

imc WAVE 2023

Software package for NVH analysis using imc test and measurement devices

imc WAVE (**W**orkstation for **A**coustic and **V**ibration **E**ngineering) is a software package for NVH (Noise Vibration and Harshness) analysis. It is based on imc STUDIO and is installed as a separate instance of imc STUDIO. It can be equipped with multiple, separately licensed analyzers.

The software enables the user to perform measurements, evaluations, data visualization, and to compose reports specifically for acoustic tests. The device families imc CRONOS und imc C-SERIES in particular are used for this purpose.

One distinctive feature of the imc WAVE analyzers is their capability to process not only the primary acoustics signals from microphones and accelerometers, but also additional measurement data channels that an imc device can provide. Such as temperature, mechanical strain (strain gauges) etc., or signals and other information from CAN-busses on board vehicles. This means that operating conditions of the test object and its environment can be measured synchronously along with the acoustic variables, and that the results can be correlated and analyzed accordingly.

imc WAVE comprises comfortable user guidance along the typical workflow, including menus for configuration of the applied measurement systems and calibration routines for the sensors.

The captured measurement data are processed according to comprehensive analysis procedures that are fully compliant with all relevant standards. All data are saved and administered and the results are visually displayed in a selection of pre-defined pages on the PC and as printable reports.



Note

Limited functionality

Components and functions with gray text are not yet implemented in the current version of imc WAVE.

imc WAVE properties

- PC-based NVH test and analysis software package under MS Windows
- configuration and operation of imc test and measurement systems
- synchronized data capture, of both acoustic sensor data and also of additional measurement channel data from an all-purpose imc measurement device
- "multi-domain" data acquisition, i.e. analog sensors and signals, digital process variables, Fieldbus (CAN) signals
- real-time data processing: live analysis from running measurements
- application-oriented visualization of the live data (raw data and complex results)
- storage and administration of measured data and analysis results, incl. export functions

Licensing

License activation is performed using the **imc LICENSE Manager**. Find details in the imc LICENSE Manager documentation.

Additionally to the imc WAVE license you will receive an **imc FAMOS Runtime license**.

System Requirements

Supported operating systems

Windows 10*/11* (64 bit)

*released in conformance with the version of Windows 10/11 applicable at build date of imc software

Minimum requirements for the PC

4-core CPU 2 GHz ¹

8 GB RAM (recommended: 16 GB RAM) ¹

10 GB free hard disk space (recommended: SSD) ²

Display resolution: 1280 x 1024 (recommended: 1920x1080)

1 Requirements and recommended minimum configurations for the applied PC will rise with increasing number of connected devices and the resulting overall system data rate. Another crucial factor will be the extend of used live analysis and visualization functions on the PC.

A smooth operation will also heavily rely on sufficient RAM memory resources on the PC: It must ensure to satisfy all vital functions without any outsourcing to slow external swap file (HDD/SSD) in order to guarantee sustainable performance.

2 The hard drive memory requirement increases if measured data are saved to the PC.

Other operating system components

The following components are installed with the imc WAVE setup if they are not already present:

Component	Version	Folder in "System" directory
Microsoft .NET Framework	4.8	DotNetFx4.8
Microsoft VC 2015-2019	14.28.29910	Microsoft Visual C++ Redistributable\2019
Microsoft VC 2010	10.0.402219.1	Microsoft Visual C++ Redistributable\2010
Microsoft VC 2005	6.0.3790.0	Microsoft Visual C++ Redistributable\2005
Microsoft Build Tools 2015	14.0.23107.10	MSBuildTools2015

imc WAVE Starter Packages and USB based Data Acquisition (*)

imc WAVE has been specially designed for use with imc data acquisition and [measurement systems](#). In particular, it exploits the imc systems' versatility, flexibility and its variety of input data channels that also include non-acoustic signals, vehicle and fieldbus systems etc.

However, as a quick start and for somewhat more simple tasks, so called "Starter Packages" are also offered: Besides the software they also incorporate a complete set of transducers (microphones and accelerometers) and a 2-channel IEPE/ICP USB signal conditioner for direct PC connection as a signal source.

