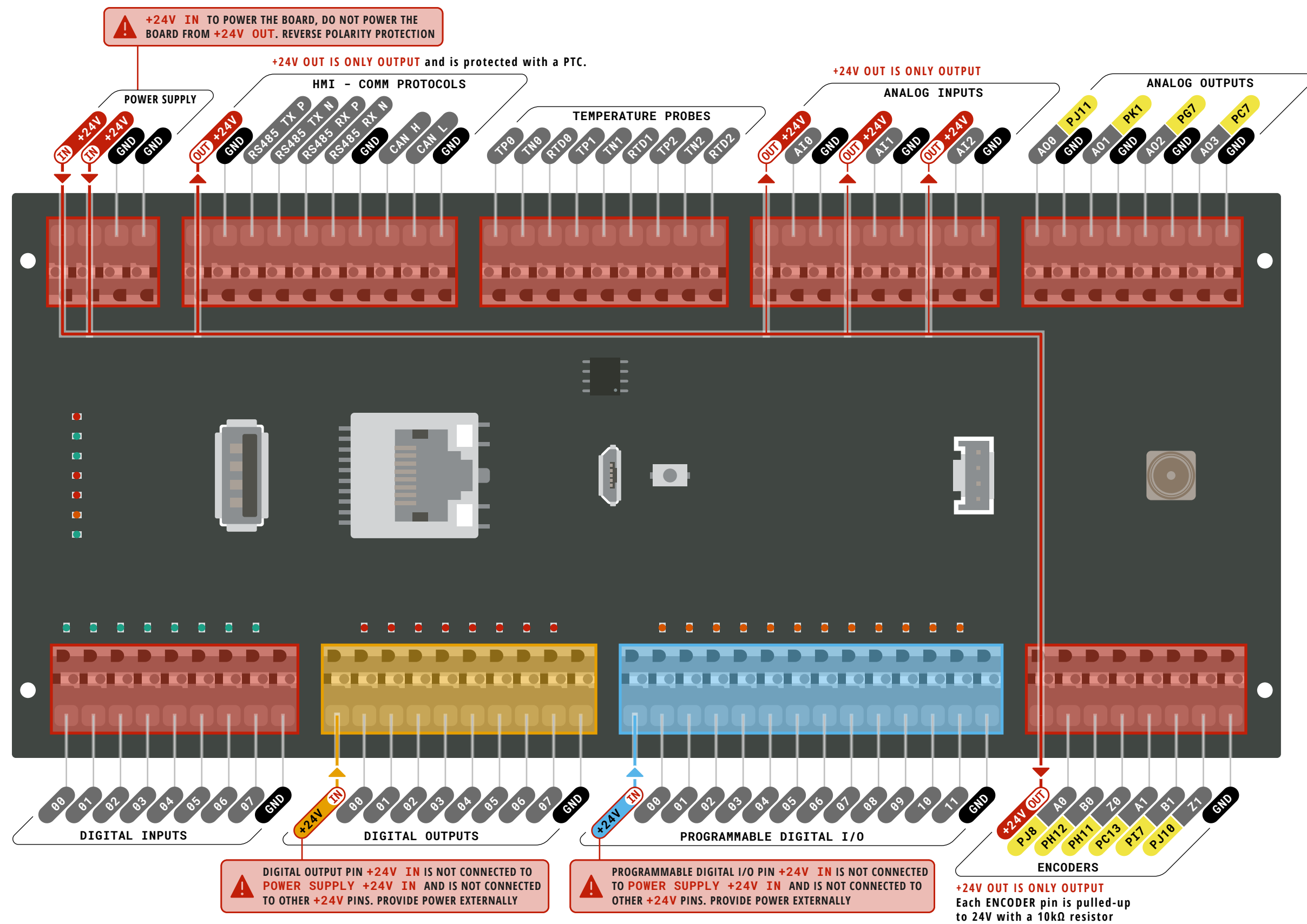


TOP VIEW



Legend:

- Power
- Power Input
- Power Output
- Ground
- +24V programmable outputs
- +24V digital outputs
- GPIO Digital External
- Analog External
- Main Part
- Secondary Part
- Internal Component
- Other Pins (Reset, System Control, Debugging)
- LED
- RGB LED
- Other

GND is the same all over the board



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RS485, RS422, RS232

Pin Name	Functionality: RS485 / RS422 full duplex	Functionality: RS485 half duplex	Functionality: RS232
RS485 TX P	TX+	Data+	NOT CONNECTED
RS485 TX N	TX-	Data-	TXD
RS485 RX P	RX+	NOT CONNECTED	RXD
RS485 RX N	RX-	NOT CONNECTED	NOT CONNECTED

i

120Ω termination resistors are integrated and can be connected/disconnected via FW configuration

