INSERT PICTURES HERE

Description

The VIVA board is a hardware platform designed specifically for students and beginners to learn and experiment with microcontroller-based systems. It is equipped with two (2) microcontrollers and comes with various built-in peripherals and features that make it easier for students to start their journey in embedded systems and programming. If the Arduino bootloader is programmed onto the ATmega328, the ATMEL microcontroller is compatible with many Arduino sketches.

Features

- Microcontrollers: 8-bit, RISC
  - PIC: PIC16F1829
  - ATMEL: ATmega328
- Hello World! LEDs
- Programming interfaces: JTAG, and ICSP
- Capacitance keypad: UTSA letters
- Buttons: reset and interrupt signals
- Pin breakouts: 0.1” (2.54 mm) pin headers
- Communication bus: I2C
- USB-to-UART modules: CP2102
- OLED module: I2C
- Prototyping area: 0.1” pitch, plated through holes
- VDD selector: 3.3V or 5.0V

Applications

- Learning Embedded Systems
- Programming Practice
- Experimentation and Prototyping
- Understanding Peripherals
- Project Building
- Debugging and Troubleshooting
- Educational Resources
- Cross-Platform Compatibility
- Preparing for Industry

REV.	REVISION NOTE	DATE
v1	INITIAL RELEASE	AUG.2014
v2	ADDED PROTOTYPING AREA	JAN.2015
v3	ADDED HIGH-SIDE TRANSISTOR SWITCH. ADDED ABC CAP TOUCH BUTTONS.	AUG.2015
v4	CONVERTED TO SURFACEMOUNT. REPLACED ABC WITH UTSA.	AUG.2018
v5	EXPANDED TO 100 x 100 mm. ADDED ATmega328P.	JAN.2022

v5.1, JAN.2022

EXPANDED TO 100 x 100 mm
ADDED ATmega328P
REMOVED HIGH-SIDE TRANSISTOR SWITCH

v5.2, MAY.2022

ADDED ATMEGA BUTTON
CHANGED OLED DISPLAY
ADDED DTR CAPACITOR

v5.3, JUNE.2023

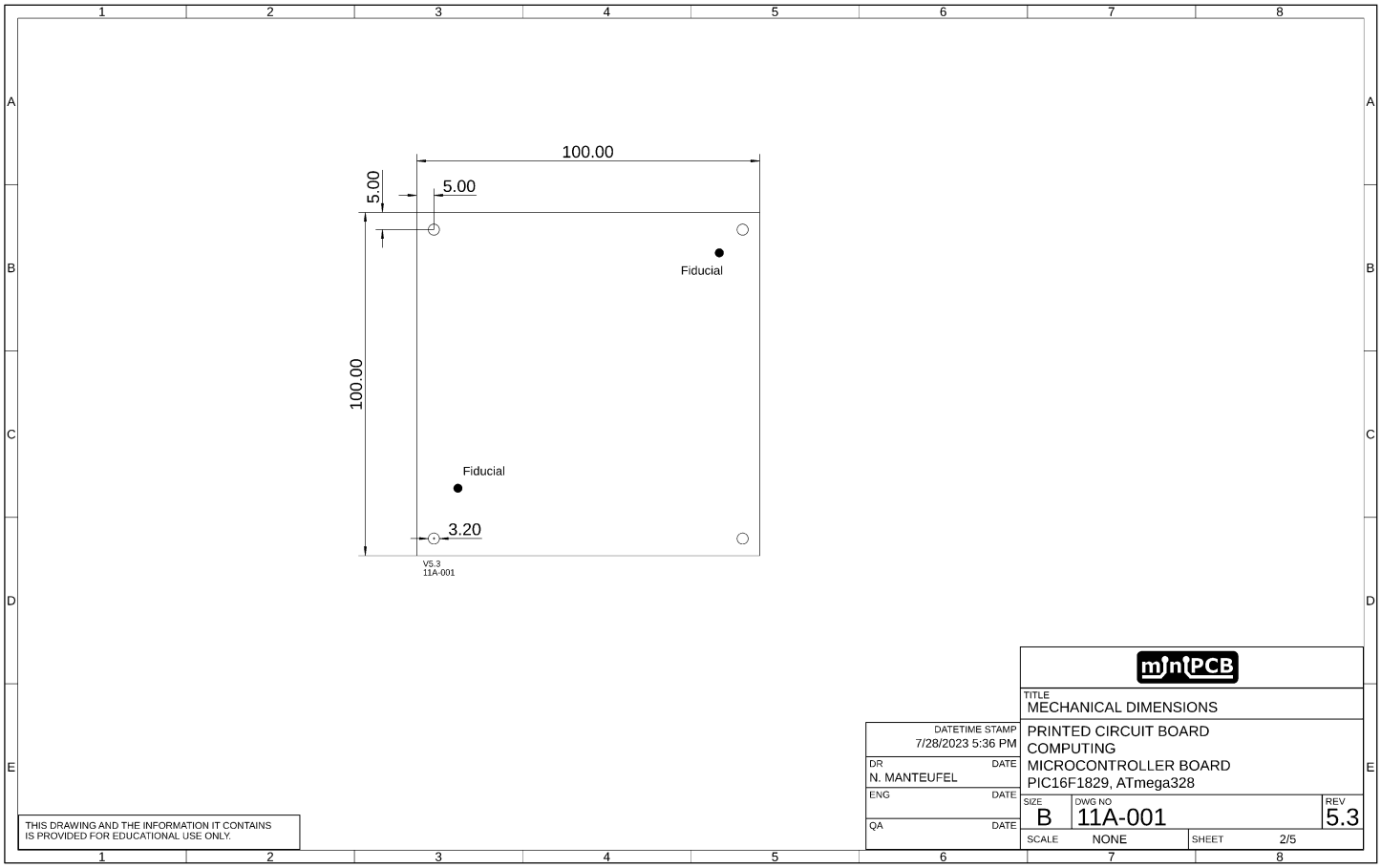
UPDATED ATmega328P PIN BREAKOUTS
UPDATED FOOTPRINTS AND SILKSCREEN FOR HIGHER DENSITY LAYOUT