These packages can cover Sound Level Meter (SLM) applications or vibration analysis as complete solution - ready to go.

Such USB based data acquisition supports non-triggered measurements for 2 channels with 24 Bit resolution (10 V) at 48 kHz sampling rate.

* Only suitable for imc WAVE Spectrum Analyzer. Not to be used in combination with imc WAVE Structural Analyzer.

Software Requirements and Installation

- Based on imc STUDIO and installed as an independent and customized instance of imc STUDIO.
- Parallel to imc WAVE, an additional instance of imc STUDIO can be run on the same PC (Runtime, Standard, Professional, Developer). As long as this instance is based on the same version of imc STUDIO (e.g. 2023 R1), both instances are subordinated to the same program installation, which means they share resources. For this reason, the installation of both imc WAVE and imc STUDIO must be performed in a single joint setup procedure. Any attempt to perform installation in succession or subsequently will cause the already existing instance to be deleted.

imc WAVE Spectrum Analyzer

The Spectrum Analyzer performs spectral analysis in real time on time-domain signal from acoustic sensors such as microphones and accelerometers. This especially includes the calculation of octave and 1/3-octave spectra. The Spectrum Analyzer, consisting of "imc WAVE Noise", "imc WAVE Vibration" and "imc WAVE Rotation", provides a number of settings options for the purpose of parameterizing these calculations in accordance with industrial standards. These include weighting in both time- and frequency domain, with standard procedures, filters, window functions, etc.

The Inline Analysis "imc WAVE Structure" offers functions for 2 channel spectrum analysis, e.g. frequency response function or coherence.

Furthermore, the complete functionality of a sound level meter is included, that entirely covers the associated industrial standard.

Calculation functions and required licenses

With the corresponding license, you are able to activate the following analyzers:

Name and license required	Description
imc WAVE Noise	Functions for noise analysis, e.g. sound pressure level, Leq, sound intensity, FFT-spectra, 1/3-octave and 1/1-octave spectrum. <ul style="list-style-type: none">• Sound level meter according to Standard IEC 61672-1• 1/3- and 1/1-octave analysis as 3D or averaged according to Standard IEC 61260-1• FFT analysis as 3D or averaged• Determining the sound intensity (time plot, narrow band spectrum and 1/3-octave spectrum) for measurements with an intensity probe
imc WAVE Rotation	Functions for analysis of rotating machinery <ul style="list-style-type: none">• Resampling of time-domain channels• Order-tracking analysis as a 3D or averaged• FFT analysis as a 3D or averaged• Calculation of an input signal over time to a channel over RPMs (RPM-presentation)• Calculation of spectrum over time or revolutions, to a 3D-channel over RPMs (RPM-vector-presentation)• Calculation of 3D cross sections

Name and license required	Description
imc WAVE Structure	<p>Functions for 2-channel analysis in the frequency domain</p> <ul style="list-style-type: none"> • Generation of output signals for the purpose of subsequent modal analysis • Calculation of transfer functions with noisy input- and/or output signals • Calculation of the coherence as a quality indicator • Power rating by means of the cross-power-spectrum and spectral power density • FFT analysis as 3D or averaged
imc WAVE Vibration	<p>Functions for vibration analysis of human vibration and machine diagnostics</p> <ul style="list-style-type: none"> • Filters (LP, HP, BP, BS, simple/double integration, simple/double differentiation, envelope curve) • Machine diagnostics according to Standard ISO 10816 and ISO 20816 • Human vibration filters according to Standard ISO 2631-1, ISO 8041, DIN EN 12299 • 1/3- and 1/1-octave analysis of vibration as 3D or averaged according to Standard IEC 61260-1 • FFT analysis as 3D or averaged

imc WAVE Noise

Functions	Description
Basic analysis functions	<ul style="list-style-type: none"> • FFT analysis (up to 131072 data points) as 3D or averaged • simultaneous calculation of octaves and 1/3-octaves in real time • calculation of spectra with constant absolute and relative bandwidth • selectable frequency range for the spectrum analysis • A-, B-, C- and linear frequency weighting selectable • time-weighting: Fast, Slow • window functions: rectangular, Hamming, Hanning, Flattop, Blackman and Blackman-Harris • frequency -weighted sound level with exponential time weighting • calculation of frequency-weighted averaging levels

