

CAN Bus Module LAN-XI 25.6 kHz Type 3058

CAN Bus Module Type 3058 is a versatile 8-channel 25.6 kHz LAN-XI data acquisition module with two independent CAN bus input channels ideal for automotive noise, vibration and harshness (NVH) applications both in the lab and in the field.

The eight dynamic input channels support CCLD transducers, transducers with TEDS (transducer electronic data sheet), and automotive tachometer signals. Four of the eight channels can be configured into two AES3 balanced input channels for digital signals – enabling connection to a head and torso simulator (HATS).

CAN Bus and digital input is supported by Sonoscout™ NVH Recorder BZ-5950 (product data: [BP 2463](#)). Therefore, Type 3058 can be used as a front end for recording NVH data along with vehicle parameters and HATS digital input.



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Uses and Features

Uses

- NVH recording and analysis
- As a measurement front end (NVH Simulator, Sonoscout, BK Connect™)
- Monitoring vehicle parameters
- Providing sound quality metrics (loudness, sharpness, articulation index)
- General sound and vibration measurements

Features

- DC to 25.6 kHz input range (sampling rate 65.5 kHz)
- Built-in constant current line drive (CCLD) to power sensors
- 30 V input range, for automotive tachometer signals
- AES3-balanced input channels – supports digital HATS
- CAN bus
 - High-speed CAN: ISO 11898-2. CAN 2.0 A/B up to 1 Mbit/s
 - Low-speed CAN (fault tolerant): ISO 11898-3
 - Support for J-1939 and OBD-II via CAN
- Micro SD card, for stand-alone recording
- LAN interface – keeps setup local
- LED indicators on each channel (conditioning, cable break)
- Power: Mains, DC, battery or PoE (IEEE 802.3af)
- Robust casing

CAN Bus Module Type 3058 is a low-noise data acquisition unit with eight input channels and two CAN bus input channels. It is designed specifically for automotive testing applications: recording vehicle parameters, together with signals from mounted sensors and/or HATS.

Eight Input Channels

The eight analogue dynamic input channels cover signals with frequencies from DC to 25 kHz, which is ideal for most NVH applications. The input channels support direct voltage signals and provide conditioning for CCLD transducers such as microphones, accelerometers, binaural recording headsets and Sound Quality HATS.

Four of the input channels can be configured as two balanced input channels for digital signals according to AES3 (channels 3 + 7, and/or 4 + 8). This enables connectivity to 2-channel digital audio signals systems such as digital artificial heads.

The input channels also have a special 'vehicle tach' input range (30 V) that allows tachometer pulses from, for example, flywheel sensors on the vehicle to be input directly into the module.

Two CAN Bus Channels

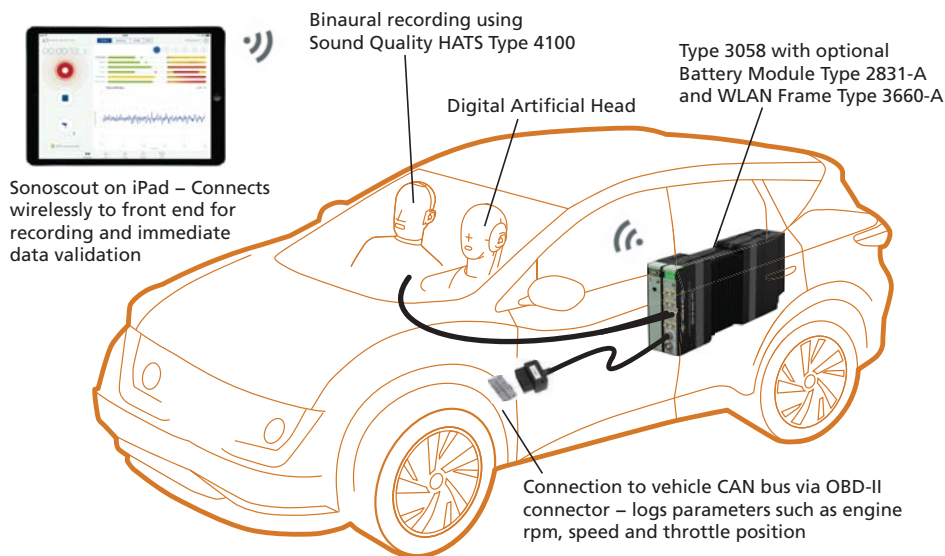
The two independent CAN bus channels enable connectivity to both the vehicle CAN and another CAN device, for example, high-precision GPS equipment. The module supports both high-speed and low-speed CAN, as well as OBD-II via CAN.

