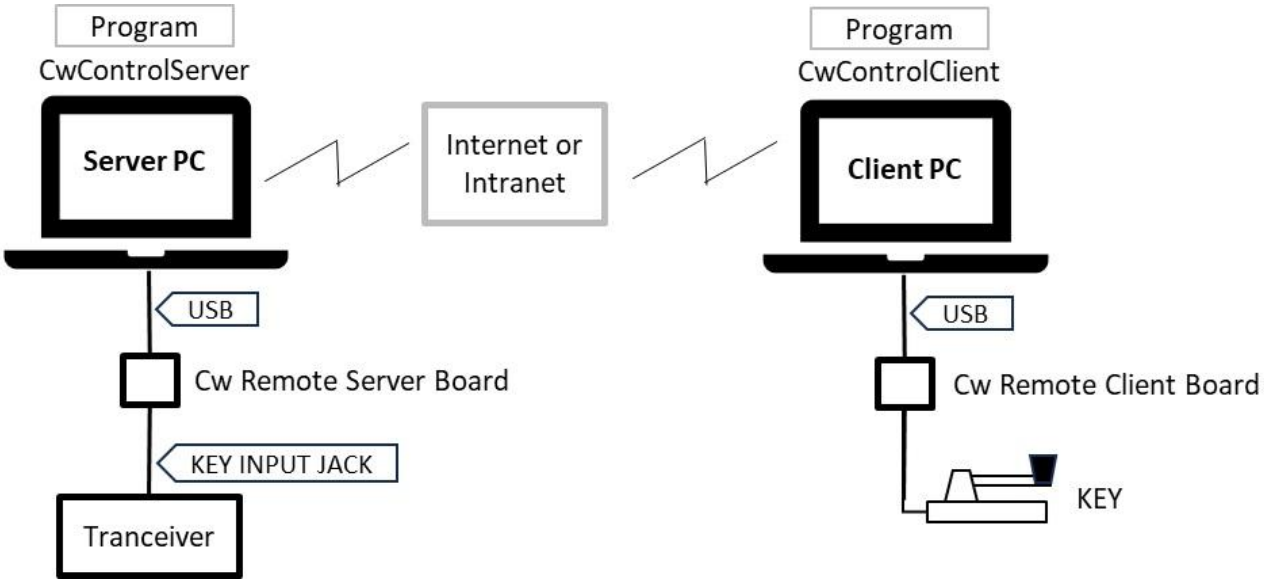
CW Remote Control of USB

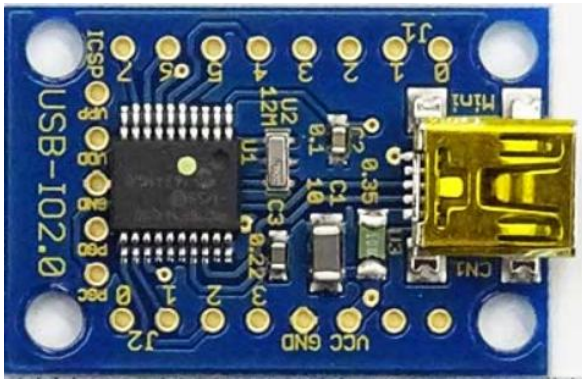
1. General

   This document is a summary of the CW remote key control interface and program designed by JA7EIF.
   It can be done without any complicated modifications on commercially available USB-IO2.0 boards.

