

# SERVICE MANUAL



**M 52**

Digital Music Vault

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# NAD M52 Digital Music Vault Quick Setup Guide

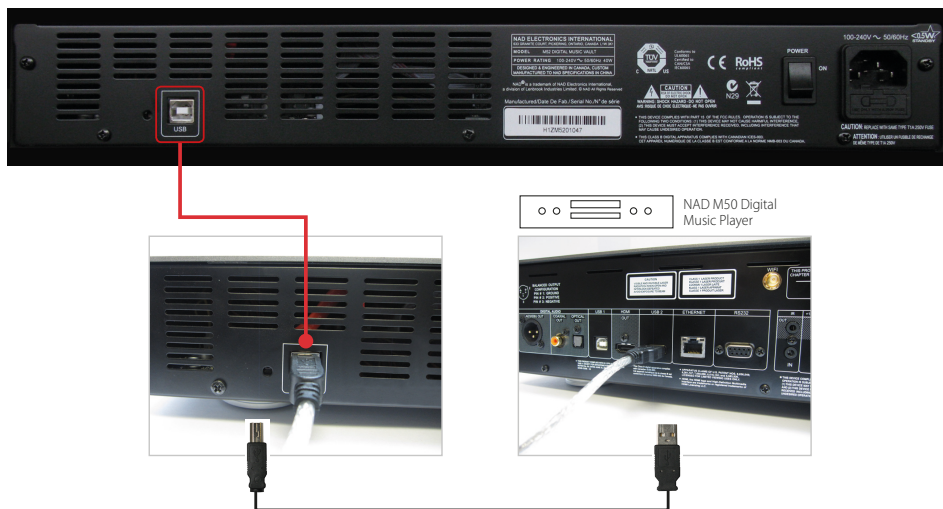
## WHAT'S IN THE BOX



## IMPORTANT!

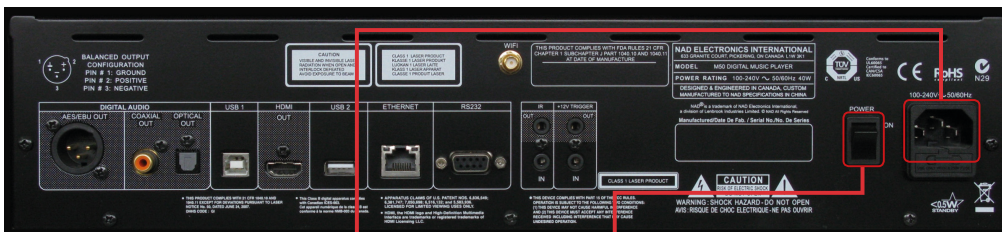
- The NAD M50 that appears in this guide is a reference model only and not included in the NAD M52 package.
- The NAD M52 is compatible only with the NAD M50.
- The NAD M52 cannot be connected directly to a PC or MAC.
- Check out the NAD website, <http://nadelectronics.com/products/masters-series/M52-Digital-Music-Vault>, for further information about the NAD M52.

## CONNECT!



## POWER UP!





## M52 References for Service Manual (Rev. A)

### M52 LED Indication

**standby:** power LED amber, HDD LEDs off

**power up:** power LED steady blue, HDD LEDs interleaving flashing red/blue

**short-time power loss** (e.g. USB unplug and plug back in a second or two): Power LED steady blue, HDD LEDs flashing red/blue at the same time

**unit active healthily:** all LEDs steady blue and the unit can be accessed and recognized

**unit has invalid RAID set:** all LEDs steady blue but the unit can't be accessed or not recognized.

**rebuilding:** LED of the rebuilding HDD flashing blue

**rebuild success:** LED of the rebuilding HDD steady blue

**rebuild failure:** LED of the rebuilding HDD flashing red

**individual disk healthy:** LED of the HDD steady blue

**disk failure:** LED of the HDD flashing red

**disk missing:** LED of the HDD steady red

### NOTE:

- 1) "unit has invalid RAID set" may be caused by inserting a HDD that was part of other RAID set unit. Wiping the last few sectors of the HDD will solve the problem (see "Rebuild" note 1). Or if it's caused by something else, re-initialize and reconfigure the RAID set is required which will cause the data loss.
- 2) "disk failure" may be caused by SATA port failure if the disk itself is healthy. Replacing the failed disk with a new one or unplug and plug back the failed disk, and rebuild RAID array will solve the problem (see how to rebuild RAID array section).

## **Initialize /Configure the RAID Array**

### **1) When is RAID array initialization needed**

When the RAID array is invalid or when two or more of the HDDs are replaced, re-initialization of the RAID array is required. But the initialization will destroy all data previously stored on the disks and is completely **irreversible!**

### **2) How to initialize and configure RAID array**

Make sure all the hard disks are healthy.

