

# MICROCHIP FOR ALL SEASONS





# NORTHERN LIGHTS

## Edge AI Demonstration Kit for Object Recognition-Based Motor Control

Future Electronics introduces **Northern Lights**, the first of several bold engineering demonstration platforms promoting numerous Microchip technologies to inspire your next design.

### Display Module

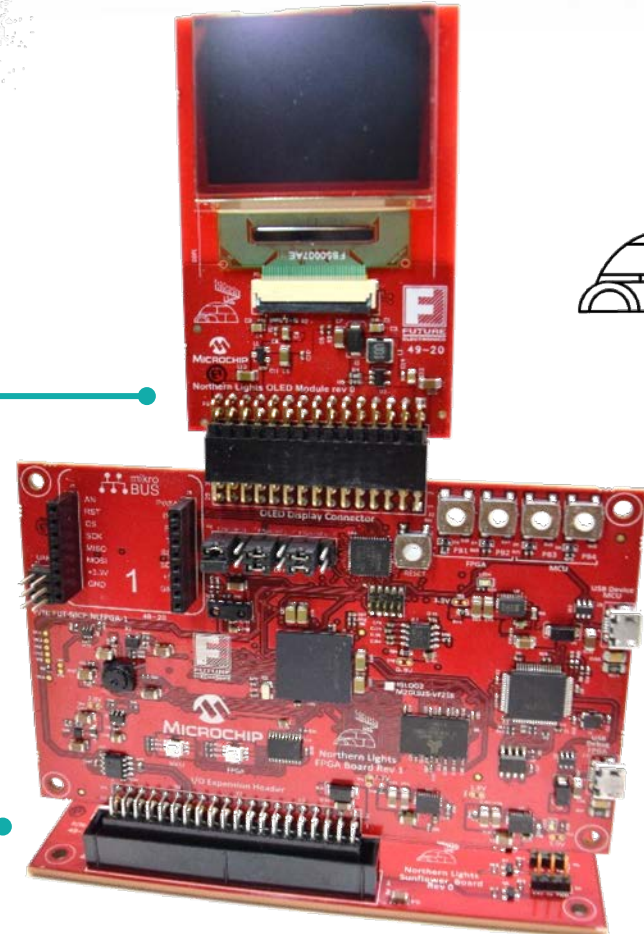
with color OLED panel

### Video Board

with color CMOS image sensor and low power FPGA

### Motor Control Board

with digital signal controller for servo control



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## Demonstration Kit Features

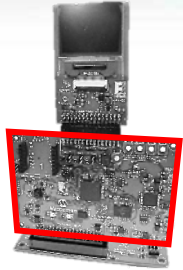
- Flexible platform combining intelligent machine vision and motor control technologies
- Multiple Microchip solutions
  - IGLOO2 FPGA, SAM E51 MCU, dsPIC33 DSP, MCP2562 CAN transceiver, and MIC33M350 power modules
- 720p color CMOS sensor, proximity sensor and color OLED display
- CAN, UART, USB and mikroBUS™ interfaces
- Out-of-the-box demo which recognizes digits and moves robotic arm to corresponding position

## Applications

- Production line defect recognition and removal
- Automatic manufacturing calibration
- Object recognition and collision avoidance
- Many additional applications in industrial, defense, medical and automotive markets



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## Northern Lights Demonstration Kit Video Board

