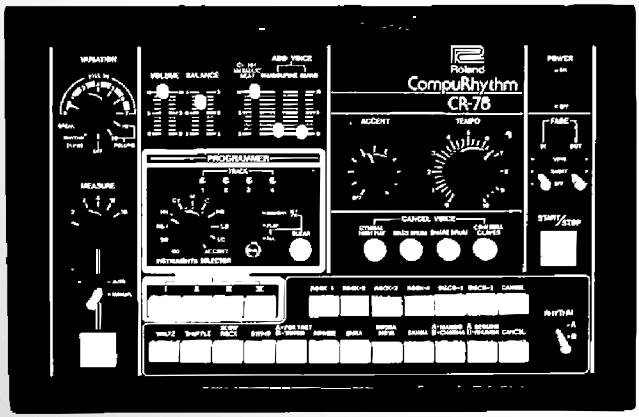
CRX8-M

MIDI Interface for Roland CR-68 / CR-78

Model 8-449
ver. 1.0



INSTALLATION MANUAL FOR CR-68

Content

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

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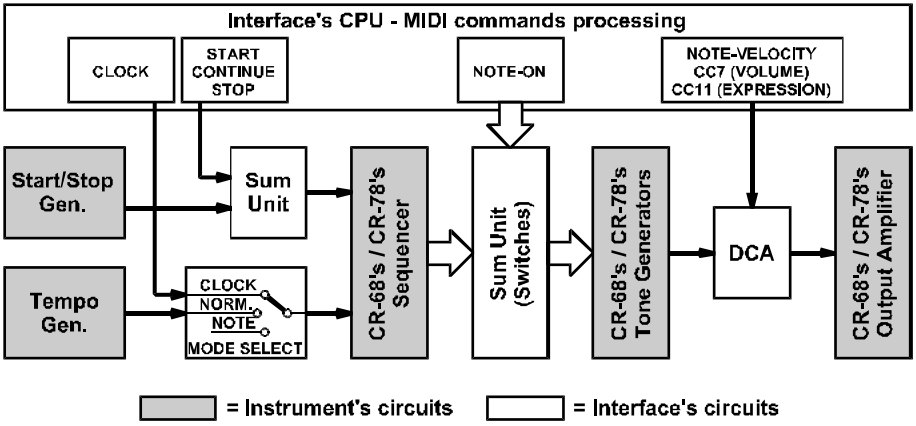
1. GENERAL INFORMATION

CRX8-M MIDI interface enables full integration of Roland CR-68 and CR-78 instruments to MIDI 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.

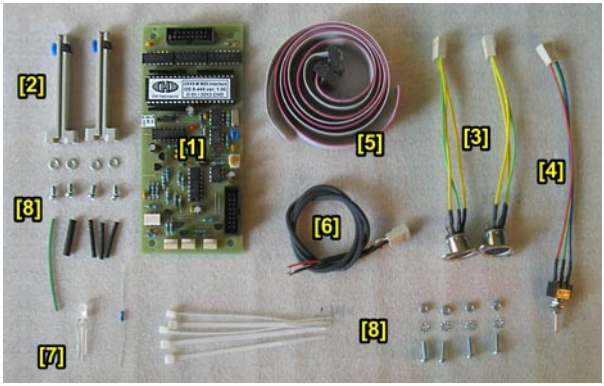
Pic. 1.1 – Connection to the instrument



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] MIDI 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 1MΩ
[8] Coupling elements: 4x screw M3x6, 4x screw M3x10, 4x washer ϕ3,2, 4x tooth lock washer ϕ3,2, 4x nut M3, 5x plastic stripe, insulation tube ϕ1 mm, 3x heat-shrink insulation tube ϕ2 mm, heat-shrink insulation tube ϕ4 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. 2.1.1

Pic. 2.1.2

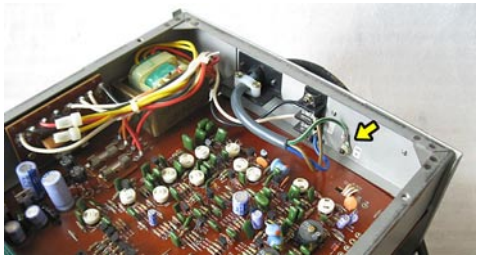
2.2. MODIFICATION OF INSTRUMENT'S REAR PANEL

MIDI 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.

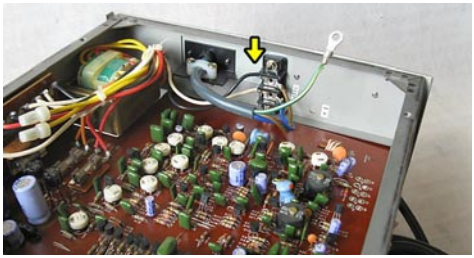
2.2.1. PANEL REMOVING

a) Flip over the instrument upside down and unscrew earth solder lug of mains cable from instrument's chassis (pic. 2.2.1.1).
b) Unsolder black and white wires of mains cable from terminal plate on rear panel (pic. 2.2.1.2).

Pic. 2.2.1.1



Pic. 2.2.1.2

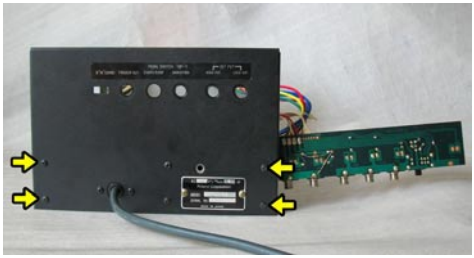


c) Flip over the instrument back and unscrew nuts of Jack connectors on instrument's rear panel (pic. 2.2.1.3). Keep the nuts and insulating washers. They will be used again after the MIDI kit installation. Remove the Jack board (label OP-102) from the panel and put it aside carefully so that cables soldered to the board would not be damaged.

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.

Pic. 2.2.1.3

Pic. 2.2.1.4



e) Remove rear panel with mains cable and terminal plate from the instrument.

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 ϕ 2 mm, 8x ϕ 3,5 mm, 1x ϕ 6,5 mm and 2x ϕ 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.

