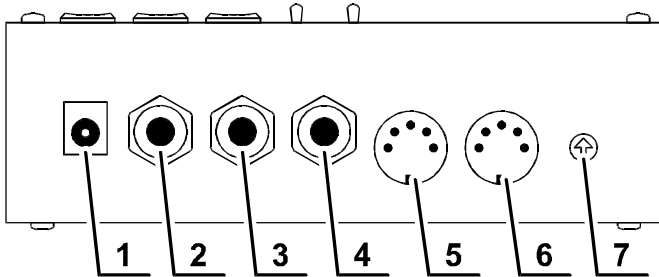


1. CONTROLLER DESCRIPTION

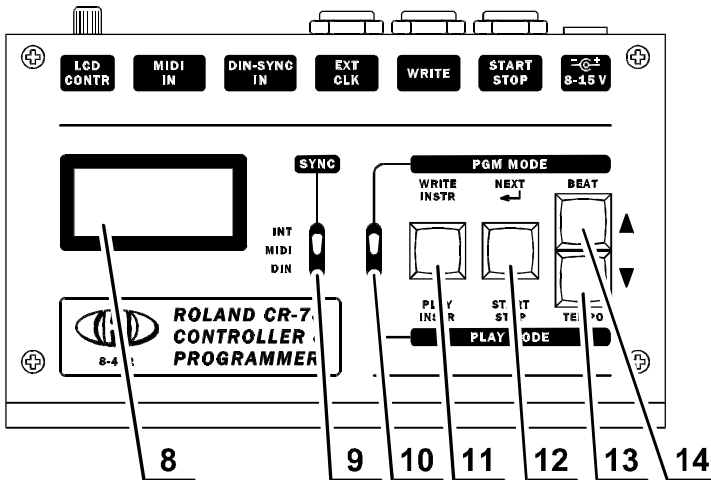
CR78-PGM is programmer and controller for Roland CR-78 drummachine. With help of it, CR-78 can be programmed very easy (by similar way as with original Roland WS-1 programmer). More over, CR78-PGM enables to control CR-78 during playback manually or via MIDI or DIN-SYNC buses.

Pic. 1 – Panels of the device

Rear panel



Top panel



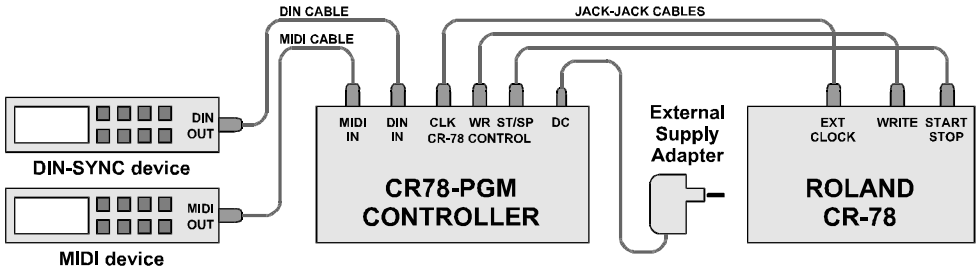
- [1] Power supply connector DC
- [2] START/STOP signal output
- [3] WRITE signal output
- [4] CLOCK signal output
- [5] DIN-SYNG bus input
- [6] MIDI bus input
- [7] LCD contrast setting

- [8] Display
- [9] Synchronization selector – SYNC switch
- [10] Working mode selector – MODE switch
- [11] PLAY / WRITE INSTRUMENT button
- [12] START-STOP / NEXT button
- [13] DECREMENT button
- [14] INCREMENT button



2. CONTROLLER CONNECTION

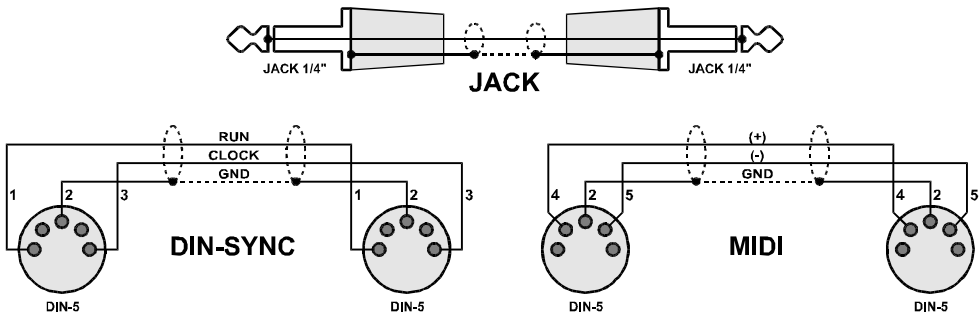
Pic. 2 – Connection of the device



Pic. 2 shows complete connection of the controller into the system. Schematics of used cables are shown in pic. 3.

