Electronics for Model Railways

By Davy Dick

Introduction

Unless you are running an antique clockwork train set or have a large outdoor layout running steam trains, you are already using electrical and electronic equipment. For most railway modellers, power is supplied to the loco's motor through the track. With the help of electronics, our layouts can be further improved. How about control of points, signals, lights, turntables, crossing gates and barriers, uncouplers, sound effects – and much more.

We can even detect where trains are on our layouts or automate activities, with or without computers.

At first sight, this may seem complicated – but layout wiring and controls often consist of lots of little individual circuits, each carrying out its own function (e.g. switching a point or lighting an LED).

The chapters try to look at each issue and show how they fit together.

If you like, you can read through from start to finish. However, it is not meant to Be read as a book. If you are new to electronics, this book covers a lot of ground. You are not meant to understand it all after just a guick read through.

You will also find that you already know some parts – and are not currently interested in other parts.

I would suggest that everyone have a read of the first chapter – even if you think you already know all the basics.

Also, as you are working with a hot soldering iron, knives and cutters, drills and so on, be aware of safety at all times.

In particular, please read the safety notes on page 50 of Part A and page 72 of Part B. Hopefully, there is something of interest in here for all railway modellers.

Davy Díck

Model Electronic Railway Group member 1853

Electronics for Model Railways – Part A

© 2014 by David Dick

All rights reserved under the Attribution-Non-Commercial-NoDerivatives Licence.

This book may be freely copied and distributed but may not be changed or added to without prior written permission of the author.

This book is free and its material may not be used for commercial purposes.

This book is issued as, without any warranty of any kind, either express or implied, respecting the contents of this book, including but not limited to implied warranties for the book's quality, performance, or fitness for any particular purpose.

Neither the author or distributors shall be liable to the reader or any person or entity with respect to any liability, loss or damage caused or alleged to be caused directly or indirectly by this book. All trade names and product names are the property of their owners.

Electronics for Model Railways – Part B

© 2014 by David Dick

All rights reserved.

This book is not covered by the CLA licence.

No part of this document may be reproduced or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission of the author. This book is issued as, without any warranty of any kind, either express or implied, respecting the contents of this book, including but not limited to implied warranties for the book's quality, performance, or fitness for any particular purpose.

Neither the author or distributors shall be liable to the reader or any person or entity with respect to any liability, loss or damage caused or alleged to be caused directly or indirectly by this book.

Contents [each part is page-numbered from 1]

Part A

Chapter 1 – Basic electronics	. 6
Chapter 2 – Loco controllers	35
Chapter 3 – Layout wiring	
Chapter 4 – Track wiring	60
Chapter 5 – Voltage problems	78
Chapter 6 – Point wiring	
Chapter 7 - Point motors & servos	
Chapter 8 – Scenic lighting	
Chapter 9 – Coach lighting	
Chapter 10 - Adding sound	
Chapter 11 - Track occupancy detectors .	184
Chapter 12 – R F I D	202
Chapter 13 – Digital Command Control	212
Chapter 14 – CBUS	240

Part B

Chapter 15 – Transistors, ICs & PICs 5)
Chapter 16 - Interfacing techniques16)
Chapter 17 - Computers & model railways . 37	
Chapter 18 – Assembling a tool kit)
Chapter 19 – Soldering	2
Chapter 20 – Using test equipment 108	3
Chapter 21 - Pocket Money Projects 130)
Chapter 22 – Abbreviations & Acronyms 194	1
Appendix - M E R G 200)
The Model Electronic Railway Group	

Electronics for Model Railways

Version: v1 - December 2014

Distributed with MERG Journal 2014 No.4

CD identity: EfMR_v1_MERG_CD

Data compact disk, CDFS file system, two files:

Part_A_v1.pdf 257 pages - size: 19,924 kb

Part_B_v1.pdf 206 pages - size: 25,520 kb Total: 44.4 Mb