

CRX8-M

MIDI Interface for Roland CR-68 / CR-78 Model 8-449 ver. 1.0

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This manual in PDF form is available on supplemental CD-ROM or on manufacturer's web-pages.

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1. GENERAL INFORMATION

CRX8-M MIDI interface enables full integration of Roland CR-68 and CR-78 instruments to MDI system. The Interface affects some functional blocks of the instrument which then can be controlled with a help of MIDI commands. All original functions of the instrument stay unchanged and the instrument still can be used the same way as before the interface installation. Pic. 1.1 shows functional block diagram of the instrument after the interface installation.





1.1. PARTS OF MIDI INTERFACE

The delivery of MIDI interface kit contents all parts necessary for installation inc. all support and coupling elements. Parts of delivery are also manuals for installation, handling and interface's SysEx communication and CD-ROM with support software. Please check if the delivery is complete before the installation (see pic. 1.1.1).



Pic. 1.1.1 – Parts of the interface kit



The CRX8-M interface kit delivery contents :

- [1] MID I interface board
- [2] 2x Support guide for PCB
- [3] 2x Bunched cables with DIN-5 socket
- [4] Bunched cables with tumbler switch
- [5] 2x Flat cable with connector
- [6] Shielded audio-cable with connector
- [7] Bi-color LED, resistor 1M Ω

- [8] Coupling elements: 4x screw M3x6, 4x screw M3x10, 4x washer ϕ 3,2, 4x tooth lock washer ϕ 3,2, 4x nut M3, 5x plastic stripe, insulation tube ϕ 1 mm, 3x heat-shrink insulation tube ϕ 2 mm, heat-shrink insulation tube ϕ 4 mm
- [9] Documentation: CD-ROM, manuals in printed form

2. MIDI INTERFACE INSTALLATION

Montage of all parts of the interface into Roland CR-68 / CR-78 instrument is a little more complicated but no major problem should occur if all instructions indicated in installation manual are kept. Procedures of interface's parts installation are described in detail in chapters below. Please keep these instructions exactly so that the instrument isn't damaged.



Attention ! Disconnect the instrument from the mains prior to the installation. Otherwise, there is a risk of the electric shock!

The producer is not responsible for any eventual mechanical or electrical damage of the CR-68 / CR-78 instrument caused by the infringement of the described installation procedure or by careless manipulation during the installation of the MIDI interface!

2.1. REMOVING OF INSTRUMENT'S COVER

a) Unscrew four screws on bottom side of the instrument cover (pic. 2.1.1) Keep the screws. They will be used again after the MIDI kit installation.

b) Carefully extrude the instrument's chassis backward from the cover (pic. 2.1.2).







Pic. 2.1.2

2.2. MODIFICATION OF INSTRUMENT'S REAR PANEL

MDI sockets, tumbler switch and interface's board will be placed on rear panel of the instrument. For easier montage of these elements, it is convenient to remove the panel from the instrument.

2.2.1. PANEL REMOVING

a) Disconnect flat connector of bunched cables leading from Jack connectors board (pic. 2.2.1.1). This is valid only for instruments with serial numbers from 821051, older instruments have not this connector.



b) Unscrew nuts of Jack connectors on instrument's rear panel (pic. 2.2.1.2). Keep the nuts and insulating washers. They will be used again after the MIDI kit installation. Remove the Jack board (label OP-104A) from the panel and put it aside carefully so that other cables soldered to the board would not be damaged.

Note:: Two boards (label OP104 and OP129) are used in instruments with serial numbers up to 780699 – both boards need to be removed.



Pic. 2.2.1.2



c) Unmount mains cable (pic. 2.2.1.3) - unscrew earth solder lug from instrument's chassis [A], unsolder cable wires from terminal plate [B], unfasten catch clamp [C] and pull the cable out.

d) Unscrew four screws on instrument's rear panel (pic. 2.2.1.4) – now the panel is freed. Keep the screw. They will be used again after the MIDI kit installation.







