

## BRÜEL & KJÆR® Data Analysis Software

### BK Connect Hardware Setup

Real and Virtual Data Acquisition Hardware Connection

*BK Connect® is a fully integrated solution for multi-channel data acquisition (using our industry-leading LAN-XI hardware), data processing, data management and reporting. The innovative user interface is easily customized so you can adapt it to the needs of different users within your organization enabling expert users and operator technicians to work together with maximum efficiency and high productivity.*

*The core applications of BK Connect are designed for general-purpose sound and vibration engineering. Together they provide a comprehensive set of tools for real-time measurements and data processing with the flexibility to deal with a wide range of engineering scenarios – from repetitive, standardized testing to complex troubleshooting investigations.*



### Uses and features

#### Uses

- Sound and vibration data acquisition
- Visualization, editing and audio playback of time data after recording and in preparation for analysis
- Display of frequency, rpm and order content of time signals during audio playback

#### Features

- Support for up to two LAN-XI data acquisition modules or any single LAN-XI Light module
- User interface and data organization optimized to fit your workflows, allowing multiple tests, setups and applications inside a single project
- Transducer Manager for transducer setup
- Hardware Browser for channel setup
- Transducer calibration/verification
- Real-time Monitor including a monitor recorder
- Graphical setup of transducers used with the data acquisition hardware (using real or virtual front end)
- Easy to configure auxiliary and CAN bus input channels to be used for operating condition verification and in measurement
- Generator output excitation setup for LAN-XI hardware
- Support of generic auxiliary digital interface (GADI), which allows for the integration of auxiliary parameters with dynamic data and measurement of auxiliary parameters as a function of time
- Support for Transducer Frequency Response Equalization for select HBK accelerometers and microphones

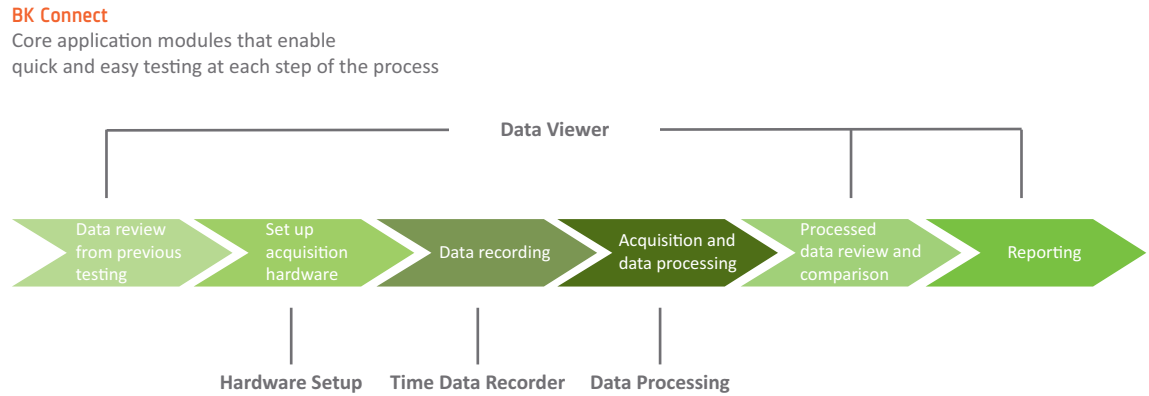
## The BK Connect core suite

The core applications of BK Connect are:

- **BK Connect Data Viewer** for data management, viewing and reporting
- **BK Connect Hardware Setup** for setting up transducers and front-end hardware
- **BK Connect Time Data Recorder** for dedicated time data recording and review
- **BK Connect Data Processing** for real-time measurements and time or function data processing

Each of these applications is designed as a self-contained solution for a typical task or set of tasks within test and analysis. Select the module or modules that will help you perform the task, or combine applications to increase functionality and create super-efficient workflows for quick and easy completion of multiple steps in a sound and vibration test process.

