

TECHNICAL SPECIFICATIONS

ACKCIO DIGITAL NODE BEAM-DG



MODEL

BEAM-DG

Supports digital sensors using RS232, RS485 or SDI-12 communication protocols

MECHANICAL

DIMENSION

220mm x 140mm x 80mm

WEIGHT

1.7kg

MATERIAL

Die-cast aluminium

DIGITAL MEASUREMENTS

COMMUNICATION PROTOCOLS

MODBUS RTU

SDI-12

Custom*

*For custom protocols, contact Ackcio

SUPPORTED BAUD RATES

4800 - 115200

POWER SUPPLY OPTIONS FOR SENSORS

Battery:

5V @ 200mA

12V @ 200mA

24V @ 45mA

External power (12V, 3A, 36W):

5V @ 200mA

12V @ 200mA

24V @ 45mA

NOTE: All power modules are within $\pm 10\%$ tolerance

MEASUREMENT RATE	Dependant on sensor(s)
MEASUREMENT DURATION	Dependant on sensor(s)
SUSTAINED INPUT VOLTAGE W/O DAMAGE	±18V DC max
INPUT IMPEDANCE	120Ω typical for RS-485/232

INPUT

DIGITAL PORTS	RS232 Serial Port RS485 Full / Half Duplex Serial Port SDI-12 Bidirectional Port
WIRING	Push-in CAGE CLAMP (0.2 - 1.5 mm ² / 24 - 16 AWG)

LOW-POWER MCU / PERIPHERALS

MCU	Ultra-low power Arm® Cortex®-M3 48MHz 32-bit CPU
MEMORY	128KB flash, 20KB ultra-low-leakage SRAM
CLOCK	High-precision RTC self-compensated in temperature (10ppm from -40°C to +80°C)
ON-BOARD SENSORS	Temperature sensor (range: -40°C to +80°C, resolution: 0.01°C, accuracy: ±1.8°C) Barometer sensor (range: 300 to 1100hPa, resolution: 0.18Pa, accuracy: ±1.7hPa)
EXTERNAL FLASH	8MB

INTERFACES

DISPLAY / KEYBOARD	LEDs	SYS - System status indication SENS - Sensing status indication
	Buttons	TEST - to test the Node RESET - to reset the Node FORMAT - to do a factory reset of the Node
USB DEVICE PORT	USB 2.0 full speed (Micro B connector) 5V, max 500 mA for mobile OTG	
IDC10 CONNECTOR	Only for firmware programming	

RF & MESH SPECIFICATIONS

RADIO BAND	ISM Band 863 - 870MHz, 902 - 928MHz
TRANSMIT POWER	Up to 1 W (30 dBm)
MODULATION	2-GFSK

CERTIFICATIONS	FCC: 2AT8M-DG-V3X2 IC: 27349-DGV3X2 CE/RED Anatel (Brazil) MoC (Israel)
ANTENNA	$\frac{1}{4}$ λ stub antenna with SMA connector
LINK DATA SPEED	50 kbps bitrate
DATA SECURITY	AES128 encrypted end-to-end data
HOPS	Up to 12
NETWORK SIZE	Up to 50 Nodes
RANGE*	Line-of-sight: Up to 5km Urban: Up to 1km Below ground: Up to 500m

*Ranges are based on a transmission power of 30dbm. Actual transmission distances may vary depending on deployment conditions.

SOFTWARE & FIRMWARE

FIRMWARE	Ackcio Mesh: Ackcio's long-range low-power mesh networking firmware
SOFTWARE	Ackcio Nimbus: Android app for device setup, network monitoring, and troubleshooting

PROTECTION

CIRCUIT PROTECTION	Surge protection DC breakdown voltage 60V ($\pm 20\%$ @100V/ μ s) Impulse breakdown voltage 500V (@5kV/ μ s) typical Short circuit protection in power outputs Reverse supply protection
ESD	15kV

SYSTEM POWER REQUIREMENTS

SUPPLY VOLTAGE	Battery: 2.7V to 4V External power supply: 8-36V, min 36W
INTERNAL NON-RECHARGEABLE BATTERIES	3 x D-Cell Li-SOCl ₂ 3.6V nominal voltage Recommended capacity 19Ah
TYPICAL CURRENT DRAIN	<20 μ A in system idle <100mA in system RX mode <300mA in system TX mode (depends on output RF power setting)

ENVIRONMENTAL CONDITIONS

OPERATING TEMPERATURE	-40°C to +80°C
PROTECTION	IP67

SENSOR COMPATIBILITY

SENSOR MANUFACTURER	SUPPORTED SENSORS	MAXIMUM NUMBER OF SEGMENTS/SENSORS	EXTERNAL POWER REQUIREMENT
 CAMPBELL SCIENTIFIC <small>WHEN MEASUREMENTS MATTER</small>	All SDI-12 Sensors	14	No
 ENCARDIO RITE	All SDI-12 Sensors	32	No
 GEOKON	In-place Inclinometer	TBA	No
 GEO SENSE	In-place Inclinometers and tilt sensors	TBA	No
 In-Situ	All SDI-12 Sensors	14	No
 MEASURAND	ShapeArray (SAAV/SAAX/SAAV Extend) - Low-power mode	200	No
	ShapeArray (SAAV/SAAX/SAAV Extend) - Regular power mode	100*	No
	NOTE: Compatible with serial number 66,000 and above.		
 METER	All SDI-12 Sensors	14	No
 Mine Design technologies	Smart-Link	Non-addressable: 1 Addressable: 6	No
 rst INSTRUMENTS <small>Monitor with Confidence</small>	Legacy ASCII and Next-Gen (Gen 4) protocol	40	No
 SISGEO	All SISGEO digital instruments	TBA	No
 YieldPoint	All sensors up to 13 channels - In RS485 Port	1	No
	All sensors up to 13 channels - Using dMUX	8	No
 ZC	In-place Inclinometer - ZC CX100	8	No
	In-place Inclinometer - ZC CX300	24	No

*Contact us for information on larger ShapeArray segments.

NOTE: Compatibility varies depending on the generation of digital sensors, please contact us if you have any questions.

Digital sensor compatibility list is continually expanding, please contact us for most current information.

MOUNTING BRACKETS / PLATES

BEAM-BK-LG

Large multi-purpose mounting bracket (vertical/horizontal/pole) with mounting screws



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