CENTAURUS 3

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Centaurus 3

Overview

- 40 x PWM HSD Power Outputs
- 5x PWM LSD Outputs
- Expandable I/O with EtherCAT™
- Ultimate in power control & configuration

Cosworth's Centaurus 3 offers 40 HSD power outputs all with PWM capability, delivering a greater amount of power outputs and configurability than its IPS32 predecessor. Think of the Centaurus 3 as the Centaurus 5 baby brother - fewer, simplified outputs, but still packing market leading onboard data logging, processing power and output control. Take control of your power management requirements, leveraging the hugely powerful Pi Maths and Logic functionality to execute complex output control strategies and failsafe's.

Cosworth's power box range also includes support for ethernet driven displays and steering wheels (CDU 4.3, 7, 10.3, CCW Mk2, CCW Mk3, and I/O expansion via EtherCAT™, providing market leading levels of resolutions and synchronicity with the SJU (Synchronous Junction Unit).
Cosworth's Auto-Coding platform is available on the Centaurus 3, allowing for custom strategies to be developed in a MATLAB/Simulink® environment then deployed on to the device

Electrical data	
Operating Voltage	6.6 to 31.5V
Current consumption*1	925mA @ 14V
Load Dump Protection	ISO 16750-2:2012 pulse 5a, Ri(min) = 1Ω"
Communication	
Ethernet	2x 100MB/S
CAN Ports	2 x Independent CAN Ports Max BAUD rate; 1MBit/s 128x Message Buffers per Port Software selectable 120Ω Termination
LIN Ports	2 x LIN Bus Master
EtherCAT	1 x EtherCAT Master
Serial Debug Ports	1 x Bi-Directional RS232 Fixed @115200 BAUD Rate
Mechanical data	
Size	235 x 172 x 33.55 mm
Weight	1250 grams
Environmental	IP66
Material	6082-T6 Anodized
Vibration	Cosworth DV-V©
Operating Temp	-20ºC to + 70ºC
Storage Temp	-20ºC to + 80ºC

I/O	
HSD Outputs	6 x 2.5A 488Hz PWM 15 x 7.5A 244Hz PWM 10 x 12A 122Hz PWM 2 x 24A 122Hz PWM 2 x 25A 122Hz PWM with Wiper 2 x 25A 244Hz PWM with Hi-Surge 2 x 50A 122Hz PWM 1 x 75A 122Hz PWM
LSD Outputs	5 x 488Hz @ 0.2A
Switch Inputs	6 x Switch inputs to VBatt or GND
Analogue Inputs	4 x 0 - 5V Filtered 3dB frequency of ~15.9kHz 2.1M Ω Impedance 12-bit Resolution
Sensor Supplies	4 x Selectable 5/VBatt 100mA @ 5V 700mA @ VBatt
Motion Sensor	3-Axis Accelerometer ±16g
Internal Monitoring	Battery Voltage Box Temperature Internal PSU's Excitation Voltage Power Output Voltage Power Output Current Power Output Status
LEDs	6 x System Status LEDs 40 x Power Output Status LEDs

Product Variant Matrix

Token Logging Options

Variant	Centaurus 3 Plus	Centaurus 3 Pro	Centaurus 3 Ultra
Part Number	01P-610160-Plus	01P-610160-Pro	01P-610160-Ultra
Capacity (MB)	512MB	512MB	1024MB
Bandwidth (bytes/sec)	50,000	50,000	100,000
Sampling Rate (Hz)	200	500	1,000
Event Based Sampling Rates (Hz)	200	500	1,000
No. of Event Based Logging Tables	1	3	5
Total no. of Channels	2,048	2,048	2,048
Maths Channels	150	300	450
Logic Channels	Enabled	Enabled	Enabled
Analogue Inputs	4	4	4
Digital Inputs	6 (level)	6 (level)	6 (level)
CAN Ports	2	2	2
LIN Ports	2	2	2
Ethernet (100MB/s)	2	2	2
EtherCAT Ports	-	-	1
Ethernet Displays	-	48	48
Auto Coding Customer	Enabled	Enabled	Enabled
Auto Coding Developer	Upgrade option	Upgrade option	Upgrade option