Fig. 1  
BK Connect core applications



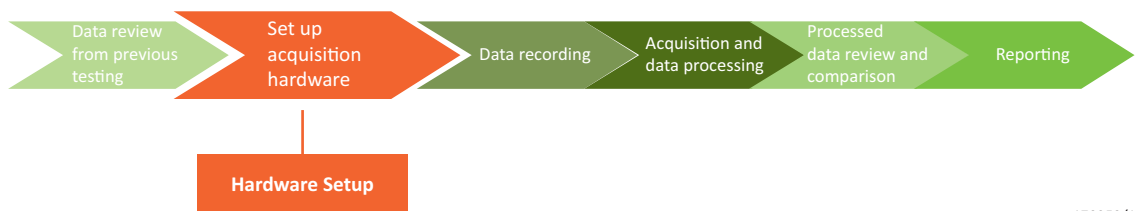
### Licensing that fits your needs

The four core applications can all be used stand-alone or incorporated into the main application, BK Connect Data Processing. On its own, Data Processing is purely for time or frequency data post-processing, however when the Hardware Setup licence is present, you can also measure in real time. When the Time Data Recorder licence is present, you can simultaneously record and post-process test data to quickly produce your final results and/or reports.

## BK Connect Hardware Setup

### BK Connect Hardware Setup

Application modules for graphics-based setup of your data acquisition hardware



BK Connect Hardware Setup allows you to connect to a front end and prepare the physical setup. You can use the Hardware Setup application stand-alone with your LAN-XI front-end system to quickly and easily assign all of your transducers via TEDS' automatic detection or manual drag-and-drop. The HW Setup Table provides a quick overview of the hardware configuration including signal names, DOF information, transducer calibration information and front-end settings. This is coupled with the Hardware Matrix which provides you with an interactive graphical display of the front end, including real-time display of the LAN-XI LED status rings, enabling you to understand the state of your instrumentation from inside the BK Connect user interface. Selections in the Hardware Matrix are instantly reflected in the HW Setup Table, which makes it very easy to handle large channel counts as the channel table scales automatically to the selection in the matrix.

The real-time monitors in BK Connect Hardware Setup include time, profile vs time, level, FFT spectrum, 1/3-octave spectrum, and FFT spectrogram displays and PC sound-card-based audio playback to give you confidence in your instrumentation setup and ensure you are ready to start acquiring data. A start/stop recorder is included to provide a simple data acquisition option.

You can also connect to a virtual front end based on a known hardware configuration. This enables you to prepare in advance for a test without having to connect to the physical front end and tie up test resources, which is especially useful when preparing for a large-scale test with many channels.