2.2.2. DRILLING OF HOLES FOR INTERFACE BOARD, MIDI SOCKETS AND SWITCH

a) It is necessary to drill total of 12 holes to instrument's rear panel ($1x \phi 2 mm$, $8x \phi 3,5 mm$, $1x \phi 6,5 mm$ and $2x \phi 16 mm$) as shown on pic. 2.2.2.1. For easier designation of centers of new holes, it is convenient to use drill template in scale 1:1 (template in PDF form is part of documentation on supplemental CD-ROM). Put the template to rear panel (from outer side) and copy positions of centers of new holes to the panel with help of scriber or center punch.

b) Drill all necessary holes. Use sharp drills with required diameters. **Work carefully** so that surface of the panel is not damaged during drilling! Clean the edge of all holes with small rasp or with point of bigger drill after drilling.

2.2.3. MONTAGE OF INTERFACE BOARD, MIDI SOCKETS AND SWITCH

a) Put plastic guide supports of the interface's board to inside of the panel so that grips of detent pins of the supports were upwards and screw the supports to the panel (pic. 2.2.3.1).



Pic. 2.2.2.1





b) Unclog detent pins on supports by pressing of grips ([A] on pic. 2.2.3.2) and intromit interface board into the supports so that triad of connectors with locks is pointed at holes for MIDI sockets and switch ([B] on pic. 2.2.3.2). Then fix the interface board by pulling of grips - detent pins must click into detent holes in the interface board.







c) Get flat connectors of MIDI cables through the holes with $_{\varphi}$ 16 mm (from outside of panel) and insert DIN sockets of the cables into the holes fully. Both MIDI bunched cables are identical and they can be swapped.

d) Fix DN sockets to the panel using screws M3, tooth lock washers ϕ 3,2 mm and nuts M3 from the interface accessories (pic. 2.2.3.3).

e) Insert tumbler switch into hole with ϕ 6,5 mm (from inside of panel) and fix it using nuts and washers (pic. 2.2.3.4). Orientation of the switch gives washer with aligning plugs – it assures that the switch can't be mounted contrarywise.



f) Plug connectors of bunched cables of MDI sockets and switch to interface board (pic. 2.2.3.5) – back connector is for the switch [A], middle is for MIDI input [B] and fore is for MIDI output [C]. Orientation of the connectors is unambiguously given by the lock and they can't be flipped.







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g) It is suitable to label the DIN sockets and tumbler switch – for example, with self-adhesive foil glued near to the sockets and switch on panel of the instrument (pic. 2.2.3.6).

h) Leave rear panel unmounted so that easy accessibility to instrument' printed circuits boards is kept during next procedures of installation.

2.3. REPLACEMENT OF INDICATION LED

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a) Remove original LED from board (label OP-100A) on front panel of the instrument (pic. 2.3.1).

Note.: This board has label OP100 in instruments with serial number up to 780699. Operating sequence is the same for both types of the board.

b) Hold leads of the LED with a tweezers and after their unsoldering, pull the LED from hole in sub-panel.

c) Adapt leads of bicolour LED from the interface accessory as shown on pic. 2.3.2. Place insulating tubes on leads of the LED (pic. 2.3.2).





d) Insert bicolour LED to hole in sub-panel and front panel of the instrument so that its straight lead was on the right – out of OP-101A board. Insert bent leads R and C to freed holes in OP-100A board and solder them (pic. 2.3.3).

e) Swap wires Nr. 3 and 4 connected to OP-100A board. Unsolder both wires and the solder the black wire to soldering pad Nr. 4 (right terminal pad on the board) and the brown wire to soldering pad Nr. 3 (pic. 2.3.4).



