Wi-Fi and Bluetooth Modules					
MOD1	Function	MCU Pin	Pin Name	Function Name	Voltage
2	BLE_RX	U3C(119)	PD5	USART2_TX	+3.3 V
3	BLE_TX	U3C(122)	PD6	USART2_RX	+3.3 V
4	BLE_CTS_N	U3C(118)	PD4	USART2_RTS	+3.3 V
5	BLE_RTS_N	U3C(117)	PD3	USART2_CTS	+3.3 V
14	BLE_REG_ON	U3C(44)	PC4	GPIO_OUTPUT	+3.3 V
20	WIFI_SDIO_CLK	U3C(113)	PC12	SDIO	+3.3 V
22	WIFI_SDIO_CMD	U3C(116)	PD2	SDIO	+3.3 V
23	WIFI_SDIO_D2	U3C(111)	PC10	SDIO	+3.3 V
24	WIFI_SDIO_D0	U3C(98)	PC8	SDIO	+3.3 V
25	WIFI_SDIO_D3	U3C(112)	PC11	SDIO	+3.3 V
26	WIFI_SDIO_D1	U3C(99)	PC9	SDIO	+3.3 V
27	WIFI_HOST_WAKE	U3C(97)	PC7	GPIO_INPUT	+3.3 V
28	WIFI_REG_ON	U3B(135)	PB5	GPIO_OUTPUT	+3.3 V
37	SLEEP_CLK	U3B(100)	PA8	32KHZ	+3.3 V
38	BLE_HOST_WAKE	U3C(45)	PC5	GPIO_INPUT	+3.3 V
39	BLE_DEV_WAKE	U3C(96)	PC6	GPIO_OUTPUT	+3.3 V

Temperature Sensor				
Function	MCU Pin	Pin Name	Function Name	Voltage
TEMP_ADC	U3D(22)	PF10	ADC3_IN8	+3.3 V

Serial Flash 8 Mbit				
U2	MCU Pin	Pin Name	Function Name	Voltage
1	SPI1_NSS	U3B(40)	PA4	+3.3 V
2	SPI1_MISO	U3B(42)	PA6	+3.3 V
3	+3.3 V	-	-	+3.3 V
4	GND	-	-	GND
5	SPI1_MOSI	U3B(43)	PA7	+3.3 V
6	SPI1_SCK	U3B(41)	PA5	+3.3 V
7	+3.3 V	-	-	+3.3 V
8	+3.3 V	-	-	+3.3 V

NEBULA 1.0
IoT DEVELOPMENT KIT
QUICK START GUIDE

Product Overview

The Nebula™ board is an IoT cloud ready board which allows developers to quickly prototype and deploy their IoT ecosystems.

Wireless connectivity is supported by the Murata 1DX module which is powered by the Cypress CYW4343W Wi-Fi (802.11 b/g/n) and Bluetooth Smart Ready (V4.1 +EDR) chipset radio. The module is designed to fit into small spaces and is smaller than a dime. The Nebula™ is driven by the STM32F429 ARM Cortex-M4 Microcontroller and includes 8 Mb of serial flash.