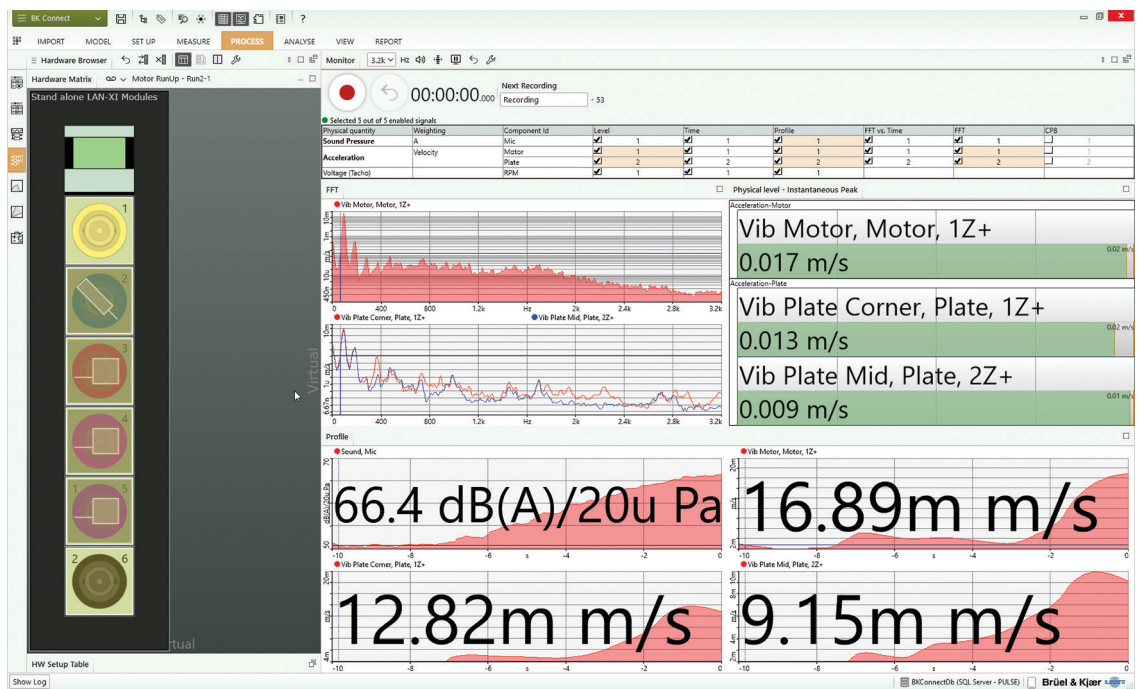
### BK Connect Hardware Setup Type 8401

Type 8401 allows connection of up to two LAN-XI front-end modules or a single LAN-XI Light module. Two Type 8401 licenses can be stacked together to provide unlimited module access. Once connected:

- Create and manage transducers in the transducer database, including auxiliary transducers
- Assign transducers to front-end channels (assuming no TEDS) including selection of correction curves for select HBK transducers
- Perform transducer verification (calibration)
- Real-time monitor displays
- Simple start/stop recording to a .bkc file
- Set up the generator output of your LAN-XI front end
- Select the channels from a .dbc file, then edit the CAN-bus .dbc file for use in acquisition

You can manage the setup using the real-time monitor display, which provides instant and continuous visual feedback on signals coming in to the front end. The displays start immediately upon connecting to the front end, so no initialization is needed and start-up is extremely fast.

