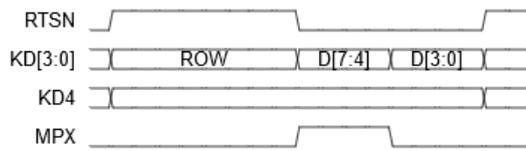


■ MZ-2500 keyboard communication protocol

■ Communication protocol



RTSN, KD4, MPX are output signals from the main unit side. KD [3: 0] is a bidirectional signal between the main unit and the keyboard.

One cycle is about 1.2us. It is not exact and varies.

When RTSN = H, the main unit drives KD [3: 0] and outputs the Row of the key matrix. KD [4: 0] has not yet been determined when RTSN starts up.

When RTSN = L, the keyboard side drives KD [3: 0] and outputs the key matrix data. When MPX = H, the upper 4 bits are output, and when MPX = L, the lower 4 bits are output.

When KD4 = H, the key data of the column specified by Row of the key matrix is output. When KD4 = L, the result of ANDing the key data of all Rows in the key matrix is output.

When I / O port E8h is changed from the software, KD [4: 0] changes during the period of RTSN = H, and the subsequent period of RTSN = L becomes shorter, which is a mysterious behavior. With this, the keyboard side can not return the correct data, but it seems that the data returned at this time is discarded, so it seems that you do not have to worry about it.

■ USB keyboard adapter

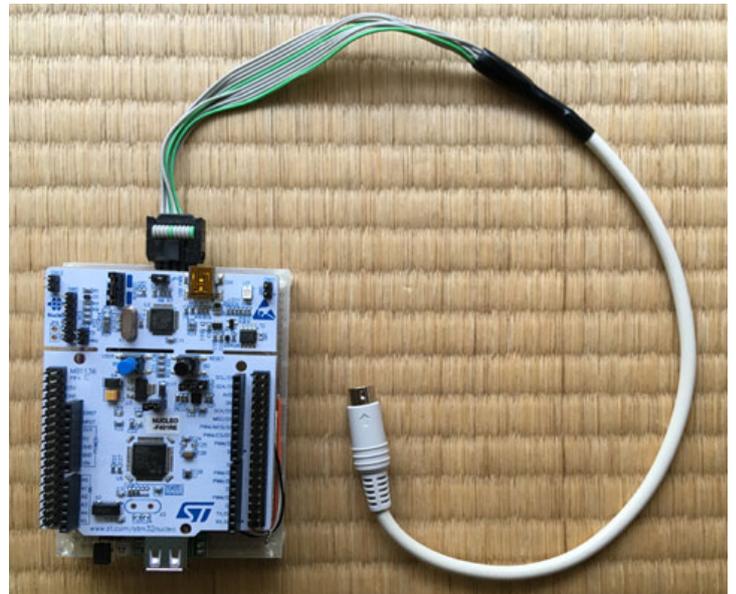
I made a USB keyboard adapter using the [STM32F401RE-NUCLEO board](#) . In addition to the connectors, only one 74HC257 is added.

The keyboard connector of MZ-2500 (2511/2521/2531) is a Mini-DIN 8-pin connector, but you need to be careful because the hole on the main body side where you insert the connector is narrow. In the case of a prefabricated Mini-DIN 8-pin connector, it will not fit if the cover that covers the outside is attached. When using an existing Mini-DIN 8-pin connector cable, the mold must be thin to fit. Also, since the frame GND is used as the GND of the signal line, it can only be used with a fully connected and shielded cable. Sanwa Supply's [KPU-MAC5N](#) is an easy-to-obtain item that meets the conditions, but it is quite [expensive](#) .

When the keyboard adapter is operating, it is powered by the MZ, so switch the jumper JP5 on the STM32F401RE-NUCLEO board to the E5V side.

It supports Japanese 109 keyboard. The keys are assigned appropriately to the keys with the same name. Special ones are assigned as shown in the table below.

Japanese 109 keyboard keys	MZ-2500 keyboard keys
Full-width / half-width	Esc
Caps Lock	LOCK
F11	HELP
F12	BREAK
PrintScreen	COPY
Pause	BREAK
Home	CLR HOME
Del	INST DEL
Page Down	Numeric keypad,
Windows	Argo key
Menu	Argo key
Hiragana katakana	Kana
Alt	GRAPH