Typical applications

- acoustics measurements, fully conformant to applicable industry standards
- acceptance and certification measurements with respect to noise emission and sound levels
- product qualification tests
- product optimization in the R&D field
- in-vehicle noise levels: tests for quality assessment and optimization
- comprehensive and wholistic investigations: root cause analysis of origins, propagation paths and effects of noise and vibration
- incorporation of acoustics expertise into general application fields of physical measurement engineering

imc WAVE Rotation

Functions	Description
Basic analysis functions	<ul style="list-style-type: none">• FFT analysis (up to 131072 data points) as 3D or averaged• Calculation of order-tracking spectra• Determining of RPMs, and Resample-functions• Window functions: rectangular, Hamming, Hanning, Flattop, Blackman and Blackman-Harris• Class-counting and representation of time data and spectra plotted over the RPMs

Typical applications

- product qualification tests
- product optimization in the R&D field
- End-Of-Line Quality Assurance
- comprehensive investigations of rotating machinery

imc WAVE Structure

Functions	Description
Basic analysis functions	<ul style="list-style-type: none">• FFT analysis (up to 131072 data points) as 3D or averaged• Power density spectrum (up to 131072 points) as 3D or averaged• Coherence (up to 131072 points) averaged• Cross power density (up to 131072 points) spectrum as 3D or averaged• Frequency response (up to 131072 points) function as 3D or averaged

Typical applications

- product qualification tests
- product optimization
- evaluation of signal power and structural behavior

imc WAVE Vibration

Functions	Description
Basic analysis functions	<ul style="list-style-type: none">• FFT analysis (up to 131072 data points) as 3D or averaged• simultaneous calculation of octaves and 1/3-octaves in real time• calculation of spectra with constant absolute and relative bandwidth• selectable frequency range for the spectrum analysis• Human vibration filter, high-, low-, bandpass and band rejection• time-weighting: Fast, Slow• window functions: rectangular, Hamming, Hanning, Flattop, Blackman and Blackman-Harris• frequency -weighted sound level with exponential time weighting

Typical applications

- standards-conformant measurements for human vibration and machine diagnostics
- acceptance and certification measurements in conjunction with impact of vibration on humans
- in-vehicle seating comfort: Measurements for qualification and optimization
- hand-arm vibration: handheld machinery
- acceptance and certification measurements in conjunction with impact of vibration on machinery
- product qualification tests
- product optimization in the R&D field
- comprehensive and wholistic investigations: root cause analysis of origins, propagation paths and effects of vibration

imc WAVE Structural Analyzer

The Structural Analyzer serves the purpose of systematic analysis of the vibration behavior of mechanical structures. This is typically done by applying a strike with a special impulse hammer. This injects a well defined excitation signal into the structure, while the structure's response to this stimulus is measured using accelerometer sensors. The correlations among all synchronous signals (outputs), including that of the stimulus (input), yields transfer functions which fully characterize the structure's vibration behavior (resonances, eigenfrequencies, modes).

These calculated results in connection with the information on the associated measurement points (DOF, Degree Of Freedom), which the Structure Analyzer also administers, can be exported to subsequent analysis programs via a standardized data exchange format. Such specialized analysis programs, for instance ME'scope by Vibrant Technology, can be purchased in addition to the WAVE-Analyzer and offer advanced evaluation tools and display options for modal analysis.