Configurable Hardware

Type 3058 is part of the family of Brüel & Kjær LAN-XI data acquisition hardware – a versatile system of modular hardware that can be configured and reconfigured in different setups.

When combined with Wireless LAN Frame Type 3660-A and Battery Module Type 2831-A*, Type 3058 becomes a wireless, portable front end with more than seven hours of battery life, data acquisition channels and a CAN bus interface. Use this configuration as the front end in your Sonoscout system for a comprehensive NVH solution, see Fig. 1.





Fig. 1
Type 3058 used in a
Sonoscout system



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* Types 3660-A and 2831-A are part of the LAN-XI hardware family, see Product Data [BP 2215](#) for more information

Compliance with Standards

   	<p>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</p> <p>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</p> <p>WEEE mark indicates compliance with the EU WEEE Directive</p>
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
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 +55 °C (14 to 131 °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, 2 g, 10 – 500 Hz IEC 60068–2–27: Shock: 100 g IEC 60068–2–29: Bump: 1000 bumps at 25 g
Enclosure	IEC 60529: Protection provided by enclosures: IP 31

EFFECT OF RADIATED AND CONDUCTED RF, MAGNETIC FIELD AND VIBRATION

Radiated RF: 80–2700 MHz, 80% AM 1 kHz, 10 V/m

Conducted RF: 0.15–80 MHz, 80% AM 1 kHz, 10 V

Magnetic Field: 30 A/m, 50 Hz

Vibration: 5–500 Hz, 12.7 mm, 15 m/s²

Specifications – LAN Interface

CONNECTOR

Modules: RJ 45 (10baseT/100baseTX) connector complying with IEEE 802.3 100baseX

Frames: When used with Types 3660-C-100 and -D-100, the use of a ruggedized RJ45 data connector (Neutrik® NE8MC-1) can be used to screw the cable to the frame

Cable type: Types 3660-C-100 and -D-100 communicate at 1000 Mbit/s. Shielded cables of type 'CAT 5e' or better should be used. Individual modules communicate at 100 Mbit/s.

All LAN connectors support MDIX, which means that cables may be 'crossed' or not.

For stand-alone modules, PoE is also supported (IEEE 802.3af). PoE requires screened shielded twisted pair (S/STP or S/FTP) CAT 6 LAN cables

PROTOCOL

The following standard protocols are used:

- TCP
- DHCP (incl. auto-IP)
- DNS (on top of UDP)
- IEEE 1588–2002 (on top of UDP)
- IP
- Ethernet

ACQUISITION PERFORMANCE

Each module generates data at almost 20 Mbit/s when measuring 8 + 2 CAN channels at 25.6 kHz bandwidth.

In a frame, the modules are capable of handling their own maximum traffic while the built-in switch on the frame's backplate has more than sufficient capacity. This means that bottlenecks can only occur outside these, for example in:

- External switches
- PC

PTP PERFORMANCE

PTP Synchronization (with 1 Gigabit LAN Switch):

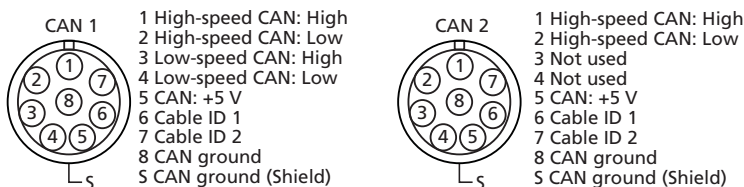
Typical sample synchronization better than 200 ns

(approximately ±0.07° @ 1 kHz, ±2° @ 25.6 kHz)

Better performance can be expected with a dedicated PTP switch:

- UL-0265: 10-port Gigabit Managed Switch with PTPv2 and PoE (8 ports). This is a dedicated PTP switch, preconfigured for optimal use with LAN-XI

Fig. 1 Pinouts for CAN 1 and CAN 2 connectors on LAN-XI Front Panel UA-3101-080 (see specifications on next page)



