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# **28-PIN LIN DEMO BOARD USER'S GUIDE**

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# 28-PIN LIN DEMO BOARD USER'S GUIDE

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## Table of Contents

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### Chapter 1. 28-Pin LIN Demo Board Overview

1.1 Introduction .....	4
1.2 Highlights .....	4
1.3 28-Pin LIN Demo Board Supported Devices .....	4
1.4 28-Pin LIN Demo Board Overview .....	5
1.5 Running the Default Demonstration .....	5

### Appendix A. Hardware Schematics

A.1 Introduction .....	7
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<b>Worldwide Sales and Service .....</b>	<b>10</b>
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## Chapter 1. 28-Pin LIN Demo Board Overview

### 1.1 INTRODUCTION

The 28-Pin LIN Demo Board is a small and simple demonstration PCB for Microchip's 28-pin Dual Inline Package (DIP) PIC<sup>®</sup> Microcontroller Units (MCU). It is populated with a PIC16F886 MCU, a MCP2021 LIN Transceiver with voltage regulator, four LEDs, 2 push buttons and a potentiometer. The demo board has several test points to access the I/O pins of the MCU and a generous prototyping area. The MCU can be programmed with the PICkit<sup>™</sup> 2 Microcontroller Programmer or the MPLAB<sup>®</sup> ICD 2 using the RJ-11 to 6-pin inline adapter (AC164110).

### 1.2 HIGHLIGHTS

This chapter discusses:

- 28-Pin LIN Demo Board Supported Devices
- The 28-Pin LIN Demo Board Overview
- Running the Default Demonstration

### 1.3 28-PIN LIN DEMO BOARD SUPPORTED DEVICES

The 28-Pin LIN Demo Board can be used with virtually any 28-pin Dual Inline Package (DIP) PIC MCU. The assembled 28-Pin LIN Demo Board is populated with a PIC16F886-I/P microcontroller.

Additional 28-Pin LIN Demo Boards can be ordered from Microchip Technology and distributors. Part number, DM164120-3, comes with one assembled and two blank 28-Pin LIN Demo Boards. The blank demo board can be used for evaluating or prototyping circuits using any of the 28-pin devices listed below.

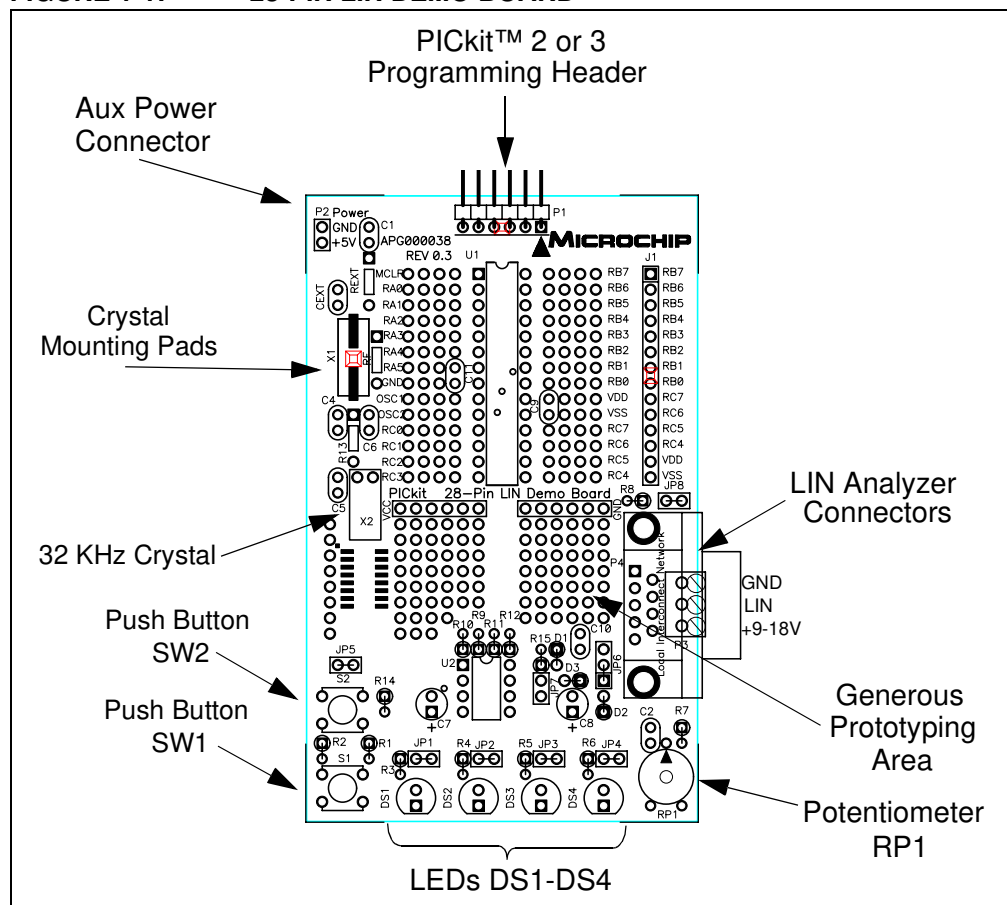
PIC16CR63	PIC16F913	PIC18F2510
PIC16CR76	PIC16F916	PIC18F2520
PIC16C63A		PIC18F2515
PIC16C745		PIC18F2523
PIC16C773	PIC18F2220	PIC18F2525
	PIC18F2221	PIC18F2550
PIC16F737	PIC18F2320	PIC18F2580
PIC16F767	PIC18F2321	PIC18F2585
PIC16F870	PIC18F2331	PIC18F2610
PIC16F872	PIC18F2410	PIC18F2620
PIC16F873A	PIC18F2420	PIC18F2680
PIC16F876A	PIC18F2423	PIC18F2682
PIC16F882	PIC18F2431	PIC18F2685
PIC16F883	PIC18F2450	PIC18F24J10
PIC16F886	PIC18F2455	PIC18F25J10
	PIC18F2480	

