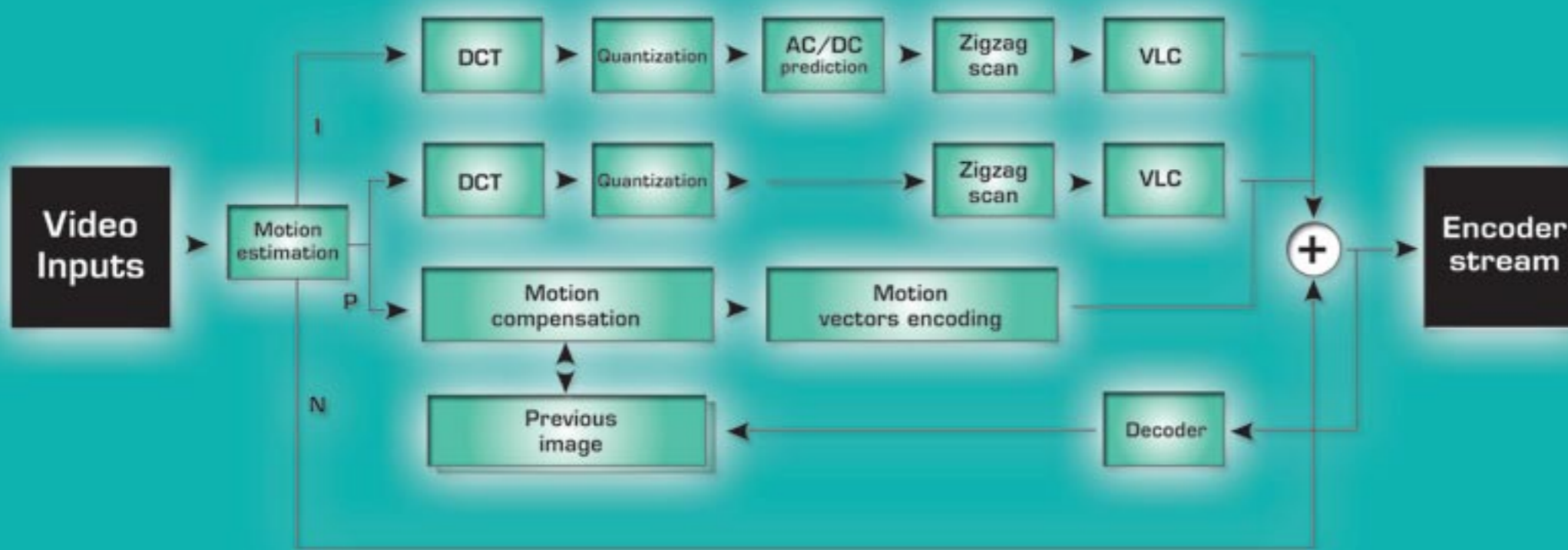


Combining
high-performance
and high-quality

MPEG-4 Suite

Audio & Video suite for DSP



HARDWARE PRODUCTS

- Imaging Evaluation Kits
- Digital Media Evaluation Kits
- Dedicated to A/V applications
- Specific hardware integration



