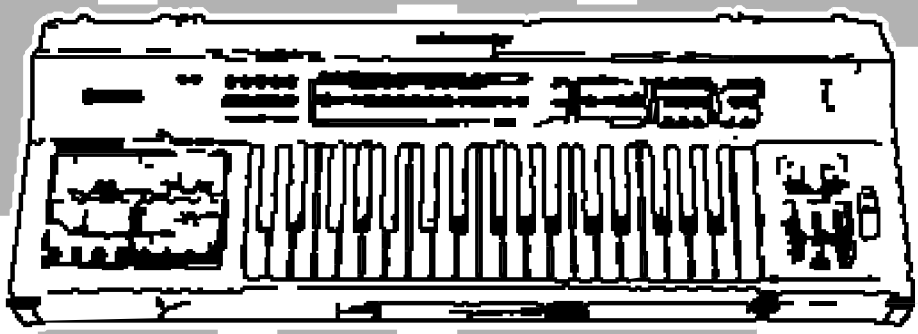
SY2-KBD

MIDI Interface for Yamaha SY-2 (SY-1) Keyboard Control

Model 8-439
Version 1.0



Installation Manual

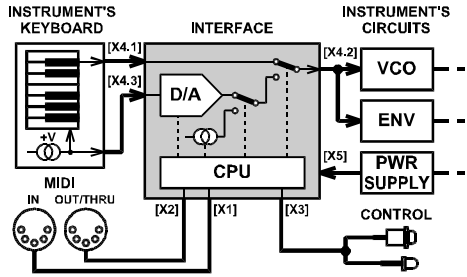
Contents:

1 GENERAL INFORMATION

SY2-KBD MIDI interface controls VCO and GATE generator of the Yamaha SY-1 / SY-2 synthesizer. Simplified block schematics of the interface installation in the instrument shows fig. 1.1.

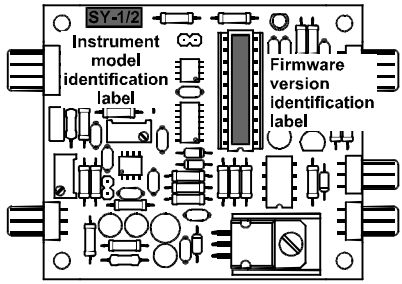
The interface board is the same for both SY-1 and SY-2 instruments. This manual describes only **installation into SY-2**. SY-1 is electrically the same but mechanical construction is a little different from SY-2. So you have to adapt the montage of MIDI sockets and LED / Reset button and also placement of the interface board. Wiring of the interface to instrument's keyboard circuit and to SM-1 board remain the same for both SY-1 and SY-2 instruments (see appendix).

Figure 1.1 – Connection to instrument circuits



The interface firmware can be revised. Actual version of the firmware is printed on the identification label on the interface's processor (see fig. 1.2). It is also possible to read the actual version of firmware from the interface by MIDI System Exclusive message.

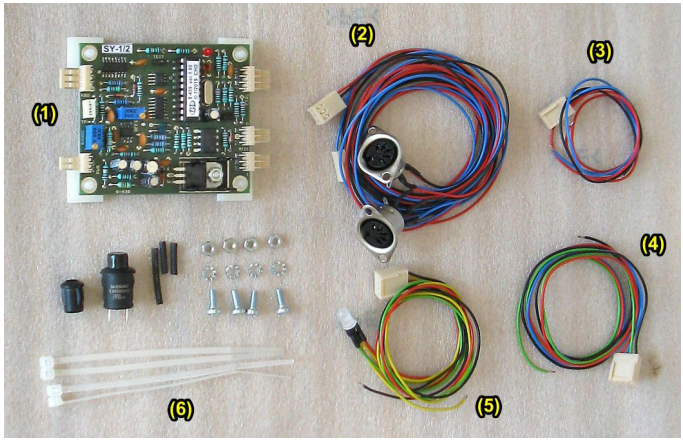
Figure 1.2 – Identification labels



1.1 MIDI INTERFACE KIT PARTS

MIDI interface kit contents all necessary parts for installation incl. all support and coupling elements. The delivery also includes both installation and operation manuals in printed form. Please check if the delivery is complete before the installation (see fig. 1.1.1).