Ordering Information

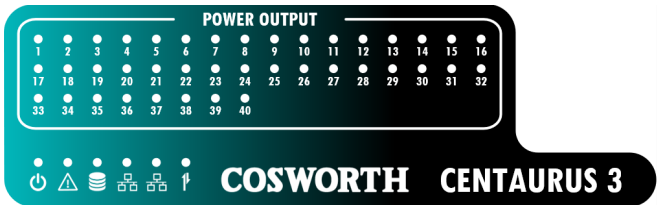
Part Number	
01I-610160	Centaurus 3
01P-610160-Plus	Plus Token
01P-610160-Pro	Pro Token
01P-610160-Ultra	Ultra Token
01P-610160-AC-DEV	Auto Coding Developer Token

Compatible Devices

Compatible Devices	
CDU 4.3	01D-640030
CDU 7.0	01D-640040
CDU 10.3	01D-640060
Badenia 5	01L-650080
Badenia 2	01L-650100
RLU	01L-650030
SJU	01L-650050
CCW Mk2	01D-641150
CCW Mk3	01D-641350

Software Information		
	Pi Toolset	Configuration software for power control and logging (v9 and above)
	Pi Toolbox	Professional Data Analysis (v10 and above)
	Auto-Coding via MATLAB/Simulink®	Customer auto-coding are available via MATLAB/ Simulink® and Cosworth Workspace Editor

