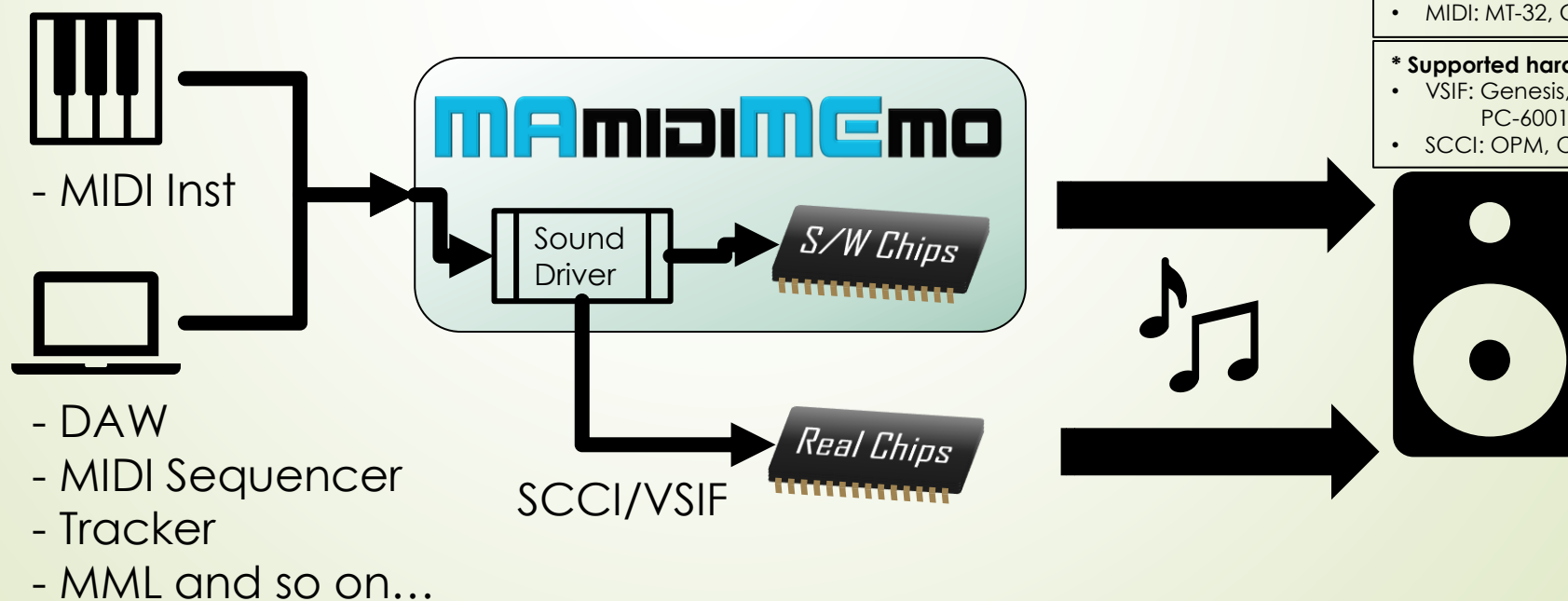# MAmidiMEmo
The Virtual S/W Synthesizer

User's Manual – for MAmidiMEmo V4.6.5.0

What is the MAmidiMEmo?

- MAmidiMEmo is a virtual chiptune sound MIDI module for Windows

- You can use MIDI or DAW to sound the MAmi

- MAmi supports various sound chips*

- Also, MAmi can drive real hardware chips* via SCCI, VSIF

* Supported chips are the following
- PCM: C140, SPC700
- FM Synthesis: OPM, OPN2, OPNA, OPLL, OPL, OPL3
- WSG: NAMCO CUS30, HuC6280, SCC
- PSG: SID, POKEY, GB APU, SN76496, NES APU, MSM5232, AY-3-8910
- VOICE: TMS5220, SP0256, SAM
- MIDI: MT-32, CM-32P(Simulation)

* Supported hardware is the following
- VSIF: Genesis, SMS, Famicom, MSX, C64, PC-6001
- SCCI: OPM, OPNA, OPZ

- MIDI Inst

MAmIDIMEmo

Sound Driver → S/W Chips

Real Chips

SCCI/VSIF

- DAW
- MIDI Sequencer
- Tracker
- MML and so on…

Install & Basic Settings

- Install & run
  - Extract the downloaded zip file.
  - Click MAmidiMEmo.exe and please press [Allow access] button. This is because MAmidiMEmo uses interprocess communication technology to communicate with other apps in order to sound from the app.
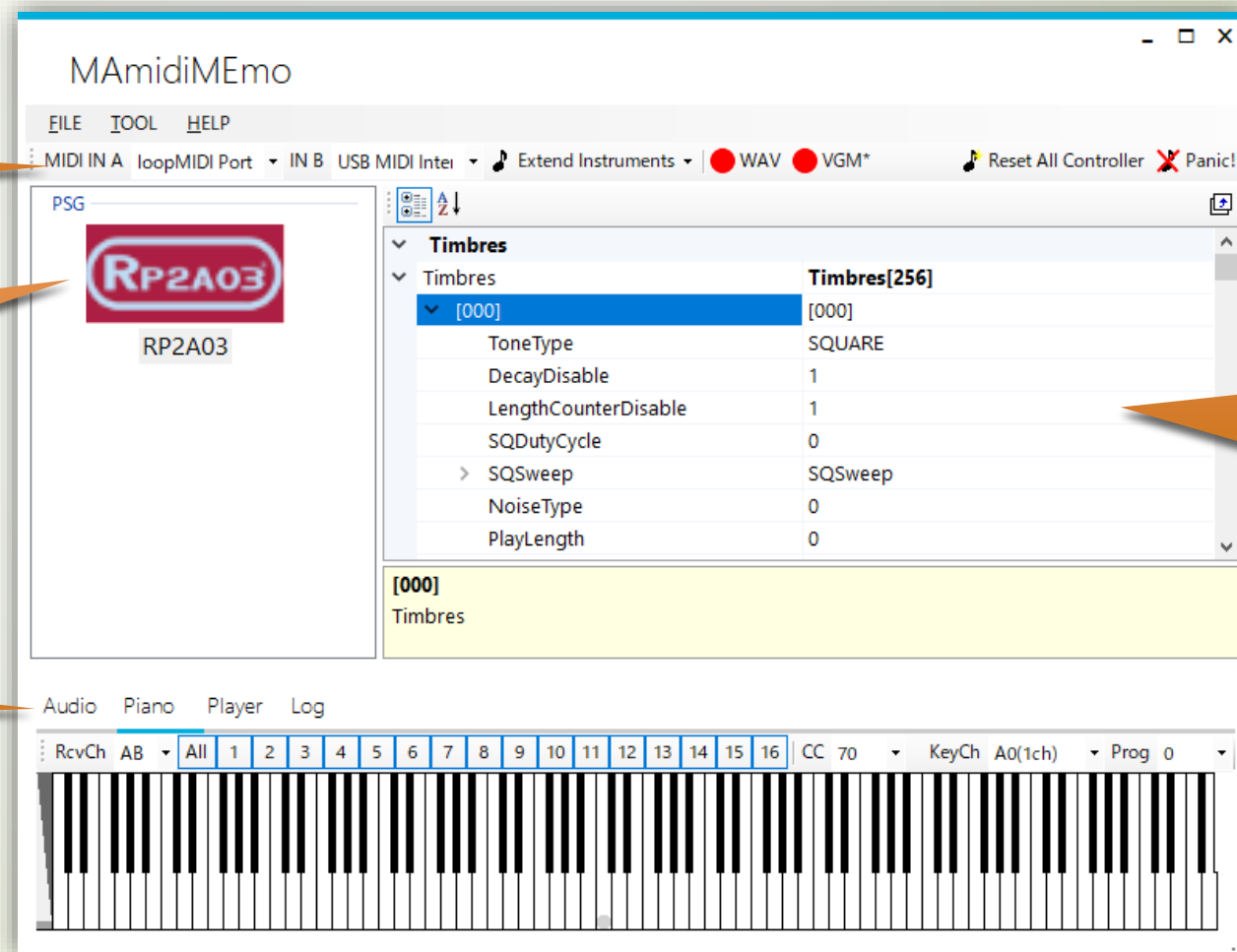

  - Will open the MAmidiMEmo. If not, please check the followings.
    - **.NET Framework 4.7 or later** installed on your PC.
    - **VC++ 2012 Runtime** installed on your PC.
    - (Execute "DelZoneID.ps1" to remove "Zone.Identifier" flag.)