Figure 1.1.1 – Parts of the interface kit



The SY2-KBD interface kit delivery contents:

(1) MIDI Interface board
(2) 2x DIN-5 socket with cable
(3) Bunched cables for power supply
(4) Bunched cables with LED
(5) Bunched cables of keyboard control signals
(6) Next parts and coupling elements (button, LED holder, screws, nuts, washers, insulation tubes and tightening strips)
(7) Owner's and Installation manuals in printed form

2 MIDI INTERFACE INSTALLATION

Mounting the interface in the Yamaha SY-2 synthesizer is very easy. If you follow the instructions from this manual, there should be no major problems during the installation. The interface installation procedure is thoroughly described in the following chapters. Please follow these instructions accurately to avoid any damage of the instrument.

Attention! Disconnect the instrument form the mains prior to the installation. There is a risk of the electric shock!

Attention! Observe precautions for handling electrostatic discharge sensitive devices!

The manufacturer is not responsible for any eventual mechanical or electrical damage of the Yamaha instrument caused by the infringement of the described installation procedure or by careless manipulation during the installation of the MIDI interface!

It is recommended to calibrate the instrument accordingly to the instructions in service manual of the instrument prior the interface installation. This ensures trouble-free operation of the interface.

2.1 OPEN THE INSTRUMENT

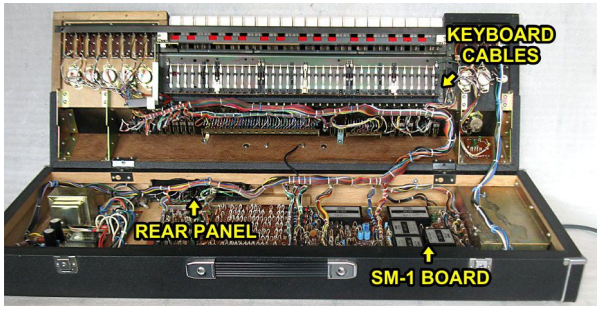
a) Unscrew two screws on the bottom side of the instrument (fig. 2.1.1). Keep the screws and washers - they will be used again after the MIDI kit installation is finished. Then place the instrument to normal position.

b) Lift top panel of the instrument up and then flip it back. Carefully remove plastic cover from instrument's keyboard switches (fig. 2.1.2) so that it is not damaged during disassembly.

Figure 2.1.1

Figure 2.1.2

Figure. 2.1.3



c) All instrument's parts and boards needed for the interface installation are now accessible (fig. 2.1.3).

2.2 DRILLING OF HOLES FOR MIDI SOCKETS

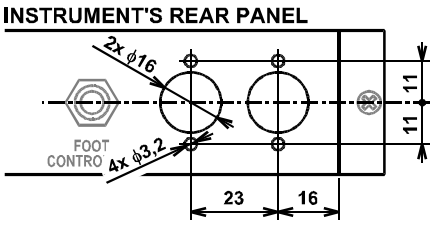
The interface has both MIDI input and output. Only MIDI input is necessary for the basic interface operation. MIDI output has not to be installed – see chapter 3.1. Nevertheless, having both MIDI input and output (MIDI-IN and MIDI-THRU/OUT sockets) is more convenient for an easy integration in a more advanced MIDI system.

a) The suitable place for the MIDI sockets montage is on the right side of the metal panel on rear side of the instrument (fig. 2.2.1). You have to drill six holes to the panel.

b) Drill two holes with diameter 16 mm and four holes with diameter 3,2 mm to the metal panel as shown on fig. 2.2.2 (all dimensions are in mm). Use sharp drills and **work carefully** so that the cover is not scratched and other parts and cables inside the instrument **are not damaged** [1]!

Figure 2.2.1

Figure 2.2.2



c) Clean the edge of the holes with small rasp or tip of bigger drill from both sides of the panel after the holes are drilled.

c) **Clean all iron sawdust and raspings from the inside of the instrument**, they can cause short circuits or serious electrical damage if left inside the instrument. Please clean the instrument carefully!

2.3 MIDI SOCKETS MOUNTING

a) Pull flat connectors of MIDI cables (from the interface accessory) through 16 mm holes in the metal panel from outer side and insert DIN sockets into the holes. Both MIDI cables are identical and can be swapped.

Figure 2.3.1

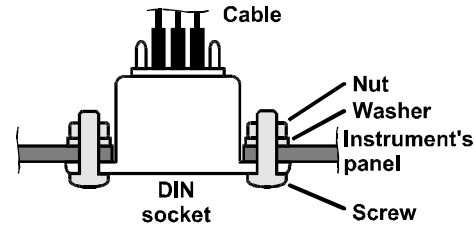


Figure 2.3.2

[1] If you want to be sure that the instrument parts will not be damaged during the drilling, you can remove the switch and the connectors from the panel and then you can remove the whole metal panel from the instrument. Now, it is allowed to drill the panel outside the instrument. After all holes are drilled and cleaned, the panel can be placed back to the instrument.

b) Fix DIN sockets to the drilled holes using screws, nuts and tooth-lock washers from the interface accessory (fig. 2.3.1).

c) It is recommended to label the DIN sockets ("MIDI IN", "MIDI THRU/OUT" for example) with self-adhesive foil glued near the sockets (fig. 2.3.2).