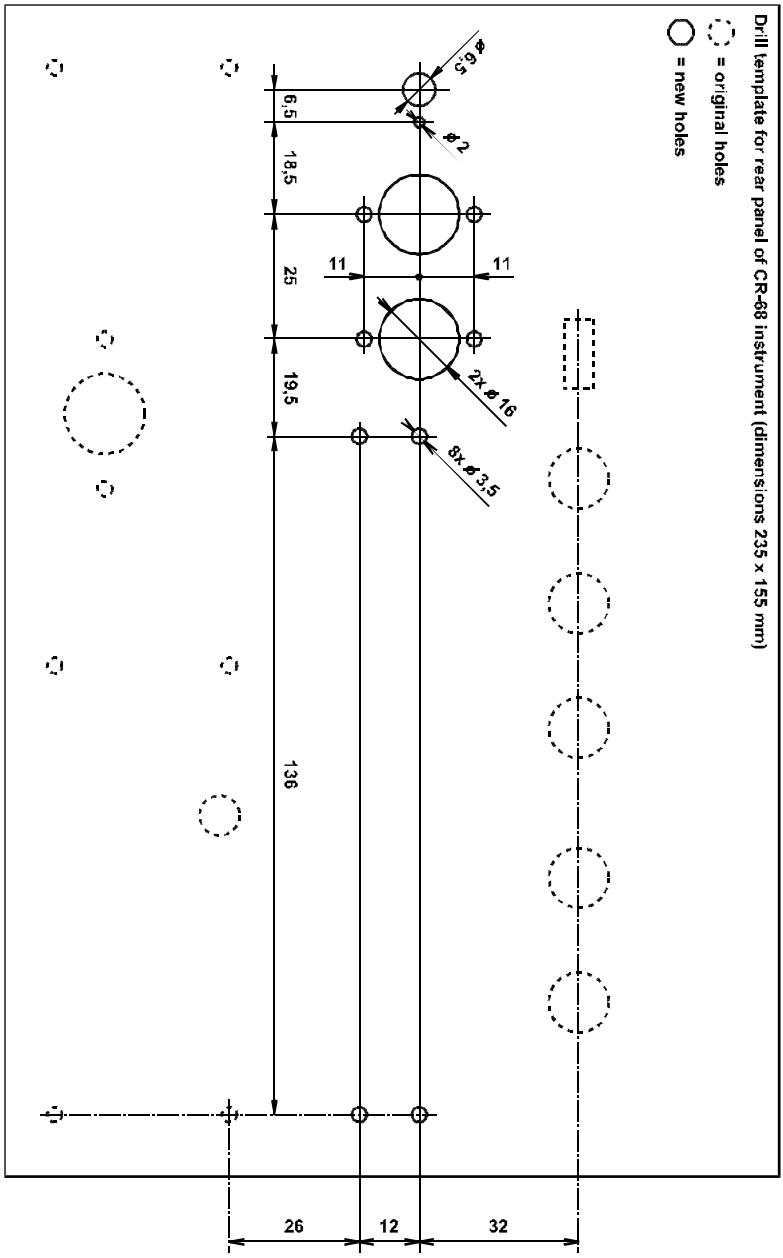
Note.: If necessary, remove mains cable holder and terminal plate from rear panel. This enables easier work with the template.

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

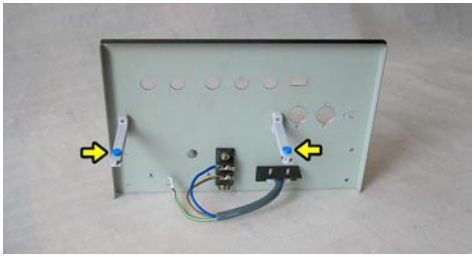
a) Put plastic guide supports of the interface's board to inside of the panel so that grips of detent pins of the supports were upwards and screw the supports to the panel (pic. 2.2.3.1).

Pic. 2.2.2.1

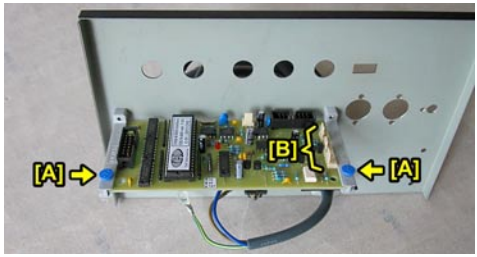


b) Unclog detent pins on supports by pressing of grips ([A] on pic. 2.2.3.2) and intromit interface board into the supports so that triad of connectors with locks is pointed at holes for MIDI sockets and switch ([B] on pic. 2.2.3.2). Then fix the interface board by pulling of grips - detent pins must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

Pic. 2.2.3.1



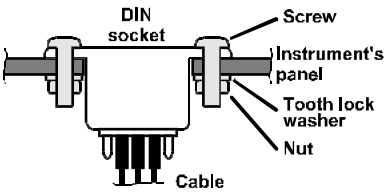
Pic. 2.2.3.2



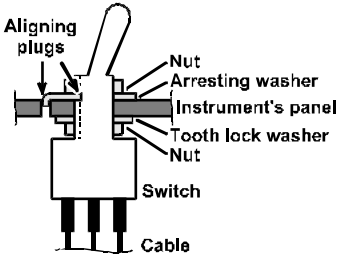
c) Get flat connectors of MIDI cables through the holes with ϕ 16 mm (from outside of the panel) and insert DIN sockets of the cables into the holes fully. Both MIDI bunched cables are identical and they can be swapped.

d) Fix DIN 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).

Pic. 2.2.3.3



Pic. 2.2.3.4



Pic. 2.2.3.5

Pic. 2.2.3.6

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 MIDI 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.

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.

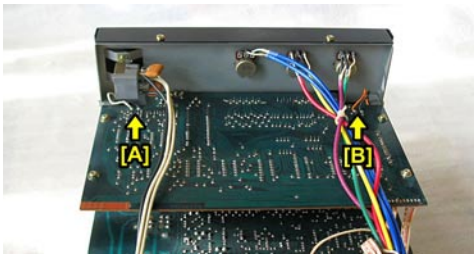
2.3. CPU BOARD REMOVING

a) By pulling, remove knobs from potentiometer TEMPO and rotary selectors VARIATION on instrument's front panel (pic. 2.3.1).

b) Unsolder wires from START/STOP button ([A], black and white) and VARIATION button ([B], black and orange) from CPU board (pic. 2.3.2).