   Necessary Hardware: 2 sets of USB-IO2.0 boards with keying interface
   Necessary Software: CwControlServer and CwControlClient programs which can be installed on normal Windows PC (Win7/10/11)



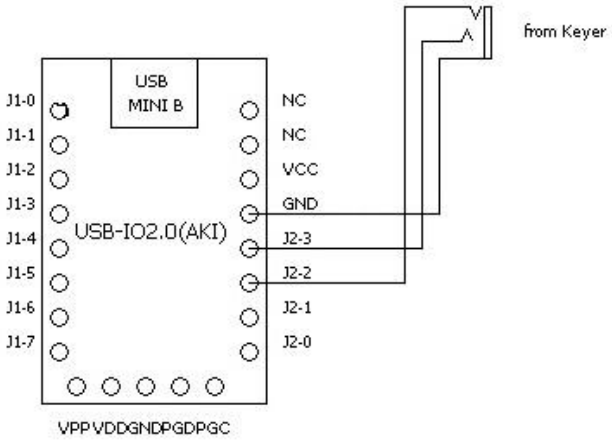
2. Hardware
   Prepare 2 sets of USB-IO2.0 boards. One for Client (Key in) side, one for Server (Key out) side.
   USB-IO2.0 board is available at Akizukidenshi or Km2Net in Japan.
   Modification procedure on each USB Board is described in 2.1 & 2.2 below.



USB-IO2.0(AKI)　actual size:2x3cm

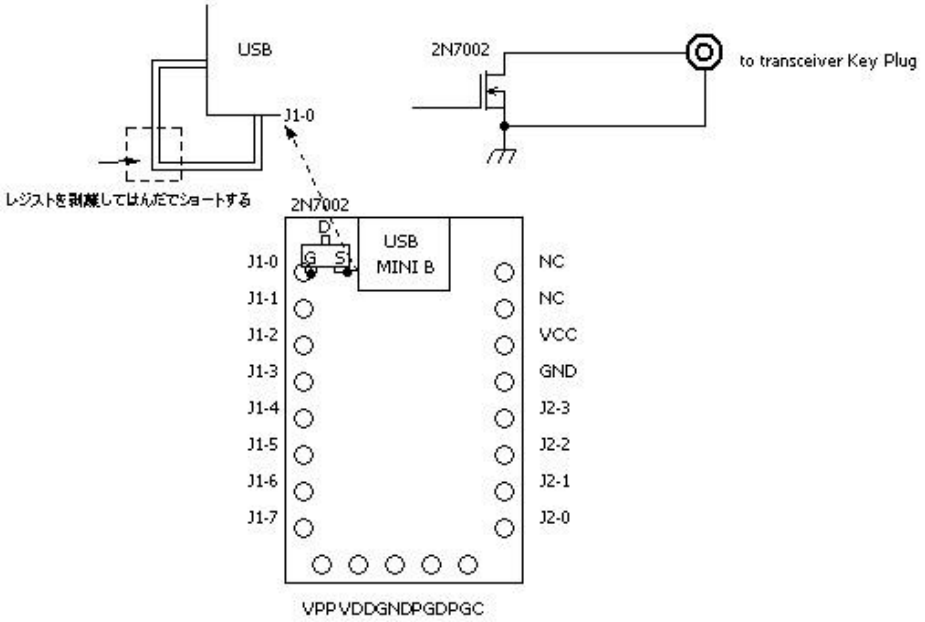
2.1 Modification for Cw Remote Client Board

Use J2-2 and J2-3 pins for Key input

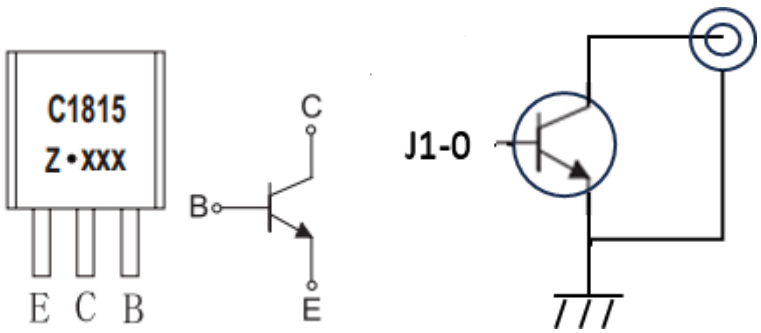


2.2 Modification for Cw Remote Sever Board

Use J1-0 pin for Keying output



When a KEY ON signal comes from the client, the output of J1-0 will be set to High.
The transceiver's KEY terminal needs to be set to LOW.
In the original design by JA7EIF, a surface-mount 2N7002 is used for this function. In this case withstand voltage is 60V or less and it is a positive load.
In case 2N7002 is not available or surface-mount is not preferred, other discrete components such as 2SC1805 Transistor (NPN), TLP222 Photo Coupler, etc. that you may have in your parts bin can be used.



