PRODUCT DATA

PULSE Access Type 7781-N6

Your Entry into the World's Most Complete Sound & Vibration Testing Platform

Enter the world's most complete sound and vibration testing platform: PULSE™. The PULSE hardware/software family is your solid foundation upon which to build a system to suit your present needs, and that can be extended as your requirements change.

PULSE Access comprises a series of basic analyzers that are the core of any measurement system. These basic analyzer solutions contain all you need for simple sound and vibration tests, operating supremely as stand-alone applications. They can also easily be expanded to fit larger, industry-specific solutions.

By upgrading to PULSE FFT and CPB analyzers Type 7700, 7770 or 7771, you can quickly gain access to the complete range of PULSE LabShop applications and LAN-XI hardware solutions. This expandability and the continuing development of new PULSE applications and hardware, ensure the safety of your investment now and in the future.

Uses and Features

General

- Spectral analysis on up to six channels
- Ideal as a laboratory or portable field system
- The foundation for a multichannel system
- Ultra-compact system requiring only one LAN-XI hardware module
- Smart Start feature: a quick, three-step start-up guide
- Simultaneous multi-analysis using overall level analysis, multiple FFTs and synthesized CPB analysis
- Based on modular LAN-XI data acquisition hardware
  - Dyn-X technology*, eliminates the need for input ranging, giving a single measuring range of 160 dB
  - More than 7 hours of autonomous use with optional LAN-XI Battery Module Type 2831-A
- Supports IEEE 1451.4-capable transducers with TEDS (Transducer Electronic Data Sheet)

Basic FFT Analyzer

- FFT resolution up to 6400 lines
- FFT analysis bandwidth standard up to 25 kHz, 50 kHz or higher*
- Multi-buffer spectrum logging/Waterfall
- Triggered and zoom FFT and cepstrum analysis
- Exponential and linear averaging
- Time-averaging signal enhancement
- Integration and differentiation
- Start trigger for analysis with pre-trigger
- Transient and exponential window
- FRF H1, H2, H3 as Bode plot and Coherence output
- Resonance and damping cursor readouts

Basic Order Analyzer

- FFT-based order analysis with up to two tacho signals
- Order analysis without tracking for analysis of lower orders and moderate RPM slew rates, based on frequency spectra from FFT analyses
- Real-time spectra and 3D plots like colour contour, Campbell diagram, individual order, and structural slices versus RPM of one or more rotating parts

Basic Overall Level Analyzer

- Overall analysis according to IEC 61672
- Frequency weightings A, B, C, and D
- L_{eq} logging – sound levels vs. time

Basic Synthesized CPB Analyzer

- Frequency weightings A, B, C, and D
- Generates 1/1-, 1/3-, 1/12- and 1/24-octave bands

* Depending on LAN-XI hardware module

Basic FFT Analyzer

Simple, real-time FFT analysis is available from two to six channels for mobility measurements, vibration diagnostics, or narrow-band analysis of acoustic or vibration signals, featuring:

- Autospectrum and cross-spectrum
- Resonance and damping estimation
- Harmonic and sideband detection

