Basic idea is to create **big** 7-segment displays using led-strip -modules like these

- http://dx.com/p/diy-5w-6000k-475-550lm-led-white-light-rectangle-strip-dc-12-14v-146071
- http://dx.com/p/diy-3w-3000k-285-315lm-cob-led-rectangle-strip-dc-12-14v-142034?item=21
- http://dx.com/p/2-5w-12x5050-smd-led-white-light-car-decoration-daytime-running-flexible-strip-lamp-12v-145721?item=71
- http://dx.com/p/24-led-car-flexible-bar-diy-led-auto-lamps-24cm-bar-length-113323?item=85
- http://dx.com/p/72w-soft-flexible-cuttable-white-300-led-smd-lamp-tape-strip-5m-dc-12v-126238?item=4 (probably best choice, not insanely bright and 5m gets us 10 digits if we use 7cm segments [7 digits for 10cm segments, which would be ~110ma per strip, much more manageable])

The 3+W ones will take pretty hefty transistors to drive them, the usual "500mA" darlington arrays cannot handle full current on all channels (500mA peak current on 7 channels is limited to 10% duty cycle), some discrete options (mosfets are better anyway):

- http://fi.rsdelivers.com/product/international-rectifier/irf8734pbf/mosfet-n-channel-30v-21a-hexfet-soic8/6886891.aspx
- http://fi.rsdelivers.com/product/vishay/si1912edh-t1-e3/mosfet-n-channel-20v-113a-sc-70-6/7103235.aspx
- http://fi.rsdelivers.com/product/on-semiconductor/mc1413dg/darlington-array-x7-npn-50v-05a-soic16/5164979.aspx (7ch, can handle ~150mA per channel when all are fully on)

Control/driver board

The dirver/control board itself will have:

- shift-register
- the driver-transistors for 7 segments and the last bit can be wired for single led driven directly from the reg (dot)
- +/- connectors for the led strips
- LED Power +/GND connectors (in this case 12V)
- 5V/GND connector for logic
- daisy-chaining connector for the shift-register, see for example: https://github.com/HelsinkiHacklab/reactor/blob/master/blueprints/shift_reg.brd
- Optionally it could also have an ATTIny to act as I2C interface to the shift-reg(s)
    - Or even ATMega88, in that case we would have both TWI and SPI in hardware so we could drive a lot of shift-registers very fast (think PWM for brightness control)

Due to size reasons (see below) SMD components are preferred.

Physical assembly

Made on layers from lasercut acrylic (except maybe the bottommost layer needs to be some sort of metal so we can spread the heat from the led-strips around a bit [and it wouldn't hurt to be able to sink heat from the driver transistors as well])

Bottom: thin square the size of the display, this is where the led-strips and control board mounts to.
Layer1: Thick (basically determined by control-board thickness, though if it becomes too thick or othetwise a problem the board can be mounted elsewhere) opaque black acrylic square with cutouts for the led strips and the control board

Layer2: thin translucent but diffuse square of colored acrylic to give color to the digits and diffuse the led-strips
Top: thing opaque cover plate, square with cutouts for the segments.

All of these layers will have at least 3 holes to a side to keep them together with screws.

We can cut the acrylic at the Aalto Fablab (our own lasercutter won't handle pieces this big)

Other ideas

Matrix display: http://kirjoitusalusta.fi/hacklab-ledmatrix7x31