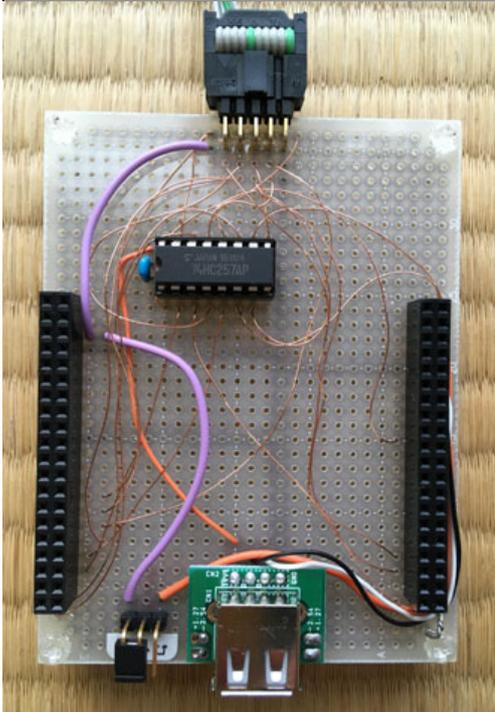
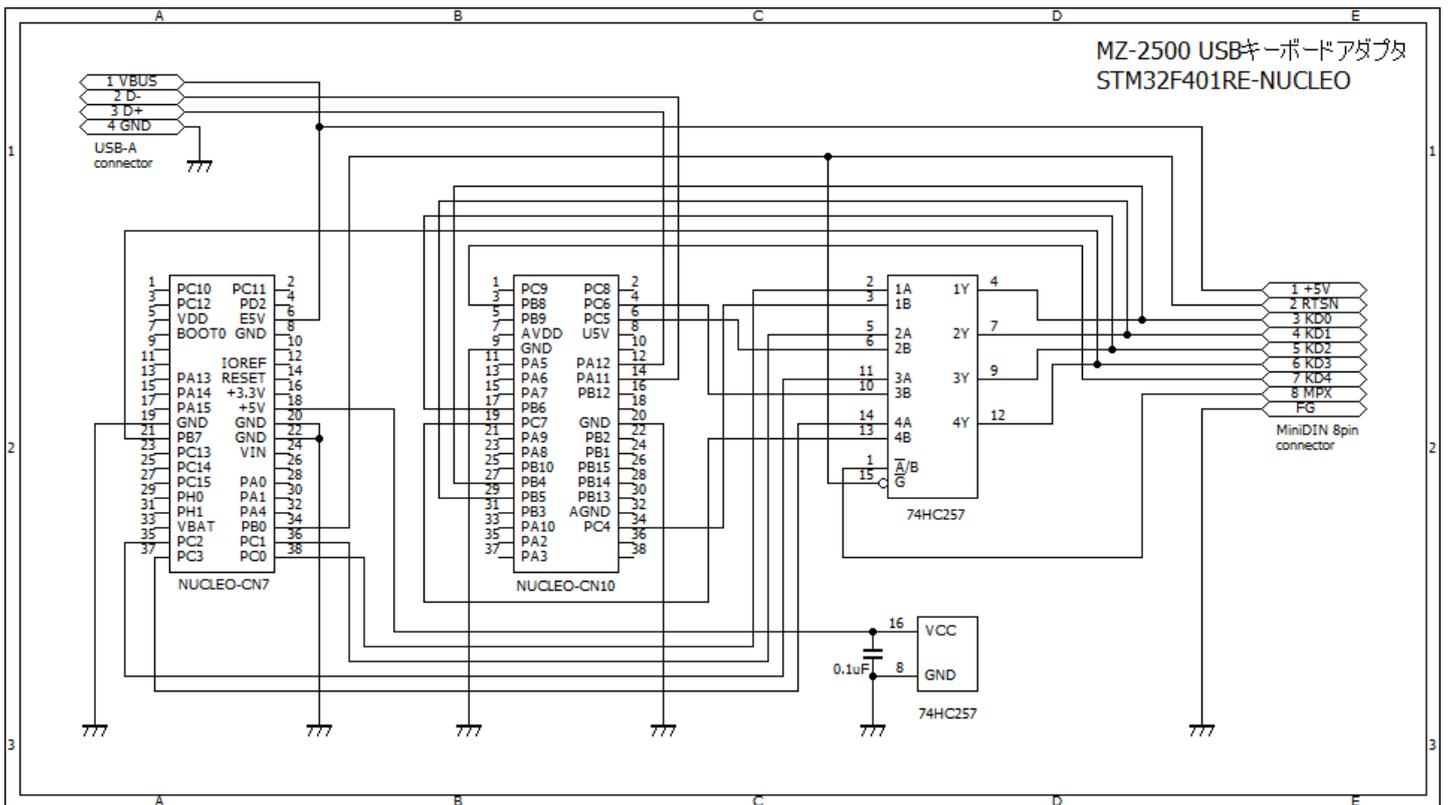


Since we have confirmed the operation only with a limited number of keyboards, some keyboards may not work. Keyboards with a USB Hub or keyboards that are internally connected through a Hub will not work.

Operation has been confirmed	Does not work
Sanwa Supply SKB-SL08W	FILCO FKB108M / JB
Sanwa Supply SKB-L1UBK	Tai-Hao F21-WE45
ELECOM TK-FCM062	Lenovo SK-8805 (* Keyboard with USB Hub)
ELECOM TK-FCM077PBK	Lenovo KUF0452 (* Internal USB Hub connection)
DELL SK-8185	

Lenovo SK-8825
Lenovo LXH-EKB-10YA

■ Circuit diagram



■ Firmware

- v0.3 Fixed a bug that the [M] key could not be entered on some keyboards [Download](#)
- v0.2 Fixed a bug that the key could not be entered when pressing [F1]-[F8]
- v0.1 The version that worked for the time being

■ How to write firmware

1. Download [STM32CubeProgrammer](#)
2. Connect the STM32F401RE-NUCLEO board to your PC via USB and run the STM32Cube Programmer
3. Select "ST-Link" with the button on the upper right of the window and press "Connect"
4. Select "Erasing & Programming" from the menu on the left side of the window
5. Press the "Browse" button of "File programming" and select the file to write
6. Check "Verify programming" and "Run after programming" in "Programming options"

7. Press "Start Programming" at the bottom of the window to start writing
8. When you're done, press "Disconnect" to remove the board from your PC

* When writing, remove the adapter from the MZ and return the jumper JP5 on the NUCLEO board to the U5V side.

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