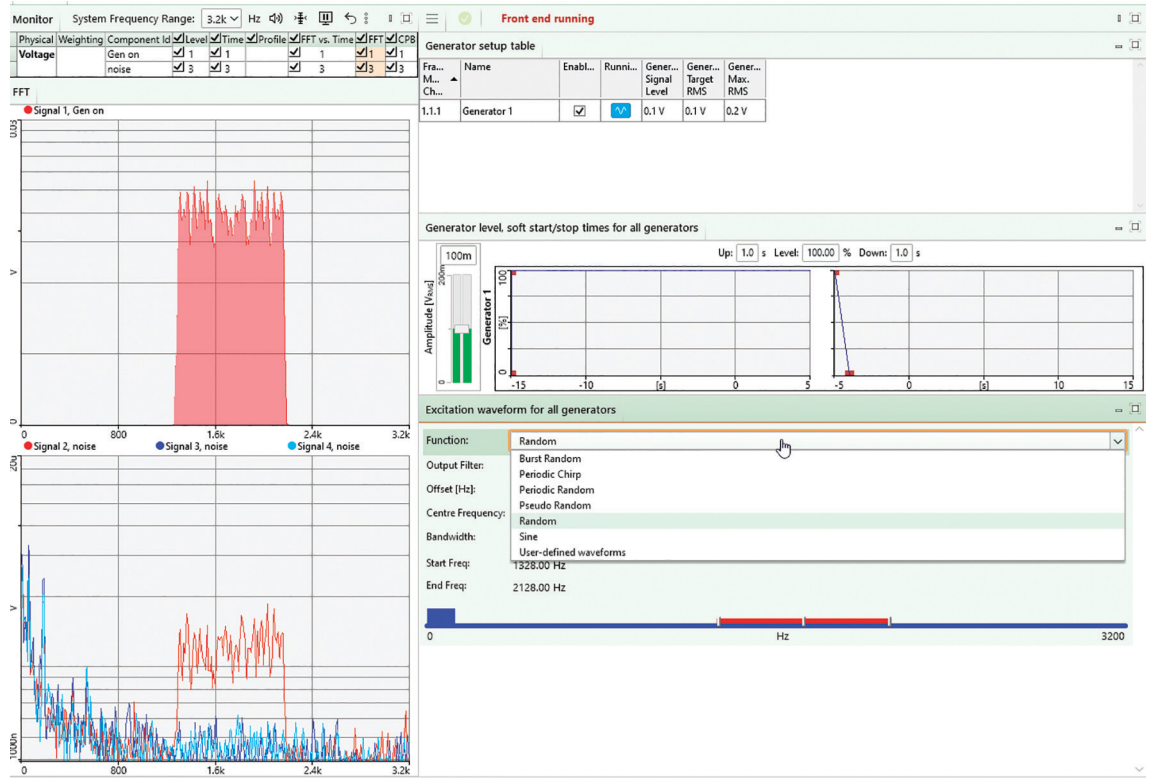
Fig. 2  
Hardware Setup



### Generator Setup

The Generator Setup task can be used to configure the output of your connected LAN-XI hardware. Once set up, start the generator in the Standard Measurement or Time Data Recorder task, or in the Monitor component's recorder.

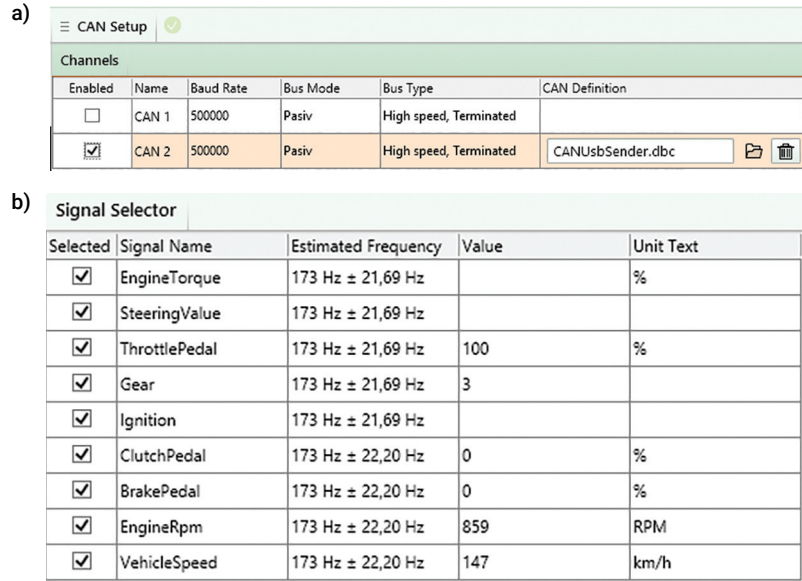
**Fig. 3**  
The Generator Setup task



**CAN bus support**

The setup, monitoring and recording of CAN-bus data is supported using the SAE J1939, OBDII or specific .dbc file. To start, use the CAN Setup task: Select which CAN connector to use and which CAN messages to use; then create CAN files, edit the parameters for the CAN messages and add CAN files together.

**Fig. 4**  
Tools in the CAN Setup task  
a) Setup sub-task: Select the CAN connector and CAN messages  
b) Editor sub-task: Create and edit CAN files