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Specifications – LAN-XI CAN Bus Module Type 3058-B-080

POWER REQUIREMENTS

DC Input: 10 – 32 V DC

Connector: LEMO coax., FFA.00.113, ground on shield

Power Consumption:

DC Input: <15 W

Typical Operating Time on Battery Type 2831-A:

> 7 hours with single module

> 40 minutes in Type 3660-D frame (up to two batteries in Type 3660-D)

Supply via PoE: According to IEEE 802.3af, max. cable length 50 m

Temperature Protection:

Temperature sensor limits module's internal temperature to 80 °C (176 °F). If temperature exceeds limit, system will automatically enable fan in LAN-XI frame, or shut down module outside frame

DIMENSIONS AND WEIGHT

Height: 132.6 mm (5.22")

Width: 27.5 mm (1.08")

Depth: 250 mm (9.84")

Weight: 750 g (1.65 lb)

Specifications – CAN Interface

CONNECTOR

8-pin LEMO type, see Fig. 1

(with special key to stop you using it with other non-CAN LEMO connectors)

PROTOCOL

- High-speed CAN ISO 11898-2, CAN 2.0 A/B up to 1 MBit/s
- Low-speed CAN (fault tolerant) ISO 11898-3
- J-1939 and OBD-II via CAN supported

Specifications – AES3

AES3 inputs for digital audio interface (two 2.0 stereo channel).

The following refers to the front panel UA-3101-080. AES3 is a balanced digital signal and requires two connections per stereo channel with this front panel:

- Digital channel 1, L + R: Connect to channel 3 + 7
- Digital channel 2, L + R: Connect to channel 4 + 8

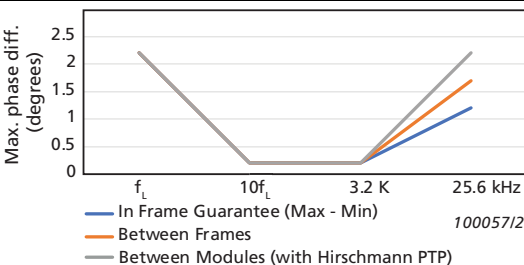
The two input connectors in each digital channel may be switched. This does not change audio properties or channel configuration.

SMB connectors: Centre: Input, Shield: Ground

Supported sampling frequencies: 32, 44.1, 48, 88.2, and 96 kHz

Specifications – Analogue Input Channels

Frequency Range			DC to 25.6 kHz or any range defined by high-pass filters and by software decimation set under ‘frequency span’		
Sampling Rate			65.5 k samples/s		
A/D Conversion			24 bit		
Data Transfer			24 bit		
Input Voltage Ranges			1 V _{peak} 10 V _{peak} 30 V _{peak} (Tacho Range)		
Input Signal Coupling		Differential	Signal Ground is ‘Floating’ (1 MΩ re chassis)		
		Single-ended	Signal ground is connected to chassis (‘Grounded’)		
Input Impedance			Direct: 1 MΩ <300 pF CCLD: >100 kΩ <300 pF		
Absolute Maximum Input			±60 V _{peak} without damage		
High-pass Filters		– 0.1 dB *	–10% @ **	–3 dB @ **	Slope
* Defined as the lower frequency, f _L , for guaranteed fulfilment of – 0.1 dB accuracy	0.1 Hz –10% digital high-pass filter	0.5 Hz	0.1 Hz	0.05 Hz	–20 dB/dec.
	0.7 Hz –0.1 dB digital high-pass filter	0.7 Hz	0.15 Hz	0.073 Hz	
** Defined as the nominal –10%/–3 dB filter frequency	1 Hz – 10% analogue high-pass filter	5 Hz	1.0 Hz	0.5 Hz	–20 dB/dec.
*** Single analogue pole and 2nd order digital filter section	7 Hz –0.1 dB digital high-pass filter	7 Hz	1.45 Hz	0.707 Hz	–60 dB/dec.
	22.4 Hz –0.1 dB analogue*** high-pass filter	22.4 Hz	14.64 Hz	11.5 Hz	
Absolute Amplitude Precision, 1 kHz, 1 V _{input}			±0.05 dB, typ. ±0.01 dB		
Amplitude Linearity (linearity in one range)	0 to 60 dB below full scale		±0.1 dB, typ. ±0.01 dB		
	60 to 80 dB below full scale		±0.2 dB, typ. ±0.02 dB		
	80 to 100 dB below full scale		typ. ±0.05 dB		