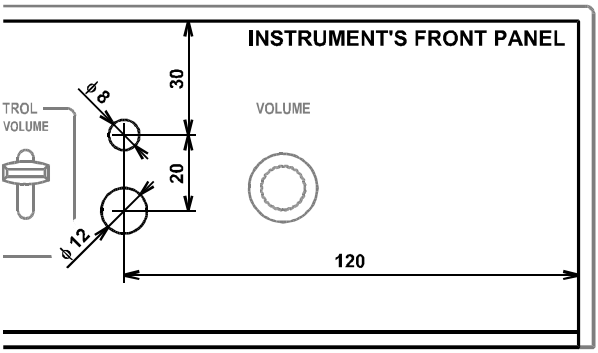
2.4 DRILLING OF HOLES FOR BUTTON AND INDICATION LED

Figure 2.4.1

There are two control elements on the interface – Reset button and bi-color LED. They are not necessary for the interface operation, so they need not to be installed (if you prefer to maintain the vintage status of the instrument) – see chapter 3.2. Nevertheless having both of them installed is more convenient for easier device control.

a) If you decide to install the LED and the button, the suitable place for them is on the right side of the top panel of the instrument (fig. 2.4.1). In that case, you have to drill two holes in the panel as shown on fig. 2.4.2 (all dimensions are in mm).

Figure 2.4.2



a) Drill one hole with diameter 12 mm (for Reset button) and one hole with diameter 8 mm (for indication LED) to the panel – see pic. 2.4.2. Use sharp drills and **work very carefully** (do not press on the drill) so that the instrument's cover is not scratched and **edges of the holes are not chipped** during the drilling!

b) Clean the edge of all holes with small rasp or with point of bigger drill after the holes are drilled. Work very carefully again. Clean all sawdust and raspings from the inside of the instrument.

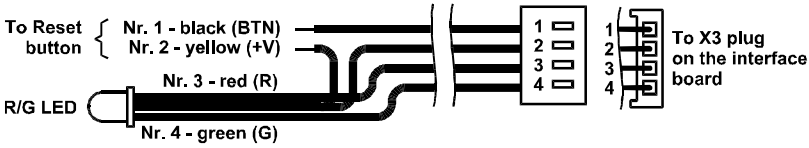
2.5 BUTTON AND INDICATION LED MOUNTING

The LED and Reset button cable from the interface accessory is fitted with 4-pin flat connector (fig. 2.5.1). Two wires outgoing from this connector must be soldered to the button after it is fitted to instrument's panel.

a) Pull the LED (on cable from the interface accessory) through the 8 mm hole in the instrument's panel from the inner side and insert it into the LED holder from interface accessory (fig. 2.5.2).

b) Insert the LED holder to the hole and push it untill collar of the holder reaches the panel surface (fig. 2.5.3).

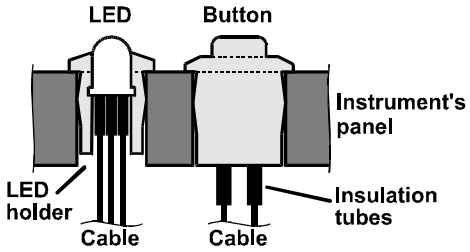
Figure 2.5.1



c) Insert the Reset button from interface accessory into the 12 mm hole in the instrument's panel from the outer side and push it untill collar of the button reaches the panel surface (fig. 2.5.3).

Figure 2.5.2

Figure 2.5.3



d) Place heat-shrink insulation tubes ϕ 2 mm (length 10 mm, from the interface accessory) on yellow wire Nr. 2 and black wire Nr. 1 of the bunched cables (fig. 2.5.4).

e) Solder the yellow (+V) and black (BTN) wires to soldering lugs of the Reset button. Then isolate the connections with the insulation tubes and heat them (with a hot-flue pistol for example) until they shrink tightly to the wires (fig. 2.5.5). Work carefully – the soldering lugs are less accessible.