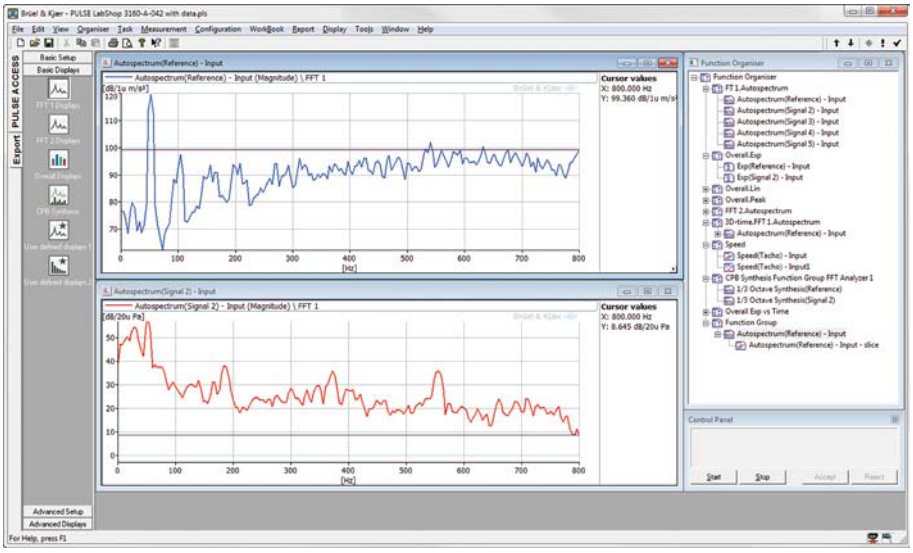


Fig. 1
A basic 2-channel FFT measuring sound and vibration

Basic Order Analyzer

Order analysis relates measurements to revolutions of a rotating part, improving knowledge about machinery such as aircraft and automotive engines, powertrains, pumps, compressors and electric motors.

This basic configuration provides FFT-based order analysis on up to six channels with up to two tacho signals. FFT-based order analysis is an attractive solution when:

- Only lower orders are of interest
- Orders are well separated
- RPM ranges are limited
- Slew rates are moderate

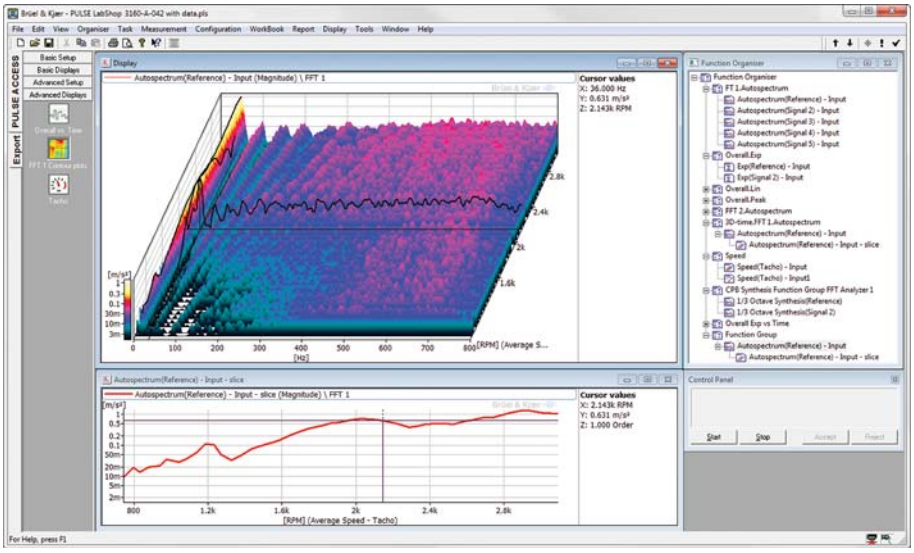
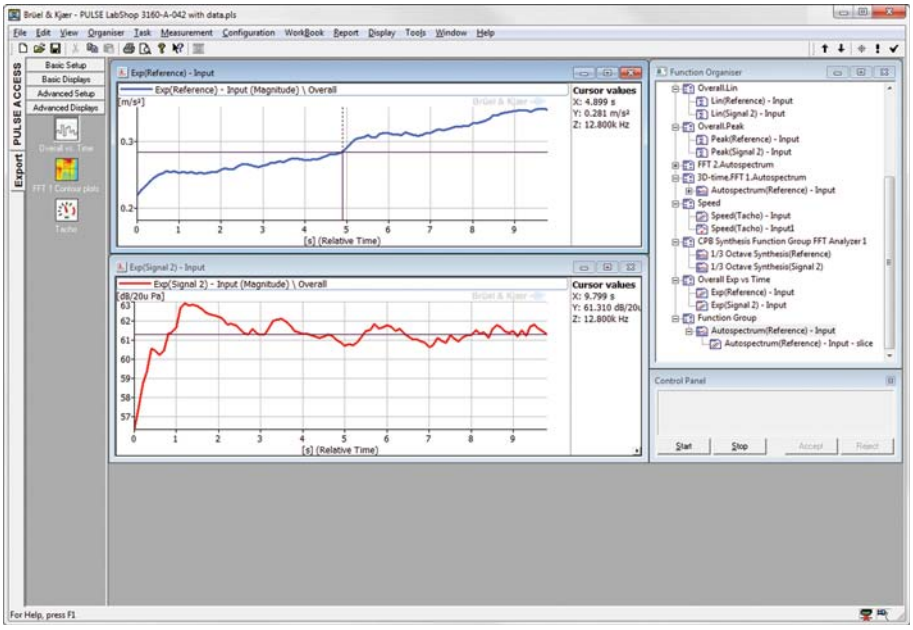


