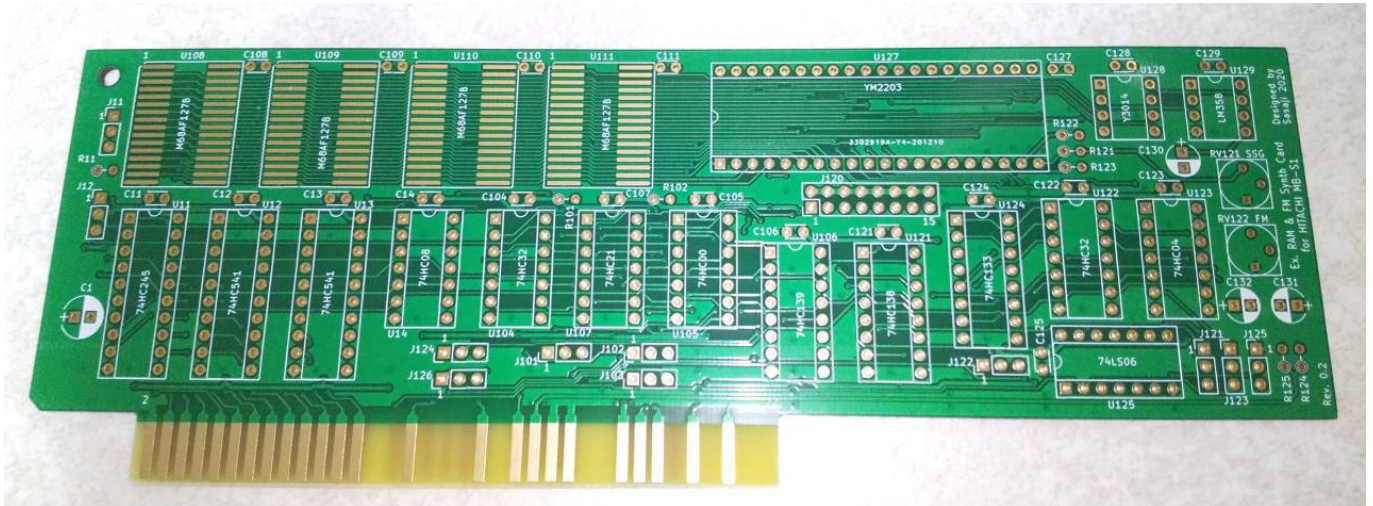


Extended RAM & FM Synthesis Card for HITACHI MB-S1

Designed by Sasaji 2020 Rev. 0.2

This is the extension card for HITACHI MB-S1 and Limelight. This is assembled two circuits which are extended RAMs and FM Synthesis. You can use two circuits, or just one of them.



The PCB image



Example of assembling parts

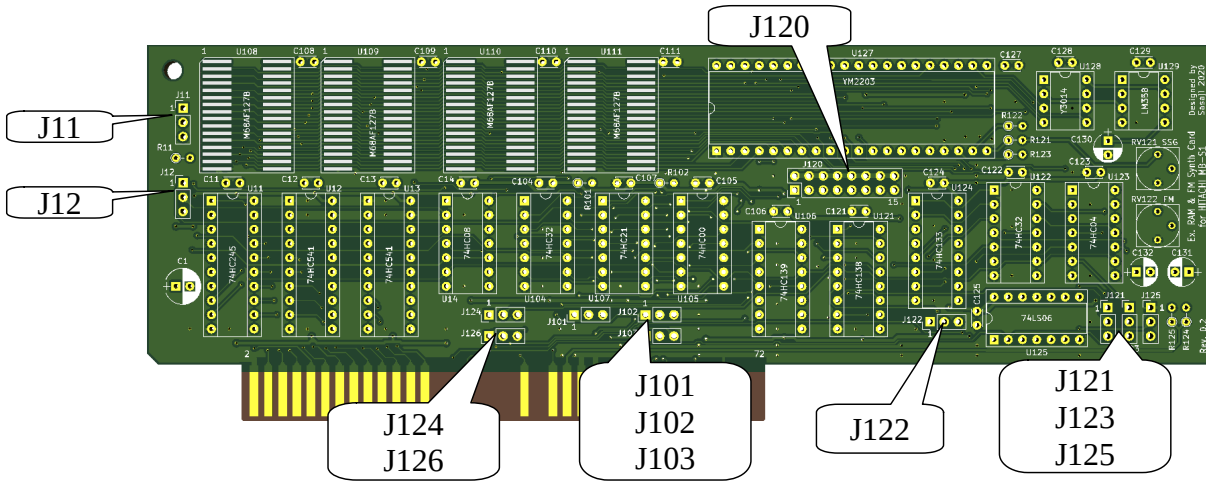
Parts List

- Parts number #1 to #99 are mandatory.
- Parts number #100 to #119 are necessary if you use extended RAMs.
- Parts number #120 to #139 are necessary if you use FM Synth.

