

# Tescia® – Software for Repetitive Testing

Dynamic testing of large complex machinery such as gas turbines, with signals from several hundred transducers distributed logically around the test object, demand the use of multichannel data acquisition systems. Such tests have well-defined processes and are typically referred to as benchmarking, standard testing, or repetitive testing.

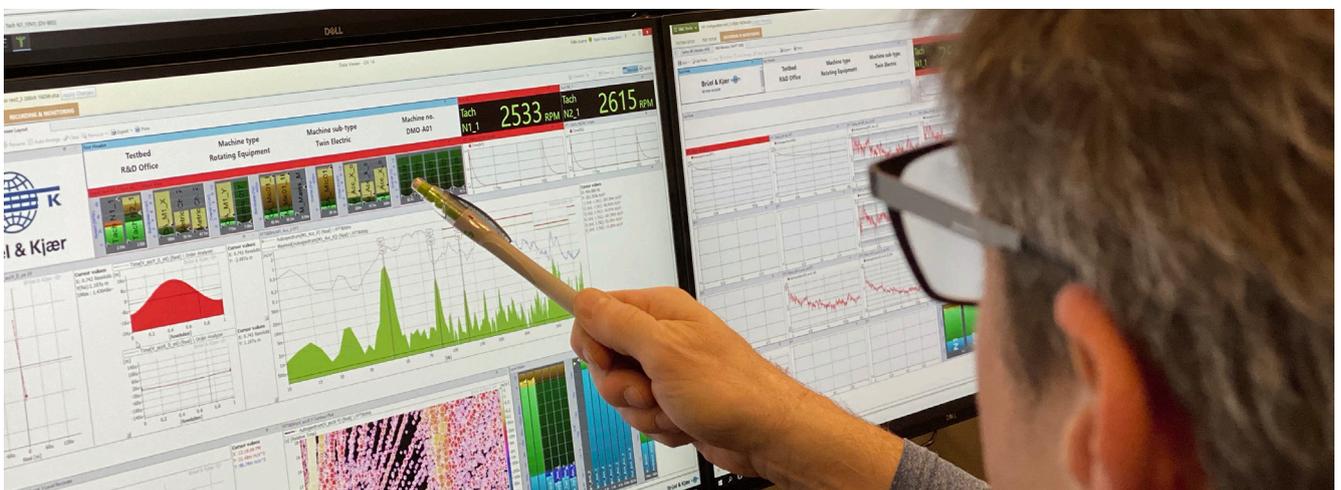
Tescia Repetitive Testing Type 8560 is the base software application that makes this kind of testing possible. It is designed to perform controlled tests on a wide range of devices and allows you to measure in real time under various operating conditions and configurations. It also allows you to record raw data, and analyse/archive data collected from these standardised, large-scale tests.

To help manage the tasks involved, the software follows a logical workflow and the test process is easy to define and modify. A complete system that includes the renowned Brüel & Kjær® LAN-XI data acquisition hardware and a dedicated PC that can be used in a small production environment with just one user, or in a larger system with multiple test and monitoring seats. As your need grows, channel count and seats can be expanded to meet the demand.

Other options are available that build on the base Type 8560 application and add capabilities for testing in specific domains, such as rotating machinery testing, in-operation conformance check, product protection testing, ground vibration monitoring, in-flight vibration and acoustic test and production/in-operation testing.

## Uses

- Standardised and repetitive testing on high-value products
- Configurable repetitive testing - specifically for gas turbine testing
- Acquisition, analysis and handling of dynamic data and slow-speed data
- Monitoring applications such as on rotating machinery, sensitive machinery and floors
- Distribution of data locally or globally
- Export of metrics to slow-speed systems
- Multi-analysis: advanced FFT, order, synchronous order, 1/n-octave and cross-spectra
- Correlation of high- and low-speed (steady state) data
- Stationary as well as transportable use

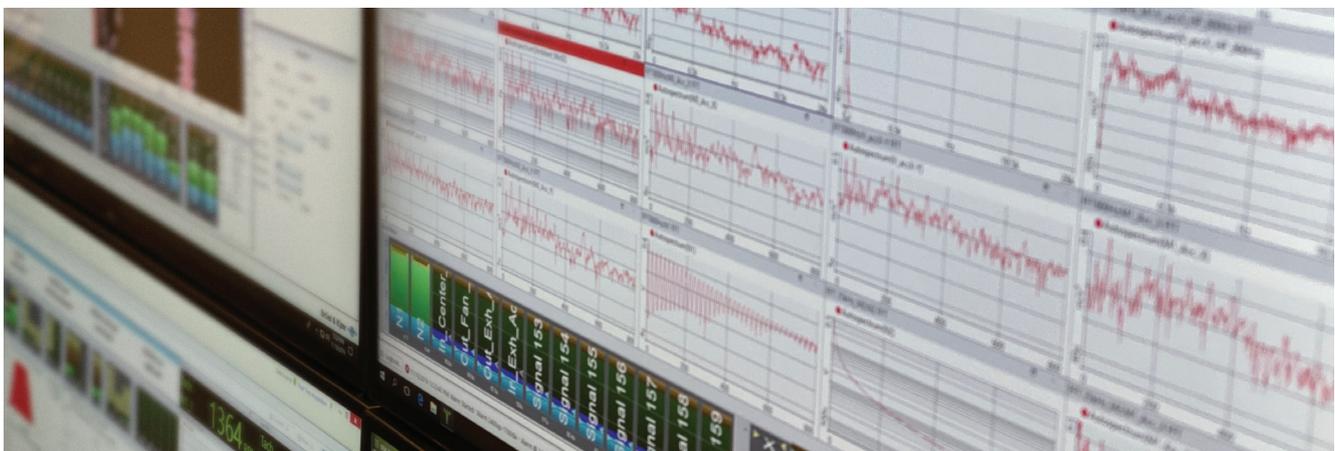
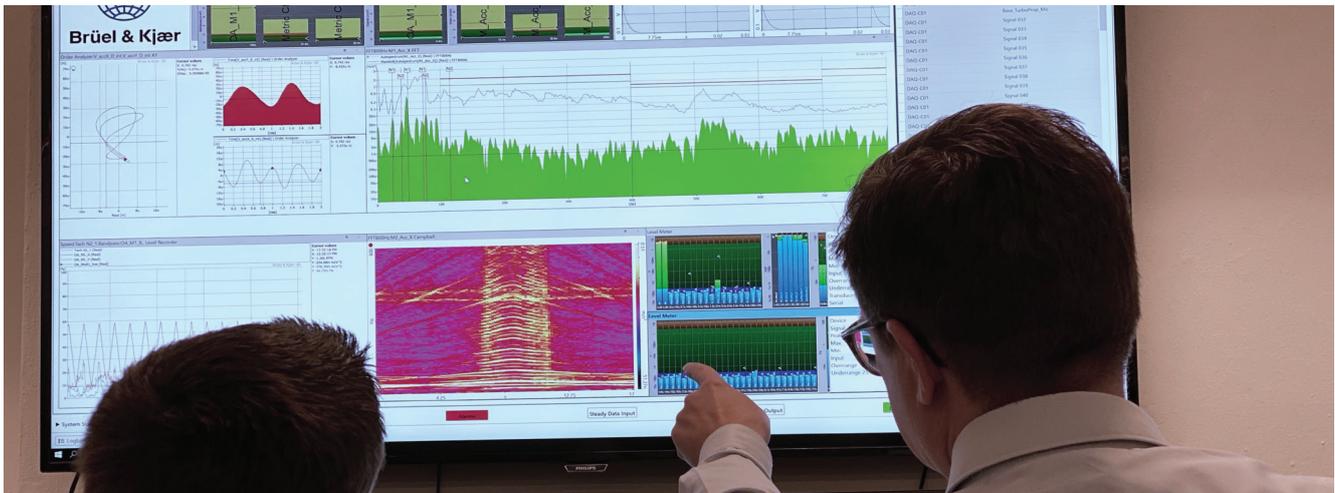


