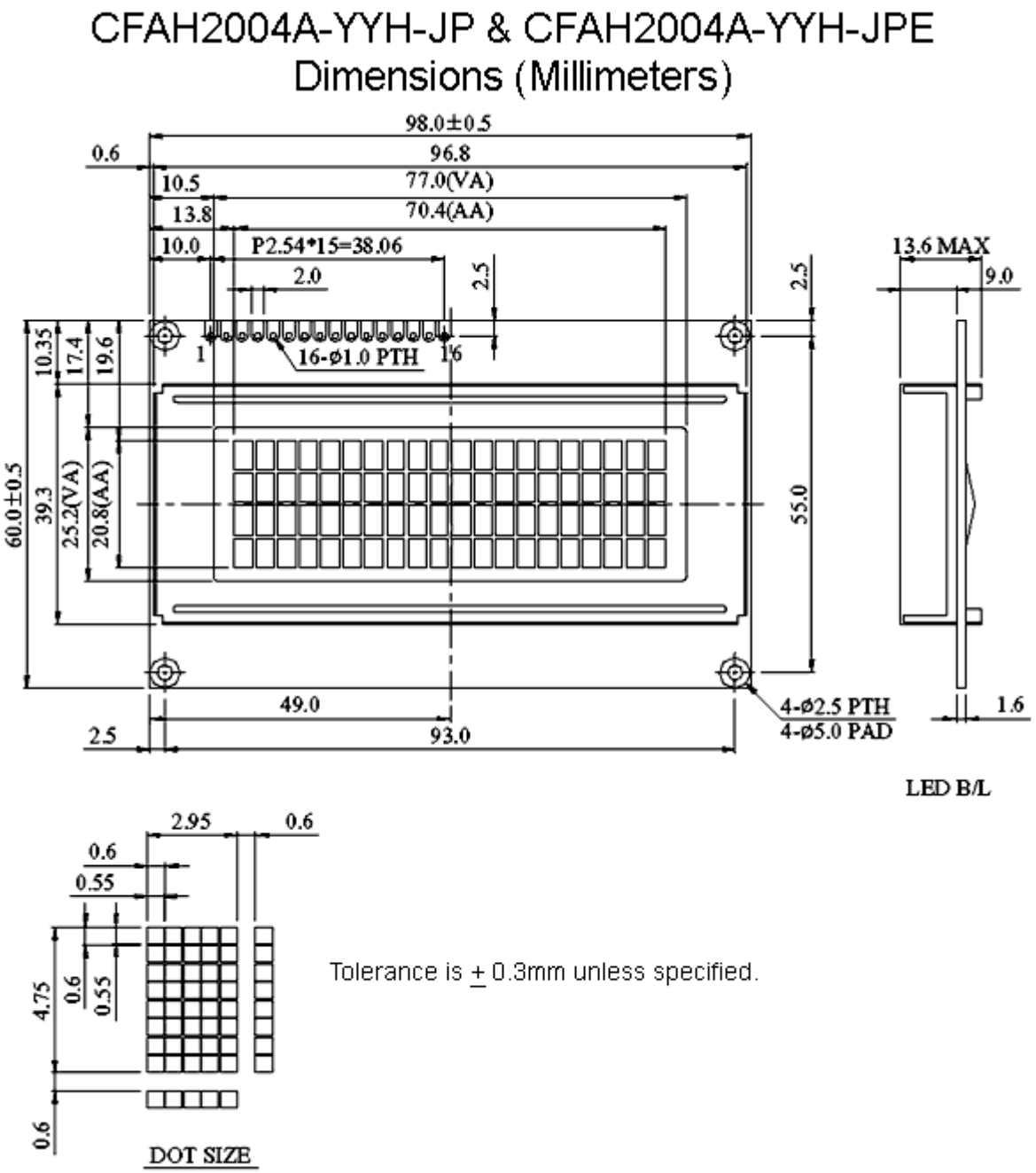
The control surface PCBs are designed to work with the following parts:

- PacTec PT-10 enclosure
- 1.5mm anodized aluminium panels, the same dimensions as the PT-10 aluminium panels, but without mounting holes in the corners. The panel is mounted to the case using screws glued to the panel underside. The PCB is mounted to the panels using threaded spacers glued to the panel underside.
- 4x M3x25mm countersunk head bolts, 8x M3 nuts, 8x M3 flat washers, 8x M3 spring washers. I was unable to find M3 countersunk head bolts, so I used 1/8“ which fits the PCB holes and PT-10 mount holes. (Obviously if you use 1/8” bolts, you need 1/8“ nuts, but M3 washers will fit 1/8” bolts). These bolts are glued to the panel underside in the corners. The nuts hold the panel to the PT-10 and also support the corners of the PCB.
- 25x M3x10mm threaded spacers (tapped spacers), 25x M3x6mm screws, 25x M3 spring washers. These spacers are glued to the panel underside where they align with mount holes in the PCB.
- I used JB Weld metal glue to attach bolts and spacers to the panel underside. I cannot recommend any other alternative. Also, I believe this glue works well with anodized aluminium but maybe not with non-anodized aluminium. **Avoid JB-Kwik PLEASE! Get the original JB-Weld! Do not get cheap imitations! You need a slow setting time, JB-Kwik is TOO KWIK!!!**
- 48x ALPS tactile switches, 13mm tall (ALPS part SKHHDTA010). The control surface PCBs and front panel are designed around these switches. They snap into the PCB holes and are thus perfectly aligned with the panel, and poke out 1.5mm from the top of the panel, making for a neat finish. Datasheet here: http://www3.alps.com/WebObjects/catalog.woa/E/PDF/Switch/Tact/SKHH/SKHH.PDF What it doesn't show is that they taper from 3.5mm diameter at base of shaft to 3.0mm diameter at top of shaft. If you get switches like this from another manufacturer, they should taper the same way, i.e. preferably be 3.0mm at top of shaft so there is a little gap when put in the 3.5mm hole in panel.
- “Industry Standard” 4×20 character LCD display, PCB dimensions 98mm x 60mm, mount holes 93.0mm x 55.0mm, bezel dimensions 39.3mm x 96.8mm x 9.0mm. For an example, see Crystalfontz Standard LCD modules http://www.crystalfontz.com/products/2004a/index.html. The PCB dimensions might be slightly different with other manufacturers, and the bezel dimensions can be +/-1mm without problems, but the mount hole dimensions must match exactly, if they do, this display is most likely meeting the “industry standard” so everything else will match as well.



- Note about PLED displays: My prototype MB-6582 used a PLED display. PLED displays look absolutely awesome, but some models have shorter lifespans and so all PLED displays were discontinued for that reason. **Therefore, I do not recommend people buy a PLED display.** You can mount the much thinner PLED display in the 10mm gap between the panel and control surface PCB, and use two extra PCBs mounted above and below the display, to mount 13x ALPS tactile switches, 7mm tall (ALPS part SKHHBVA010) and 8x 3mm LEDs. This option requires some extra wires soldered between the extra PCBs and the control surface PCB (it is obvious where they go, as the extra PCBs are just copies of the control surface PCB area underneath). This is how the prototype MB-6582 was constructed. If people really want to use a PLED display, they can contact me, as I can supply the extra PCBs and 7mm switches (and know where to get 4×20 PLEDs).
- 3mm LEDs, preferably bright ones. 64x LEDs for modulation matrix, 48x other CS LEDs on control surface, 1x LED for power on (mounts above power switch). Since all LEDs are in a 16×8 LED matrix, it is not advised to use different colours of LEDs that are powered by the same DOUT pin (through the same resistor) as the brightness will be different. See