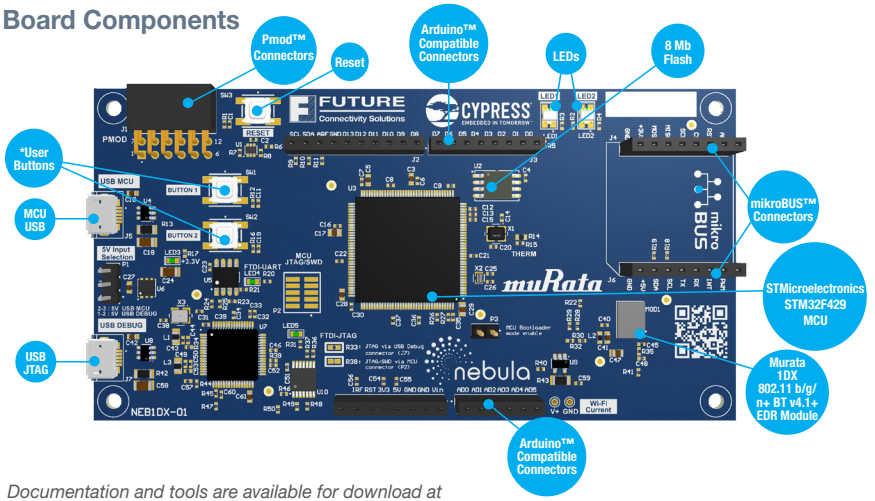
The Nebula™ board supports application development through Cypress' WICED (Wireless Internet Connectivity for Embedded Devices) platform. WICED is the only SDK that combines wireless, MCUs and memory in one environment that runs on Windows, OS X and Linux through Eclipse-based IDE.

Equipped to support 4 different interfaces to access the STM32F429 peripherals, the Nebula™ board enables developers to create any IoT application:

1. **Arduino™ Compatible Shield**
2. **mikroBUS™ Socket**
3. **Pmod™ Type 2A**
4. **USB Device**

The Nebula™ board has been designed for novices and expert developers alike looking to explore the vast opportunities in IoT applications such as asset tracking, energy management, fitness, lighting controls, HVAC, portable controls, security and building automation.

Board Components



Documentation and tools are available for download at

https://community.cypress.com/community/partners/future-connectivity-solutions

mikroBUS Adapter					
J4	Function	MCU Pin	Port Name	Function Name	Voltage
1	MIKRO_AD	U3B (37)	PA3	ADC123_IN3	+3.3 V
2	MIKRO_RST	U3D (12)	PF2	GPIO output	+3.3 V
3	MIKRO_CS	U3D (3)	PE4	SPI4_NSS	+3.3 V
4	MIKRO_SCK	U3D (1)	PE2	SPI4_CLK	+3.3 V
5	MIKRO_MISO	U3D (4)	PE5	SPI4_MISO	+3.3 V
6	MIKRO_MOSI	U3D (5)	PE6	SPI4_MOSI	+3.3 V
7	+3.3 V	-	-		+3.3 V
8	GND	-	-		GND

mikroBUS Adapters					
J6	Function	MCU Pin	Pin Name	Function Name	Voltage
1	MIKRO_PWM	U3B (36)	PA2	Timer (CH1 or CH3)	+3.3 V
2	MIKRO_INT	U3C (26)	PC0	GPIO Input	+3.3 V
3	MIKRO_RX	U3D (59)	PE8	UART7_TX	+3.3 V
4	MIKRO_TX	U3D (58)	PE7	UART7_RX	+3.3 V
5	MIKRO_SCL	U3D (11)	PF1	I²C2_SCL	+3.3 V
6	MIKRO_SDA	U3D (10)	PF0	I²C2_SDA	+3.3 V
7	+5 V	-	-		+5 V
8	GND	-	-		GND

Arduino Connectors					
J8	Function	MCU Pin	Pin Name	Function Name	Voltage
1	NC	-	-		-
2	GND	-	-		GND
3	GND	-	-		GND
4	+5 V	-	-		+5 V
5	+3.3 V	-	-		+3.3 V
6	ARD_RESET	U3C (123)	PD7	GPIO Output	+3.3 V
7	+3.3 V	-	-		+3.3 V
8	NC	-	-		-

Arduino Connectors					
J3	Function	MCU Pin	Pin Name	Function Name	Voltage
1	ARD_IO0	U3C (78)	PD9	USART3_RX	+3.3 V
2	ARD_IO1	U3C (77)	PD8	USART3_TX	+3.3 V
3	ARD_IO2	U3C (80)	PD11	USART3_CTS	+3.3 V
4	ARD_IO3	U3C (81)	PD12	USART3_RTS	+3.3 V
5	ARD_IO4	U3D (63)	PE10	GPIO	+3.3 V
6	ARD_IO5	U3D (64)	PE11	GPIO	+3.3 V
7	ARD_IO6	U3D (65)	PE12	GPIO	+3.3 V
8	ARD_IO7	U3D (66)	PE13	GPIO	+3.3 V

Note 1: USER_BUTTON2 is not able to trigger an external interrupt due to it sharing an interrupt line with the WiFi module. The state of the button pin would need to be continuously monitored for proper use.

