

**LAPORAN RESMI
PRAKTIKUM 12 ARSITEKTUR KOMPUTER
“TEMPERATURE SENSOR LCD INTERFACING”**



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**PROGRAM STUDI SARJANA TERAPAN TEKNOLOGI REKAYASA INTERNET
DEPARTEMEN TEKNIK ELEKTRO
POLITEKNIK ELEKTRONIKA NEGERI SURABAYA
2021/2022**

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275 MOV CX,00FFH; Delay
276 Delay24:loop Delay24
277 MOV AL,0100B
278 MOV DX,PORTB
279 OUT DX,AL
280 MOV CX,00FFH; Delay
281 Delay25:loop Delay25
282 MOV AL,0110B
283 MOV DX,PORTB
284 OUT DX,AL
285 SUB BL,100011B
286 JMP XC
XB6:
287 MOV AL,'6'
288 MOV DX,PORTC
289 OUT DX,AL
290 MOV CX,00FFH; Delay
291 Delay26:loop Delay26
292 MOV AL,0110B
293 MOV DX,PORTB
294 OUT DX,AL
295 MOV CX,00FFH; Delay
296 Delay27:loop Delay27
297 MOV AL,0110B
298 MOV DX,PORTB
299 OUT DX,AL
300 SUB BL,11110B
301 JMP XC
XB5:
302 MOV AL,'5'
303 MOV DX,PORTC
304 OUT DX,AL
305 MOV CX,00FFH; Delay
306 Delay28:loop Delay28
307 MOV AL,0110B
308 MOV DX,PORTB
309 OUT DX,AL
310 MOV CX,00FFH; Delay
311 Delay29:loop Delay29
312 MOV AL,0110B
313 MOV DX,PORTB
314 OUT DX,AL
315 MOV CX,00FFH; Delay
316 Delay30:loop Delay30
317 MOV AL,0110B
318 MOV DX,PORTB
319 OUT DX,AL
320 SUB BL,11001B
321 JMP XC
XB4:
322 MOV AL,'4'
323 MOV DX,PORTC
324 OUT DX,AL
325 MOV CX,00FFH; Delay
326 Delay31:loop Delay31
327 MOV AL,0110B
328 MOV DX,PORTB
329 OUT DX,AL
330 SUB BL,1010B
331 JMP XC
332 Delay31:loop Delay31
333 MOV AL,0110B
334 MOV DX,PORTB
335 OUT DX,AL
336 SUB BL,10100B
337 JMP XC
XB3:
338 MOV AL,'3'
339 MOV DX,PORTC
340 OUT DX,AL
341 MOV CX,00FFH; Delay
342 Delay32:loop Delay32
343 MOV AL,0110B
344 MOV DX,PORTB
345 OUT DX,AL
346 MOV CX,00FFH; Delay
347 Delay33:loop Delay33
348 MOV AL,0110B
349 MOV DX,PORTB
350 OUT DX,AL
351 SUB BL,1111B
352 JMP XC
XB2:
353 MOV AL,'2'
354 MOV DX,PORTC
355 OUT DX,AL
356 MOV CX,00FFH; Delay
357 Delay34:loop Delay34
358 MOV AL,0110B
359 MOV DX,PORTB
360 OUT DX,AL
361 MOV CX,00FFH; Delay
