Analog 2.0 documentation

Vol. 10

Production of MInI Board II

Version: 1.2

Created : December **25 , 2008**

table of contents

1. About this document

This document is **a tool for calibrating the analog synthesizer system Analog** 2.0 .

I will explain how to make MInI Board II .

Before reading this document, read the Starter Kit manual to get **the basics** of Analog 2.0 .

Please understand the general structure.

This document also includes the panel, power supply module, and lie included in the starter kit.

It is written on the assumption that the fly has already been assembled.

Change log

Version date		Changes
1.0 1.0	2009/11/21 Analog2.0 **Document Version** 2.0	-Review **the circuit design.** -Revised **the document accordingly.**
1.1 1.1	2009/12/06 -Fixed **a mistake in the parts list and R9 .**	**(Error) Resistor (Correct) Semi-fixed resistance** -Fixed **a mistake in the parts list, R12 .** **(Error) Resistor (Correct) Semi-fixed resistance**
1.2 1.2	2009/12/25 -Fixed **the caption error in the figure.**	**(Error) Noise generator (Correct) MInI Board II**

2. Manufacture of MInI Board II 2.1.

Production flow - **Obtaining** parts -

Installing parts on the board - **Installing**

panel parts- Checking **the wiring of the**

board-Checking the **operation** -

Adjustment

2.2. Outline of the module to be manufactured

Function

In this article, **I will explain how to make** MInI Board II , **which is used for proofreading everywhere, throughout the production of** Analog 2.0.