**GADI support**

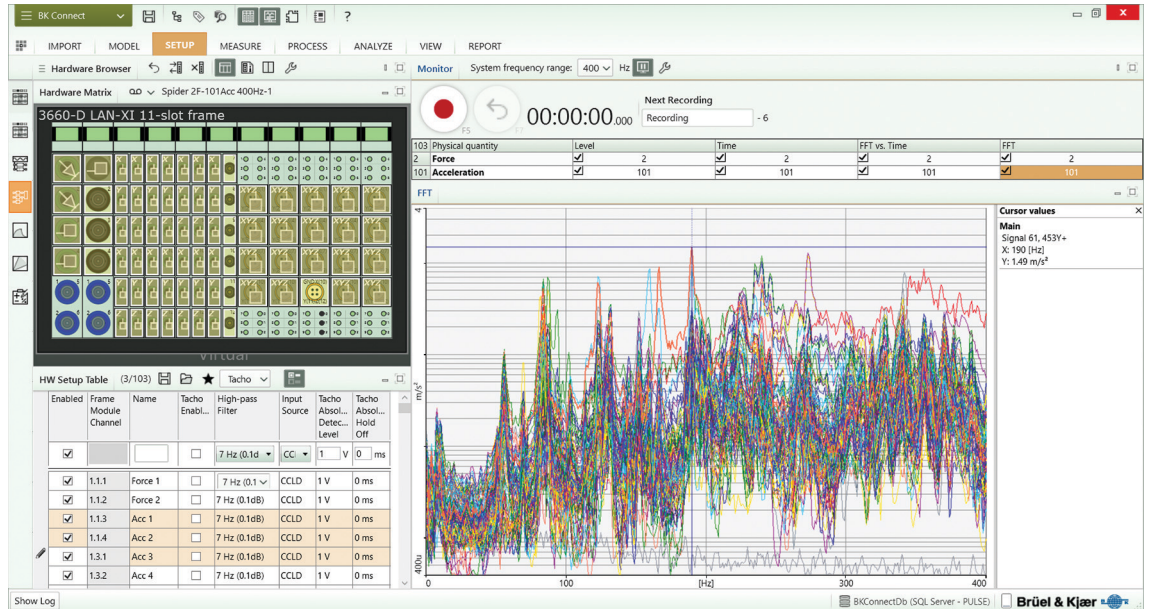
With generic auxiliary digital interface (GADI) support, you can insert 'slow' digital process values into the BK Connect data stream. Here they appear as auxiliary data and can be used similar to analogue auxiliary data (temperature, oil pressure, wind speed, etc.).

Since these process data samples are provided one at a time and are time-stamped by BK Connect when received, there may be a small uncertainty imposed by the Windows® operating system. Likewise, this data is not buffered and streamed over the local area network (LAN) in the same way as normal high-speed input channels and may therefore be slightly offset. GADI, however, tries to align to normal buffering and transmission delays.

## BK Connect Hardware Setup (advanced) Type 8401-A

BK Connect Hardware Setup (advanced) Type 8401-A adds the ability to measure with an unlimited number of LAN-XI modules, as well as one-button accelerometer mounting check to check the mounted resonance state of your accelerometers\*. This is an invaluable aid, especially in high-channel count tests, to ensure that all accelerometers remain firmly mounted to the test structure throughout the test process. You can also perform a detailed verification of the performance of your LAN-XI hardware modules using the Module Verification tool. The tool checks that the electrical noise, distortion, input range levels and the high-pass filter setting of the modules are still within the manufacturer's specification, eliminating a source of uncertainty in your measurement chain.

**Fig. 5**  
Hardware Setup  
(advanced) showing  
recording in the Monitor



## Virtual Hardware Setup (free of charge)

BK Connect Virtual Hardware Setup Type 8401-V is a free licence that lets you use any physical front-end configuration that has been saved as a 'virtual front end.' The file can be used to assign transducers and configure the HW Setup Table as if you were using the actual physical hardware, thus allowing you to set up your test at your desk rather than in the lab or out in the field.

\* Requires accelerometers which support the accelerometer mounting check function.



## Specifications – BK Connect Hardware Setup modules

This Windows®-based analysis software is delivered via download option or USB installation media. The licence is either: node-locked to a PC host ID or dongle; or floating, locked to a network server

### System

#### PC SYSTEM REQUIREMENTS

- Windows® 10 Pro or Enterprise (x64) with either Current Branch (CB), Current Branch for Business (CBB), Semi-annual Channel (Targeted) or Semi-annual Channel servicing model
- Windows® 11 Pro or Enterprise (x64) with either Current Branch (CB), Current Branch for Business (CBB), Semi-annual Channel (Targeted) or Semi-annual Channel servicing model
- Microsoft® Office 2019 (x32 or x64) or Office 2021 (x32 or x64)
- Microsoft® SQL Server® 2019 (SQL Server 2019 Express included with software)