- Power on the unit
- Press "reset" button at the rear panel soon after the hard disk LEDs starts to flash
- Press "reset" button again after the LEDs flash 20 times after the above step. After this step, all the HDD LEDs become steady blue. At this point, all the data in the hard disks are lost and the unit has to be formatted.
- Partition and format the unit

## **Rebuild**

### **1) When is RAID array rebuild needed**

If one and only one of the hard disks is either missing or fails, i.e. that hard disk's LED becomes steady red or flashing red, the unit RAID array needs rebuild.

If two or more than two hard disks fail, RAID array can't be rebuilt and the data in the unit will be lost. At this point, to continue use the unit, you will have to replace all the broken/failed hard disks and re-initialize the RAID array.

### **2) How to rebuild a RAID array with same healthy HDD in the unit**

This case happens when one healthy HDD is removed and then put back at the same position.

- Power down the unit
- Unplug one healthy HDD
- Power up the unit until it's steady (2 HDDs LED blue, unplugged HDD LED red) – this step leaves the unit in degraded mode
- Power down the unit
- Plug the HDD back
- Power up the unit – this step will rebuild the RAID array of the unit

### **3) How to rebuild a RAID array with a new healthy HDD**

This case happens when one HDD is replaced with a new healthy HDD.

- Power down the unit
- Remove the failed/broken hard disk
- Replace it with a new healthy hard disk
- Power back on the unit. Press the tiny "reset" button at the rear panel after HDD LEDs flashes 22 times. This will start the RAID array rebuild. During rebuild, the new HDD LED will be flashing blue and the rest LEDs are steady blue.

**NOTE:**

1) *“new healthy hard disk”*

It must be at least the size of the smallest disk used when the set of RAID disks was created. Disk with identical capacity as the other two is recommended, with the best option of matching the same model number of the other two disks.

It could be a brand new hard disk bought from store or used one as long as it is healthy, could be either formatted or unformatted, could have existing data or empty, but it must **NEVER** be used by other RAID device before. If the HDD is used by other RAID device before, make sure to **WIPE the last few sectors of the HDD** where the RAID information is stored.

\*\*\*\*\* example to wipe the last 2MB or less of a 1TB HDD that is connected to Ubuntu Linux \*\*\*\*\*

```
remi@ubuntu:~$ sudo dd if=/dev/zero of=/dev/sdb bs=1024 count=2048 seek=976761000
```

```
dd: writing `'/dev/sdb': No space left on device (this warning is ok)
```

```
1585+0 records in
```

```
1584+0 records out
```

```
1622016 bytes (1.6 MB) copied, 1.43649 s, 1.1 MB/s
```

2) *“rebuild time”*

The rebuild time takes approximately 4 hours for three 1TB SATA II disk (e.g. Seagate Pipeline HD 2) and 2.5 hours for three 1TB SATA III disk (e.g. Seagate Pipeline HD). The rebuild time varies depending on the SATA disk capacity.

3) *“data integrity during rebuild”*

During the rebuild process, the data in the unit stays as is, and you may continue use the unit.

4) *“interrupt during rebuild”*

Only powering off of M52 can interrupt the rebuild. Unplugging USB cable won't stop the rebuild. We recommend not turning the power off during the rebuild process. But if it is interrupted it will continue rebuilding the data as soon as the power is restored.

## FAQ:

### **1) *What is degraded mode?***

M52 works in degraded mode when one and only one of the healthy RAID array set of disks is removed. While in degraded mode, the unit continues to operate without loss of data, storage capacity, or performance. However, the unit is no longer secure and will suffer data loss if one or more disk fails.

### **2) *One of the HDD LED flashes blue for 1 or 2 minute after power up. What is it doing and why?***

The short-time LED flash means the corresponding HDD is rebuilding. It's because the previous power off happens before disks commit their caches to disk, which causes the data or parity inconsistency on the disk. The short-time rebuild upon power up will correct the inconsistency.

### **3) *Can I swap any of the HDDs in the unit or between units?***

No. Each disk has a unique global ID which ensures that disks cannot be swapped between sets – although sets with swapped disks might behave correctly, the data is useless because it is mixed up.

### **4) *Why does it take so long to power up the unit?***

The system switches on the disks independently and with sufficient delay between disks to minimize peak power consumption during motor spin-up.