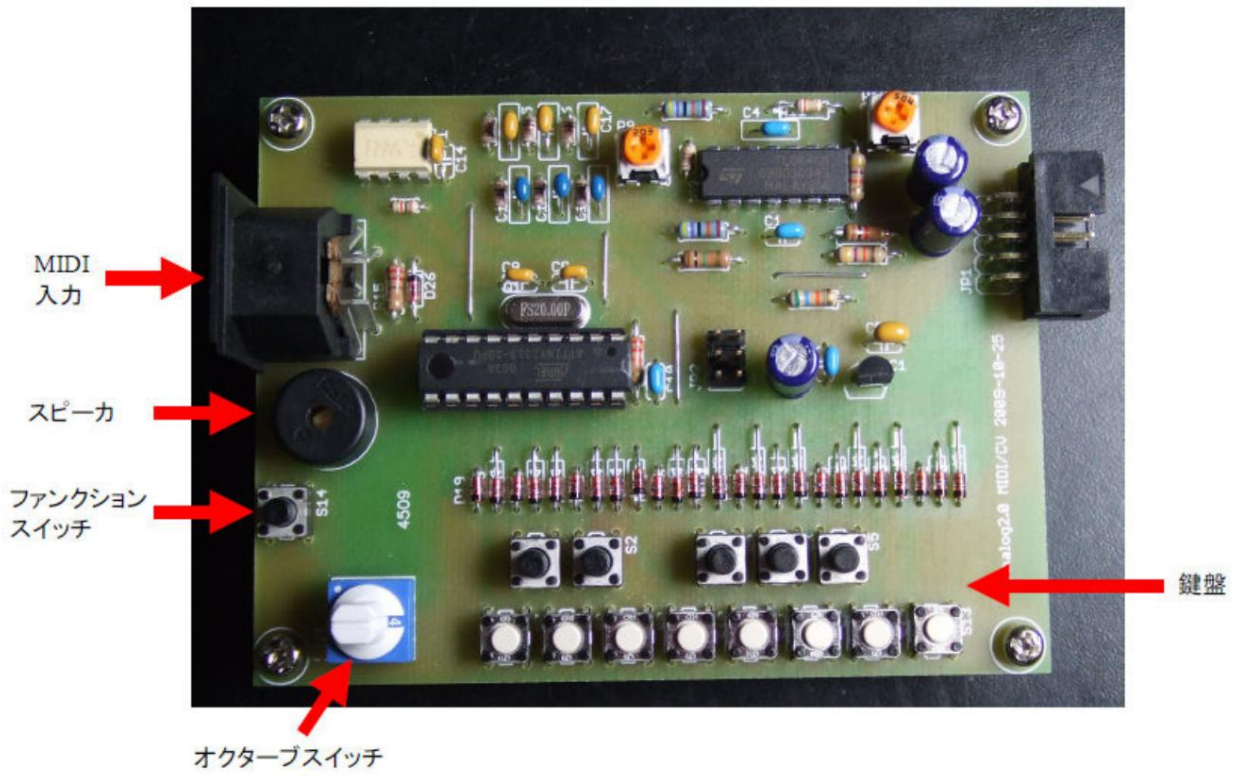
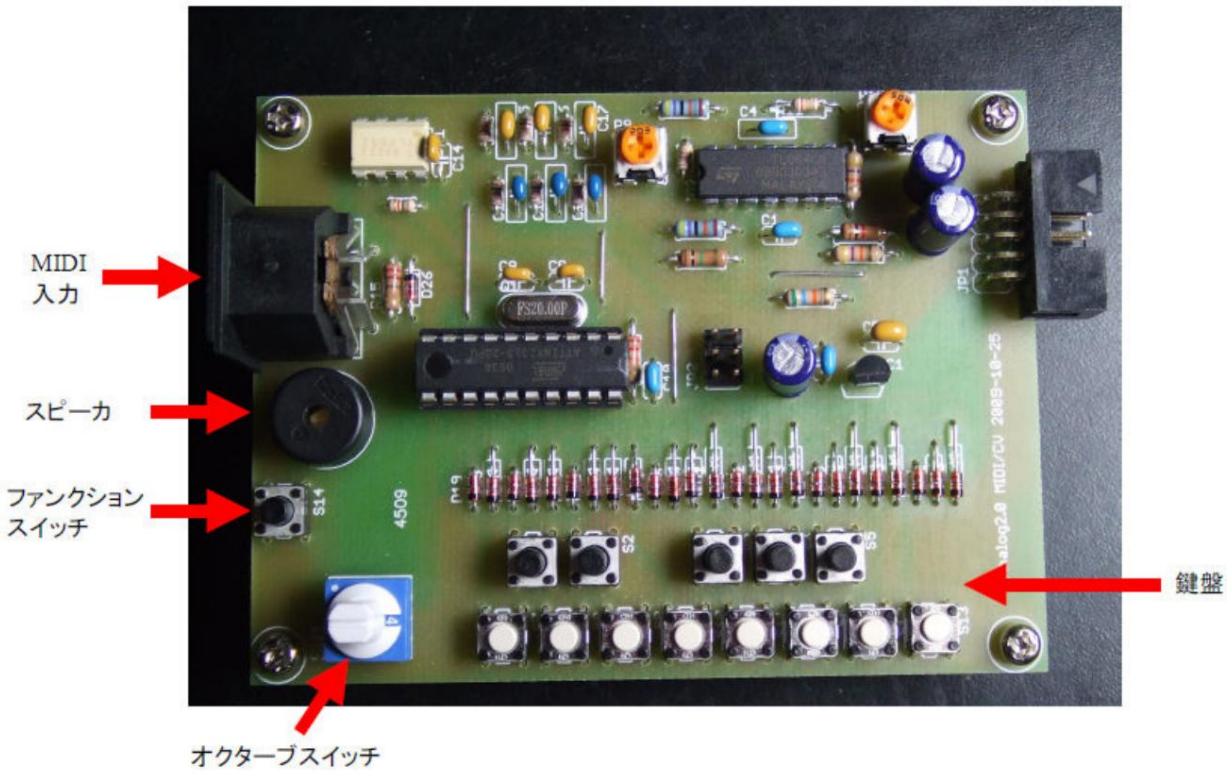


Figure 2-1 shows the appearance **of** MInI Board II .