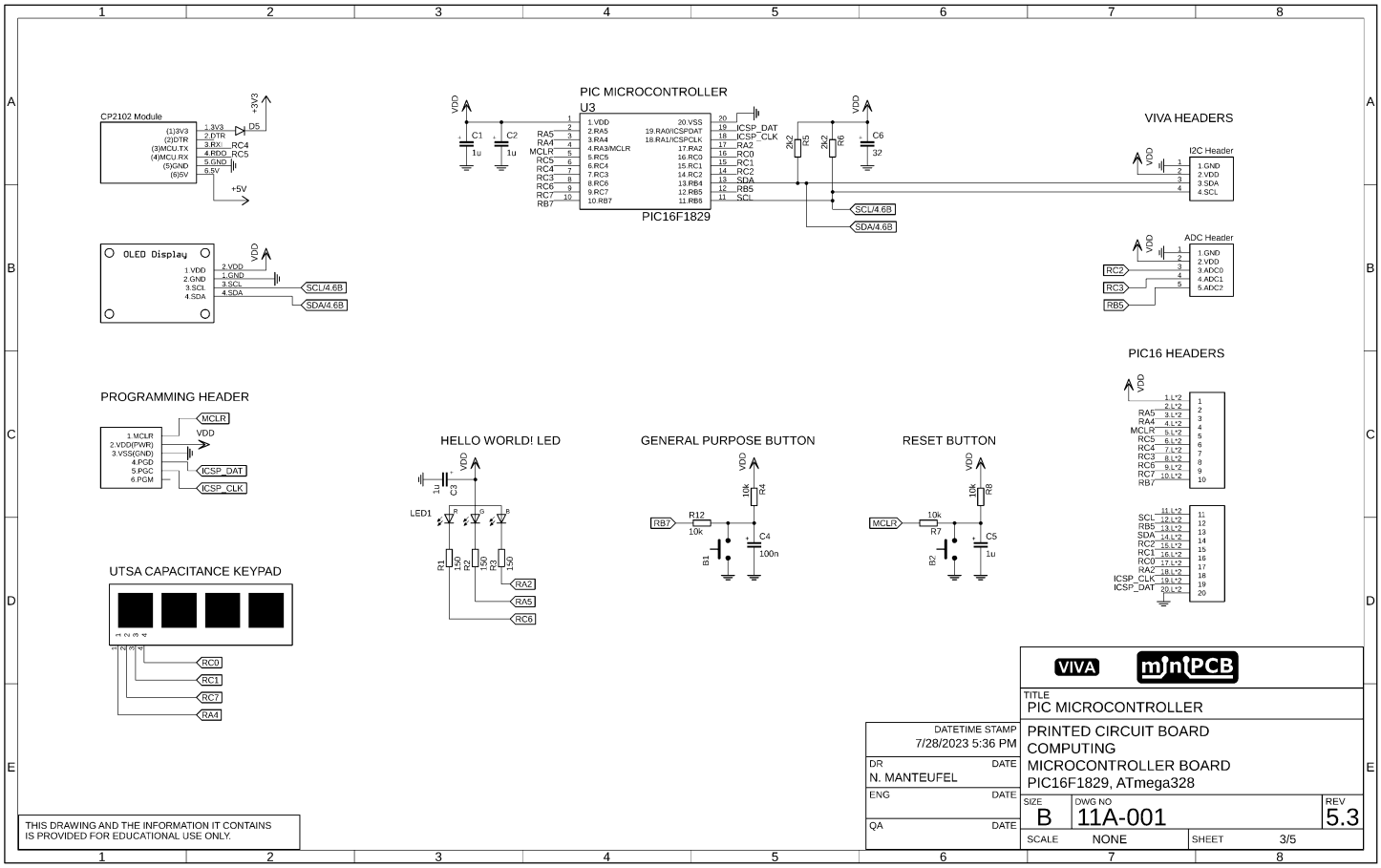
DATETIME STAMP 7/28/2023 5:36 PM
DR N. MANTEUFEL DATE
ENG DATE
QA DATE

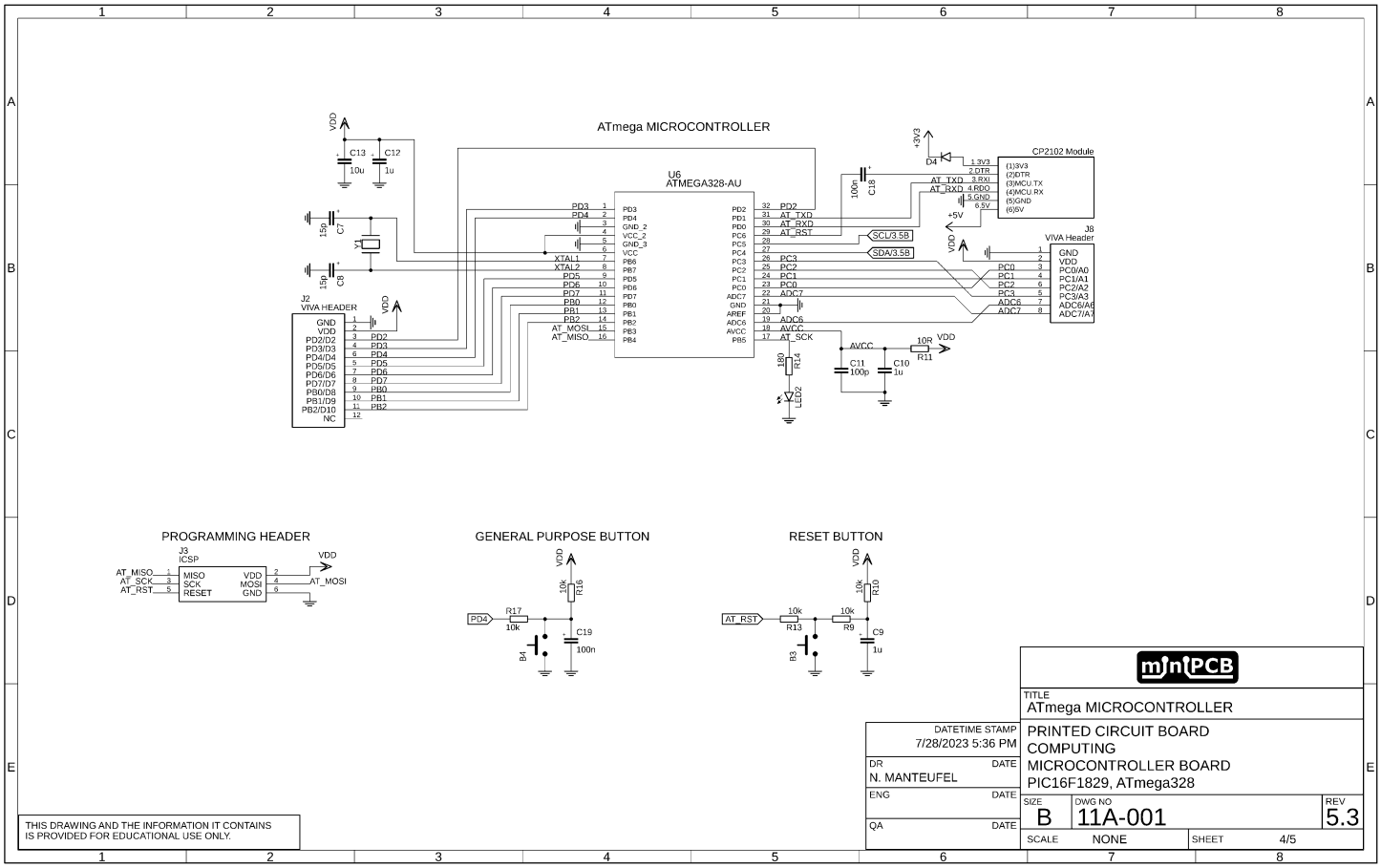
TITLE: VIVA UTSA BOARD
PRINTED CIRCUIT BOARD
COMPUTING
MICROCONTROLLER BOARD
PIC16F1829, ATmega328