NPN TR (eg.2SC1815)

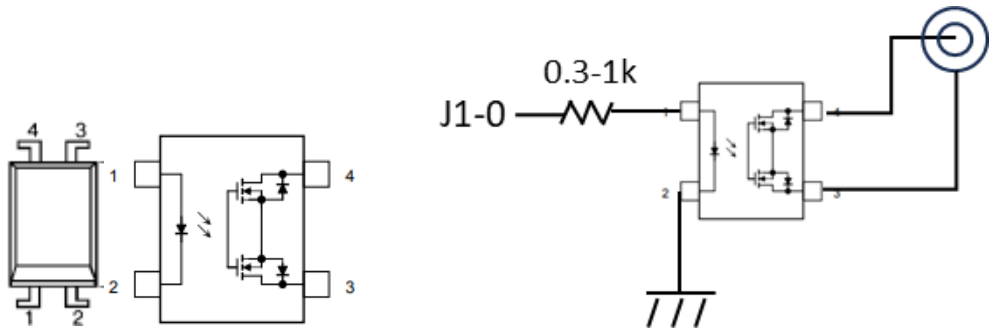


Photo Relay(eg.TLP-222A)

3. Software

3.1 Download the following program from JA7EIF' s website.

Latest program is available at JA7EIF' s website. (Free)

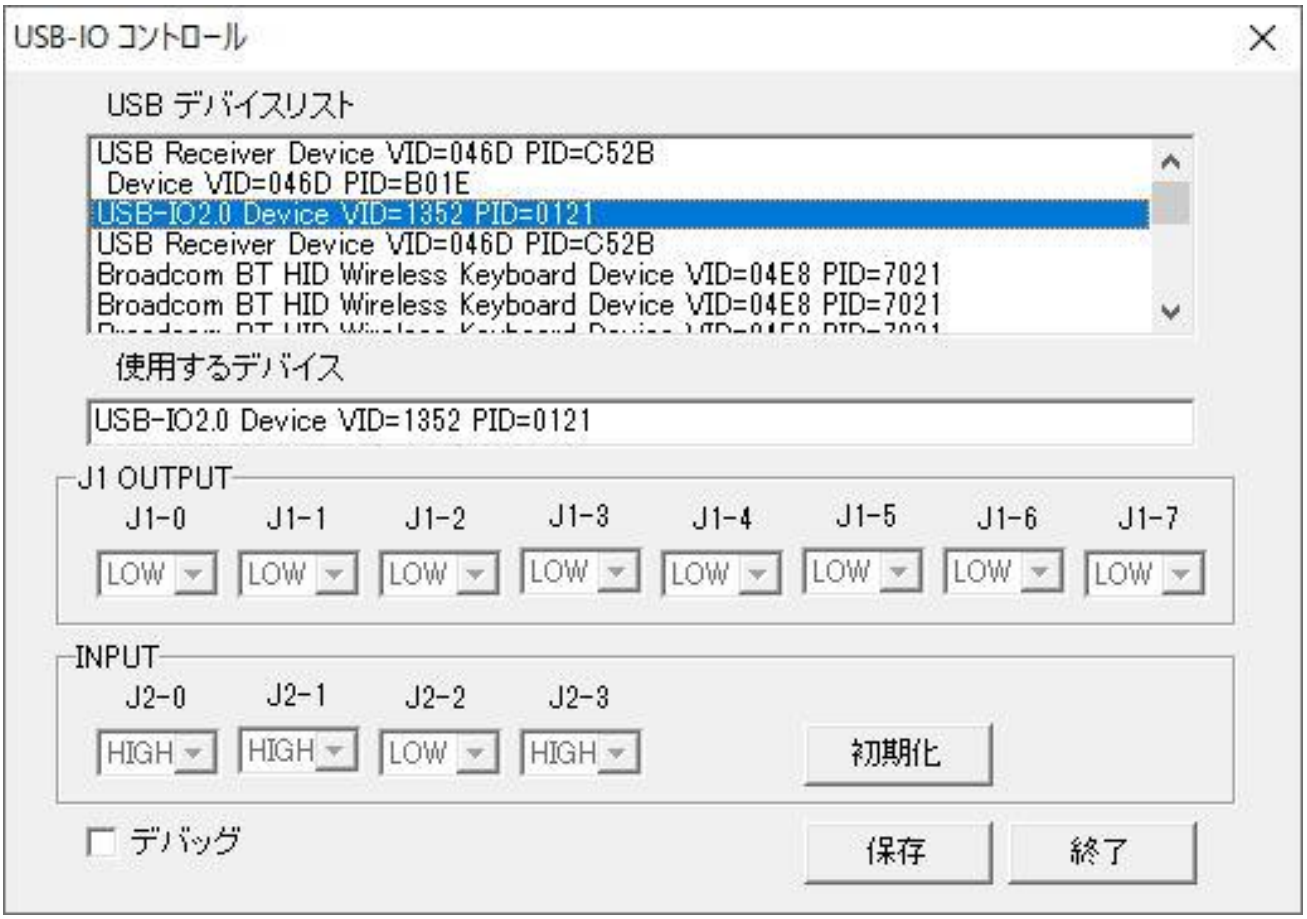
For Server PC : CwControlServer.zip
https://www.ikd-net.com/ham/CW_Remote/CwControlServer.zip
For Client PC: CwControlClient.zip
https://www.ikd-net.com/ham/CW_Remote/CwControlClient.zip

