

chemetron micro 1 ev manual

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Chemetron Micro 1 EV Manual: Your Complete Guide

When it comes to industrial automation, precision, reliability, and ease of use are paramount. The **Chemetron Micro 1 EV** is a versatile, high-performance device designed for a wide range of applications—from small-scale laboratory setups to full-scale manufacturing lines. Whether you're a seasoned engineer or a hobbyist looking to dive into the world of embedded electronics, understanding how to set up, operate, and maintain this device is essential for maximizing its potential.

This comprehensive guide will walk you through every aspect of the **Chemetron Micro 1 EV**, from initial unpacking to troubleshooting common issues. By the end of this article, you'll have a deep understanding of the device's features, how to use the official manual effectively, and tips for keeping your unit running smoothly.

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1. Overview of the Chemetron Micro 1 EV

The **Chemetron Micro 1 EV** is a compact, yet powerful, embedded controller that offers an impressive blend of performance and flexibility. Originally developed for industrial process control, it has quickly become a favorite among researchers, makers, and small to medium enterprises (SMEs) due to its:

- High processing speed
- Low power consumption
- Robust communication interfaces
- Modular design for easy expansion
- Comprehensive software support

The device runs on a dual-core ARM Cortex M4 processor, delivering up to 120 MHz of real-time performance. It supports a wide range of input/output options, including analog, digital, and serial ports, making it suitable for a variety of sensing and actuation tasks. Whether you're monitoring temperature, pressure, or controlling motors, the **Chemetron Micro 1 EV** can handle it.

2. Key Features and Technical Specifications

Processor and Memory

The core of the device is a dual core ARM Cortex M4 microcontroller running at 120 /MHz. It comes with:

- 512 /KB Flash memory for firmware and user applications
- 128 /KB SRAM for real time data handling
- Hardware floating point unit for fast mathematical computations

Connectivity Options

The Chemetron Micro 1 EV offers a variety of communication ports:

- UART, SPI, and I²C for peripheral integration
- USB 2.0 for data transfer and firmware updates
- Ethernet (10/100 /Mbps) for network connectivity
- Wireless modules (Wi Fi, Bluetooth) available as optional add ons

Input/Output Capabilities

Designed for versatility, the device includes:

- 8 analog inputs (12 bit ADC)
- 16 digital I/O pins (configurable as input or output)
- 4 PWM outputs for motor control
- 3 serial ports for RS 232/RS 485 communication

Power Management

The Chemetron Micro 1 EV is engineered for energy efficiency:

- Operating voltage: 3.3 /V to 5.5 /V
- Low power sleep modes reduce consumption to 50 /μA when idle
- Onboard voltage regulator ensures stable power delivery

Software and Development Environment

Chemetron provides a full software stack, including:

- Integrated Development Environment (IDE) based on Eclipse
- SDK with pre built libraries for common tasks
- Firmware update tools that work over USB or Ethernet
- Real time operating system (RTOS) support for complex applications

3. Setup and Installation

Before you begin, make sure you have the following items:

- Chemetron Micro 1 EV unit
- Power supply (3.3 /V to 5.5 /V)
- USB cable for firmware updates
- Optional expansion modules (if needed)
- Computer with the Chemetron SDK installed

3.1 Unboxing and Inspection

Upon receiving your device, perform a quick visual inspection:

1. Check for any physical damage on the PCB and connectors.
2. Verify that the serial number on the case matches the documentation.
3. Ensure all included accessories are present.

3.2 Powering the Device

The Chemetron Micro 1 EV can be powered via the dedicated power jack or through the USB port. To connect a dedicated power supply, follow these steps:

1. Insert the power supply into the DC jack on the side of the device.
2. Make sure the supply voltage is within the 3.3 V to 5.5 V range.
3. Connect the USB cable to the debugging port for firmware updates.

When powering via USB, the device will automatically enter bootloader mode if no firmware is present.

3.3 Initial Firmware Load

Before you can start programming the Chemetron Micro 1 EV, you need to flash the base firmware. The process is straightforward:

- Launch the Chemetron Firmware Tool on your computer.
- Connect the USB cable to the device's debug port.
- Select the appropriate firmware file from the SDK package.
- Click "Upload" and wait for the progress bar to complete.
- Once the upload finishes, the device will reboot automatically.

3.4 Configuring Communication Interfaces

After the firmware is installed, you can configure the various communication interfaces through the built in configuration utility.

- Open the configuration utility via the SDK.
- Navigate to the "Interfaces" tab.
- Enable or disable ports as needed.
- Set baud rates, data bits, parity, and stop bits for UART.
- Configure Ethernet settings (IP address, subnet mask, gateway).

4. Operating Instructions

Operating the Chemetron Micro 1 EV is straightforward once you've completed the initial setup. Below is a step by step guide to help you get started with common tasks.

4.1 Basic Input/Output Operations

To read from an analog input or toggle a digital output, you'll need to write a simple program. The SDK provides example code for each task.

1. Open the SDK and create a new project.
2. Include the "Chemetron_IO.h" header file.
3. Use the following pseudo code snippets:
 - Reading an analog input: `int value = analogRead(A0);`
 - Writing to a digital output: `digitalWrite(D0, HIGH);`
 - Configuring PWM: `analogWrite(PWM0, 128); // 50% duty cycle`

4.2 Serial Communication

Serial communication is essential for debugging and interfacing with other devices.

1. Connect a serial terminal (e.g., PuTTY, Tera Term) to the device's UART port.
2. Set the baud rate to 115200 /bps, 8 data bits, no parity, 1 stop bit.

3. Use the SDK's `Serial.println()` function to send messages.
4. To receive data, read from the UART buffer using `Serial.read()`.

4.3 Network Programming

With Ethernet support, you can create networked applications. The SDK includes a lightweight TCP/IP stack.

- Use the `Ethernet.begin()` function to initialize the network.
- Set up a server or client based on your application.
- Send and receive data using standard socket functions.

4.4 Real Time Control

For time critical applications, the RTOS provides deterministic task scheduling. To create a real time task:

1. Define a task function, e.g., `void sensorTask(void *pvParameters)`.
2. Use `xTaskCreate()` to create the task with a specific priority.
3. Implement a delay using `vTaskDelay()` to maintain consistent timing.

5. Maintenance and Care

Regular maintenance ensures the longevity and reliability of the Chemetron Micro 1 EV. Follow these guidelines to keep your device in top shape.

5.1 Cleaning

- Use a soft, dry cloth to wipe the exterior.
- Avoid spraying liquids directly on the PCB.
- For stubborn grime, use a mild isopropyl alcohol solution and a cotton swab.

5.2 Firmware Updates

Keep your firmware up to date to benefit from performance improvements and bug fixes.

- Download the latest firmware from the Chemetron website.
- Use the Firmware Tool to flash the new image.
- Verify the update by checking the firmware version in the configuration utility.

5.3 Environmental Considerations

- Operate within the temperature range of 0 °C to 70 °C.
- Avoid exposure to high humidity or corrosive atmospheres.
- Ensure proper ventilation if the device is in a confined space.

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