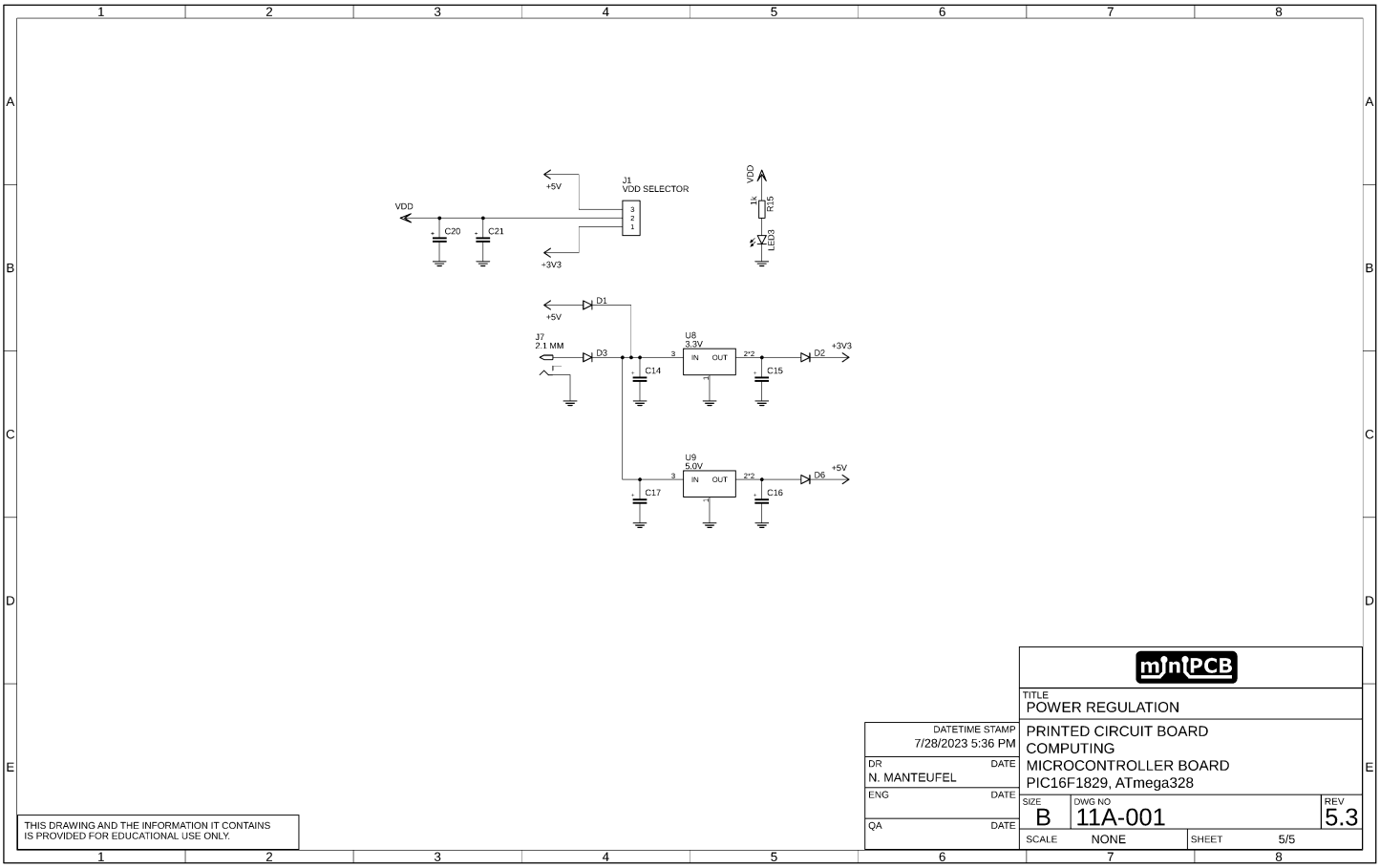
SIZE	DWG NO	REV
B	11A-001	5.3

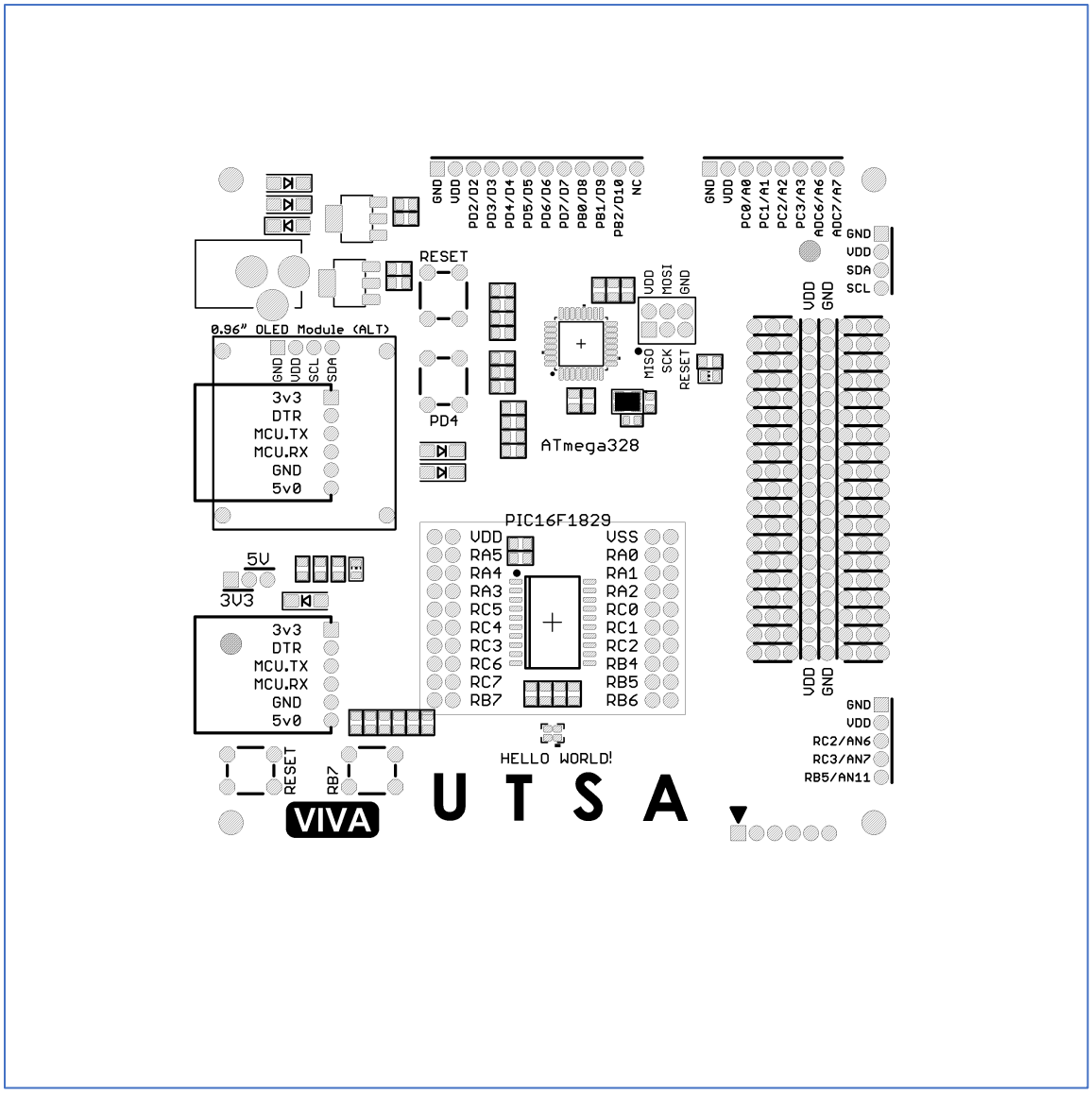
SCALE NONE SHEET 1/5

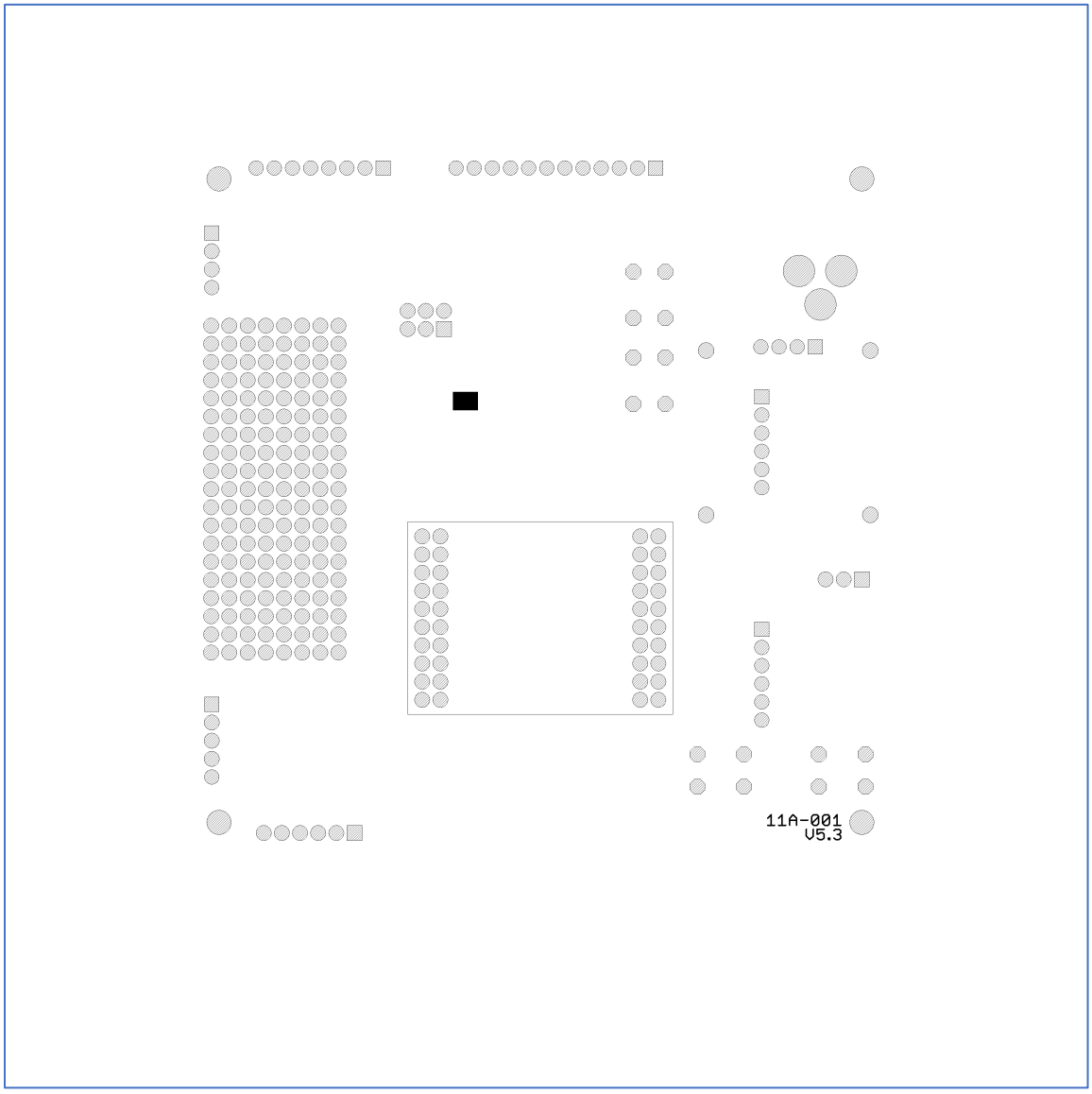

100.00
5.00
5.00
Fiducial
100.00
Fiducial
3.20
V5.3
11A-001
THIS DRAWING AND THE INFORMATION IT CONTAINS
IS PROVIDED FOR EDUCATIONAL USE ONLY.
DATETIME STAMP
7/28/2023 5:36 PM
DR
N. MANTEUFEL
DATE
ENG
DATE
QA
DATE
TITLE
MECHANICAL DIMENSIONS
PRINTED CIRCUIT BOARD
COMPUTING
MICROCONTROLLER BOARD
PIC16F1829, ATmega328
SIZE
B
DWG NO
11A-001
REV
5.3
SCALE
NONE
SHEET
2/5


PIC MICROCONTROLLER
U3
PIC16F1829
CP2102 Module
OLED Display
VIVA HEADERS
I2C Header
ADC Header
PIC16 HEADERS
PROGRAMMING HEADER
HELLO WORLD! LED
GENERAL PURPOSE BUTTON
RESET BUTTON
UTSA CAPACITANCE KEYPAD
THIS DRAWING AND THE INFORMATION IT CONTAINS IS PROVIDED FOR EDUCATIONAL USE ONLY.
DATETIME STAMP 7/28/2023 5:36 PM
DR N. MANTEUFEL
ENG
QA
TITLE PIC MICROCONTROLLER
PRINTED CIRCUIT BOARD
COMPUTING
MICROCONTROLLER BOARD
