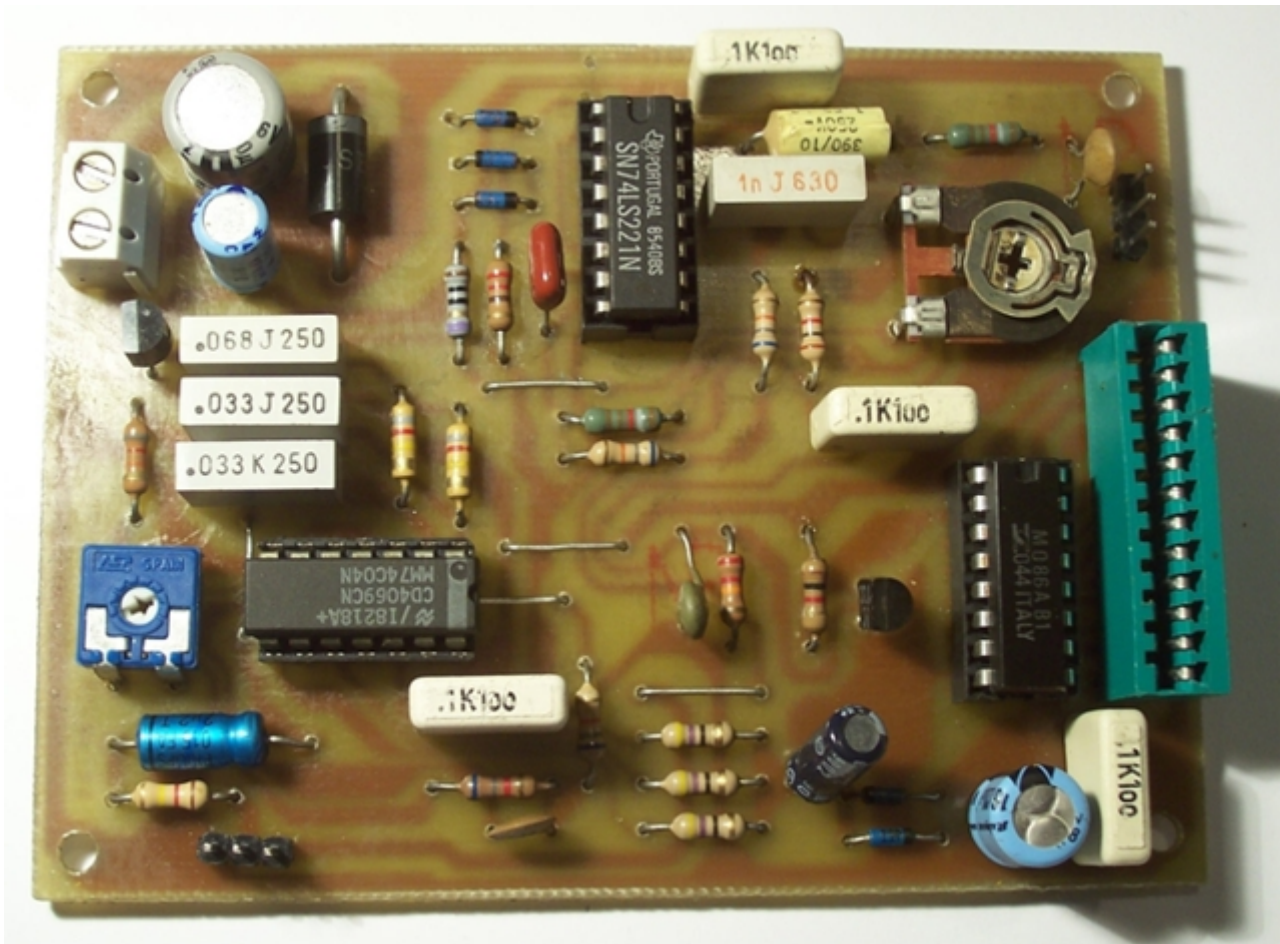


T.O.S.