Pic. 2.3.1

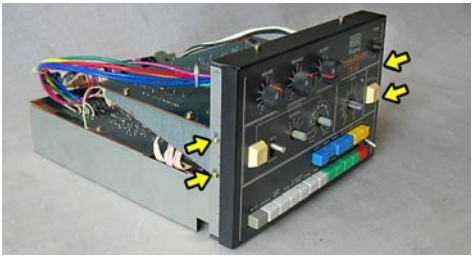
Pic. 2.3.2



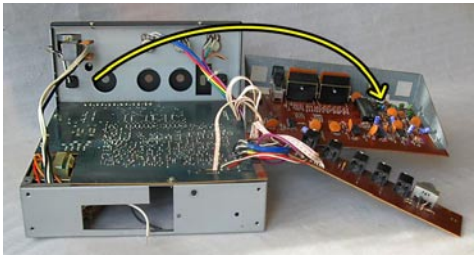
c) Unscrew two screws on left side and two screws on right side of instrument's front which are fixing holder of CPU board (pic. 2.3.3). Keep the screws. They will be used again after the MIDI kit installation.

d) Now, the CPU board is freed and it can be turned out of the instrument so that components on the board will be accessible (pic. 2.3.4).

Pic. 2.3.3



Pic. 2.3.4



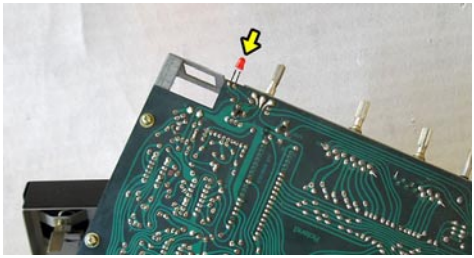
2.4. REPLACEMENT OF INDICATION LED

a) Remove original LED from CPU board of the instrument (pic. 2.4.1).

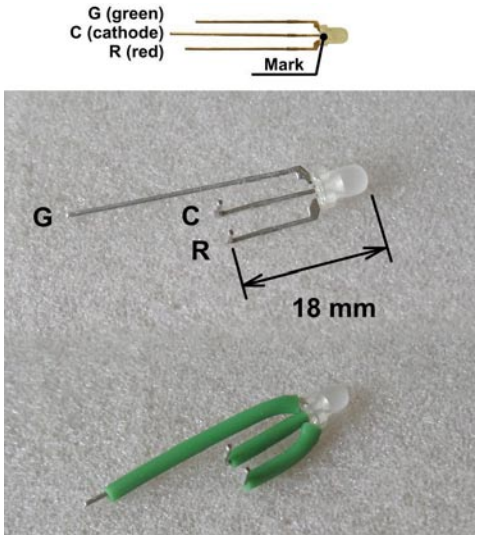
b) Adapt leads of bi-color LED from the interface accessory as shown on pic. 2.4.2. Place insulating tubes ϕ 1 mm from the interface accessories on leads of the LED.

c) Insert bent leads "R" and "C" of bi-color LED into freed holes in CPU board and solder them (pic. 2.4.3). Straight lead "G" oriented to cutout in the CPU board stays unconnected meanwhile.