Fig. 2
FFT-based order analysis with colour contour or waterfall plot

Basic Overall Level Analyzer

The Overall Level Analyzer performs a broadband analysis. When measuring sound, this analyzer is equivalent to a sound level meter and fulfils selected, relevant requirements of IEC 651, IEC 61672 and IEC 60804 for a class 1 instrument.

Fig. 3
Basic overall analysis



Basic Synthesized CPB Analyzer

Real-time, Constant Percentage Bandwidth (CPB) synthesis from your FFT results generating 1/1-, 1/3-, 1/12- and 1/24-octave bands, which is often preferable when analysing noise.

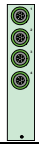
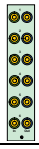
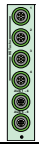
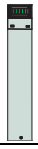
Fig. 4
Basic 2-channel CPB Synthesis from FFT

Hardware Compatibility with PULSE Access

Table1 gives an overview of the PULSE LAN-XI hardware modules that are compatible with PULSE Access. See Ordering Information on page 7 for optional hardware.

Note that LAN-XI frames Types 3660-C and 3660-D are available for use with an upgrade to full PULSE FFT/CPB Type 7700, 7770 or 7771 software license.

Table1 *Compatible LAN-XI modules*

Input Types	Type No.	Product Name	No. of Input Channels	No. of Output Channels	Frequency Range	Default Front Panel (included with module)	
• Direct voltage • CCLD* • Microphone preamplifier† • Charge‡	3050-A-040	4-ch. Input Module, 51.2 kHz	4	0	0 Hz to 51.2 kHz		UA-2100-040: BNC
	3050-A-060	6-ch. Input Module, 51.2 kHz	6	0	0 Hz to 51.2 kHz		UA-2100-060: BNC
	3052-A-030	3-ch. Input Module, 102.4 kHz	3	0	0 Hz to 102.4 kHz		UA-2100-030: BNC
• Direct voltage • CCLD* • Charge‡	3053-B-120	12-ch. Input Module, 25.6 kHz	12	0	0 Hz to 25.6 kHz		UA-2107-120: SMB
• Direct voltage • CCLD* • Microphone preamplifier† • Charge‡ • High-speed tacho • Auxiliary**	3056-A-040	4-ch. Input/HS Tacho + 8-ch. Auxiliary Module, 51.2 kHz	4+8	0	0 Hz to 51.2 kHz		UA-2111-040: Auxiliary BNC
• Direct voltage • CCLD* • Microphone preamplifier† • Charge‡	3160-A-022	Generator††, Input/Output Module, 51.2 kHz	2	2	0 Hz to 51.2 kHz		UA-2100-022: BNC
	3160-A-042	Generator††, Input/Output Module, 51.2 kHz	4	2	0 Hz to 51.2 kHz		UA-2100-060: BNC
–	2831-A	Battery Module‡‡	0	0	–		–

* CCLD = Constant Current Line Drive, which includes DeltaTron, ICP®, and IEPE accelerometers and microphone preamplifiers
† 0 or 200 V polarization voltage
‡ Via CCLD Converter Type 2646 or Charge to CCLD Converter Type 2647 range
** Auxiliary channels not supported by PULSE Access
†† Generator not supported by PULSE Access
‡‡ Rechargeable Li-Ion battery with an output voltage of 14.8 V and a capacity of 6400 mAh. On the front, five LED status indicators show the remaining capacity

Upgrade to Greater Test and Analysis Options

PULSE Access is your gateway to Brüel & Kjær's entire PULSE platform. For a full listing and description of all PULSE software, go to www.bksv.com.