PIC16F1829, ATmega328
SIZE B
DWG NO 11A-001
REV 5.3
SCALE NONE
SHEET 3/5

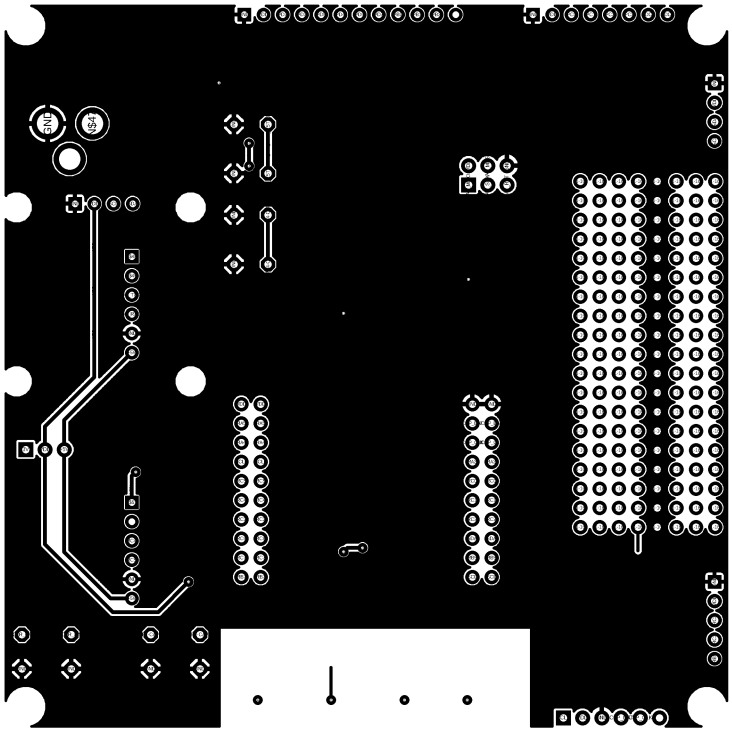

ATmega MICROCONTROLLER
U6
ATMEGA328-AU
CP2102 Module
J8
VIVA Header
J2
VIVA HEADER
PROGRAMMING HEADER
J3
ICSP
GENERAL PURPOSE BUTTON
RESET BUTTON
LED2
THIS DRAWING AND THE INFORMATION IT CONTAINS IS PROVIDED FOR EDUCATIONAL USE ONLY.
DATETIME STAMP
7/28/2023 5:36 PM
N. MANTEUFEL
TITLE
ATmega MICROCONTROLLER
PRINTED CIRCUIT BOARD
COMPUTING
MICROCONTROLLER BOARD
PIC16F1829, ATmega328
SIZE
B
DWG NO
11A-001
REV
5.3
SCALE
NONE
SHEET
4/5


J1
VDD SELECTOR
+5V
+3V3
VDD
C20
C21
R15
LED3
D1
D2
D3
D6
J7
2.1 MM
U8
3.3V
U9
5.0V
IN
OUT
C14
C15
C16
C17
+3V3
+5V
THIS DRAWING AND THE INFORMATION IT CONTAINS
IS PROVIDED FOR EDUCATIONAL USE ONLY.
DATETIME STAMP
7/28/2023 5:36 PM
DR
N. MANTEUFEL
DATE
ENG
DATE
QA
DATE
TITLE
POWER REGULATION
PRINTED CIRCUIT BOARD
COMPUTING
MICROCONTROLLER BOARD
PIC16F1829, ATmega328
SIZE
B
DWG NO
11A-001
REV
5.3
SCALE
NONE
SHEET
5/5