CAN

Pin Name	Functionality: CAN
CAN H	CAN_H
CAN L	CAN_L

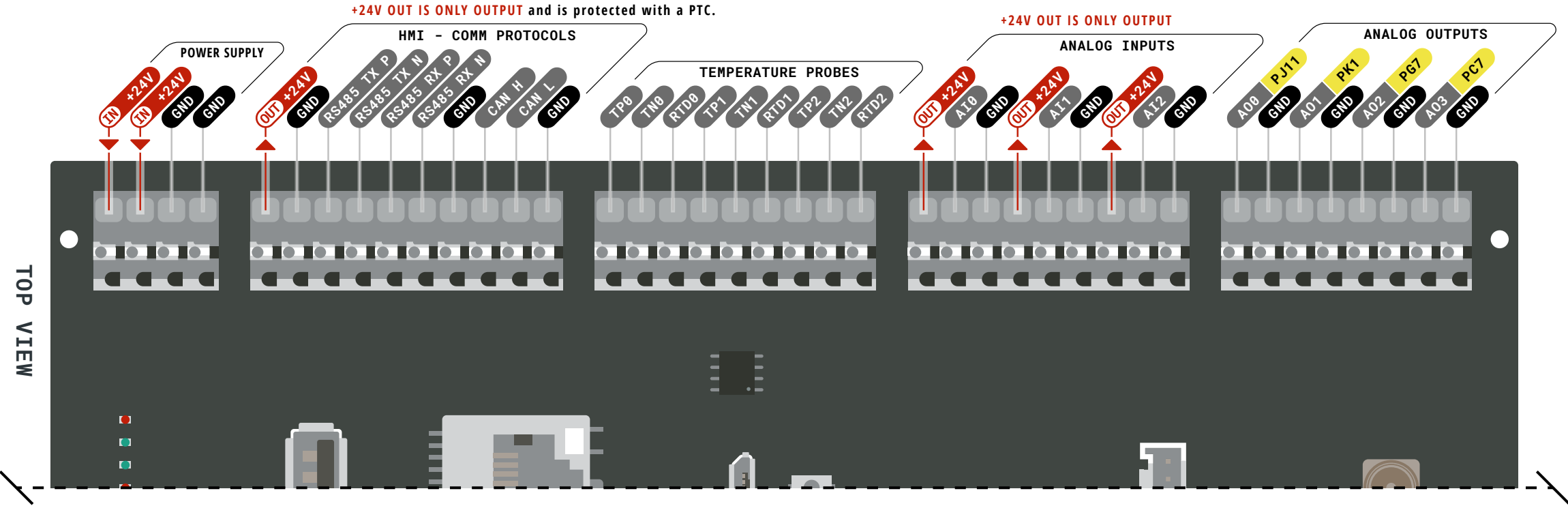
120Ω ON BOARD TERMINATIONS

CAN H

CAN L

ON BOARD Capacitor 4.7nF

GND



TEMPERATURE PROBES

TERMOCOUPLE SUPPORTED J K

Connection diagram:

TP*

TN*

RTD*

CONNECT THE THERMOCOUPLE NEGATIVE TO TN, NOT TO GND

RTD SUPPORTED PT100

Connection diagram, with 2 wires RTD:

TP*

TN*

RTD*

ADD JUMPER BETWEEN TP* AND RTD* PINS

Connection diagram, with 3 wires RTD:

TP*

TN*

RTD*

TEMPERATURE PROBES PINS CAN BE CONNECTED ONLY WITH COMPATIBLES THERMOCOUPLES OR RTDs, NO DIRECT VIN SHOULD BE CONNECTED TO THE PINS

ANALOG INPUTS

THE 3 ANALOG INPUT PINS CAN MEASURE VOLTAGE IN 3 WAYS:

0-10V function (DEFAULT):

AI*

GND

MAXIMUM INPUT VOLTAGE IS 10V

4-20mA function:

+24V OUT

AI*

MAXIMUM CURRENT IS 20mA
MAXIMUM VOLTAGE IS 3V3

NTC function:

AI*

GND

All +24V OUT ANALOG INPUT pins are connected and protected by a single PTC.

PTC

OUT +24V

OUT +24V

OUT +24V

PTC MAXIMUM CURRENT IS 500mA

DO NOT CONNECT DIRECTLY +24V IN OR +24V OUT TO AI*

BE CAREFUL BEFORE CHANGING THE FUNCTION THAT THE WIRING IS CORRECTLY DONE, HIGH RISK OF BOARD DAMAGE!

ANALOG OUTPUTS

Each pin can be independently set up to 10V and can source up to 20mA.

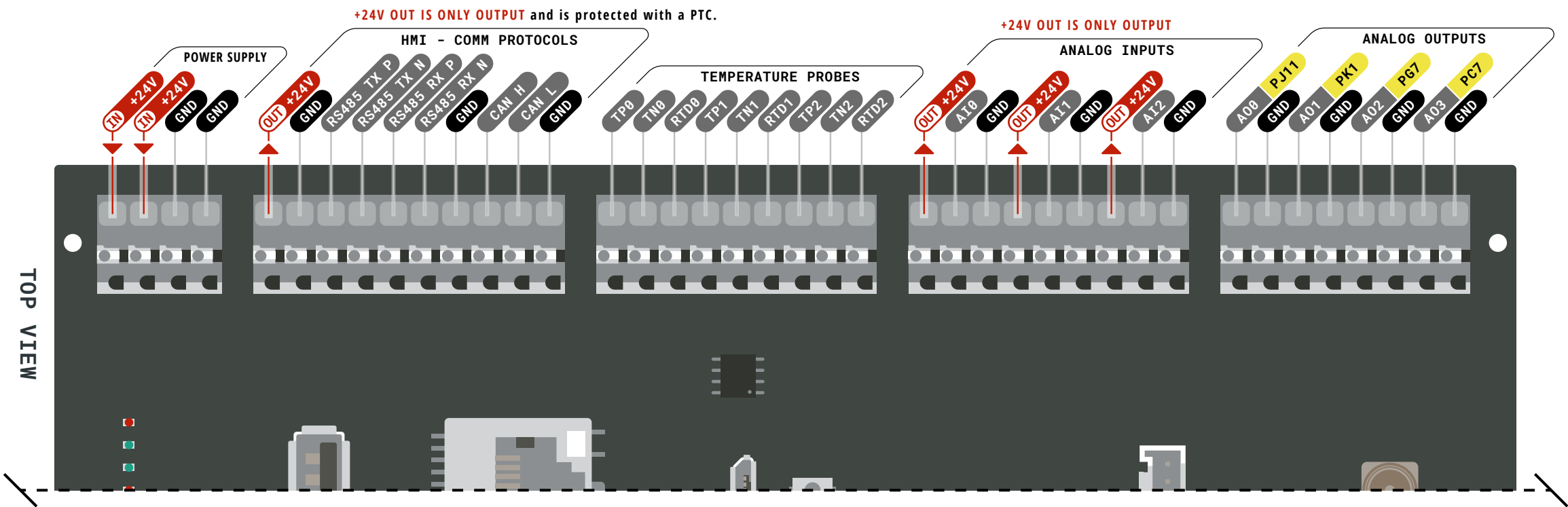
HMI - COMM PROTOCOLS

+24V OUT is protected with a PTC.