### **5) *Can other HDD brands been used (e.g. WD red)?***

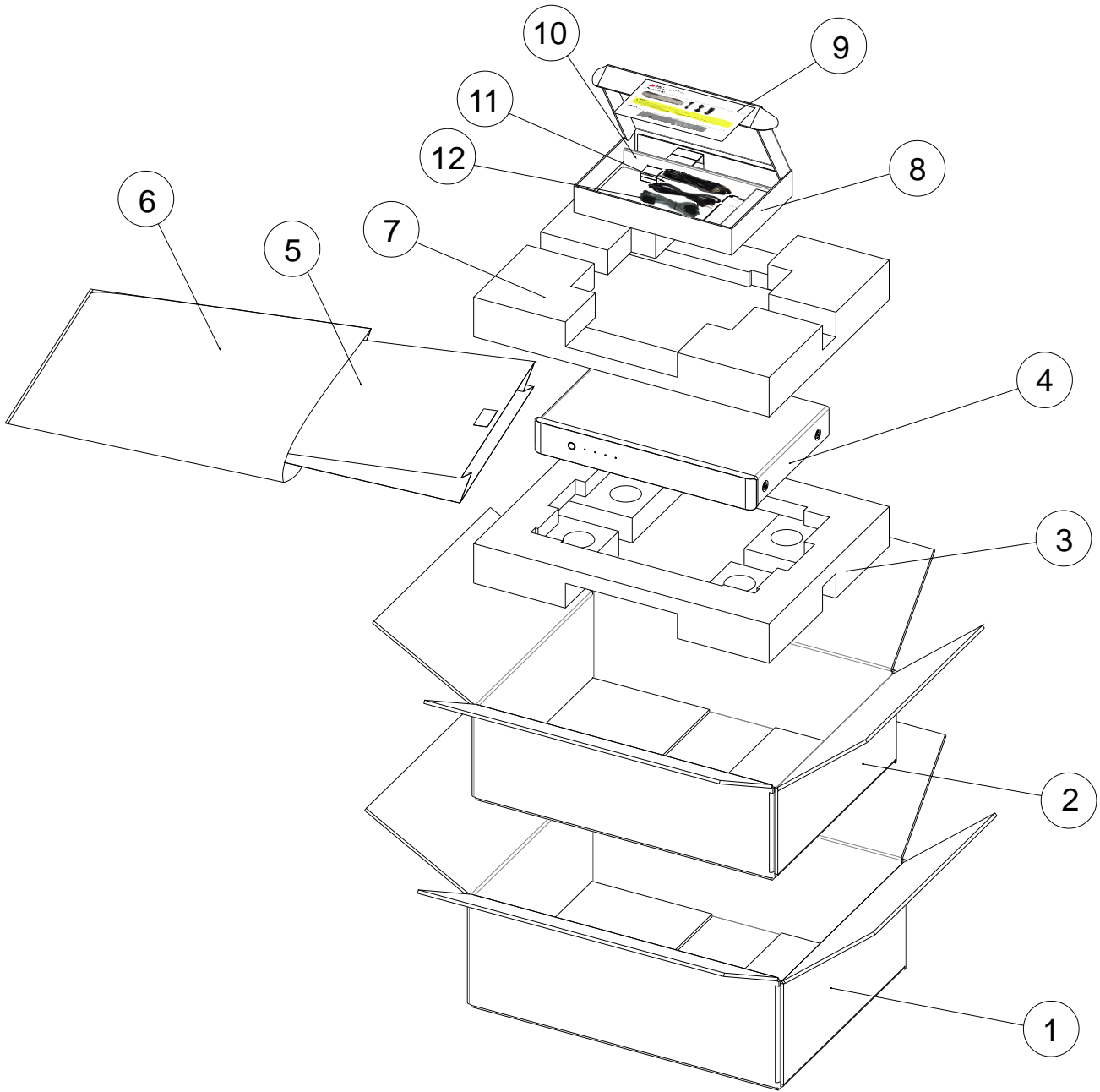
M52 allows the SATA disk drives to be of different brands and sizes. The capacity of a set of RAID disks is twice of the smallest disk size, leaving the upper part of any larger disk unused. However, HDDs of identical capacities and same models are recommended. In case you can't get identical HDDs for a RAID set, be aware that:

- The smallest HDD disk size can't be greater than 1TB due to configuration
- When M52 already works in degraded mode, a new HDD plugged into the array for rebuild must be at least the size of the smallest disk used when the set of RAID disks was created
- HDD disk voltage tolerance can't be greater than 5% for +5v and 10% for +12v
- If HDD disks are not SATA II or SATA III type, the data transmission speed will be decreased and the rebuild time will be longer