If synchronization with MIDI and/or DIN-SYNC bus is not used, corresponding cable(s) stay unconnected at all.

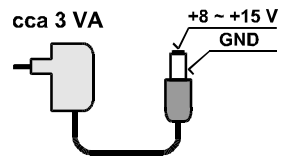
Pic. 3 – Cables for connection



The device is powered from external supply adapter. DC voltage from the adapter is connected to DC power supply connector [1]. It is standard coaxial connector (diameter 6 / 2,1 mm). External power supply must be able to provide at least 200 mA at 8 - 15 volt. DC voltage needn't to be stabilized.

The positive pole must be on inner pin, the negative on the external pin of the connector – see pic.4. The polarity is also depicted on panel of the device. The controller is protected against wrong polarity of supply voltage. The device does not work in such case, but it will not be damaged.

Pic. 4 - Supply adapter





3. CONTROLLER OPERATION

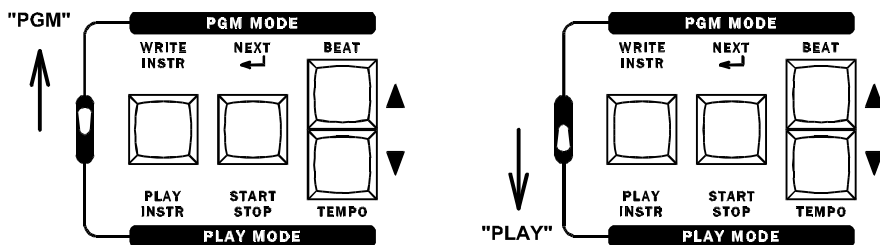
The device is not equipped with power switch. It works immediately after a supply adapter is connected. After connection with CR-78, it is necessary to turn on the controller first (to connect supply adapter to the controller). Now reset sequence will begin. During reset, display [8] shows name of the device and number of operational system version. After reset sequence, CR-78 can be turned on yet (by "POWER" switch on its panel).



All information about actual status of the device are displayed on display [8] during operation. Contrast of the display viewing can be set with LCD-CONTR [7] knob on rear panel.

3.1. WORKING MODE SELECTION

Requested working mode of the device can be selected by MODE [10] switch – "PLAY" for playback (lower position) or "PGM" for programming of user memories of CR-78 (upper position of the switch).



4. "PLAY" WORKING MODE

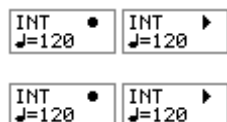
- PLAY - After PLAY mode is selected by MODE [10] switch, display [8] shows info about working mode change shortly and then the controller comes into playback mode.
- MODE -

In PLAY mode, the device controls tempo of CR-78 and its START/STOP function. Method of control depends on selected synchronization source. "TEMPO" knob on CR-78's panel is not functional!

4.1. SELECTION OF SYNCHRONIZATION SOURCE

CR-78 synchronization source can be selected by three-position SYNC [9] switch. It is possible to select these sources: Manual control with help of controllers on device's panel (upper position of SYNC switch), synchronization with MIDI bus (middle position of SYNC switch) or synchronization with DIN-SYNC bus (lower position of SYNC switch).

4.1.1. MANUAL SYNCHRONIZATION



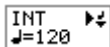
In manual (internal) synchronization mode, "INT" and "START [▶]" / "STOP [●]" symbols are shown in upper row of display [8], actual tempo is shown in lower row.

Playback tempo is controlled with TEMPO INCREMENT [14] / DECREMENT [13] buttons. Range of the tempo can be from 25 to 500 BPM (Beat per Minute). Tempo is increased / decreased in ±1 steps if INCREMENT [14] /



DECREMENT [13] buttons are pressed shortly. If TEMPO INCREMENT [14] / DECREMENT [13] buttons are pressed longer time, the tempo is increased / decreased continuously during the buttons are held.