PTC

OUT +24V

PTC MAXIMUM CURRENT IS 500mA



Legend:

Power

Power Input

Power Output

Ground

+24V programmable outputs

+24V digital outputs

GPIO Digital External

Analog External

Main Part

Secondary Part

Internal Component

Other Pins (Reset, System Control, Debugging)

LED

RGB LED

Other

GND is the same all over the board

PORTENTA MACHINE CONTROL

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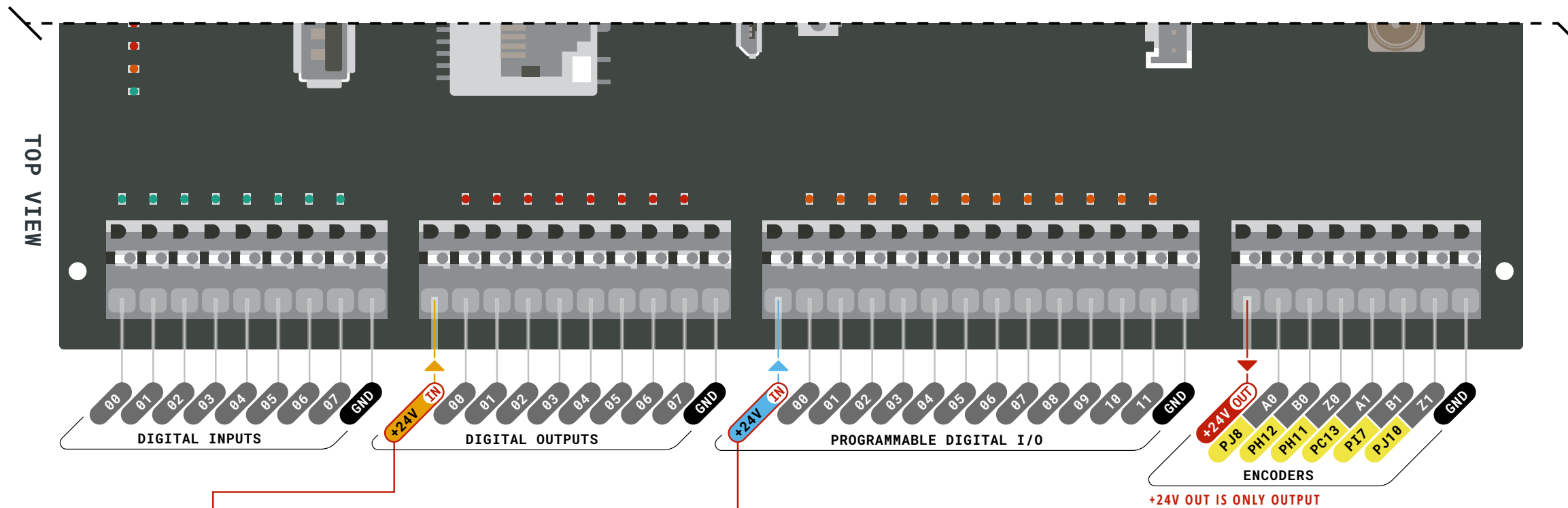
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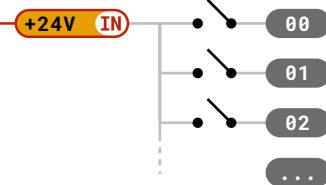
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⚠️ DIGITAL OUTPUT PIN +24V IN IS NOT CONNECTED TO POWER SUPPLY +24V IN AND IS NOT CONNECTED TO OTHER +24V PINS. PROVIDE POWER EXTERNALLY

DIGITAL OUTPUTS

- The pins are connected with the +24V IN with high side switches:

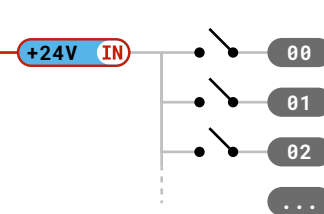


MAXIMUM CURRENT IS 500mA FOR EACH PIN

⚠️ PROGRAMMABLE DIGITAL I/O PIN +24V IN IS NOT CONNECTED TO POWER SUPPLY +24V IN AND IS NOT CONNECTED TO OTHER +24V PINS. PROVIDE POWER EXTERNALLY

PROGRAMMABLE DIGITAL I/O

- The output voltage can be readed, if HIGH or LOW.
- The pins are connected with the +24V IN with high side switches:



MAXIMUM CURRENT IS 500mA FOR EACH PIN

ENCODERS

+24V OUT is protected with a PTC.



PTC MAXIMUM CURRENT IS 500mA

Each pin is pulled-up to 24V with a 10kΩ resistor.

Legend:

- Power
- Power Input
- Power Output
- Ground
- +24V programmable outputs
- +24V digital outputs

- GPIO Digital External
- Analog External
- Main Part
- Secondary Part
- Internal Component
- Other Pins (Reset, System Control, Debugging)