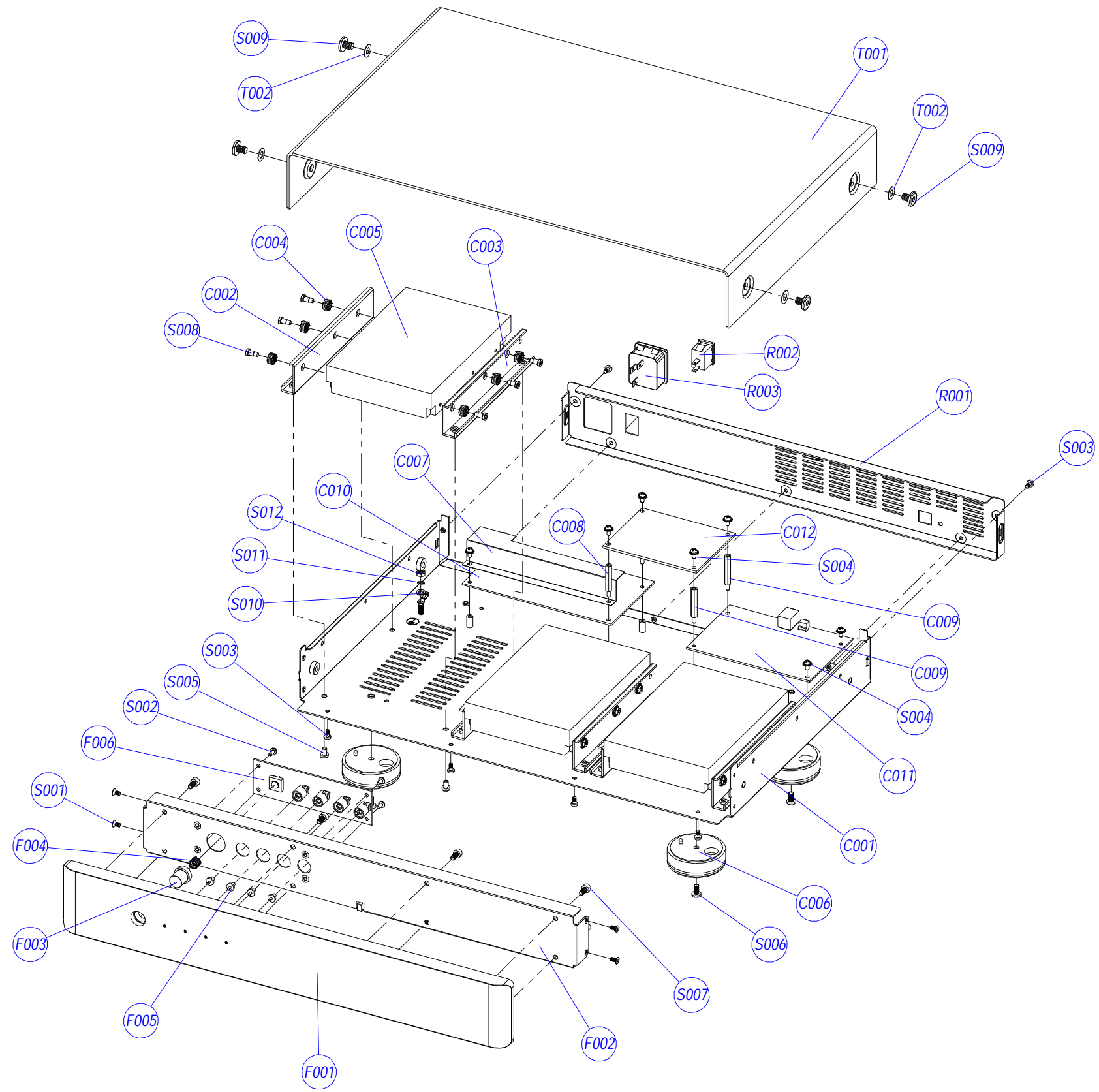
### **6) *If the controller board is replaced but the existing three HDDs are kept using, what will happen?***

If the controller board is configured same as the one before replaced, i.e. same RAID mode, disk number, and flash type/speed etc., and the existing three HDDs are kept same position, the RAID set of disks should work just fine as the serial numbers of the HDDs all match and they are automatically treated as a complete set.







REF.NO	Part No.	Description	Qty.
1	88-212002-0A	Shipping Box	1
2	88-212001-0A	Gift Box	1
3	89-211001-0	EPE Bottom	1
4	00-65200-00	M52 Unit	1
5	87-211001-0	Non-woven Cloth Bag	1
6	90-001001-0	Poly-bag	1
7	89-211002-0	EPE Top	1
8	88-043003-0	M15Accessories Box	1
9	30-46521-00	Quick Start Guide	1
10	88-043004-0	M15 Box Sheet	1
11	A15-16250-07	AC Cord	1
	A15-13125-00	AC Cord(AH)	1
12	29-65201-00	USB Cable	1



## EXPLODED VIEW PARTS LIST

REF.NO	PART NO.	DESCRIPTION	Qty.	REF.NO	PART NO.	DESCRIPTION	Qty.
C001	67-212001-1	Chassis	1				
C002	67-212004-0	HDD Left Bracket	1	T001	67-211002-0	Top Cover	1
C003	67-212005-0	HDD Right Bracket	1	T002	76-046001-0	Screw Washer	4
C004	85-212001-0	Anti-Vibrate Grommet	18				
C005	37-31000-00	Rigid Disk (HD)	3				
C006	J83-043001-0	Foot Assembly	4	S001	61-063106-0	Self Taping Screw STF3×6	4
C007	78-212001-1	Insulation Bracket	1	S002	61-023506-1	Machine Screw MB3×6	4
C008	69-212001-0	Copper Spacer	2	S003	61-023106-0	Self Taping Screw STB3×6	9
C009	69-212002-0	Copper Spacer	2	S004	61-373506-0	Machine Screw M3×6	8
C010	01-65209-00	Power BOARD	1	S005	61-024506-0	Machine Screw MB4×6	12
C011	01-65201-00	Decode Board	1	S006	61-024108-0	Self Taping Screw STB4×8	4
C012	01-65208-00	DC-DC Board	1	S007	61-224508-1	Machine Screw MH4x8	8
				S008	61-094510-0	Screw TGM-10SW	18
				S009	61-246508-1	Machine Screw MB6X8	4
F001	70-212001-1B	Fascia	1	S010	62-010402-0	Nut M4	1
F002	67-212002-1	Subfascia	1	S011	63-020411-0	Spring Washer Φ4	1
F003	70-048013-0	Power Button	1	S012	63-010408-0	Plain Washer Φ4	1
F004	92-048001-0	Spring for Button	1				
F005	76-008001-0	LED Lens	4				
F006	01-65202-00	KEY Board	1				
R001	67-212003-1C	Rear Panel	1				
R002 	A17-07103-12	AC Inlet	1				
R003 	A11-01101-03	Rocker Switch	1				

