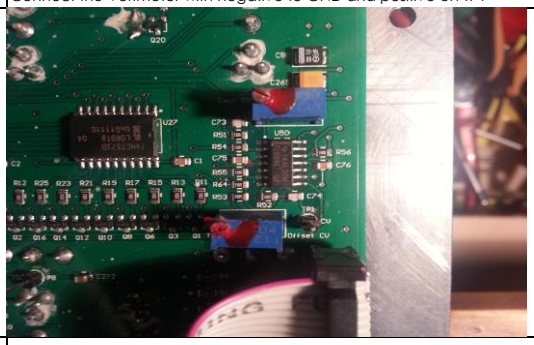
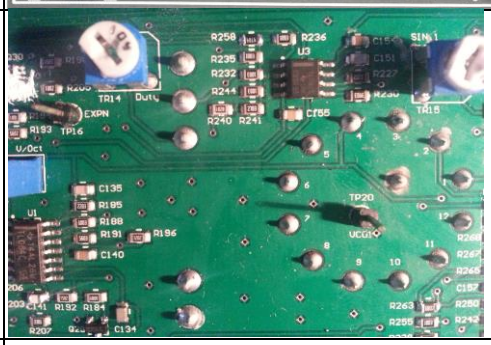
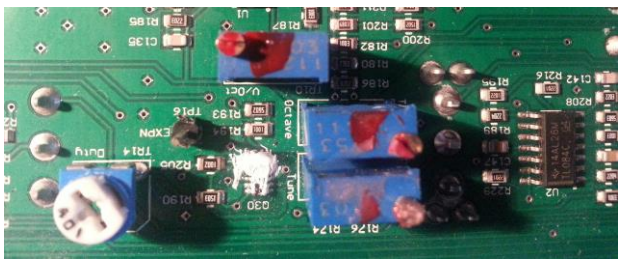
	Grp Synthesizer A4
	VCO BOARD - MIDI TO CV Calibration
1	Connect the Voltmeter with negative to GND and positive on TP1
	
2	Press the C3 key on your keyboard Midi (it is the first C a Midi keyboard to 5 octaves) and adjust **TR1** (CV Offset) until you read 3.00V
3	Press the C8 key on the keyboard and adjust the **TR2** (Gain CV) until you read 8.00V
4	Repeat steps 2 and 3 until the correct adjustment (errors of 2/3 mV are accepted)
5	Press the keys C3, C4, C5, C6, C7, C8 alternately and check the right interval of 1V / Oct)
	VCO BOARD - Pitch Bend Calibration
6	Place the frequency counter on the TP20 of VCO 1 and set a Square wave
7	Set the BEND AMOUNT knob to 0
8	Press any note and read its frequency
9	Ranges from 0 to 10 of the BEND AMOUNT knob. Adjust trimmer R4 until there are no frequency variations
	
	VOLTAGE CONTROLLED OSCILLATOR 1 (VCO 1) Calibration 1V/Oct , Octave Selector and Waveform
	
	 
10	Set the MASTER TUNE knob to 0
11	Connect the Frequency meter to **TP20** and select the **Square Wave.**
12	Set the **OCTAVE** switch to position **8 '**
13	Press and release C3 key on the Midi keyboard
14	Set the VCO to 50 Hz with Tune and Fine knobs
15	Press and release C7 key on the Midi keyboard
16	Now the frequency should be around 800 Hz. If it turns out to be slightly lower, lower it further by a few Hz with the TR10 V / Oct, while if it turns out slightly higher, always with the trimmer TR10 raise it some Hz
	Example1: With C7 pressed we have a frequency of 792Hz instead of 800Hz, with TR10 bring it to 788Hz. Press C3 and adjust with FINE and TUNE until you return the frequency to 50 Hz accurate. Press C7 again and check if the frequency has risen around 800 Hz, if it is still low repeat

	the operation up to have a precise interval of 1V / Oct.
	Example 2: With C7 pressed we have a frequency of 812Hz instead of 800Hz, with TR10 bring it to 818Hz. Press C3 and adjust with FINE and TUNE until you return the frequency to 50 Hz accurate. Press C7 again and check if the frequency has lowered around 800 Hz, if it is still high repeat the operation up to have a precise interval of 1V / Oct.
17	Set the OCTAVE switch to position 64 'and press the C7 key
18	With the TUNE and FINE knobs, set the frequency to 50Hz
19	Set the OCTAVE selector to 4 'and adjust the frequency with TR11 at 800Hz
20	The frequency will double with each click of the switch. Example: 50hz, 100hz, 200hz, 400hz, 800hz, 1600hz (Errors of a few Hz in the 2' position is normal)
	Waveform Calibrator VCO 1
21	Place the oscilloscope on the TP20 located behind the WAVEFORM switch of VCO1
22	Set the Waveform switch of VCO 1 to square wave (6th position)
23	Adjust the TR14 (Duty) to have a Duty Cycle at 50%
24	Set the Waveform switch of VCO 1 to Triangular wave (2nd position)
25	Adjust the TR12 (Simtr) until you have a good triangular waveform (See Image)
	