Window Overview

MIDI IN A,B Selector

Active Chips (see next)

Tools

Chip Parameter Editor (see next)

Add and Remove a Chip

To add
Select the chip from this menu.

To remove
Open a context menu and select.

MAmidiMEmo

FILE   TOOL   HELP

Extend Instruments ▾   ● WAV   ● VGM*   ♪ Reset All Controller   ✗ Panic!

PSG

RP2A03

RP2A03

❯ **Timbres**	
❯ Timbres	**Timbres[256]**
	[000]
	SQUARE
...ble	1
...unterDisable	1
SQDutyCycle	0
❯ SQSweep	SQSweep
NoiseType	0
PlayLength	0

Reduce selected chip type(s)
Clone selected chip
Clear all

[000]
Timbres

Audio   Piano   Player   Log

RcvCh AB ▾ | All | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | CC 70 ▾   KeyCh A0(1ch) ▾   Prog 0 ▾

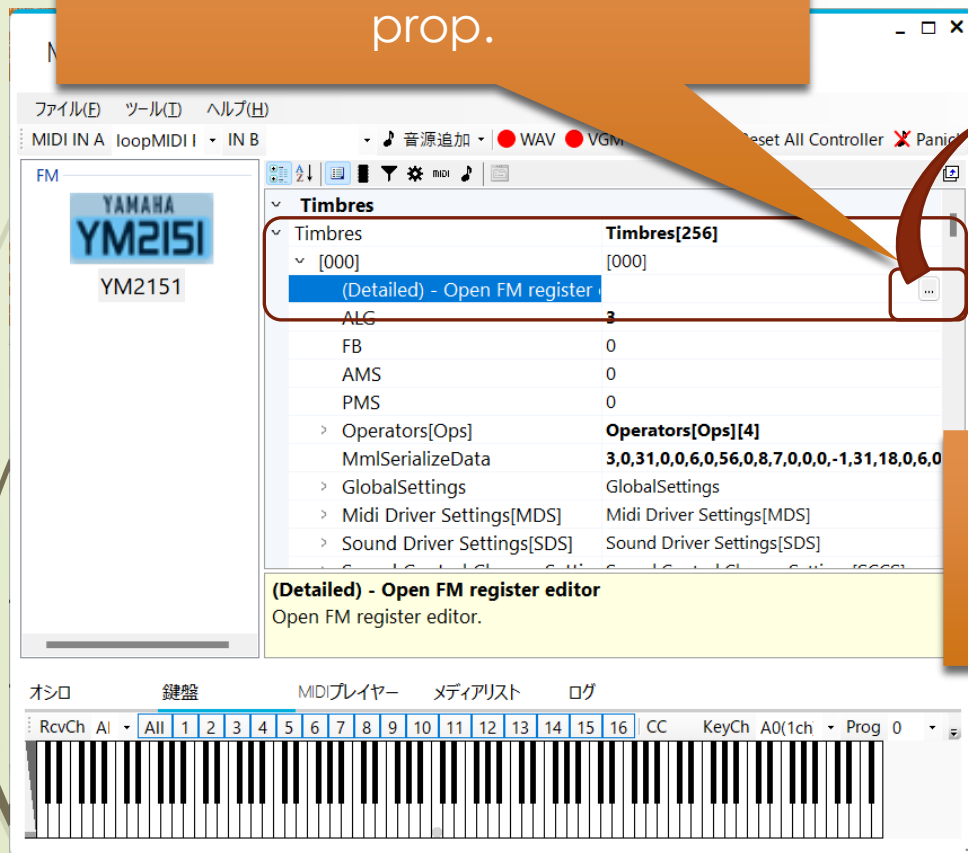# Edit chip and sound parameters

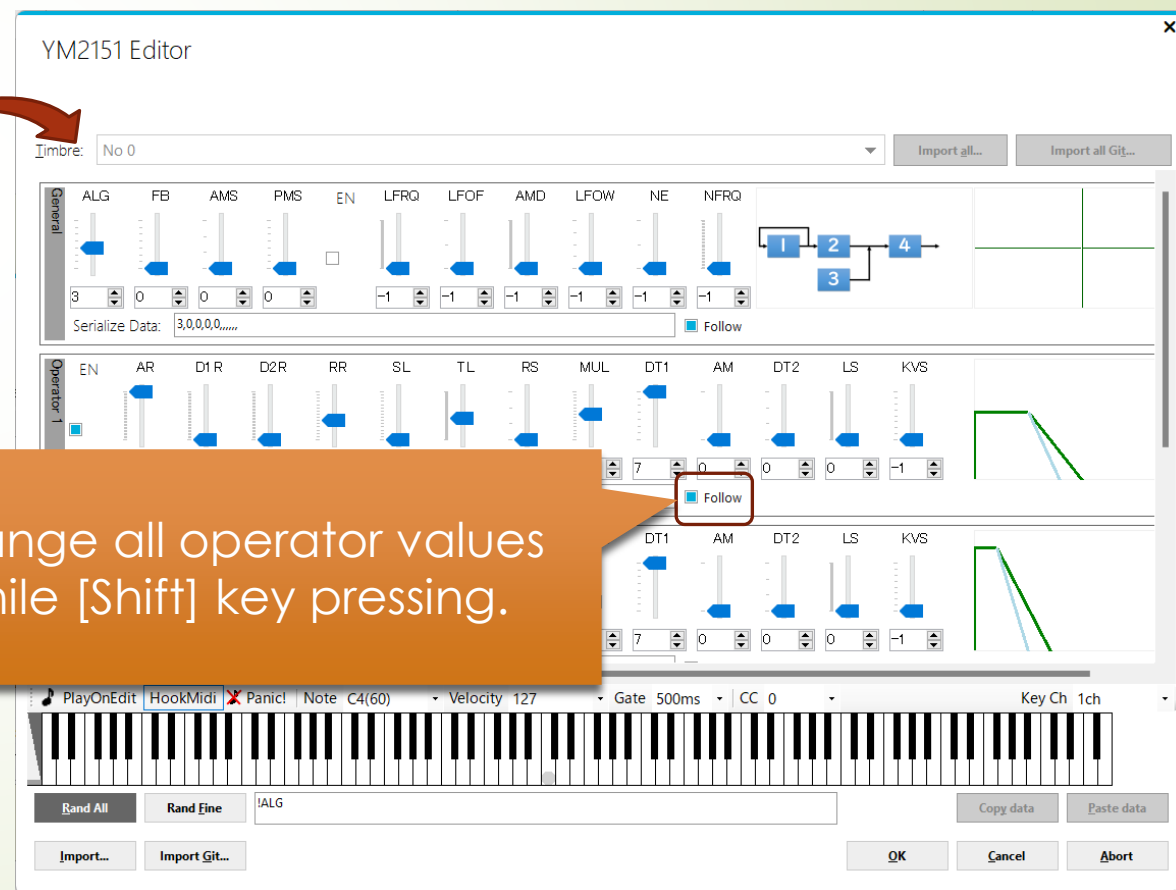**1. Click chip**

2. Click parameter

3. Change value
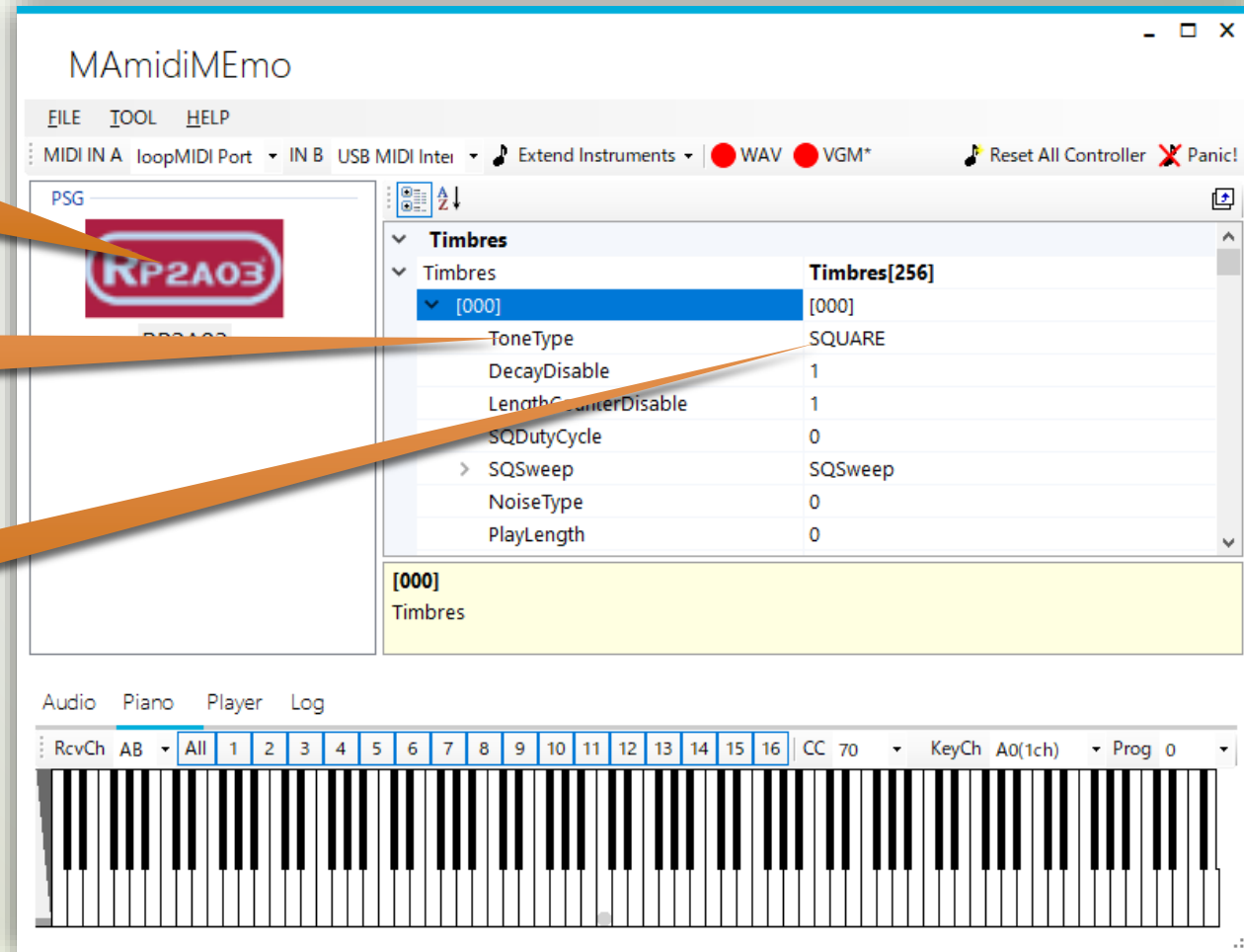
Edit FM registers with a GUI editor

Select a timbre and click the […] button on the "(Detailed)" prop.

Change all operator values while [Shift] key pressing.

Between MIDI ch and Chip ch Relation.

- You don't need to concern the Chip ch. , generally. MAmidiMEmo will assign suitable Chip ch. automatically. However, you need to concern a max ch. number of the Chip.

- MAmidiMEmo will assign oldest sounding ch. to sound the new sounds.

MAmidiMemo will assign empty ch. or oldest sounsing ch. , generally.