14-65212-00 FFC 12p 460mm

14-65207-03 M52 7pin SATA cable L=200mm

14-65207-04 M52 7pin SATA cable L=160mm

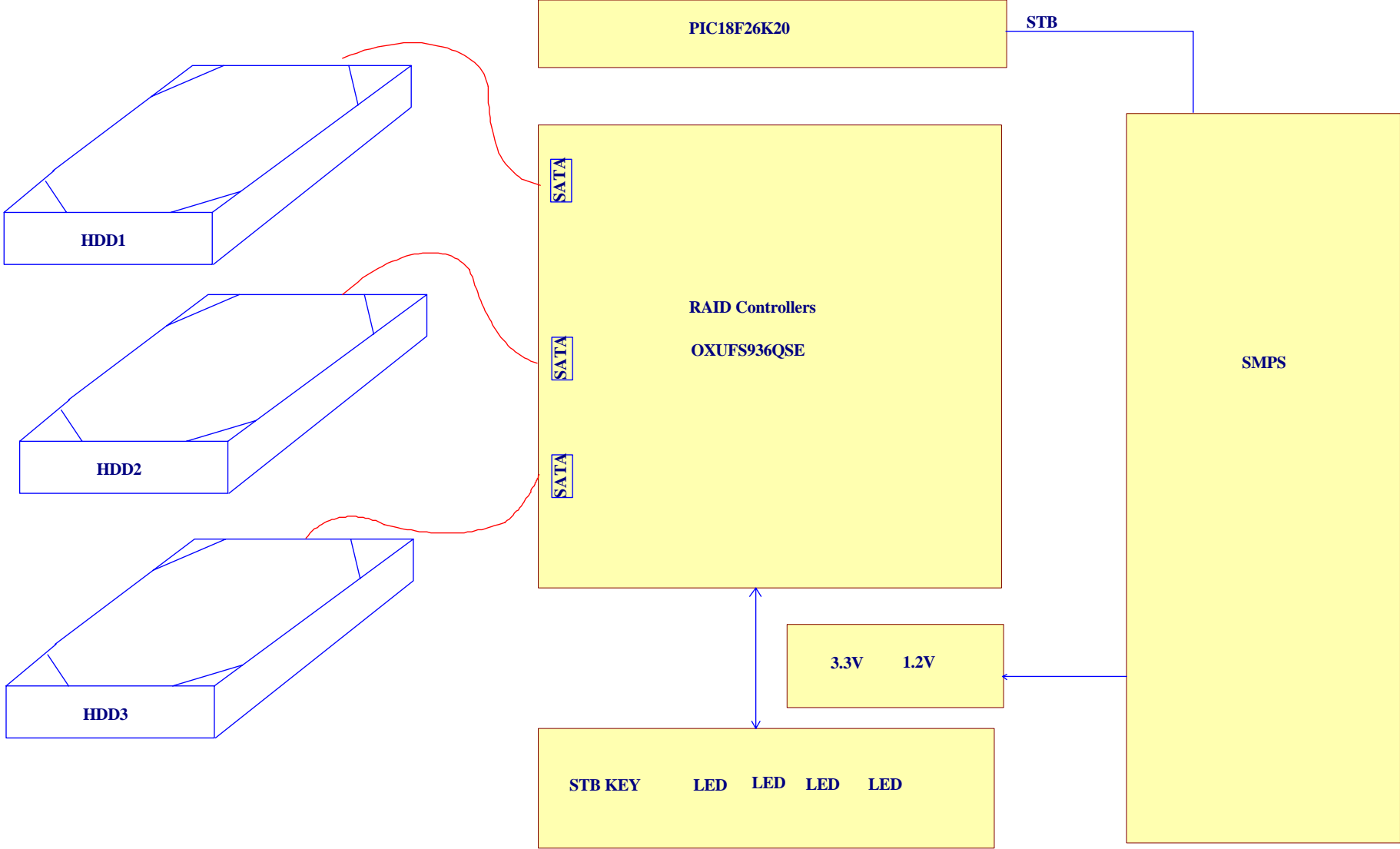
14-65207-05 M52 7pin SATA cable L=300mm