362 Delay35:loop Delay35
363 MOV AL,0110B
364 MOV DX,PORTB
365 OUT DX,AL
366 MOV CX,00FFH; Delay
367 Delay36:loop Delay36
368 MOV AL,0110B
369 MOV DX,PORTB
370 OUT DX,AL
371 SUB BL,1010B
372 JMP XC
XB1:
373 MOV AL,'1'
374 MOV DX,PORTC
375 OUT DX,AL
376 MOV CX,00FFH; Delay
377 Delay37:loop Delay37
378 MOV AL,0110B
379 MOV DX,PORTB
380 OUT DX,AL
381 SUB BL,1010B
382 JMP XC
383 Delay37:loop Delay37
384 MOV AL,0110B
385 MOV DX,PORTB
386 OUT DX,AL
387 SUB BL,1010B
388 JMP XC
389 Delay38:loop Delay38
390 MOV AL,0110B
391 MOV DX,PORTB
392 OUT DX,AL
393 MOV CX,00FFH; Delay
394 Delay39:loop Delay39
395 MOV AL,0110B
396 MOV DX,PORTB
397 OUT DX,AL
398 MOV CX,00FFH; Delay
399 Delay40:loop Delay40
400 MOV AL,0110B
401 MOV DX,PORTB
402 OUT DX,AL
403 MOV CX,00FFH; Delay
404 Delay41:loop Delay41
405 MOV AL,0110B
406 MOV DX,PORTB
407 OUT DX,AL
408 MOV CX,00FFH; Delay
409 Delay42:loop Delay42
410 MOV AL,0110B
411 MOV DX,PORTB
412 OUT DX,AL
413 MOV CX,00FFH; Delay
414 Delay43:loop Delay43
415 MOV AL,0110B
416 MOV DX,PORTB
417 OUT DX,AL
418 MOV CX,00FFH; Delay
419 Delay44:loop Delay44
420 MOV AL,0110B
421 MOV DX,PORTB
422 OUT DX,AL
423 MOV CX,00FFH; Delay
424 Delay45:loop Delay45
425 MOV AL,0110B
426 MOV DX,PORTB
427 OUT DX,AL
428 MOV CX,00FFH; Delay
429 Delay46:loop Delay46
430 MOV AL,0110B
431 MOV DX,PORTB
432 OUT DX,AL
433 MOV CX,00FFH; Delay
434 Delay47:loop Delay47
435 MOV AL,0110B
436 MOV DX,PORTB
437 OUT DX,AL
438 MOV CX,00FFH; Delay
439 Delay48:loop Delay48
440 MOV AL,0110B
441 MOV DX,PORTB
442 OUT DX,AL
443 MOV CX,00FFH; Delay
444 Delay49:loop Delay49
445 MOV AL,0110B
446 MOV DX,PORTB
447 OUT DX,AL
448 MOV CX,00FFH; Delay
449 Delay50:loop Delay50
450 MOV AL,0110B
451 MOV DX,PORTB
452 OUT DX,AL
453 MOV CX,00FFH; Delay
454 Delay51:loop Delay51
455 MOV AL,0110B
456 MOV DX,PORTB
457 OUT DX,AL
458 MOV CX,00FFH; Delay
459 Delay52:loop Delay52
460 MOV AL,0110B
461 MOV DX,PORTB
462 OUT DX,AL