Figure 2.5.4

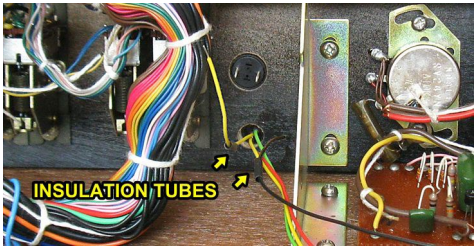
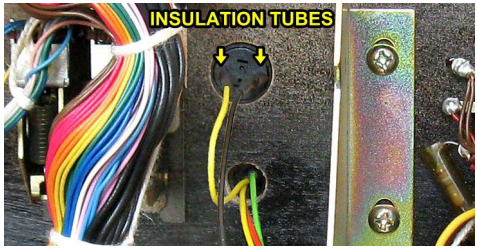


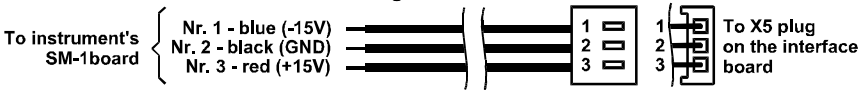
Figure 2.5.5



2.6 POWER SUPPLY CABLE MOUNTING

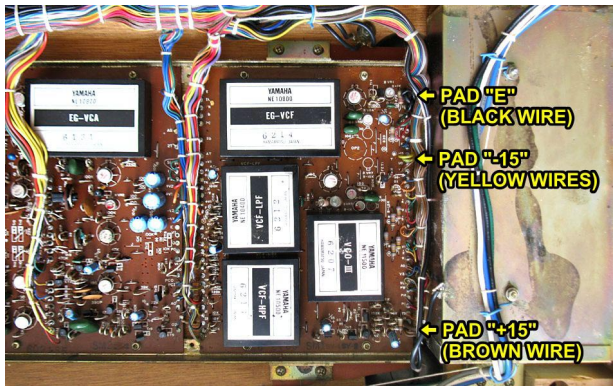
The power supply cable from the interface accessory is fitted with 3-pin flat connector (fig. 2.6.1). Wires outgoing from this connector must be connected to several places at the instrument's SM-1 board (fig. 2.6.2).

Figure 2.6.1



a) Solder the red wire Nr. 3 "+15V" to "+15" labeled pad on the SM-1 instrument's board (fig. 2.6.3 and fig. 4-1). A thick brown wire of original bunched cables is already soldered here.

Figure 2.6.2



b) Solder the black wire Nr. 2 “GND“ to “E” labeled pad on the SM-1 instrument’s board (fig. 2.6.4 and fig. 4-1). A thick black wire of original bunched cables is already soldered here.

c) Solder the blue wire Nr. 1 “-15V“ to “-15” labeled pad on the SM-1 instrument’s power supply board (fig. 2.6.4 and fig. 4-1). Two yellow wires of the original bunched cables are already soldered here.

Figure 2.6.3

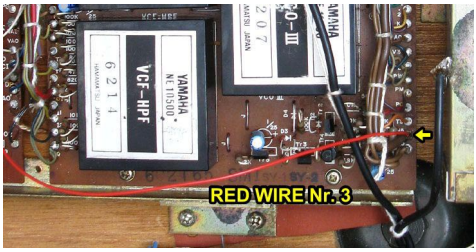
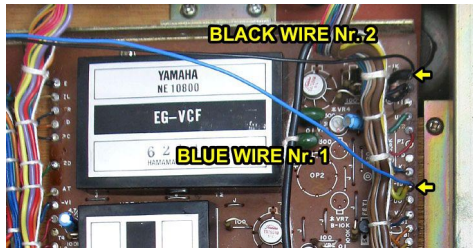


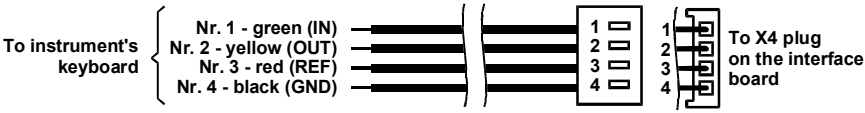
Figure 2.6.4



2.7 KEYBOARD CONTROL SIGNALS CABLE MOUNTING

The keyboard control signals cable from the interface accessory is fitted with 4-pin flat connector (fig. 2.7.1). Wires outgoing from this connector must be connected to the instrument’s keyboard and between the instrument’s keyboard and SM-1 board (fig. 2.7.2).

Figure 2.7.1



a) Unsolder the blue wire (hot wire of shielded blue cable) from soldering pad on the instrument’s keyboard (fig. 2.7.3 and fig. 4-2).

b) Place heat-shrink insulation tube ϕ 2 mm (length 25 mm, from the interface accessory) on blue wire Nr. 2 “OUT” of the keyboard control signals cable and solder the blue wire to blue wire freed from the soldering pad (fig. 2.7.4 and fig. 4-2).