- LED
- RGB LED
- Other

⚠️ GND is the same all over the board

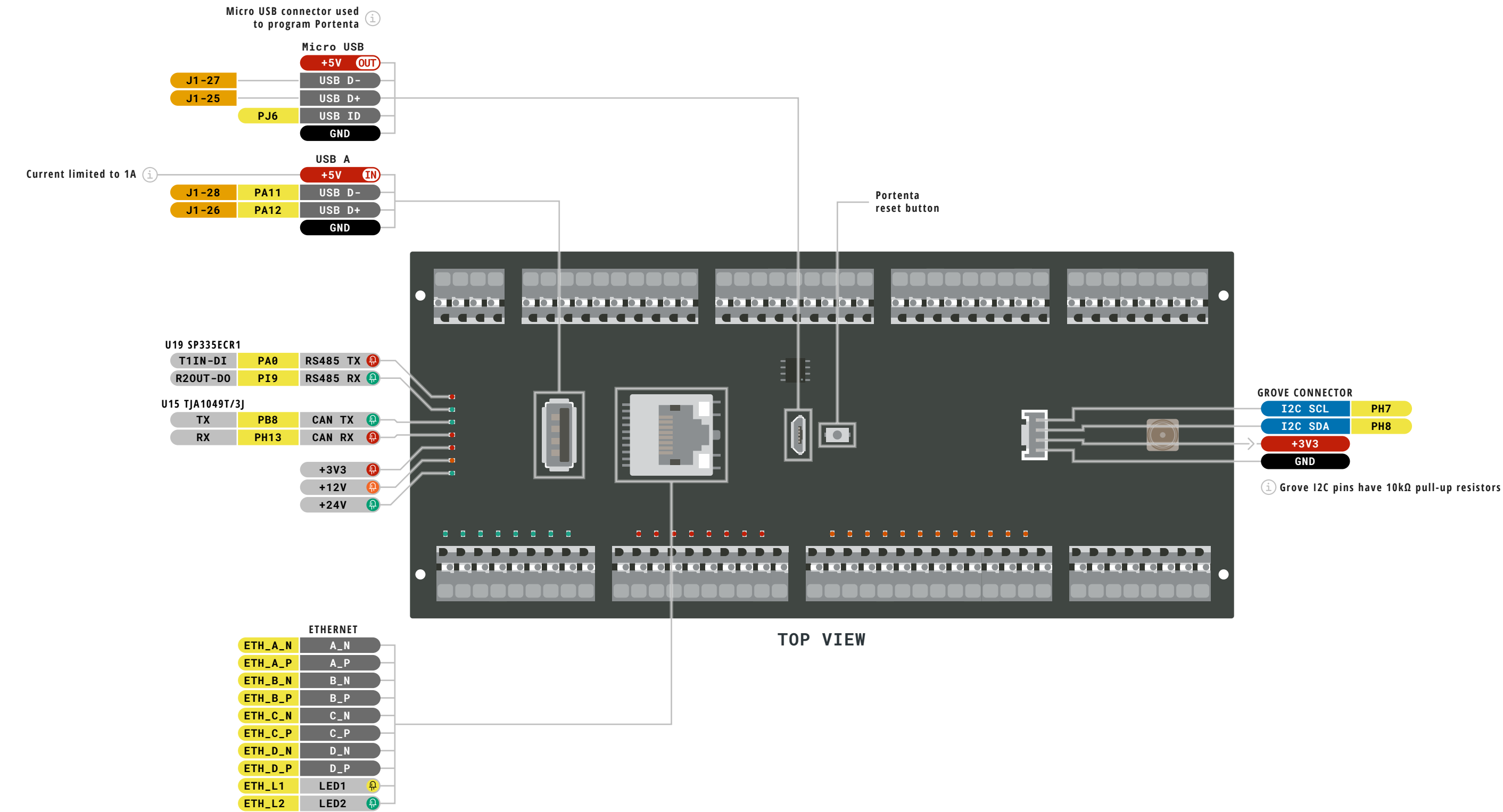
PORTENTA
MACHINE
ARDUINO CONTROL

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Legend:

- Power
- Power Input
- Power Output
- Ground
- +24V programmable outputs
- +24V digital outputs

- GPIO Digital External
- Analog External
- Main Part
- Secondary Part
- Internal Component
- Other Pins (Reset, System Control, Debugging)

- I2C
- SPI
- UART/USART
- Other SERIAL Communication
- Analog
- PWM/Timer
- Default
- Default
- Default
- Default

- LED
- RGB LED
- Other

GND is the same all over the board

PORTENTA MACHINE CONTROL

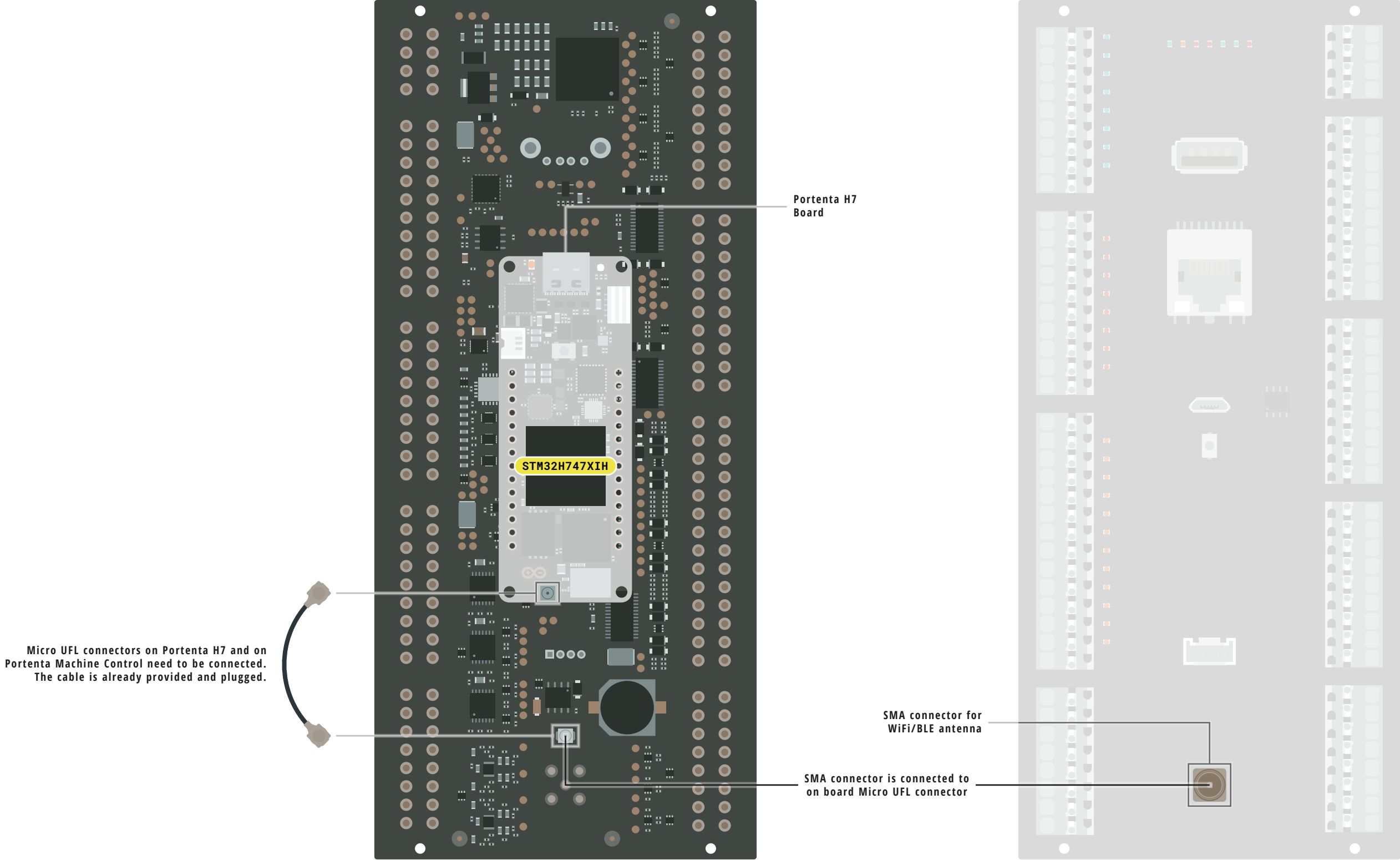
SKU code: AKX00032
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BOTTOM VIEW