See Ordering Information on page 7 for upgrade details.

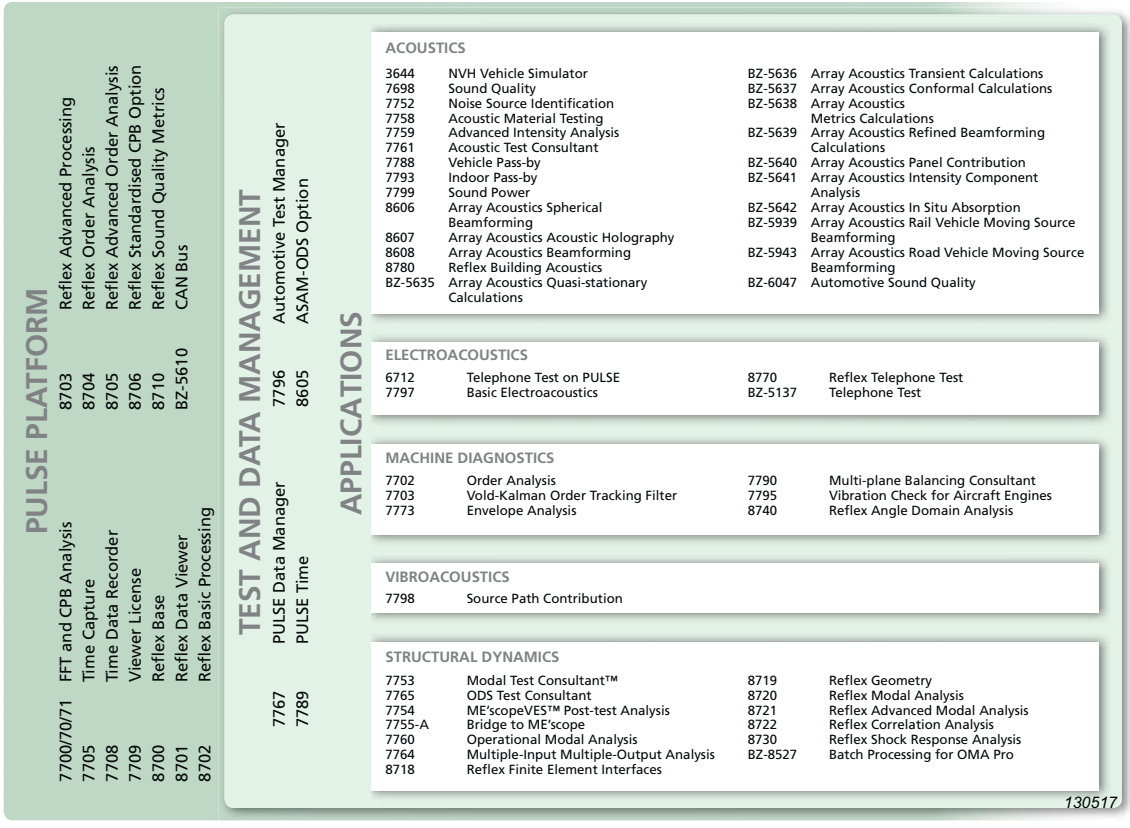


Fig. 5
When you upgrade to FFT/CPB Software Type 7700, 7770 or 7771, you gain access to a world of possibilities within real-time measurement and analyses, test and data management tools, and post-processing analyses

Note:
Use of PULSE Time Data Recorder Type 7708 requires upgrade to a full PULSE LabShop license.