Pic. 2.3.4

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Pic. 2.3.1

OP-101A

Pic. 2.3.3

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2.4. AUDIO-CABLE INSTALLATION

a) Free end of the audio-cable (shielded cable from the interface accessory) will be connected to soldering pads on potentiometer board (label OP-103A) on instrument's front panel (pic. 2.4.1).

b) Unsolder hot wire of red shielded cable from soldering pad Nr. 1 from the potentiometer board (pic. 2.4.2).







c) Place heat-shrink insulation tube ϕ 2 mm (from the interface accessory) on white wire of audiocable and solder white wire freed from the board to it.

d) Isolate the connection with the insulation tube and heat it (with a hot-flue pistol for example) until it shrinks tightly to the cables (obr. 2.4.3).

e) Solder red wire of the audio-cable to freed soldering pad Nr. 1 on potentiometer board (pic. 2.4.4).

f) Solder shielding of audio-cable to ulterior soldering pad Nr. 9 to which shielding of original red shielded cable is already connected (pic. 2.4.4).







2.5. FLAT CABLE OF CONTROL SIGNALS INSTALLATION

Use one of flat 16-wire cable from the interface accessory as cable of control signals – both delivered flat cables are identical and they can be swapped.

Most of wires of the cable will be connected to CPU board of the instrument. There are three versions of CPU board - with label GL-9 (instruments with serial number up to 780699), GL-9A (instruments with serial number from 780700 to 821050) and GL-9B (instruments with serial number from 821051). GL-9 and GL-9A boards are almost identical (pic. 2.5.1a), a differences are only in details irrelevant for control signals cable installation. GL-9B board is smaller and it has a different placement of components (pic. 2.5.1b).

Pic. 2.5.1a







Split up free end of the cable (by ripping or cutting) to individual wires and adapt their lengths as necessary during the cable installation. Wire Nr. 1 (terminal) is signed with red color. Cut out wire Nr. 16 (the other terminal - unsigned) entirely. It is not used in CR-78 instrument (pic. 2.5.2). Stripe ends of wires Nr. 1 to 15 in length about 2 mm and tin them.

Particular wires of control signals cable will be connected in accordance with table 1 and pic. 2.5.1.

Table 1 – Wires of flat cable of control signals connection						
Wire	Signal	Point for connection	Remarks			
1	MB-IN	CPU board, wire-wrapping tip Nr. 17 ("MB")	Colored wire			
2	S/S-RST	CPU board, lead of R108 resistor				
3	S/S-SET	CPU board, lead Nr. of 6 IC109	Cut the IC lead from board !			
4	LED-R	OP-110 board, soldering pad Nr. 3				
5	LED-G	Lead G of bi-color LED	Newly installed LED			
6	LED-IN	CPU board, lead Nr. 6 of IC115				
7	S/S-RUN	CPU board, lead Nr. 1 of IC109				
8+9	+5 V	CPU board, wire-wrapping tip Nr. 25 ("+5")				
10+11	GND	CPU board, wire-wrapping tip Nr. 26 ("G")				
12	+15 V	CPU board, wire-wrapping tip Nr. 28 ("+15")				
13	CLK-OUT	Jack connectors board, soldering pad "I" or "In"				
14	CLK-IN	White wire from pin "In" of CPU board				
15	ACCENT	Sound generators board, resistor R660	See chapter 2.6 item e)			
16	-	-	Unused wire			









a) Unreel original violet wire from wire-wrapping pin Nr. 17 on instrument's CPU board (pic. 2.5.3 and [1] on pic. 2.5.1). Flip over the instrument and unreel the other end of violet wire from wire-wrapping pin Nr. 22 "MB in" on sound generators board (label VG-11 or VG-11A). Remove freed violet wire from the instrument, it will not be used yet. Flip over the instrument back.







b) Solder wire Nr. 1 "MB-IN" (terminal, signed in red) of control signals flat cable to freed wirewrapping pin Nr. 17 on CPU board ([1] on pic. 2.5.1).

c) Solder wire Nr. 2 "S/S-RST" of flat cable to bottom (on GL-9, GL-9A board) or to right (on GL-9B board) lead of R108 resistor on CPU board ([2] on pic. 2.5.1).

d) Cut off lead Nr. 6 of integrated circuit IC109 as nearly as possible at printed circuit board (pic. 2.5.5). Align freed lead with a help of tweezers (pic. 2.5.6). <u>Be very careful</u>, so that no other component and copper layer on the board are damaged!

e) Solder wire Nr. 3 "S/S-SET" of flat cable to freed lead Nr. 6 of integrated circuit IC109 ([3] on pic. 2.5.7).