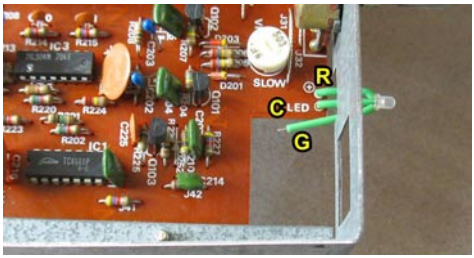
Pic. 2.4.1



Pic. 2.4.2



Pic. 2.4.3

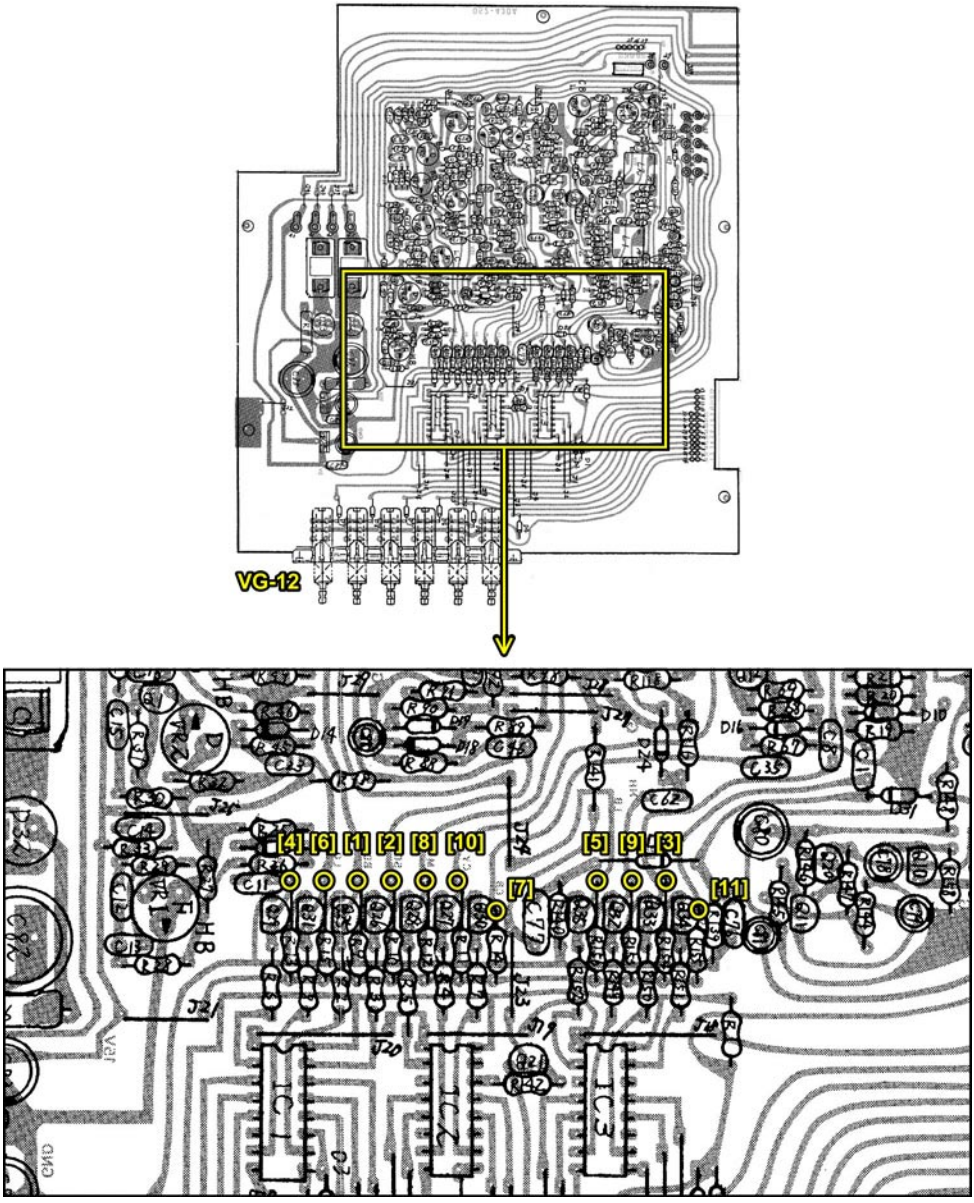


2.5. FLAT CABLE OF TRIGGER SIGNALS INSTALLATION

Table 1 – Wires of flat cable of sound generators trigger signals connection			
Wire	Signal	Pad for connection	Remarks
1	Bass Drum	"BD" – resistor R9 / collector of transistor Q25	Colored wire
2	Snare Drum	"SD" – resistor R10 / collector of transistor Q26	
3	Rim Shot	"RS" – resistor R154/ collector of transistor Q33	
4	High Bonga	"HB" – resistor R13 / collector of transistor Q29	
5	Low Bonga	"LB" – resistor R156 / collector of transistor Q35	
6	Low Conga	"LC" – resistor R15 / collector of transistor Q31	
7	Cow Bell	"CB" – resistor R14 / collector of transistor Q30	
8	Maracas	"M" – resistor R12 / collector of transistor Q28	
9	High Hat	"HH" – resistor R153 / collector of transistor Q32	
10	Cymbal	"CY" – resistor R11 / collector of transistor Q27	
11	Claves	"C" – resistor R155 / collector of transistor Q34	
12	Tambourine L	-	Unused wire
13	Tambourine H	-	Unused wire
14	Guiro P	-	Unused wire
15	Guiro T	-	Unused wire
16	Metallic Beat	-	Unused wire

Pic. 2.5.1

View to components side !



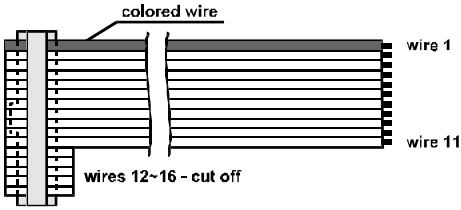
Use one of flat 16-wire cable from the interface accessory as cable of trigger signals – both delivered flat cables are identical and they can be swapped.

Split up free end of the cable (by ripping or cutting) to individual wires and adapt their lengths as necessary during the cable installation. Cut out wires Nr. 12 to 16 entirely. They are not used in CR-68 instrument (pic. 2.5.2). Stripe ends of wires Nr. 1 (signed with red color) to 11 in length about 2 mm and tin them.

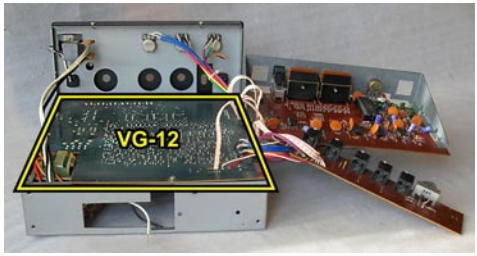
All wires of the cable will be connected to sound generators board VG-12 **from soldering side**. The board is placed in instrument's chassis with soldering side upward (pic. 2.5.3). Particular wires of trigger signals cable will be connected in accordance with table 1 and pic. 2.5.1, 2.5.4.

Note.: Used soldering pads on the board are signed by abbreviations of corresponding drum instruments (BD, SD, etc., pic. 2.5.4).

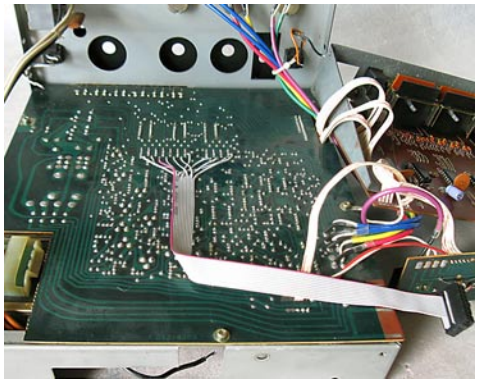
Pic. 2.5.2



Pic. 2.5.3



Pic. 2.5.4



a) Solder wire Nr. 1 "Bass Drum" (terminal, signed in red) to lead of resistor R9 interconnected with collector of transistor Q25 ([1] on pic. 2.5.1).

b) Solder wire Nr. 2 "Snare Drum" to lead of resistor R10 interconnected with collector of transistor Q26 ([2] on pic. 2.5.1).

c) Solder wire Nr. 3 "Rim Shot" to lead of resistor R154 interconnected with collector of transistor Q33 ([3] on pic. 2.5.1).

d) Solder wire Nr. 4 "High Bonga" to lead of resistor R13 interconnected with collector of transistor Q29 ([4] on pic. 2.5.1).

e) Solder wire Nr. 5 "Low Bonga" to lead of resistor R156 interconnected with collector of transistor Q35 ([5] on pic. 2.5.1).

f) Solder wire Nr. 6 "Low Conga" to lead of resistor R15 interconnected with collector of transistor Q31 ([6] on pic. 2.5.1).

g) Solder wire Nr. 7 "Cow Bell" to lead of resistor R14 interconnected with collector of transistor Q30 ([7] on pic. 2.5.1).

h) Solder wire Nr. 8 "Maracas" to lead of resistor R12 interconnected with collector of transistor Q28 ([8] on pic. 2.5.1).

i) Solder wire Nr. 9 "High Hat" to lead of resistor R153 interconnected with collector of transistor Q32 ([9] on pic. 2.5.1).

j) Solder wire Nr. 10 “Cymbal“ to lead of resistor R11 interconnected with collector of transistor Q27 ([10] on pic. 2.5.1).

k) Solder wire Nr. 11 “Claves“ to lead of resistor R155 interconnected with collector of transistor Q34 ([11] on pic. 2.5.1).