14-65205-00 5pin SATA Power L=150mm

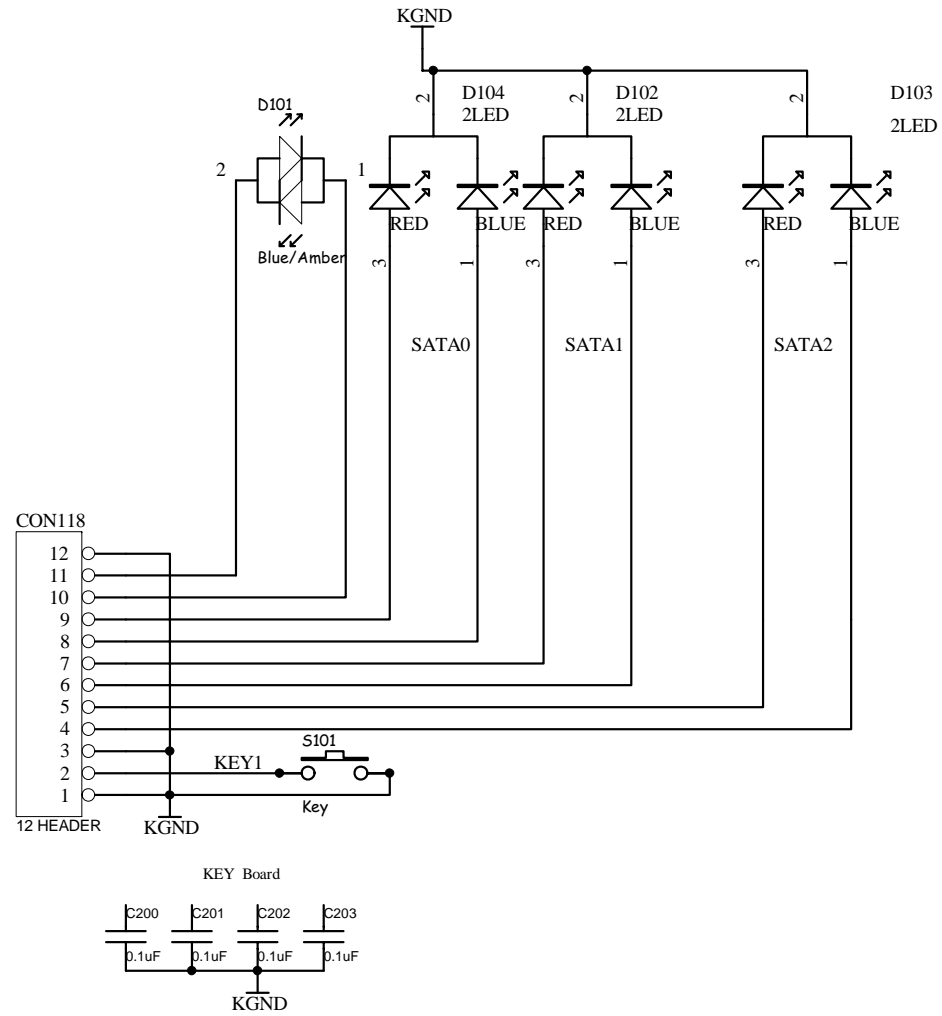
14-65205-01 5pin SATA Power L=200mm

14-65205-02 5pin SATA Power L=350mm