Simply create appropriate folders on the server PC and mobile PC, unzip each ZIP file, and launch the "exe" file. No installation process required.

3.2 Server side

Insert the server USB-IO2.0 board to the Server PC and launch CwControlServer.exe

By default the port ポート is 50004, but you can change it to your preferred port.
If you change it, don't forget to change the firewall as well.
The ID is left blank, so enter any alphanumeric characters, just like the password.
This completes the settings, but if you see the message " USB デバイスを使用できません(USB device cannot be used)", press the [USB] button to open USB-IO コントロール(control) window, then check if it is recognized.



Akizuki Electronics' USB-IO2.0 is recognized as
[USB-IO2.0 Device VID=1352 PID=0121]
Km2Net's USB-IO2.0 is recognized as
[USB-IO2.0 Device VID=1352 PID=0120].
, so please select the proper USB device that you are using.

The [初期化](Initialize) button sets the J2 port to pull-up input and J1 to output.
If you are using USB-IO2.0 for the first time, please initialize it once.

Check □デバッグ (Debug) to check operation manually. Uncheck it when using keys.
The check box will be unchecked when you press the 終了(Exit) button.

3.3 Client side

Insert the client USB-IO2.0 board to the Client PC and launch CwControlClient.exe

IP アドレス(IP Address)

Enter the IP address of the server you want to connect to.
If you are connecting via the Internet, enter a global IP.

ポート(Port)

The default is 50004.
The icom RSBA1 remote program uses 50001-50003 (default), so we set it to that, but you can change it to any port you like.
However, it must match the server's port.

ID

If it does not match the server's ID, you will not be able to connect.
This is a simple security measure.

[接続]Connect Button

Try to connect to the server.
When connected, it will change to [接続中](Connected).

[切断]Disconnect Button

Disconnect from the server.

[USB] Button

Select the USB device to use.
See the server side explanation in 3.2 above.

[終了]Exit Button

Exit the program.

Mode

○ スルー(Through) : Use the connected key as is.
○ バグキー(Bug Key) : Bug key mode (dot priority).
○ エレキー(Ele Key) : Ele key (squeeze key) mode.

