MAX 10→

The Next Step In Low Cost FPGA Integration

FPGA World

September 2015

Innovation Leader Across the Board

ALTERA®

MAX® FPGAs and CPLDs

Cyclone® FPGAs and SoCs

Arria® FPGAs and SoCs

Stratix® FPGAs and SoCs

Enpirion® Power Solutions

FPGAs and CPLDs
Low Cost, Non-volatile

FPGAs
Cost/Power Balance SoC & Transceivers

FPGAs
Mid-range FPGAs SoC & Transceivers

FPGAs
Optimized for High Bandwidth

PowerSoCs
High-efficiency Power Management

RESOURCES

Embedded Soft and Hard Processors

Nios® II

ARM

Design Software

QUARTUS® II

DSP Builder

Development Kits

Intellectual Property (IP)

- Industrial
- Computing
- Enterprise

GENERATION 10

Portfolio of FPGAs and SoCs

TSMC 55 nm Embedded Flash

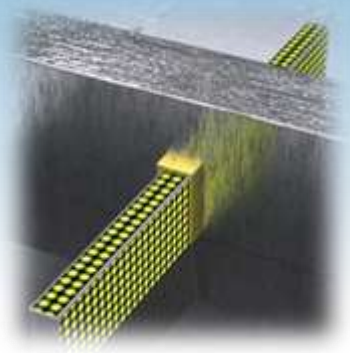
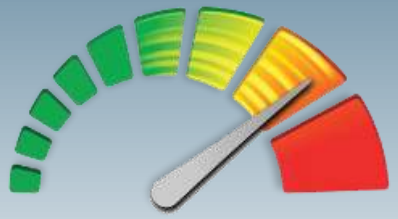
Instant-on, low-cost, non-volatile FPGAs

TSMC 20 nm

Highest Performance 20 nm FPGA and SoCs

Intel 14 nm Tri-gate

2x Higher Core Performance vs. 28 nm

Best in class Semiconductor Innovation & Technology	Compelling New Device Architectures	Strategic Investments That Open Up New Markets
intel 	 HyperFlex™ ARCHITECTURE	 OpenCL