Recommended PC

- Gen Intel® Core™ i7 3GHz processor, or better
- 8 GB RAM
- 250 GB Solid State Drive (SSD) with 20 GB free space, or better
- DVD-RW drive
- 1 Gbit Ethernet network
- Microsoft® Windows® 8.1 Pro (64-bit), Windows® 7 SP1 (32- and 64-bit) or Windows® XP Professional (SP3)
- Microsoft® Office 2007 (SP2), Office 2010 (SP2) (32-bit) or Office 2013 (32-bit)
- Adobe® Reader® 11.0 (US version: included with PULSE Access)
- Microsoft® SQL Server® 2008 R2 Express Edition (SP1) (included with PULSE Access)

Basic FFT

FREQUENCY
Lines: 50 – 6400
Span: 1 Hz – 204.8 kHz in 1, 2, 5... and 2^n steps (depending on hardware)
Overlap: 0%, 25%, 50%, 66.67%, 75% and Max%

AVERAGING
Mode: Exponential, Linear and Peak. Spectral Averaging or Signal Enhancement

TIME WEIGHTING
The following are available:
- Uniform
- Hanning
- Flat-top
- Kaiser-Bessel
- Transient
- Exponential

Trigger: Free-run, signal or manual

FREQUENCY WEIGHTING
- A, B, C, D
- $j\omega^2$, $j\omega$, 1, $1/j\omega$, $1/j\omega^2$

PRE-PROCESSING
The following pre-processing can be selected for an analyzer:
- Time
- Autospectrum
- Cross-spectrum

POST-PROCESSING
The following post-processing functions can be applied to measured data:
- Complex time (Hilbert transform)
- Fourier spectrum
- Phase-assigned autospectrum (PAS)
- Ratio-based PAS
- Frequency response function (H1, H2, H3)
- 1/Frequency response function (1/H1, 1/H2, 1/H3)
- Coherence
- Signal-to-noise ratio
- Coherent/non-coherent power
- Auto-correlation
- Cross-correlation
- Impulse response (h1, h2, h3)
- Cepstrum
- Liftered Spectrum
- CPB (1/n-octave) Synthesis

Overall Level Analyzer

Complies with the requirements for a type 1 instrument in IEC 61672, IEC 651 and IEC 60804 Type 1

PRE-PROCESSING
Pre A-, B-, C- and D-weighting

MEASUREMENT MODES
- Exponential (including fast and slow)
- Exponential + impulse
- Exponential + maximum hold
- Exponential + minimum hold
- Exponential + statistics (L_N percentile level, N = 1, 2, …, 99)
- Linear
- Linear + impulse
- Peak

All modes can be measured simultaneously

Impact Testing

FREQUENCY
Lines: 50 – 6400
Span: 1 Hz – 204.8 kHz in 1, 2, 5... and 2^n steps (depending on hardware)

AVERAGING
Mode: Exponential and Linear
Averages: User-definable
Time Weighting: Uniform window or Force (hammer) + Exponential (response)
Signal Trigger: Hammer impact signal for averaging with possibility for undo
Trigger Level: Graphical or user-definable in % of max. input
Delay: –10% of time record length

Run-up/Run-down Testing

Lines: 50 – 6400
Span: 1 Hz – 204.8 kHz in 1, 2, 5... and 2^n steps (depending on hardware)
Overlap: 0%, 25%, 50%, 66.67%, 75% and Max%

AVERAGING
Mode: Exponential, Linear, Peak and Peak-Peak. Spectral Averaging or Signal Enhancement
Averages: User-definable
Time Weighting: Hanning window

TRIGGER
Start: User-definable in RPM
Stop: User-definable in RPM
Update: User-definable in RPM

TACHO
Pulses/Rev.: User-definable: 400 to 1200000 pulses per minute (depending on LAN-XI module)
Order Traces: Unlimited user-definable orders

Common Specifications

DATA VALIDATION AND DISPLAY PLOTS
- Level Meter
- RPM Meter
- Time waveform
- Autospectra
- FRF magnitude and phase
- Coherence
- Bode plots
- Waterfall plots with frequency- or order-based slice extraction
- Contour plots with frequency- or order-based slice extraction