Note 2: The mikroBUS and PMOD connector external interrupt pins share an interrupt line. This limits only one of the pins to be able to cause an interrupt. The other pin would need to be continuously monitored for proper use if devices are connected to both interface connectors.

Arduino Connectors					
J9	Function	MCU Pin	Pin Name	Function Name	Voltage
1	AD_CH0	U3D (13)	PF3	ADC3_IN9	+3.3 V
2	AD_CH1	U3D (14)	PF4	ADC3_IN14	+3.3 V
3	AD_CH2	U3D (15)	PF5	ADC3_IN15	+3.3 V
4	AD_CH3	U3D (19)	PF7	ADC3_IN5	+3.3 V
5	AD_CH4	U3D (20)	PF8	ADC3_IN6	+3.3 V
6	AD_CH5	U3D (21)	PF9	ADC3_IN7	+3.3 V

Arduino Connectors					
J2	Function	MCU Pin	Pin Name	Function Name	Voltage
1	ARD_IO8	U3D (142)	PE1	UART8_TX	+3.3 V
2	ARD_IO9	U3D (141)	PE0	UART8_RX	+3.3 V
3	ARD_IO10	U3B (73)	PB12	SPI2_NSS	+3.3 V
4	ARD_IO11	U3C (29)	PC3	SPI2_MOSI	+3.3 V
5	ARD_IO12	U3C (28)	PC2	SPI2_MISO	+3.3 V
6	ARD_IO13	U3B (74)	PB13	SPI2_SCK	+3.3 V
7	GND	-	-		GND
8	ARD_AVREF	-	+3.3 V		+3.3 V
9	ARD_SDA	U3B (137)	PB7	I²C1_SDA	+3.3 V
10	ARD_SCL	U3B (136)	PB6	I²C1_SCL	+3.3 V

Pmod Connectors					
J1	Function	MCU Pin	Pin Name	Function Name	Voltage
1	PMOD_D0	U3E (93)	PG8	SPI6_NSS	+3.3 V
2	PMOD_D1	U3E (129)	PG14	SPI6_MOSI	+3.3 V
3	PMOD_D2	U3E (127)	PG12	SPI6_MISO	+3.3 V
4	PMOD_D3	U3E (128)	PG13	SPI6_SCK	+3.3 V
5	GND	-	-	-	GND
6	+3.3V	-	-	-	+3.3 V
7	PMOD_D4	U3B (34)	PA0	PMOD_INT/ USART4_TX	+3.3 V
8	PMOD_D5	U3B (35)	PA1	PMOD_RESET/ USART4_RX	+3.3 V
9	PMOD_D6	U3C (114)	PD0	CAN1_RX	+3.3 V
10	PMOD_D7	U3C (115)	PD1		+3.3 V
11	GND	-	-		GND
12	+3.3V	-	-		+3.3 V

LED and User Buttons				
Function	MCU Pin	Pin Name	Function Name	LEVEL
LED1_GREEN	U3D (49)	PF11	GPIO Output	Active High
LED1_RED	U3B (48)	PB2	GPIO Output	Active High
LED2_GREEN	U3B (47)	PB1	GPIO Output	Active High
LED2_RED	U3B (46)	PB0	GPIO Output	Active High
USER_BUTTON1	U3E (91)	PG6	GPIO Input	Active High
USER_BUTTON2	U3E (92)	PG7	GPIO Input	Active High