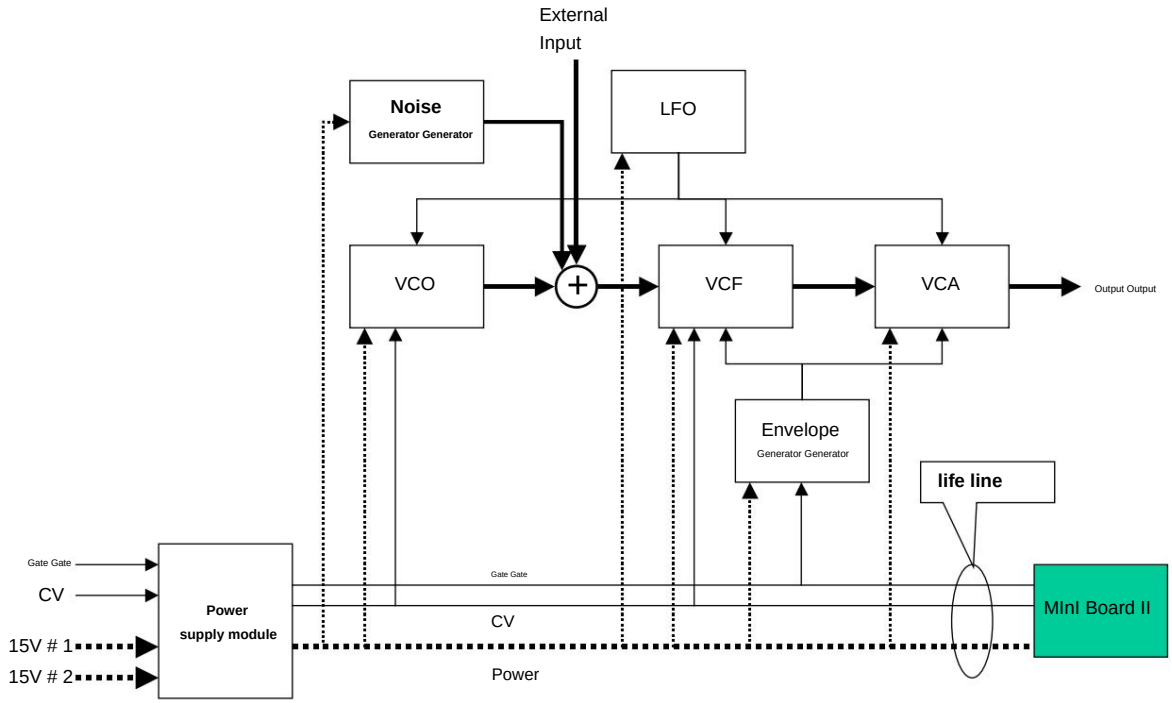


II **Figure** 2-1 MInI Board II External View of MInI Board

MInI Board II **has the following functions.** -Connect **to a lifeline**
cable to generate CV and Gate **signals. CV and** Gate _
Output to the lifeline bus.
--CV **and** Gate are **generated by keyboard or** MIDI signals. -The keyboard
generates CV **in the octave specified by the octave switch .** For example, if **you specify** “4” on **the octave**
switch and press the A **key,** a CV **equivalent to A4 will be generated.**
-Press and hold the **function switch for** 1 second to get a 440 Hz **reference sound from the speaker.**
It is a force. To stop the reference tone, **press and hold the function switch again for** 1 second.

The function of MInI Board II **can be changed by updating the firmware. The above specifications are for firmware version** 1.0 .