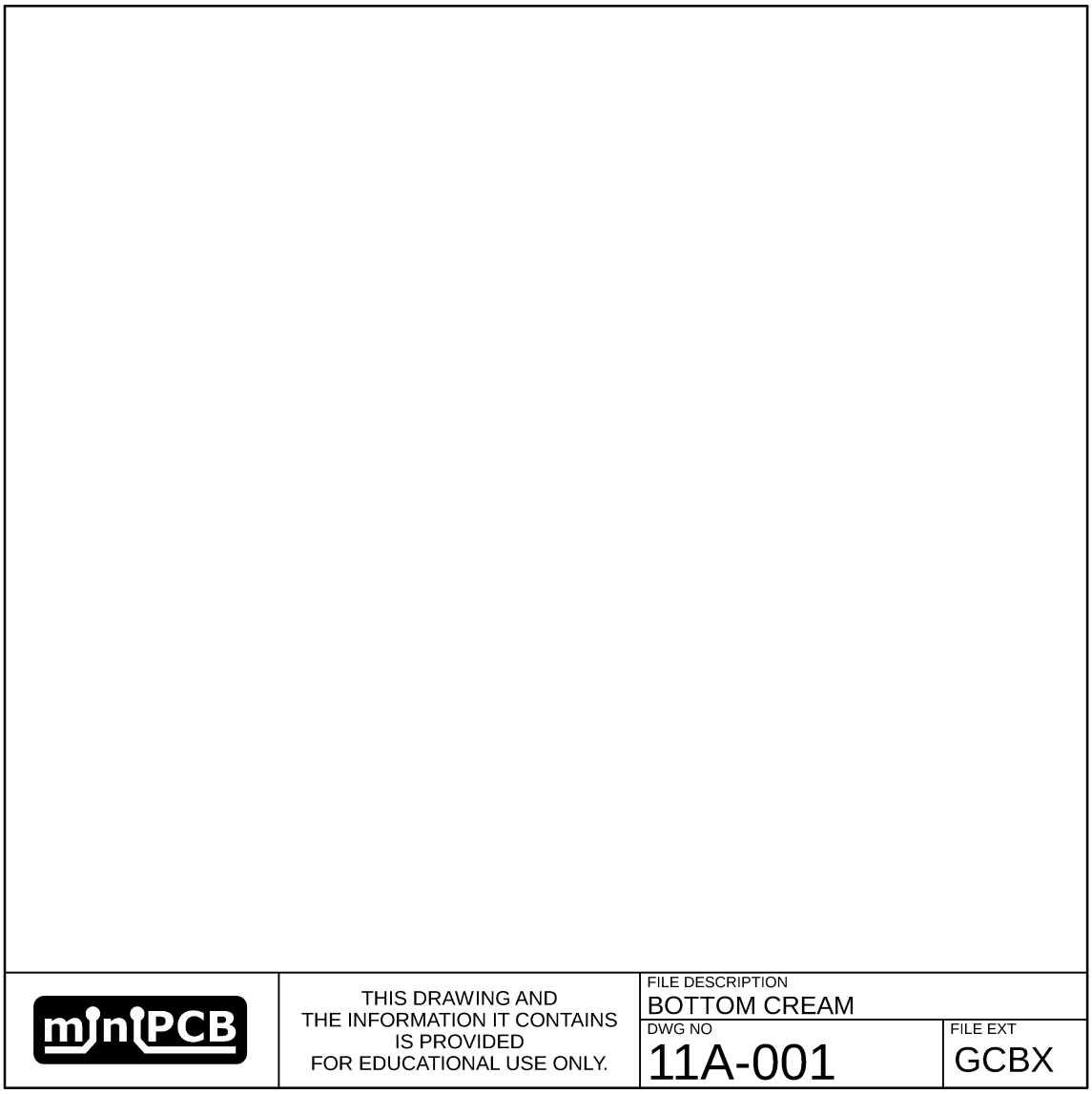

GND VDD PD2/D2 PD3/D3 PD4/D4 PD5/D5 PD6/D6 PD7/D7 PB0/D8 PB1/D9 PB2/D10 NC
GND VDD PC0/A0 PC1/A1 PC2/A2 PC3/A3 ADC6/A6 ADC7/A7
GND VDD SDA SCL
RESET
0.96" OLED Module (ALT)
GND VDD SCL SDA
3v3 DTR MCU.TX MCU.RX GND 5v0
PD4
VDD MOSI GND
MISO SCK RESET
ATmega328
PIC16F1829
VDD RA5 RA4 RA3 RC5 RC4 RC3 RC6 RC7 RB7
VSS RA0 RA1 RA2 RC0 RC1 RC2 RB4 RB5 RB6
VDD GND
5V
3V3
3v3 DTR MCU.TX MCU.RX GND 5v0
HELLO WORLD!
RESET RB7
VIVA
U T S A
GND VDD RC2/AN6 RC3/AN7 RB5/AN11

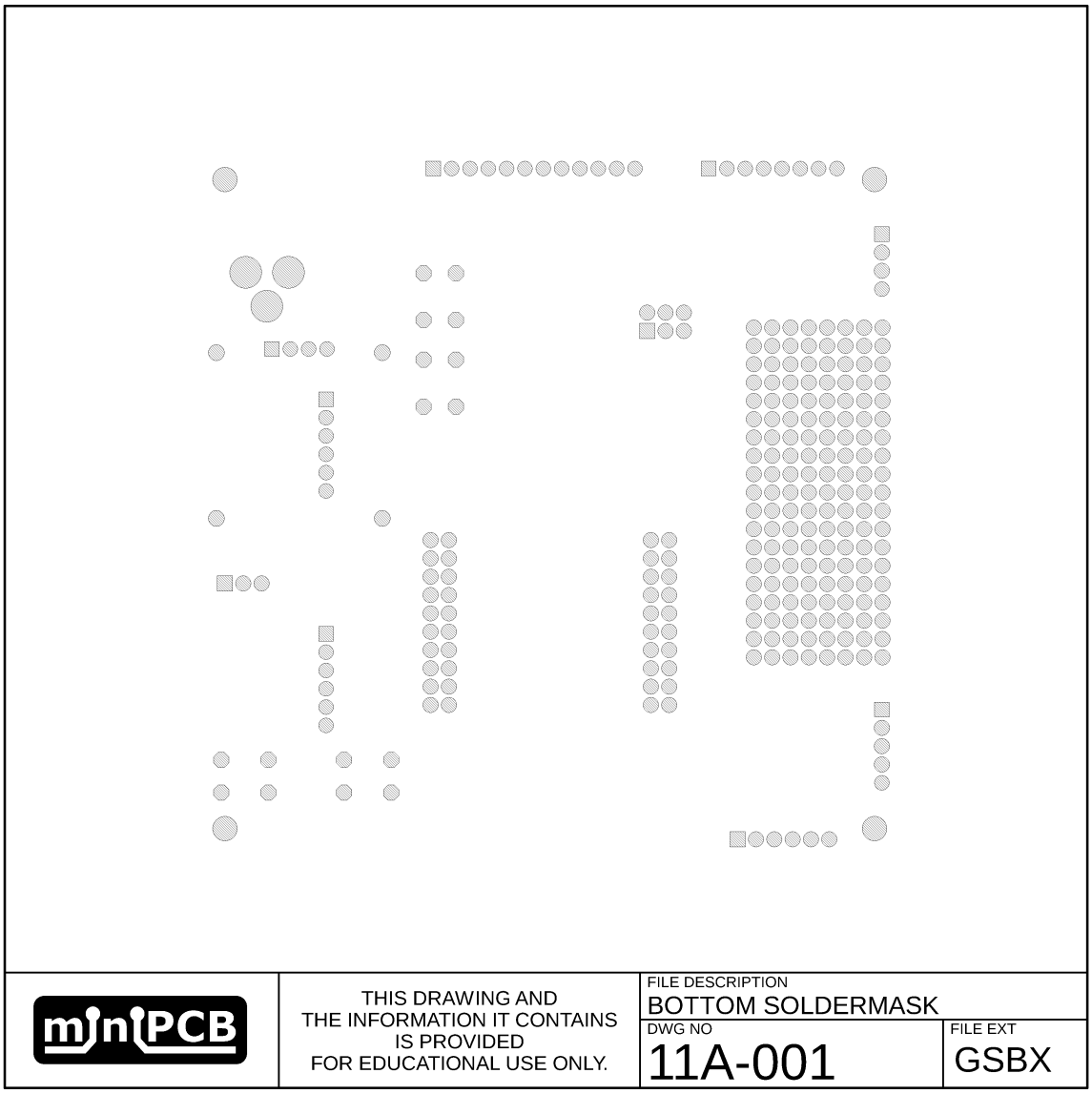

11A-001
V5.3


11A-001
V5.3
THIS DRAWING AND
THE INFORMATION IT CONTAINS
IS PROVIDED
FOR EDUCATIONAL USE ONLY.
FILE DESCRIPTION
BOTTOM SILKSCREEN
DWG NO
11A-001
FILE EXT
GOBX