Analyzer functionalities

- calculation of transfer functions and coherence
- management of DOFs
- linkage with modal analysis software

Functions	Description
Basic analysis functions	<ul style="list-style-type: none"> • auto power spectral density • transfer function • coherence function • H1, measurement with noisy output signal • time domain signal, time plot • window functions: force window or exponential window
Measurement functions	<ul style="list-style-type: none"> • acoustic announcement (speech output) of the current DOFs for assistance during measurement • automatic impulse bounce detection and evaluation of strike quality • automatic detection of overrange or strikes below a threshold level • acoustic announcement of error warnings • replay of last measurement (impulse hammer strike) for evaluation (visual plot and audio output via headphones) • display of measurement count • interactive setting of the validity flag and selection of valid strikes to be evaluated • All other points are presented under the heading: Device Configuration (Setup)
Administration functions	<ul style="list-style-type: none"> • administration of DOF information on all measurement channels and results • roving for input and output-DOFs • data export to and ME`Scope (standard format: *.uff) • traceability of the settings for each measurement performed

Typical applications

- structural studies and modal analysis
- development and product optimization
- product qualification tests

Device Configuration (Setup)

Setup is the integrated user interface for the complete configuration of all measurement parameters along with its saving in a system configuration. This user interface can be adapted to individual needs. Similarly, any interface elements which are not needed can be hidden.

All relevant hardware properties of imc measurement devices are supported.

Functionality	Description	
	● : included ○ : optional	
Setup	Device configuration of imc devices of the groups: A4-A7 via firmware imc DEVICES B10 via firmware imc DEVICEScore	●
	Device configuration of 3rd-party (non-imc) devices (e.g. 3rd-party devices, provided appropriate license available)	○
imc Online FAMOS	Real-time analysis on data streams (device based platform and license) Firmware imc DEVICES ● Firmware imc DEVICEScore ---	○

Special functions and applications

- Uniform operating software for imc's Ethernet-compatible measurement devices (see: Supported imc measurement devices)
- Operation of multiple synchronized devices, networked via Ethernet.
- Setup automatically recognizes the measurement system's capabilities and offers correspondingly adapted configurations (low training requirements - high measurement reliability)
- Setting up a system configuration ("Experiment") is possible without even having a measurement device physically available ("offline")
- Supports sensor recognition by means of TEDS conforming IEEE 1451.4. ⁽¹⁾

1: Applicable with devices of the firmware group imc DEVICES (A4-A7)

Basic functions	Description
Channel settings	<ul style="list-style-type: none"> • All inputs and outputs of a measurement system can be set using one single user interface (analog inputs/outputs, digital inputs/outputs, fieldbus channels, virtual channels, etc.) • Per-channel configuration (e.g. name, sampling interval, measurement duration, input range, characteristic curve correction, filters, and much more.) • Opening independent curve windows, which are not connected with a Panel page
Data saving on the PC	<ul style="list-style-type: none"> • Data saving can be set for each channel separately • Saving of measured data in a different file format (imc Format Converter, e.g. ASCII, EXCEL and more) • Each trigger event can be saved to a separate data file. • Customized storage location for measurement data: Allows the measurements to be saved in varying (including variable-dependent) folders.

Supported imc measurement device groups

The imc WAVE analyzers can be used with any measurement systems belonging to the imc CRONOS device families or imc C-SERIES. In particular, the devices must be equipped with appropriate measurement amplifier modules for microphones/accelerometers (e.g. IEPE/ICP). Suitable module types: ICP2-8, AUDIO2-4, QI-4 etc.

The device series imc CRONOS*flex* (CRFX) and imc CRONOS-XT (CRXT) are especially suitable and recommended. These device series digitize the captured signals at a resolution of 24 bits and are therefore a perfect fit for the high dynamic requirements in NVH testing.

Device groups

[Firmware imc DEVICES](#) - device groups A4-A7

- | | |
|---|---|
| • imc CRONOS <i>compact</i> | • imc CRONOS-XT |
| • imc CRONOS <i>flex</i> | • imc BUSDAQ <i>flex</i> ⁽¹⁾ |
| • imc CRONOS-SL-N | • imc BUSDAQ ⁽¹⁾ with sn. 13xxxx and higher |
| • imc C-SERIES with sn. 14xxxx and higher | • imc SPARTAN ⁽¹⁾ with sn. 13xxxx and higher |
| | • other customized devices with sn. 13xxxx and higher |

[Firmware imc DEVICEScore](#) - device groups B10

- imc EOS ⁽²⁾

1 : For additional measurement signals such as Fieldbusses (CAN), temperatures, strain gauges, etc.. Not suitable as audio inputs to the analysers.