LED Indicator Definitions

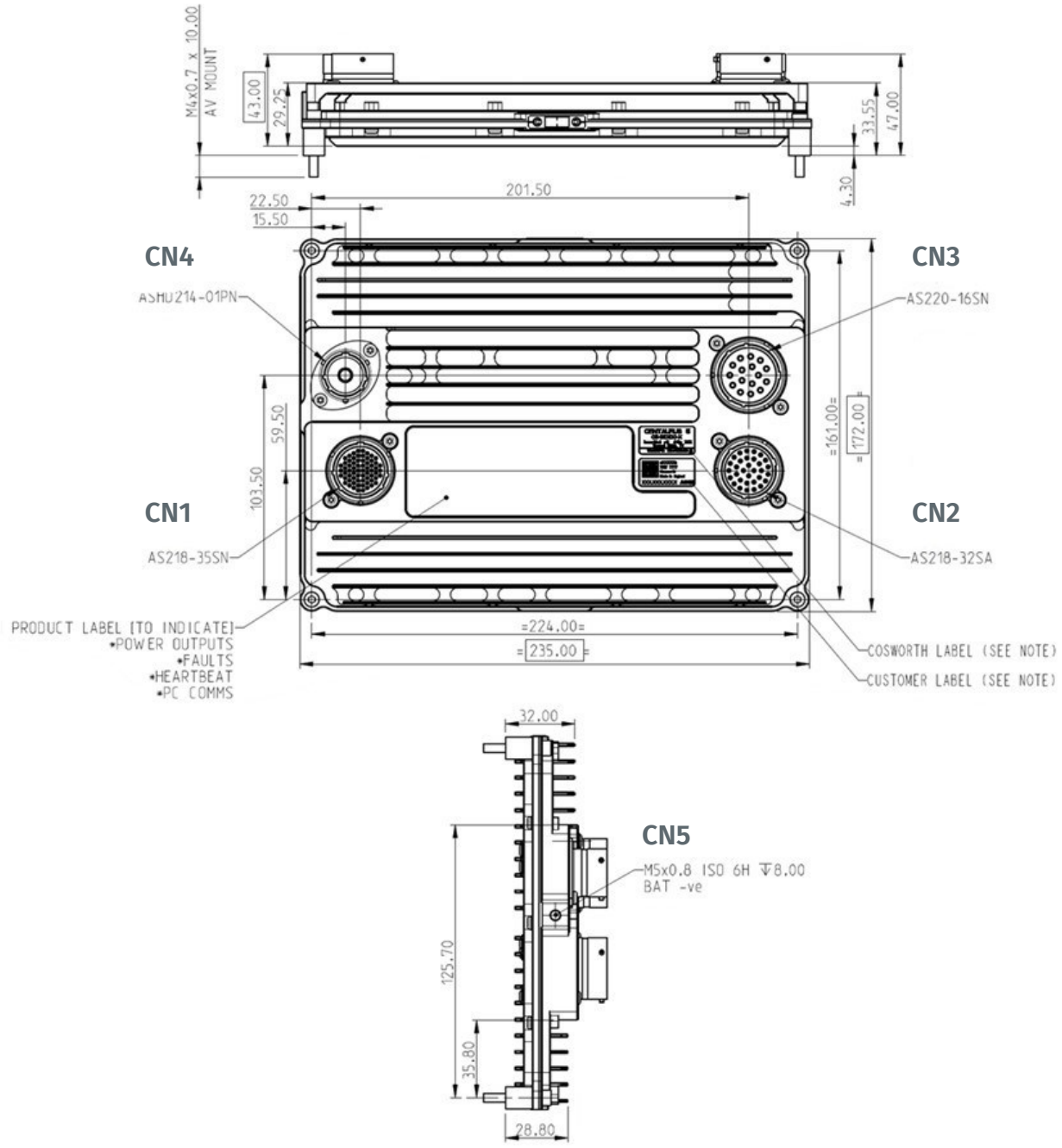


Legend	Function	Sequence	Period
⏻	No power to the Unit	Off	
	Initialising and waiting for clock sync	On	
	Unit operational	50% Flash (1Hz)	
⚠	During startup a single flash LED test	Long Single Pulse	
	Normal running operation	Off	
	Logger error or no dataset loaded	On	
🗄	During startup a single flash LED test	Long Single Pulse	
	Normal running operation	Off	
	Logger full and overwriting data	On	
🖧	100Base T. No connection established	Off	
	Connection established	50% Flash (1Hz)	
	Communication active	Flickering	
🖧	100Base T. No connection established	Off	
	Connection established	50% Flash (1Hz)	
	Communication active	Flickering	
	EtherCAT, no connection established	Off	
	Connection established	50% Flash (1Hz)	
	Communication active	Flickering	

Power Output LEDs

Legend	Function	Sequence	Period
●	Power Output Off	Off	
	Power Output On	On	
	Power Output Tripped	50% Flash (5Hz)	

Dimensions



Installation

When you install the Centaurus 3:

- Make sure that the unit is protected against severe vibrations by mounting using supplied AV mounting kit. Also make sure that the unit is not fouling other structures which may experience severe vibrations. The warranty will be void if mounted differently.
- Make sure that the unit is positioned in an area with an ambient temperature of less than 70°C or with sufficient cooling air flow to prevent over heating.
- Make sure that the unit is mounted away from sources of electrical interference.
- Make sure that the unit is mounted in position where unit will not come into contact with water.
- Make sure that the case is connected to ground via CN5 with 35mm^2 size cable.

Connector Information

All pin outs are grouped in function order, rather than pin order.