Overall Frequency Response re 1 kHz, from lower limit f_L to upper limit f_U f _L is defined as the lower frequency for guaranteed fulfilment of –0.1 dB accuracy (see under High-pass Filters) f _U is defined as the chosen frequency span		±0.1 dB	
Noise: Measured lin. 10 Hz to 25.6 kHz (Input terminated by 50 Ω or less)	Input Range	Guaranteed	Typical
	1 V _{peak}	< 7.5 μV _{rms} (< 47 nV _{rms} /√Hz @ 1 kHz)	< 5.5 μV _{rms} (< 35 nV _{rms} /√Hz @ 1 kHz)
	10 V _{peak}	< 75 μV _{rms} (< 470 nV _{rms} /√Hz @ 1 kHz)	< 55 μV _{rms} (< 350 nV _{rms} /√Hz @ 1 kHz)
Spurious-free Dynamic Range re full-scale input (Input terminated by 50 Ω or less) Spurious-free dynamic range is defined as the ratio of the rms full-scale amplitude to the rms value of the peak non-harmonic spectral component	Input Range	Typical	
	1 V _{peak}	130 dB	
	10 V _{peak}	130 dB 120 dB with DC coupling	
DC Offset re Full Scale Measured after automatic DC compensation at current temperature when changing from AC to DC coupling or changing input range when DC coupled		Guaranteed	Typical
		< –80 dB	< –90 dB
Harmonic Distortion (all harmonics)		Guaranteed	Typical
		–80 dB in 1 V range –75 dB in 10 V range	–100 dB @ 1 kHz
Crosstalk: Between any two channels of a module or between any two channels in different modules	Frequency Range	Guaranteed	Typical
	0 – 25.6 kHz	< –80 dB	–100 dB
Channel-to-Channel Match (10 V_{peak} and 1 V_{peak} input ranges)		Guaranteed	Typical
Maximum Gain Difference f _L is defined as the –0.1 dB frequency		0.1 dB from lower frequency limit, f _L , to 25.6 kHz (0.4 dB at –10% filter frequency)	±0.01 dB
Maximum Phase Difference (within one frame) f _L is defined as the –0.1 dB filter frequency			
Sound Intensity Phase Match		Not relevant	
Common Mode Rejection		Guaranteed	
		10 V range	1 V range
	0.1 – 120 Hz	60 dB	80 dB
	120 Hz – 1 kHz	50 dB	70 dB
	1 kHz – 25.6 kHz	30 dB	50 dB
Absolute Max. Common Mode Voltage		±28 V _{peak} without damage	
		±3 V _{peak} without clipping	
		If common mode voltage exceeds the max. value, care must be taken to limit the signal ground current in order to prevent damage. Maximum is 100 mA. The instrument will limit the voltage to the stated max. ‘without damage’ common mode value	
Anti-aliasing Filter At least 90 dB attenuation of those frequencies that can cause aliasing	Filter Type	3rd order Butterworth	
	–0.1 dB @	25.6 kHz	
	–3 dB @	64 kHz	
	Slope	–18 dB/octave	
Supply for Microphone Preamplifiers		Not available	
Supply for Microphone Polarization		Not available	
Supply for CCLD		3.6 mA from 24 V source	
		If any CCLD-coupled channel is paralleled with another channel, this must also be CCLD-coupled. Otherwise the signal might be clipped by the paralleled channel	
Tacho Supply		CCLD for Type 2981 (Power supply for legacy types MM-0012 and MM-0024 not available)	

Analogue Special Functions	Transducers: Supports IEEE 1451.4-capable transducers with standardized TEDS
Overload Detection	<p>Signal Overload: Detection level in 1 V range: $\pm 1 V_{\text{peak}}$ In 10 V range: $\pm 10 V_{\text{peak}}$ (in CCLD mode $\pm 7 V_{\text{peak}}$)</p> <p>CCLD Overload: Detection of cable break or short-circuit + detection of CCLD transducer working point fault. Detection level: $+ 2 V/20 V$</p> <p>Common Mode Voltage Overload: Detection level: $\pm 3 V$</p>
Protection	<p>If signal input level exceeds the measuring range significantly, the input will go into protection mode until the signal goes beyond the detection level again – but at least for 0.5 s. While in protection mode, the input is partly switched off and the input impedance is strongly increased. (The measured value will be strongly attenuated but still detectable)</p> <p>Direct mode detection level: $\pm 33 V_{\text{peak}}$ CCLD mode detection level: $+27/-2 V_{\text{peak}}$</p>