2 : Only suitable for imc WAVE Spectrum Analyzer. Not to be used in combination with imc WAVE Structural Analyzer.

2-channel IEPE/ICP-signal conditioner for direct PC connection (via USB) ⁽³⁾

For simple two-channel measurements, the audio interface with IEPE/ICP signal conditioning (FH/ICP2-USB; article # 13300113) can be connected to the PC via USB 2.0. The integration is done as a third-party device (page "Devices" > tab "Device options" > "3rd party device management") and does not require an additional license.

- IEPE/ICP signal conditioning, USB 2.0 interface (incl. power via USB)
- 24 Bit ADC, 48 kHz sampling rate, 1 Hz .. 20 kHz

3 : Only suitable for imc WAVE Spectrum Analyzer. Not to be used in combination with imc WAVE Structural Analyzer.

Firmware imc DEVICES

Basic functions	Description
Channel settings	<ul style="list-style-type: none"> Channel-wise selection of extended output data format (24 bit resolution) for data acquisition with CRFX/CRXT channels
Data saving on the device	<ul style="list-style-type: none"> Data saving can be set for each channel separately Each trigger event can be saved to a separate data file CAN Log data in the file format: Vector(CANalyser) possible
File Manager	<ul style="list-style-type: none"> Enhances the Windows Explorer®
Access to the device memory	<ul style="list-style-type: none"> Enables copying and deleting of files and folders from the devices internal storage to a PC.
Trigger-Machine	<ul style="list-style-type: none"> Either directly started or triggered measurement Starting and/or stopping by trigger 48 independent triggers supported ("<i>Multi-Machine Trigger</i>") Pre-triggers adjustable Various definable events (thresholds, time-in-range, signal edges, etc.) Logical conjunctions of multiple events can form complex trigger conditions Number of trigger releases freely selectable (multitrigger, "<i>Multi-Shot Trigger</i>") Event-driven digital output
Balancing and taring function	<ul style="list-style-type: none"> Setting of the scaling and balancing performed on a per-channel basis and the results are displayed for the current experiment.
Sensor Recognition	<ul style="list-style-type: none"> Readout of sensor information from TEDS
Optional functions	Description
Application-oriented functions and signal processing (optional)	<ul style="list-style-type: none"> Timer start Real-time clock (DCF 77, GPS, NTP⁽¹⁾, PTP⁽²⁾ or IRIG B002⁽¹⁾ for synchronization of sampling clocks and absolute time) Synchronized measurement with multiple devices Master device generates a DCF77 or IRIG-B⁽¹⁾ signal Support of GPS-receiver for capturing geo-position data Time zones and switch between daylight saving and standard time Exchange of display variables via the network imc Online FAMOS: for device based immediate real-time signal analysis (mathematics, statistics, digital filtering, control commands, closed-loop control, FFT, order-tracking) as well as real-time control. Process vector (single-value state variables: last current value) Synchronous Tasks (real-time cycles), imc Online FAMOS Professional necessary
<p>1 : supported by devices as of group A5 and higher: SN 13xxxx, SN 14xxxx, SN 16xxxx, SN 19xxxx</p> <p>2 : supported by devices as of group A7 and higher with the suffix "-GP", as well as CRXT: SN 19xxxx</p>	
Supported interfaces	Description
Connection with devices	<ul style="list-style-type: none"> Ethernet (LAN or WLAN - depending on the device equipment) Via appropriate routers: LTE, 5G, etc. The connection to the device can optionally be password-protected
Fieldbusses	<ul style="list-style-type: none"> CAN + protocols