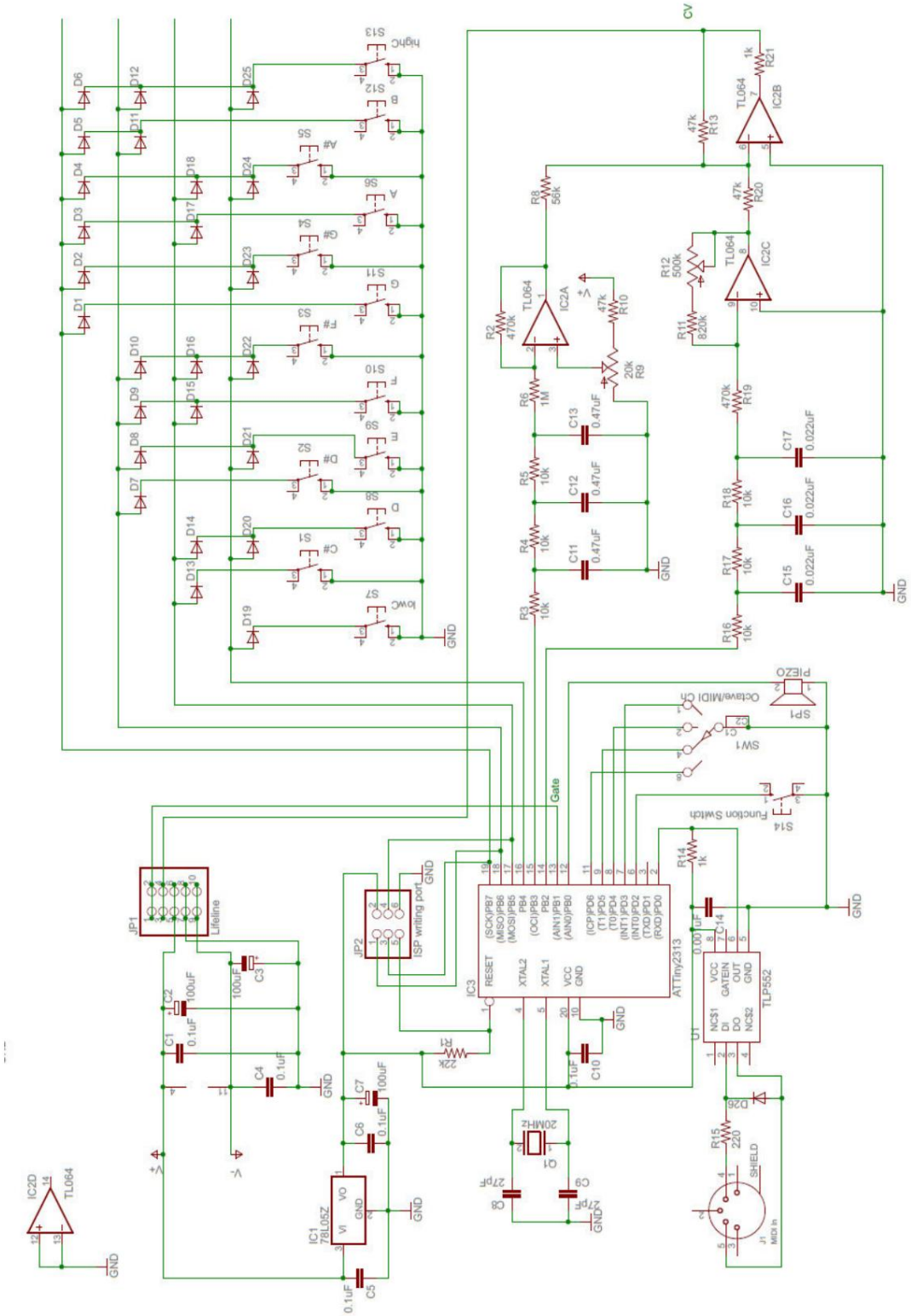
Positioning within the
system Figure 2-2 shows the positioning of the MInI Board in the configuration of the Analog 2.0 **production system .**



II Figure 2-2 MInI Board II

circuit

The circuit diagram of the power supply circuit to be manufactured is shown in Figure 2-3 .



Board ICFigure 2.3: MInI Board II

2.3. Obtaining parts

The parts required for production are as follows. When making, first get these parts please.

Board IIParts required to manufacture MInI

parts number	Device name	Value / model number	remarks
C1	**Multilayer Ceramic Capacitor**	0.1 ÿF	
C2	**electrolytic capacitor**	100 ÿF	
C3	**electrolytic capacitor**	100 ÿF	
C4	**Multilayer Ceramic Capacitor**	0.1 ÿF	
C5	**Multilayer Ceramic Capacitor**	0.1 ÿF	
C6	**Multilayer Ceramic Capacitor**	0.1 ÿF	
C7	**electrolytic capacitor**	100 ÿF	
C8	**ceramic capacitor**	27pF	
C9	**ceramic capacitor**	27pF	
C10	**Multilayer Ceramic Capacitor**	0.1 ÿF	
C11	**Multilayer Ceramic Capacitor**	0.47ÿF	
C12	**Multilayer Ceramic Capacitor**	0.47ÿF	
C13	**Multilayer Ceramic Capacitor**	0.47ÿF	
C14	**Multilayer Ceramic Capacitor**	0.001 ÿF	
C15	**Multilayer Ceramic Capacitor**	0.022ÿF	
C16	**Multilayer Ceramic Capacitor**	0.022ÿF	
C17	**Multilayer Ceramic Capacitor**	0.022ÿF	
D1	**diode**	1N4148	
D2	**diode**	1N4148	
D3	**diode**	1N4148	
D4	**diode**	1N4148	
D5	**diode**	1N4148	
D6	**diode**	1N4148	
D7	**diode**	1N4148	
D8	**diode**	1N4148	
D9	**diode**	1N4148	
D10	**diode**	1N4148	
D11	**diode**	1N4148	