Ordering Information

Type 3058-B-080 LAN-XI 8-ch. Input + 2-ch. CAN Bus Module 25.6 kHz

Includes the following accessories:

- UA-3101-080: LAN-XI detachable front panel with 8 × SMB input connectors and 2 × LEMO 8-pin CAN bus connectors
- ZG-0426: Power supply via mains (100 – 240 V)
- AO-1450: LAN Cable, shielded CAT 6, RJ 45 (M), 2 m (6.5 ft)
- ZH-0717: CAN Cable, high-/low-speed CAN with LED indication and power, LEMO 8-pin to D-sub 9-pin, 3 m (10 ft)
- ZH-0718: CAN Breakout Adapter, EMC hood, D-sub 9-pin to wireable terminal blocks
- AO-0791: CAN Cable, LEMO 8-pin to ODB-II 16-pin

Sonoscout Configuration using Type 3058-B-080

Type 3663-x-080*	8-channel CAN Sonoscout Kit (includes Type 3058-B-080)
AO-0795-D-010	CAN Cable, J-1939-13 Type 2 9-pin to D-sub 9-pin, 1 m (3.3 ft)
AO-0788-D-030	HATS Cable, 2 × SMB (AES3) to XLR 3-pin (HATS), 3 m (10 ft)
AO-0823-D-004	CAN Cable, OBD-II 16-pin (M) Type B (for 24 V trucks) to OBD-II 16-pin (F), 0.4 m (1.3 ft)

For more information on Sonoscout Kit Type 3663-B-080, see Sonoscout NVH Recorder BZ-5950 product data: [BP 2463](#).

Calibration Services for LAN-XI Analyzers

ANA-LNXI-CAF	Accredited Calibration
ANA-LNXI-CAI	Initial Accredited Calibration
ANA-LNXI-CTF	Traceable Calibration
ANA-LNXI-TCF	Conformance Test with Certificate

* x = B or J

Type 3663-B-080: for use internationally (except Japan)
Type 3663-J-080: for use in Japan

Supported Brüel & Kjær Products

SENSORS

A wide range of Brüel & Kjær accelerometers, microphones, preamplifiers and sound intensity probes is available for use with a LAN-XI system. The system supports IEEE 1451.4-capable transducers with standardized TEDS.

CABLING AND ADAPTERS

WA-1705	Adapter, SMB (F) to Microdot (F), for LAN-XI and array microphones
AO-0723	Adapter, SMB to BNC, for using cables with BNC connectors
AO-0725	Cable, SMB to SMB, for tachometer
AO-0691	Cable, SMB to 10 – 32, for accelerometers
AO-0699	Cable (high temp.), SMB to 10 – 32, for accelerometers
AO-0698	Cable, SMB to M3, for mini-accelerometers
AO-0690	Cable, 3 × SMB to 4-pin Microtech, for triaxial accel.
AO-0587	Cable, SMB to BNC, for Preamplifier Type 2671
AO-0528	Cable, 4-pin Microtech connectors, for triaxial accel.

CONDITIONING

WB-1497	20 dB Attenuator
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LAN-XI HARDWARE

Type 2831-A	Battery Module
Type 3660-A-20x [†]	Wireless LAN Frame
Type 3660-C-100	5-module LAN-XI Front-end Frame with GPS
Type 3660-D-100	11-module LAN-XI Front-end Frame with GPS
ZG-0858	DC Power Charger, car utility connector to Type 2831-A
AO-0546	DC Power Cable, car utility connector to single module
AO-1489	DC Power Cable, car utility connector to 11-module frame (Type 3660-D-100)
UL-0265	10-port Gigabit Managed Switch with PTP and PoE (8 ports)

SOFTWARE

Brüel & Kjær's analysis software supports LAN-XI hardware.

[†] x = 0 or 1

Type 3660-A-200: for use internationally (except Japan)
Type 3660-A-201: for use in Japan

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