PRODUCT DATA

2-channel CCLD Signal Conditioner for Production Testing Type 1704-C-102

Type 1704-C-102 is a CCLD conditioner/amplifier designed for Production Testing. It includes features specifically optimised for stationary work stations.

It provides signal conditioning, amplification and gain for CCLD compatible:

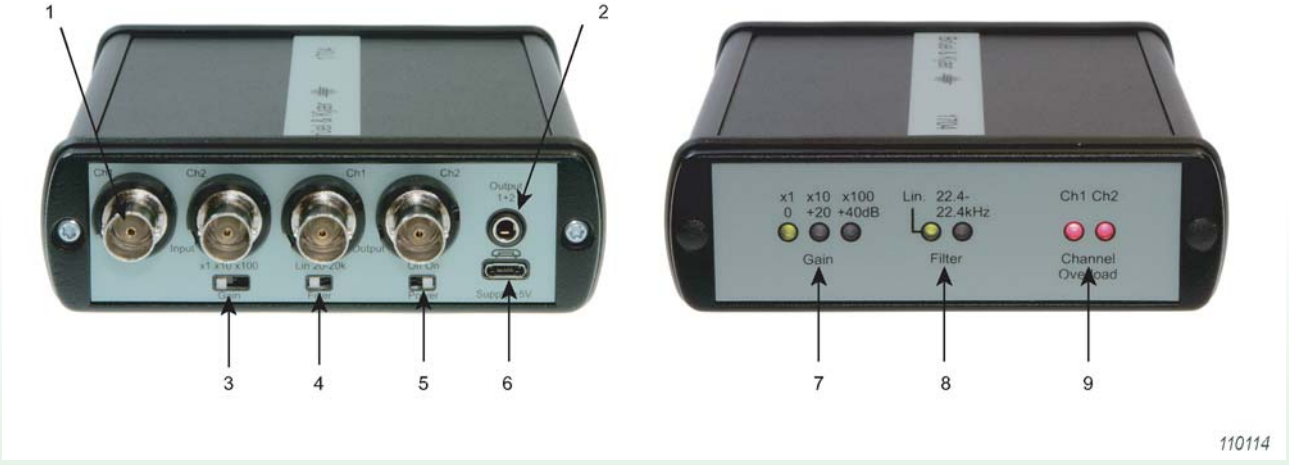
- *Accelerometers*
- *Charge Accelerometers (using Type 2647 Inline charge amplifier)*
- *Microphones*
- *Tacho Probes*

Uses and Features

- Provides power for microphones, accelerometers and other CCLD-compatible transducers
- Industry standard CCLD power is compatible with wide range of DeltaTron® and ICP® sensors
- Two channels for cross and FRF measurements
- Powered from PC's USB connector (with optional cable): no need for an extra mains adaptor in the test stand
- Wide range of gains (×1, ×10 and ×100) amplify signal before A/D to improve noise floor
- Selectable acoustic bandpass filter removes unwanted frequencies
- Recessed switches on back of unit avoid accidental changes to configuration
- LEDs on front clearly show system status and setting for fast verification of configuration
- Both 2 × BNC and 3.5 mm stereo output connectors provide options to connect to A/D converters or sound cards

Description

Fig. 1 *Connectors, switches and LEDs on Type 1704-C-102: 1) CCLD power for accelerometers, microphones and tacho probes; 2) 3.5 mm stereo socket for soundcard connection; 3) and 4) Gain and filters to improve dynamic range; 5) Power On/Off; 6) USB Micro-B for powering; 7), and 8) Gain and Filter LEDs; 9) LED overload and CCLD cable fault detection*



Brüel & Kjær

Type 1704-C-102 provides two channels of CCLD (Constant Current Line Drive) power for CCLD transducers such as microphones, accelerometers, and tachometer probes.

CCLD power is a de facto standard in the dynamic test and measurement world and has many manufacturer specific names such as DeltaTron®, ICP® (Integrated Circuit Piezoelectric), IEPE (Integrate Electronics Piezoelectric) and ISOTRON®. Type 1704 CCLD signal conditioners are compatible with transducers using any of the above trade names.