Legend:

- | | | | |
|---------------------------|--------------|---|---------|
| Power | Power Input | GPIO Digital External | LED |
| | Power Output | Analog External | RGB LED |
| Ground | | Main Part | Other |
| +24V programmable outputs | | Secondary Part | |
| +24V digital outputs | | Internal Component | |
| | | Other Pins (Reset, System Control, Debugging) | |

! GND is the same all over the board

**PORTENTA
MACHINE
ARDUINO CONTROL**

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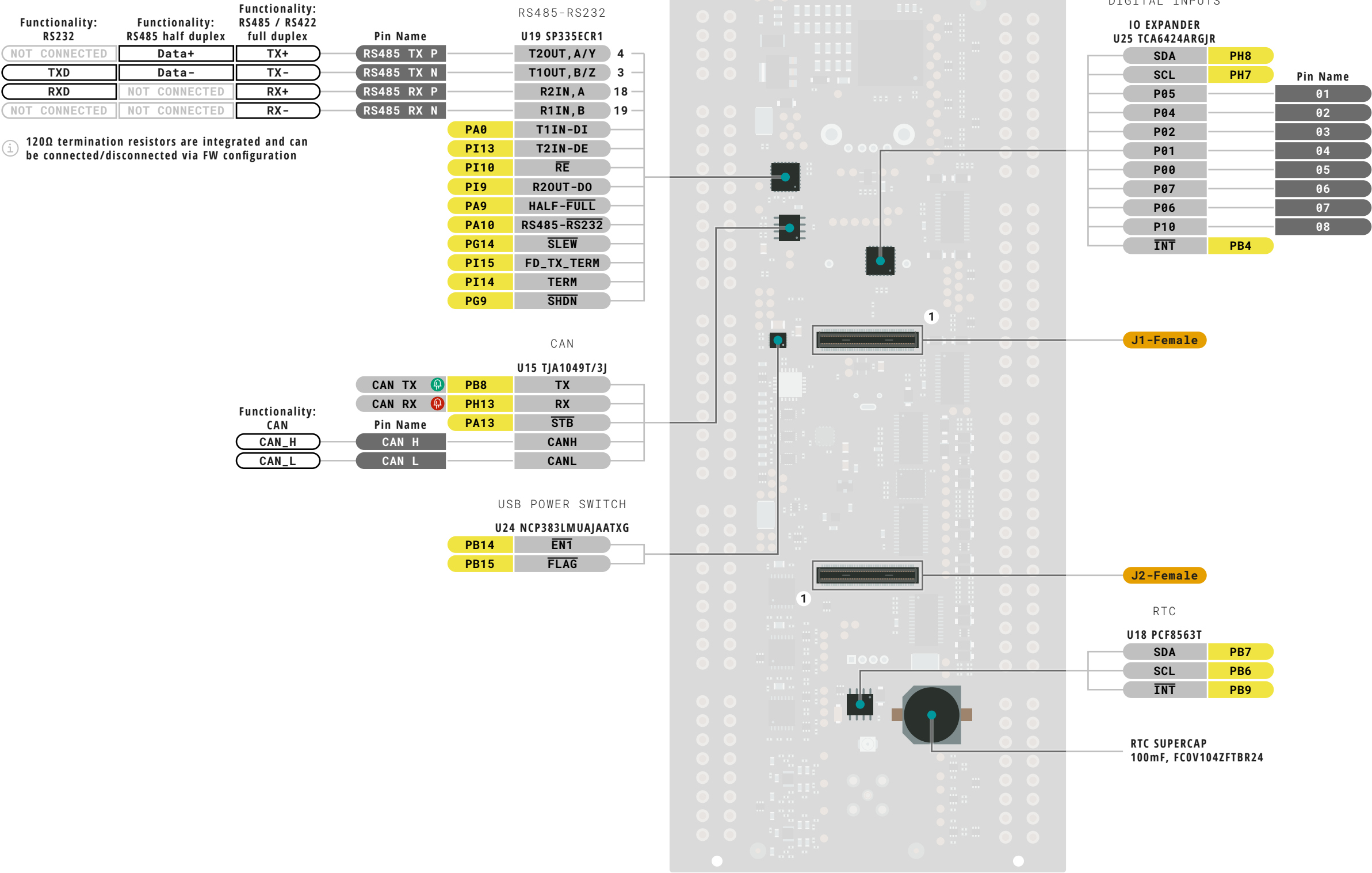
W A R N I N G !