Parts Number	Parts Name	Qty.	Description
C1	Electrolytic Capacitor	1	47~100uF, 16V~

C11~C129	Ceramic Capacitor	20	0.1uF
C130	Electrolytic Capacitor	1	10uF, 16V~
C131,C132	Electrolytic Capacitor	2	22uF~47uF, 16V~
R11~R102	Carbon Resistor	3	4.7KΩ~10KΩ, 1/4W~
R121~R125	Carbon Resistor	5	1KΩ, 1/4W~
RV121	Potentiometer	1	2KΩ Ex: Tokyo Cosmos GF063P1B202
RV122	Potentiometer	1	10KΩ Ex: Tokyo Cosmos GF063P1B103
U11	CMOS Logic IC	1	74HC245, DIP20
U12, U13	CMOS Logic IC	2	74HC541, DIP20
U14	CMOS Logic IC	1	74HC08, DIP14
U104,U122	CMOS Logic IC	2	74HC32, DIP14
U105	CMOS Logic IC	1	74HC00, DIP14
U106	CMOS Logic IC	1	74HC139, DIP16
U107	CMOS Logic IC	1	74HC21, DIP14
U108~U111	SRAM	4	STMicro M68AF127B or compatible SRAM(618128), SOIC32
U121	CMOS Logic IC	1	74HC138, DIP16
U123	CMOS Logic IC	1	74HC04, DIP14
U124	CMOS Logic IC	1	74HC133, DIP16
U125	TTLLogic IC	1	74LS06, DIP14
U127	FM Synth IC	1	YM2203, DIP40
U128	DAC	1	Y3014, DIP8
U129	Opamp	1	LM358 or LM2904, DIP8
J11~J126	Jumper	11	Pin Header 3pin x1 2.54mm pitch
J120	Jumper	1	Pin Header 8pin x2 2.54mm pitch
	Jumper pin	12	To short pin headers.
	ICsocket		If need.

Setting Jumper



Using Circuit (J11, J12)

- Pin number are #1,#2 and #3 from the top.

		Short 1-2	Short 2-3
J11	Use Extended RAMs?	Yes	No
J12	Use FM Synth?	Yes	No

Range of Extended RAMs Area (J101 ~ J103)

- If you want to share with installed extension RAMs in the machine, disable RAMs on this board according to memory capacity.
- Pin number are #1, #2 and #3 from the left.

	J101	J102	J103
Use all RAMs	Short 1-2	Short 1-2	Short 2-3
Disable 64KB of the first RAM	Short 1-2	Short 2-3	Short 1-2
Disable 128KB	Short 1-2	Short 2-3	Short 2-3
Disable 256KB	Short 2-3	Short 2-3	Short 2-3

I/O Addresses of FM Synth (J120 ~ J125)

- Pin number #1 of J120 is the bottom left, #2 is the top left, and #16 is the top right. Short top pins and bottom pins.
- Pin number of J121, J123 and J125 are #1, #2 and #3 from the top.
- Pin number of J122 and J124 are #1, #2 and #3 from the left.

	J120	J121 ~ J125
Use I/O Addresses at \$FF1E and \$FF1F	Short 15-16	Short 1-2
Use I/O Addresses at \$FFE6 and \$FFE7 (*1)	Short 7-8	Short 2-3

(*1) Select this if you use as Extended PSG.

Connecting Interrupt Signal of FM Synth (J126)

- Pin number are #1, #2 and #3 from the left.

		Short 1-2	Short 2-3
J126	Connect to	IRQ	FIRQ

Attention

- Make sure to short the jumper J120 only in one place. If you short-circuit multiple places, the IC will be destroyed.
- This board is a prototype. No consideration is given to noise generated during use and deterioration over time.

Disclaimer

I am not responsible for any damage caused by this board.
You use this board at your own risk.

Web

<http://s-sasaji.ddo.jp/bml3mk5/s1exmemfm.htm>

QR Code ---->

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