Figure. 2.7.2

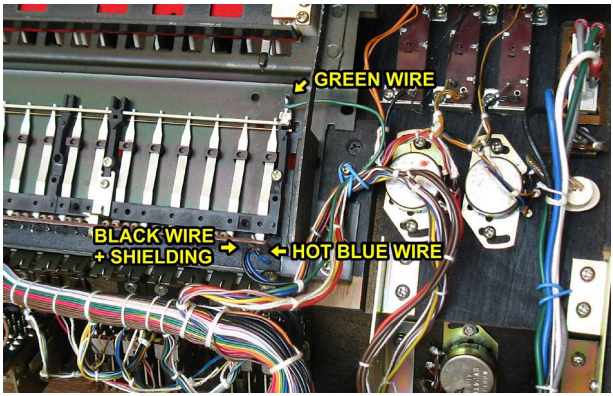


Figure 2.7.3

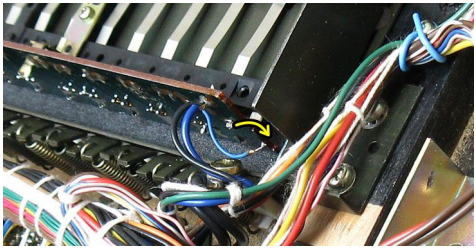
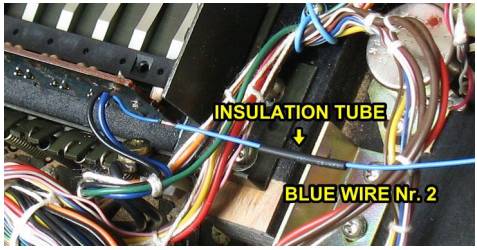


Figure 2.7.4



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

d) Solder red wire Nr. 1 “IN” of the interface cable to the soldering pad where the blue wire was connected previously (fig. 2.7.5 and fig. 4-2).

e) Solder black wire Nr. 4 “GND” of the interface cable to soldering pad of the instrument’s keyboard – to pad where a black wire and shielding of the blue cable are already soldered (fig. 2.7.5 and fig. 4-2).

f) Solder green wire Nr. 3 “REF” of the interface cable to lug on the instrument’s keyboard where a green wire is already soldered (fig. 2.7.6 and fig. 4-2).

Figure 2.7.5

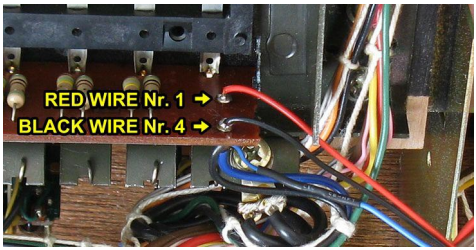
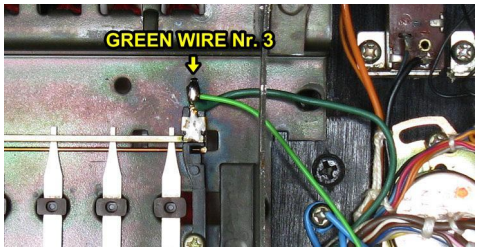


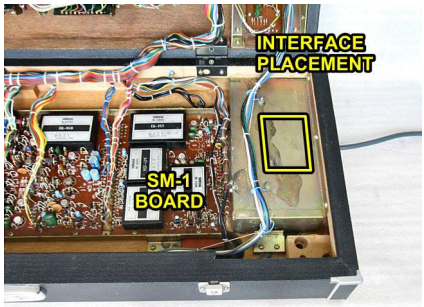
Figure 2.7.6



2.8 THE INTERFACE BOARD MOUNTING

a) The interface board will be placed on the metal cover on the right side, inside the instrument – near the right side-board (fig. 2.8.1).

Figure. 2.8.1



b) Clean the part of rear panel inside of the instrument for the interface board placement (fig. 2.8.1). Use a chemical cleaner to remove all dirt and grease.

c) Remove the protective foil form the self-adhesive supports of the interface board (fig. 2.8.2).

d) Attach the interface board to the metal cover so that the board side with two connectors X4 (“KBD”) and X5 (“PWR”) points to the back as shown on the figure 2.8.3. Then fix the self-adhesive supports by pressing down to the metal cover.