## Benefits

- Safeguarding of high-value test objects
- Reduced preparation and total test times
  - Less setup time in test cell or on test bench
  - Ability to share test configurations
  - Streamlining and automation of test processes
  - Optional off-line test setup/configuration
- Configurable repetitive testing – can be applied in generic product testing or specifically to gas turbine tests
- Complete scalability to fit test environment and processes
- Safe acquisition of test data
  - Configurable real-time frequency, time and order-based alarms that help protect the test object
  - Real-time monitoring of signals and recording
- Swift decision-making – real-time analysis, whether local or remote, provides data to any decision maker when needed
- Minimum time usage of prototypes

## Features

- Real-time Data Conversion in DATx format
- Built-in application proficiency
- Setup parameters managed using a Microsoft® Excel® workbook and/or the graphical user interface (GUI)
- Highly scalable
- Channel management
- Multiple simultaneous users: local or remote
- Multiple workstation user profiles: Test Seat; Data Viewing Seat; Data Analysis Seat
- Supports low-speed (steady state) data
- Manual and automatic (using event triggers) data recording and analysis
- Reference profiles and triggering on profiles exceedances
- Logbook for logging all automatic and manual events
- Data archiving of raw recorded data and processed data
- Flexible metadata handling options
- Multi-channel and multi-function monitoring
- Real-time alarms with optional relay output
- On-the-spot selective playback of recorded files for swift decisions
- WAN remote based real-time displays
- Acoustic calibration
- Event time trigger
- Time display and IRIG-B time control
- Event output: /exe/bat execution



# The System

Systems using software for repetitive testing can vary greatly – from single-user, stand-alone systems that acquire and process data from a single data acquisition module on a single laptop, to an extensive system that acquires data from thousands of channels and distributes the data to multiple computers for processing in real time.

The key to Tescia’s scalability comes from the ability to mix and match modular data acquisition hardware and software licences. The ability to combine multiple licences enables system configurations of all sizes, ranging from small and portable to very large and complex.

At the centre of the Tescia solution is **Repetitive Testing Type 8560** - base software application that allows you to perform standardised tests on any product, including data acquisition, monitoring and analysis, and recording, storage and transfer of data during successive test runs.

Type 8560 can be combined with one (or more) options, to address your testing requirements in the following areas:

- Rotating machinery testing (for example, gas turbine testing)
- In-operation conformance checks
- Product protection (for example, during satellite transportation)
- In-flight vibration and acoustic testing
- Production and in-operation testing

- Monitoring applications such as on rotating machinery, sensitive machinery and floors
- Airborne and structureborne noise according to MIL-STD-740 and MIL-STD-1474E
- Ground vibration monitoring

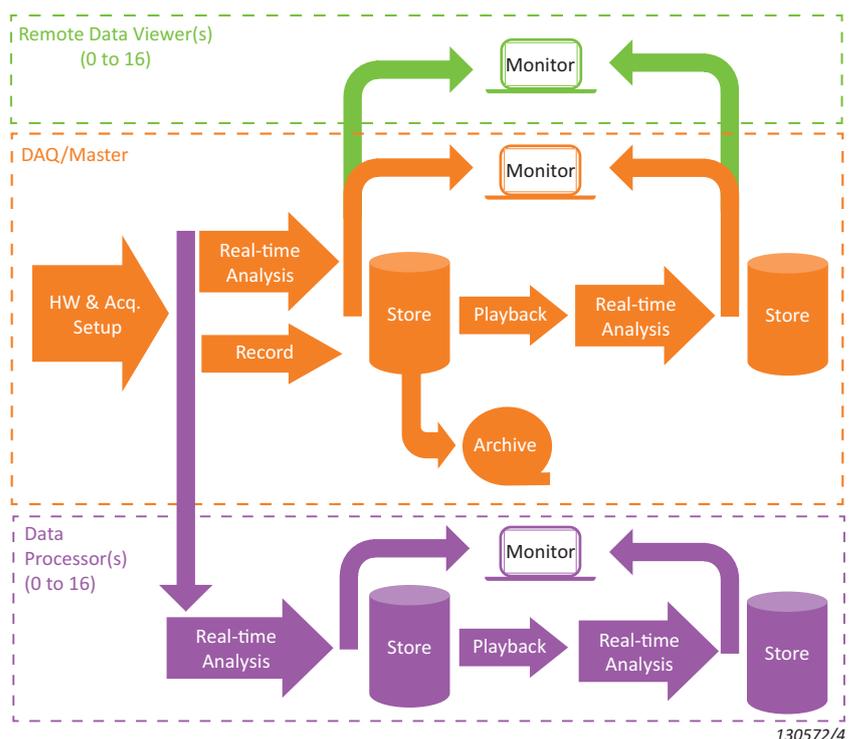
Together with a LAN-XI data acquisition front end and one or more dedicated PCs, the system acquires the dynamic data generated by large-scale tests. Real-time measurement, analysis and data viewing are supported as well as data recording analysis and playback. Should any channel or module develop a fault, the powerful combination of the LAN-XI data acquisition hardware and the software means that operation will continue seamlessly.