12 note Top Octave Synthesizer

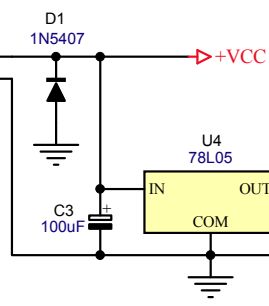
with M087B1 / M086B1 integrated circuits



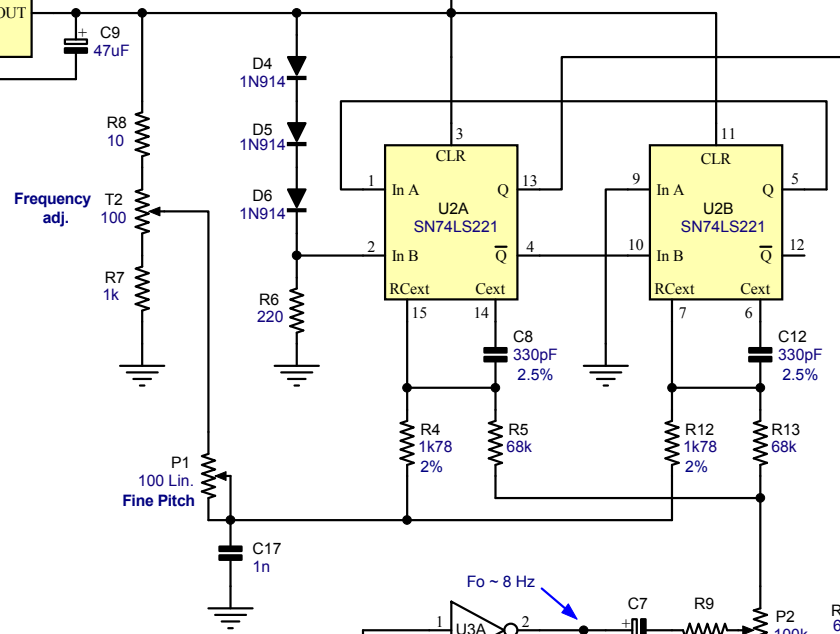
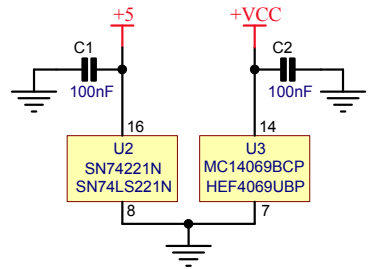
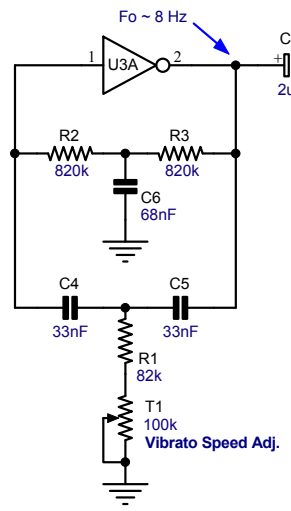
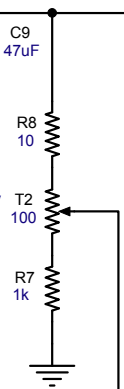
SERVICE MANUAL



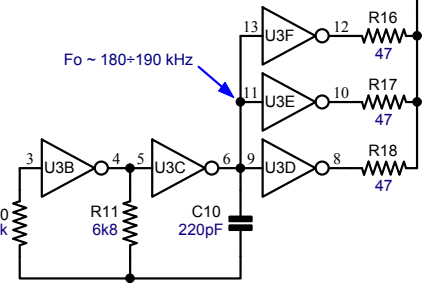
Power Supply
9...14 Vcc
100 mA max.



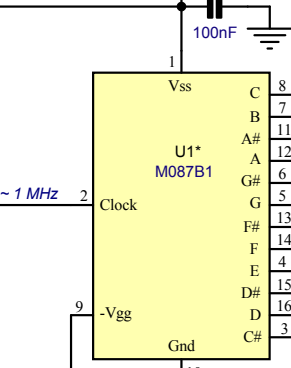
Frequency
adj.



Fo ~ 180÷190 kHz



Clock ~ 1 MHz



M2
Octave Output

C	8	12	4187 Hz
B	7	11	3953 Hz
A#	11	10	3730 Hz
A	12	9	3520 Hz
G#	6	8	3321 Hz
G	5	7	3134 Hz
F#	13	6	2959 Hz
F	14	5	2795 Hz
E	4	4	2635 Hz
D#	15	3	2487 Hz
D	16	2	2349 Hz
C#	3	1	2216 Hz

U1 also can be:
M086
S50242
MK50242

Author: Valter Narcisi - San Benedetto del Tronto (AP)			
Project: TOS - 12-note Top Octave Synthesizer with M087B1 / M086B1			Year: 2014
Size: —	DWG no.: 1	Rev.: 1	Scale: 1:1
Note: www.narcisivalter.it - info@narcisivalter.it			Sheet: 1 of 1