Figure 2.8.2

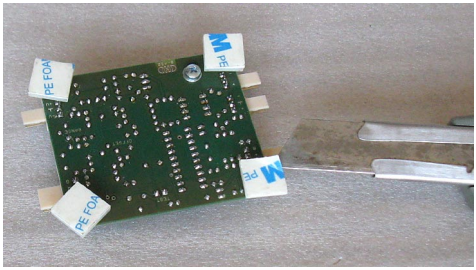
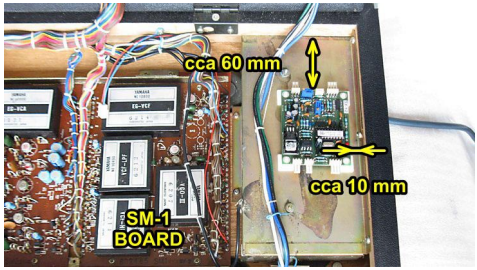


Figure 2.8.3



e) Plug the 3-pin connector of the bunched cables lead from the power supply board to X5 (“PWR”) plug head on the interface board. Orientation of the connector is given by the connector lock so it cannot be plugged reversely (fig. 2.8.4).

f) Plug 4-pin connector of the bunched cables lead from keyboard to X4 (“KBD”) plug head on the interface board. Orientation of the connector is given by the connector lock again (fig. 2.8.4).

g) Plug two 3-pin connectors of the MIDI cables to X1 (“I”) and X2 (“O”) plug heads on the interface board. Orientation of the connectors is given by the connector lock again but be sure that the connectors are not exchanged: MIDI input must be plugged to X1 head and MIDI output to X2 head (fig. 2.8.4).

h) Plug the 4-pin connector of the bunched cables leads from Reset button and LED to X3 (“CTRL”) plug head on the interface board. Orientation of the connector is given by the connector lock again (fig. 2.8.4).

i) Align newly installed MIDI cables and fix them to the original bunched cables with help of three original cable holders. Fix other interface cables together with four plastic stripes from the interface accessory (fig. 2.8.5).

Figure 2.8.4

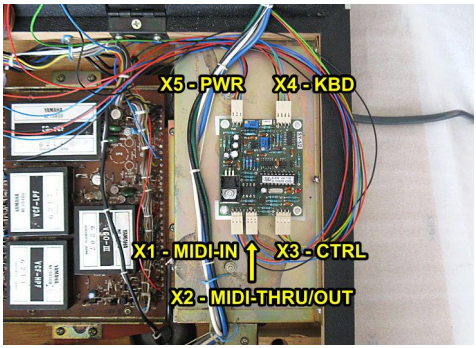
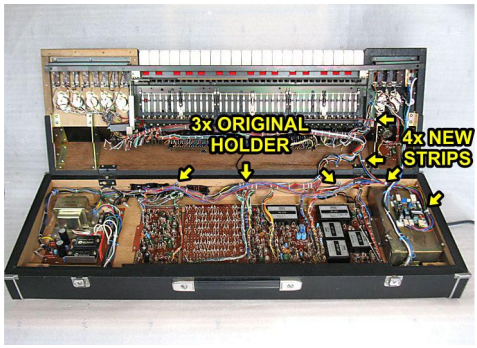
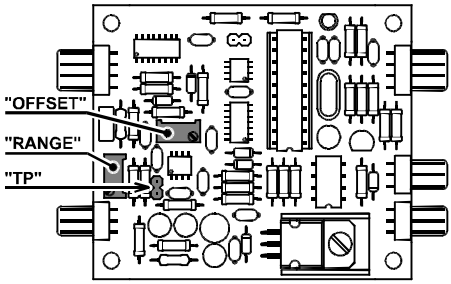


Figure 2.8.5



2.9 INTERFACE ADJUSTMENT

Figure 2.9.1



There are two variable resistors on the interface board labeled “OFFSET” and “RANGE” (fig. 2.9.1). They must be adjusted before the interface is used. Adjustment procedure is following[2]:

a) Connect MIDI output of your MIDI master keyboard (or PC / sequencer / DAW) to MIDI input of the interface[3].

b) Connect audio output of the instrument to a tuner or to a frequency meter.

c) Set all controllers on the instrument’s panels to a clear sound without any modulation.