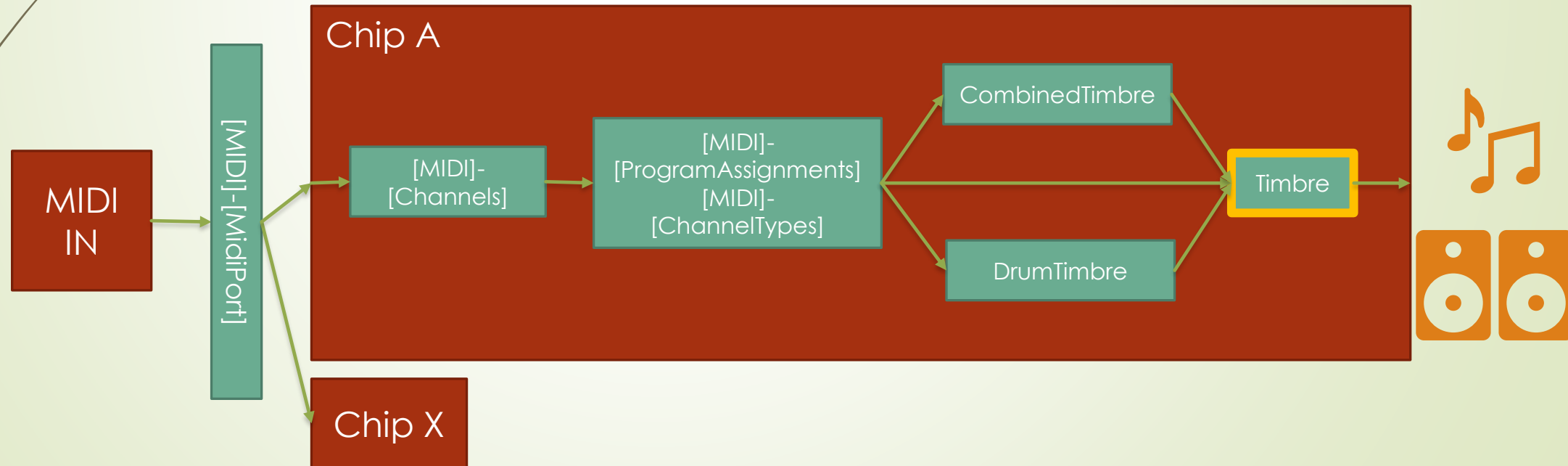Note On Msg from MIDI ch. X

MAmidiMEmo

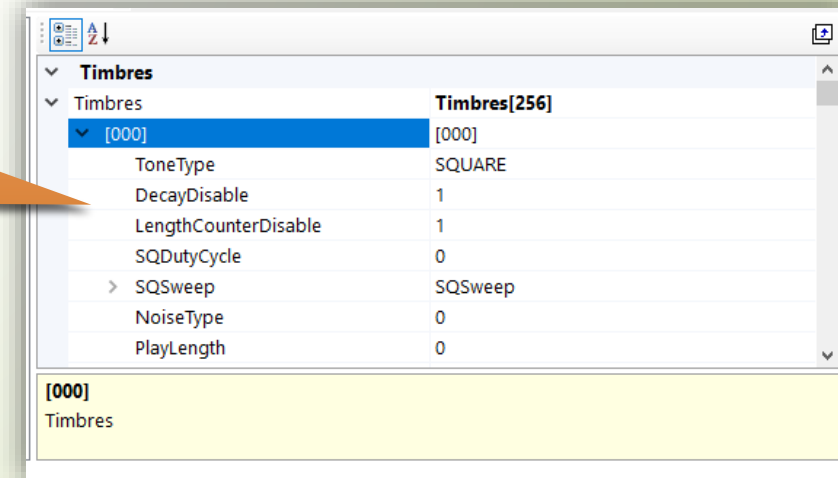Chip A

FM ch. 1

FM ch. 2

FM ch. 3

Sounding Structure

- MAmidiMEmo outputs a sound from MIDI message along with the following structure.
So, at least, you need to edit the **Timbre** parameters to sound something.
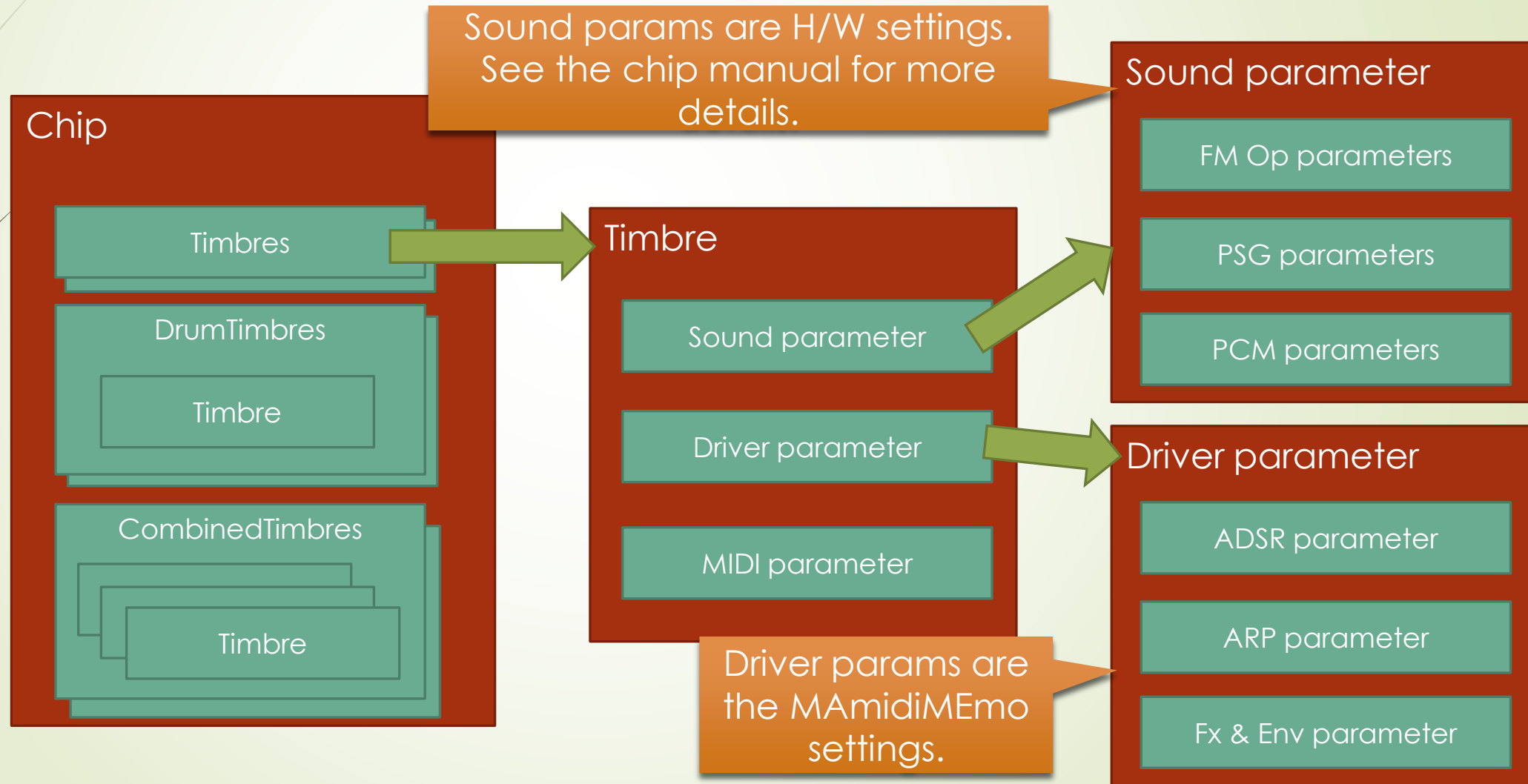
Timbre

- Generally, a chip has 256 Timbres, 256 CombinedTimbres, 128 DrumTimbres.

- CombinedTimbre can sound multiple Timbers at the same time (up to 4)

- DrumTimbre can sound Timbes as a Drum sounds (Ignoring Note Off msg).

- You can change the Timbre parameters on the Chip Parameter Editor. Generally, you need to learn the chip specification to edit the chip parameters.

Chip Parameter Editor

Timbres	
Timbres	Timbres[256]
[000]	[000]
ToneType	SQUARE
DecayDisable	1
LengthCounterDisable	1
SQDutyCycle	0
SQSweep	SQSweep
NoiseType	0
PlayLength	0

[000]
Timbres

Timbre Structure

Chip

- Timbres
- DrumTimbres
  - Timbre
- CombinedTimbres
  - Timbre

Sound params are H/W settings. See the chip manual for more details.

Timbre

- Sound parameter
- Driver parameter
