MB6582 Control Surface Troubleshooting

Note: This guide is currently work in progress and will be subject to further updates within the next couple of days.

This section is about the MB6582 control surface trouble shooting based on the PCB version 2.0. Please note that inappropriate working control surfaces can have a fault on the control surface PCB as well as on the Base PCB. Therefore it is important to disconnect the CS PCB from the base PCB in order to separate the root causes of the various possible faults.

It is also recommended to use this guide to verify the function of your control surface during the build process. This will help you to identify faults early during the assembly process and will make you live easier while testing the completed synthesizer.

The following acronyms are used in this section:

CS = Control Surface PCB = Printed Circuit Board

There are different root causes on the CS PCB leading to an inaccurately working control surface. Please find an overview of the most common faults:

- Shorts → caused by the midiboxer
- Bad solder joints → caused by the midiboxer
- Defective components (switchsed, LED, diods, encoders) → component manufacturing issue
- Broken interconnection points (between the bottom and top side) → PCB manufacturing issue
- Shorts or breaks on the boards → PCB manufacturing issue

The first step to do a successful trouble shooting is to understand the design of the CS PCB. Attached you will find an overview of the usage of the connection pads between the CS and the Base PCB:

MB6582 SID V2 / Base PCB / CS PCB Connector Overview PCB V2 / 22.06.2011 / Documentation by M.Breitfelder	
Pad	**Usage**
JD1	Encoder Signal
JD2	Encoder Signal
JD3	Encoder Signal
JD4	Encoder Signal
JD5	All switches +5V
JD6	Matrix LED's +5V
JD7	Indicator LED's +5V
JD8	All switches and all LED's GND
JD9	GND / +5V for the Encoder only

Please note that the all switches and all LED’s are sharing the same GND pad JD8 ! This is important to understand because if you have shorts between JD8 tracks you will find that a series of switches or

LED's are not working properly. In this case the MB6582 firmware will not be able to distinguish between switches connected to the faulty tracks. Also all the LED's connected to the faulty tracks may light up together. It is also very helpful to understand that the encoders are using exclusively the pads JD1 to JD4 as well as JD9 ! If you find encoders working inappropriately you just need to check the rails on these pads.

The following steps are recommended to be carried out during the trouble shooting. Please make sure that the CS PCB is NOT connected to the Base PCB !

Check of the single components:

1. LED's → Check all the LED's on the CS PCB. This is necessary to check that they are all oriented appropriately and functioning as expected. To do this you can built yourself a cable that you connect to the LED connector on the Base PCB.
2. Switch Diodes → Use your Multimeter to check that all the diodes are working properly. You just need to select the diod test function on your multimeter. You need to connect the anode to the plus (red) lead and the cathode to the minus (black) lead. The multimeter will show you the forward current. Even the cheapest Multimeters offer a diod test mode to check switch diodes. Check also the orientation of the diodes. The black stripe on the diode should match the bar at the end of the arrow symbol on the CS PCB.
3. Switches → Check the "routed through" connection on the long sides of the switch. Then Check that each switch is closing when pressed as expected (short sides of the switches)

Once you have checked the components separately you can continue with testing the function and connection of each component. The following overview tables will guide you through each component to be verified:

LED Assignment Matrix

MB6582 SID V2 / LED Assignment Matrix										PCB V2 / 22.06.2011 / Documentation by M.Breitfelder		
		JD8 / GND										
		D0	D1	D2	D3	D4	D5	D6	D7			
		LED Matrix Column 1	LED Matrix Column 2	LED Matrix Column 3	LED Matrix Column 4	LED Matrix Column 5	LED Matrix Column 6	LED Matrix Column 7	LED Matrix Column 8			
JD7 / +5V	D0	Matrix Mode / Matrix	Osc Select / 3	Osc / Waveform / Noise	Osc / Mod S/R / Sync	Filter / Filter Select / 1	Filter / Mode / HP			LED Matrix Row 8	D0	JD6 / +5V
	D1	Matrix Mode / Meter	Osc Select / 2	Osc / Waveform / Pulse	Osc / Mod S/R / Ring	Filter / Filter Select / 2	Filter / Mode / BP			LED Matrix Row 7	D1	
	D2		Osc Select / 1	Osc / Waveform / Saw	Env / Env Select / 2	Filter / Filter Select / 3	Filter / Mode / LP			LED Matrix Row 6	D2	
	D3			Osc / Waveform / Triangle	Env / Env Select / 1		Filter / Ext In / Ext In			LED Matrix Row 5	D3	
	D4	Osc Ctrl / Env	Env / Ctrl / Env	Global / SID / L	LFO / Waveform / Saw	LFO / LFO Select / 5	LFO / LFO Select / 1	Global / SID Engine / 4	Global / Mode / Sync	LED Matrix Row 4	D4	
	D5	Osc Ctrl / Misc	Env / Ctrl / Misc	Global / SID / R	LFO / Waveform / Pulse	LFO / LFO Select / 6	LFO / LFO Select / 2	Global / SID Engine / 3	Global / Mode / CC	LED Matrix Row 3	D5	
	D6	Osc Ctrl / Knob	Env / Ctrl / Assign		LFO / Waveform / Noise	LFO / Waveform / Triangle	LFO / LFO Select / 3	Global / SID Engine / 2	Global / Mode / Edit	LED Matrix Row 2	D6	
	D7				LFO / Waveform / Mixed	LFO / Waveform / Sinus	LFO / LFO Select / 4	Global / SID Engine / 1	Global / Mode / Play	LED Matrix Row 1	D7	