STMicroelectronics

M087B1

12-note Top Octave Synthesizer
(TOS)

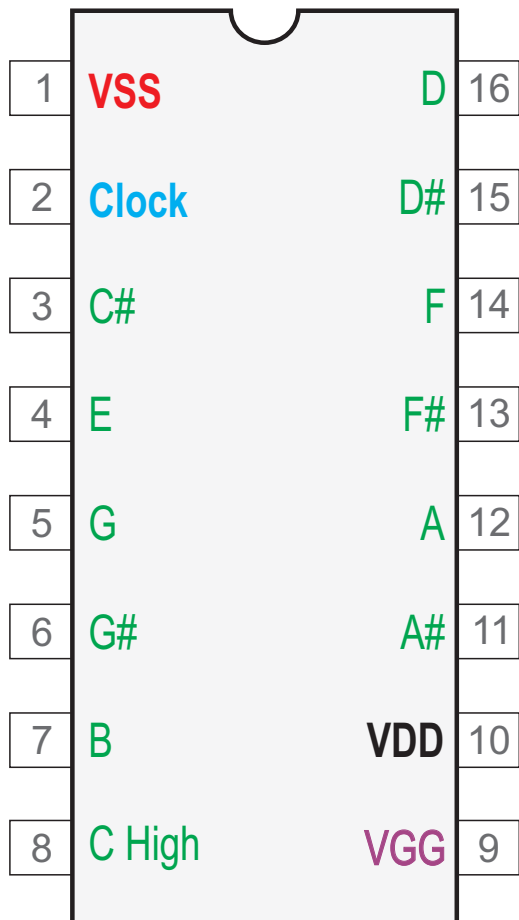
Chip Package: **DIP16**

Power Supply (max): **0 ÷ 20 Vcc** (Dual)

Power Supply (typ.): **9 ÷ 15 Vcc** (Dual)

Master Clock Input: **0,015 ÷ 2 MHz**

Duty Cycle: **50%**



Pin No.	Note	Div.	Freq. Output	
			Clock IN 999,68 kHz	Clock IN 1999,36 kHz
3	C#	451	2216,68 Hz	4433,17 Hz
16	D	426	2346,66 Hz	4693,33 Hz
15	D#	402	2436,76 Hz	4973,53 Hz
4	E	379	2637,68 Hz	5275,36 Hz
14	F	358	2792,40 Hz	5584,80 Hz
13	F#	338	2957,63 Hz	5915,27 Hz
5	G	319	3133,79 Hz	6267,59 Hz
6	G#	301	3321,19 Hz	6642,39 Hz
12	A	284	3520,00 Hz	7040,00 Hz
11	A#	268	3730,15 Hz	7460,30 Hz
7	B	253	3951,30 Hz	7902,61 Hz
8	C	239	4182,76 Hz	8365,52 Hz

STMicroelectronics

M086AB1

12-note Top Octave Synthesizer
(TOS)