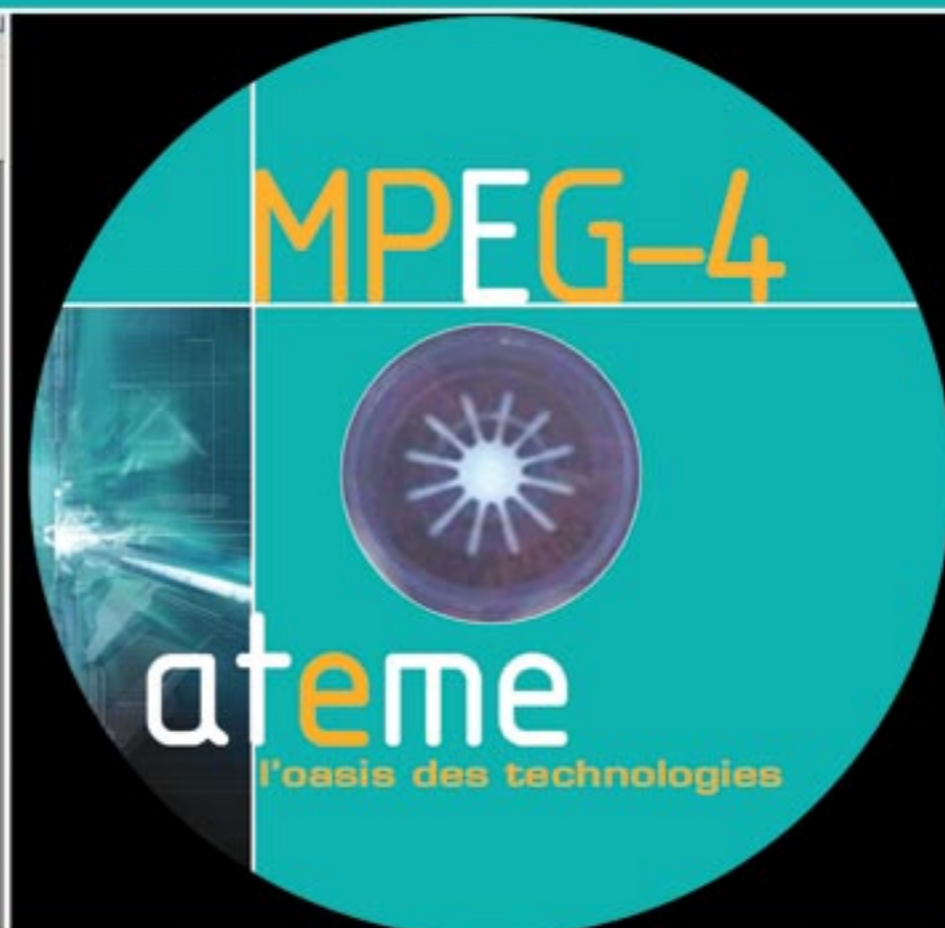
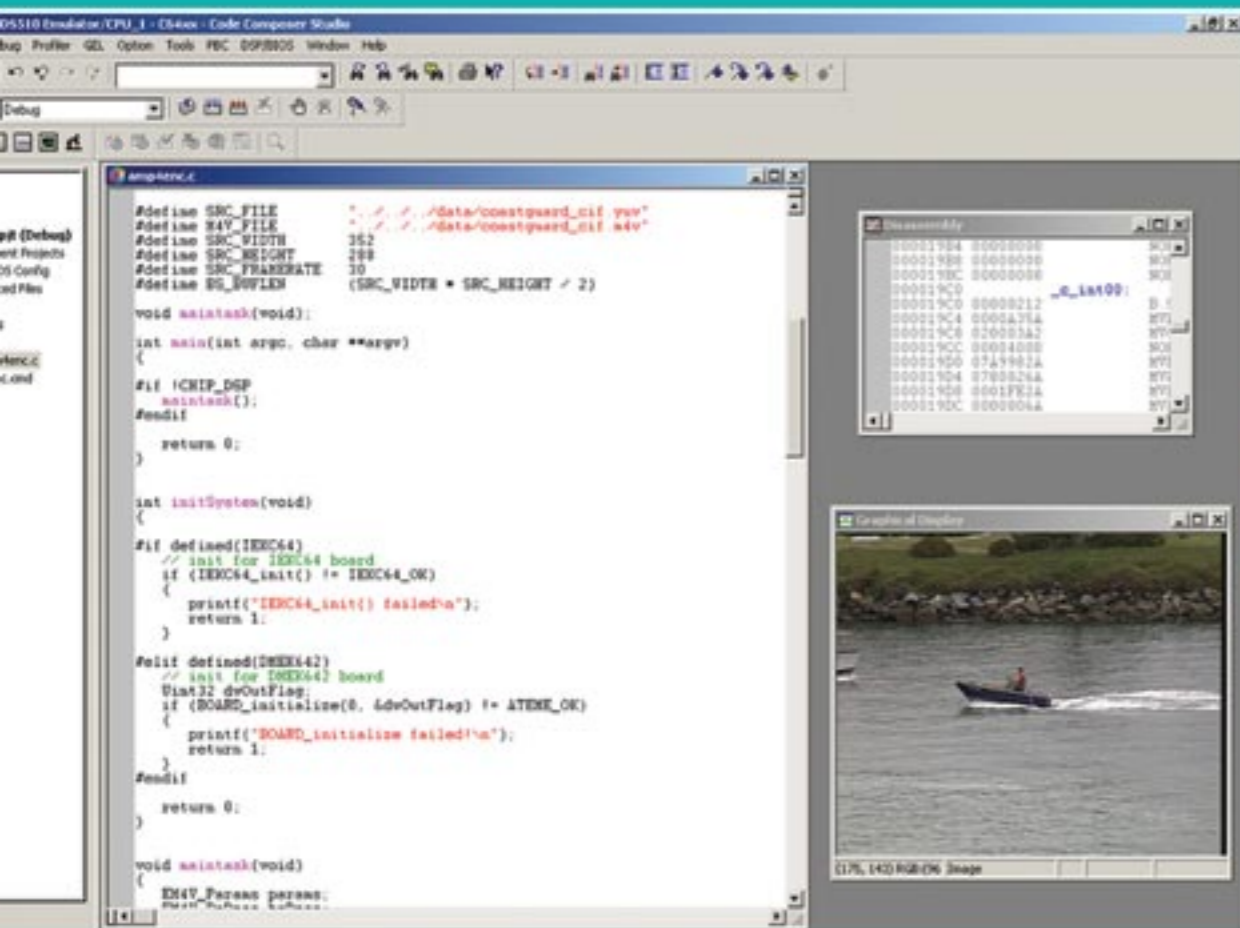
Imaging Evaluation Kit