## Designing the Test

Before performing dynamic tests, it is necessary to decide how the analysis is to be performed, monitored and displayed, and where and how the data will be stored.

Test specialists can determine individual test parameters as needed – from defining the acquisition hardware, applying sensor conditioning, configuring test metrics and calculations, to setting data access rights, and determining the structure of data reports and storage. All parameters for each test type are registered and implemented via the workbook and/or software GUI, allowing the test operator to complete his tasks quickly and easily with good assurance of test repeatability.

Fig. 1  
Typical test workflow



# Optimised Workflow Using the Software

Type 8560 is designed to reduce preparation and test time. For example, one of the tools available is the extensive self-test of the complete hardware system prior to starting a test. This means that tracking down potential system issues and identifying failures before the engine is running can be found much faster than manual methods. The results of these self-tests can then be stored as a table for future documentation.

## Test Setup

Depending on the complexity of the test, test setup can be performed:

- Using the software's graphical user interface (GUI)
- Using the included Microsoft® Excel® workbook. Simply upload the workbook to the software
- Using both the GUI and workbook. For example, start setting up a test configuration off-line using the workbook, then modify the parameters in the GUI once on-line

Using the workbook to manage the test setup, it is possible to gain an overview of the test and its parameters without opening the software. This makes it easier to collaborate, potentially saving time and effort for all those involved (specialists, stakeholders, design engineers, test operators, test engineers, etc.). This off-line access can also optimise the specialist's time by minimizing the time used on test instrumentation.

For smaller or less complicated tests, using just the GUI should suffice.

## Data Monitoring and Analysis

During the whole test, the signals are monitored to detect abnormal behaviour of the test object and ensure acquisition system integrity.

These automatic system 'integrity checks' include:

- Under-range
- Overload
- Cable break
- Front-end errors
- Communication errors

Simultaneously, you can also monitor and analyse various functions, ranging from time signals, overall, to FFT spectra, cross spectra, real-time 1/n-octave and synthesised 1/n-octave spectra. These can be shown in various display formats, including:

- Time, orbit plots
- Spectra, cross spectra
- Order spectra, order slices
- Bode and polar plots

- Nyquist plots
- Contour and Campbell plots
- Multiple parameter strip charts
- Bar graph
- Digital value readouts

While performing a test, it is essential to have access in real time to specific metrics that will allow you to make on-the-spot decisions. Metrics are calculated from the functions and compared to defined limits. Some metrics are very simple, such as the vibration level at a given frequency range, or slightly more complex, such as the maximum values of a given order in a predefined speed range.

If alarms have been created on a metric, the limits are visualised in the display by changing colours: yellow for a warning, red for an alarm. If connected, alarms will be transmitted to a relay box, which allows you to abort the test or adjust parameters as needed.

Analysis can be started and stopped manually. Alternatively, event-based triggers, such as signal levels, speed conditions, digital inputs from the test object, or any combination of the above, can be set enabling semi- or fully-automated data recording.

With the main licence (Type 8560), you have the possibility to create virtual channels to:

- Generate virtual (not measured) time signals based on filtering and mathematical calculation of multiple measured signals. Examples include: single- and double-integration, HP and LP filtering, sum and difference
- Expand the scope and complexity of the metrics, which can then be calculated and extracted

## Data Recording

Gap-free raw data is recorded using a single start/stop button. Alternatively, event-based triggers can be set enabling semi- or fully-automated data recording.

Recorded data is accessible for post-processing by other systems during recording without impacting the in-process recording or monitoring. After the recording, the data can be played back, converted to other formats, or backed up to external disks.

## Data Storage and Transfer

Raw recorded data can be converted from its native PTI format to DatX, HDF5, or PTI format. Before archiving or transferring, the data is integrity checked. Any function data can be exported to Microsoft® Excel® with a single click.

# Getting Right to the Task at Hand

Six main tasks: System Setup, Test Setup, Calibration, Recording & Monitoring, Playback and Data Handling, guide you through setup and testing. If parameters are registered in the workbook, simply upload it to the software and the information is automatically distributed throughout the user interface. For the test operator, this means quick and easy test implementation – with little or no setup or preparation before testing.

A Calibration task is included, which allows the test operator to validate the sound pressure transducers in the system, before and after testing, as required.

The Recording & Monitoring task is the main focus for the operators. The screens can be customised to show what is essential, which is typically the test metadata, alarms, recording and control buttons, and relevant data plots. Pages can be created to match the specific test focus, and these page layouts can be stored, shared and retrieved. Each page in this task can be quickly converted to a PDF file or printed out.

The Playback task allows recorded data to be selected and played back. In this way, a deeper investigation of important events can be made. The Data Handling task allows you to view, convert, transfer and archive data files as required.

In the System Status panel at the bottom of the GUI, status information is visible at all times for all the system components: data acquisition hardware (DAQs), data viewers, etc. Colour-coding of the panel's icons allows quick response to alarms and faults. Clicking on an icon opens a more detailed view of that component's status.

The system also has a logbook that records all the main activities during a test run. It includes an event list and any warnings/alarms that were generated. These details can then be used to monitor specific events, diagnose faults or review the test sequence.

## Data Viewing

Users with Data Viewing licences can view the measured and analysed functions, set up displays, but cannot change the analysis set-up (frequency bandwidth, number of spectra, triggers, etc.), however, display setup remains fully configurable by the user.

