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LABORATORY MANUAL
2019-2020

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Contents

Appendix B

Laboratory Equipment

Each lab station is set up to accomodate two people at one time and should have the following equipment (or its equivalent):

1. Oscilloscope (min. of Tektronix TDS-1002, dual channel, 60 MHz, digital storage, 2 GS/s)
2. Function generator (sine, square and triangle waves, 0 to 2 MHz, B&K 3022)
3. Two variable power supplies (0 to ±15 volts, about 250 mAmp)
4. Solderless breadboard for circuit assembly
5. Assorted 1/4 Watt resistors (10 Ohms to 10 MegOhms)
6. Assorted capacitors (10 pfd to 220 μF)
7. Assorted wire (solid 22 guage, BNC cables), and tools (needle nose pliers, wire cutter, wire striper, and small screwdriver for scope probe adjustments)
8. Computer with data acquisition board with digital I/O, DAC, ADC (Nat. Instr. USB-6008) and C++ compiler.
9. Other semiconductor components (transistors, diodes, integrated circuits, etc.) obtained as needed (some listed below).

   op-amps: 741, 3140

   instrumentation amplifier: AD622

   diodes: 1N914 (signal), 1N4007 (power), 1N4735 (zener)

   transistors: 2N3906 (NPN), 2N3906 (PNP), 2N7000 (n-chan. MOSFET)

   high speed CMOS: 74HC00 (NAND), 74HC02 (NOR), 74HC04 (inverter), 74HC08 (AND), 74HC14 (Schmit trigger inverter), 74HC32 (OR), 74HC74 (D flip flop), 74HC86 (XOR), 74HC161 (4 bit synch. counter), 74HC164 (8 bit par. out shift reg), 74HC194 (4 bit shift left/right), 74HC221 (dual one-shot), 74HC240 (octal 3-state invert. buffer) 74HC283 (4 bit adder), 74HC4066 (quad analog switch)

Misc.: 6.3VAC CT transformer, 555 (timer), 7-segment LED display, 40kHz acoustic transducer, small radio and audio speaker

Appendix C

Manufacturers and Distributors

Electronics components, from discrete components like resistors and capacitors to sophisticated integrated circuits are manufactured by a variety of different companies. However, in most cases, you do not buy the components directly form the manufactures. Instead you purchase the components from a distributor. Distributors range from large scale industrial suppliers who will only sell components in large quantities to other companies to small mail order companies that will sell small quantities of components to individuals.

In most cases you must get the specifications for the components and decide want you want before contacting the distributor. This information is available in the form of data books from the manufacturer (discussed more in chapter 2) or in many cases can be found on web sites set up by the manufacturers (a general listing of different IC'c can be found at www.chipcenter.com). Some manufacturers web sites are listed in table C.1 (this is NOT a recommendation for or against any particular manufactures, but only a list of some sources of information). You may find the specifications for many types of electronics components on these sites.

Most distributors now have their whole catalogs on-line for easy access. Some distributors that will sell small quantities to individuals and their web sites are listed in table C.2 (again this is NOT a recommendation for or against any particular supplies, but only a list of some that are available):

There are also several companies that produce software for computer aided design of electronic circuits. Some of these companies are listed in table C.3. These programs can be useful for analyzing complicated electronic circuits. Some of these companies offer free downloads of limited-use evaluation

AMD:	www.amd.com
Analog Devices:	www.analog.com
NXP:	www.nxp.com
Intel:	www.intel.com
Renesas (Intersil):	www.renesas.com
On Semiconductor:	www.onsemi.com
Texas Instruments;	www.ti.com

Table C.1: Some Manufactures

Arrow:	www.arrow.com
Digi-Key:	www.digikey.com
Jameco:	www.jameco.com
JDR:	www.jdr.com
Mouser Electronics:	www.mouser.com
Newark:	www.newark.com

Table C.2: Some Distributors

Circuit Maker:	www.circuitmaker.com
Electronic Workbench:	www.electronicsworkbench.com
LTspice	www.linear.com/designtools/software
Spectrum Software:	www.spectrum-soft.com
OrCad	www.orcad.com
Spice	bwrc.eecs.berkeley.edu/Classes/IcBook/SPICE/

Table C.3: Some electronics CAD companies.

or student versions. Again this list is not a recommendation for or against any particular company but just a list of some things that are available.

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Index

UG-01080 2020.06.02 To HSSI Pins. Native Transceiver PHYs. Each device family, beginning with Series V devices offers a separate Native PHY IP core to provide low-level access to the hardware.Â Introduction to the Protocol-Specific and Native Transceiver PHYs Send Feedback. UG-01080 2020.06.02. Figure 1-2: Stratix V Transceiver Native PHY IP Core. Native Transceiver PHYs. ATTENTION Please read this instruction manual carefully before installing and operating the instrument. Not following the guidelines could result in personal injury and/or damage to the equipment. BRONKHORSTÂ®. Disclaimer. The information in this manual has been reviewed and is believed to be wholly reliable. No responsibility, however, is assumed for inaccuracies. The material in this manual is for information purposes only.Â Hook-up diagram laboratory-style MBC RS232 + analog Hook-up diagram industrial style MBC-II RS232 + analog Hook-up diagram CORI-FLOW RS232 + analog Hook-up diagram LIQUI-FLOW L30 digital RS232 + analog. (document nr. 9.16.062) (document nr. 2College of Physics and Electronic Engineering, Hengyang Normal University, Hengyang 421002, China 3Department of Physics, Key Laboratory for Low-Dimensional Structures and Quantum Manipulation (Ministry of Education), and Synergetic Innovation Center for Quantum Eects and Applications of Hunan, Hunan Normal University, Changsha 410081, China.Â [3] F. Xia, H. Wang, J. C. M. Hwang, A. H. Castro, and L. Yang, Black phosphorus and its isoelectronic materials, Nat. Rev. Phys. 1, 306 (2019). [4] A. Molle, J. Goldberger, M. Houssa, Y. Xu, S.-C. Zhang, and D. Akinwande, Buckled two-dimensional Xene sheets, Nat. Mater. DEA laboratories provide advisory, scientific and technical services to DEA, federal law enforcement, intelligence operations, and the criminal justice system at large. Each laboratory serves geographic area defined by SF (Exhibit 1/7001). Policy statements within the Laboratory Operations Manual (LOM) are mandatory requirements. The word â€˜shouldâ€™ within a statement signifies a best-practice, or recommendation. The word â€˜mayâ€™ in a statement provides permission that does not require additional authorization. The : future : laboratory. : : : nespresso professional : w orkplace futures. : Part One: Foresight Overview : 2 : Part Two: The Fluid Workforce : 4 : New Bricolage Living : The Optimised Self : Post-growth Society : The Focus Filter Part Three: Workplace Futures : 10 Workplace 2030: The Communal Workplace : Hospitality Ethos : Multimodal Design : Resilience Culture : Civic Purpose Part Four: Conclusion : 24.