

TECHNICAL SPECIFICATIONS

ACKCIO VIBRATING WIRE NODES BEAM-VW-S1 & BEAM-VW-S8



MODELS

BEAM-VW-S1	Supports 1 sensor (1 vibrating wire channel, 1 pulse counter, and 1 thermistor channel)
BEAM-VW-S8	Supports 8 sensors (8 vibrating wire channels and 8 thermistor channels)

MECHANICAL

BEAM-VW-S1

BEAM-VW-S8

DIMENSION

100mm x 100mm x 80mm

220mm x 140mm x 80mm

WEIGHT

0.7kg

1.7kg

MATERIAL

Die-cast aluminium

Die-cast aluminium

VIBRATING WIRE MEASUREMENTS

VIBRATING WIRE MODULE 12-bit differential analog-to-digital converter

MEASUREMENT RATE 5 samples per second data acquisition with variable size moving average filter after resonant frequency lock

MEASUREMENT DURATION 5s per measurement cycle

VIBRATING WIRE READING SPECIFICATIONS
 Excitation Wave: 8V peak-to-peak sweep
 Measurement Range: 450 - 6000Hz
 Resolution: 0.01Hz
 Accuracy: $\pm 0.04\%$ FS

THERMISTOR READING SPECIFICATIONS
 Measurement Range: -20°C to $+80^{\circ}\text{C}$ for 3K thermistor
 Resolution: 0.1 $^{\circ}\text{C}$
 Accuracy: $\pm 0.2^{\circ}\text{C}$

SUSTAINED INPUT VOLTAGE W/O DAMAGE 3.6V DC max

INPUT IMPEDANCE >100kHz

INPUT	BEAM-VW-S1	BEAM-VW-S8
ANALOGUE DIFFERENTIAL INPUTS	1 vibrating wire channel, 1 thermistor channel, and 1 pulse counter	8 vibrating wire channels and 8 thermistor channels
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	<p>LEDs</p> <ul style="list-style-type: none"> - SYS - System status indication - SENS - Sensing status indication <p>Buttons</p> <ul style="list-style-type: none"> - 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 SPECIFICATIONS

RADIO BAND	ISM Band 863 - 870MHz, 902 - 928MHz	
TRANSMIT POWER	Up to 1 W (30 dBm)	
MODULATION	2-GFSK	
CERTIFICATIONS	<p>BEAM-VW-S1</p> <p>FCC: 2AT8M-VW-S1-V3X0</p> <p>IC: 27349-VWS1V3X0</p> <p>CE/RED</p> <p>Anatel (in progress)</p>	<p>BEAM-VW-S8</p> <p>FCC: 2AT8M-VW-S8-V3X0</p> <p>IC: 27349-VWS8V3X0</p> <p>CE/RED</p> <p>Anatel (in progress)</p>
ANTENNA	¼ λ stub antenna with SMA connector	
LINK DATA SPEED	50 kbps bitrate	
DATA SECURITY	AES128 encrypted end-to-end data	

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
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ESD	15kV
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SYSTEM POWER REQUIREMENTS

SUPPLY VOLTAGE	2.7V to 4V
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INTERNAL NON-RECHARGEABLE BATTERIES	BEAM-VW-S1	BEAM-VW-S8
	1 x D-Cell Li-SOCl ₂ 3.6V nominal voltage Recommended capacity 19Ah	2 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)
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ENVIRONMENTAL CONDITIONS

OPERATING TEMPERATURE	-40°C to +80°C
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PROTECTION	IP67
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LIFETIME (MONTHS)

MODEL	SAMPLING FREQUENCY (MINS)						BATTERY
	5	10	15	30	60	360	
BEAM-VW-S1	8	11	13	17	19	22	1 x 19Ah D-Size Li-SOCl ₂
BEAM-VW-S8	3	5	7	12	19	36	2 x 19Ah D-Size Li-SOCl ₂

NOTE: Above table is for reference only. Estimation is done under typical Singapore weather conditions. The radio transmission power was set to 21dBm. Battery lifetimes might vary depending on deployment conditions and the formed wireless mesh topology.

MOUNTING BRACKETS / PLATES

BEAM-BK-SM

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

BEAM-BK-LG

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

PRODUCT IMAGES



Ackcio BEAM-VW-S1



Ackcio BEAM-VW-S8



Ackcio BEAM-VW-S1 with our **BEAM-BK-SM** small multi-purpose mounting bracket for vertical/horizontal or pole mounting



Ackcio BEAM-VW-S8 with our **BEAM-BK-LG** large multi-purpose mounting bracket for vertical/horizontal or pole mounting



Ackcio BEAM-VW-S1
(inner view)



Ackcio BEAM-VW-S8
(inner view)

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