CCLD conditioning has advantages for Production Testing because it allows the transducer power to be delivered using the same coaxial cable that the transducer uses to return the measurement signal. This reduces cabling costs and improves noise immunity compared to multi-conductor cables.

Connectors

Type 1704-C-102 has all its connectors and switches located on the rear of the unit. Status LEDs are situated on the front of the unit, allowing the test-station operator to easily see the status and configuration of the unit. Connectors on the back make for a cleaner test setup, reduce the risk of cables being damaged and reduce the cable length between the signal conditioner and the A/D converter.

Fig. 2
Type 1704-C-102 has all connectors and switches on the rear of the unit for clean test-station setup

Gain and Filtering

Type 1704 includes analogue gain and filtering. Available gains settings include ×1 (0 dB), ×10 (+20 dB) and ×100 (+40 dB). Adding gain before the analogue to digital conversion can improve the system's noise floor. Likewise, the selectable acoustic band-pass filter can remove unwanted frequencies before the analogue to digital conversion.

Brüel & Kjær's Family of CCLD DeltaTron Signal Conditioners

Type 1704-C-102 is part of a larger family of CCLD DeltaTron signal conditioners. From small, battery- or USB-powered units to large, computer-controlled systems, Brüel & Kjær has a unit to fit your needs.

Table1 *Features of Brüel & Kjær's Family of CCLD DeltaTron Signal Conditioners*

	1704-A	1704-C-102	WB-1453	2693 DeltaTron NEXUS	2694-A
Mains (AC) Power	✓	✓	–	✓	✓
USB Power	✓	✓	–	–	–
Battery Power	✓	–	✓	Optional	–
Number Channels per Unit	1 or 2	2	3	1 – 4	16
Manual Control	✓	✓	N/A	✓	–
Computer Control	–	–	–	✓	✓
Read Transducer's Electronic Datasheet (TEDS)	–	–	–	✓	✓
Uni (Fine) Gain Adjustment	–	–	–	✓	–
Multiplexer Output	–	–	–	–	✓
Maximum Number Channels from one PC	–	–	–	99 per COM or USB port	256 per COM or USB port
Maximum Frequency (kHz at filters –5% point)	55	55	25	100 (–10%)	50 (–10%)
Minimum Frequency (Hz at filters –5% point)	2.2	2.2	0.1	0.1 (–10%)	0.1 (–10%)
Maximum Gain	× 100 (40 dB)	× 100 (40 dB)	× 1 (0 dB)	× 10000 (80 dB)	× 100 (40 dB)
Minimum Gain	× 1 (0 dB)	× 1 (0 dB)	× 1 (0 dB)	× 0.1 (–20 dB)	× 0.316 (–10 dB)
A-weighting (type 0)	✓	–	–	✓	Optional
Single and Double Integration Filters	–	–	–	Optional	Optional
Constant Current Supply (mA)	3 – 4.1	3 – 4.1	3	4 or 10	6

Compliance with Standards

CE C-Tick	CE-mark indicates compliance with EMC Directive and Low Voltage Directive C-Tick mark indicates compliance with the EMC requirements of Australia and New Zealand
Safety	EN/IEC 61010–1 and ANSI/UL 61010–1: Safety requirements for electrical equipment for measurement, control and laboratory use
EMC Emission	EN/IEC 61000–6–3: Generic emission standard for residential, commercial, and light-industrial environments CISPR 22: Radio disturbance characteristics of information technology equipment. Class B Limits FCC Rules, Part 15: Complies with the limits for a Class B digital device
EMC Immunity	EN/IEC 61000–6–1: Generic standards – Immunity for residential, commercial and light industrial environments EN/IEC 61000–6–2: Generic standards – Immunity for industrial environments EN/IEC 61326: Electrical equipment for measurement, control and laboratory use – EMC requirements **Note:** The above is only guaranteed using accessories listed in this Product Data
Temperature	IEC 60068–2–1 & IEC 60068–2–2: Environmental Testing. Cold and Dry Heat Ambient Operating Temperature: –10 to +50°C (14 to 122°F) Storage Temperature: –25 to +70°C (–13 to +158°F)
Humidity	IEC 60068–2–78: Damp Heat: 93% RH (non-condensing at 40°C (104°F))
Mechanical	Non-operating: IEC 60068–2–6: Vibration: 0.3mm, 20ms^{-2}, 10 – 500Hz IEC 60068–2–27: Shock: 1000ms^{-2} IEC 60068–2–29: Bump: 1000 bumps at: 400ms^{-2}
Enclosure	IEC 60529: Protection provided by enclosures: IP 20
RoHS	RoHS compliant