## Data Processor

Users with Data Processor licences can process data on multiple independent analysis seats without interfering with the recording. A Time Stream T-Driver is added to a single acquisition system, which enables up to 16 Data Analysis Seats. These seats can operate in real-time totally autonomously, either local, connected to the same network as the acquisition system, or remote.

Fig. 2  
Example recording  
and monitoring screen



# Safe Testing

Monitoring the status of the test object and the acquisition system during the complete test (in real time) further increases the test efficiency and the data quality.

You can also ensure that the test system is working and the test object is not damaged during the test session. Several test-specific parameters (metrics) can be monitored in real time allowing you to abort the tests in

case of operating degradation or failure of the engine, either manually (or automatically) when defined levels are exceeded.

Alarms can be transferred to a physical relay box, which allows you to abort the test or adjust the test parameters. The relay box also provides digital logical inputs allowing you, for example, to use the bench control system for trigger purposes.

## Modular Front Ends with LAN-XI Data Acquisition Hardware

The system front end, based on LAN-XI hardware, provides unequalled dynamic range and accuracy, and is very robust mechanically and electronically with built-in (and documented) analogue and digital calibration tests.

LAN-XI is a versatile platform of modular hardware for real-time sound, vibration and dynamic data parameter acquisition. Single modules can be used as stand-alone front ends or as part of a distributed setup. Multiple modules can be collected in frames, and frames can be collected in racks either of which can be used as stand-alone front ends, or as part of a distributed setup.

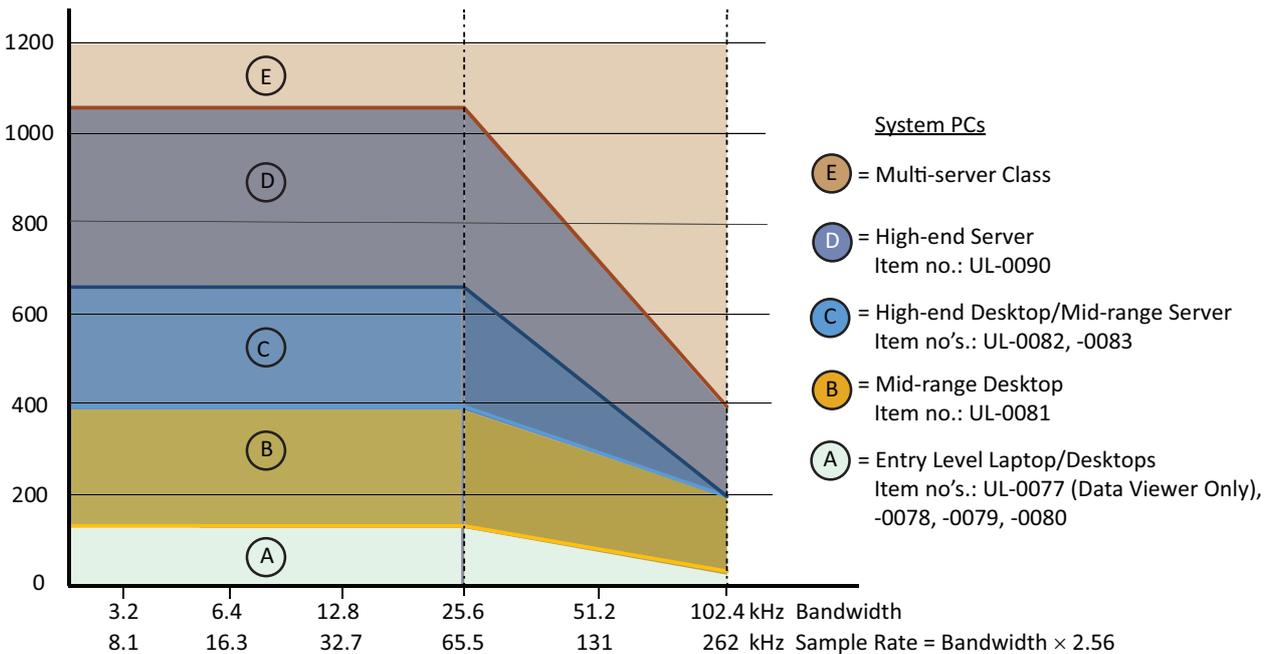
When included in a system for repetitive testing, the hardware can collect, synchronise and record data from one to thousands of transducers connected to the data acquisition front end.

For detailed information about hardware, see:

- Product Data [BP 2215](#): LAN-XI Data Acquisition Hardware (modules, frames, accessories)
- Product Data [BP 2421](#): LAN-XI Front Panels (interchangeable front panels)
- Product Data [BP 2513](#): 3-ch. Bridge-input Module LAN-XI 102.4 kHz Type 3057-B-030

## System PCs

Number of Channels



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Fig. 3 An overview of the computers currently available (and their capabilities) that can be used with your Tescia data acquisition system

# System Configurations and Licencing

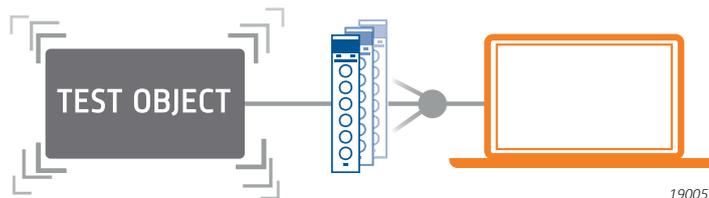
## Single Data Acquisition System, Configuration 1

The most basic configuration of a data acquisition system is a single front end and a single computer, designed for situations where a single test engineer is performing a test. The test seat, connected to the acquisition front end, is also where the test is monitored and the data is recorded, backed up and transferred.