26	Set the Waveform switch of VCO 1 to Sine wave (1st position)
27	Rotate the TR15 (Sin1) until a sinusoidal shape is obtained
28	Now rotate the TR13 (Sin2) until you read a Duty on the oscilloscope of 50%
29	Repeat the operations until you perceive a clear sinusoid (See Image)
	
	VOLTAGE CONTROLLED OSCILLATOR 2 (VCO 2) Calibration 1V/Oct and Octave Selector
	
30	Set the MASTER TUNE knob to 0
31	Connect the Frequency meter to **TP21** and select the **Square Wave.**
32	Set the **OCTAVE** switch to position **8 '**
33	Press and release C3 key on the Midi keyboard
34	Set the VCO to 50 Hz with Tune and Fine knobs
35	Press and release C7 key on the Midi keyboard
36	Now the frequency should be around 800 Hz. If it turns out to be slightly lower, lower it further by a few Hz with the TR20 V / Oct, while if it turns out slightly higher, always with the trimmer TR20 raise it some HZ.
	Example1: With C7 pressed we have a frequency of 792Hz instead of 800Hz, with TR20 bring it to 788Hz. Press C3 and adjust with FINE and TUNE until you return the frequency to 50 Hz accurate. Press C7 again and check if the frequency has risen around 800 Hz, if it is still low repeat the operation up to have a precise interval of 1V / Oct.
	Example 2: With C7 pressed we have a frequency of 812Hz instead of 800Hz, with TR20 bring it to 818Hz. Press C3 and adjust with FINE and TUNE until you return the frequency to 50 Hz accurate. Press C7 again and check if the frequency has lowered around 800 Hz, if it is still high repeat the operation up to have a precise interval of 1V / Oct.
37	Set the OCTAVE switch to position 64 'and press the C7 key
38	With the TUNE and FINE knobs, set the frequency to 50Hz
39	Set the OCTAVE selector to 4 'and adjust the frequency with TR21 at 800Hz
40	The frequency will double with each click of the switch. Example: 50hz, 100hz, 200hz, 400hz, 800hz, 1600hz (Errors of a few Hz in the 2' position is normal)
	Waveform Calibrator VCO 2
41	Place the oscilloscope on the TP21 located behind the WAVEFORM switch of VCO2
42	Set the Waveform switch of VCO 2 to square wave (6th position)
43	Adjust the TR22 (Duty) to have a Duty Cycle at 50%
44	Set the Waveform switch of VCO 2to Triangular wave (2nd position)
45	Adjust the TR23 (Simtr) until you have a good triangular waveform
46	Set the Waveform switch of VCO 2 to Sine wave (1st position)
47	Rotate the TR25 (Sin1) until a sinusoidal shape is obtained

48	Now rotate the TR24 (Sin2) until you read a Duty on the oscilloscope of 50%
49	Repeat the operations until you perceive a clear sinusoid
	VOLTAGE CONTROLLED OSCILLATOR 3 (VCO 3) Calibration 1V/Oct and Octave Selector
	