#### RECOMMENDED PC SYSTEM

- Intel® Core™ i9, 3 GHz processor or better
- 32 GB RAM
- 1 TB Solid State Drive (SSD) with 100 GB free space, or better
- 1 Gbit Ethernet network\*
- Microsoft® Windows® 10 Pro or Enterprise (x64) with CB
- Microsoft® Office 2021 (x32)
- Microsoft® SQL Server® 2019
- Screen resolution of 1920 × 1080 pixels (full HD)

#### FRONT END SUPPORT

One or more LAN-XI data acquisition modules (stand-alone or in frame)

\* A dedicated data acquisition network (LAN or WAN) is recommended. A network that only handles data from the front end improves the stability of the data

## Specifications – BK Connect Hardware Setup Type 8401

### Prerequisites

- See system specifications

### Specifications

<b>CONFIGURATION</b>		The software automatically detects the front-end hardware and configures the system. If IEEE 1451.4 capable transducers (with standardized TEDS) are being used, these are detected and attached automatically to the correct input channels
<b>HARDWARE BROWSER</b>	<b>Description:</b>	Combines an interactive display of the front-end hardware, called the Hardware Matrix, and a channel list called the HW Setup Table. These two components, working together, provide a highly efficient way to work with any size system
	<b>Header Bar Buttons:</b>	<ul style="list-style-type: none"> <li>• Resetting of channel status</li> <li>• Reconnecting the front end</li> <li>• Display of either the HW Setup Table, the LAN-XI home page, or an overall level meter for all channels</li> </ul>
<b>HARDWARE MATRIX</b>	<b>Description:</b>	<ul style="list-style-type: none"> <li>• Signal levels indicated using coloured rings</li> <li>• Channel overload status, using different symbols for different types of overload</li> <li>• Transducer status, using symbols to identify each transducer type</li> <li>• Calibration/verification status when used in the Transducer Verification task</li> <li>• Drop destination for transducers dragged from the Transducer Manager</li> <li>• Channel selector for the HW Setup Table and overall level meter</li> <li>• Automatic indication of TEDS transducers</li> </ul>
	<b>Layout Views:</b>	<ul style="list-style-type: none"> <li>• Square Grid: Completely dynamic. Signals form a best-fit grid in the available screen space using coloured rings to display signal amplitude</li> <li>• Bar Grid: Completely dynamic. Signals form a best-fit grid in the available screen space using bars to display signal amplitude</li> </ul> <p>Note that the grid displays can be sorted according to Signal Name, Maximum Level, Minimum Level and Level Range</p>
	<b>Matrix Display Styles:</b>	<ul style="list-style-type: none"> <li>• Physical: A visually representative display of the physical front-end hardware</li> <li>• Logical: Channels shown as coloured rings in the same configuration as the physical hardware</li> </ul>

HW SETUP TABLE	<b>Description:</b>	The HW Setup Table contains all information about the front-end hardware and any transducers connected to it. The number of rows displayed in the table depends on the channel selection made in the Hardware Matrix, the default being all channels. The size of the table updates dynamically according to which channels are selected in the Hardware Matrix, making it very easy to focus on subsets of channels when needed
	<b>Editing the Table:</b>	<ul style="list-style-type: none"> <li>• Manual editing of channel information</li> <li>• Update from an external XML or UFF 1808 (Channel Table) file or from Microsoft® Excel®</li> <li>• Save HW Setup Table contents to an external XML or UFF 1808 (Channel Table) file for later use</li> <li>• Create different (favourite) views to tailor which columns should be shown</li> </ul>
TRANSDUCER MANAGER	<b>Description:</b>	The Transducer Manager works with a Microsoft® Access® database (as used by PULSE LabShop) to manage transducer specifications and calibration information. A full set of Brüel & Kjær transducer types, with nominal sensitivities, is provided with all BK Connect installations, but more can be added using the Transducer Manager. Each transducer type can have a number of devices of that type, each with its own unique calibration history
	<b>Adding Transducers:</b>	<p>Individual devices, or groups of devices, can be dragged and dropped onto the Hardware Matrix to add transducers to the configuration and/or add calibration/sensitivity information:</p> <ul style="list-style-type: none"> <li>• Drag a transducer type to many (or all) channels. The HW Setup Table applies the nominal sensitivity for that type to the selected channel(s)</li> <li>• (Typical) Drag specific devices to individual channels where they are known to be physically connected</li> </ul>