Switch Assignment Matrix

MB6582 SID V2 / Switch Assignment Matrix								PCB V2 / 22.06.2011 / Documentation by M.Breitfelder
		JD8 / GND						
		D0	D1	D2	D3	D4	D5	D6	D7
JD5 / +5V	D0	Global / Matrix Mode / Mode	Matrix / Row 1 / Pitch 1	Matrix / Column 1 / Mod Source 1	Global / Nav./ Shift	Global / Nav / Up	Global / Nav / F1	Global / SID Engine / 4	Global / Mode / Sync
	D1	Osc / Waveform	Matrix / Row 2 / Pitch 2	Matrix / Column 2 / Mod Source 2		Global / Nav / Left	Global / Nav / F2	Global / SID Engine / 3	Global / Mode / CC
	D2	Osc / Select	Matrix / Row 3 / Pitch 3	Matrix / Column 3 / Mod Source 3		Global / Nav / Right	Global / Nav / F3	Global / SID Engine / 2	Global / Mode / Edit
	D3	Osc / Mod S/R	Matrix / Row 4 / Mod PW 1	Matrix / Column 4 / Mod Source 4	Global / Nav./ Menu	Global / Nav / Down	Global / Nav / F4	Global / SID Engine / 1	Global / Mode / Play
	D4	Env / Select	Matrix / Row 5 / Mod PW 2	Matrix / Column 5 / Mod Source 5			Global / Nav / F5		
	D5	Filter / Select	Matrix / Row 6 / Mod PW 3	Matrix / Column 6 / Mod Source 6		Global / SID L/R	LFO / Select		
	D6	Filter / Mode	Matrix / Row 7 / Mod Filter	Matrix / Column 7 / Mod Source 7		LFO / Waveform	Env / Ctrl		
	D7	Osc / Control	Matrix / Row 8 / Mod Volume	Matrix / Column 8 / Mod Source 8			Filter / Ext In		