WATERFALL PLOTS
No. of Multi-buffers: 8
Maximum Capacity: 30000 and dependent on RAM in PC
Increment: User-definable in seconds (free-run trigger) or new trigger (signal or manual trigger)

DISPLAY FUNCTIONALITY
Each display can be manipulated via context-menu commands:
- Zoom
- Unzoom
- Overlay Curve
- Delete Overlay
- Save Active Curve
- Copy Active Curve
- Spectral Units: Power (mean square), Root Mean Square, Power Spectral, Density, RMS Spectral Density, Energy Spectral Density
- Acoustic Weighting: As signal, A-weighted, B-weighted, C-weighted, D-weighted, Linear
- jω Weighting: $1/j\omega^2$, $1/j\omega$, None, $j\omega$, $j\omega^2$

DATA EXPORT
- Export of selected functions in PULSE ASCII File or Universal File Format (UFF)
- Export of selectable functions to Microsoft® Excel®
- Direct import of PULSE Access data in PULSE Reflex platform (requires at least a Reflex Base Type 8700 license). Advanced reporting and data comparison available with Reflex Data Viewer Type 8701
- Direct export of selectable functions to MATLAB®
- Active Displays available for Microsoft® Office products

Updating Software Version

We strongly recommend that you update your PULSE installation to the last major release to ensure that the latest security updates from Microsoft® are supported in your installation.
This Windows®-based analysis software is delivered on a DVD. The license is node-locked either to a PC host ID or USB key

Ordering Information

Type 7781-N6*	PULSE Access, 1 – 6-channel license, with Basic FFT, Synthesized CPB and Overall Analyzers

REQUIRED SOFTWARE

Type 3099-A-N1†	PULSE LAN-XI Single Module Front-end Driver

OPTIONAL SOFTWARE

Type 8700	PULSE Reflex Base (for direct import of data into Reflex post-processing environment)
Type 8701	PULSE Reflex Data Viewer (for advanced reporting)

OPTIONAL ACCESSORIES

Type 2831-A	LAN-XI Battery Module
Type 2981	CCLD Laser Tacho Probe

SOFTWARE MAINTENANCE

M1-7781-N6	Software Maintenance and Support Agreement for PULSE Access
M1-3099-A-N1	Software Maintenance and Support Agreement for Type 3099-A-N1

Software Upgrade to Full PULSE Systems‡

Type 7770-N6	Upgrade to 6-ch. PULSE FFT Analysis
Type 7700-N6	Upgrade to 6-ch. PULSE FFT and CPB Analysis
Type 7702-N6	Upgrade to 6-ch. PULSE Order Tracking

Available Hardware

Type 3050-A-060	LAN-XI 6-ch. Input Module, 51.2 kHz, Mic., CCLD, V
Type 3050-A-040	LAN-XI 4-ch. Input Module, 51.2 kHz, Mic., CCLD, V
Type 3052-A-030	LAN-XI 3-ch. Input Module, 102.4 kHz, Mic., CCLD, V
Type 3160-A-042	LAN-XI Generator, 4/2-ch. Input/Output Module, 51.2 kHz, Mic., CCLD, V **Note:** Generator output not supported by PULSE Access
Type 3160-A-022	LAN-XI Generator, 2/2-ch. Input/Output Module, 51.2 kHz, Mic., CCLD, V **Note:** Generator output not supported by PULSE Access
Type 3053-B-120	LAN-XI 12-channel Module, CCLD, V
Type 3056-A-040	LAN-XI 4-ch. Input/HS-Tacho + 8-ch. Aux. Module, 51.2 kHz, Mic., CCLD, V **Note:** Auxiliary channels not supported by PULSE Access

For more information on LAN-XI hardware in general and optional front panels, please refer to Product Data BP 2215 and BP 2421

* N = node-locked license, 6 = maximum channel count
† N = node-locked license, 1 = number of LAN-XI modules
‡ PULSE Time Data Recorder Type 7708 requires a full PULSE LabShop license

BP 2491 – 12 2014-02

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Local representatives and service organisations worldwide

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