463 MOV CX,00FFH; Delay
464 Delay53:loop Delay53
465 MOV AL,0110B
466 MOV DX,PORTB
467 OUT DX,AL
468 MOV CX,00FFH; Delay
469 Delay54:loop Delay54
470 MOV AL,0110B
471 MOV DX,PORTB
472 OUT DX,AL
473 MOV CX,00FFH; Delay
474 Delay55:loop Delay55
475 MOV AL,0110B
476 MOV DX,PORTB
477 OUT DX,AL
478 MOV CX,00FFH; Delay
479 Delay56:loop Delay56
480 MOV AL,0110B
481 MOV DX,PORTB
482 OUT DX,AL
483 MOV CX,00FFH; Delay
484 Delay57:loop Delay57
485 MOV AL,0110B
486 MOV DX,PORTB
487 OUT DX,AL
488 MOV CX,00FFH; Delay
489 Delay58:loop Delay58
490 MOV AL,0110B
491 MOV DX,PORTB
492 OUT DX,AL
493 MOV CX,00FFH; Delay
494 Delay59:loop Delay59
495 MOV AL,0110B
496 MOV DX,PORTB
497 OUT DX,AL
498 MOV CX,00FFH; Delay
499 Delay60:loop Delay60
500 MOV AL,0110B
501 MOV DX,PORTB
502 OUT DX,AL
503 MOV CX,00FFH; Delay
504 Delay61:loop Delay61
505 MOV AL,0110B
506 MOV DX,PORTB
507 OUT DX,AL
508 MOV CX,00FFH; Delay
509 Delay62:loop Delay62
510 MOV AL,0110B
511 MOV DX,PORTB
512 OUT DX,AL
513 MOV CX,00FFH; Delay
514 Delay63:loop Delay63
515 MOV AL,0110B
516 MOV DX,PORTB
517 OUT DX,AL
518 MOV CX,00FFH; Delay
519 Delay64:loop Delay64
520 MOV AL,0110B
521 MOV DX,PORTB
522 OUT DX,AL
523 MOV CX,00FFH; Delay
524 Delay65:loop Delay65
525 MOV AL,0110B
526 MOV DX,PORTB
527 OUT DX,AL
528 MOV CX,00FFH; Delay
529 Delay66:loop Delay66
530 MOV AL,0110B
531 MOV DX,PORTB
532 OUT DX,AL
533 MOV CX,00FFH; Delay
534 Delay67:loop Delay67
535 MOV AL,0110B
536 MOV DX,PORTB
537 OUT DX,AL
538 MOV CX,00FFH; Delay
539 Delay68:loop Delay68
540 MOV AL,0110B
541 MOV DX,PORTB
542 OUT DX,AL
543 MOV CX,00FFH; Delay
544 Delay69:loop Delay69
545 MOV AL,0110B
546 MOV DX,PORTB
547 OUT DX,AL
548 MOV CX,00FFH; Delay
549 Delay70:loop Delay70
550 MOV AL,0110B
551 MOV DX,PORTB
552 OUT DX,AL
553 MOV CX,00FFH; Delay
554 Delay71:loop Delay71
555 MOV AL,0110B
556 MOV DX,PORTB
557 OUT DX,AL
558 MOV CX,00FFH; Delay
559 Delay72:loop Delay72
560 MOV AL,0110B
561 MOV DX,PORTB