Encoder Assignment Matrix

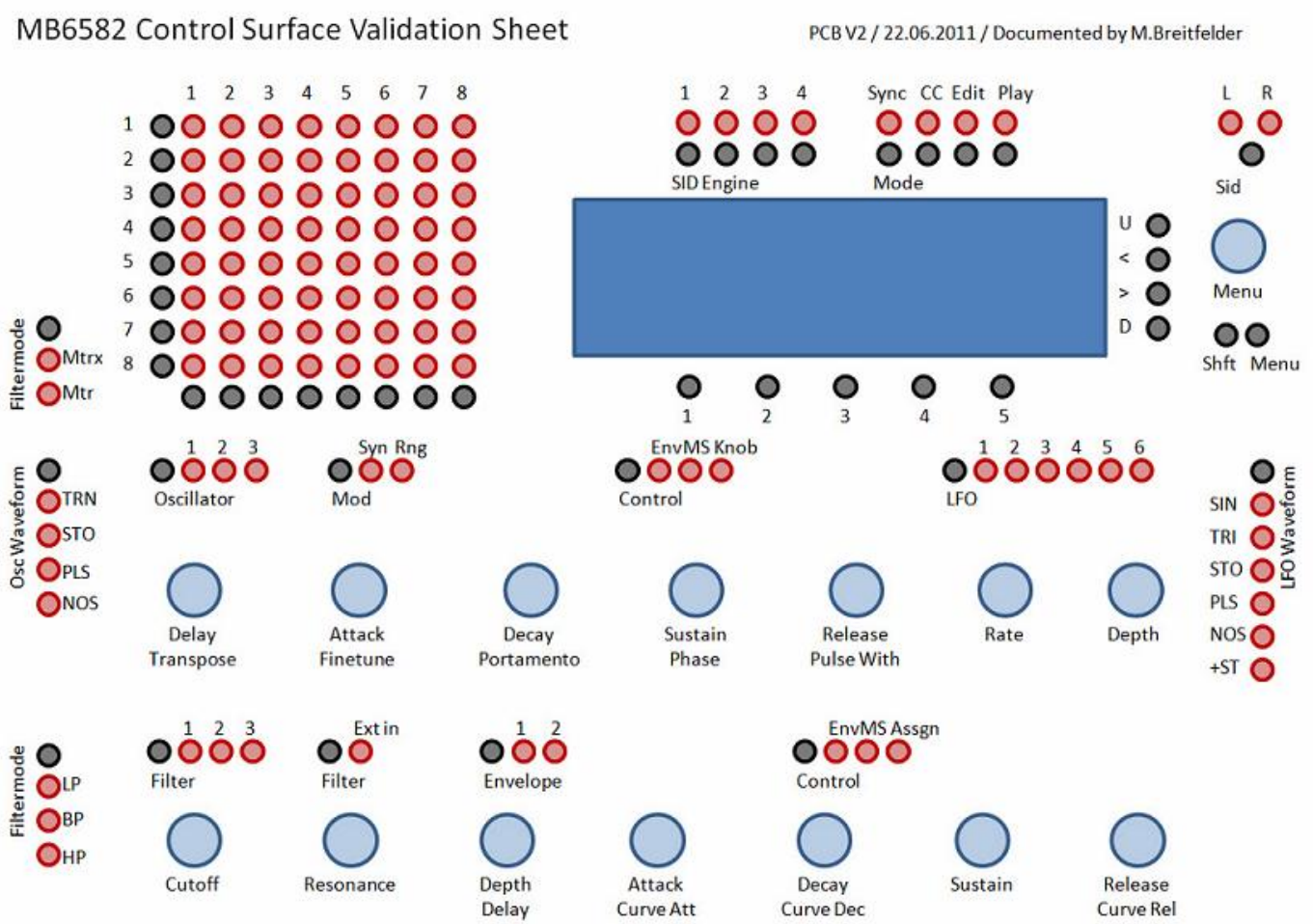
MB6582 SID V2 / Encoder Assignment Matrix PCB V2 / 22.06.2011 / Documentation by M.Breitfelder					
		JDx / GND			
		JD1	JD2	JD3	JD4
	D0	LFO Rate	Osc Sustain	Osc Attack	Not used
	D1	LFO Rate	Osc Sustain	Osc Attack	Not used
	D2	Envelope Release	Envelope Decay	Envelope Depth	Filter Cutoff
	D3	Envelope Release	Envelope Decay	Envelope Depth	Filter Cutoff
	D4	LFO Depth	Osc Release	Osc Decay	Osc Delay
	D5	LFO Depth	Osc Release	Osc Decay	Osc Delay
	D6	Menu	Envelope Sustain	Envelope Attack	Filter Resonance
	D7	Menu	Envelope Sustain	Envelope Attack	Filter Resonance

Check the function of each component on the CS PCB:

1. LED Matrix –> Use the cable described in point a) above to check the wiring from the connection points. You need to connect the GND wire to one connection point on the JD8 pad and the +5V wire to one connection point on the JD6 pad. Please use the LED Assignment Matrix shown below. You need to check all 64 combinations to make sure that the complete matrix LED’s are working appropriately. During this test only single LED’s should light up. If more than one LED’s lights up then you have got a short on the PCB.
2. Indicator LED’s → Use the cable described in point a) above to check the wiring from the connection points. You need to connect the GND wire to one connection point on the JD8 pad and the +5V wire to one connection point on the JD7 pad. Please use the LED Assignment Matrix shown below. You need to check all individual LED’s to make sure that they are working as expected. During this test only single LED’s should light up. If more than one LED’s lights up then you have got a short on the PCB.
3. Switches → The function of the switches can easily be tested with the diode mode on your Multimeter. You need to connect the GND wire of your Multimeter to one connection point on the JD8 pad. The positive wire (red) has to be connected to one connection point of the JD5 pad. Please use the Switch Assignment Matrix to identify the correct connection point on the JD8 and JD5 pads. You should now press down the switch and check on your Multimeter display if it is working appropriately. With this check you won’t be able to identify shorts on the GND part of the board. To exclude shorts on the JD8 GND pad you need to measure the resistance between each connection point on the JD8 pad.
4. Encoders → The encoders are connected to the connection pads JD1 to JD4 as well as JD9.

Please refer to the Encoder Assignment Matrix and the Base PCB / CS PCB Connector Overview. You can used the continuity mode (2K Skale) to check the encoders. You need to connect the wires from the Multimeter to the connection points of JD1 to JD4 as well as JD9.

If you haven't found any faults so far you can start testing your CS while connected to the Base PCB. Please use the following verification sheet to test the function of each component of the control surface:



You should walk through all components ! Please document your test results on the validation sheet in order to support the later troubleshooting in the forum.