Playback can be started and stopped with help of START / STOP [12] button. Actual status is shown on the right in upper row of display [8]. Round symbol [●] represents STOP status; arrow symbol [▶] represents START status.



With help of PLAY INSTR [11] button, it is possible to run up a sound generator of CR-78 which is selected with "INSTRUMENT SELECTOR" rotary selector on CR-78 panel.

After the PLAY INSTR [11] button is pressed, display [8] shows info about an instrument launching [▶] for a moment. A drum instrument can be running by this way only when CR-78 is just playing a rhythm. It is impossible when playback is stopped.

4.1.2. SYNCHRONIZATION WITH MIDI BUS



In MIDI synchronization mode, the controller receives commands from MIDI-IN [6] input. Only common system commands CLOCK (F8h), START (FAh), CONTINUE (FBh) and STOP (FCh) are acceptable. All others MIDI

commands are ignored. "MID" and "START" / "STOP" symbols are shown in upper row of display [8]. Round [●] represents STOP status, arrow [▶] represents START status.

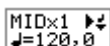


Actual tempo of playback derived from MIDI CLOCK commands is displayed in upper row of display [8] in BPM (Beat per Minute) form. Info "Slow" is displayed if the tempo is lower than 0,6 BPM or if no MIDI CLOCK

commands are received. Info "Fast" is displayed if the tempo is higher than 999,9 BPM.



With help of INCREMENT [14] and DECREMENT [13] buttons, normal [x1] or doubled [x2] speed of playback tempo can be chosen.



With help of PLAY INSTR [11] button, it is possible to run up a sound generator of CR-78 which is selected with "INSTRUMENT SELECTOR" rotary selector on CR-78 panel.

After the PLAY INSTR [11] button is pressed, display [8] shows info about an instrument launching [▶] for a moment. A drum instrument can be running by this way only when CR-78 is just playing a rhythm. It is impossible when playback is stopped.

START/STOP [12] button is not used in MIDI synchronization mode at all.

4.1.3. SYNCHRONIZATION WITH DIN-SYNC BUS

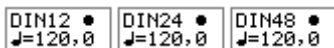


In DIN-SYNC synchronization mode, the controller receives CLOCK and RUN signals from DIN [5] input. Signals RESET and FILL are ignored.

"DIN" and "START" / "STOP" symbols are shown in upper row of display [8]. Round [●] represents STOP status, arrow [▶] represents START status.

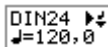


Actual tempo of playback derived from CLOCK signal is displayed in upper row of display [8] in BPM (Beat per Minute) form. Info "Slow" is displayed if the tempo is lower than 0,6 BPM or if no CLOCK signal is present. Info "Fast" is displayed if the tempo is higher than 999,9 BPM.



TEMPO INCREMENT [14] / DECREMENT [13] buttons select type of DIN bus in accordance to number of clock pulses per quarter note (PPQN). DIN-24 (24 PPQN) type is default setting.

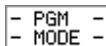
This type complies with most of devices equipped with DIN-SYNC output. For the others, DIN-12 (12 PPQN) or DIN-48 (48 PPQN) types can be selected. Count of clock pulses transmitted from connected device must be found in documentation of this device and type of DIN bus must be set in accordance with it.



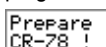
With help of PLAY INSTR [11] button, it is possible to run up a sound generator of CR-78 which is selected with "INSTRUMENT SELECTOR" rotary selector on CR-78 panel. After the PLAY INSTR [11] button is pressed, display [8] shows info about an instrument launching [♩] for a moment. A drum instrument can be running by this way only when CR-78 is just playing a rhythm. It is impossible when playback is stopped.

START/STOP [12] button is not used in DIN-SYNC synchronization mode.

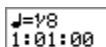
5. "PGM" WORKING MODE



Programming (PGM) mode of the device enables very easy programming of CR-78's user memories (patterns). After PGM mode is selected (with MODE [10] switch), display [8] shows info about working mode change shortly and then the controller comes into programming mode.



After entering into programming mode, invitation for setting of CR-78 is shown on display [8]. Valid setting of CR-78 must be confirmed by NEXT [12] button pressing. Now programming procedure begins.