Data formats	Description
Display variable	Float $\pm 10^{30}$
imc Online FAMOS	Local variable: Float $\pm 10^{30}$
imc Online FAMOS Professional	pv-variable as Float: $\pm 10^{30}$ pv-variable as Integer: $\pm 2^{31}$

Maximum channel count per device											
Active channels		512		Active channels of the current configuration: Total sum of analog, digital, fieldbus and virtual channels as well as possible monitor channels							
Active analog channels		198 ⁽¹⁾		Activated analog channels of the current configuration (sum of primary channels and possibly monitor channels) (1): 128 with imc CRONOSflex (CRFX) and imc CRONOS-XT (CRXT), incl. output channels of type DAC-8 and DIO-Ports of type DI / DO							
Fieldbus channels		1000		Number of defined channels (active and passive); Currently activated channels are limited by the total number of activated channels (512).							
Process vector variables		800		Single-value variables, each containing the latest current measured values. A process vector variable is automatically created for each channel.							
		without monitor channels				with monitor channels					
Channel type	determined by	limit (active+passive)		activated	total activated	limit (active+passive)		activated	total activated		
Analog channels	system-expansion	Channel	240	198	512	Channel	240	198	512		
						Monitor	240				
Incremental counter	system-expansion	Channel	16	16		Channel	16	16			
						Monitor	16	16			
DIO/DAC-Ports	system-expansion	Port	16	16		Port	16	16			
						Monitor	16	16			
Fieldbus channels	flexible	Channel	1000	512		Channel	1000	512			
						Monitor					
Virtual channels (OFA)	flexible	-	-	512		-	-	512			

Occupancy for ports (examples):

- one DO module (e.g. DO-16) occupies 1 port
- one DI8-DO8-ENC4-DAC4 module occupies 3 ports
- one DAC module (e.g. DAC-8 or DAC-4) occupies 1 port



Monitor-ports: DI-ports (respectively channels) have monitor-ports, DO/DAC-ports in contrary do not have monitor-ports

Additional software options for devices

Components	Description
imc Online FAMOS (Professional)	imc Online FAMOS offers a large number of real-time functions for pre-processing. The pre-processing is performed by a digital signal processor (DSP) in the device.
Online class-counting	Extension for imc Online FAMOS: Class-counting and Rainflow counting for fatigue analysis
Online order tracking	Extension for imc Online FAMOS: order tracking analysis of rotating machinery
Vector database interface	Import of *.dbc CAN configuration files
ECU protocols for CAN Interface	Support for complex ECU protocols (CAN-Bus)

Components	Order code	CRFX, CRXT, CRC, CRSL, C-SERIES	SPARTAN, BUSDAQ, BUSFX
imc Online FAMOS	DEV ⁽¹⁾ /OFA	●	○
Update of imc Online FAMOS on imc Online FAMOS Professional	DEV ⁽¹⁾ /OFA-UP	○	○
Online class-counting	DEV ⁽¹⁾ /ONLCLASS	○	○
Online order tracking	DEV ⁽¹⁾ /ONORDER	○	○
Vector database linkage	DEV ⁽¹⁾ /VEC-DATB	○	○
ECU protocols for CAN Interface	DEV ⁽¹⁾ /ECU-P	○	○

● : included ○ : optional --- : not available in imc WAVE

1 : DEV is to be replaced with the device's order code abbreviation.