SOFTWARE PRODUCTS

- MPEG-4 video codec
- Video pre- & post-processing
- Audio codecs (AAC, MP3, ...)
- Streaming (RTP/RTSP, TCP/IP ...)

PLATFORMS

- Embedded (C64x, DM64x)
- PC



Ateme's MPEG-4 implementation is fully ISO compliant (14496-2), and ensures complete inter-operability with any other MPEG-4 solution.

Ateme's MPEG-4 video codec is offered in three configurations:

- **SIMPLE** for low-cost limited features applications such as handheld CE products, home networking (baby-watch, fridge, ...)
- **STANDARD** for SDTV and wireless / internet communications systems such as video conference/surveillance, automotive, ...
- **ADVANCED** for high-quality video, feature-rich applications such as professional broadcast, home theatres, ...

Ateme MPEG-4: the high quality video, low bandwidth and tight storage space solution!

Encoder features

Version Applications	Simple	Standard	Advanced
Benefits	Low cost limited features	Communication H263 compatible SDTV (full D1)	High quality appliances Featuring rich
Tele-surveillance	X	X	
Transport	X	X	
Consumer	X	X	X
Automotive		X	
Telecoms		X	
Aeronautics		X	X
Multimedia - Broadcast			X

Pre-processing:

Pre-processing enables enhances encoding efficiency.

A set of noise reduction filters (low-pass, antidust) are available for the encoder platform.

Specific implementation:

Ateme can customize its libraries to fit your application cost, performance and features constraints.