### The system includes:

- Front-end driver: 1 × BZ-1020: Driver for 1 to 132 front-end modules or 1 × BZ-1021: Driver for 1 to 5 front-end modules
- Test software: 1 × Type 8560 (one licence per PC)
- Any of the following options: BZ-1001, BZ-1002, BZ-1003, BZ-1004, BZ-1005, BZ-1008

Fig. 4 A single data acquisition system: front end plus acquisition PC



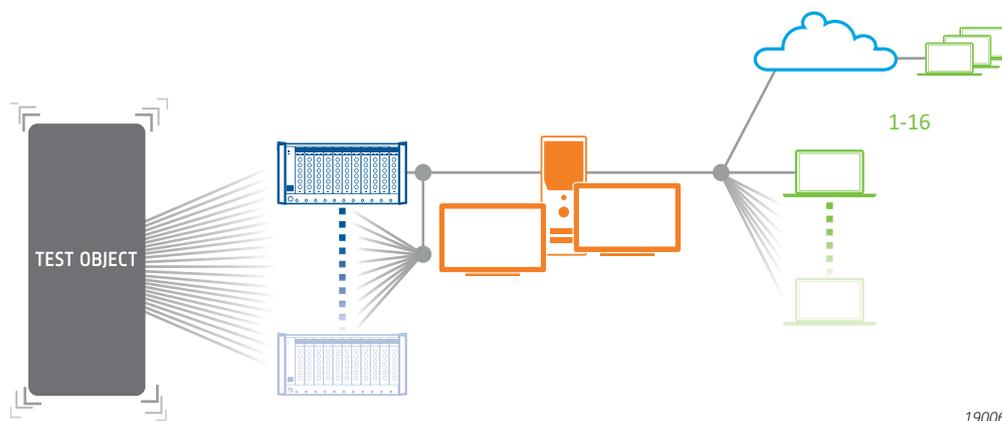
## Single Data Acquisition System with Data Viewing, Configuration 2

It is possible to build on Configuration 1 to create larger systems. You can increase the number of test participants by adding licences for viewing the data on other computers. Data amounts are small enough that they can be transmitted over the Internet to enable remote viewing.

### The system includes:

- Front-end driver: 1 × BZ-1020: Driver for 1 to 132 front-end modules or 1 × BZ-1021: Driver for 1 to 5 front-end modules
- Test software: 1 × Type 8560 (one licence per PC)
- Any of the following options: BZ-1001, BZ-1002, BZ-1003, BZ-1004, BZ-1005, BZ-1008
- Data viewing: 1 × BZ-1010 (1 to 16, one licence per PC)

Fig. 5 Data viewing seats added to a single data acquisition system collecting data from the front-end



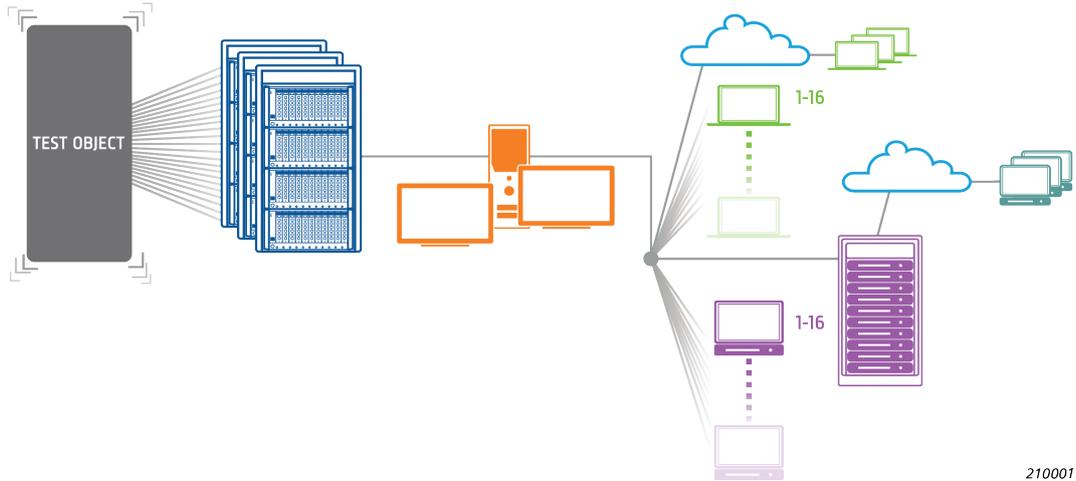
**Single Data Acquisition System with Data Viewing and Data Processing, Configuration 3**

It is possible to build even bigger configurations. You can increase the number of test participants by adding licenses for adding additional real-time analysis capability and monitoring on up to 16 additional computers.

The computer becomes a Data Processor by choosing the BZ-1022 Time Stream T-driver license instead of front-end driver license (BZ-1020 or BZ-1021).

Each Data Processor has the same analysis possibilities as the main data acquisition system. The available analysis depends on installed options.

*Fig. 6 Data Viewing Seats and Data Processing Seats added to a single data acquisition system collecting data from the front-end*



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**Licensing**

Licensing has been designed to provide simplified configuration of the most complex setups. The basic licence is Tescia Repetitive Testing Type 8560 software, which is the universal tool for any type of