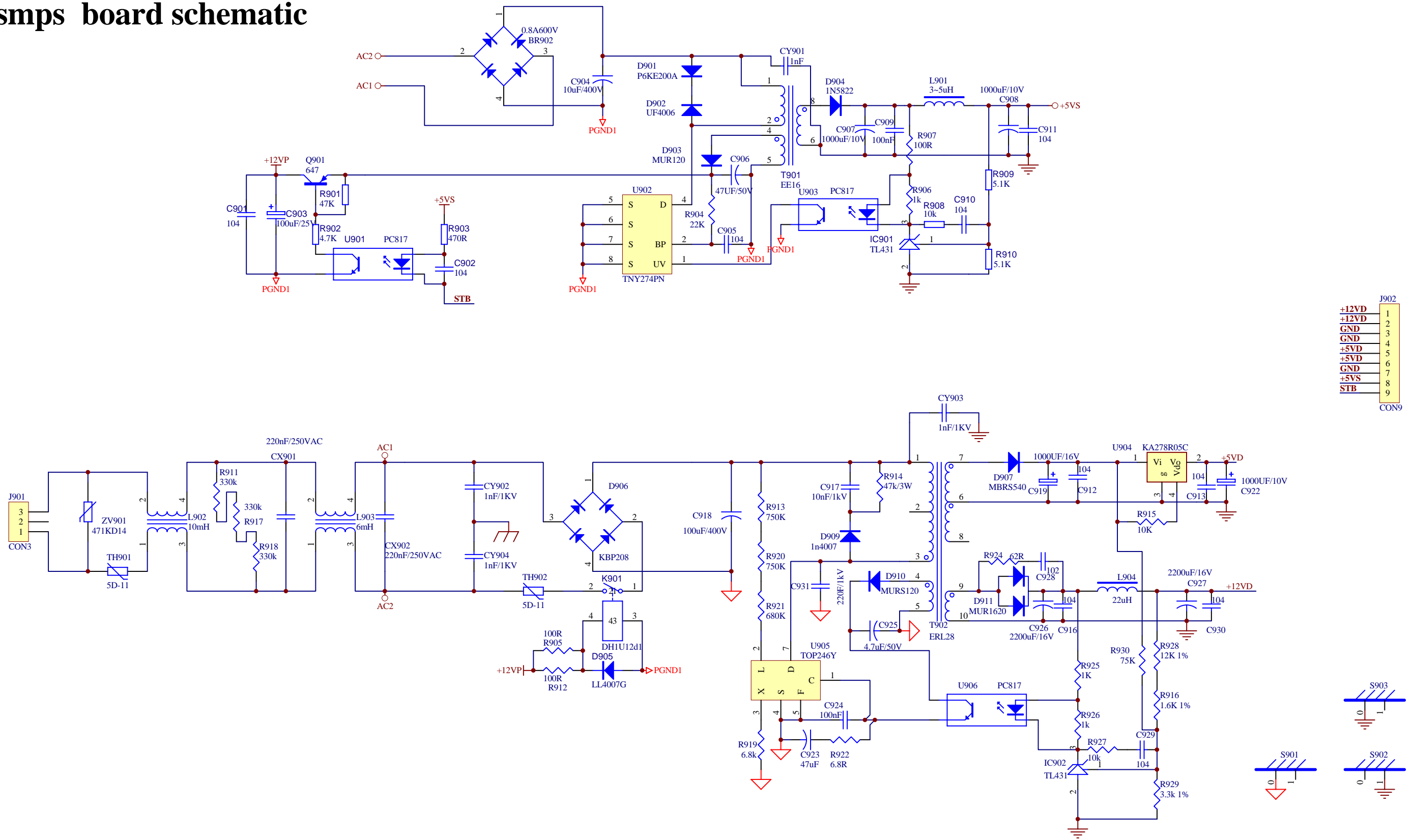
# M52 BLOCK DIAGRAM



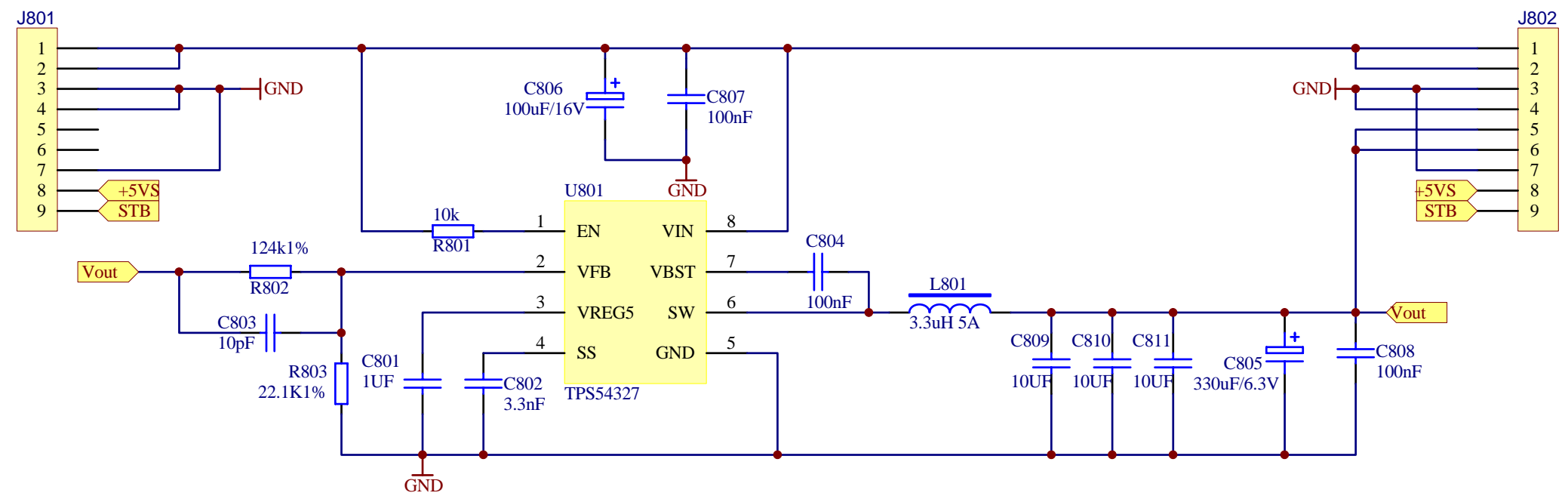
# keyboard schematic



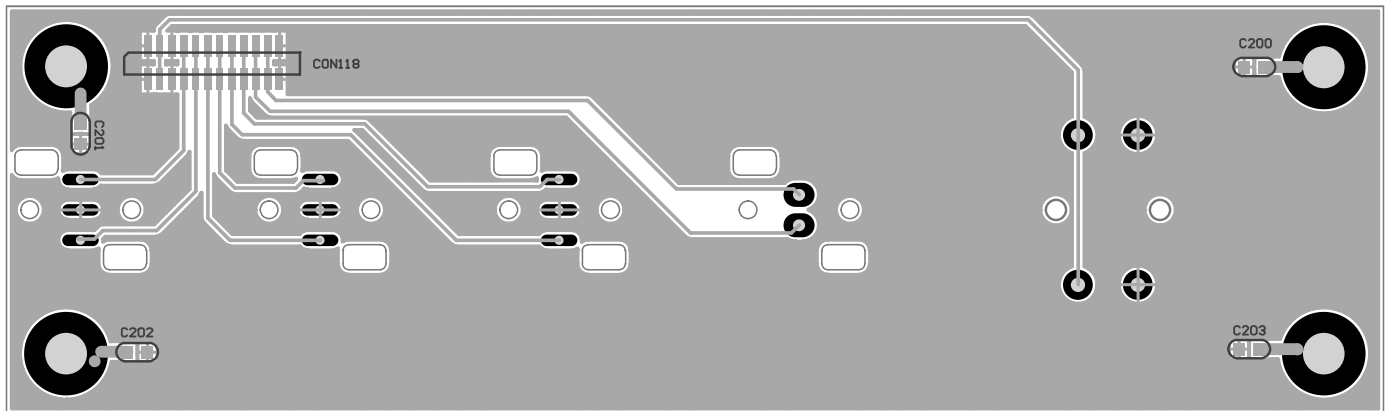
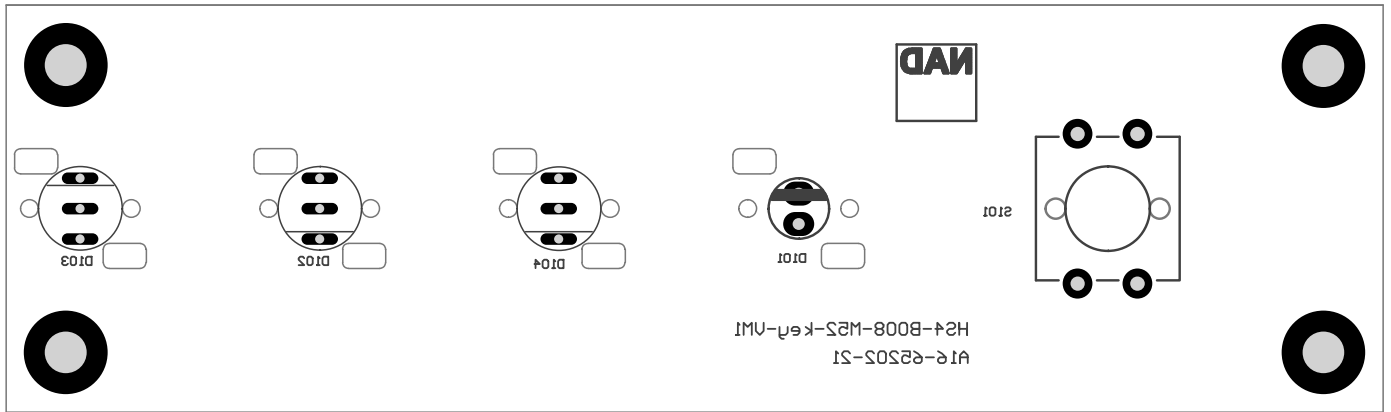