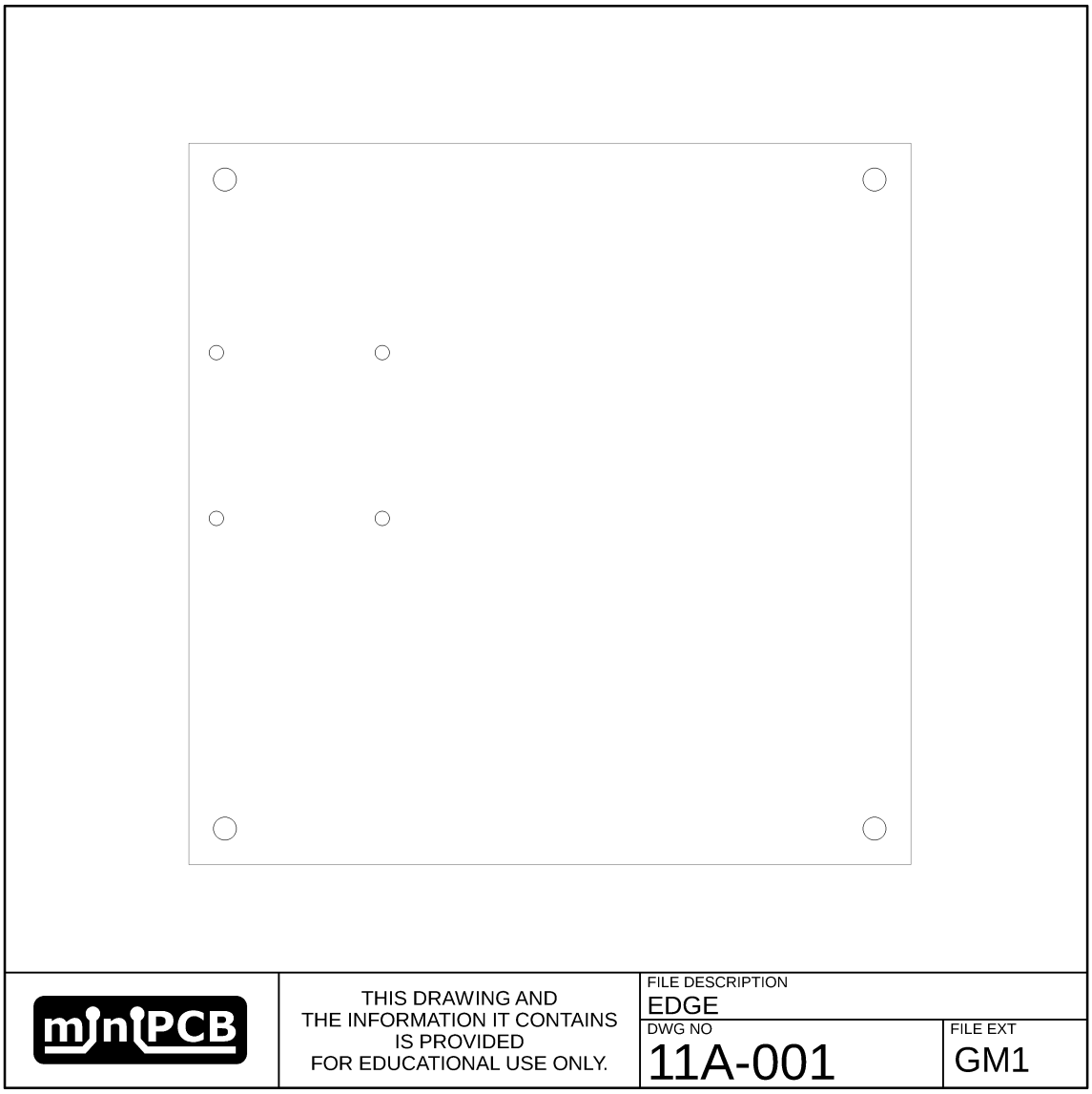


	THIS DRAWING AND THE INFORMATION IT CONTAINS IS PROVIDED FOR EDUCATIONAL USE ONLY.	FILE DESCRIPTION BOTTOM COPPER	
		DWG NO 11A-001	FILE EXT GLBX


THIS DRAWING AND
THE INFORMATION IT CONTAINS
IS PROVIDED
FOR EDUCATIONAL USE ONLY.
FILE DESCRIPTION
BOTTOM CREAM
DWG NO
11A-001
FILE EXT
GCBX

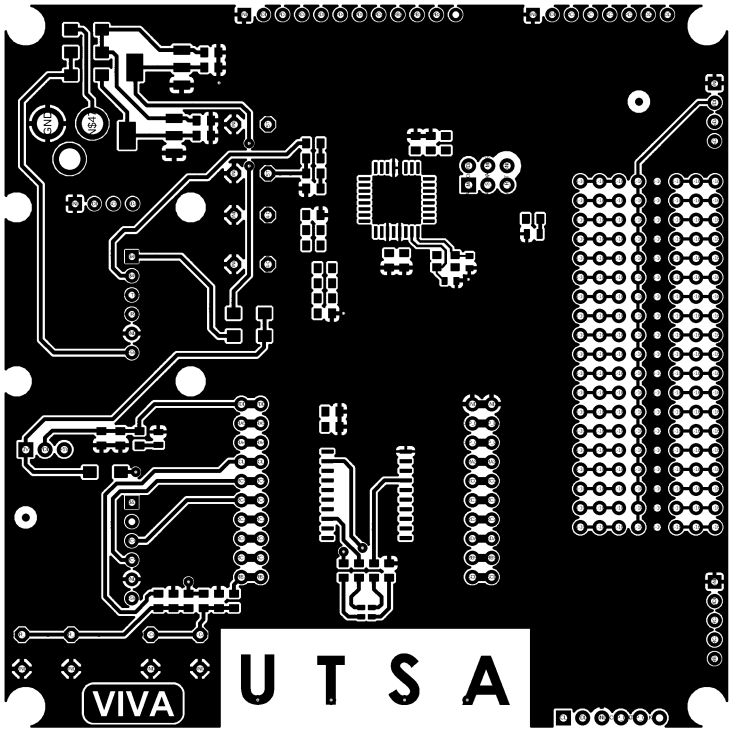


miniPCB	THIS DRAWING AND THE INFORMATION IT CONTAINS IS PROVIDED FOR EDUCATIONAL USE ONLY.	FILE DESCRIPTION: BOTTOM SOLDERMASK	
		DWG NO: 11A-001	FILE EXT: GSBX