**mikroBUS™ Connector**

**Proximity Sensor**  
(Vishay VCNL4200)

**720p Color CMOS  
Digital Image Sensor**  
(ON Semi MT9M114)

**CAN Transceiver**  
(Microchip MCP2562)

**I/O Expansion Header**  
(to Motor Control Board)

**OLED Display  
Module Connector**

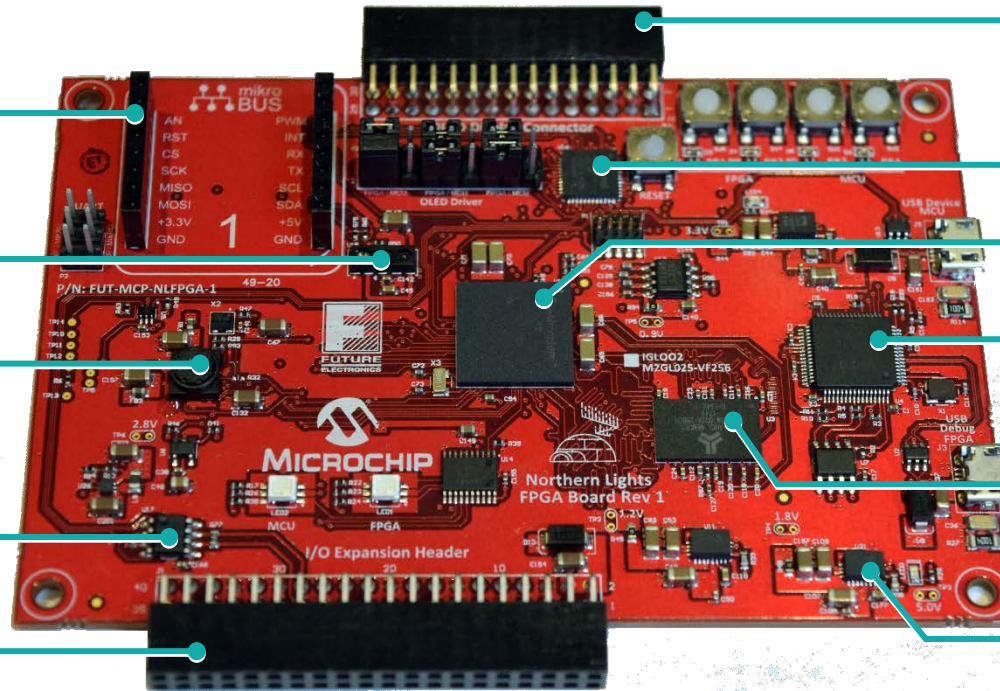
**32-bit ARM Cortex-M4 MCU**  
(Microchip SAM E51)

**IGLOO2 FPGA**  
(Microchip M2GL025-VF256)

**USB to UART Interface**  
with embedded FlashPro5 Programmer  
(FTDI FT4232HL)

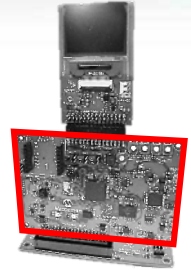
**32M x 16-bit DDR2 SDRAM**  
(Alliance AS4C32M16D2A-25BCN)