# smps board schematic



# DCDC board schematic

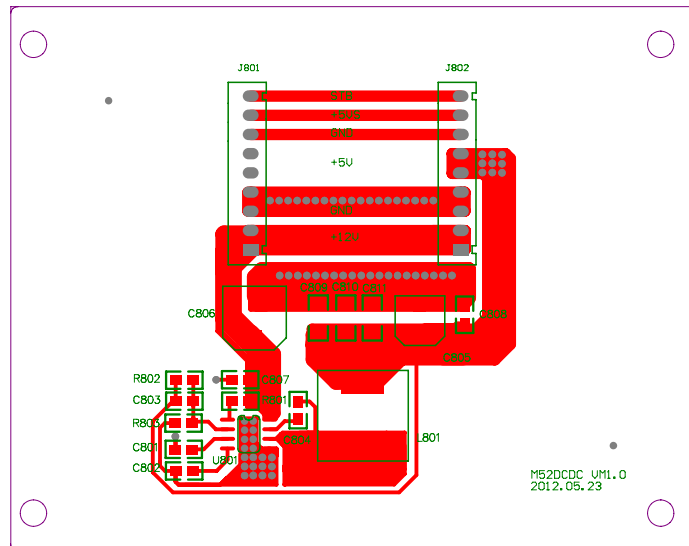


# keyboard Layout





# DCDC board layout



# SMPS board layout