# 28-Pin LIN Demo Board Overview

## 1.4 28-PIN LIN DEMO BOARD OVERVIEW

The 28-Pin LIN Demo Board is populated with a PIC16F886 MCU (U1), a MCP2021 LIN Transceiver with Voltage Regulator (U2), four LEDs (DS1-DS4), Two push buttons (SW1 and SW2), 32 KHz crystal (X2) and potentiometer (RP1). The board layout is shown in Figure 1-1. The demo board has several test points to access the I/O pins of the MCU and a generous prototyping area. The MCU can be programmed with the PICKit™ 2 Microcontroller Programmer from header P1.

FIGURE 1-1: 28-PIN LIN DEMO BOARD



## 1.5 RUNNING THE DEFAULT DEMONSTRATION

The assembled 28-Pin LIN Demo Board comes preprogrammed with a demonstration program. To use this program, power the demo board (9.0-18.0 Vdc) using a LIN Network Analyzer and/or a bench power supply connected to header P3 or P4. To use the PICKit™ 2 Microcontroller Programmer, connect it to a PC USB port using the USB cable. The demo board will blink the LEDs in the Reset pattern. The Reset pattern consists of three different LED blink patterns. First, the LEDs will “ping pong” (LED1, 2, 3 and 4, then LED 4, 3, 2 and 1). Second, the LEDs will blink on and off in unison. Third, the LEDs will perform the ADC display where values 0x0A, 0x0D and 0x0C display in sequence followed by the Most Significant 4 bits of the ADC result measuring channel 1, which is the on-board potentiometer. After this sequence, the EAUSART is initialized for LIN communication.

Sending an ID of 0x2F will request a four-byte data response as follows:

Data byte 1 = ADC result

# 28-Pin LIN Demo Board User's Guide

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Data byte 2 = (bit 5 = SW1, bit 4 = SW2, bit 3:0 LEDS)

Data byte 3 = 0 (not used)

Data byte 4 = 0 (not used)



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## Appendix A. Hardware Schematics