**Power Module**  
(Microchip MIC33M350)

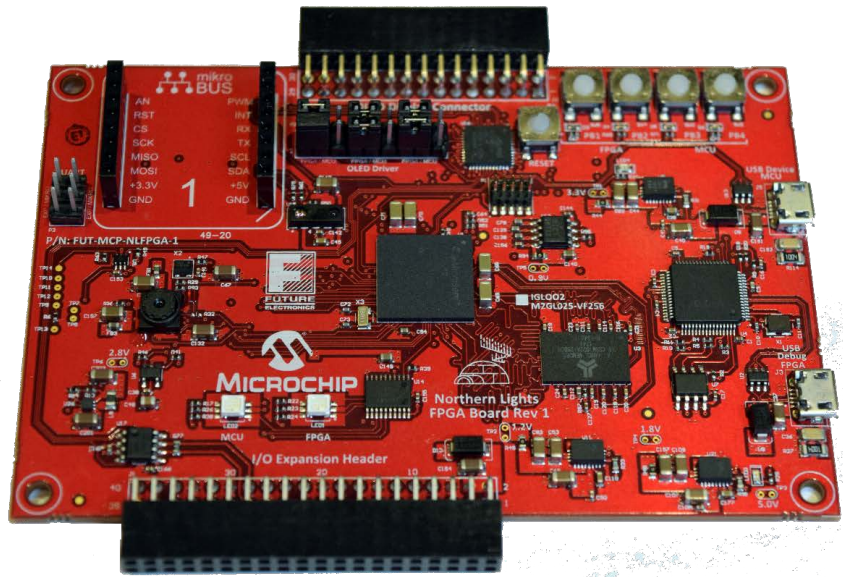




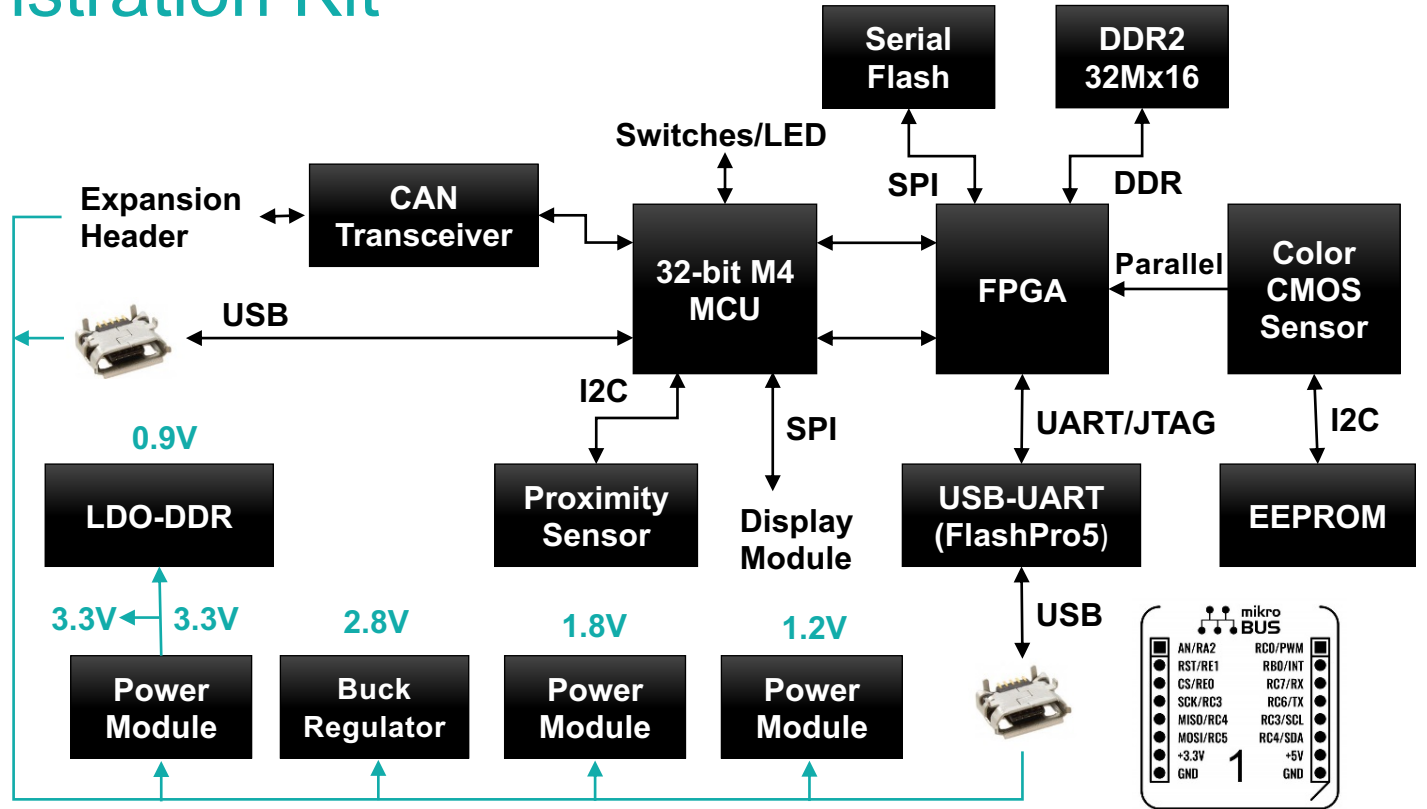
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## Northern Lights Demonstration Kit Video Board