- MIDI parameter

Driver params are the MAmidiMEmo settings.

Sound parameter

- FM Op parameters
- PSG parameters
- PCM parameters

Driver parameter

- ADSR parameter
- ARP parameter
- Fx & Env parameter

Driver parameters - Fx & Env Structure

- You can make for a rich sound by using driver params. Especially, FxS can do it.

## Fx & Env parameter

Volume Env

Pitch Env

Arp Env

Dedicated Env

	FxS
FxS	
Enable	False
DutyEnvelopes	
VolumeEnvelopes	
PitchEnvelopes	
PitchStepType	Relative
PitchEnvelopeRange	2
ArpEnvelopes	
ArpStepType	Absolute
EnvelopeInterval	50
Memo	
SerializeData	

Click here to open the GUI Editor.

Sample sounds

- There are sample sound files in the "Samples" folder. You can drop a sample file "*.MAmi" to the left pane.
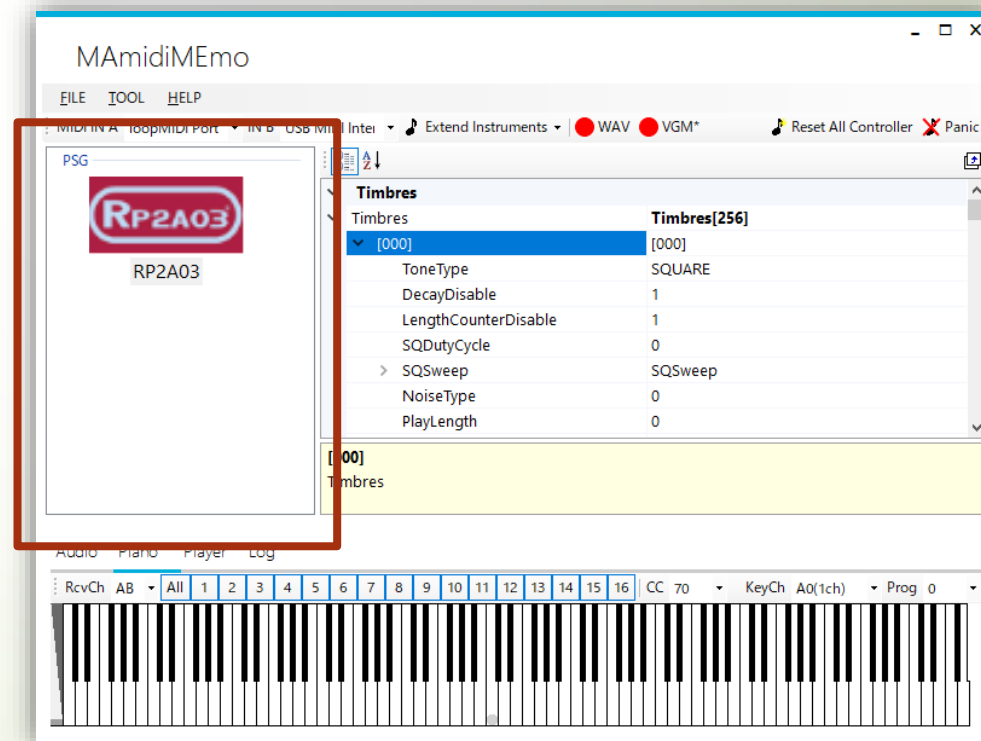
Additional files

- YM2608
  - Place legitimate "ym2608_adpcm_rom.bin" file in the MAmidiMEmo directory to sound ADPCM rhythm sounds.
- MT-32
  - Place legitimate "MT32_CONTROL.ROM" and "MT32_PCM.ROM" in the MAmidiMEmo directory to sound ADPCM sounds.

Limit Break

- Any chip can output only a few voices. However, MAmidiMEmo can break this limitation by the following steps.