50	Set the MASTER TUNE knob to 0
51	Connect the Frequency meter to **TP22** and select the **Square Wave.**
52	Set the **OCTAVE** switch to position **8 '**
53	Press and release C3 key on the Midi keyboard
54	Set the VCO to 50 Hz with Tune and Fine knobs
55	Press and release C7 key on the Midi keyboard
56	Now the frequency should be around 800 Hz. If it turns out to be slightly lower, lower it further by a few Hz with the TR27 V / Oct, while if it turns out slightly higher, always with the trimmer TR27 raise it some HZ.
	Example1: With C7 pressed we have a frequency of 792Hz instead of 800Hz, with TR27 bring it to 788Hz. Press C3 and adjust with FINE and TUNE until you return the frequency to 50 Hz accurate. Press C7 again and check if the frequency has risen around 800 Hz, if it is still low repeat the operation up to have a precise interval of 1V / Oct.
	Example 2: With C7 pressed we have a frequency of 812Hz instead of 800Hz, with TR27 bring it to 818Hz. Press C3 and adjust with FINE and TUNE until you return the frequency to 50 Hz accurate. Press C7 again and check if the frequency has lowered around 800 Hz, if it is still high repeat the operation up to have a precise interval of 1V / Oct.
57	Set the OCTAVE switch to position 64 'and press the C7 key
58	With the TUNE and FINE knobs, set the frequency to 50Hz
59	Set the OCTAVE selector to 4 'and adjust the frequency with TR28 at 800Hz
60	The frequency will double with each click of the switch. Example: 50hz, 100hz, 200hz, 400hz, 800hz, 1600hz (Errors of a few Hz in the 2' position is normal)
	Waveform Calibrator VCO 3
61	Place the oscilloscope on the TP22 located behind the WAVEFORM switch of VCO3
62	Set the Waveform switch of VCO3 to square wave (6th position)
63	Adjust the TR29 (Duty) to have a Duty Cycle at 50%
64	Set the Waveform switch of VCO 3 to Triangular wave (2nd position)
65	Adjust the TR30 (Simtr) until you have a good triangular waveform
66	Set the Waveform switch of VCO 3 to Sine wave (1st position)
67	Rotate the TR32 (Sin1) until a sinusoidal shape is obtained
68	Now rotate the TR31 (Sin2) until you read a Duty on the oscilloscope of 50%
69	Repeat the operations until you perceive a clear sinusoid
	"VOLTAGE CONTROLLED OSCILLATOR 1 (VCO 1) 440Hz Tuning
70	Position the MASTER TUNE and TUNE and FINE of the VCO1 perfectly in the central position **0**
71	Set the OCTAVE switch of the VCO1 to position **8 '**and press the KEY A 440Hz (A key after the central C)
72	Connect the Frequency meter to TP20 and select the Square Wave.
73	Adjust TR9 until you read the precise 440 Hz frequency counter
	"VOLTAGE CONTROLLED OSCILLATOR 2 (VCO 2) 440Hz Tuning
74	Position the MASTER TUNE and TUNE and FINE of the VCO1 perfectly in the central position **0**
75	Set the OCTAVE switch of the VCO2 to position **8 '**and press the KEY A 440Hz (A key after the central C)
76	Connect the Frequency meter to TP21 and select the Square Wave.
77	Adjust TR19 until you read the precise 440 Hz frequency counter
	"VOLTAGE CONTROLLED OSCILLATOR 3 (VCO 3) 440Hz Tuning
78	Position the MASTER TUNE and TUNE and FINE of the VCO1 perfectly in the central position **0**
79	Set the OCTAVE switch of the VCO3 to position **8 '**and press the KEY A 440Hz (A key after the central C)
80	Connect the Frequency meter to TP22 and select the Square Wave.
81	Adjust TR26 until you read the precise 440 Hz frequency counter

	SEQUENCER BOARD CV A & B TUNING
	
	
1	Place the MODE switch on 8x2
2	Connect the Frequency meter to TP20 (VCO1) and select the Square Wave.
3	Set the OCTAVE switch of the VCO1 to position 8 'and press the KEY A 440Hz (A key after the central C)
4	Place Switch 1 "VCO SEQ ENABLE" on **A** position
5	With the TR1 (OFFSET CVA) calibrate up to not cause frequency changes in the SWITCH movement between the central position and the HIGHT position
6	Place Switch 1 "VCO SEQ ENABLE" on **B** position
7	With the TR7 (OFFSET CVB) calibrate up to not cause frequency changes in the SWITCH movement between the central position and the LOW position
8	Place Switch 1 in **Central** Position
9	Connect the Voltmeter to TP4 (CVA) and set the Step 1 potentiometer to zero. You will read some MilliVolts on a voltmeter. This is OK
10	Place the Range A Switch on **X4** Position.
11	Place the potentiometer Step1 on **10** posisition. - With TR2 (Gain CVA) adjust the voltage to 4 volts, a few mV of error are accepted
12	Connect the Voltmeter to **TP6** (CVB) and set the Step 9 potentiometer to zero. You will read some MilliVolts on a voltmeter. This is OK
13	Place the Range B Switch on X4 Position.
14	Place the potentiometer Step9 on 10 posisition. - With TR6 (Gain CVB) adjust the voltage to 4 volts, a few mV of error are accepted
	Sequencer Board Cv A+B TUNING
15	Place the MODE switch on 16x1
16	Connect the Frequency meter to TP20 (VCO1) and select the Square Wave.
17	Set the OCTAVE switch of the VCO1 to position 8 'and press the KEY A 440Hz (A key after the central C)
18	With the TR3 (OFFSET CV A+B) calibrate up to not cause frequency changes in the **SWITCH 1** movement between the central position and the LOW position
19	Connect the Voltmeter to TP5 (CV A+B) and set the Step 1 potentiometer to zero. You will read some MilliVolts on a voltmeter. This is OK
20	Place the Range A & B Switch on X4 Position.
21	Place the potentiometer Step1 on 10 posisition. - With TR4 Gain A (A+B) adjust the voltage to 4 volts, a few mV of error are accepted
22	Now with the black STEP ADV button activate step 9
23	Place the potentiometer Step9 on 10 posisition. - With TR5 Gain B (A+B) adjust the voltage to 4 volts, a few mV of error are accepted
24	The tuning is finished.