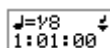
Length of programming step is displayed in upper row and actual position of programming is displayed in lower row of display [8].

Requested length of programming step (length of Beat) can be selected with BEAT INCREMENT [14] / DECREMENT [13] buttons. Just valid length of programming step is shown on display [8]. Available Beats and their lengths in clock pulses (Ticks) are in table below:

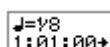
Table 1 – Lengths of available Beats

Beat	1/32 ³	1/16 ³	1/16	1/8 ³	1/8	1/4 ³	1/4	1/2 ³	1/2	1/1
Length [Ticks]	1	2	3	4	6	8	12	16	24	48

Actual position is displayed in M:B:T (Measure : Beat : Tick) form. Starting position (after PGM mode is selected) is always 1:01:00.



Pressing of WRITE INSTR [11] button inserts drum instrument selected with "INSTRUMENT SELECTOR" selector on CR-78 panel onto actual position. Actual position is not changed when an instrument is inserted so it is possible to insert more instruments (up to 4, ACCENT include) onto the same position. It can be done if next instrument is selected with "INSTRUMENT SELECTOR" selector on CR-78 panel and then WRITE INSTR [3] button is pressed repeatedly. Symbol of note [♩] is displayed in upper row of display [8] every time when the button is pressed. The controller doesn't react during the symbol is displayed – it is necessary to wait for blackout of the symbol before next pressing of a button.



Actual position is shifted one step ahead if NEXT [12] button is pressed. Length of the step is equal to number of clock pulses (Ticks) corresponded to duration of selected Beat (with BEAT SLCT [2] rotary encoder – see table 1). After the position is shifted, new actual position is shown in lower row of display [8]. Repeated pressing of NEXT [12] button enables sequent stepping – it is equivalent to insertion of a pause. Symbol of arrow [➔] is displayed in lower row of display [8] every time when the button is pressed. The controller doesn't react during the symbol is displayed – it is necessary to wait for blackout of the symbol before next pressing of a button.

5.1. PROGRAMMING MODE ON CR-78

It is necessary to turn CR-78 to programming mode before start of CR-78's memories programming. Some controllers on CR-78's panel must be set to following positions:



- 17) Press NEXT [12] button (on the controller) for continuing to next note. Display [8] will show 1:08:00 position (eighth 8th of first measure).
- 18) Select "BD" with "INSTRUMENT SELECTOR" (on CR-78 panel) and store the instrument into CR-78's memory with WRITE INSTR [11] button pressing (on the controller).
- 19) Press NEXT [12] button (on the controller) for continuing to next note. Display [8] will show 2:01:00 position (first 8th of second measure).
- 20) Next notes are quarters again - set length of Beat to "1/4" (with BEAT INCREMENT [14] / DECREMENT [13] buttons). Display [8] will show 2:01:00 position (first quarter of second measure).
- 21) Store "BD" instrument (it stays selected from previous step) with WRITE INSTR [11] button pressing (on the controller).
- 22) Select "CH" with "INSTRUMENT SELECTOR" (on CR-78 panel) and store the instrument into CR-78's memory with WRITE INSTR [11] button pressing (on the controller).
- 23) Press NEXT [12] button (on the controller) for continuing to next note. Display [8] will show 2:02:00 position (second quarter of second measure).
- 24) Store "CH" instrument (it stays selected from previous step) with WRITE INSTR [11] button pressing (on the controller).
- 25) Press NEXT [12] button (on the controller) for continuing to next note. Display [8] will show 2:03:00 position (third quarter of second measure).
- 26) Store "CH" instrument (it stays selected from previous step) with WRITE INSTR [11] button pressing (on the controller).
- 27) Select "SD" with "INSTRUMENT SELECTOR" (on CR-78 panel) and store the instrument into CR-78's memory with WRITE INSTR [11] button pressing (on the controller).
- 28) Press NEXT [12] button (on the controller) for continuing to next note. Display [8] will show 2:04:00 position (fourth quarter of second measure).
- 29) Select "CH" with "INSTRUMENT SELECTOR" (on CR-78 panel) and store the instrument into CR-78's memory with WRITE INSTR [11] button pressing (on the controller).
- 30) Now programming of CR-78 memory is finished. Turn "PROGRAM SWITCH" switch on CR-78 panel to "PLAY" position.
- 31) Turn the controller to playback mode (MODE [10] switch to "PLAY" position).
- 32) CR-78 will replay newly programmed rhythm during next start of playback.