Chip Package: **DIP16**

Power Supply (typ.): **9 ÷ 15 V**

Master Clock Input: **0,100 ÷ 2,5 MHz**

Typical Clock Input: **2 MHz**

Duty Cycle: **50%**

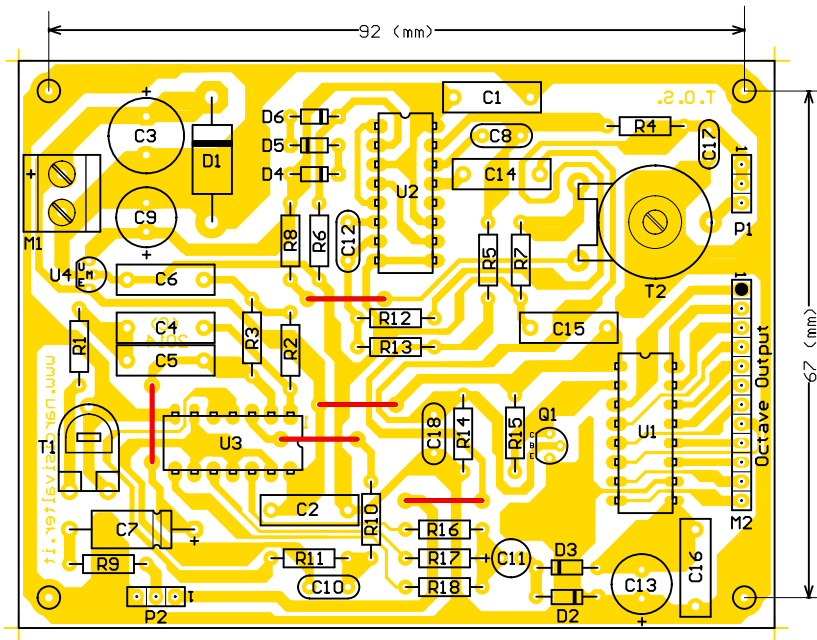


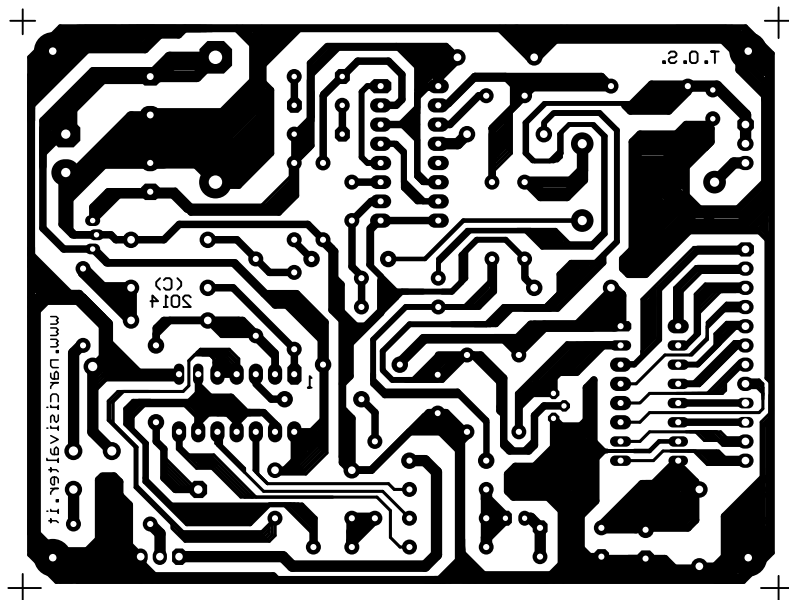
Pin No.	Note	Div.	Freq. Output	
			Clock IN 999,68 kHz	Clock IN 1999,36 kHz
3	C#	451	2216,68 Hz	4433,17 Hz
16	D	426	2346,66 Hz	4693,33 Hz
15	D#	402	2436,76 Hz	4973,53 Hz
4	E	379	2637,68 Hz	5275,36 Hz
14	F	358	2792,40 Hz	5584,80 Hz
13	F#	338	2957,63 Hz	5915,27 Hz
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6	G#	301	3321,19 Hz	6642,39 Hz
12	A	284	3520,00 Hz	7040,00 Hz
11	A#	268	3730,15 Hz	7460,30 Hz
7	B	253	3951,30 Hz	7902,61 Hz
8	C	239	4182,76 Hz	8365,52 Hz

MOSTEK MK50242	AMI S50242	Chip Package: DIP16 Power Supply (typ.): 9 ÷ 15 V Master Clock Input: 0,100 ÷ 2,5 MHz Typical Clock Input: 2 MHz Duty Cycle: 50%
12-note Top Octave Synthesizer (TOS)		