D12 **diode**	1N4148	
D13 **diode**	1N4148	
D14 **diode**	1N4148	
D15 **diode**	1N4148	
D16 **diode**	1N4148	
D17 **diode**	1N4148	
D18 **diode**	1N4148	
D19 **diode**	1N4148	
D20 **diode**	1N4148	
D21 **diode**	1N4148	
D22 **diode**	1N4148	
D23 **diode**	1N4148	
D24 **diode**	1N4148	
D25 **diode**	1N4148	
D26 **diode**	1N4148	
IC1 **3-terminal regulator**	LM78L05	
IC2 **operational amplifier**	TL064	
IC3 **microprocessor**	ATTiny2313	
J1 **connector**	DIN 5P 180 °	MIDI **input**
JP1 **box pin header**	2x5 L **-shaped**	Lifeline
JP2 **pin header**	2x3	ISP writing port
Q1 **Crystal oscillator**	20MHz	
R1 **resistor**	22kÿ	
R2 **resistor**	470kÿ	
R3 **resistor**	10kÿ	
R4 **resistor**	10kÿ	
R5 **resistor**	10kÿ	
R6 **resistor**	1Mÿ	
R8 **resistor**	56kÿ	
R9 **semi-fixed resistance**	20kÿ	
R10 **resistor**	47kÿ	
R11 **resistor**	820kÿ	
R12 **semi-fixed resistance**	500kÿ	
R13 **resistor**	47kÿ	
R14 **resistor**	1kÿ	

R15 **resistor**	220ÿ	
R16 **resistor**	10kÿ	
R17 **resistor**	10kÿ	
R18 **resistor**	10kÿ	
R19 **resistor**	470kÿ	
R20 **resistor**	47kÿ	
R21 **resistor**	1kÿ	
S1 **tact switch**		**Keyboard** C #
S2 **tact switch**		**Keyboard** D #
S3 **tact switch**		**Keyboard** F #
S4 **tact switch**		**Keyboard** G #
S5 **tact switch**		**Keyboard** A #
S6 **tact switch**		**Keyboard** A
S7 **tact switch**		**Keyboard** lowC
S8 **tact switch**		**Keyboard** D
S9 **tact switch**		**Keyboard** E
S10 **tact switch**		**Keyboard** F
S11 **tact switch**		**Keyboard** G
S12 **tact switch**		**Keyboard** B
S13 **tact switch**		**Keyboard** highC
S14 **tact switch**		Function Switch
SP1 **piezo speaker**		
SW1 **rotary** DIP **switch**		Octave / MIDI Ch
U1 **photocoupler**	TLP552	

Precautions when obtaining parts

As much as possible, the parts are made up of those available at Akihabara stores. There are restrictions on the shape of parts

In some cases, the item number of Sengoku Densho is listed in the parts list. please refer.

Please be careful when obtaining the following parts.

DIN 5P **connector** Used as an Analog 2.0 MIDI **connector. Board mounting tie**
DIN connectors may be difficult to obtain at Akihabara stores .
plug. For example , you can get it from RS **Online.**

Rotary DIP switches There are various types of rotary DIP switch pinouts.
Yes, you need to be careful. Akizuki Denshi's 0-F **Rotary Dip / Positive**
The **logic is that the pin is of the** 2x3 **type.**

ATTiny2313 ATTiny2313

Atmel **microprocessor. You need to write the firmware to the processor.** The **firmware is pre-written in** AT Tiny2313 **included in the kit,** but the processor
If you prepare a separate firmware or update the firmware
If so, writing work is required. The MInI Board II **board** uses a **write port to allow writing by** the AVR ISP
I am willing to.

2.4. Substrate manufacturing

Figure 2-4 **is the wiring diagram of the printed circuit board to be manufactured this time. The line connecting the square lands is Ja**

It is a damper line.

