Technical
Specifications

M2M PANTHER

Industrial phased-array instrumentation with TFM

Eddyfi Technologies

COMPACT, LIGHT AND POWERFUL ADVANCED PHASED-ARRAY

The M2M Panther™ product range combines speed and performance of phased-array ultrasound technology in a compact format. Targeted towards integrators for inline inspections and laboratories for R&D, M2M Panther products offer a flexible and scalable solution for generic and custom NDT.

Real-time total focusing method (TFM) for high speed inspection

Recognized amongst the highest-resolution PAUT techniques, TFM is natively implemented on M2M Panther. Combined with unparalleled data throughput, M2M Panther offers faster imaging of larger inspection zones for easier evaluation.

Compact, rugged & scalable

From 32:128 to 2048:2048 configurations, M2M Panther compact units are scalable for automated inspection. With up to 16 units used in parallel, M2M Panther offers a substantial increase in inspection speed.

- Unlimited number of probes
- Unlimited number of groups
- Up 13k+ focal laws

M2M Panther is IP54. Its casing has external fans for optimized heat dissipation with no air intake.

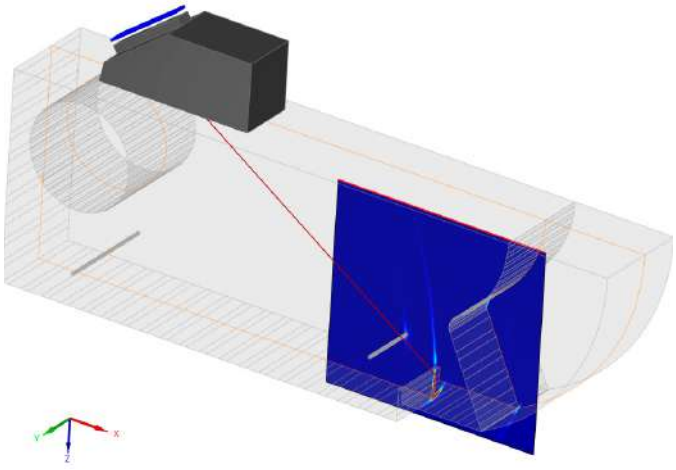
Fastest data throughput

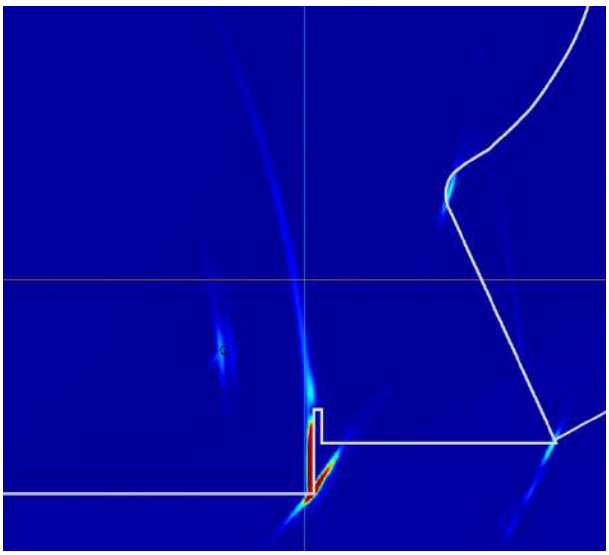
Uniquely equipped with a 320MB/s high-speed link, M2M Panther offers the fastest data throughput of the market.

Advanced phased-array modes

The CIVA-based Acquire™ monitoring software and its extensive SDK allow managing fast industrial modes and advanced laboratory configurations:

- 3D CAD configuration and rendering
- LINEAR, MATRIX, DLA, DMA, DAISY, ANNULAR, SECTORIAL probes
- PE, TOFD, PAUT, FMC, PWI, TFM Imaging techniques
- FAST modes
- SAUL modes
- Adaptive TFM modes
- 3D real-time imaging

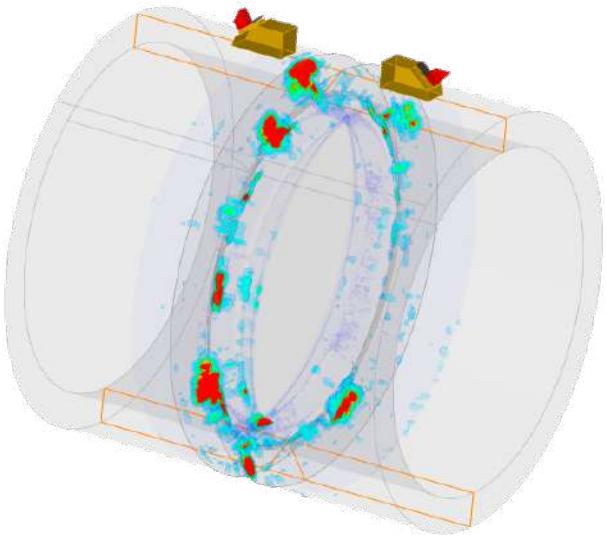


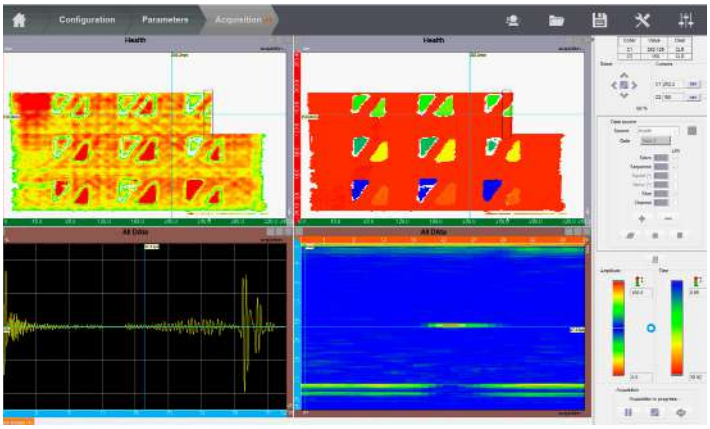


TFM multimode reconstruction (TT, TTT, TTTT) in 1 million pixels zone in a 3D CAD

