PRODUCT DATA

Battery-powered CCLD Signal Conditioners

Type 1704-A-001, one-channel, and Type 1704-A-002, two-channel

Type 1704-A is a range of CCLD conditioner/amplifiers designed for field and lab use. It includes features like a built-in, rechargeable battery optimised for in situ measurements.

They provide signal conditioning, amplification and gain for CCLD compatible:

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

110106

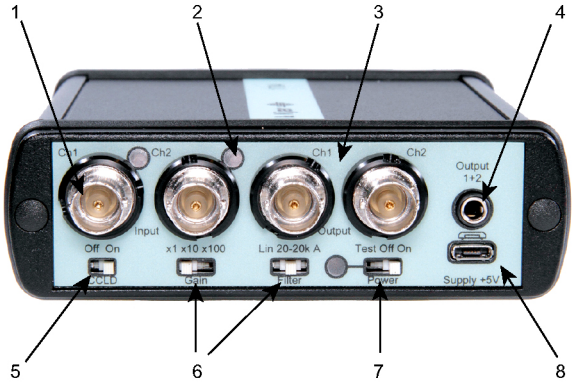
Uses and features

- Provides power for microphones, accelerometers and other CCLD-compatible transducers
- Industry standard CCLD power is compatible with wide range of CCLD sensors
- Built-in Li-Ion battery and charger – ready to measure when you are
- Powered and charged from PC's USB connector (with optional cable): no need for an extra mains adaptor
- Wide range of gains (×1, ×10 and ×100) amplify signal before A/D to improve noise floor
- Selectable acoustic bandpass and A-weighting (type 0) filters remove unwanted frequencies
- Switches to quickly change settings and LEDs 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-A-002:

1) CCLD power for accelerometers, microphones and tacho probes
2) LED overload and CCLD cable fault detection
3) BNC outputs for connection to instrumentation
4) 3.5 mm stereo socket for soundcard connection
5) CCLD On/Off – can be used without CCLD power as voltage amplifier and filter
6) Gain and filters to improve dynamic range
7) 13 hours of battery life
8) USB Micro-B for powering and charging



110012

The Type 1704-A range of conditioners provides CCLD (Constant Current Line Drive) power for CCLD transducers such as microphones, accelerometers, and tachometer probes. Type 1704-A-001 is a one-channel version while Type 1702-A-002 is a two-channel version.

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), ISOTRON® and the related IEPE (Integrated Electronics Piezoelectric) standard. Type 1704 CCLD signal conditioners are compatible with transducers using any of the above trade names.

CCLD conditioning has advantages 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
The Type 1704-A range of conditioners have all their connectors, switches and status LEDs located on the front of the unit.

Flexible Powering Options
Type 1704-A uses a Micro-B USB connector for power and charging the built-in rechargeable battery. Power comes from either the provided mains adaptor or from a powered USB port of a computer using the optional USB cable. A quick glance at the front of Type 1704-A confirms status and settings when making measurements in the field.

The built-in rechargeable battery is not only more convenient than replacing non-rechargeable batteries but also makes for a lower cost of ownership. The rechargeable battery has at least 500 cycles, each lasting for 15 hours (Type 1704-A-001) or 13 hours (Type 1704-A-002)

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 bandpass filter can remove unwanted frequencies before the analogue to digital conversion. An A-weighting type 0 filter is also selectable.

HBK's Family of CCLD Signal Conditioners
Type 1704-A is part of a larger family of CCLD signal conditioners. From small, battery- or USB-powered units to large, computer-controlled systems, HBK has a unit to fit your needs.