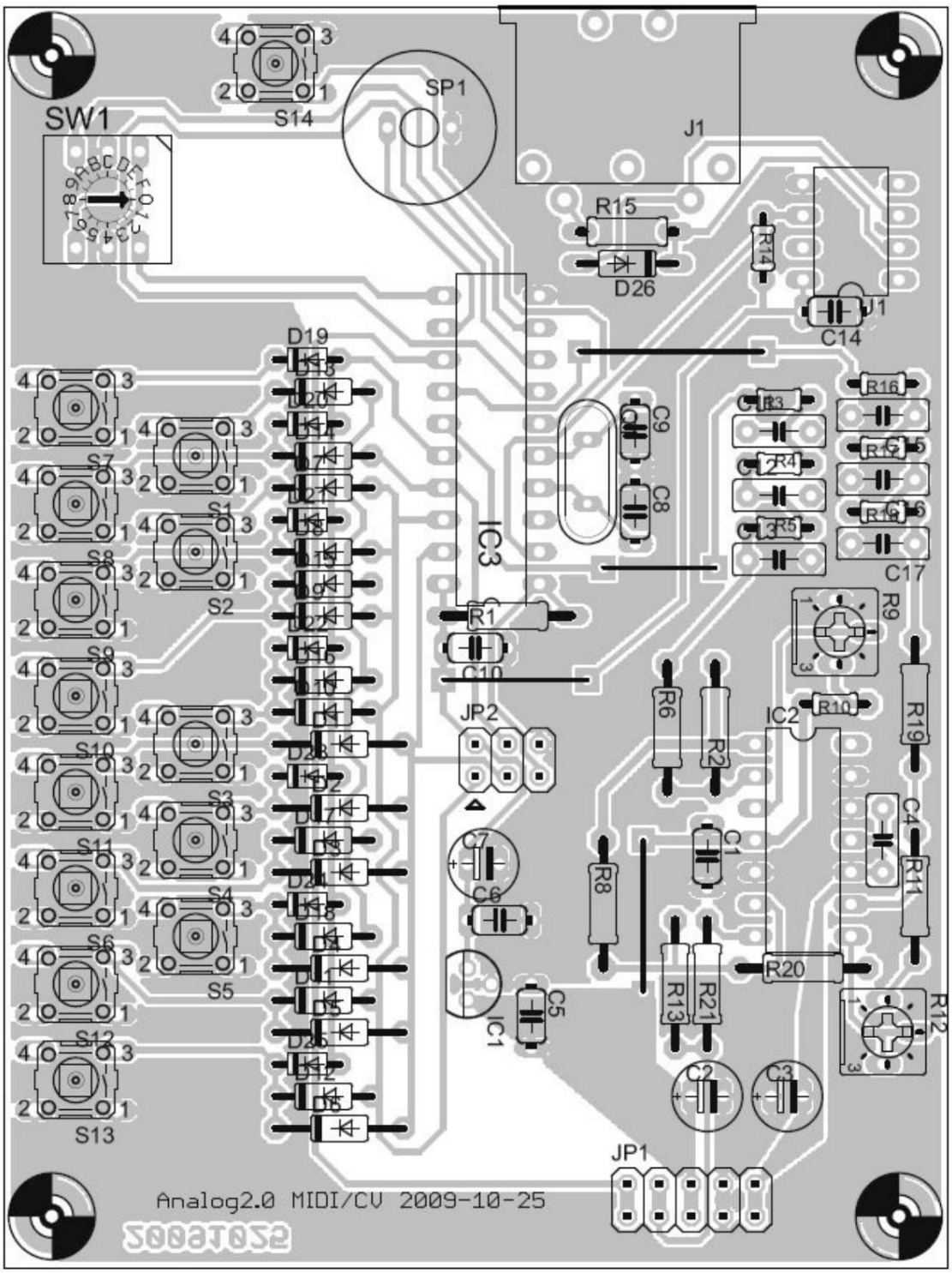


Figure 2-4 MInI Board MInI Board **board wiring diagram**

Unlike other functional modules, MInI Board II **is premised on being used as a single board. However, it is recommended to put it in a simple case for safety. Install spacers at least at the four corners.**