Pic. 2.5.6

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Pic. 2.5.7



f) Solder wire Nr. 4 "LED-R" to soldering pad Nr. 3 on OP-100A board on instrument's front panel ([4] on pic. 2.5.8).

g) Place heat-shrink insulation tube ϕ 2 mm (from the interface accessory) on wire Nr. 5 "LED-G" and solder it to lead "G" (unconnected by that time) of newly installed bi-color LED. solate the connection with the insulation tube and heat it (with a hot-flue pistol for example) until it shrinks tightly to the wire and LED's lead ([5] on pic. 2.5.9).



Pic. 2.5.9



h) Solder wire Nr. 6 "LED-IN" to lead Nr. 6 of IC115 on CPU board ([6] on pic. 2.5.1).

i) Solder wire Nr. 7 "S/S-RUN" to lead Nr. 1 of IC 109 on CPU board ([7] on pic. 2.5.1).

j) Solder wires Nr. 8 and 9 "+5V" to wire-wrapping pin Nr. 25 (+5V) on CPU board ([8,9] on pic. 2.5.1).

k) Solder wires Nr. 10 and 11 "GND" to wire-wrapping pin Nr. 26 (GND) on CPU board ([10,11] on pic. 2.5.1).

I) Solder wire Nr. 12 "+15V" to wire-wrapping pin Nr. 28 (+15V) on CPU board ([12] on pic. 2.5.1).

m) Unsolder white wire "In" from Jack board OP-104A (pic. 2.5.10). If your instrument has two boards wirh Jack connectors (label OP104 and OP-129), unsolder wire leading to pad "I" on smaller board OP-129 (pic. 2.5.11).



n) Solder wire Nr. 13 "CKL-OUT" of flat cable to freed soldering pad "In" on OP-104A board or to pad "I" on OP-129 board respectively ([13] on pic. 2.5.12).

o) Place heat-shrink insulation tube ϕ 2 mm (from the interface accessory) on freed white wire and solder it to wire Nr. 14 "CLK-IN" of flat cable. Isolate the connection with the insulation tube and heat it (with a hot-flue pistol for example) until it shrinks tightly to the wires ([14] on pic. 2.5.12).







p) Get wire Nr. 15 "ACCENT" of flat cable through hole in instrument's chassis to area of sound generators board ([15] on pic. 2.5.13). The wire will be connected to lead of resistor R660 on sound generators board – see next chapter.

q) Align wires of control signals flat cable and audio-cable near by original instrument's cabling and fix them with a help of plastic stripes from the interface accessory (pic. 2.5.14).



Pic. 2.5.14

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2.6. FLAT CABLE OF TRIGGER SIGNALS INSTALLATION

Use remaining flat 16-wire cable from the interface accessory as cable of trigger signals.



Pic. 2.6.1

All wires of the cable will be connected to sound generators board from soldering side. The board is placed in bottom area of the instrument's chassis. There are two versions of the board - with label VG-11 (instruments with serial number up to 780699) and VG-11A (instruments with serial number from 780700). Both versions are different only in details irrelevant for trigger signals cable installation so all installation procedures of the cable are the same for both versions.

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By the same way as with control signals cable, split up free end of trigger signals cable (by ripping or cutting) to individual wires (pic. 2.6.2) and adapt their lengths as necessary during the cable installation. Stripe ends of wires in length about 2 mm and tin them.

Particular wires of trigger signals cable will be connected in accordance with table 2 and pic. 2.6.1. Wire Nr. 1 is signed with red color.