Specifications – Type 1704-C-102

		Gain ×1 (0 dB)	Gain ×10 (+20 dB)	Gain ×100 (+40 dB)
Input Connector	Channel 1 and 2	BNC		
Output Connector	Channel 1 and 2	BNC or 3.5 mm stereo plug		
Amplifier Gain		0 dB (×1), 20 dB (×10); 40 dB (×100)		
Gain Tolerance		± 1%		
Excitation Voltage		22 V ± 2 V (typ. 21 V)		
Excitation Current		3 to 4.1 mA (nom. 3.55 mA)		
Maximum Input Voltage (peak)		± 10 V		
Input Protection		35 V_p (non-destructive)		
Maximum Output Voltage (peak)		± 10 V		
Output Impedance		50 Ω		
Cable Fault Voltage Levels		2.5 V and 18 V		
Total Harmonic Distortion		< 90 dB (0.003%) @ 1 kHz 1 V_{rms}		
DC Offset		< 5 mV		
Frequency Range (–5%)		2.2 Hz to 55 kHz	2.2 Hz to 55 kHz	2.2 Hz to 55 kHz
Frequency Range (–3 dB)		0.8 Hz to 100kHz	0.8 Hz to 100 kHz	0.8 Hz to 75 kHz
Filters		Linear (none), Acoustic Bandpass		
Acoustic Bandpass Filters	60 dB/decade	22.4 Hz to 22.4 kHz (–3 dB)		
Spectral Output Noise Lin. (μV/√Hz)	(1 Hz)	< 0.2	< 1.5	< 15
	(10 Hz)	< 0.05	< 0.3	< 3
	(100 Hz)	< 0.025	< 0.15	< 0.8
	(1 kHz)	< 0.025	< 0.15	< 0.8
	(10 kHz)	< 0.025	< 0.15	< 0.8
	(100 kHz)	< 0.025	< 0.15	< 0.8
Broadband Electrical Output Noise, Lin. (μV_{rms})	(1 Hz to 10 kHz)	2	12	70
	(1 Hz to 100 kHz)	11	75	210 (50 kHz)
Broadband Output Noise (μV_{rms})	in Acoustic Bandpass (Lin.)	2.5	18	100
	with internal Acoustic Bandpass filter	13	22	100
Crosstalk (dB)	CCLD Power Enabled, Linear filter	–115	–105	–91
	Direct (CCLD Off), Linear filter	–125	–105	–100
Size		125 × 110 × 35 mm (4.9 × 4.3 × 1.4″)		
Weight		326 g (11.5 oz.)		
Temperature Range (operating)		–10 to +50°C (14 to 122°F)		
Temperature Range (charging)		0 to 50°C (32 to 122°F)		

POWER SUPPLY

Mains Supply: Supported by Power Supply ZG-0863-US (included).
90 – 264 V AC, 40 – 65 Hz

Ordering Information

Type 1704-C-102 2-channel CCLD Signal Conditioner for Production Testing

OPTIONAL ACCESSORIES

AO-1494 Cable, USB-A (M) to USB-B (M), 1.8 m
KE-0463 Soft Carrying Case
Type 2647-A/B/C/D Charge to CCLD Converters for measuring with charge accelerometers

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HEADQUARTERS: Brüel & Kjær Sound & Vibration Measurement A/S · DK-2850 Nærum · Denmark
Telephone: +45 7741 2000 · Fax: +45 4580 1405 · www.bksv.com · info@bksv.com

Local representatives and service organisations worldwide

Brüel & Kjær