CN1 Connector

Connector	Mating Connector
AS218-35SN-943B	AS618-35PN

CN1 Pinout

Pin	Token Variant			Description
	Plus	Pro	Ultra	
34	DBatt+VE	DBatt+VE	DBatt+VE	Digital supply +VE[1]
43	DBatt-VE	DBatt-VE	DBatt-VE	Digital Supply -VE[2]
28	Shutdown#	Shutdown#	Shutdown#	Active Low System Shutdown[3]
41	ETH1-RX+	ETH1-RX+	ETH1-RX+	Ethernet 1 100BaseT for PC / expansion comms
42	ETH1-RX-	ETH1-RX-	ETH1-RX-	
39	ETH1-TX+	ETH1-TX+	ETH1-TX+	
40	ETH1-TX-	ETH1-TX-	ETH1-TX-	
23	ETH2-RX+	ETH2-RX+	ETH2-RX+	Ethernet 2 100BaseT for PC / expansion comms
24	ETH2-RX-	ETH2-RX-	ETH2-RX-	
16	ETH2-TX+	ETH2-TX+	ETH2-TX+	
15	ETH2-TX-	ETH2-TX-	ETH2-TX-	
2	N/A	N/A	ECAT-TX+	EtherCAT 100BaseT for system expansion
6	N/A	N/A	ECAT-TX-	
7	N/A	N/A	ECAT-RX+	
3	N/A	N/A	ECAT-RX-	
47	CANH1	CANH1	CANH1	CAN port 1 with 120Ohm software selectable termination
48	CANL1	CANL1	CANL1	
50	CANH2	CANH2	CANH2	CAN port 2 with 120Ohm software selectable termination
49	CANL2	CANL2	CANL2	
32	LIN1	LIN1	LIN1	LIN bus master 1
33	LIN2	LIN2	LIN2	LIN bus master 2
29	DEBTX	DEBTX	DEBTX	Debug comms
38	DEBRX	DEBRX	DEBRX	
17	AIN1	AIN1	AIN1	4 x 0-5V 12-bit analogue inputs
27	AIN2	AIN2	AIN2	
10	AIN3	AIN3	AIN3	
18	AIN4	AIN4	AIN4	
26	Switch Input 1	Switch Input 1	Switch Input 1	6 x Switch Inputs Software selectable for switch to Gnd or VBatt
25	Switch Input 2	Switch Input 2	Switch Input 2	
35	Switch Input 3	Switch Input 3	Switch Input 3	
36	Switch Input 4	Switch Input 4	Switch Input 4	
45	Switch Input 5	Switch Input 5	Switch Input 5	
44	Switch Input 6	Switch Input 6	Switch Input 6	

CN1 Pinout (continued)

Pin	Output				Description
	Name	Current	PWM	Surge Time	
1	EXT5/12PSU1	100mA @5V 700mA @12V		N/A	4 x Sensor Excitations
8	EXT5/12PSU2				
14	EXT5/12PSU3				
9	EXT5/12PSU4				
5	Sensor Gnd	700mA	N/A	N/A	4 x Sensor Gnds[4]
13	Sensor Gnd				
37	Sensor Gnd				
46	Sensor Gnd				
60	Output 1	2.5A	488Hz	2ms	6 x 2.5A Standard Outputs
59	Output 2	2.5A			
58	Output 3	2.5A			
64	Output 4	2.5A			
65	Output 5	2.5A			
66	Output 6	2.5A			
51	Output 7	7.5A			3 x 7.5A Standard Outputs
52					
53					
54	Output 8	7.5A			
55					
56					
57	Output 9	7.5A			
62					
63					
61	N/A	..			
4	PWM LSD1	200mA	488Hz	N/A	5 x Low Side Drive Outputs
11	PWM LSD2	200mA			
12	PWM LSD3	200mA			
19	PWM LSD4	200mA			
20	PWM LSD5	200mA			
21	N/A	..	..	.. ..	
22	N/A				
30	N/A				
31	N/A				

All pin outs are grouped in function order, rather than pin order.

CN2 Connector

Connector	Mating Connector
AS218-32SA-943B	AS618-32PA

CN2 Pinout

Pin	Output				Description
	Name	Current	PWM	Surge Time	
P	Output 10	7.5A	244Hz	2ms	12 x 7.5A Standard Outputs
R	Output 11	7.5A			
S	Output 12	7.5A			
T	Output 13	7.5A			
A	Output 14	7.5A			
B	Output 15	7.5A			
C	Output 16	7.5A			
D	Output 17	7.5A			
E	Output 18	7.5A			
F	Output 19	7.5A			
G	Output 20	7.5A			
H	Output 21	7.5A			
f j	Output 22	15A			10 x 15A Standard Outputs
g h	Output 23	15A			
a b	Output 24	15A			
c d	Output 25	15A			
e U	Output 26	15A			
V W	Output 27	15A			
X Y	Output 28	15A			
J Z	Output 29	15A			
K L	Output 30	15A			
M N	Output 31	15A			

All pin outs are grouped in function order, rather than pin order.