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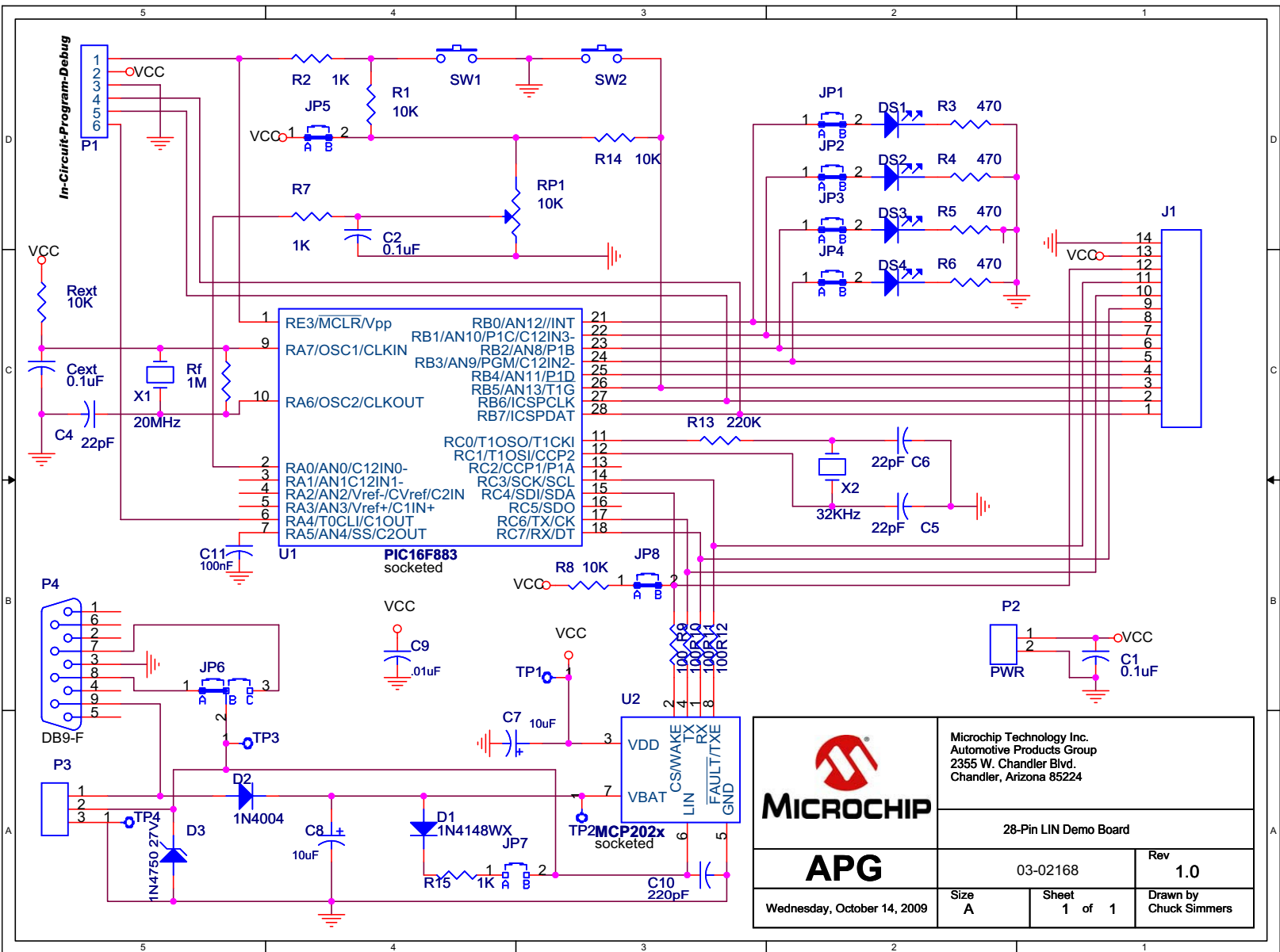
### A.1 INTRODUCTION


This appendix contains the 28-Pin LIN Demo Board schematic and Bill of Materials.



# 28-Pin LIN Demo Board User's Guide

## A.1.1 Schematic Diagram



 <b>MICROCHIP</b>		Microchip Technology Inc. Automotive Products Group 2355 W. Chandler Blvd. Chandler, Arizona 85224	
		28-Pin LIN Demo Board	
<b>APG</b>		03-02168	Rev 1.0
Wednesday, October 14, 2009	Size A	Sheet 1 of 1	Drawn by Chuck Simmers

## A.1.2 Bill of Materials

Bill of Materials		
Designation	Qty	Description
C1, C2	2	Capacitor, Ceramic, 0.1 $\mu$ F, 5%, X7R
C5, C6	2	Capacitor, Ceramic, 22 pF, 50V, C0G
C7, C8	2	Capacitor, Tantalum, 10 $\mu$ F, 5%, 35V
C9	1	Capacitor, Ceramic, 0.01 $\mu$ F, 5%, X7R
C10	1	Capacitor, Ceramic, 220 pF, 50V, C0G
R3-R6	4	Resistor, 470 $\Omega$ , 5%, 1/8W
R2, R7	2	Resistor, 1 k $\Omega$ , 5%, 1/8W
R1, R8, R14, R15	4	Resistor, 10 k $\Omega$ , 5%, 1/8W
R9-R12	2	Resistor 100 $\Omega$ , 5%, 1/8W
R13	1	Resistor 220 k $\Omega$ , 5%, 1/8W
RP1	1	Potentiometer 10 k $\Omega$ , thumbwheel
DS1-DS4	4	LED, T1-3/4, 5mm
D1	1	1N4750, 27V, Zener diode
D2	1	1N4004, diode
D3	1	1N4148, diode
SW1	1	Switch, push button, momentary
U1 – Microcontroller	1	28-pin PIC <sup>®</sup> MCU
U2 - LIN Transceiver	1	MCP2021-500E/P
P1	1	Connector, header, right-angle, 6-pin, 0.100" spacing, 0.025"
P4	1	D-SUB 9-pin female
JP1:5, JP7:JP8	7	Connector, header, 2-pin, 0.100" spacing, 0.025" square
JP6	1	Connector, header, 3-pin, 0.100" spacing, 0.025" square
Rubber Feet	4	Bumpon square, 0.40 x 0.10, black
X2	1	Crystal, tuning fork, cylinder, 12.5 pF
J1	1	Connector, receptacle 1x14-pin



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