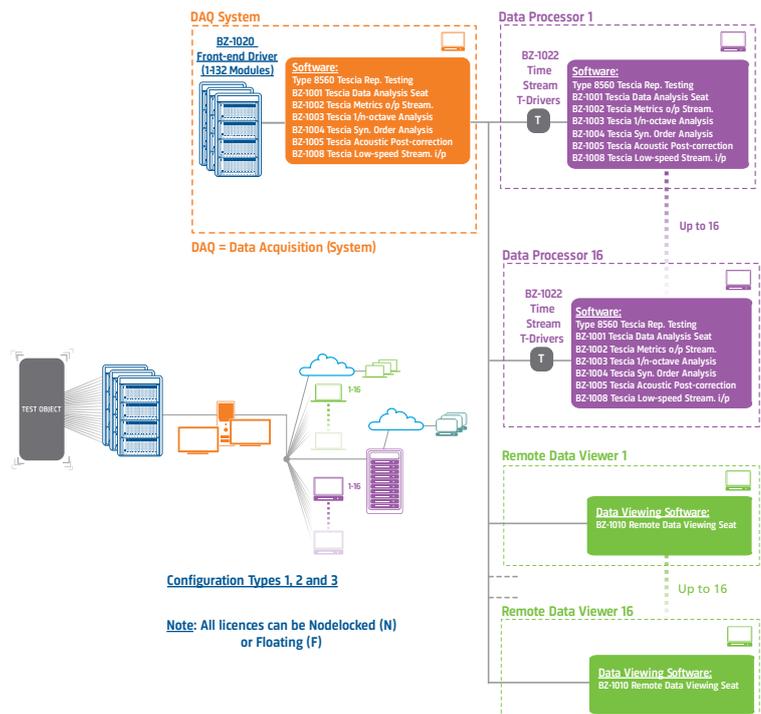
**The system includes:**

- Front-end driver: 1 × BZ-1020: Driver for 1 to 132 front-end modules or 1 × BZ-1021: Driver for 1 to 5 front-end modules
- Test software: 1 × Type 8560 and any of the following options: BZ-1001, BZ-1002, BZ-1003, BZ-1004, BZ-1005, BZ-1008
- Data viewing: 1 × BZ-1010 (1 to 16, one licence per PC)
- Test software: 1 × Type 8560 (one licence per PC) and any of the following options: BZ-1001, BZ-1002, BZ-1003, BZ-1004, BZ-1005, BZ-1008
- Front-end driver: 1 × BZ-1022: Time Stream T-Driver (0 to 16)
- PC with Microsoft Windows operating system, remote desktop to a Data Processor(s)

standardised repetitive testing.

You can then configure your system with the required number of channels and test and viewer seats, then add more specific applications and functionality as needed.

*Fig. 7 Licence example for remote data viewing and data processing - up to 16 data viewing stations and up to 16 data processing stations can be configured*



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Table1 Licencing for standard, repetitive testing

Item No.	Description	Functions and features
<b>Standardised Repetitive Testing</b>		
Type 8560	Tescia Repetitive Testing	<p><b>Recording</b></p> <ul style="list-style-type: none"> <li>• Time data (.pti), real-time conversion (.datx), metrics (.bkc)</li> <li>• Off-line conversion: file formats .datx, .hdf5 and .pti</li> </ul> <p><b>Virtual channel processing</b></p> <ul style="list-style-type: none"> <li>• Single and double integration</li> <li>• Summing with scaling coefficients</li> <li>• LP and HP filtering</li> </ul> <p><b>Analysis</b></p> <ul style="list-style-type: none"> <li>• FFT, order analysis (FFT based), overall analysis<sup>1</sup>, tacho analysis, envelope analysis</li> </ul> <p><b>Spectra monitoring</b></p> <ul style="list-style-type: none"> <li>• FFT, FFT mag/phase, octave synthesis, (auto, cross, phase assigned spectra), bode, polar, scope, orbit (XY), campbell, contour, waterfall, order magnitude</li> <li>• All displays include visual alarm indications</li> </ul> <p><b>Metric processing</b></p> <ul style="list-style-type: none"> <li>• Speed, time data (min, max), single frequencies (Over-All RMS, max line RMS), range of frequencies (Over-All RMS, max line RMS), order magnitude (max line RMS), order phase (max line RMS)</li> </ul> <p><b>Metric monitoring</b></p> <ul style="list-style-type: none"> <li>• Level meter, metric view (visual alarm), digital display (visual alarm), live recorder (visual alarm), speed monitor (visual alarm)</li> </ul> <p><b>Event triggers</b></p> <ul style="list-style-type: none"> <li>• Manual, metrics, digital (logic) inputs, timers</li> </ul> <p><b>Automation Events</b></p> <ul style="list-style-type: none"> <li>• Recording, alarm</li> </ul>
<b>Required Licences (one of the following)</b>		
BZ-1020	Tescia Front-end Driver, 1 to 132 LAN-XI modules	<ul style="list-style-type: none"> <li>• Enables data acquisition</li> <li>• Controls the LAN-XI modules</li> <li>• One license is required</li> </ul>
BZ-1021	Tescia Front-end Driver, 1 to 5 LAN-XI modules	
BZ-1022	Tescia Time Stream T-Driver, Up to 16 clients in one system	<ul style="list-style-type: none"> <li>• Enables a single Data Processing Seat<sup>2</sup> (max. 16 seats in one Tescia system)</li> <li>• Receive time data in real time from the acquisition server</li> <li>• One License associated to each Data Processing Seat computer is required</li> </ul>
<b>Optional Licences</b>		
BZ-1001	Tescia Data Analysis Seat <sup>2</sup>	<p><b>Analysis</b></p> <ul style="list-style-type: none"> <li>• Enables analysis control over FFT and overall analyzers and (if license available) over octave and synchronous order analyzers</li> <li>• Playback analysis</li> </ul> <p><b>Reference Profiles</b></p> <ul style="list-style-type: none"> <li>• FFT, 1/n-octave, order spectral displays</li> </ul> <p><b>Spectra monitoring and analysis results</b></p> <ul style="list-style-type: none"> <li>• FFT, FFT mag/phase, octave synthesis, (auto, cross, phase assigned spectra), bode, polar, scope, orbit (XY), campbell, contour, waterfall, order magnitude</li> <li>• All displays include visual alarm indications</li> </ul> <p><b>Metric monitoring and analysis results</b></p> <ul style="list-style-type: none"> <li>• Level meter, metric view (visual alarm), digital display (visual alarm), live recorder (visual alarm), speed monitor (visual alarm)</li> </ul> <p><b>Event triggers</b></p> <ul style="list-style-type: none"> <li>• Reference profiles</li> </ul> <p><b>Automation Events</b></p> <ul style="list-style-type: none"> <li>• Analysis (auto spectra 2D and multi-spectra 3D) saved in .csv)</li> </ul>
BZ-1002	Tescia Metrics Output Streaming	<ul style="list-style-type: none"> <li>• Enables streaming of metric values over Ethernet in IENA<sup>3</sup> format</li> </ul>