#### Real-time monitor

<b>MONITORS</b>	Channel monitor (time or FFT), channel level meter, channel level history, elapsed time, rpm profile, tachometer
<b>FFT MONITOR</b>	Monitors 2D spectra or 3D spectrograms for all active channels or selected channels. Grouped automatically based on the physical quantity
<b>PROFILE MONITOR</b>	Monitors the profile vs time for CAN-bus and auxiliary data and selected dynamic channels
<b>CPB MONITOR</b>	Monitors 2D spectra for all active channels with the option to apply acoustic weighting to sound pressure signals. Channels are grouped automatically based on the physical quantity
<b>LEVELS MONITOR</b>	Monitors the overall levels displayed in voltage or physical quantity for all active or selected channels. The data can be monitored as instantaneous level or max. hold, using slow, fast or impulsive time weighting
<b>TIME MONITOR</b>	Monitors the complete raw time history for the entire length of the recording, while overlaying overload and marker locations

#### Auxiliary parameter logging

<b>CONNECTION</b>	Use cable AO-0738-D010 to connect to LAN-XI module Type 3056
<b>INTEGRATION</b>	<ul style="list-style-type: none"> <li>• Integration of auxiliary parameters (temperature, wind speed, etc.) with dynamic data</li> <li>• Auxiliary parameter as a function of time</li> <li>• Auxiliary channels can be recorded and played back</li> </ul>
<b>SAMPLING RATE</b>	16 Hz per LAN-XI channel

#### CAN Setup

<b>SETUP</b>	Select the CAN connector to enable or the CAN Definition file to use. The Signal Selector will show up allowing you to inspect the CAN signals available in the CAN Definition file. Select which CAN signals to include in your recordings and get an estimate for how often the CAN signals will appear along with a quick view of the current signal values
<b>EDITOR</b>	Open a CAN Definition file and select the signals that should be used. Edit parameters for the CAN signals or add/delete new lines in the .dbc file. The edited file can be appended to new CAN Definition files or saved

#### Transducer Verification

Transducer Verification (under Setup) can be used either to verify that transducers are functioning correctly, or to make a new calibration. A transducer calibrator is used to apply the necessary excitation for either verification or calibration. Multiple calibrators can be used simultaneously.

The software automatically detects the calibrator signal and performs the verification/calibration, with coloured status indicators in the Hardware Matrix and HW Setup Table showing In Progress, Failed or Passed. At the end of the procedure, the Transducer Manager is updated along with the HW Setup Table and calibration information is added to the device's calibration history.

#### Waveforms

Software-determined arbitrary waveforms up to 2 Msamples  
**Waveforms Available:** Single fixed sine (continuous), stepped sine, random (continuous or burst), pseudo-random, periodic random.  
 User-defined, arbitrary waveforms up to 25.6 kHz can be streamed or downloaded

## Specifications – BK Connect Hardware Setup Types 8401-A and 8401-V

### Hardware Setup (advanced) Type 8401-A

#### PREREQUISITES

- BK Connect Hardware Setup Type 8401

#### ADDED FUNCTIONALITY TO TYPE 8401

- Support for more than two data acquisition modules
- System validation tasks (analogue diagnostics)
- Advanced system verification task, Accelerometer Mounting Check, that works with select Brüel & Kjær accelerometers utilizing unique Brüel & Kjær measurement chain technology

### Ordering information\*

Type 8401-X	BK Connect Hardware Setup
Type 8401-A-X	BK Connect Hardware Setup (advanced)
Type 8401-V-X	BK Connect Virtual Hardware Setup