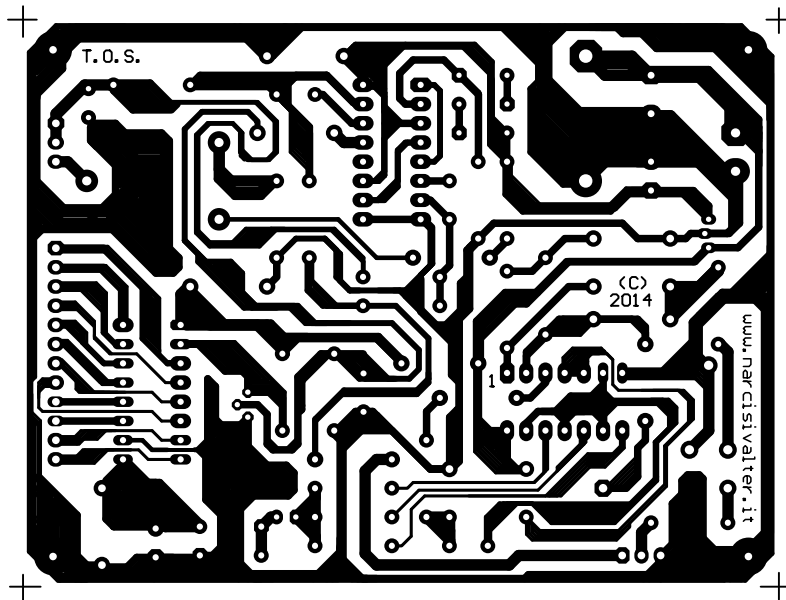


Pin No.	Note	Div.	Freq. Output	
			Clock IN 999,68 kHz	Clock IN 1999,36 kHz
③	C#	451	2216,68 Hz	4433,17 Hz
⑩	D	426	2346,66 Hz	4693,33 Hz
⑮	D#	402	2436,76 Hz	4973,53 Hz
④	E	379	2637,68 Hz	5275,36 Hz
⑭	F	358	2792,40 Hz	5584,80 Hz
⑬	F#	338	2957,63 Hz	5915,27 Hz
⑤	G	319	3133,79 Hz	6267,59 Hz
⑥	G#	301	3321,19 Hz	6642,39 Hz
⑫	A	284	3520,00 Hz	7040,00 Hz
⑪	A#	268	3730,15 Hz	7460,30 Hz
⑦	B	253	3951,30 Hz	7902,61 Hz
⑧	C	239	4182,76 Hz	8365,52 Hz





MASTER - Mirror side (specchio)