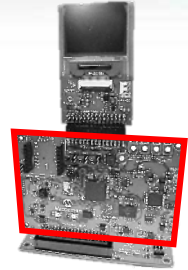


5.0V

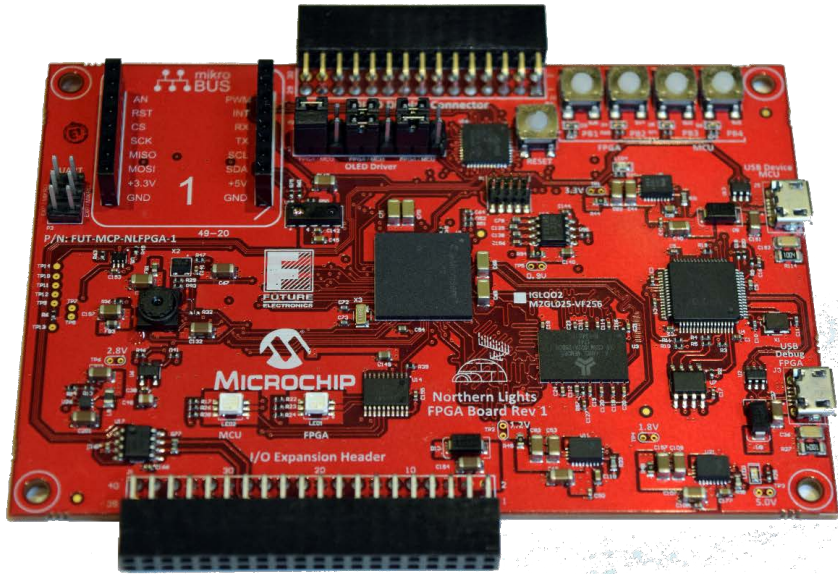




# NORTHERN LIGHTS

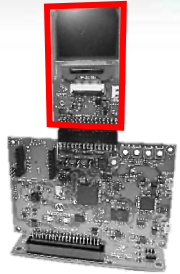


## Northern Lights Demonstration Kit Video Board



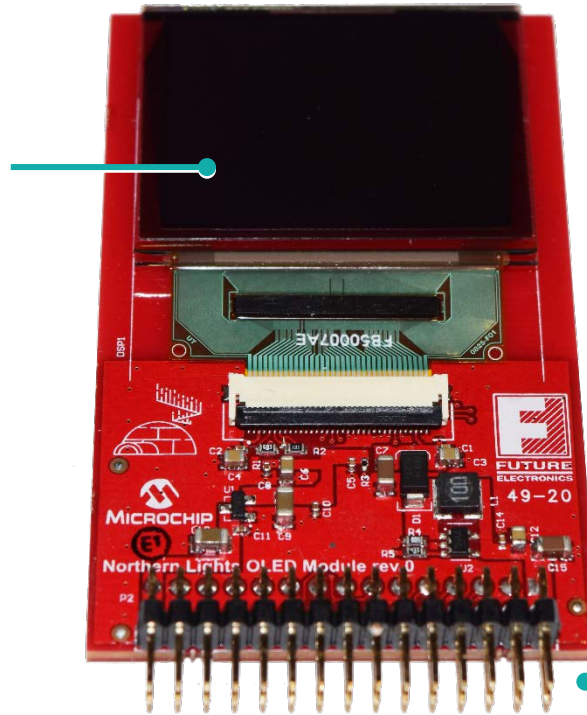
- **Microchip IGLOO2 FPGA featured on video board**
  - 28K LEs (extendable to 150K LEs)
  - Low power (7mW standby, 70mW per 5G serdes)
  - Secure (DPA hardened, AES256, SHA256)
  - Reliable (flash-based SEU-immune fabric)
- **FPGA functions include**
  - AI CNN model (digit recognition)
  - Soft RISC-V processor (camera and CNN weights config, OLED output)
  - Scaler (OLED output)
  - UART (communicate inference value)