2.6. FLAT CABLE OF CONTROL SIGNALS INSTALLATION

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

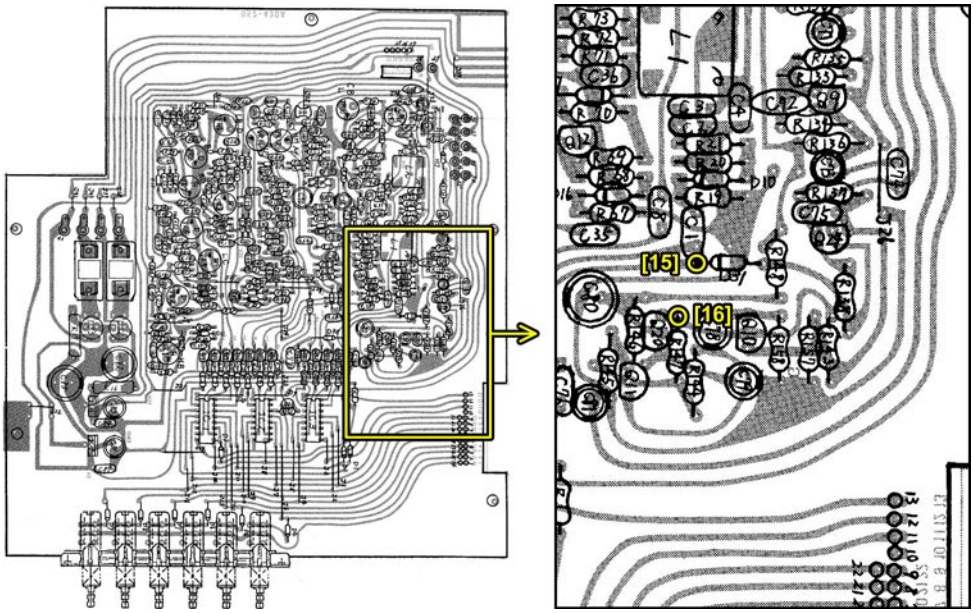
By the same way as with control signals cable, split up free end of trigger signals cable (by ripping or cutting) to individual wires and adapt their lengths as necessary during the cable installation. Cut out wire Nr. 1 (signed with red color) entirely. It is not used in CR-68 instrument (pic. 2.6.3). Stripe ends of wires Nr. 1 to 16 in length about 2 mm and tin them.

Particular wires of trigger signals cable will be connected to sound generators board (VG-12) and to CPU board of the instrument in accordance with table 2 and pic. 2.6.1, 2.6.2.

There are two versions of CPU board with label GL-10A (older version) and GL-10B (newer version). GL-10A and GL-10B boards have a little different placement of some components (pic. 2.6.1a, 2.6.1b).