NOTE: For the basic operation by using straight key or other external key, just check スルー(Through), then skip the rest of this article and go to article 4.Basic Operation.

SW4 – SW7

Checking SW4, SW5, SW6, and SW7 will set the server-side USB-IO outputs J1-4, J1-5, J1-6, and J1-7 to High.

SW4→J1-4
SW5→J1-5
SW6→J1-6
SW7→J1-7

You can use a MOS relay or similar to connect to the server-side J1 port (J1-4, J1-5, J1-6, and J1-7) as a remote switch.

To change the name of SW4...SW7,
open the CwControlClient.ini file in the same folder as the program with an editor such as Notepad and edit it.

□ サイドトーン(Side Tone)

Check to output side tone.
The default is 32-bit, 48000Hz. So, Check that the default speaker properties are set to ”32-bit, 48000Hz (studio quality)” (24-bit and 16-bit are also fine).
If you do not want to change the default speaker settings, modify ”CwControlClient.ini” explained later to match the sample rate.
You can change the sidetone frequency to your liking.
You can change it by entering a number even if it is a frequency other than the registered ones.

VOL

Volume adjustment.

お気に入り(Favorites)

You can save three frequently used settings.
To register them,
select a number.
At first, no settings are registered, so the following message will be displayed.

Press the OK button to close the dialog, then press the [MW] button.
The current ”Speed”, ”Dash”, ”Dot”, ”Space” and ”Reverse” will be registered.
The next time you click the number, the registered ”Speed”, ”Dash”, ”Dot”, ”Space” and ”Reverse” will be set.

スピード(Speed)

Bug key, electric key mode, keyboard
Varies the symbol speed of the electric key and the speed of the single dot on the bug key.
The left end is the fastest at 200 characters/minute, and the right end is the slowest at 50 characters/minute.

長点 (single dot/dah ratio)

Electric key mode, keyboard
The length of the dah (relative to 1 single dot) on the electric key.
Can be changed from 3 to 4.6. Default is 3 (cannot be set below 3)

単点(短点)(Single dot)

Bug key, electric key mode, keyboard
The length of the single dot.
Can be changed from 0.5 to 1.5. The default is 1.

For example, if you set it to 0.5, the length of the single dot output at the set speed will be halved, and the space after will be 1.5 times larger.

長間(Space)

Electronic key mode, keyboard

The length of the interval between dashes.

Can be changed from 0.5 to 1.5. The default is 1.

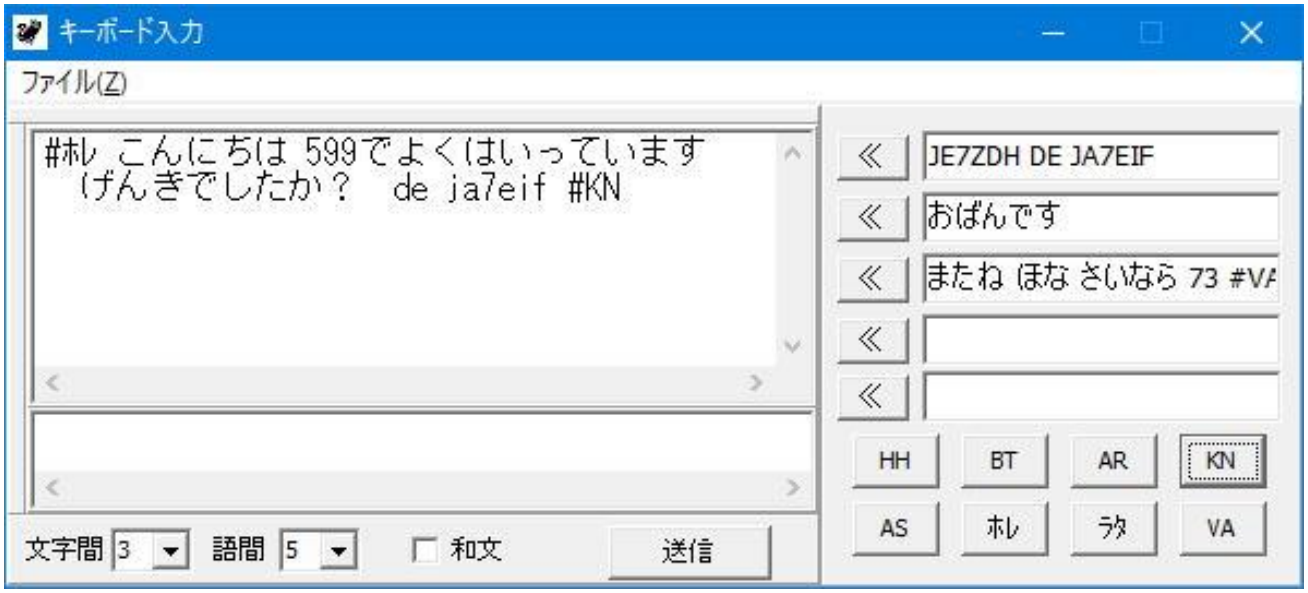
For example, if you set it to 0.5, the interval between dashes (length of one dot) at the set speed will be halved.