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## Northern Lights Demonstration Kit Display Module

1.69" 160x128 Color OLED Display  
(WiseChip UG-6028GDEBF02)



**Video Board Connector**  
(Reversible for viewing flexibility)





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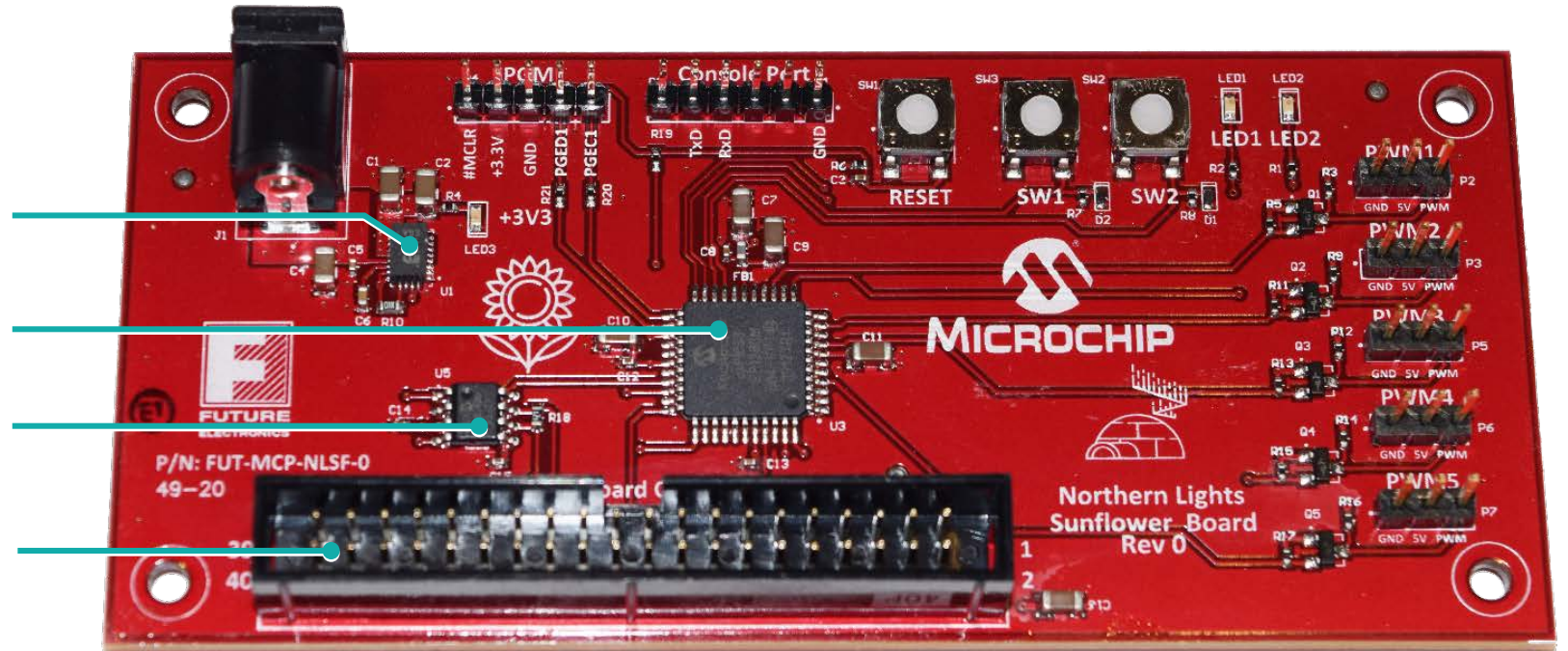
## Northern Lights Demonstration Kit Motor Control Board