Table 2 – Wires of flat cable of sound generators connection						
Wire	Signal	Point for connection	Remarks			
1	Bass Drum	Pin Nr. 4 of flat connector "1~6"	Colored wire			
2	Snare Drum	Pin Nr. of flat connector "7~12"				
3	Rim Shot	Pin Nr. 6 of flat connector "1~6"				
4	High Bonga	Pin Nr. 1 of flat connector "1~6"				
5	Low Bonga	Pin Nr. 3 of flat connector "1~6"				
6	Low Conga	Pin Nr. 2 of flat connector "1~6"				
7	Cow Bell	Upper lead of R583 resistor (collector of Q527)				
8	Maracas	Pin Nr. 10 of flat connector "7~12"				
9	High Hat	Pin Nr. 9 of flat connector "7~12"				
10	Cymbal	Pin Nr. 8 of flat connector "7~12"				
11	Claves	Pin Nr. 5 of flat connector "1~6"				
12	Tambourine L	Upper lead of R553 resistor (collector of Q522)				
13	Tambourine H	Upper lead of R554 resistor (collector of Q523)				
14	Guiro P	Upper lead of R667 resistor (base of Q518)				
15	Guiro T	Upper lead of R668 resistor (base of Q519)				
16	Metallic Beat	Upper lead of R567 resistor (base of Q526)				

a) Get free end of trigger signals flat cable through hole in instrument's chassis to area of sound generators board (pic. 2.6.3) and flip over the instrument upside down.

Pic. 2.6.3

b) Wires of the cable will be soldered to sound generators board from soldering side so it is necessary to unfix the board and flip it over. Disconnect the connectors of voltage stabilizers ([A] on pic. 2.6.4) and unsolder leads of mains transformer from the board ([B] on pic. 2.6.4). Make a note about positions of the connectors and the transformer leads so that they will not be **exchanged or flipped** during return assembly!

c) Remove sound generators board from plastic distance spacers – swat detents of all spacers stepwise (7x) with a help of flat pliers for example and lift the board simultaneously using soft tense (pic. 2.6.5).

d) After total release of sound generators board, fold up the board carefully. Take care of cables leading to the board so that they are not damaged or interrupted!

Pic. 2.6.5

e) Connect wire Nr. 15 "ACCENT" of control signals cable – see item q) of previous chapter. The wire will be connected to lead of resistor R660 on sound generators board ("ACCENT" on pic. 2.6.1) from soldering side. Method of connection of this wire depends on version of sound generators board. On VG-11A board, wire Nr. 15 "ACCENT" is soldered directly to upper lead of resistor R660 (pic. 2.6.7). On VG-11 board, it is necessary to insert serial resistor 1M Ω from the interface accessory (pic. 2.6.8): Solder one of the resistor leads to wire Nr. 15. Place heat-shrink insulation tube ϕ 4 mm (from the interface accessory) on the resistor and heat the insulation tube (with a hot-flue pistol for example) until it shrinks tightly to the resistor (pic. 2.6.9). Solder the other lead of 1M Ω resistor to upper lead of resistor R660 on sound generators board - pic. 2.6.8 and 2.6.10.

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Pic. 2.6.9

f) Now, connect wires of trigger signals cable to sound generators board. Solder wire Nr. 1 "Bass Drum" (terminal, signed in red) to pin "4-BD" of connector "1~6" ([1] on pic. 2.6.1).