Configuration (platform)	Simple 32 bits	Standard 32 bits	Advanced 32 bits
Frame resolution (PAL & NTSC)	Up to 352x288 in 16x16 increment	Up to 720x576 in 16x16 increment	Up to 720x576 in 16x16 increment
Frame rate	Fixed and variable	Fixed and variable	Fixed and variable
VOP supported	I, P	I, P	I, P, B
Motion Window search	±16 pixels	Up to ± 128 pixels*	Up to ±1024 pixels*
AC/DC prediction	✓	✓	✓
Half pixel motion compensation	✓	✓	✓
Unrestricted motion vectors	✓	✓	✓
I frame insertion:			
- User specified	✓	✓	✓
- Automated			✓
Dynamic reconfiguration of the encoder	✓	✓	✓
Full set of quality/speed tuning flags	✓	✓	✓
3 Regulation modes:			
- CBR (Constant bitrate)	✓	✓	✓
- VBR (Variable bitrate)		✓	✓
- ABR (Average bitrate)			✓
Adjustable video buffer size and occupancy (VBV mode used)	✓	✓	✓
Bitrate	Unlimited	Unlimited	Unlimited
Quantization method 1 and 2	✓	✓	✓
Custom quantization matrices	✓	✓	✓
Short Header (H263 baseline compatibility)		✓	✓
Error resilience:			
- Slice resynchronization		✓	✓
- Data partitioning			✓
- Reversible VLC			✓
4 MV (4 Motion vectors)			✓
Automated scene change detection			✓
2-pass encoding			✓
Psycho-visual quality enhancements			✓
Interlaced support			✓
Quarter pixel motion compensation			✓*
Global Motion Estimation			✓*

Our encoder library generates **Video Elementary Streams** compatible with MPEG-4 standard.

Decoder features

Encoder version compatibility	Simple, Standard, Advanced
Base version	32 bits
Reference MPEG-4 profile	Advanced Simple
Frame resolution (PAL & NTSC)	Up to 2048x2048 in 4x4 increments*
Frame rate	Fixed and variable
VOP supported	I, P, B, S-GMC
Motion Window Search	Up to ±1024 pixels*
AC/DC prediction	✓
Half pixel motion compensation	✓
Unrestricted motion vectors	✓
Quantization method 1 and 2	✓
Custom quantization matrices	✓
4 MV (4 Motion Vectors)	✓
Short Header (H263 baseline compatibility)	✓
Error resilience:	
- Slice re-synchronization	✓
- Data partitioning	
- Reversible VLC	
Reversible VLC	✓
Quarter pixel motion compensation	✓*
Interlaced support	✓
Global Motion Estimation	✓*

Compatibility:

Our decoder version is fully compatible with MPEG-4 Simple Object as well as Advanced Simple Object, DivX3.11™, DivX 4™, DivX 5™, XviD™, 3ivx™ encoder versions.

Post-processing:

Post-processing improves the image quality after decompression.

Various filters may be applied:













- Deblocking (horizontal & vertical for luminance and chrominance),
- Deringing* (horizontal & vertical for luminance and chrominance).

Our decoder library takes **Video Elementary Streams** as input.

* platform dependant

Encoder & decoder performance

The following codec benchmarks have been measured using the standard configuration of the encoder on an IEKC64x@600MHz - 352x288@25fps. All references are PAL resolution, NTSC frame rate.

Platform		High Quality	Typical	Low Bit Rate
“Akiyo” Video conference Studio recording				
IEKC64x	Encoder CPU load/PSNR/Bit rate	7.9 % 43.9 dB 299 kb/s	6.6 % 37.5 dB 66 kb/s	6.3 % 34.6 dB 39 kb/s
	Decoder CPU Load	4.7 %	4.0 %	3.9 %
DM642	Encoder CPU load/PSNR/Bit rate	7.8 % 43.9 dB 299 kb/s	6.3 % 35.5 dB 66 kb/s	5.9 % 34.6 dB 37 kb/s
“Container” Video Surveillance Outdoor - fixed camera				
IEKC64x	Encoder CPU load/PSNR/Bit rate	12 % 41 dB 849 kb/s	7.7 % 34.1 dB 149 kb/s	6.9 % 31.4 dB 68 kb/s
	Decoder CPU Load	8.5 %	4.7 %	4.2 %
DM642	Encoder CPU load/PSNR/Bit rate	12 % 41 dB 849 kb/s	7.6 % 34.1 dB 149 kb/s	6.4 % 31.4 dB 68 kb/s
“Coastguard” Video Surveillance Outdoor - traveling camera				
IEKC64x	Encoder CPU load/PSNR/Bit rate	20 % 41.2 dB 2778 kb/s	15 % 33.6 dB 650 kb/s	14 % 30.8 dB 308 kb/s
	Decoder CPU Load	13 %	9.3 %	7.7 %
DM642	Encoder CPU load/PSNR/Bit rate	20 % 41.2 dB 2778 kb/s	15.6 % 33.6 dB 650 kb/s	14 % 32.2 dB 308 kb/s
“Foreman” Outdoor Hand-held camera				
IEKC64x	Encoder CPU load/PSNR/Bit rate	19 % 41.5 dB 2320 kb/s	14% 34.8 dB 391 kb/s	13 % 32.2 dB 195 kb/s
	Decoder CPU Load	12 %	7.9 %	6.6 %
DM642	Encoder CPU load/PSNR/Bit rate	19 % 41.5 dB 1914 kb/s	14% 34.8 dB 395 kb/s	13 % 32.2 dB 198 kb/s