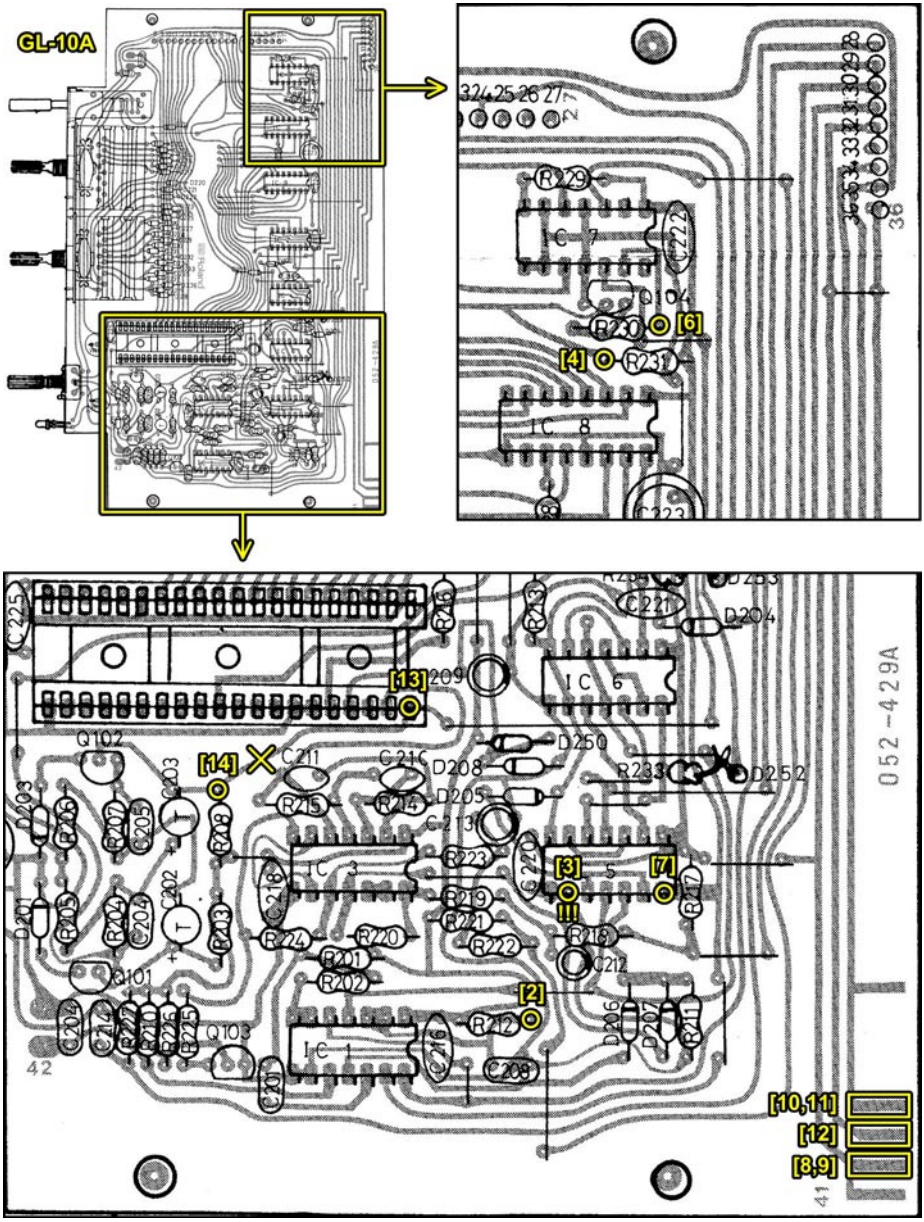
Pic. 2.6.1

VG-12 / View to components side !



Pic. 2.6.2a

GL10A / View to soldering side !



Pic. 2.6.2b

GL10B / View to soldering side!

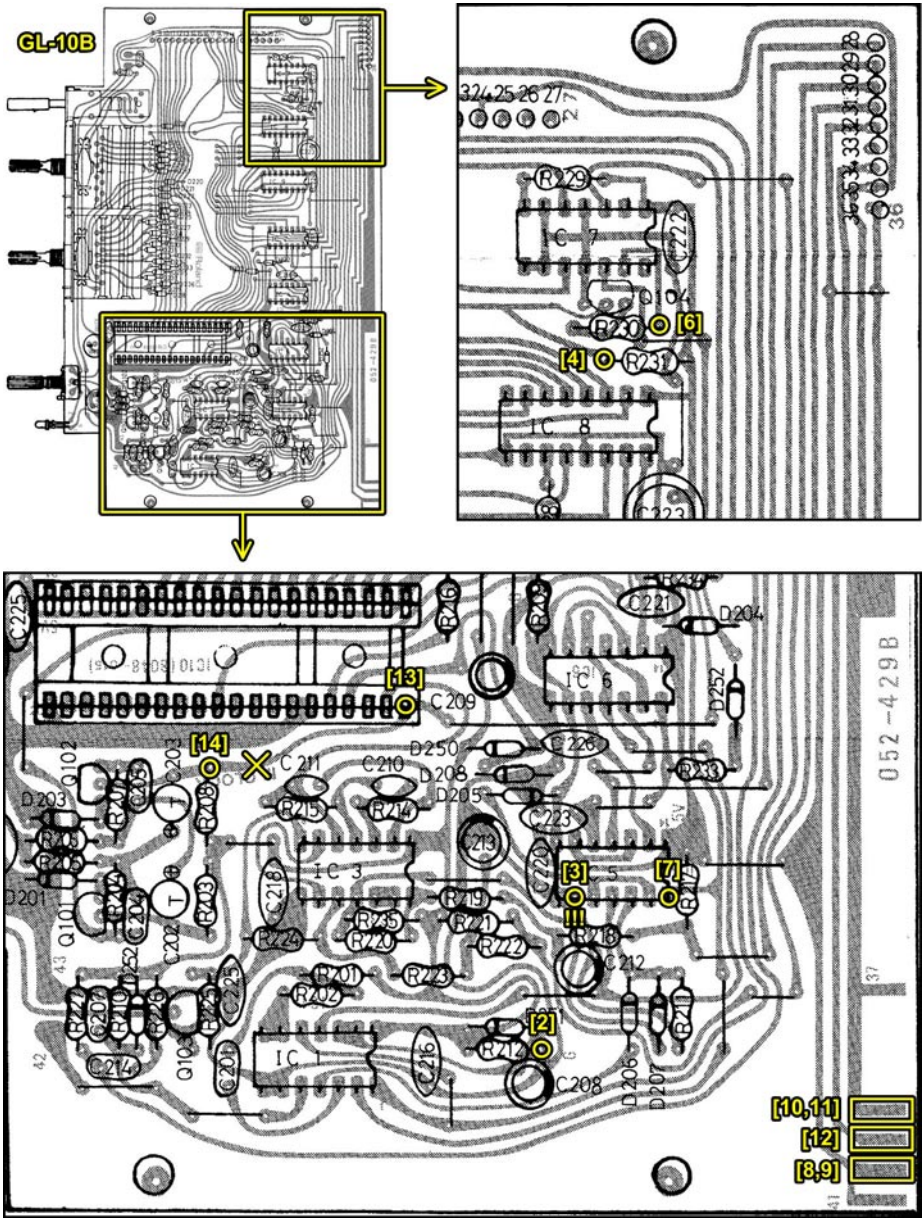
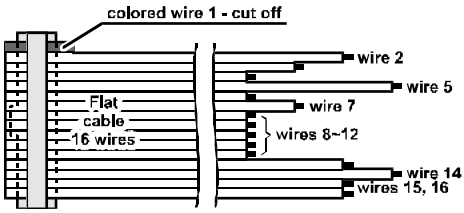


Table 2 – Wires of flat cable of control signals connection			
Wire	Signal	Pad for connection	Remarks
1	MB-IN	-	Colored, unused wire
2	S/S-RST	CPU board, lead of R212 resistor	
3	S/S-SET	CPU board, lead Nr. 6 of IC5	Cut the IC lead from board !
4	LED-R	CPU board, lead of R231 resistor	
5	LED-G	Lead G of bi-color LED	Newly installed LED
6	LED-IN	CPU board, lead of R230 resistor	
7	S/S-RUN	CPU board, lead Nr. 1 of IC5	
8+9	+5 V	CPU board, soldering pad “40” (+5)	
10+11	GND	CPU board, soldering pad “38” (G)	
12	+15 V	CPU board, soldering pad “39” (+15)	
13	CLK-OUT	CPU board, lead Nr. 1 of IC10	
14	CLK-IN	CPU board, lead of R208 resistor	
15	ACC-OUT	Sound generators board, cathode of D31	
16	ACC-IN	Sound generators board, lead of R147 resistor	