Rear panel:

- **OUTPUT** switch → to **HIGH** (left position)

Top panel:

- **PITCH-BEND** and **PORTAMENTO** switches → both **off** (upper position)
- Tone selector switches → **FLUTE** / **CLARINET** tone **on** (lower position), all others **off** (upper position)
- Tone side selector → to **SIDE I** (upper position)
- **TRANSPOSITION** selector → **NORMAL** switch **on** (lower position)
- **TOUCH CONTROL** switches → all switches **off** (upper position)
- **FOOT CONTROL** switches → both switches **off** (upper position)
- **VOLUME** knob → to middle position

Left panel:

- **TUNE** knob → to middle position
- **PULSE WIDTH** knob → **maximum** (fully clockwise)
- **VIBRATO - DEPTH** knob → **minimum** (fully counterclockwise)
- **ENVELOPE** sliders → **ATTACK**, **DECAY**, **RELEASE** to **SHORT** (lower position) / **SUSTAIN** to **MAX** (upper position)
- **FILTER** sliders → **LOW PASS FREQUENCY** to **HIGH** (upper position) / **HIGH PASS FREQUENCY** to **LOW** (lower position) / **LOW PASS RESONANCE** and **HIGH PASS RESONANCE** to **MIN** (lower position)

[2] It is suppossed that the interface is in "Factory Reset" status before the adjustment procedure. If it is not, send the **F0 00 20 21 7F 52 50 03 7F 5C F7 [hex]** SysEx message to the intarface first.

[3] Set transmitting MIDI Channel to number 1 on the master keyboard.

Positions of other controllers on instrument's panels are not significant.

d) Plug instrument's power supply cable to a mains socket and switch the instrument on by main switch on right panel. **Attention - work very carefully during whole adjustment procedure - there is a risk of electric shock!**

e) Now, the interface is in "Stand-by" mode - the interface's indication LED is off. If not, press the "RESET" button of the interface.

f) **Wait a few minutes** to stabilize the temperature of all instrument circuits.

g) Measure the voltage between pins of the "TP" jumper head (fig. 2.9.1) with a quality digital multimeter. It should be zero volts exactly. If it is not, adjust it with "OFFSET" variable resistor on the interface board (fig. 2.9.1).

h) Press the highest C key on the instrument's keyboard - indication bi-color LED remains off.

i) Measure the output tone frequency by the tuner (frequency meter). It should be 1046,5 Hz approx. Remember the measured tone frequency. Then release the highest C key.

j) Press the C4 key on the master keyboard (i.e. send MIDI Note Nr. 96 to the interface) and hold it. The indication LED will light in green.

k) Check the output tone frequency by the tuner (frequency meter) again. It must be the same as the frequency measured in paragraph i). If it is not, adjust it with "RANGE" variable resistor on the interface board (fig. 2.9.1).

l) Release the C4 key on the master keyboard. Switch the instrument off and **disconnect the power supply cable from mains socket**.

2.10 FINISHING OF THE INSTALLATION

a) Place the plastic cover back over the instrument's keyboard switches (fig. 2.10.1).

b) Close the instrument - flip top panel of the instrument back to its original position (fig. 2.10.1).

c) Fix the panel to the instrument with original two screws and washers from bottom of the instrument (fig. 2.10.2).

Figure 2.10.1

Figure 2.10.2

The installation of the MIDI interface kit is now finished and the Yamaha SY-2 instrument is prepared for MIDI communication.

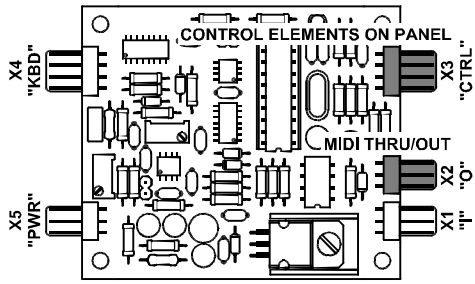
Please read carefully user manual of the interface before usage of modified instrument.

3 INSTALLATION TIPS

3.1 MIDI – THRU/OUT OUTPUT

SY2-KBD interface has both MIDI input and output. However, only MIDI input is necessary for basic operation of the interface (i.e controlling the instrument by MIDI commands). MIDI THRU/OUT output connector need not to be installed at all. If you don't require transfer of MIDI data to another MIDI devices (THRU function) or reverse communication of the interface with host system (OUT function). In such case, X2 connector (labeled "**O**") on the interface board will remain unused (see pic. 3.1).

Figure 3.1



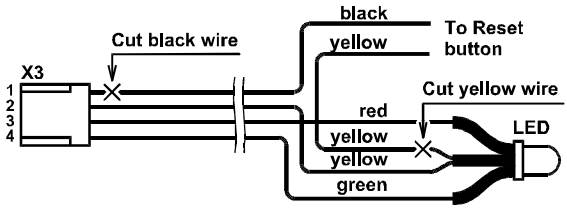
3.2 RESET BUTTON AND INDICATION LED

Installation of the Reset button and indication LED isn't necessary as well. You don´t need to install this bunched cables if you don't want to damage the instrument's panel by drilling. In such case, X3 connector (labeled "**CTRL**") will remain unused (see fig. 3.1).