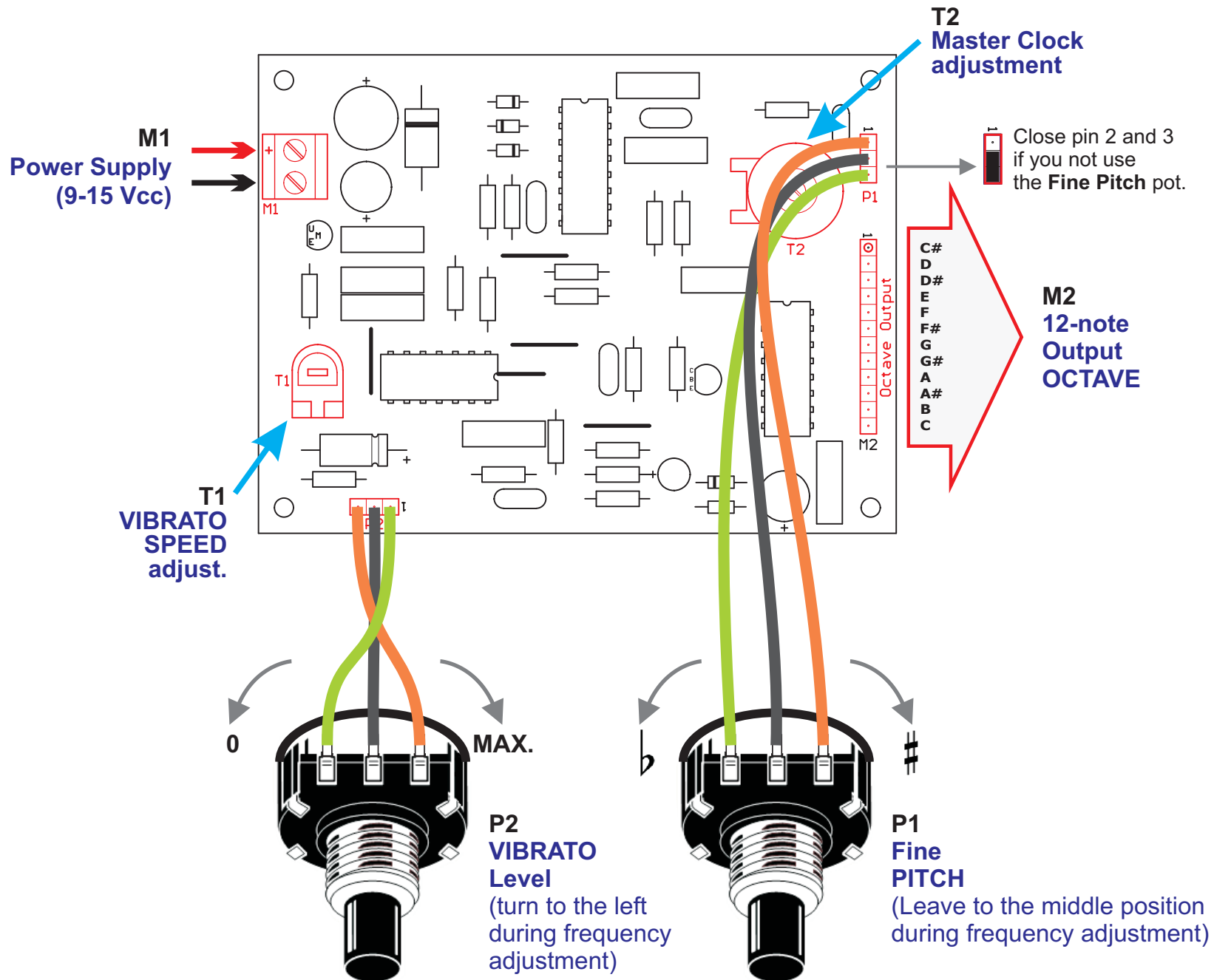


MASTER - Copper Side (Lato rame)

**Top Octave Synthesizer with M087B1 - M086B1
Spare Parts**

Designator	Component	Notes
C1	100nF	Capacitor
C2	100nF	Capacitor
C3	100uF - 25V	Electrolitic Capacitor
C4	33nF	Capacitor
C5	33nF	Capacitor
C6	68nF	Capacitor
C7	2u2 - 16V	Electrolitic Capacitor
C8	330p - 2.5%	Capacitor
C9	47uF - 16V	Electrolitic Capacitor
C10	220p	Capacitor
C11	1u - 16V	Electrolitic Capacitor
C12	330p - 2.5%	Capacitor
C13	220u - 16V	Electrolitic Capacitor
C14	1n	Capacitor
C15	100nF	Capacitor
C16	100nF	Capacitor
C17	1n	Capacitor
C18	3.9 pF	Capacitor
R1	82k	Resistor 1/4 W
R2	820k	Resistor 1/4 W
R3	820k	Resistor 1/4 W
R4	1k78 - 2%	Resistor 1/4 W
R5	68k	Resistor 1/4 W
R6	5k6	Resistor 1/4 W
R7	1k	Resistor 1/4 W
R8	10	Resistor 1/4 W
R9	120k	Resistor 1/4 W
R10	68k	Resistor 1/4 W
R11	6k8	Resistor 1/4 W
R12	1k78 - 2%	Resistor 1/4 W
R13	68k	Resistor 1/4 W
R14	22k	Resistor 1/4 W
R15	1k	Resistor 1/4 W
R16	47	Resistor 1/4 W
R17	47	Resistor 1/4 W
R18	47	Resistor 1/4 W
R19	4k7	Resistor 1/4 W
T1	100k	Trimmer
T2	100	Trimmer
D1	1N5407	Diode
D2 - D6	1N914	Diode (General Purpose)
Q1	BC237	NPN Transistor
U1	M087B1 - M086B1	Tos Integrated Circuit
U2	SN74LS221	SN74221N or SN74LS221N
U3	CD4069	MC14069BCP
U4	78L05	uA78L05
M1	Power Supply	2-pole
M2	Octave Output	12-pole Farfisa socket
P1	100 Lin.	Potentiometer
P2	100k Lin.	Potentiometer

http://www.narcisivalter.it/progetti/tos_m087-b1.html



TOS integrated circuits

13-Note Top Octave Generator		12-Note Top Octave Generator	
INTEGRATED CIRCUIT	BRAND	INTEGRATED CIRCUIT	BRAND
S50240 - S50241 S50243 - S50244	AMI	MK50242	Mostek
MK50240 MK50241	Mostek	S50242 S50245	AMI
M082B1 - M082AB1 M083B1 - M083AB1	SGS-Ates (STMicroelectronics)	M086B1 - M086AB1 M087B1	SGS-Ates (STMicroelectronics)
MM5891AA MM5891AB	National	AY-1-0212 AY-3-0214	General Instruments
SFF5011	Sescosem	SFF5009 SFF5010	Sescosem
SAA1030	ITT	TMS3616 TMS36161	Texas Instruments
S2555 S2556	AMI		
MM5555 - MM5556 MM5832 - MM5833	National		
M8071 - LM8071	Sanyo		

The chips in RED color require a dual-supply / I chip in ROSSO richiedono un'alimentazione duale

www.narcisivalter.it/progetti/tos_m087-b1.html