Our encoder is fully optimized to manage MPEG-4 FULL D1 on DM642 platform.

These benchmarks are extracted from our MPEG-4 Guide.

For benchmarks in FULL format on DSP and all formats on PC as well as information on pre- & post-processing filters, footprint and MPEG-4 technology, please download this Guide at <http://extranet.ateme.com>

Applications

PLATFORM RELATED BOARDS APPLICATION	Examples	C64x	DM642	C62/C67x	DSC	OMAP	x86
		IEKC64x DMEK6414	DMEK642 DMDK642	IEKC6x11	DMDK 2400	Innovator	PC
Video security	IP Camera IP Node NVR Registration recognition	X	X	X	X		X
Telecoms	Videoconference	X	X				X
Multimedia Broadcast	Streaming Professional video	X					X
Aeronautics	Simulator (flight) Drone	X					
Automotive	Infotainment Camera...		X		X	X	
Consumer electronics	Camcorder PVP / PDA PVR / STB		X		X	X	

KEY FEATURES

- C6000 platforms
- Hardware support
- Performance
- Flexibility/Upgradability

APPLICATIONS

- Video-surveillance
- Video-conference
- In-flight entertainment
- Camcorder
- Streaming media

MPEG-4 Solutions

Pre-processing:

- Set of noise reduction filters

Post-processing:

- Deblocking, deringing

Audio codec:

- MP3, AAC, ADPCM

System layers:

- Audio/Video synchronization
- Streaming: UDP, TCP/IP, RTP/RTSP

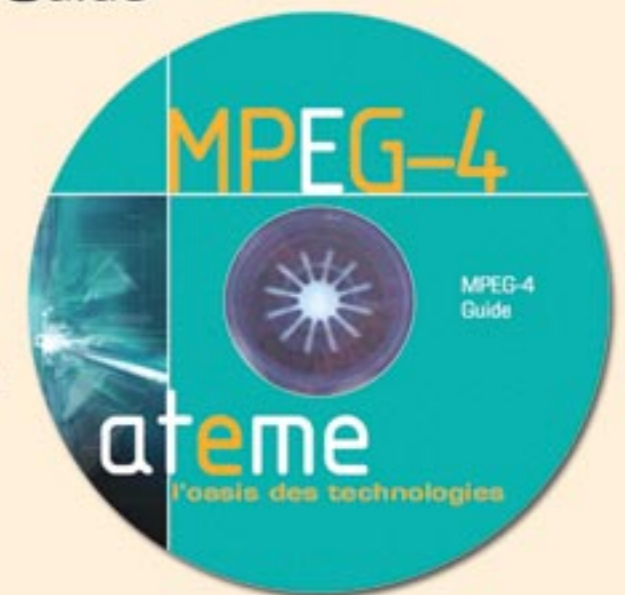
Hardware development platform:

- Imaging Evaluation Kits (IEKC64x)
- Digital Media Evaluation Kits (DMEK 6414, DMEK 642)
- Kompressor AMK4x0