The length of the dash itself will not change (as it is set as a ”dash”).

□ キーボード(Keyboard)

Since this is a computer electronic key, keyboard output is possible.

If checked, the following operation screen will be displayed.



The top row is the editing screen.

Character input can be alphanumeric, hiragana, or katakana.

They can be mixed.

For procedural signs (prosigns or symbols) such as HH, add a # (sharp) before the #H symbol.

There are buttons on the bottom right that will send frequently used procedural signs to the editing screen.

You probably won’t use the Japanese characters ヰ and ヱ, but you can just type them into the editing screen as is.

You can convert them to the symbols ヰ and ヱ by adding ^イ ^エ and ^ before

the symbol.
The five columns on the right can be used to enter frequently used strings of characters, and by pressing the ”≪” button you can send the string to the editing screen.
The ”ファイル(File)” on the far left is for saving and loading standard text.
You can save text entered on the editing screen with a file name.
Once you have entered text on the editing screen, press the [送信](Send button).
When the [送信](Send button) is pressed, the text on the editing screen will be converted to alphanumeric characters and half-width katakana and transferred to the bottom.
At the same time, it will be output as Morse code.
When outputting as Morse code, the output characters will disappear.
This screen cannot be edited, so if you want to stop it midway through, right-click and a ”[中止]Stop” menu will appear, so click it to stop.

文字間(Character Spacing)

This is the space between each character. The standard is 4, but this can be changed from 2 to 8.

語間(Word Spacing)

This puts a space between words, but you can specify the length of the space. The standard is 7, but this can be changed from 3 to 12.

和文（Japanese Text）

Normally there is no need to check this.
It will be checked automatically if it is determined to be Japanese text.
At this time, ( ) will be converted to the Japanese (Wabun Code) downward bracket and upward bracket symbols, but if you want to use them as Roman (International Code) left and right bracket symbols, uncheck this box.
If Japanese text is not used, the check mark will not be automatically entered.

□ ローカル出力(Local Output)

When checked, the key will be output to the J1-0 terminal on the same board.
When the key is on, it will be high, so connect a MOS FET and connect to the transmitter.
When connected remotely, use this to stop the key output to the local device.
When connected remotely, it will not automatically turn off, so be careful not

to output remote TX and local TX simultaneously when operating VOX.

□ ステレオプラグ(Stereo Plug)

When the key to be connected is a paddle key or a dual-paddle manipulator, use a stereo plug to check.

When connecting a vertical key, bug key, or electric key in through mode, uncheck (mono plug).

□ リバース(Reverse)

Inverts the contacts of the dot and dash.

4. Basic Operation

After completion of basic preparation of hardware and program described in article 2 and 3.
Confirm the connection of hardware at both server and client sides.
Run the control program at both server and client sides.
Then following screens are shown.