CN3 Connector

Connector	Mating Connector
AS2200-16SN-943B	AS620-16PN

CN3 Pinout

Pin	Output				Description
	Name	Current	PWM	Surge Time	
S	N/A	N/A			
M	Output 32	24A	122Hz	2ms	2 x24A Standard Outputs
R					
N	Output 33	24A			
P					
D	Output 34	25A	122Hz	2ms	2 x 25A Outputs with Wiper Support[5] NOTE not to be used for loads that can generate back emf,
B	Output 35	25A			
F	Output 36	50A	122Hz	2ms	2 x 50A Standard Outputs
G					
J	Output 37	50A			
K					
C	Output 38	75A			1 x 75A Standard Output
E					
H					
A	Output 39	25A	244Hz	20ms	2 x 25A Outputs with High Surge Support[6]
L	Output 40	25A			

Output Restrictions

Most outputs in the Centaurus 3 use Smart-fets, these have a body diode that will conduct in the reverse direction allowing current to be dumped from the load back to the battery. Four outputs are different:

Outputs 39 and 40 use conventional fets and are protected by a diode circuit from reverse battery connection. Excess voltage imposed on one output will appear on the other if it is turned on, potentially damaging the load powered from Centaurus.

Outputs 34 and 35 are designed for three brush wiper motors and have extra circuitry to prevent current flowing back from the slow speed brush into Centaurus when the high-speed brush is energized.

Loads that can generate back emf or need to dump power back to the battery must not be connected to any of these four outputs or damage may be caused either to Centaurus or sensitive loads.

All pin outs are grouped in function order, rather than pin order.

CN4 Connector

Connector	Mating Connector
ASHD214-1PN-974C	ASHD614-1SN-C35

CN4 Pinout

Pin	Name	Input			Description
		Current	Surge Time		
			3hrs	2min	
1	Batt+	150A	200A	250A	35mm^2 cable must be used to achieve full

CN5 Connector

Connector	Mating Connector
M5x0.8x8mm	M5 Bolt

CN5 Pinout

Pin	Name	Input			Description
		Current	Surge Time		
			3hrs	2min	
1	150A	Batt-	200A	250A	35mm^2 cable must be used to achieve full current rating for load dump protection[8]

1. CN1 Pin 34 DBatt+ will only supply power to the processor leaving the outputs unpowered, This can be used for a bench supply when loading code or alternatively a backup battery can be connected to allow the processor to remain powered in the event of a main battery Supply shutdown.
2. CN1 Pin 43 DBatt– is common with CN5 Batt– this pin can be used for a bench supply when loading code, this pin is not intended for main power Gnd.
3. CN1 Pin 28 Shutdown# is designed allow the user to shutdown the unit via a single switch to Gnd.
4. CN1 Pin 5, 13, 37, 46 Sensor Gnd are all common within the unit and connected to case.
5. CN3 Pin D, B Output 34 and 35 are both fitted with additional circuitry to allow for the direct connection to wiper motors allowing for “Freewheel” and “Park”.
6. CN3 Pin A, L Output 39 and 40 are both fitted with additional circuitry to allow for high surge conditions with capacitance loads, for example, 10000uf
7. CN4 Pin 1 Batt+ will supply power to both the processor and outputs. This should be connected to a 35mm^2 cable to ensure the full rating is achieved.
8. CN5 Pin 1 Batt– is required for load dump situations and should be connected to 35mm^2 cable to ensure the full rating is achieved.

Recycling and Environmental Protection

Cosworth Electronics is committed to conducting its business in an environmentally responsible manner and strive for high environmental standards.

Manufacture: Cosworth products comply with the appropriate requirements of the Restriction of Hazardous Substance (RoHS).

Disposal: Electronic equipment should be disposed of in accordance with the regulations in force and in particular in accordance with the Waste in Electrical and Electronic Equipment directive (WEEE).

Battery

This equipment contains a rechargeable battery (Manganese Silicon Lithium).

The equipment may be returned to Cosworth Electronics for a replacement battery. A charge will be made for this service.

To remove the battery for recycling:

- Remove the case(s).
- Remove printed circuit boards from the case. Remove the battery from the printed circuit board.
- Dispose of the battery in accordance with the regulations in force.
- Removal of the battery will result in the warranty of the unit being void.

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