Advanced Section

The following information is for advanced use only and
may not be officially supported by Arduino software



BOTTOM VIEW



Pin Name

RS485 TX P

RS485 TX N

RS485 RX P

RS485 RX N

RS485-RS232

U19 SP335ECR1

T2OUT,A/Y

T1OUT,B/Z

R2IN,A

R1IN,B

T1IN-DI

T2IN-DE

RE

R2OUT-D0

HALF-FULL

RS485-RS232

SLEW

FD_TX_TERM

TERM

SHDN

CAN

U15 TJA1049T/3J

CAN TX

CAN RX

Pin Name

CAN H

CAN L

PB8

PH13

PA13

TX

RX

STB

CANH

CANL

Functionality:
CAN

CAN_H

CAN_L

USB POWER SWITCH

U24 NCP383LMUAJAATXG

PB14

PB15

EN1

FLAG

DIGITAL INPUTS

IO EXPANDER

U25 TCA6424ARGJR

SDA

SCL

P05

P04

P02

P01

P00

P07

P06

P10

INT

PH8

PH7

Pin Name

01

02

03

04

05

06

07

08

PB4

RTC

U18 PCF8563T

SDA

SCL

INT

PB7

PB6

PB9

RTC SUPERCAP

100mF, FCOV104ZFTBR24

J1-Female

J2-Female

Legend:

- Power

Power Input

Power Output

Ground

+24V programmable outputs

+24V digital outputs
- GPIO Digital External

Analog External

Main Part

Secondary Part

Internal Component

Other Pins (Reset, System Control, Debugging)
- LED

RGB LED

Other

GND is the same all over the board

PORTENTA
MACHINE
ARDUINO CONTROL

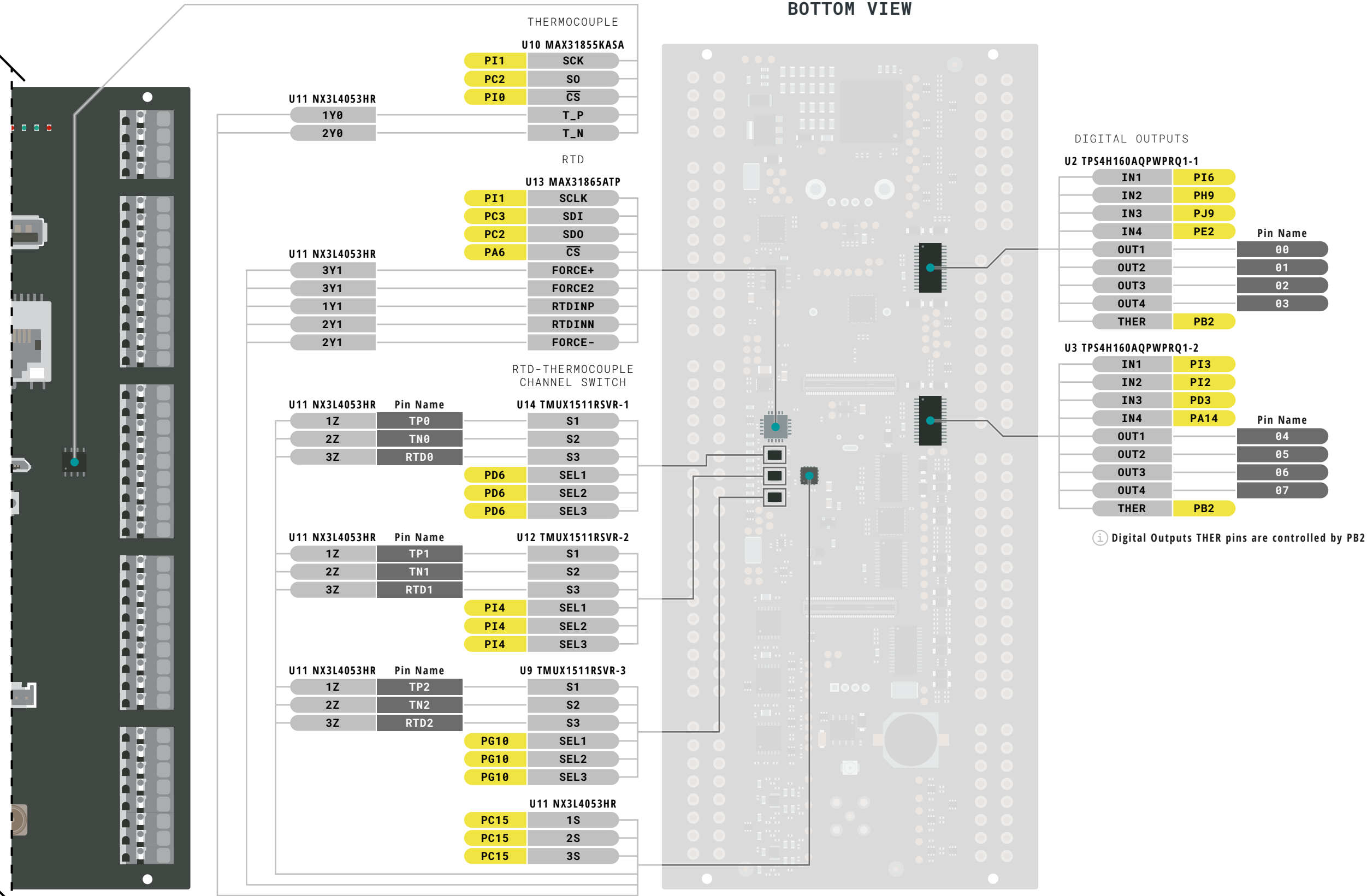
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BOTTOM VIEW



! Digital Outputs THER pins are controlled by PB2

Legend:

- Power
- Power Input
- Power Output
- Ground
- +24V programmable outputs
- +24V digital outputs
- GPIO Digital External
- Analog External
- Main Part
- Secondary Part
- Internal Component
- Other Pins (Reset, System Control, Debugging)
- LED
- RGB LED
- Other