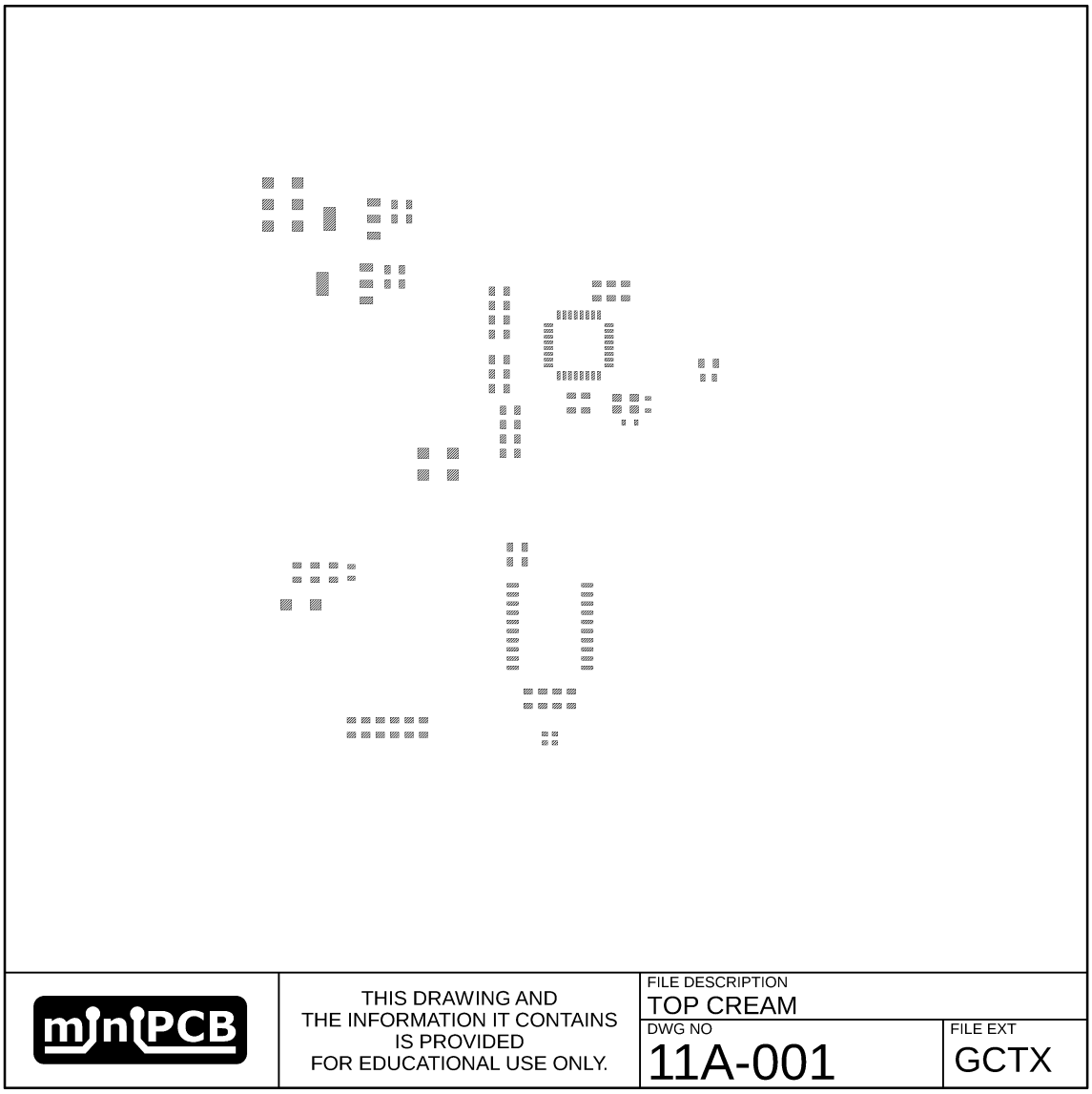


	THIS DRAWING AND THE INFORMATION IT CONTAINS IS PROVIDED FOR EDUCATIONAL USE ONLY.	FILE DESCRIPTION: EDGE	
		DWG NO: 11A-001	FILE EXT: GM1

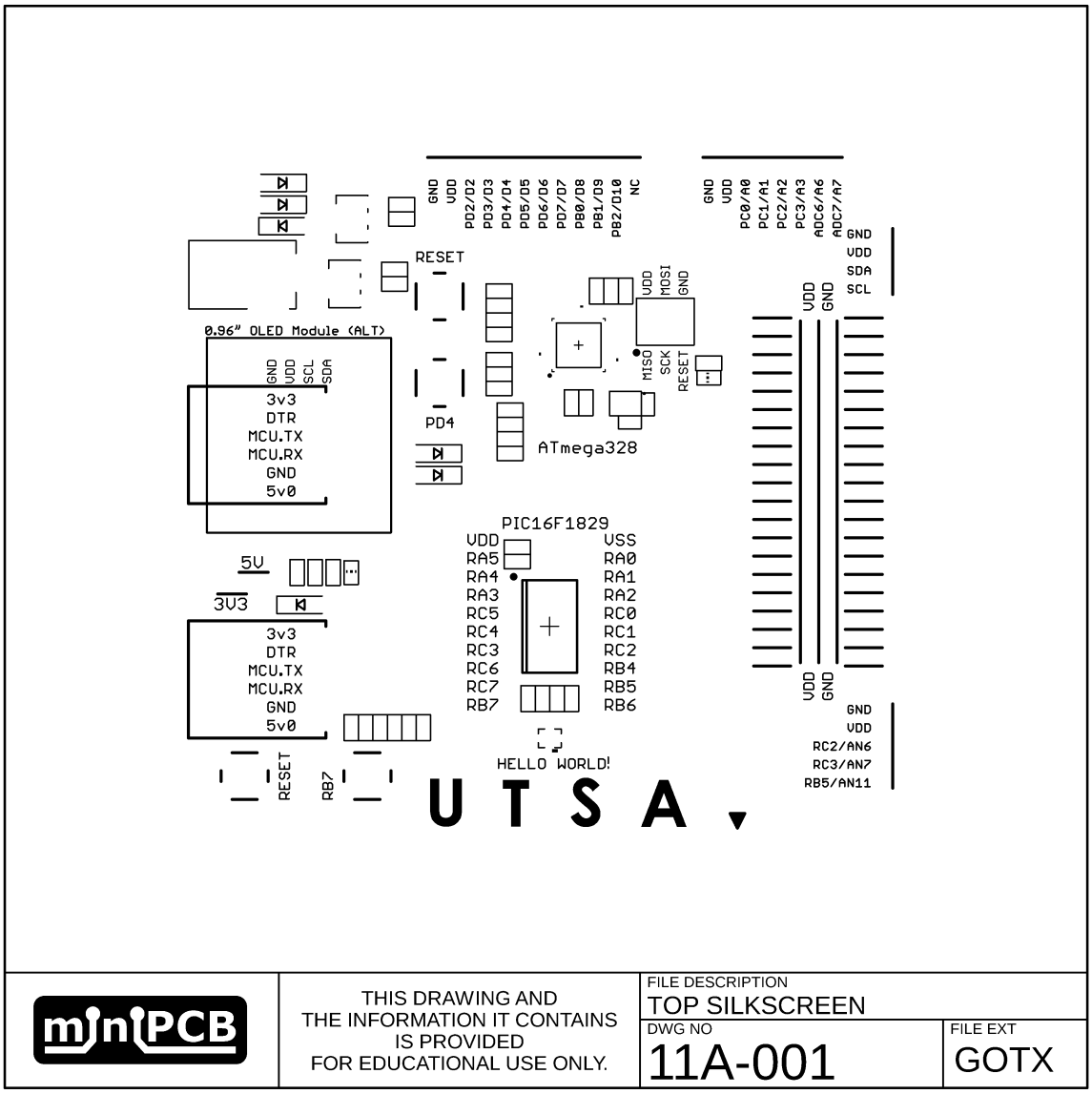

THIS DRAWING AND
THE INFORMATION IT CONTAINS
IS PROVIDED
FOR EDUCATIONAL USE ONLY.
FILE DESCRIPTION
MILLING
DWG NO
11A-001
FILE EXT
GM3