**Power Module**  
(Microchip MIC33M350)

**Digital Signal Controller**  
(Microchip dsPIC33EP128GM604)

**CAN Transceiver**  
(Microchip MCP2562)

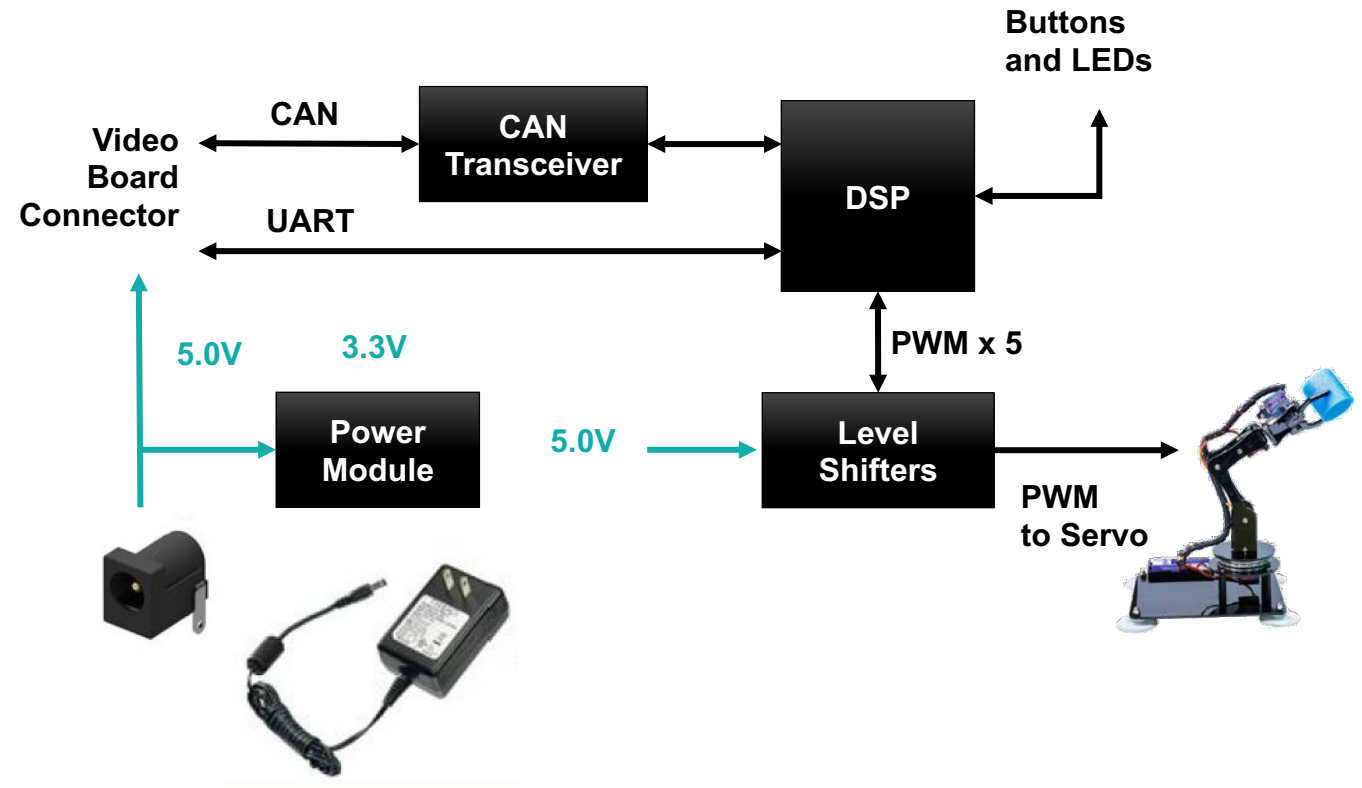
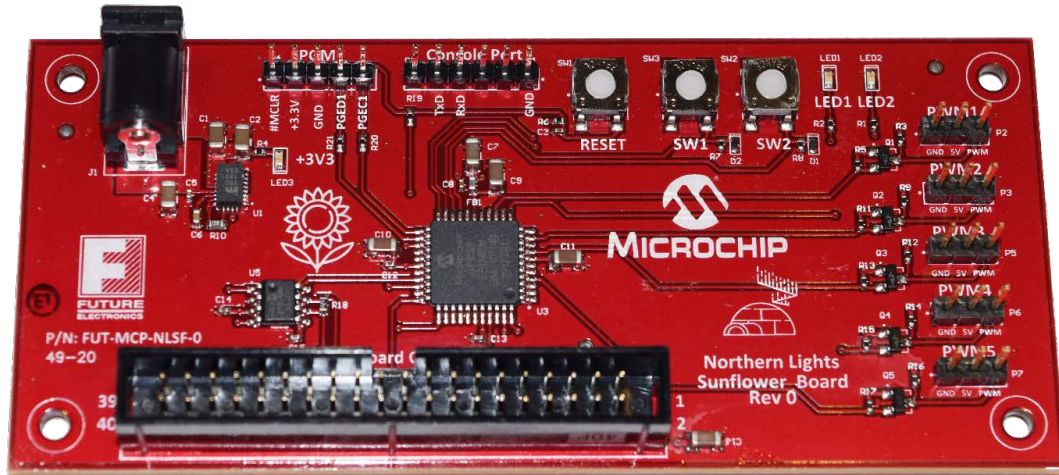
**Video Board Connector**