Pic. 2.6.3

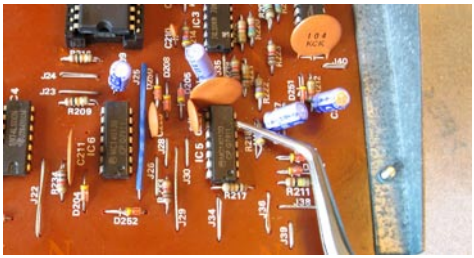


Pic. 2.6.4

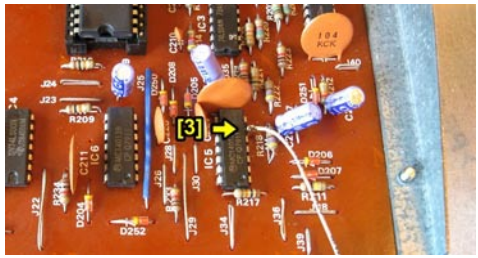
a) Cut off lead Nr. 6 of integrated circuit IC5 as nearly as possible at printed circuit board (pic. 2.6.4). Align freed lead with a help of tweezers (pic. 2.6.5). **Be very careful** so that no other components and copper layers on the board are damaged!

b) Solder wire Nr. 3 ”S/S-SET“ of flat cable of control signals to freed lead Nr. 6 of integrated circuit IC5 ([3] on pic. 2.6.2 and 2.6.6).

Pic. 2.6.5



Pic. 2.6.6

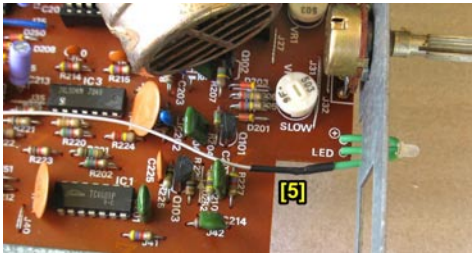


c) Place heat-shrink insulation tube ϕ 2 mm (from the interface accessory) on wire Nr. 5 "LED-G" and solder it to lead "G" (unconnected by that time) of newly installed bi-color LED. Isolate the connection with the insulation tube and heat it (with a hot-flue pistol for example) until it shrinks tightly to the wire and LED's lead ([5] on pic. 2.6.7).

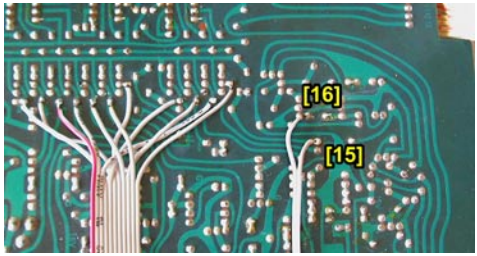
d) Solder wire Nr. 15 "ACC-OUT" to cathode of D31 diode on sound generators board VG-12 ([15] on pic. 2.6.1 and 2.6.8).

e) Solder wire Nr. 16 "ACC-IN" to upper lead of R147 resistor (interconnected with emitter of transistor Q20) on sound generators board VG-12 ([16] on pic. 2.6.1 and 2.6.8).

Pic. 2.6.7



Pic. 2.6.8

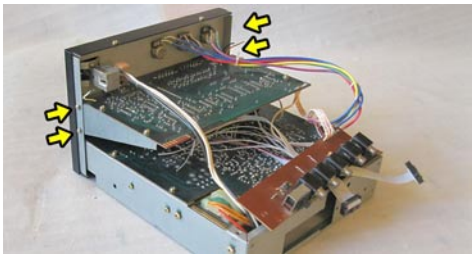


f) Turn CPU board back and insert it into front panel of the instrument. Be sure that bi-color LED is correctly placed in hole in front panel.

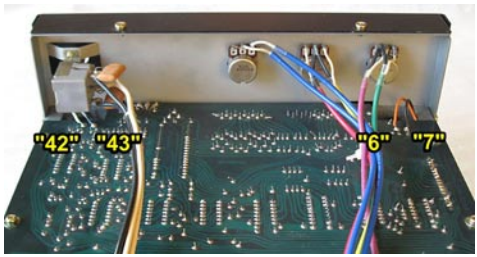
g) Fix CPU board back to instrument's front panel using four original screws (pic. 2.6.9).

h) Solder wires from START/STOP button ([A], white to soldering pad "42", black to soldering pad "43") and VARIATION button ([B), orange to soldering pad "6", black to soldering pad "7") back to CPU board (pic. 2.6.10).

Pic. 2.6.9



Pic. 2.6.10



i) Now, connect remaining wires of flat cable of control signals to CPU board **from soldering side**: Solder wire Nr. 2 "SS-RST" to lead of resistor R212 ([2] on pic. 2.6.2).

j) Solder wire Nr. 4 "LED-R" to lead of resistor R231 ([4] on pic. 2.6.2).

k) Solder wire Nr. 6 "LED-IN" to lead of resistor R230 ([6] on pic. 2.6.2).

l) Solder wire Nr. 7 „LED-IN" to lead Nr. 1 of IC5 ([7] on pic. 2.6.2).

m) On CPU board, interrupt (e.g. using thick needle) connection between lead of R208 resistor and pin Nr. 1 of IC10. This connection is marked by crossline on pic. 2.6.2.

n) Solder wire Nr. 13 "CLK-OUT" to lead Nr. 1 of IC10 ([13] on pic. 2.6.2).

o) Solder wire Nr. 14 "CLK-IN" to lead of resistor R208 ([14] on pic. 2.6.2).

p) Solder wires Nr. 8 and 9 "+5V" to by that time unused soldering pad "40" ([8,9] on pic. 2.6.2).

q) Solder wires Nr. 10 a 11 "GND" to by that time unused soldering pad "38" ([10,11] on pic. 2.6.2).

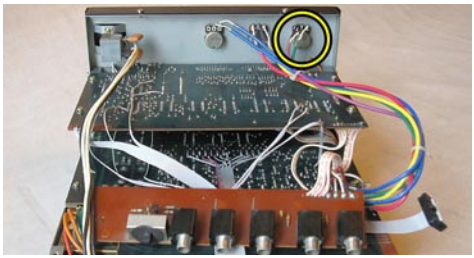
r) Solder wire Nr. 12 „+15V" to by that time unused soldering pad "39" ([12] on pic. 2.6.2).