The MPEG-4 Guide

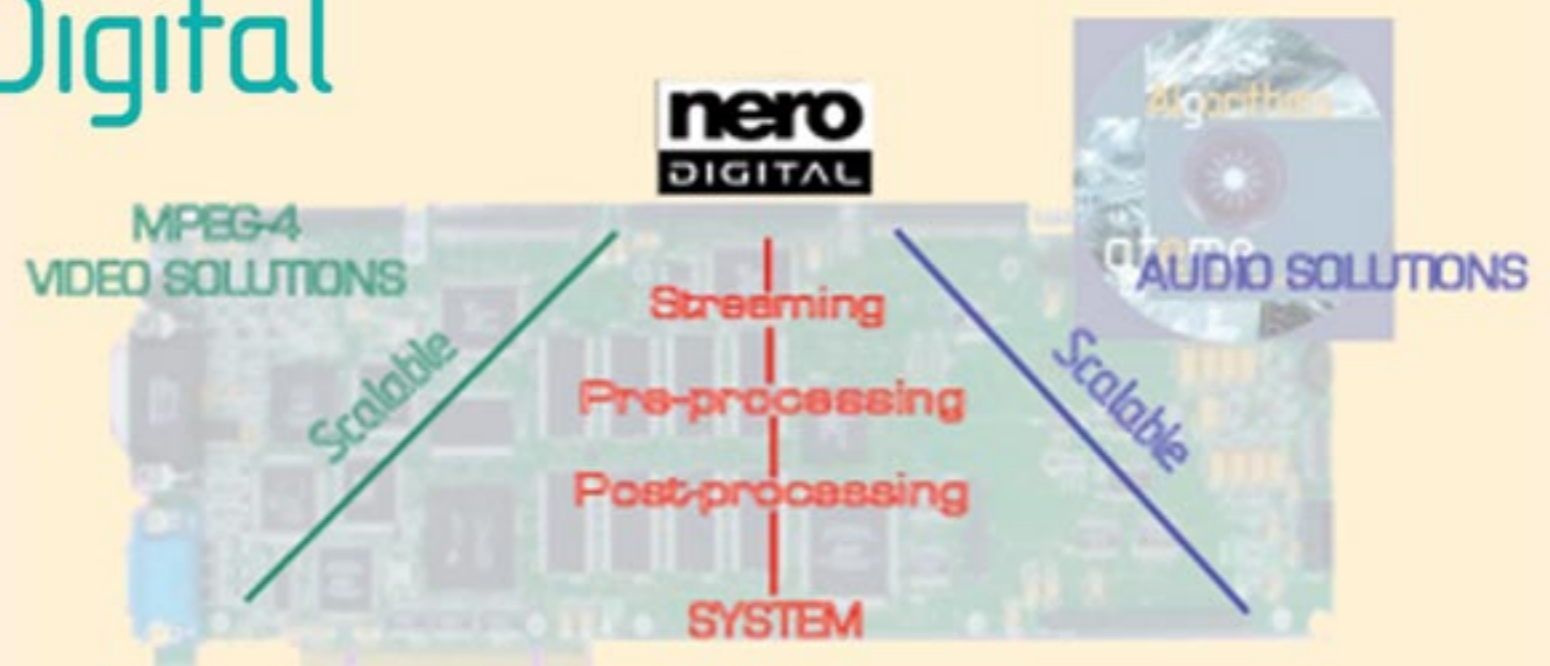
aims at providing to customers interested in MPEG-4 with all the preliminary information

needed to jumpstart a project.



To get information about all those products, download our MPEG-4 Guide at <http://extranet.ateme.com>

Nero Digital



Nero Digital is a co-development of Ate me and Ahead Software. It is the best combination of audio and video compression standards for PC and embedded: MPEG-4 ASP video and High Efficiency AAC audio. Many consumer electronics products will benefit from our high-efficiency, high-quality interoperable technology.

Learn more at www.nerodigital.com/embedded



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