It is also possible to install only the indication LED on instrument's panel. In such case, cut-off yellow and black wires from the bunched cables as shown on fig. 3.2).

If the Reset button is not installed, the interface operation is unaffected. The only limitation is that the reset of the interface can be done only by turning the instrument off and on or by MIDI commands sent to the interface (see user manual of the interface).

Figure 3.2



4 APPENDIX

Figure. 4.1 – Pads on SM-1 board (both SY-1 and SY-2 instruments)

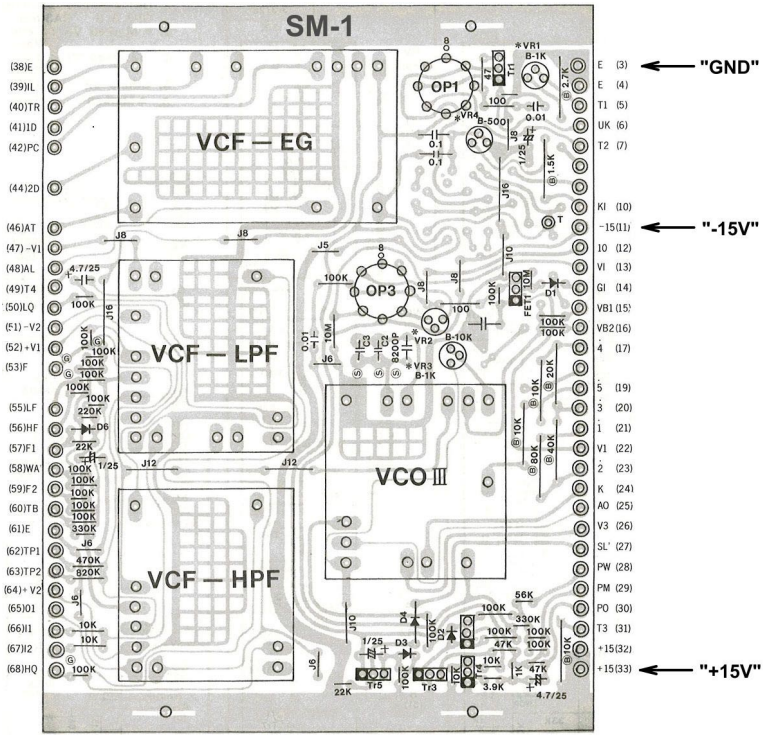


Figure. 4.2 – Manual Keyboard Switches – KM block (both SY-1 and SY-2 instruments)

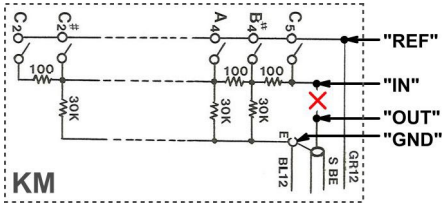


Figure. 4.3 – Interface board installed in SY-2 instrument

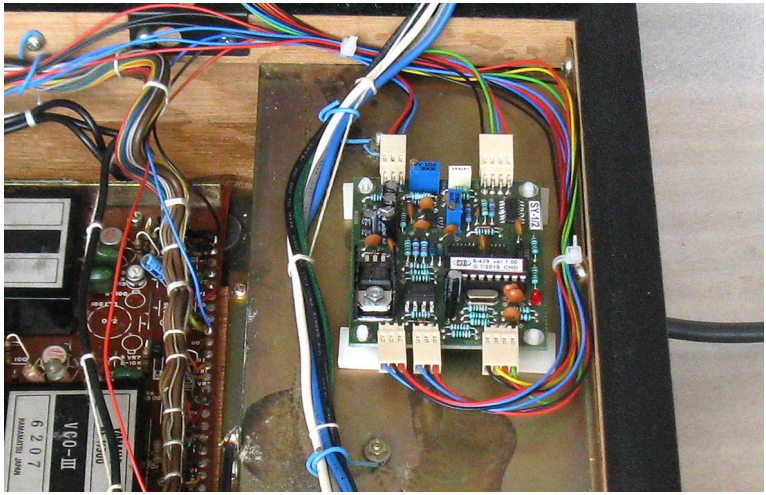


Figure. 4.4 – LED and button installed in SY-2 instrument

This manual in PDF form is available at manufacturer's web pages.

YAMAHA SY-2 (SY-1) MIDI Interface
Model SY2-KBD, Nr. 8-439, ver. 1.00
Document: 843910_instal

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