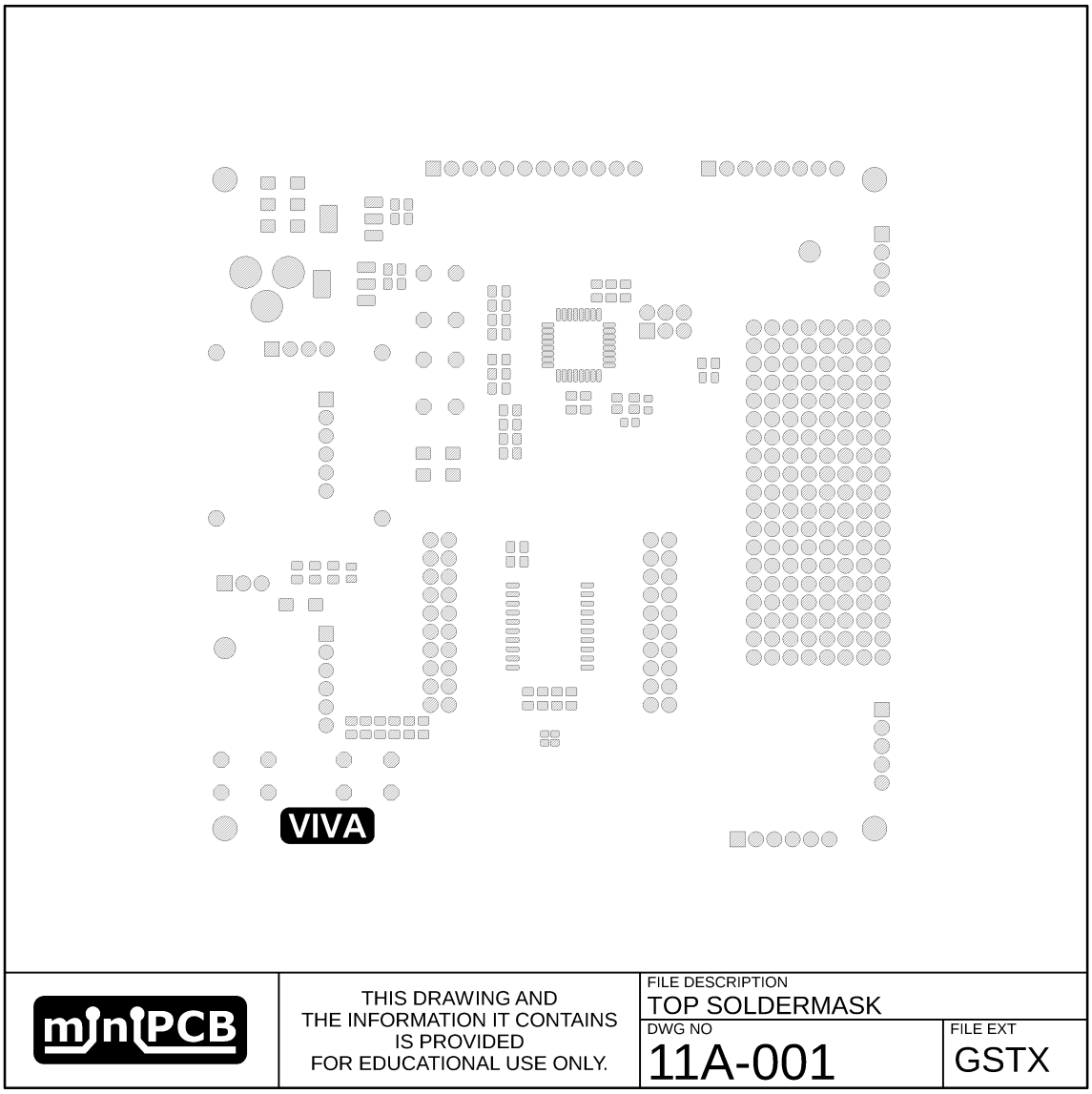
	THIS DRAWING AND THE INFORMATION IT CONTAINS IS PROVIDED FOR EDUCATIONAL USE ONLY.	FILE DESCRIPTION: TOP COPPER	
		DWG NO: 11A-001	FILE EXT: GLTX



miniPCB	THIS DRAWING AND THE INFORMATION IT CONTAINS IS PROVIDED FOR EDUCATIONAL USE ONLY.	FILE DESCRIPTION: TOP CREAM	
		DWG NO: 11A-001	FILE EXT: GCTX



miniPCB	THIS DRAWING AND THE INFORMATION IT CONTAINS IS PROVIDED FOR EDUCATIONAL USE ONLY.	FILE DESCRIPTION: TOP SILKSCREEN	
		DWG NO: 11A-001	FILE EXT: GOTX



	THIS DRAWING AND THE INFORMATION IT CONTAINS IS PROVIDED FOR EDUCATIONAL USE ONLY.	FILE DESCRIPTION: TOP SOLDERMASK	
		DWG NO: 11A-001	FILE EXT: GSTX

	THIS DRAWING AND THE INFORMATION IT CONTAINS IS PROVIDED FOR EDUCATIONAL USE ONLY.	FILE DESCRIPTION V-SCORE	
		DWG NO 11A-001	FILE EXT GM2

What does ChatGPT say?

By Nolan Manteufel, 26JUL2023

The PIC16F1829 microcontroller is commonly used in a wide range of applications, including embedded systems, home automation, motor control, industrial automation, sensor interfacing, and more. PIC microcontroller popularity stems from their robustness, affordability, and the extensive community support and resources available for programming and development.

The ATmega328 microcontroller is famously known for being used on the Arduino Uno board, one of the most popular microcontroller development boards for hobbyists, students, and professionals. The Arduino ecosystem, along with the ATmega328, has fostered a large community of enthusiasts who have created countless projects and libraries, making it an excellent choice for anyone interested in learning about embedded systems, electronics, and programming. Due to its versatility and wide-ranging support, the ATmega328 is also found in various other custom-designed boards and commercial products.

The PIC16F1829 and ATmega328 are both manufactured by Microchip Technologies. Microchip's PIC and ATmega microcontroller families are popular for various applications due to their ease of use, low cost, and versatility.

Microchip is a prominent player in the semiconductor industry and is well-known for its PIC microcontrollers and AVR microcontrollers, which are widely used in embedded systems, IoT (Internet of Things) devices, consumer electronics, automotive applications, industrial automation, and more. The company has a strong focus on providing cost-effective and energy-efficient solutions to its customers.

Here are some common uses and benefits of microcontroller student development boards:

Learning Embedded Systems: These boards provide an excellent starting point for students to learn about embedded systems and the fundamentals of microcontroller programming. They offer a hands-on experience, allowing students to interact with the hardware directly.

Programming Practice: Students can practice programming in the language supported by the microcontroller (e.g., C, C++, or assembly language). They can write code to control the board's peripherals, such as LEDs, sensors, motors, and displays.

Experimentation and Prototyping: Development boards are ideal for quickly prototyping and testing ideas. Students can interface the board with various components and sensors to create interactive projects.

Understanding Peripherals: The boards typically come with a range of onboard peripherals such as GPIO (General Purpose Input/Output) pins, timers, UART, ADC, PWM, and more. Students can learn how these peripherals work and how to utilize them effectively.

Project Building: Students can use the development board as the heart of their own projects, building upon the provided features and adding external components as needed.

Debugging and Troubleshooting: The boards often include debugging features like debuggers, built-in LEDs, and UART interfaces, which help students understand and troubleshoot their code and hardware.

Educational Resources: Many development boards are supported by extensive educational resources, tutorials, and example projects. These resources can help students grasp complex concepts and provide inspiration for their projects.

Cross-Platform Compatibility: Some development boards are designed to be compatible with different programming environments and Integrated Development Environments (IDEs), allowing students to work with the tools they are comfortable with.

Preparing for Industry: Familiarity with microcontrollers and development boards is valuable in many engineering fields, such as electronics, robotics, automation, IoT (Internet of Things), and more. Experience with development boards can give students an edge when transitioning to real-world projects and job opportunities.

Change and Liability Notice

This document is subject to change without notice. While effort has been made to ensure the accuracy of the material contained within this document, Nolan Manteufel shall under no circumstances be liable for incidental or consequential damages or related expenses resulting from the use of this document.

Trademark Notice

miniPCB is a trademark of Nolan Manteufel.

This datasheet does not constitute permission to use the miniPCB trademark.

WORDMARK	FIGUREMARK	FIGUREMARK
miniPCB™		

Revision History

REV	DESCRIPTION	ECO	DATE
A	Initial Release		

Related Content

#	TYPE	DESCRIPTION	LOCATION
1	Sale Posting	eBay	
2	Sale Posting	Mouser	
3	Repository	Engineering Files	
4	Repository	Datasheet	
5	Video	Development	
6	Video	Development	
7	Video	Testing	
8	Video	Engineering Release	

Student Challenge!

Welcome to the UTSA Student Challenge! You are invited to submit a copy your student report to nolan@minipcb.com.

The goal is to incorporate feedback from your experience in future versions of this document. We would like to create a collection of popular UTSA student projects. Junior classmates might be inspired to recreate your project, or attempt something more challenging!

Appendix

PART NUMBER	11A-001
GROUP NAME	Computing (11A)
CIRCUIT NAME	Microcontroller Board
VARIANT DESCRIPTION	UTSA, PIC16, ATmega328
BOARD DESIGN	PCB100
PRODUCT DESCRIPTION	This board was developed for electrical engineering classes at the University of Texas at San Antonio and is only available for sale to professors and student organizations.