  1. Add a chip and complete all settings the chip.

  2. Select the [Clone selected chip]
     Cloned chip added.

  3. Select the cloned chip and
     set the [Follower Mode] value to "Unit0*".
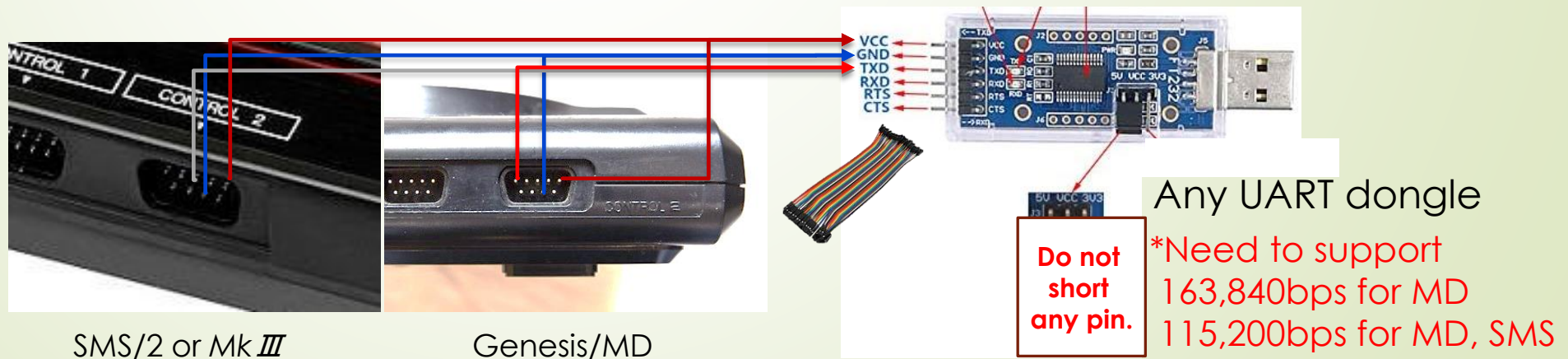   * If clone source chip ID is 0.
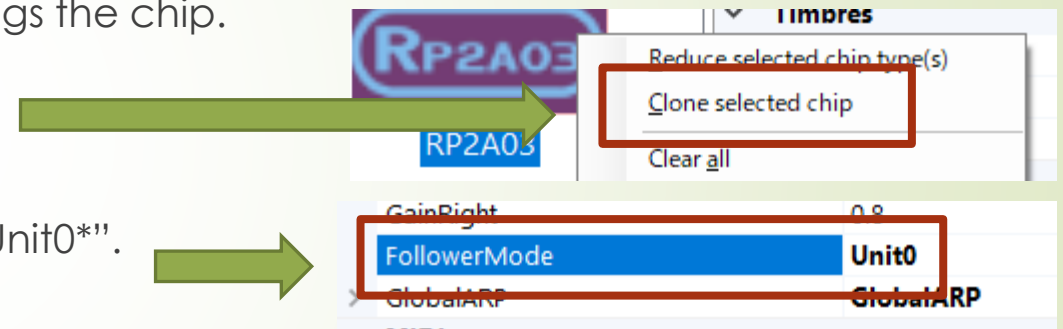
- When the clone source chip consumed all voices, the cloned chip sound for the chip.

- If you want to extend max voices more, select the [Clone selected chip] of the cloned chip. And set the [Follower Mode] value to "Unit0".

Use a real hardware

You can use a real hardware by using the VSIF / PCI device.

VGM Sound Interface(VSIF - UART) for Genesis/SMS

- MAmidiMEmo and VGMPlayer can drive real machine chips. Currently supports NTSC SMS(2, *Mk Ⅲ*) for SN76489, OPLL and NTSC Genesis(MD) for SN76489, OPN2.

- How to

  1. Buy the following parts.
     ・1x <u>UART dongle</u> (Note: FT232R and so on. CH340 and CP2102 may not work 163,840bps, only 115,200bps.)
     ・1x <u>FLASH Cart for SMS or Genesis</u> and 1x <u>D-SUB 9 pin female connector</u> and <u>DuPont wires</u>

  2. Solder like the following and connect it to the JOYSTICK PORT 2.

SMS/2 or *Mk Ⅲ*   Genesis/MD

Any UART dongle

Do not short any pin.

*Need to support 163,840bps for MD 115,200bps for MD, SMS

VGM Sound Interface(VSIF - FTDI) for Genesis

- MAmidiMEmo and VGMPlayer can drive real machine chips more faster if you use FTDI2xx(232R, 232H and so on). Currently supports NTSC Genesis(MD) for SN76489, OPN2.

- How to

  1. Buy the following parts.
     - 1x FTDI2XX dongle (FT232R or FT2232H and so on. Need to support 5V. ***WARN* Please use genuine dongle.**)
     - 1x FLASH Cart for Genesis and 1x D-SUB 9 pin female connector and DuPont wires

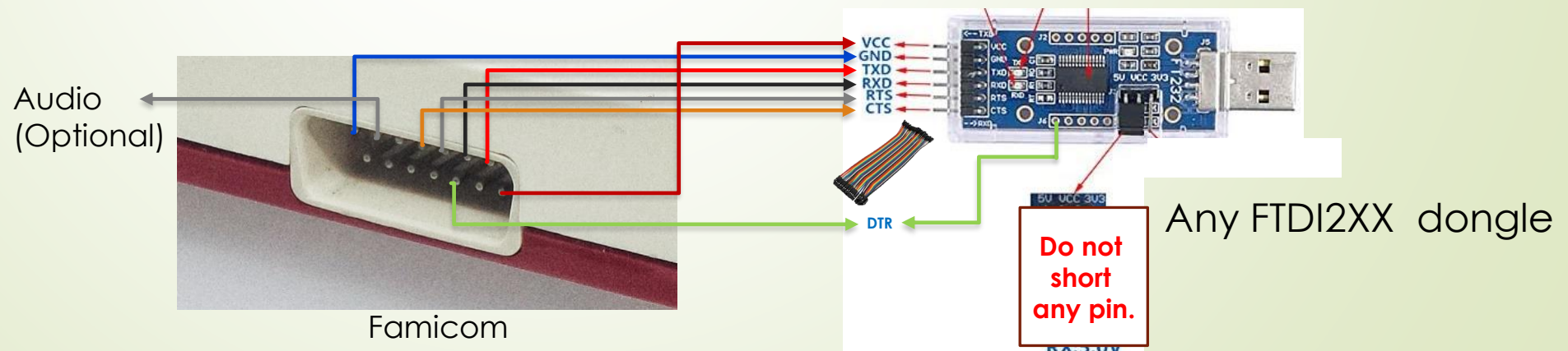 2. Solder like the following and connect it to the JOYSTICK PORT 2.

VCC
GND
TXD
RXD
RTS
CTS

DTR
DSR
DCD

Any FTDI2XX dongle

Do not short any pin.

Genesis/MD
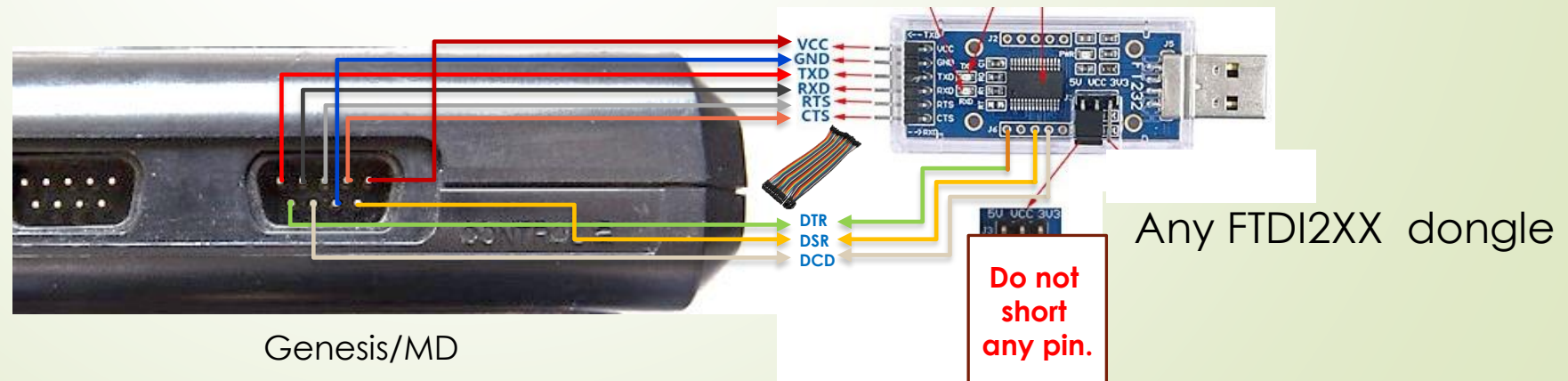
VGM Sound Interface(VSIF - FTDI) for Famicom

- MAmidiMEmo can drive real machine chips more faster if you use FTDI2xx(232R, 232H and so on). Currently supports NTSC Famicom and RP2A03(No DAC)/FDS/VRC6.