! GND is the same all over the board

**PORTENTA
MACHINE
ARDUINO CONTROL**

SKU code: AKX00032
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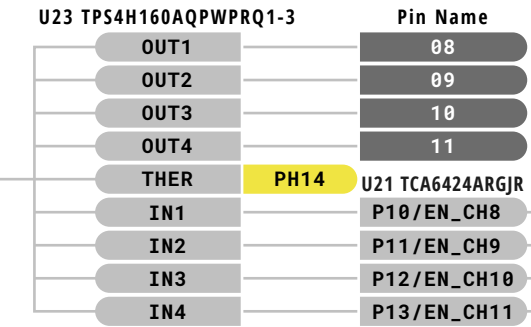
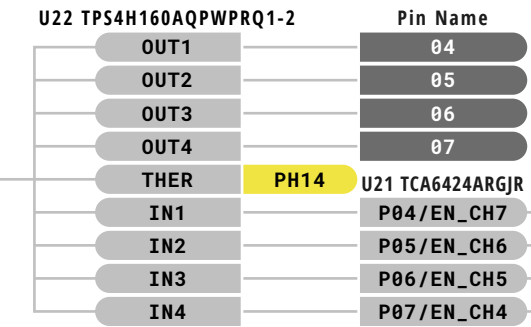
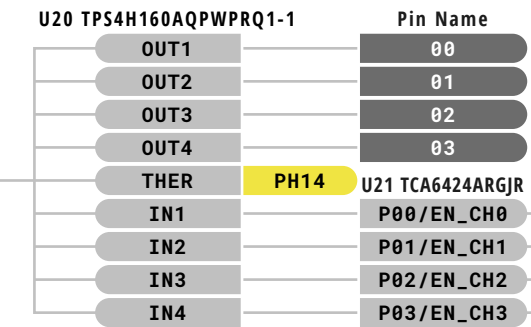
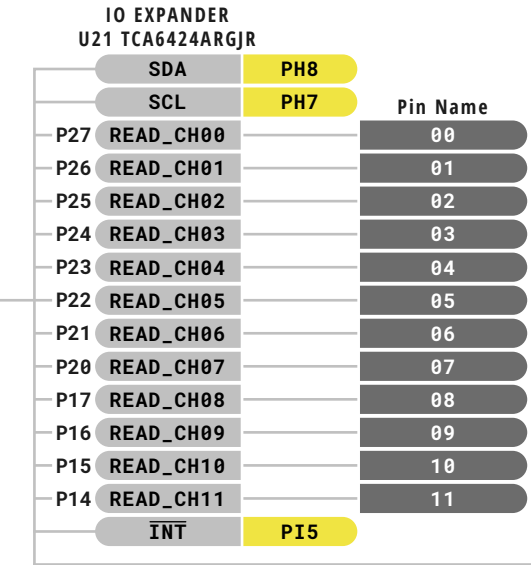
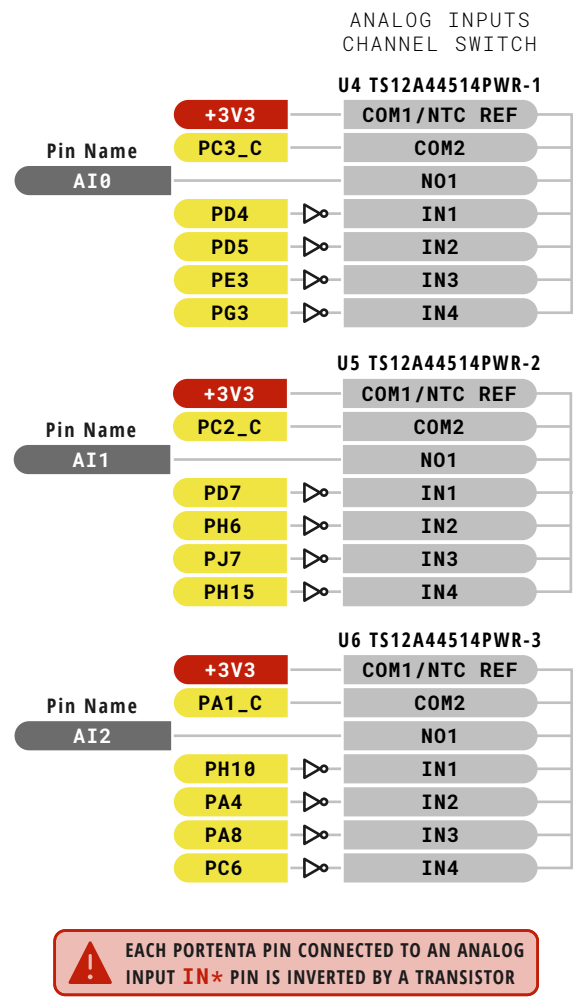
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BOTTOM VIEW

PROGRAMMABLE DIGITAL I/O



Digital Programmable THER pins are controlled by PH14

Legend:

- Power

Power Input

Power Output

Ground

+24V programmable outputs

+24V digital outputs
- GPIO Digital External

Analog External

Main Part

Secondary Part

Internal Component

Other Pins (Reset, System Control, Debugging)
- LED

RGB LED

Other

GND is the same all over the board

PORTENTA
MACHINE
ARDUINO CONTROL

SKU code: AKX00032
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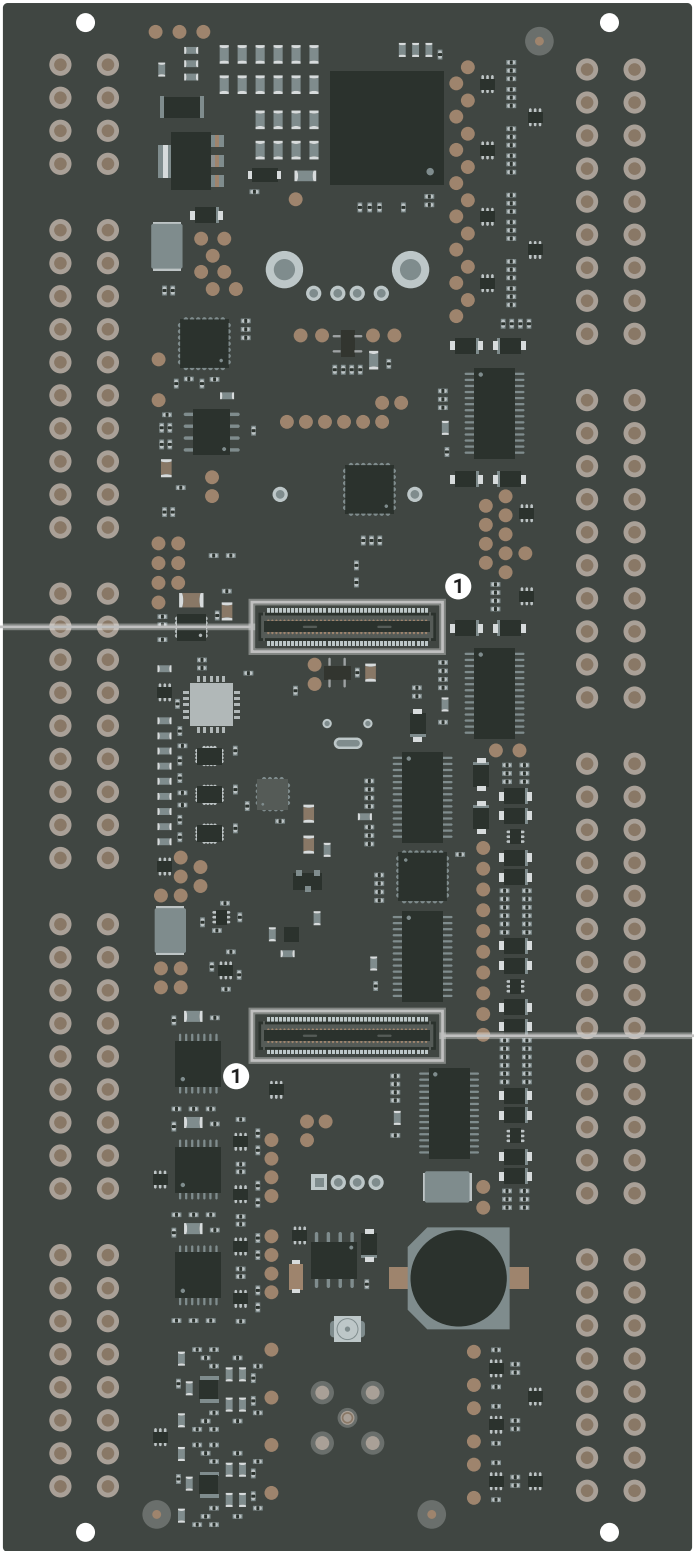
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BOTTOM VIEW

J1-Female			
ETH A+	1	2	
ETH A-	3	4	
ETH B+	5	6	
ETH B-	7	8	
	9	10	DSI D1+
	11	12	DSI D1-
	13	14	DSI D0+
	15	16	DSI D0-
ETH L1	17	18	DSI CK+
ETH L2	19	20	DSI CK-
VIN IN	21	22	GND
USB1 VBUS OUT	23	24	
USB1 D+	25	26	USB0 D+
USB1 D-	27	28	USB0 D-
USB1 ID	29	30	
GND	31	32	IN VIN
UART1 TX	33	34	UART0 TX
UART1 RX	35	36	UART0 RX
UART1 RTS	37	38	UART0 RTS
UART1 CTS	39	40	UART0 CTS
VIN IN	41	42	GND
I2C1 SDA	43	44	I2C0 SDA
I2C1 SD6	45	46	I2C0 SCL
GND	47	48	IN VIN
CAN1 TX	49	50	
CAN1 RX	51	52	
VSYS OUT	53	54	GND
SDC CLK	55	56	I2S MCK
SDC CMD	57	58	I2S WS
SDC D0	59	60	I2S DI
SDC D1	61	62	I2S D0
SDC D2	63	64	OUT VSYS
SDC D3	65	66	DMIC CK
	67	68	DMIC D0
	69	70	
	71	72	OUT V-SDCARD
RESET	73	74	
SWDIO	75	76	
SWCK	77	78	
SWO	79	80	



J2-Female			
ADC A7	80	79	ADC A3
ADC A6	78	77	ADC A2
ADC A5	76	75	ADC A1
ADC A4	74	73	ADC A0
ADC VREF- OUT	72	71	OUT ADC VREF+
GND	70	69	OUT VCC/+3V3
PWM 10	68	67	PWM 5
PWM 9	66	65	PWM 4
PWM 8	64	63	PWM 3
PWM 7	62	61	PWM 2
PWM 6	60	59	PWM 1
GPIO 6	58	57	GND
GPIO 5	56	55	
GPIO 4	54	53	SAI D0
GPIO 3	52	51	SAI FS
GPIO 2	50	49	SAI CK
GPIO 1	48	47	I2C2 SCL
GPIO 0	46	45	I2C2 SDA
GND	44	43	OUT VCC/+3V3
SPI1 COPI	42	41	
SPI1 CIP0	40	39	
SPI1 CK	38	37	
SPI1 CS	36	35	
VCC OUT	34	33	GND
	32	31	
	30	29	
UART2 RX	28	27	UART3 RX
UART2 TX	26	25	UART3 TX
GND	24	23	OUT VCC/+3V3
CAM HS	22	21	
CAM CLK	20	19	
CAM VS	18	17	
CAM D0	16	15	
CAM D1	14	13	
CAM D2	12	11	
CAM D3	10	9	
CAM D4	8	7	COINCELL
CAM D5	6	5	POWER_ON_REQ
CAM D6	4	3	BOOT_SOURCE
CAM D7	2	1	FORCE_BOOTLOADER

Legend:

- Power

IN Power Input

OUT Power Output

Ground

+24V programmable outputs

+24V digital outputs
- GPIO Digital External

Analog External

Main Part

Secondary Part

Internal Component

Other Pins (Reset, System Control, Debugging)

- LED
- RGB LED
- Other

! GND is the same all over the board

PORTENTA
MACHINE
ARDUINO CONTROL

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