562 OUT DX,AL
563 MOV CX,00FFH; Delay
564 Delay73:loop Delay73
565 MOV AL,0110B
566 MOV DX,PORTB
567 OUT DX,AL
568 MOV CX,00FFH; Delay
569 Delay74:loop Delay74
570 MOV AL,0110B
571 MOV DX,PORTB
572 OUT DX,AL
573 MOV CX,00FFH; Delay
574 Delay75:loop Delay75
575 MOV AL,0110B
576 MOV DX,PORTB
577 OUT DX,AL
578 MOV CX,00FFH; Delay
579 Delay76:loop Delay76
580 MOV AL,0110B
581 MOV DX,PORTB
582 OUT DX,AL
583 MOV CX,00FFH; Delay
584 Delay77:loop Delay77
585 MOV AL,0110B
586 MOV DX,PORTB
587 OUT DX,AL
588 MOV CX,00FFH; Delay
589 Delay78:loop Delay78
590 MOV AL,0110B
591 MOV DX,PORTB
592 OUT DX,AL
593 MOV CX,00FFH; Delay
594 Delay79:loop Delay79
595 MOV AL,0110B
596 MOV DX,PORTB
597 OUT DX,AL
598 MOV CX,00FFH; Delay
599 Delay80:loop Delay80
600 MOV AL,0110B
601 MOV DX,PORTB
602 OUT DX,AL
603 JMP XR
CODE ENDS
END
```

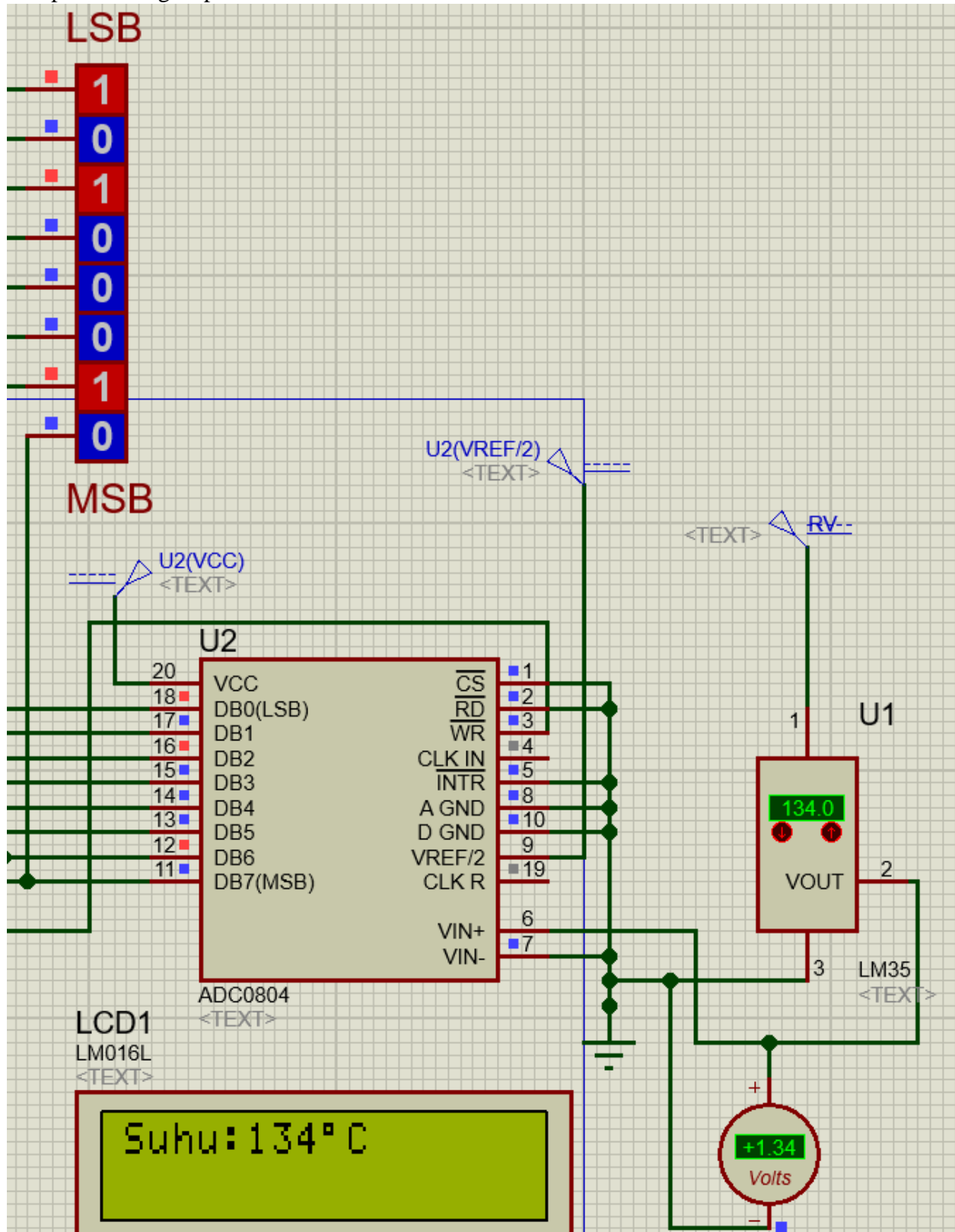
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546 OUT DX,AL
547 MOV AL,10H
548 MOV DX,PORTC
549 OUT DX,AL
550 MOV CX,00FFH; Delay
551 DelayX3:loop DelayX3
552 MOV AL,1000B
553 MOV DX,PORTB
554 OUT DX,AL
555 MOV CX,00FFH; Delay
556 DelayX4:loop DelayX4
557 MOV AL,000H
558 MOV DX,PORTB
559 OUT DX,AL
560 MOV AL,10H
561 MOV DX,PORTC
562 OUT DX,AL
563 MOV CX,00FFH; Delay
564 DelayX5:loop DelayX5
565 MOV AL,1000B
566 MOV DX,PORTB
567 OUT DX,AL
568 MOV CX,00FFH; Delay
569 DelayX6:loop DelayX6
570 MOV AL,000H
571 MOV DX,PORTB
572 OUT DX,AL
573 MOV AL,10H
574 MOV DX,PORTC
575 OUT DX,AL
576 MOV CX,00FFH; Delay
577 DelayX7:loop DelayX7
578 MOV AL,1000B
579 MOV DX,PORTB
580 OUT DX,AL
581 MOV CX,00FFH; Delay
582 DelayX8:loop DelayX8
583 MOV AL,000H
584 MOV DX,PORTB
585 OUT DX,AL
586 MOV AL,10H
587 MOV DX,PORTC
588 OUT DX,AL
589 MOV CX,00FFH; Delay
590 DelayX9:loop DelayX9
591 MOV AL,1000B
592 MOV DX,PORTB
593 OUT DX,AL
594 MOV CX,00FFH; Delay
595 DelayX10:loop DelayX10
596 MOV AL,000H
597 MOV DX,PORTB
598 OUT DX,AL
599 JMP XR
CODE ENDS
END
```