Acquire software

Acquire is M2M's up-to-date acquisition software dedicated to advanced Phased-Array UT, TFM settings and imaging. Acquire software has been designed for both Industrial applications and laboratory demonstration. Acquire is able to drive and visualize PE, TOFD and Phased Array configuration as well as TFM modes (FMC, PWI, any custom transmission). The image on the right shows on Acquire software, an electronic scanning of a 50mm composites inspection using a 128 elements phased-array probe.





Advanced analysis

Acquire's inspection data files are fully compatible with both CIVA, Enlight and ULTIS Analysis software.

Enlight™ add-on extends standards Acquire views (A-B-S-D-C Scan + Top, Side, Front views cumulated, TFM & 3D views) to 3D merging of data, automatic analysis, and advanced reporting.

In addition to real time TFM imaging, full waveform FMC data acquired by Panther can also be post-processed by CIVA Analysis add-on.

Software development kit (SDK)

In addition to Acquire acquisition software, M2M offers a Software Development Kit (SDK) to customize application-based software interface for a fully automated inspection solution:

- Full control in real-time of the ACQUIRE Software (Remote server) : Gain, TCG, gates, alarms, coders, etc.
- Real-time data retrieval (Data server)
- Language / OS / PC independent
- Very limited hardware knowledge: same program for all M2M hardware's architectures

A wide range of industrial applications

- Plate
- Tube
- Bar
- Oil & Gas
- Aerospace
- Power generation

SPECIFICATIONS

GENERAL

L x W x H: 300mm x 220mm x 155mm	Weight: 6kg
Operating temperature range: from -10°C to 50°C | 14°F to 120°F	IP54
Storage temperature range: -10°C to 60°C | 14°F to 140°F	Power supply: 240V50Hz – 110V/60Hz

PHASED-ARRAY

Linear scanning, sectorial scanning, parallel shooting, ultrafast mixed modes	Linear, Matrix, DLA and DMA, Annular and Daisy probes
Scalable up to 16 Panther units (2048 channels) | Maximum single aperture : 256 channels	Unlimited probe number | No group limitation | Up to 13100 focal laws
Delay-law computation for standard and parametric shapes (plates, cylinders, Butt Welds, T K & Y welds, elbow, nozzle, turbine blade, nozzles,...) as well as 2D and 3D CAD	Focusing mode: true depth, sound path, projection

REAL-TIME TFM, FMC, PWI

Reconstruction channels: up to 128	Max number of pixels for the reconstructed image: more than 1 Million
Max refresh rate: up to 500fps (depends on the pixel numbers)	Multiple Sound paths: direct (L or S), indirect and converted modes, Modes superposition

PULSERS

128 phased-array channels*:	Bipolar square pulse, width: 30ns to 2000ns
	Voltage amplitude: max 100V with 1V step
	Max. PRF: up to 30kHz

RECEIVERS

128 phased-array channels*:	Input impedance: 50 Ω	Gain: up to 120dB (0.1dB step)
	Frequency range: 0.4 to 20MHz	Cross-talk between two channels < 50 dB
	Max. input signal: 1.8Vpp	Ultralow noise amplifier

DIGITIZER

Digitizing and real-time summation on 128 channels	Resolution: 14bit | Dynamic: 16bit
IIR filters	Max. sampling frequency: 125 MHz
Rectified, RF, envelope	Digitizing depth up to 16k points
Max delay: 1.6 ms	Max A-scan range 65k points

ACQUISITION

A-Scan/Peak data recording	800% amplitude range
High speed FMC recording (320 MB/s)	Inspection data file size: hard drive limitation
Acquisition trigger on time, event, encoder	Data transfer through USB3

WIZARDS

CAD overlay and 3D view	Amplitude balancing
Real-time phased array calculator	Probe design | Weld geometry design
Wedge calibration (angle, height) Amplitude calibration (TCG, DAC)	Part geometry with parametric shapes (plates, cylinders, Butt Welds, T K & Y welds, elbow, nozzle, turbine blade, nozzles,...) as well as 2D and 3D CAD

ANALYSIS

A-Scan, B-Scan, C-Scan, D-Scan, Echodynamic, Top - Side - Front views	Amplitude range: up to 800%
3D view, Analysis gates	CAD part geometry: plate, cylinder, T or Y section, nozzle
Post-processing of TFM reconstruction of recorded FMC/PWI data acquisition processing in CAD geometry	CAD butt weld geometry
Compatible with EnlightTM Enlight PlusTM, CIVA and ULTIS software	Customizable inspection report

I-O

1 IPEX connector for phased-array (can be upgraded to 2 with splitter)	1 fiber optic port
4 x LEMO® 00 for PANTHER 32:128, 64:128 and 128:128 Units 2 x LEMO® for PANTHER 64:64 I 3 x encoder inputs	1 external trigger
1 USB 3.0 high speed link	1 ultra high speed summation port (for summation between modules)

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