Firmware imc DEVICEcore

Basic functions	Description
Channel settings	<ul style="list-style-type: none"> • Capture of channel data in 24-bit
Data saving on the device	<ul style="list-style-type: none"> • Data saving can be set for each channel separately
Access to the device memory	<ul style="list-style-type: none"> • Access via Windows network sharing (SMB-protocol via Samba Fileserver) • ftp Fileserver <p>Enables copying and deleting of files and folders from the devices internal storage to a PC.</p>
Trigger-Machine	<ul style="list-style-type: none"> • Either directly started or triggered measurement • Starting and/or stopping by trigger • imc EOS: 2 independent triggers supported ("Multi-Machine Trigger") • Pre-triggers adjustable • Various definable events (thresholds, time-in-range, signal edges, etc.) • Logical conjunctions of multiple events can form complex trigger conditions • Number of trigger releases freely selectable (multitrigger, "Multi-Shot Trigger") • Event-driven digital output
Optional functions	Description
Application-oriented functions and signal processing (optional)	<ul style="list-style-type: none"> • Timer start • Real-time clock (NTP or IRIG B002 for synchronization of sampling clocks and absolute time) • Synchronized measurement with multiple devices • Master device generates a IRIG-B signal • Time zones and switch between daylight saving and standard time • Process vector (single-value state variables: last current value)
Supported interfaces	Description
Connection with devices	<ul style="list-style-type: none"> • Ethernet (LAN)

Panel

The Panel provides, in addition to the imc curve window, a wide scope of new graphical display possibilities. It is possible to create report pages for documentation of measurement and analysis results.

Functions

Functionality	Description
Special functions and applications	<ul style="list-style-type: none"> The layout of the report pages can be designed freely and be exported in PDF (report mode). Compositions of Widgets in freely configurable pages (dialog mode) Special Widgets can be assigned to commands. (e.g. starting measurement or a imc FAMOS analysis)
Basic functions	<ul style="list-style-type: none"> Creation of multiple pages in which Widgets (display and control elements) such as curve windows, potentiometers, state indicators can be positioned in any arrangement.
Data Browser	Description
Display and navigation through data	<ul style="list-style-type: none"> Navigation through structured tree diagram for visualization of various measurements Searching and filtering
Current measurement	<ul style="list-style-type: none"> Displays all channels and variables belonging to the current measurement
Saved measurements	<ul style="list-style-type: none"> Loads and processes saved measurements Displays all channels and variables belonging to the saved measurements
User defined variables	Declaration of variables <ul style="list-style-type: none"> Numerical, Text
Display	<ul style="list-style-type: none"> All available channels and variables can be linked with Widgets Opening of independent curve windows not associated with the Panel Opens an independent values window with the current values of certain variables
Export / Import	Export variable <ul style="list-style-type: none"> individually or all in one file Import variable (<i>refill</i>) <ul style="list-style-type: none"> imports value to an existing (device or user-defined) variable Load variable <ul style="list-style-type: none"> Creates or replaces a variable with the properties of the variable to be imported (user-defined)
Widgets	Description
Widgets	<ul style="list-style-type: none"> imc Curve window Standard control elements such as state indicators, edit boxes, numeric inputs, tables, buttons, switches etc.
Extra functions	<ul style="list-style-type: none"> Copying and pasting of Widgets Loading and saving of curve window configurations Multi-selection of Widgets and various options for orientation and anchoring Widgets can be grouped

Panel page	Description
Extra functions	<ul style="list-style-type: none"> • Loading and saving, copying and pasting of pages • Zooming to optimal possible display • Adapting the page to the respective monitor size

Third Party Device Interface

The plug-in 3PDI is specially suited to enhancing a system configuration consisting of imc hardware with supplemental specialty devices and data sources.

The advantages of the 3PDI script are:

- integrated and uniform operation via the Setup page
- consistent format for measured data
- synchronized data

Already implemented templates and operative third-party devices

Device	Additionally licenses required for running	Description
AudioDevice	none	With the 3rd-party " <i>AudioDevice</i> ", it is possible to use the computer's audio devices (such as the microphone input) as a data source.
ChannelLoader	none	The 3rd-party " <i>ChannelLoader</i> " enables files in the imc-format to be played back as a signal during a measurement.
FunctionSimulator	none	The 3rd-party " <i>FunctionSimulator</i> " simulates various signal types (sine, cosine, trapezoid, square wave, ...).

If you have problems or questions, please contact our Customer Support/Hotline:

imc Test & Measurement GmbH

Hotline (Germany): **+49 30 467090-26**

E-Mail: hotline@imc-tm.de

Internet: <https://www.imc-tm.com>

International partners

For our international partners see <https://www.imc-tm.com/distributors/>.