mb-6582_cs_dout_wiring.pdf for LED wiring on the control surface. For example, if “SID 1” LED was red and “LFO 4” LED was green, most likely “SID 1” LED would be much brighter, since red LEDs are typically much brighter than green, on top of having a smaller voltage drop (so even a red and green with identical mcd value would have different brightness because they would receive different current due to different voltage drops across the current limiting resistor on the DOUT). However, you can use different LEDs in the mod matrix to the rest, as these use their own DOUT which is not shared with the other LEDs, so you are able to use different resistors in that DOUT to compensate for the different voltage drop. i.e. you can use red in the mod matrix, green elsewhere, and use higher resistor values before JD6 than the ones before JD7

- **NOTE on LEDs**: apparently some time after the original writing of this WIKI page, it has been discovered that blue, purple, and white LEDs (well anything with a large proportion of energy in the high frequency end of the spectrum) are hard to use, and possibly also bad for your eyes... While we're at it, apparently for best results you should be looking for tinted LEDs (not waterclear) with wide (60 degree? 100 degree?) viewing angles. Oh, and anything “high brightness” is out now. http://midibox.org/forums/index.php?/topic/12087-mb-6582-cs-leds-water-clear-or-tinted/page__hl__+white%20+led__st__40

- 15x Rotary Encoders. They are the ones that Voti sell http://www.voti.nl/winkel/p/SW-ROT.html, but I didn't get them from Voti, I got them direct from Electronics China, part number R162EC-BD1-24C Datasheet which have shaft length 20mm (L=20mm) and overall height of 26.5mm. If you look closely on the PCB, you'll see there's provision for smaller encoders with a different pinout, but they might not be the right height. The ones I use can be pulled apart and the detent removed, but leave the menu encoder detented for better handling of menus, patch changes etc. Other builders confirm that an “Alpha” brand rotary encoder (Mouser part #: 318-ENC160F-24P) is identical. **UPDATE: I now highly recommend the Bourns version of this encoder, (Mouser part #: 652-PEC16-4220FN0024), cheaper than the Alpha, very easy to turn, smooth feel, but still a good detent. It's what I ship in my other DIY kits.**

- 15x Knobs. I'm using the “Waldorf” knobs from ALBS.de (just like TK!) and these nicely cover the threaded bushings on the encoders that poke through above the panel by 1.5mm. These are the part numbers from http://www.albs.de:

863129	Drehknopf DK16-190V3 A.6/4,5 AT=14 schwarz soft-grau 1677498
863120	Drehknopf DK16-190V3 A.6/4,5 AT=14 schwarz soft-rot 3092
863118	Drehknopf DK16-190V3 A.6/4,5 AT=14 schwarz soft-weiß

Do not email ALBS.de and try to order just 15 knobs, they may ignore your email. There are bulk orders arranged on the MIDIbox forum for these knobs. If you missed out on a bulk order, start one of your own and get orders for at least 100 knobs before emailing ALBS.de.

- Case. The PT-10 from PacTec. If you want this control surface, there's no point using any other case. (Well, that's my opinion anyway. You don't have to use the PT-10 and it might be fun to see someone use this in a huge rackmount case, or in some other construction with wood endcheeks or something.)

- Fan. 40mm fan. The prototype used a fan removed from a Cooler Master Blue Ice Pro chipset fan. Other ones I built used standard black 40mm fans (i.e. intended for use in PC cooling). I suggest Performance-PCs.com as they have a good range of 40mm fans (with or without LEDs)

and you can get a 40mm fan grill at the same time. **Warning: 40mm fans with 20mm width are often very noisy.** I advise getting a quiet 10mm wide fan and running on 5 volts. The fan is mostly for making your MB-6582 look cool; a small airflow and vents cut on the right side are enough to stop the internals getting too hot.

- The panels to suit the PT-10 case are 1.5mm aluminium, and this thickness is required to make the switch shafts and rotary encoders poke through the panel the right amount.
- 50x 1N4148 small signal diodes.

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