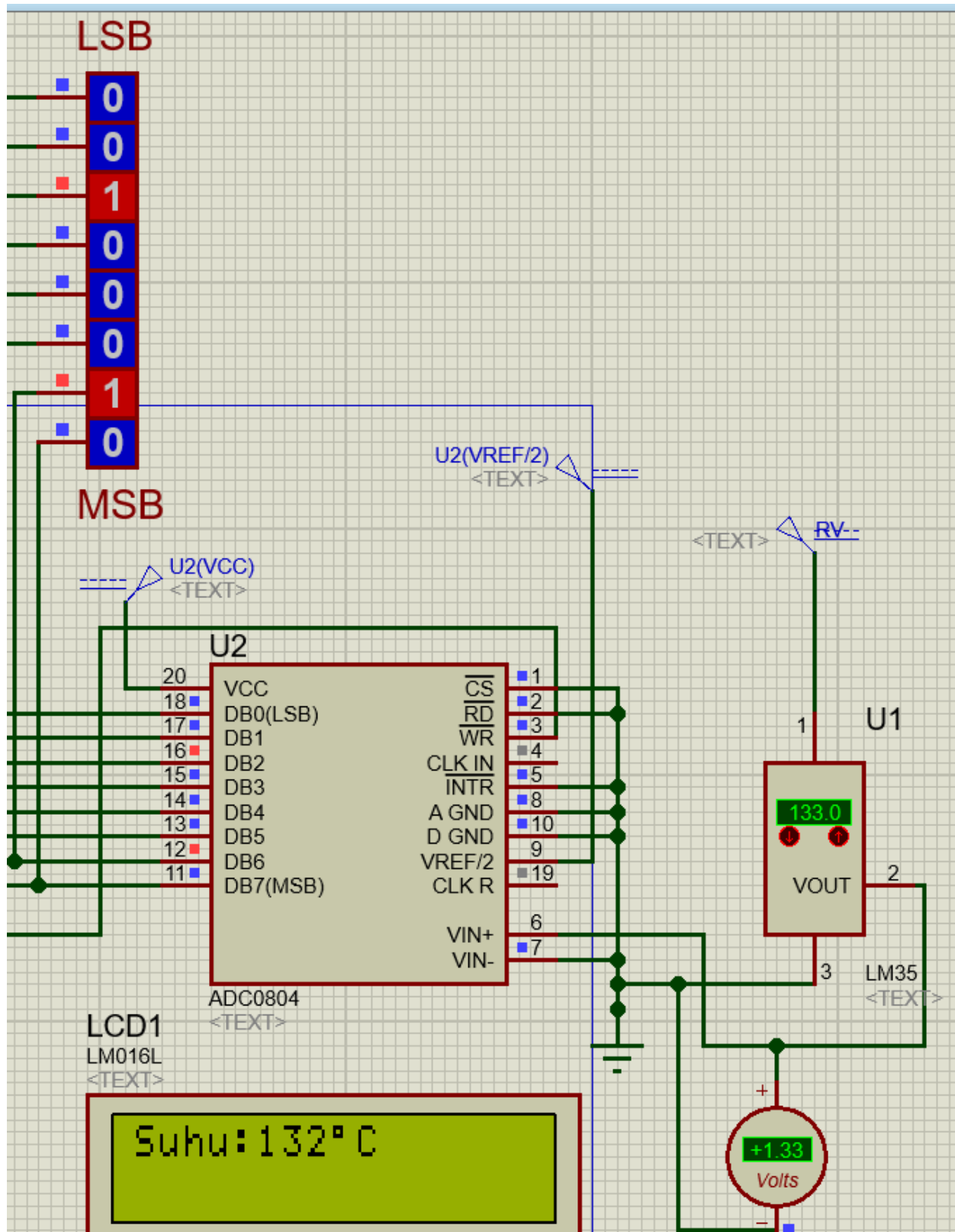
(600an baris pak hehe)