- How to
  1. Buy the following parts.
     - 1x FTDI2XX dongle (FT232R and so on. Need to support 5V. ***WARN* Please use genuine dongle.**)
     - 1x FLASH Cart for Famicom and 1x D-SUB 15 pin female connector **for FC** and DuPont wires
  2. Solder like the following.

Audio (Optional)

VCC
GND
TXD
RXD
RTS
CTS

DTR

Do not short any pin.

Any FTDI2XX dongle

Famicom

VGM Sound Interface(VSIF – FTDI) for MSX

- MAmidiMEmo can drive real MSX machine chips if you use FTDI2xx(232R, 232H and so on). Currently supports NTSC MSX for AY-3-8910 and OPLL and SCC+ and OPL3.
  NOTE: Be sure to select proper SLOT# for SCC to use SCC.
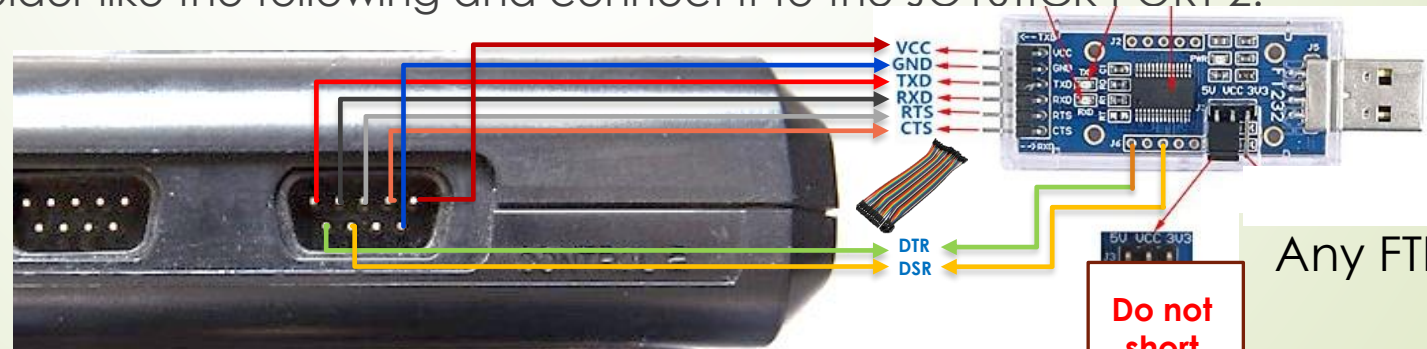   **Set FTDI clk value to 17~ for each chip.**

- How to

  1. Buy the following parts.

     - 1x FTDI2XX dongle (FT232R and so on. Need to support 5V. ***WARN* Please use genuine dongle.**)
     - 1x D-SUB 9 pin female connector and DuPont wires

  2. Solder like the following and connect it to the JOYSTICK PORT 2.

MSX

Any FTDI2XX dongle

Do not short any pin.

VGM Sound Interface(VSIF - FTDI) for Commodore 64(C64)

- MAmidiMEmo can drive real MSX machine chips if you use FTDI2xx(232R, 232H and so on). Currently supports NTSC/PAL C64 for SIDs.
  We recommend to use ARMSID with ADSR bud fixing.

- How to

  1. Buy the following parts.

     - 1x FTDI2XX dongle (FT232R and so on. Need to support 5V. ***WARN* Please use genuine dongle.**)
     - 1x D-SUB 9 pin female connector and DuPont wires

  2. Solder like the following and connect it to the JOYSTICK PORT 2.

VCC
GND
TXD
RXD
RTS
CTS

DTR
DCD
RI

Any FTDI2XX dongle

Do not short any pin.

C64
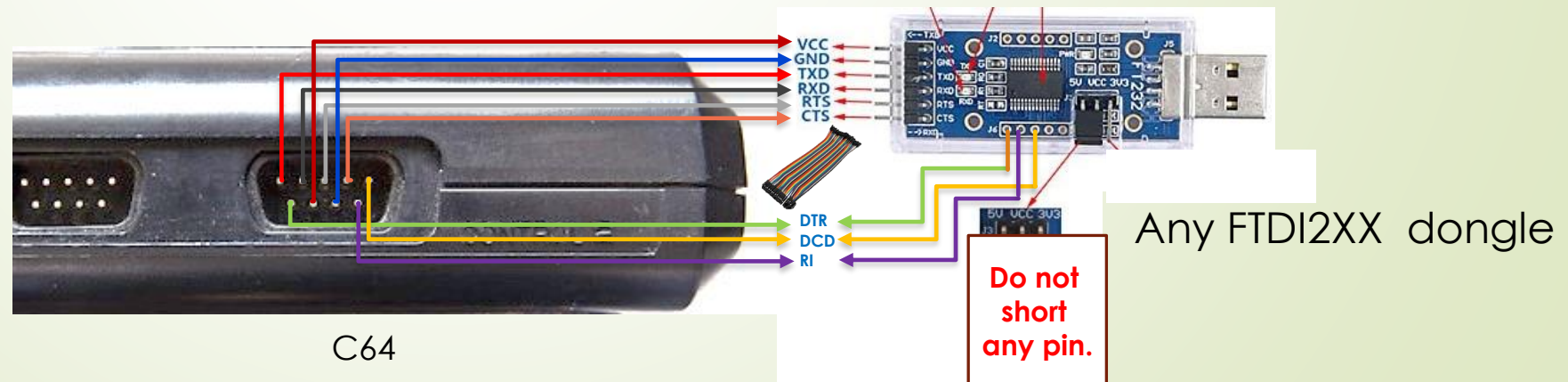
VGM Sound Interface(VSIF) Settings

1. Burn VGMPlay_md.bin(for Genesis) or VGMPlay_sms.sms(for SMS) or VGMPlay_nes*.* (for Famicom) or VGM_msx/P6.rom(for MSX*/PC-6001) or VGMPlay_c64.prg to your FLASH Cart and so on.

   *VGMPlay_nes_vrc6/fds/mmc5 ROM does not show any screen but same UI with VGMPlay_nes.nes UI
   *VGM_msx_Vkey.rom can skip booting from this ROM while the [V] key is **NOT** pressed at boot time.

2. Set the COMPort/FTDI ID and select "VSIF ***" you wish.

LFRQ	0
Chip(Dedicated)	
COMPort	**COM4**
SoundEngine	**Real(VSIF Genesis)**
CurrentSoundEngine	Real(VSIF Genesis)
Filter	

3. Reset your console and push [Panic!] button

4. (Famicom only)Re-send DPCM data.

5. Done!

6. If you can not sound sounds, make sure soldering and COMPort name. Or, please contact me.

   *Some UART dongles may not work properly.
   *Compatible consoles may not work properly.