2.7. AUDIO-CABLE INSTALLATION

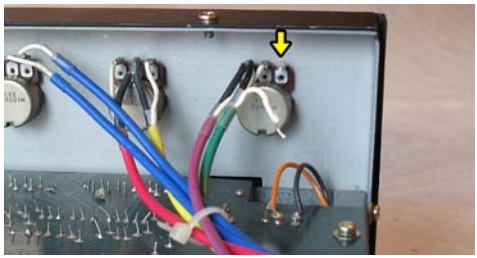
a) Free end of the audio-cable (shielded cable from the interface accessory) will be connected to VOLUME potentiometer on instrument's front panel (pic. 2.7.1).

b) Unsolder hot wire of green shielded cable from right lead of the potentiometer (pic. 2.7.2).

Pic. 2.7.1



Pic. 2.7.2



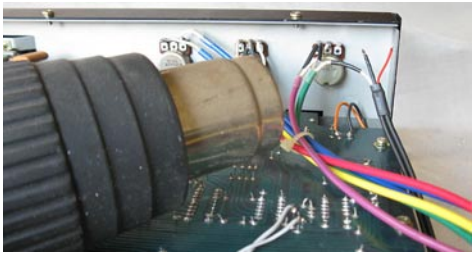
c) Place heat-shrink insulation tube ϕ 2 mm (from the interface accessory) on white wire of audio-cable and solder hot wire of green shielded cable freed from the potentiometer to it.

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 (pic. 2.7.3).

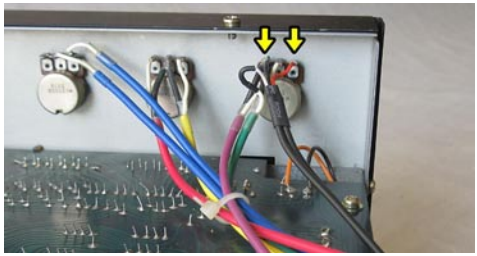
e) Solder red wire of the audio-cable to freed right lead of the potentiometer (pic. 2.7.4).

f) Solder shielding of audio-cable to left lead of VOLUME potentiometer to which shielding of original shielded cables are already connected (pic. 2.7.4).

Pic. 2.7.3



Pic. 2.7.4



2.8. FINISHING OF INSTALLATION

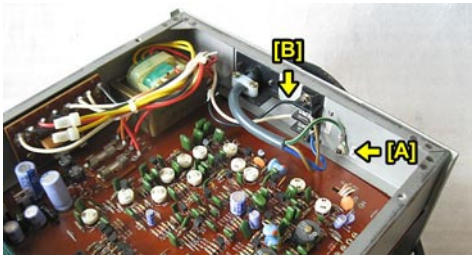
a) Put rear instrument's panel back to chassis and fix it with four original screws (pic. 2.8.1).

b) Screw back earth solder lug of mains cable to instrument's chassis using original screw, washers and nut ([A] on pic. 2.8.2).

c) Solder back black and white wires to terminal plate on rear panel ([B] on pic. 2.8.2).

Pic. 2.8.1

Pic. 2.8.2



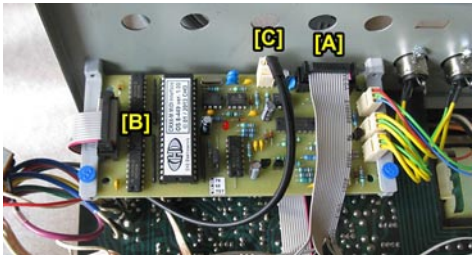
d) Plug connector of newly installed flat cable of control signals to the interface board ([A] on pic. 2.8.3).

e) Plug connector of newly installed flat cable of trigger signals (leading from sound generators board VG-12) to the interface board ([B] on pic. 2.8.3).

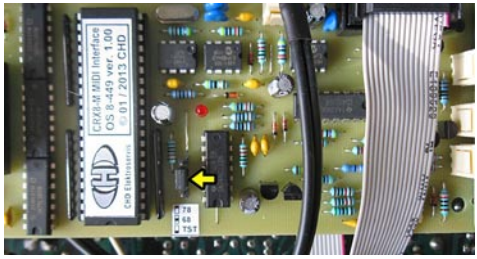
f) Plug connector of newly installed audio-cable (leading from VOLUME potentiometer) to the interface board ([C] on pic. 2.8.3).

g) Plug jumper on the interface board **to position "68"** (pic. 2.8.4).

Pic. 2.8.3



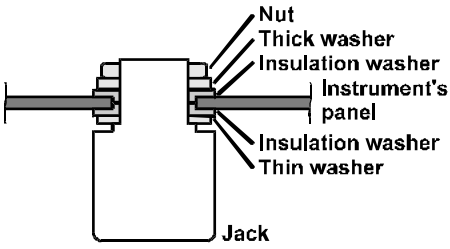
Pic. 2.8.4



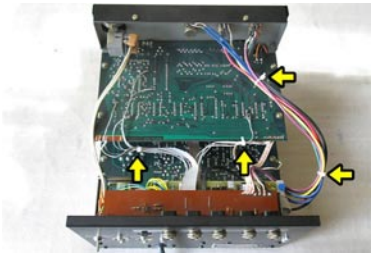
h) Insert Jack connectors boars (OP-102) to original position on instrument's rear panel. Fix the board with original nuts of Jack connectors. Don't forget to insert the insulation washers (pic. 2.8.5)!

i) 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. 2.8.6).

Pic. 2.8.5



Pic. 2.8.6



j) Get removed knobs back onto potentiometer TEMPO and rotary selectors VARIATION on instrument's front panel.

k) Intromit chassis of the instrument back to cover (pic. 2.8.7).

l) Fix the cover from bottom side with a help of four original screws (pic. 2.8.8).

Pic. 2.8.7

Pic. 2.8.8

Installation of the MIDI interface kit is now finished and the CR-68 instrument is prepared for communication via MIDI bus.

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

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