CW Remote Server before connection

CW Remote Client before connection
“USB デバイスを使用できます”(USB device is enabled)

Click 接続(connect) butonn at the client side.
When the connection is made, screens indicate as follows;

Server side：“接続先 ***.***.***.*** ID が一致しました”
（Connected to ***.***.***.*** ID matched）

Client side: [接続中](connected)
“ID js2ahg を送信しました >OK“
(ID js2ahg is transmitted >OK)

If “>OK” is indicated the connection between server and client is succeeded. Then you can start keying.

APPENDIX

Customization

Edit ”CwControlClient.ini” in the same folder as the program.

[Client]
Left=0
Top=0
[TargetServer]
IP=192.168.0.251
Port=50004
ID=JA7EIF
[ControlSw]
SW4-Label=SW4　← If you change =SW4 to =Test, SW4 on the screen will show Test
SW4=0
SW5-Label=SW5
SW5=0
SW6-Label=SW6
SW6=0
SW7-Label=SW7
SW7=0
[SideTone]
SW=1
Freqency=800
Volume=22
SampleRate=48000
Bitrate=32 ← Deleted (will be ignored even if written)
[KeyPort]
J2=3　　← Port number to connect the key
[DashPort]
J2=2　　← Port number to connect the dot terminal using a stereo plug
[ActiveTime]
Time(S)=5　　← Timer to stop sending to the server when not in use (default 5 seconds)
[KeyMode]

```
MODE=1
Speed=42
Ratio=1
DotSpace=3
DashSpace=3
Reverse=0
Local=1
```

Edit ”USB_IO.ini” in the same folder as the program.

```
[Form]
Top=0
Left=107
[CurrentDevice]
CurrentDevice=USB-IO2.0 Device VID=1352 PID=0121
[Label]
J1-0=J1-0
J1-1=J1-1
J1-2=J1-2
J1-3=J1-3
J1-4=J1-4
J1-5=J1-5
J1-6=J1-6
J1-7=J1-7
J2-0=J2-0
J2-1=J2-1
J2-2=J2-2
J2-3=J2-3
[OUT PORT INI]
J1-0=0
J1-1=0
J1-2=0
J1-3=0
J1-4=0
J1-5=0
J1-6=0
J1-7=0
[Watch Timer]
```

mS=5 ←Time interval for monitoring USB_IO (default 5ms) See Note)

Note)
It is nearly impossible to create a timer accurate to milliseconds on Windows. For example, even if you specify a 1 ms wait for the sleep(1) function, the range is 10 ms to 50 ms, so it seems that it cannot be used for control.
If you use a multimedia timer (timeSetEvent), the accuracy of 1 ms is quite good depending on the environment, but the accuracy was poor on some PCs.
2 ms should be fine in a normal environment, but it seems that 5 ms is necessary on heavy PCs, so 5 ms is set as the default.
The setting here is 1 ms to 10 ms.

Edit " CwControlSever.ini " in the same folder as the program.

```
[SERVER]
Left=0
Top=0
Port=50004
ID=JA7EIF
[TxTimeOut]
Time(S)=5      ←This is a timer that forces the key to be turned off if key data is lost from the client (default 5 seconds). Fixed in Ver2.6
[CurrentDevice]
CurrentDevice=USB-IO2.0 Device VID=1352 PID=0121
[Form]
Top=0
Left=0
[Label]
J1-0=J1-0
J1-1=J1-1
J1-2=J1-2
J1-3=J1-3
J1-4=J1-4
J1-5=J1-5
J1-6=J1-6
J1-7=J1-7
```

J2-0=J2-0
J2-1=J2-1
J2-2=J2-2
J2-3=J2-3
[OUT PORT INI]
J1-0=0
J1-1=0
J1-2=0
J1-3=0
J1-4=0
J1-5=0
J1-6=0
J1-7=0
[Watch Timer]
mS=2 ←Not used on the server

Note 1
Do not allow signal enhancements.
☐Enable audio enhancements
↑Uncheck

Disclaimer

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