Accessories
Fig. 1 *Type 1704-A includes ZG-0863 for powering and charging from the mains*

110107

Fig. 2 *Optional accessories include Soft Carrying Case KE-0463 and Cable AO-1494 to power and charge direct from a PC's USB connector*

110108

Family of HBK signal conditioners

Table 1 *Features of HBK's family of CCLD signal conditioners*

	1704-A	1704-C-102	WB-1453	2693-A CCLD NEXUS	2694-A
Mains (AC) Power	✓	✓	–	✓	✓
USB Power	✓	✓	–	–	–
Battery Power	✓	–	✓	Optional	–
Number of Channels per Unit	1 or 2	2	3	1 to 4	16
Manual Control	✓	✓	N/A	✓	–
Computer Control	–	–	–	✓	✓
Read Transducer Electronic Data Sheet (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 (dB)	× 100 (40 dB)	× 100 (40 dB)	× 1 (0 dB)	× 10000 (80 dB)	× 100 (40 dB)
Minimum Gain (dB)	× 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

	The CE marking is the manufacturer's declaration that the product meets the requirements of the applicable EU directives RCM mark indicates compliance with applicable ACMA technical standards – that is, for telecommunications, radio communications, EMC and EME China RoHS mark indicates compliance with administrative measures on the control of pollution caused by electronic information products according to the Ministry of Information Industries of the People's Republic of China WEEE mark indicates compliance with the EU WEEE Directive
Safety	EN/IEC 61010-1: Safety requirements for electrical equipment for measurement, control and laboratory use 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 EN/IEC 61000-6-4: Generic emission standard for industrial environments CISPR 32: Radio disturbance characteristics of information technology equipment. Class B Limits FCC Rules, Part 15: Complies with the limits for a Class B digital device This ISM device complies with Canadian ICES–001 (standard for interference-causing equipment)
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:** Effect of radiated RF, 80–1000 MHz 80% AM 1 kHz 10 V/m: <300 µV **Note:** The above is only guaranteed using accessories listed in this document
Temperature	IEC 60068-2-1 & IEC 60068-2-2: Environmental Testing. Cold and Dry Heat Operating Temperature: –20 to +50 °C (–4 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: 0.3 mm, 20 m/s^2, 10 – 500 Hz IEC 60068-2-27: Shock: 1000 m/s^2 IEC 60068-2-29: Bump: 1000 bumps at 250 m/s^2
Enclosure	IEC 60529: Protection provided by enclosures: IP 20

Specifications – Type 1704-A

PERFORMANCE PROPERTIES		Gain ×1 (0 dB)	Gain ×10 (+20 dB)	Gain ×100 (+40 dB)
Input Connector	Channel 1 (and Channel 2 on Type 1704-A-002)	BNC		
Output Connector	Channel 1 (and Channel 2 on Type 1704-A-002)	BNC or 3.5 mm stereo plug		
Amplifier Gain		0 dB (× 1), 20 dB (× 10), 40 dB (× 100)		
Gain Tolerance		± 1%		
Excitation Voltage		25 V ± 1 V		
Excitation current		4.3 mA ± 1 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 100 kHz	0.8 Hz to 100 kHz	0.8 Hz to 75 kHz
Filters		Linear (none), Acoustic Bandpass, A-weighting (type 0)		
Acoustic Bandpass Filters	60 dB/decade	22.4 Hz to 22.4 kHz (–3 dB)		
Spectral Output Noise Linear (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, Linear (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
	post-processed A-weighting	1.75	13	75
	with internal A-weighting filter	14	20	75
Crosstalk, dB (Type 1704-A-002 only)	CCLD powered enabled, linear filter	–115	–105	–91
	Direct (CCLD off), linear filter	–125	–105	–100

Specifications – Type 1704-A (Contd.)

PHYSICAL PROPERTIES		
Mains Supply	90 — 264 V AC, 40 — 65 Hz Supported by Power Supply ZG-0863 (included) Includes adaptors for US, UK, Europe and Australia/New Zealand	
Internal Battery Type	Li-ion	
Battery Life (hours)	Type 1704-A-001 (1704-A-002)	15 (13)
	after low battery level	1
Number of Battery Charging Cycles	500	
Time to Charge (hours)	Mains (AC) or USB (can charge while using)	6 (4 if charge only)
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)	

Ordering information

Type 1704-A-001 **1-channel battery-powered CCLD Signal Conditioner**
Type 1704-A-002 **2-channel battery-powered CCLD Signal Conditioner**

Included Accessories:

ZG-0863 Power Supply, 90 – 264 V AC, 1.5 m Cable with micro-USB-B

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

2024-06
BP 2387 – 13

hbkworld.com · info@hbkworld.com
Local representatives and service organizations worldwide

HBK
HOTTINGER BRÜEL & KJÆR