### Other BK Connect software modules and packs

#### BASIC APPLICATION AND IMPORT OPTION MODULES

Type 8400-NT	BK Connect Data Viewer (free viewer)
Type 8400-X	BK Connect Data Viewer
Type 8400-A-X	BK Connect Data Viewer (advanced)
Type 8400-B-X	BK Connect Native File Importers
Type 8400-C-X	BK Connect External File Importers
Type 8400-D-X	BK Connect Nastran Interface
Type 8400-E-X	BK Connect Ansys Interface
Type 8400-F-X	BK Connect Abaqus Interface

#### DATA RECORDING APPLICATION MODULES

Type 8402-X	BK Connect Time Data Recorder
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#### DATA PROCESSING APPLICATION AND OPTION MODULES

Type 8403-X	BK Connect Data Processing
Type 8403-A-X	BK Connect Data Processing (advanced)
Type 8405-B-X	BK Connect Advanced Frequency Analysis Option
Type 8405-C-X	BK Connect CPB Option
Type 8405-E-X	BK Connect Order Analysis Option
Type 8405-F-X	BK Connect Order Tracking Option
Type 8405-G-X	BK Connect Sound Quality Metrics Option

#### DATA RECORDING PACKS

Type 8402-NS	BK Connect Time Data Recorder Pack – node-locked licence that includes Types 8400, 8401 and 8402
Type 8402-A-NS	BK Connect Time Data Recorder Pack (advanced) – node-locked licence that includes Types 8400, 8400-C, 8401, 8401-A and 8402

#### DATA PROCESSING PACKS

Type 8403-NS	BK Connect Data Processing Pack – node-locked licence that includes Types 8400, 8401 and 8403
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### Virtual Hardware Setup Type 8401-V

Set up of a virtual hardware configuration from a file using same tools as in Type 8401. No physical hardware is required

#### PREREQUISITES

- See system specifications

#### DATA RECORDING AND PROCESSING PACKS

Type 8404-NS	BK Connect Data Processing and Time Data Recorder Pack – node-locked licence that includes Types 8400, 8401, 8402, 8403 and 8403-A
Type 8404-A-NS	BK Connect Data Processing and Time Data Recorder Pack (advanced) – node-locked licence that includes Types 8400, 8400-A, 8400-B, 8401, 8401-A, 8402, 8403 and 8403-A

#### Team data sharing

Type 8400-T-FY	BK Connect Team Server, Single User, Annual Floating Lease Licence and Support
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#### Software Maintenance and Support Agreements†

M1-8400-X	Agreement for Type 8400
M1-8400-A-X	Agreement for Type 8400-A
M1-8400-B-X	Agreement for Type 8400-B
M1-8400-C-X	Agreement for Type 8400-C
M1-8400-D-X	Agreement for Type 8400-D
M1-8400-E-X	Agreement for Type 8400-E
M1-8400-F-X	Agreement for Type 8400-F
M1-8401-X	Agreement for Type 8401
M1-8401-A-X	Agreement for Type 8401-A
M1-8401-V-X	Agreement for Type 8401-V
M1-8402-X	Agreement for Type 8402
M1-8403-X	Agreement for Type 8403
M1-8403-A-X	Agreement for Type 8403-A
M1-8405-B-X	Agreement for Type 8405-B
M1-8405-C-X	Agreement for Type 8405-C
M1-8405-E-X	Agreement for Type 8405-E
M1-8405-F-X	Agreement for Type 8405-F
M1-8405-G-X	Agreement for Type 8405-G
M1-8402-NS	Agreement for Type 8402-NS Pack
M1-8402-A-NS	Agreement for Type 8402-A-NS Pack
M1-8403-NS	Agreement for Type 8403-NS Pack
M1-8404-A-NS	Agreement for Type 8404-A-NS Pack
M1-8402-NS	Agreement for Type 8402-NS Pack

\* "X" indicates the licence model can either be N: Node locked or F: Floating

† Agreement expiration date to be agreed at time of contract

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