- g) Solder wire Nr. 2 "Snare Drum" to pin "7-SD" of connector "7~12" ([2] on pic. 2.6.1).
- h) Solder wire Nr. 3 "Rim Shot" to pin "6-RS" of connector "1~6" ([3] on pic. 2.6.1).
- i) Solder wire Nr. 4 "High Bonga" to pin "1-HB" of connector "1~6" ([4] on pic. 2.6.1).
- j) Solder wire Nr. 5 "Low Bonga" to pin "3-LB" of connector "1~6" ([5] on pic. 2.6.1).
- k) Solder wire Nr. 6 "Low Conga" to pin "2-LC" of connector "1~6" ([6] on pic. 2.6.1).
- I) Solder wire Nr. 7 "Cow Bell" to upper lead of resistor R583 ([7] on pic. 2.6.1).
- m) Solder wire Nr. 8 "Maracas" to pin "10-M" of connector "7~12" ([8] on pic. 2.6.1).
- n) Solder wire Nr. 9 "High Hat" to pin "9-HH" of connector "7~12" ([9] on pic. 2.6.1).
- o) Solder wire Nr. 10 "Cymbal" to pin "8-CY" of connector "7~12" ([10] on pic. 2.6.1).
- p) Solder wire Nr. 11 "Claves" to pin "5-C" of connector "1~6" ([11] on pic. 2.6.1).
- q) Solder wire Nr. 12 "Tambourine L" to upper lead of resistor R553 ([12] on pic. 2.6.1).
- r) Solder wire Nr. 13 "Tambourine H" to upper lead of resistor R554 ([13] on pic. 2.6.1).
- s) Solder wire Nr. 14 "Guiro P" to upper lead of resistor R667 ([14] on pic. 2.6.1).
- t) Solder wire Nr. 15 "Guiro T" to upper lead of resistor R668 ([15] on pic. 2.6.1).
- u) Solder wire Nr. 16 "Metallic Beat" to upper lead of resistor R567 ([16] on pic. 2.6.1).

v) After all wires are soldered, fold sound generators board to original position (pic. 2.6.11) and get it back onto plastic distance spacers in instrument's chassis. Plug back connectors of voltage stabilizers and solder back leads of mains transformer. Be sure that the connectors and transformer leads are not **exchanged or flipped** (also see pic. 2.6.4)!

Pic. 2.6.11

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2.7. FINISHING OF INSTALLATION

a) Put rear instrument's panel back to chassis and fix it with four original screws (pic. 2.7.1).

b) Connect back mains cable (pic. 2.7.2). This is reverse procedure as in chapter 2.2 item c) – get the cable through sleeve on the panel, fix it by catch clamp [A], solder the cable wires to terminal plate [B] and screw earth solder lug to instrument's chassis [C].

Pic. 2.7.2

c) Plug connector of newly installed flat cable of control signals to the interface board ([A] on pic. 2.7.3).

d) Plug connector of newly installed flat cable of trigger signals (leading from sound generators board VG-11x) to the interface board ([B] on pic. 2.7.3).

e) Plug connector of newly installed audio-cable (leading from OP-103A board) to the interface board ([C] on pic. 2.7.3).

f) Plug jumper on the interface board to position "78" (pic. 2.7.4).

Pic. 2.7.3

g) Insert Jack connectors boars (OP-104A, or both boards OP104 and OP129 respectively) to original position in instrument's rear panel. Fix the board with nuts of Jack connectors. Don't forget to insert the insulation washers (pic. 2.7.5)!

h) Plug flat connector of bunched cables leading from the Jack board back to CPU board of the instrument. Orientation of the connector is unambiguously given by the connector lock and it can't be plugged on the contrary (also see pic. 2.2.1.1).

- i) Intromit chassis of the instrument back to cover (pic. 2.7.6).
- j) Fix the cover from bottom side with a help of four original screws (pic. 2.7.7).

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Installation of the MIDI interface kit is now finished and the instrument is prepared for communication via MIDI bus.

Please read carefully user manual of the interface before usage of modified instrument.

3. TIP TO CR-78 IN STRUMENT MODIFICATION

On some instruments, sound generator Tambourine Short is sounding too long so it is practically impossible to distinguish it from sound of Tambourine Long generator. Shortening of period when Tambourine Short generator is sounding can be done by decreasing of value of R555 resistor (270 k Ω originally) on board VG-11 or VG-11A respectively. Connection of 75 k Ω resistor in parallel manner to R555 get right.

* * * * *