Optional Licences		
BZ-1003	Tescia 1/n-octave Analysis <sup>4</sup>	<b>Analysis</b> <ul style="list-style-type: none"> <li>Enables 1/n-octave real-time filters conforming to ISO 61260-1 Class 1</li> </ul> <b>Spectra monitoring (and analysis results when using BZ-1001)</b> <ul style="list-style-type: none"> <li>Adds the following displays (to the displays included with 8560):</li> <li>Octave spectrum, octave campbell, octave waterfall</li> <li>All displays include visual alarm indications</li> </ul>
BZ-1004	Tescia Synchronous Order Analysis	<b>Analysis</b> <ul style="list-style-type: none"> <li>Re-sampled order tracking analysis for leakage-free measurements</li> </ul> <b>Spectra monitoring (and analysis results when using BZ-1001)</b> <ul style="list-style-type: none"> <li>Adds the following displays (to the displays included with 8560):</li> <li>Order spectra</li> <li>All displays include visual alarm indications</li> </ul>
BZ-1005	Tescia Acoustic Post-correction	<b>Requires BZ-1001 and BZ-1003</b> <ul style="list-style-type: none"> <li>Line insert calibration<sup>5</sup></li> <li>Frequency response correction curve manager</li> <li>Calculate and apply acoustic correction</li> </ul>
BZ-1008	Tescia Low-speed Streaming Input	<ul style="list-style-type: none"> <li>Enables input streaming of steady data values over Ethernet in IENA and ASCII format into Tescia</li> <li>Steady data can be analyzed by the steady data analyzer and converted to metrics</li> </ul>
BZ-1010	Tescia Remote Data Viewing Seat <sup>2</sup>	<ul style="list-style-type: none"> <li>View (monitor) functions measured and analyzed on a Test Seat</li> <li>Add up to 16 Data Viewing Seats to your system per license</li> <li>Configure display set-up, as well as visual alarms</li> </ul>

<sup>1</sup> The Overall Analyzer meets the requirements of a Class 1 instrument in IEC 61672-1/IEC 651/IEC 60804.

<sup>2</sup> The personnel who are analysing, processing and viewing the data are known as 'Data Analysis Seats', 'Data Processing Seats' and 'Data Viewing Seats', respectively.

<sup>3</sup> IENA is the Airbus network packet protocol that originated during the A380 program and has been widely adopted since then.

<sup>4</sup> The 1/n-octave Analyzer meets the requirements of a Class 1 instrument in IEC 61260-1, DIN 45651, ANSI S1.11-1986, ANSI S1.11-2004 and ANSI S1.11-2014.

<sup>5</sup> Requires LAN-XI Type 3160, Front Panel UA-2115-042 and Microphone Type 4192-W-005.

## Service and Support

To ensure that the system continues to be fully operational, and that the original data reliability and accuracy is maintained over its decades of operation, the following services (customised to the solution) are available:

- Training:** On-site training on installation, set up and use of the system
- Services:** Configuration and customization of the system

<sup>1</sup> Conditions may apply depending on individual country

- Global Support Contracts (Multi-year):** Covering part, or all of the following:
  - Calibration
  - Hardware extended warranty
  - Software maintenance and upgrade
  - System support (8/5 worldwide<sup>1</sup>)
  - Yearly site visit

## Ordering Information

Table 2 Ordering Information

<sup>1</sup> Where X = N for node-locked or F for floating licence.

Software			
Type 8560-X	<b>Standardised Test Licence</b> Tescia Repetitive Testing  One standardised test licence (Type 8560) is required for the data acquisition and for every Data Processor seat  <b>Note:</b> An 'N' license is locked to a host ID: a specific PC's hardware, or a hardware key (dongle) that can be physically moved from PC to PC	BZ-1002-X <sup>1</sup> BZ-1003-X BZ-1004-X BZ-1005-X BZ-1001-X BZ-1008-X BZ-1010-X  BZ-1020-X BZ-1021-X BZ-1022-X	<b>Optional Licences</b> Tescia Metrics Output Streaming Tescia 1/n-octave Analysis Tescia Synchronous Order Analysis Tescia Acoustic Post-correction Tescia Data Analysis Seat Tescia Low-speed Streaming Input Tescia Data Viewing Seat  <b>Driver Licences</b> Tescia Front-end Driver, 1 to 132 LAN-XI modules Tescia Front-end Driver, 1 to 5 LAN-XI modules Tescia Time Stream T-Driver

## Data Acquisition Hardware

The LAN-XI hardware listed here is a sub-set of the available LAN-XI hardware; more modules and front panels are available.

Table 3 Supported LAN-XI frames and modules (with their compatible, interchangeable front panels)

Frame			
Type No.	Description		
3660-A-20x	1-module wireless LAN frame		
3660-C-100	5-module frame with GPS		
3660-D-100	11-module frame with GPS		
Module		Compatible Front Panels	
Type No.	Description	Item No.	Use
3050-A-060	6-ch. input module <ul style="list-style-type: none"> <li>• Frequency range: 51.2 kHz</li> <li>• Input types: Mic, CCLD, V</li> <li>• Includes UA-2100-060</li> </ul>	UA-2100-060	General purpose
		UA-2101-060	200 V mic, general purpose
		UA-2105-060	Charge, with Charge to CCLD Converter Type 2647
		UA-2108-060	Triaxial accelerometer, CCLD
		UA-2112-060	Array
		UA-2113-060	Monitor connectors
		UA-2114-060	Dynamic bridge transducers
		UA-2119-060	Differential charge
		UA-2120-060	Charge
Module (Contd.)		Compatible Front Panels (Contd.)	
Type No.	Description	Product No.	Use
3050-A-040	4-ch. input module <ul style="list-style-type: none"> <li>• Frequency range: 51.2 kHz</li> <li>• Input types: Mic, CCLD, V</li> <li>• Includes UA-2100-040</li> </ul>	UA-2100-040	General purpose
		UA-2101-040	200 V mic, general purpose
3052-A-030	3-ch. input module <ul style="list-style-type: none"> <li>• Frequency range: 102.4 kHz</li> <li>• Input types: Mic, CCLD, V</li> <li>• Includes UA-2100-030</li> </ul>	UA-2100-030	General purpose
		UA-2101-030	200 V mic, general purpose
		UA-2114-030	Dynamic bridge transducers
3053-B-120	12-ch. input module <ul style="list-style-type: none"> <li>• Frequency range: 25.6 kHz</li> <li>• Input types: CCLD, V</li> <li>• Includes UA-2107-120</li> </ul>	UA-2107-120	General purpose
		UA-2108-120	Triaxial accelerometer, CCLD
		UA-2109-120	12-ch. D-sub for custom cabling
		UA-2112-120	Array
		UA-2116-120	Charge (built in amplifier)
		UA-2145-D	Array
3056-A-040	4-ch. input + 8-ch. aux. module <ul style="list-style-type: none"> <li>• Frequency range: 51.2 kHz</li> <li>• Input types: Mic, CCLD, V, HS Tacho, Aux.</li> <li>• Includes UA-2111-040</li> </ul>	UA-2110-040	200 V mic, general purpose, high-speed tacho, low-frequency auxiliary data
		UA-2111-040	General purpose, high-speed tacho, low-frequency auxiliary data