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## Northern Lights Demonstration Kit Motor Control Board

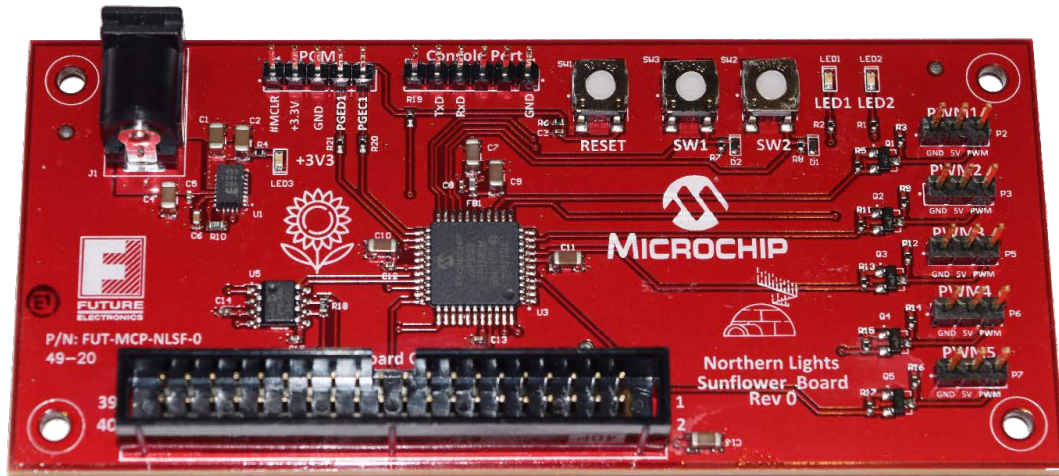




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## Northern Lights Demonstration Kit Motor Control Board



- **Microchip dsPIC33E 16-bit DSC**
  - 70 MIPS dsPIC™ core with DSP, high speed PWM outputs and enhanced on-chip peripherals
  - Brushless DC, permanent magnet synchronous, AC induction and stepper motor applications
  - Integrated Op Amps and high-performance analog for BoM cost reduction
  - Enables high-performance motor control systems
- **CAN and UART interface from video board**
  - UART interface communicates FPGA inference value to DSP
  - CAN enabled by Microchip MCP2562 transceiver



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## Northern Lights Demo

### 5-Axis Robotic Arm Responds to Recognized Digit