Any other rhythm can be programmed by similar way. The only limitation is, the shortest beat is 32th triplet and 32th note isn't accessible at all. This limitation is given by CR-78 construction.

In some cases, this limitation can be get out by doubling of tempo during playback. It is enabled if synchronization is INT or DIN-24 or DIN-48. But length of user memory is contracted to only one measure in that case.

Example: Store rhythm on pic. 6 into user memory of CR-78.

Pic. 6 – Example of more difficult rhythm



Sequence:

First, rewrite the rhythm for double-speed playback:



This rhythm can be programmed to CR-78 memory by method described above.

Set double tempo after the controller is turned back to playback mode:

- For internal synchronization (INT), set double tempo with BEAT INCREMENT [14] / DECREMENT [13] buttons directly.
- For DIN-SYNC synchronization (DINxx), set half resolution of clock pulses than it is really transmitted from clock source (set DIN-12 for synchronization source with PPQN = 24, set DIN-24 for source with PPQN = 48).

5.3. SEQUENCE OF PROGRAMMING IN REAL TIME

The controller enables real time programming of CR-78's rhythms too. This programming method is described in owner's manual of CR-78 (in THE OPERATION OF THE PROGRAMMER SECTION chapter). The only difference is that manual switch TS-1 described in the user manual is not used – it is replaced by PLAY INSTR [11] button on CR78-PGM controller.

The controller stays in playback working mode (PLAY). After setting of CR-78 (see above), tempo generator is turned on with help of START / STOP [12] button of the controller (if internal synchronization is selected) or from MIDI or DIN-SYNC device (if MIDI or DIN synchronization is selected). Now instrument selected with "INSTRUMENT SELECTOR" on CR-78's panel is written into CR-78's memory every time PLAY INSTR [11] button on CR78-PGM controller is pressed.



6. WARRANTY CONDITIONS

The equipment is provided with **thirty-month warranty** starting from the date of the equipment take-over by the customer. This date must be specified on warranty list together with dealer's confirmation.

During this period of time, all defects of equipment or its accessories, caused by defective material or faulty manufacturing, will be removed free of charge.

Warranty repair is asserted by the customer against the dealer.

Warranty period is to be extended for the time period, during which the product was under the warranty repair.

The relevant legal regulations take effect in case of cancellation of purchase contract.

The customer will lose the right for free warranty repair, if he will not be able to submit properly filled out warranty list or if the defects of the product had been caused by:

- unavoidable event (natural disaster),
- connecting the device to the incorrect supply voltage,
- inputs or outputs overloading by connecting the signals source or load source with not-corresponding characteristics etc.,
- faulty equipment operation, which is at variance with the instructions referred-to in the operating manual,
- mechanical damage caused by consumer during transportation or usage of equipment,
- unprofessional interference with the equipment or by equipment modification without manufacturer's approval.

7. TECHNICAL SPECIFICATION

Power source :	external supply adapter
Supply voltage :	8 V _{DC} to 15 V _{DC}
Current consumption :	200 mA max
EXT-CLOCK output :	Jack ¼" socket (TS)
Signal :	push-pull mode
Output voltage :	0 V for low level / +5V for high level
Output impedance :	47 Ω
WRITE and START/STOP outputs :	Jack ¼" socket (TS)
Signal :	NC switch mode
Switched voltage :	up to +15 V
Output impedance :	47 Ω for closed status / high impedance for open status
DIN-SYNC input :	DIN-5 socket (pin Nr. 1: RUN signal, pin Nr. 3: CLOCK signal, pin Nr. 2: GND, pins Nr. 4 and 5 unused)
Input voltage :	0 to +1,5 V for low level / +2,5 to +15 V for high level
Input impedance :	50 kΩ for V _{IN} up to +5 V / 5 kΩ for V _{IN} over +5 V
MIDI input :	DIN-5 socket (pin Nr. 4: + polarity, pin Nr. 5: – polarity, pins Nr. 1, 2 and 3 unused)
Connection :	standard connection – current loop 5 mA