Module (Contd.)		Compatible Front Panels (Contd.)	
Type No.	Description	Product No.	Use
3057-B-030	3-ch. bridge input module <ul style="list-style-type: none"> <li>• Frequency range: 102.4 kHz</li> <li>• Input types: Bridge, CCLD, V</li> <li>• Includes UA-2121-030</li> </ul>	UA-2121-030	Bridge transducers
		UA-3112-030	Direct and CCLD transducers, monitor output
		UA-3121-030	Bridge, charge, differential charge, CCLD/direct transducers, monitor output
		UA-3122-030	Bridge, charge, CCLD/direct transducers, monitor output
3160-A-042-R	LAN-XI 4-ch. input + 2-ch. output module <ul style="list-style-type: none"> <li>• Frequency range: 51.2 kHz</li> <li>• Input types: Mic., CCLD, V</li> </ul>	UA-3100-042	General purpose (4 x BNC inputs, 2 x generator outputs (not supported))
3160-A-022-R	LAN-XI 2-ch. input + 2-ch. output module <ul style="list-style-type: none"> <li>• Frequency range: 51.2 kHz</li> <li>• Input types: Mic., CCLD, V</li> </ul>	UA-2100-042	General purpose (2 x BNC inputs, 2 x generator outputs (not supported))
3676-B-040	LAN-XI Light 4-ch. input module <ul style="list-style-type: none"> <li>• Frequency range: 25.6 kHz</li> <li>• Input types: CCLD, V</li> <li>• Includes UA-2100-040</li> </ul>	UA-2100-040	General purpose (4 x BNC)
3677-A-041	LAN-XI Light 4+1-ch. input/output module <ul style="list-style-type: none"> <li>• Frequency range: 25.6 kHz</li> <li>• Input types: CCLD, V</li> <li>• Output type: Generator</li> <li>• Includes UA-3100-041</li> </ul>	UA-3100-041	General purpose (4 x BNC inputs, 1 x BNC gen. output)

### System PCs

Please note that this table should be used as a guideline only, actual performance depends greatly on the configuration of the analysis and channels.

Table 4 Available PCs and performance overview

Type No.	Type of PC	Max. Channels	Max. 100 kHz Ch.
UL-0077	Data Viewer Entry-level Laptop		Data Viewer only
UL-0078	Data Processor/Viewer Entry-level Desktop	132	33
UL-0079	Data Processor/Viewer Entry-level Desktop	132	33
UL-0080	Data Acquisition/Processor Entry-level Laptop	132	33
UL-0081	Data Acquisition/Processor Mid-range Desktop	396	99
UL-0082	Data Acquisition/Processor High-end Desktop	660	198
UL-0083	Data Acquisition/Processor Mid-range Server	660	198
UL-0090	Data Acquisition/Processor High-end Server	1056	396

## Software Maintenance and Support Agreements\*

Table 5 Maintenance and Support Licences

Item - Delnummer	Description
M1-1001-X-	Annual Software Maintenance and Support Agreement for Tescia Data Analysis Seat
M1-1002-X-	Annual Software Maintenance and Support Agreement for Tescia Metrics Output streaming
M1-1003-X-	Annual Software Maintenance and Support Agreement for Tescia 1/n'th Octave analysis
M1-1004-X-	Annual Software Maintenance and Support Agreement for Tescia Synchronous Order Analysis
M1-1005-X-	Annual Software Maintenance and Support Agreement for Tescia Acoustic Post-correction
M1-1008-X-	Annual Software Maintenance and Support Agreement for Tescia Low Speed Streaming input
M1-1020-X-	Annual Software Maintenance and Support Agreement for Tescia LAN-XI Frontend Driver (1 to 132 modules)
M1-1021-X-	Annual Software Maintenance and Support Agreement for Tescia LAN-XI Frontend Driver (1 to 5 modules)
M1-1022-X-	Annual Software Maintenance and Support Agreement for Tescia Time Stream T Driver
M1-8560-X-	Annual Software Maintenance and Support Agreement for Tescia Repetitive Test Seat

"X" = N for node-locked or F for floating licence.

\*Agreement expiration date to be agreed at time of contract.

## LAN-XI Calibration Services

Table 6 Calibration services available for LAN-XI modules

Type No.	Description		
ANA-LNXI-CAF	Accredited Calibration	3050-REF	Repair of Type 3050 module incl. Conformance Test
ANA-LNXI-CAI	Initial Accredited Calibration	3052-REF	Repair of Type 3052 module incl. Conformance Test
ANA-LNXI-CTF	Traceable Calibration	3053-REF	Repair of Type 3053 module incl. Conformance Test
ANA-LNXI-EW1	Extended Warranty (1 year)	3056-REF	Repair of Type 3056 module incl. Conformance Test
ANA-LNXI-TCF	Conformance Test with Certificate	3057-REF	Repair of Type 3057 module incl. Conformance Test
		3160-REF	Repair of Type 3160 module incl. Conformance Test

## Other Supported Hardware and Accessories

Table 7 Hardware and accessories that are supported

Type No.	Description	Type No.	Description
UL-1044	Relay Box, 6-ch digital isolated inputs with POE and 6 power relay outputs	AO-1450-D-XXX <sup>1</sup>	Shielded CAT 6 LAN Cable with RJ-45

<sup>1</sup> XXX = Length of cable, choose between: 020 (2 m); 100 (10 m); 300 (30 m); 800 (80 m)

## Transducers, Conditioning and Cables

For an overview of HBK's extensive selection of transducers, conditioning and cables, go to:

[bksv.com/transducers](http://bksv.com/transducers)

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**To learn more about all HBK offerings, please visit [hbkworld.com](http://hbkworld.com)**

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