VGM Sound Interface(VSIF)
for Famicom spec

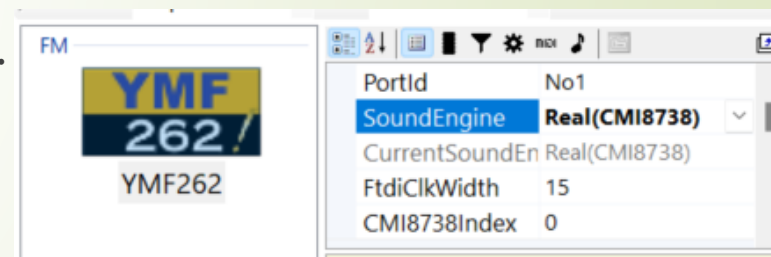| Sound	Normal ROM (Mapper 0)	FDS IMAGE*2	VRC6 ROM*2 (Mapper 24)	MMC5 ROM*2*3 (Mapper 5)
Square	OK	OK	OK	OK
Tri	OK	OK	OK	OK
Noise	OK	OK	OK	OK
DPCM	NO	OK(Up to 8KB)	NO	OK*1 (Up to 64KB)
Ext. Snd FDS	NO	OK*1	NO	NO
Ext. Snd VRC	NO	NO	OK*1	NO
Ext. Snd MMC	NO	NO	NO	NO

*1 Not Tested
*2 China flash cart may not work properly
*3 PRG-RAM 32x2 KB

Use CMI8738(OPL3) PCI Board
Please use at your own risk

1. Attach the CMI8738 Board to your PC. *Only for 64bit Windows*

2. **Disable Driver Signature enforcement**

3. (*Uninstall and remove* old CMI8738 OPL3 driver if installed.)

4. Install the CMI8738 OPL3 driver located in ".¥CMI8738OPL3" folder.

5. Set [SoundEngine] prop to the "Real(CMI8738)".

6. Have fun!!

FM

YMF 262!

YMF262

PortId	No1
SoundEngine	**Real(CMI8738)**
CurrentSoundEn	Real(CMI8738)
FtdiClkWidth	15
CMI8738Index	0

Technical information
If you want to use the OPL3 of the CMI8738 directly from your app…

1. Use the helper DLL "CMI8738OPL3Library.dll".

2. Or, direct access I/O port with admin rights.
   eg) DF00H+50H is the OPL3(CMI8738) port.

CMI8738 OPL3 Device

リソースの設定(R):

| リソースの種類 | 設定 |
| I/O の範囲 | DF00 - DFFF |

VGMPlayer

VGMPlayer

VGMPlayer can play a vgm/xgm/mgs file on a real chip via VSIF or SPFM. Substitutes for similar chips are also available. For example, an OPL track can be played on an OPL3 chip.
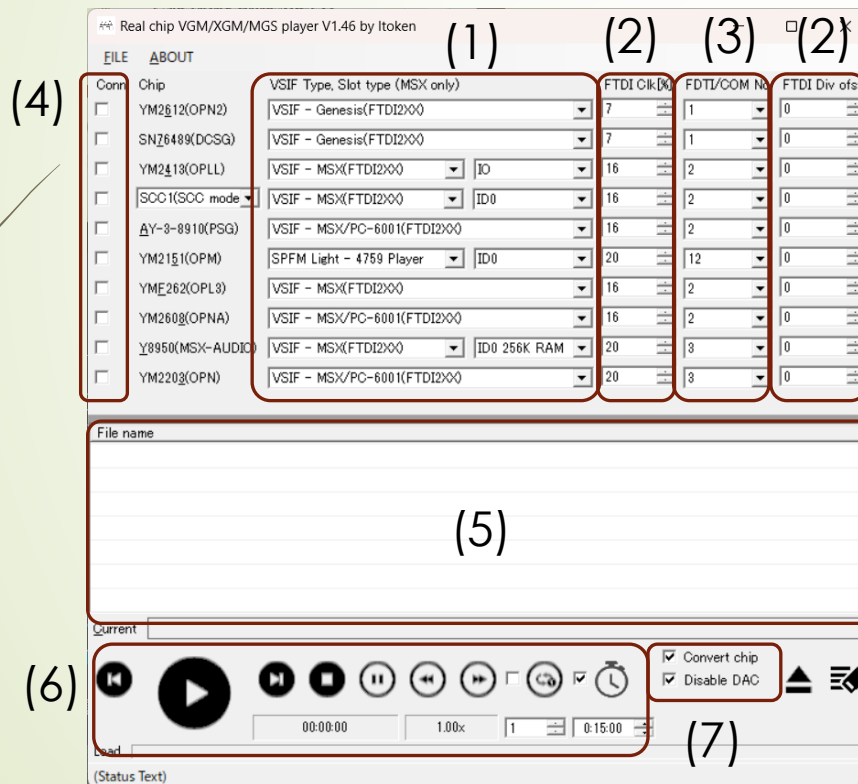
1) Select interface type

NOTE: Bandwidth of UART is narrow. So you can not play heavy track data properly.

2) Adjust FTDI Clk for FTDIxxx mode for your environment

NOTE: Usually the default value is fine, but if the sound is strange, increase the value. If the performance is slow, decrease the value. If you can not adjust by FTDI Clk, please adjust FTDI Div ofst value.

3) Specify COMPort# for UART/SPFM:
   Specify FDTI ID# for FTDI2xxx

4) Check to connect

5) Drop vgm/XGM/MGS files to here

6) Push to play.

7) If the pitch/tempo is wrong, click here.

Appendix

Trouble Shooting for MAmi

- If you noticed "sound lag" or "stutter", open the Settings dialog from [TOOL] menu. Check [Sound Type] and [Audio Latency] value.
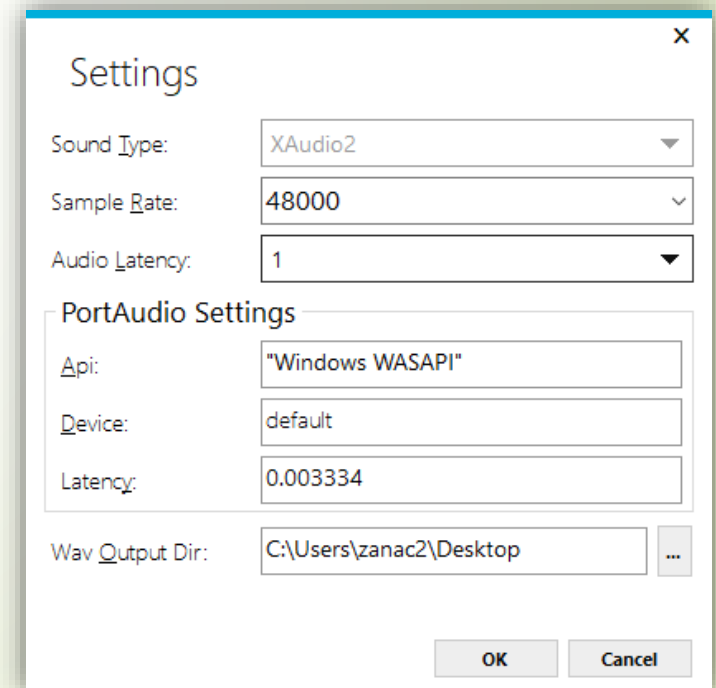
MIDI Implementation Chart 1

*Depends on the chip

Function	Transmitted	Recognize	Remarks
Basic Channel	-	1-16: Defaut 1-16: Changed	
Note Number*	-	0-127	
Velocity*	-	Yes: Note ON No: Note OFF	
After Touch	-	No	
Pitch Bend*	-	Yes	**8192: Default**
Program Change	-	0-127	**0: Default**

MIDI Implementation Chart 2

*Depends on the chip

Function	Transmitted	Recognize	Remarks
Control Change	-		
1		Modulation	**0: OFF**, 64: ON
5		Portamento Time	**0: Default**
6 38		Data Entry MSB Data Entry LSB	
7		Volume*	**127: Default**
10		Panpot*	**64: Default** 0: Left, 127: Right
11		Expression*	**127: Default**
16-19		GPCS1	Modify params
64		Hold 1	**0: OFF**, 64: ON
65		Portamento	**0: OFF**, 64: ON

MIDI Implementation Chart 3

*Depends on the chip

Function	Transmitted	Recognize	Remarks
Control Change 70-75,79	-	SCCS	Modify current timbre params
76	-	Mod. Rate	**64: Default**
77	-	Mod. Depth	**64: Default**
78	-	Mod. Delay	**64: Default**
80-83	-	GPCS2	Modify parameters
84	-	Portamento Ctrl	**0: OFF**, 64: ON
91-95	-	VST Plugin Ctrl	Modify VST params
98	-	NRPN LSB	
99	-	NRPN MSB	
100	-	RPN LSB	
101	-	RPN MSB	