3. Hasil

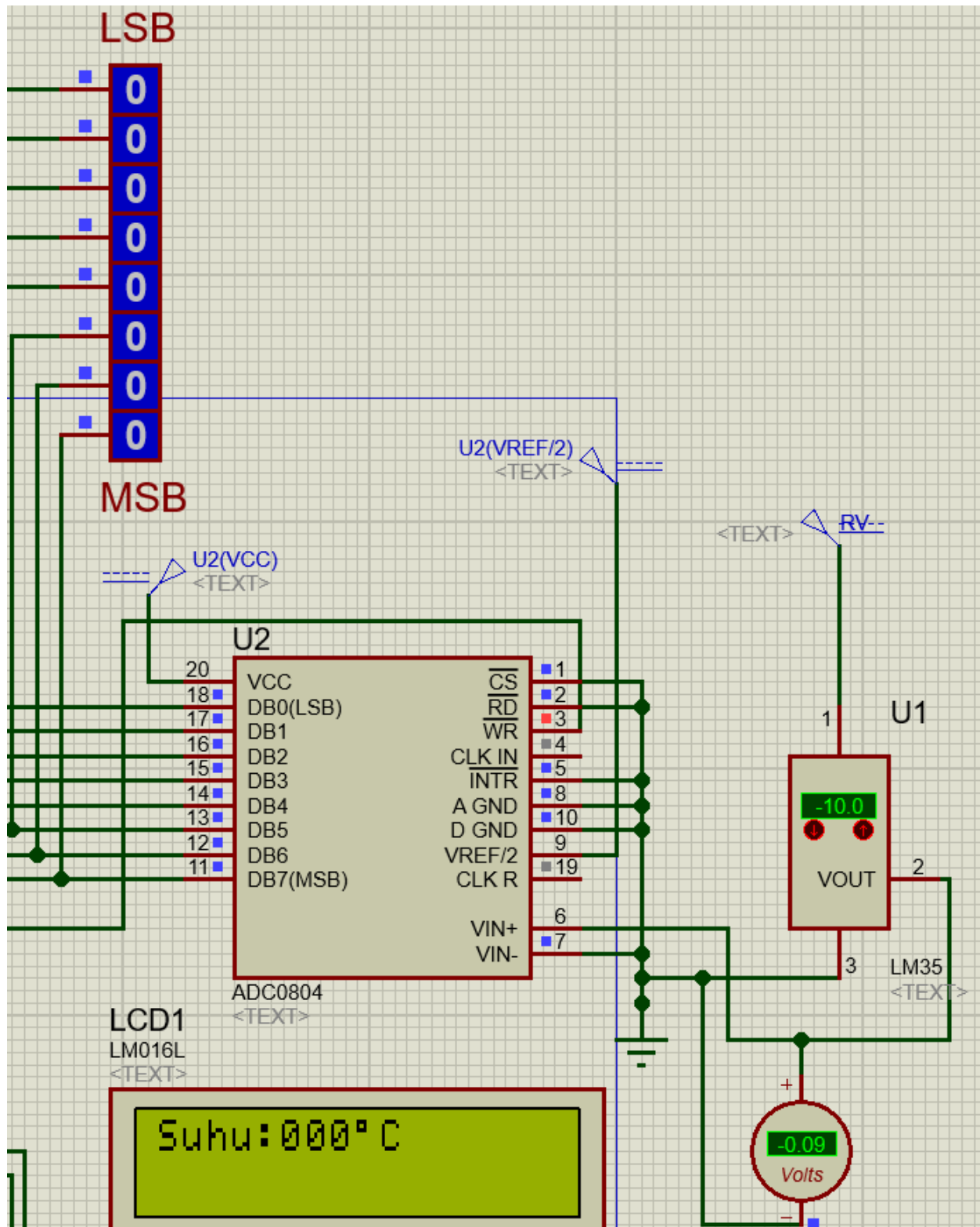
Tampilan suhu genap:



Tampilan suhu ganjil:



Tampilan suhu negative:



3.2 Analisa Praktikum

Pada percobaan kali ini, kita membuat rangkaian interfacing LCD untuk sensor suhu, dengan menggunakan perangkat lm35 sebagai sensor yang mengubah sinyal analog suhu menjadi sinyal analog listrik, kemudian kita sambungkan dengan ADC untuk mengkonversi dari sinyal analog listrik ke sinyal digital, yang kemudian dari sinyal digital itu kita olah sedemikian rupa dengan assembly 8086 untuk menjadi tampilan LCD. Dengan menggunakan VREF 5V, dan nilai V maks dari lm35 adalah 1.5V, serta nilai maks dari 8 bits output ADC (256 step), kita dapatkan nilai step sebesar sekitar 76,5. Dari nilai step tersebut, saya mengonversi menjadi tampilan lcd dengan seleksi substraksi ratusan, puluhan dan satuan. Kelemahan dari rangkaian saya ini adalah hanya menunjukkan nilai kelipatan 2, karena 1 step bernilai sekitar 1,96 Volt, jadi saya bulatkan, serta tidak dapat menampilkan hasil suhu dibawah 0, karena sinyal dari ADC akan tetap 0000 0000 setelah suhu melewati 0 derajat.

3.3 Kesimpulan

1. Kita mempelajari tentang Interfacing LCD sensor suhu
2. Kita belajar tentang konversi sinyal analog ke digital