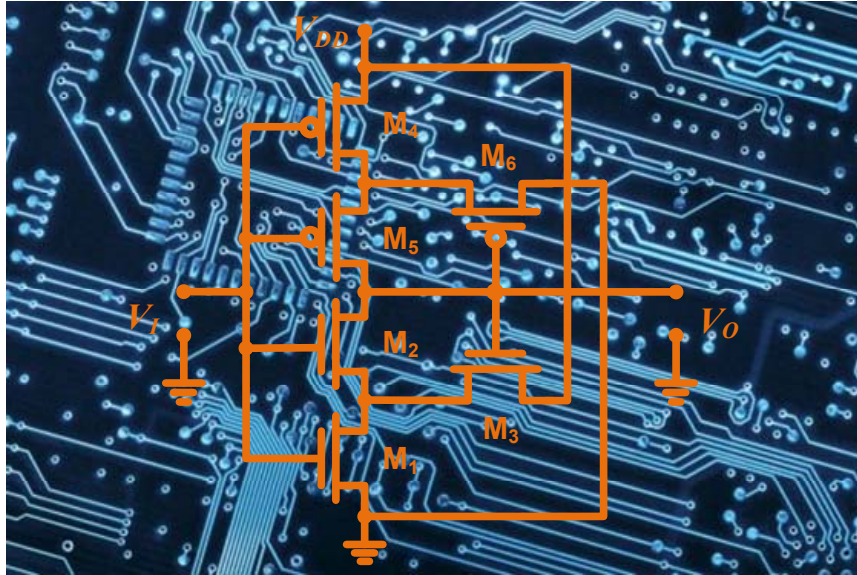


Laboratory Manual for Electronic Circuits 3

Experiments in Electronics Fundamentals



2018-Adana

Çukurova University

Murat AKSOY - Bülent Büyükgüzel - Zehan Kesilmiş - A. Özgür Polat



AKADEMİSYEN
KITABEVI

© Copyright 2018

Bu kitabın, basım, yayın ve satış hakları Akademişyen Kitabevi A.Ş.'ne aittir. Anılan kuruluşun izni alınmadan kitabın tümü ya da bölümleri mekanik, elektronik, fotokopi, manyetik kağıt ve/veya başka yöntemlerle çoğaltılamaz, basılamaz, dağıtılamaz. Tablo, şekil ve grafikler izin alınmadan, ticari amaçlı kullanılamaz. Bu kitap T.C. Kültür Bakanlığı bandrolü ile satılmaktadır.

ISBN 978-605-258-086-8 **Sayfa ve Kapak Tasarımı** Akademişyen Dizgi Ünitesi

Kitap Adı Laboratory Manual for Electronic Circuits - 3 **Yayıncı Sertifika No** 47518

Yazar Murat AKSOY **Baskı ve Cilt** Sonçağ Matbaacılık

Yayın Koordinatörü Yasin Dilmen **DOI** 10.37609/akya.1364

GENEL DAĞITIM
Akademişyen Kitabevi A.Ş.

Halk Sokak 5 / A
Yenişehir / Ankara
Tel: 0312 431 16 33
siparis@akademisyen.com

www.akademisyen.com

Preface

This section of laboratory manual is prepared for the students taking the electronic circuit course which is EEE328 Digital Electronics, offered in the Electrical and Electronics Engineering Department at Çukurova University. The content covers the course materials taught in the department. The manual is mainly intended to verify theory taught in the electronic courses in the laboratory.

This manual is divided into two parts as follows:

Section 1 introduces the laboratory rules.

Section 2 is devoted to experiments involving the digital electronic circuits which are taught in EEE328. It contains eight experiments, and it starts with logic voltage level of gates. The following three experiments are subjected on basic gates (RTL, DTL, TTL, MOS) and its characteristics. The last four experiments are subjected on multivibrator circuits such as bistable, monostable, and astable.

Each experiment contains the following parts:

Objective: The purpose of the experiment is given.

Theory: The complementary information about the theory related to the experiment.

Preliminary: Detailed analysis of the experiment and should be completed before coming to the laboratory.

Experimental Procedure: Containing a relatively structured set of steps for performing the experiment.

Conclusion: This section is included for the evaluation of the differences between the theoretical and experimental results.

Equipment List: Lists of components and standard equipments which DMM, Oscilloscope, signal generator, and a prototyping board.

Appendix includes the data sheets for the components used in the experiments.

July 2018, Adana

Assist. Prof. Dr. Murat AKSOY

Contents

SECTION 1	7
1. GENERAL LABORATORY RULES	7
SECTION 2	9
DIGITAL ELECTRONIC CIRCUITS	9
EXPERIMENT 1	10
LOGIC VOLTAGE LEVELS OF LOGIC GATES	10
EXPERIMENT 2	16
DTL AND TTL LOGIC GATES	16
EXPERIMENT 3	23
NMOS AND CMOS INVERTERS	23
EXPERIMENT 4	32
CMOS TRANSMISSION GATE	32
EXPERIMENT 5	38
SCHMITT TRIGGER	38
EXPERIMENT 6	46
ASTABLE MULTIVIBRATORS	46
EXPERIMENT 7	58
MONOSTABLE MULTIVIBRATORS	58
EXPERIMENT 8	68
THE 555 TIMER	68
REFERENCES	75
MANUFACTURERS' DATA SHEETS	76

References

1. D. A. Neamen, Microelectronics: Circuit Analysis and Design, McGraw Hill International Edition, 2007
2. R. C. Jaeger, Microelectronic Circuit Design, McGraw Hill, International Edition, 1997
3. A. S. Sedra, K. C. Smith, Microelectronic Circuits, Oxford University Press, 1998
4. D.A. Bell, Laboratory Manual for Electronic Devices and Circuits, David A. Bell P.O. Box 22003, Canada,2001
5. D. Buchla, Experiments in Electronics Fundamentals and Electric Circuit Fundamentals, Prentice Hall, 1998
6. M. Köksal, Ş. Ç. Bayram, S. Mamiş, M.Aksoy, H. Selçuk, Circuit Analysis Laboratory Manual, University of Gaziantep, 1992
7. M. Aksoy, Ö. Ünal, Electronis A- Text Lab Manual, Çukurova University, 2001
8. J. Keown, PSpice and Circuit Anaysis, Macmillan, 1994