MIDI Implementation Chart 4

*Depends on the chip

Function	Transmitted	Recognize	Remarks
Control Change	-		
121		Reset All Ctrl	
126	-	Mono Mode	**0: OFF** 1-127: Max Voice Num.*
127	-	Poly Mode	**0: OFF** 1-127: Reserve Voice Num.* *Reset Mono Mode when set

MIDI Implementation Chart 5

Function	MSB	LSB	Remarks
RPN	0	0	Pitch Bend Range 0-**2**-127 [Half Note]
	0	5	Mod Depth **0**-127 [Relative]

MIDI Implementation Chart 6

Function	MSB	LSB	Remarks
NRPN	0	16-19 80-83	GPCS[1-4] Value GPCS[5-6] Value 0-127
	0	70-75 79	SCCS[1-6] Value SCCS[10] Value 0-127

MIDI Implementation Chart 7

Function	Change Receiving MIDI ch. dynamically.	Remarks

NRPN	NRPN MSB Bx 63 41 ··· for MIDI ch(1–7)
	NRPN LSB Bx 62 <Device ID> ... Specify Device ID of existing instrument.
	DATA MSB Bx 26 <Unit No> ... Specify Unit No of the above Device ID of existing instrument.
	DATA LSB Bx 06 <Receiving MIDI ch(1–7) bit sets. 1=On, 0=Off>
	          bit 6 5 4 3 2 1 0
	          ch 7 6 5 4 3 2 1
	
	NRPN MSB Bx 63 42 ... for MIDI ch(8–14)
	NRPN LSB Bx 62 <Device ID> ... Specify Device ID of existing instrument.
	DATA MSB Bx 26 <Unit No> ... Specify Unit No of the above Device ID of existing instrument.
	DATA LSB Bx 06 <Receiving MIDI ch(8–14) bit sets. 1=On, 0=Off>
	          bit 6 5 4 3 2 1 0
	          ch 14 13 12 11 10 9 8
	
	NRPN MSB Bx 63 43 ... for MIDI ch(15–16)
	NRPN LSB Bx 62 <Device ID> ... Specify Device ID of existing instrument.
	DATA MSB Bx 26 <Unit No> ... Specify Unit No of the above Device ID of existing instrument.
	DATA LSB Bx 06 <Receiving MIDI ch(15–16) bit sets. 1=On, 0=Off>
	          bit 6 5 4 3 2 1 0
	          ch xx xx xx xx xx 16 15	

VSIF – Generic (UART 115K), SMS(UART 115K) SPECIFICATION for AY-3-8910, YM2413

- Baud rate: 115,200 bps

- Protocol: 8 bits, None parity bit, 1 stop bit

- 1 packet : 2 bytes

1st	2nd
Reg #	Value

VSIF – MSX/P6(FTDI) SPECIFICATION
for AY-3-8910, OPLL, SCC-I, OPL3, OPM, OPNA/OPN2, OPN

- Baud rate : 38,400 bytes / sec

- 1 packet : 5 bytes + a

1st(Start)	2nd(clk=0)	3rd(clk=1)	4th(clk=0)	5th(clk=1)	
Type	Address(Hi)	Address(Lo)	Value(Lo)	Value(Hi)	…

- 1byte : 4bit(data) + 2bit(Start + Clk bit)

	7							0
Start			1	Type	Type	Type	Type	Type
Clk			0	clk	Data	Data	Data	Data
	MSB							LSB

- Type:

  - **0**　　　　AY-3-8910: Write value to address

  - **1,2,(12)**　　YM2413: **1** is write value to address, **2** is set OPLL cartridge slot number

  - **3〜9**　　　SCC-I: *(in preparation)*

  - **10〜11**　　YMF262: **10** is write value to address of port L , **11** is Write value to address of port H

  - **(13),14**　　OPM: Write value to address

  - **15**　　　DCSG: Write value to address

  - **16 〜17**　　OPNA/OPN2: Write value to address

  - **18**　　　OPN: Write value to address
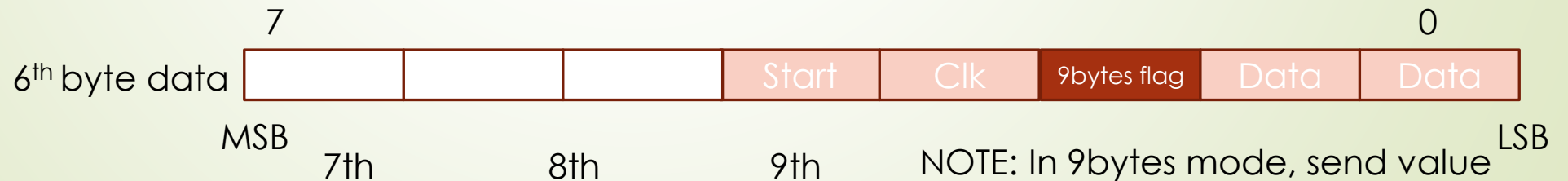
VSIF – C64(FTDI) SPECIFICATION for SID

- Baud rate : 31,250 bytes / sec

- 1 packet : 6 bytes(1 byte value) or 9 bytes (2 bytes value) mode

	1st	2nd	3rd	4th	5th	6th	7~9th
	Address(Lo 3bit)	Address(Mid 3bit)	Address(Hi 2bit)	Value(Hi 3bit)	Value(Mid 3bit)	Value(Lo 2bit)	Same as 4,5,6 th
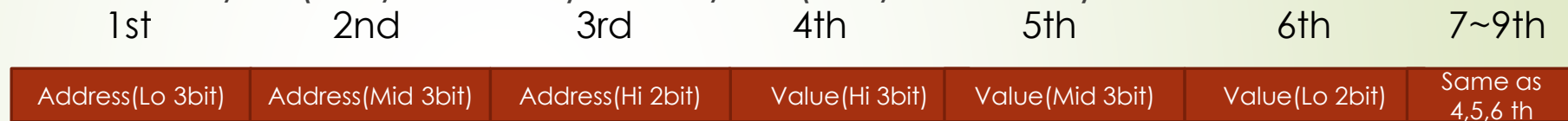
- 1byte : 3bit(data) + 2bit(Start(Active low) + Clk(Active low) bit)

7   0

			Start	Clk	Data	Data	Data

MSB   LSB

- 9 bytes mode flag:

7   0

6th byte data

			Start	Clk	9bytes flag	Data	Data

MSB   LSB

	7th	8th	9th
7~9th byte data …	Value(Hi 3bit)	Value(Mid 3bit)	Value(Lo 2bit)

NOTE: In 9bytes mode, send value for Address+1 data first, second is Address+0 data

Integrate with MAmidiMEmo via RPC

▰ MAmidiMEmo will starts RPC server on port 30000 at startup with "-chip_server" option.
So, your application can be integrate with the MAmidiMEmo via RPC.
MAmidiMEmo provides the following API

```
//Write the value to the address to the specific chip
void DirectAccessToChip(unsigned char DeviceID, unsigned char UnitNo, unsigned int address, unsigned int data)
```

* You can confirm the DeviceID and UnitNumber from the property.
* Currently, OPLL(ID9), SCC(ID7), AY8910(ID11) chips are supported.
* If you want to use SCC**1**(aka SCC**+**), you need to add 0x100 to the address.

GlobalARP	
∨ **MIDI**	
DeviceID	7
UnitNumber	0

```
rpc::client* m_rpcClient = new rpc::client("localhost", 30000);   //Open RPC port
:::
//Write SCC1 wave form
m_rpcClient->async_call("DirectAccessToChip", (unsigned char)7, (unsigned char)0, (unsigned int)0x100, (unsigned int)10);
//All sound off for AY8910
m_rpcClient->async_call("DirectAccessToChip", (unsigned char)11, (unsigned char)0, (unsigned int)7, (unsigned int)0x3f);
//Key off 1ch for OPLL
m_rpcClient->async_call("DirectAccessToChip", (unsigned char)9, (unsigned char)0, (unsigned int)0x20, (unsigned int)0x0);
:::
m_rpcClient->~client(); //Close RPC port
```