2.5. Checking the wiring on the board

At this point, the assembly of the MInI Board **circuit is complete. I'd like to move it right away, but don't turn it on yet. Be sure to check the wiring before turning on the power. In the unlikely event that there is a wiring error, not only will it not operate normally, but in some cases parts will be damaged. vinegar. Check the checklist below to see if the wiring is correct.**

[] Is the resistor installed in the correct place and with the correct value? [] Is the capacitor installed in the correct place, with the correct type and with the correct value? [] Is the electrolytic capacitor installed in the correct orientation? [] Is the diode installed in the correct place and in the correct orientation? [] Is the transistor installed in the correct place and in the correct orientation?
[] Are IC1 and IC2 **installed in the correct place and in the correct orientation? [] Is the jack pin header installed in the correct place? []**
Turn the board over and check the soldering points. The adjacent copper foil pattern is Han
Is there a solder bridge that is short-circuited in the da?
[] Is there any place where the soldering is immo soldering? If the body of the part is shaken and the lead at the soldering point moves, it is almost certainly immo solder. The potato solder will peel off over time, so if you find it, re-solder it.

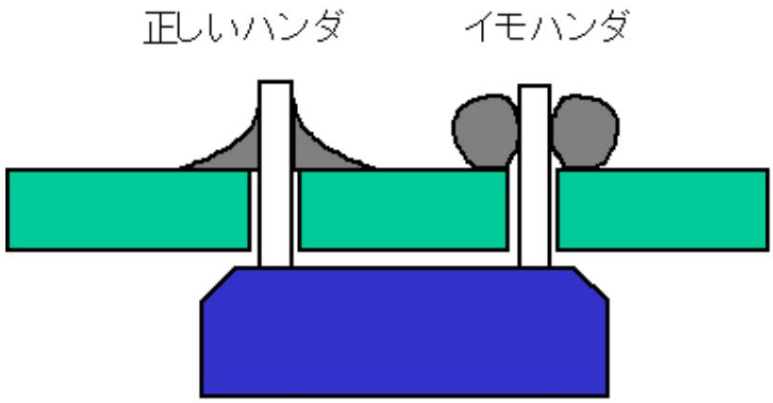


Figure 2-5 **Correct solder and immo solder**

2.6. Operation check

Now, let's check the operation. To check the operation, use a tester and a device that outputs MIDI signals **such as a MIDI keyboard .**

Checking the Gate

signal Connect the negative side of the tester to ground. Connect the positive side to pin **1 or** 2 (Gate terminal) of **JP1 (lifeline connector) . Don't accidentally touch the pin next to it**

be careful.

When **nothing is done,** 0V is output to the Gate **terminal .**

Press the keys on the keyboard one by one **and check that about** 5V is output to the Gate output **only while you press any key .** Next, when you input an arbitrary note signal from a MIDI **device (such as playing a keyboard) ,** 5V **will be output to the Gate output.**

Please check that it comes out.

Checking the CV

signal Connect the positive side of the tester to pin 3 **or** 4 (CV **terminal) of** JP1 (lifeline connector).

increase. Be careful not to accidentally touch the pin next to it.

Set the octave switch to 0 and press the Low C **key on the keyboard.** Make **a note of the CV** voltage, then press the High C **key on the keyboard.** If the **CV is roughly** 1V **larger, it is operating normally. It doesn't have to be exactly** 1V because it hasn't been adjusted yet.

Then set the octave switch to 1 and press the High C **key on your keyboard** again. If the CV increases **by about** 1V , **it is normal operation. Confirmation of reference sound generator**

Press and hold the **function switch for** 1 **second. It is normal if the** 440Hz reference sound comes out of the **speaker . To stop the reference tone, press and hold the function switch again for** 1 **second.**

2.7.

Adjustment Offset

adjustment Connect the negative side of the tester to pin 3 **or** 4 (CV **terminal) of** JP1 (lifeline connector).

To do. Be careful not to accidentally touch the pin next to it.

Set the octave switch to 0 and press Low C on the keyboard . **Turn the semi-fixed resistor** R9

And adjust so **that** CV **becomes** 0V .

Then press High C on the keyboard . Turn the **semi-fixed resistor** R12 **to adjust the CV to** 1V .

Repeat this procedure several times.