Expanding Opportunities for FPGAs

ALTERA

2X
Core Performance

5.5M
Logic Elements

Up to 70%
Lower Power

Heterogeneous
3D SiP
Integration

Up to 10
TFLOPS

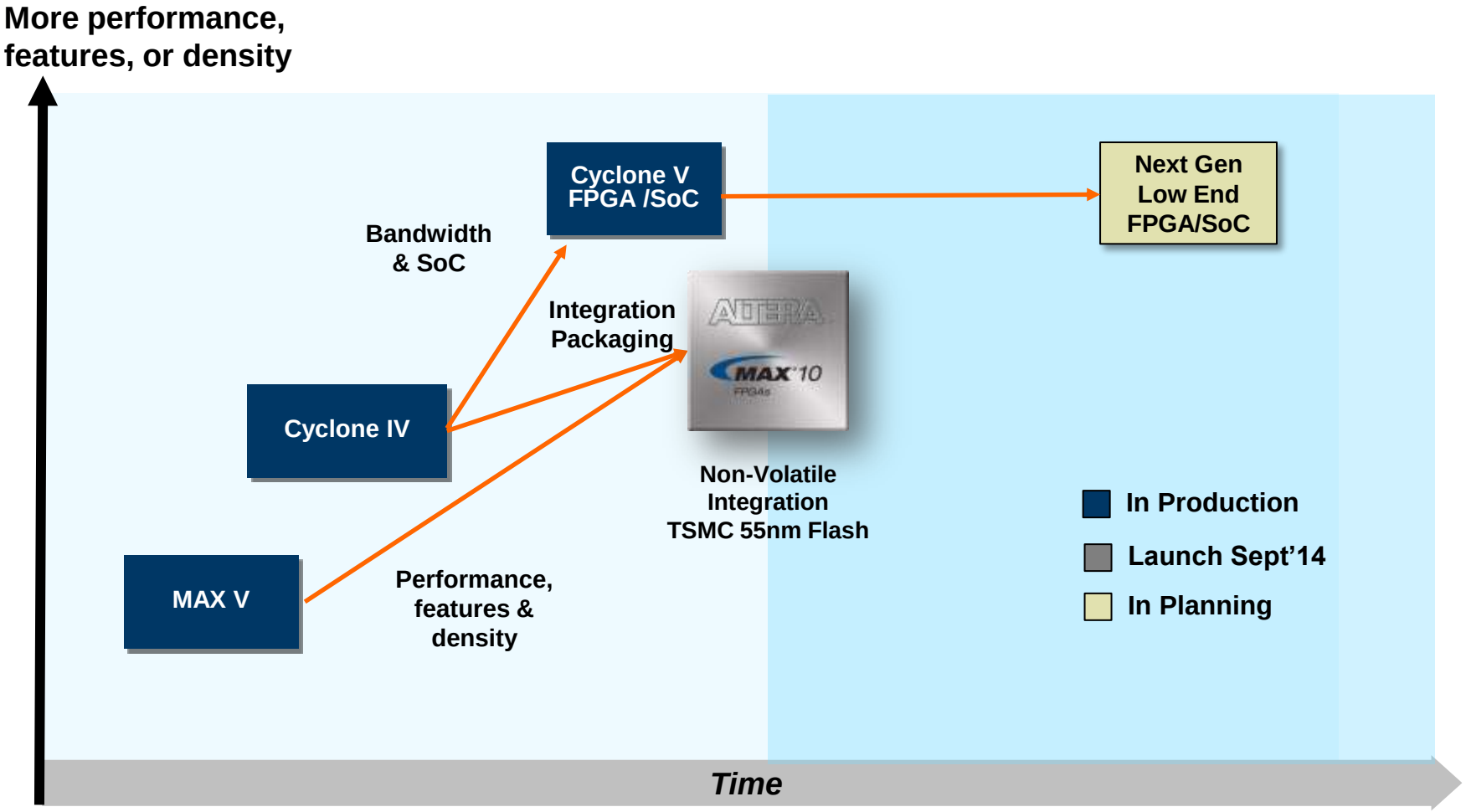
Intel 14 nm
Tri-Gate

Most
Comprehensive
Security

Quad-Core
Cortex®-A53
ARM Processor

ALTERA®

Altera Continues Focus & Investment in Low End Families



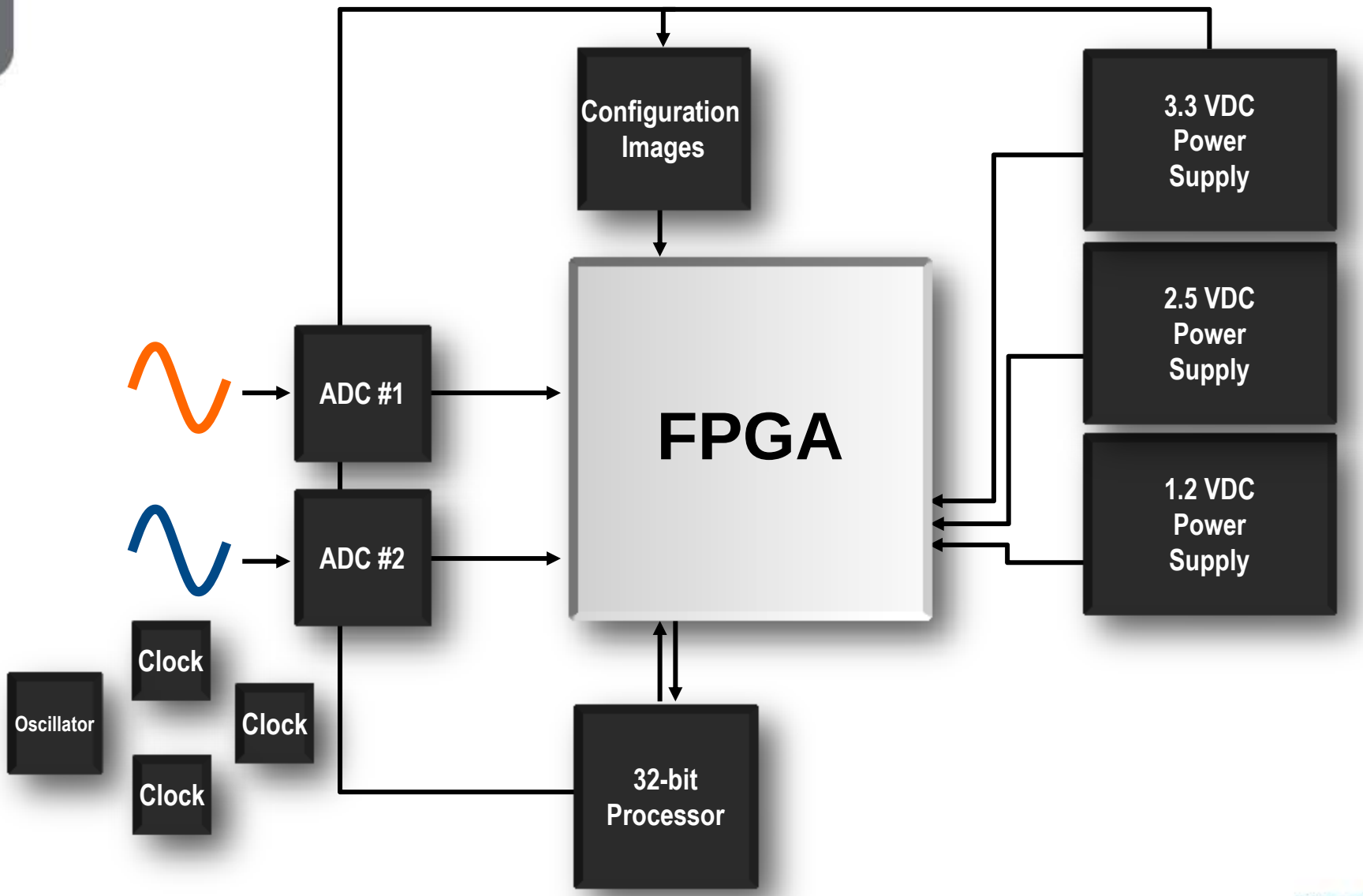
What makes it different ?

It s time to rethink what an FPGA is.

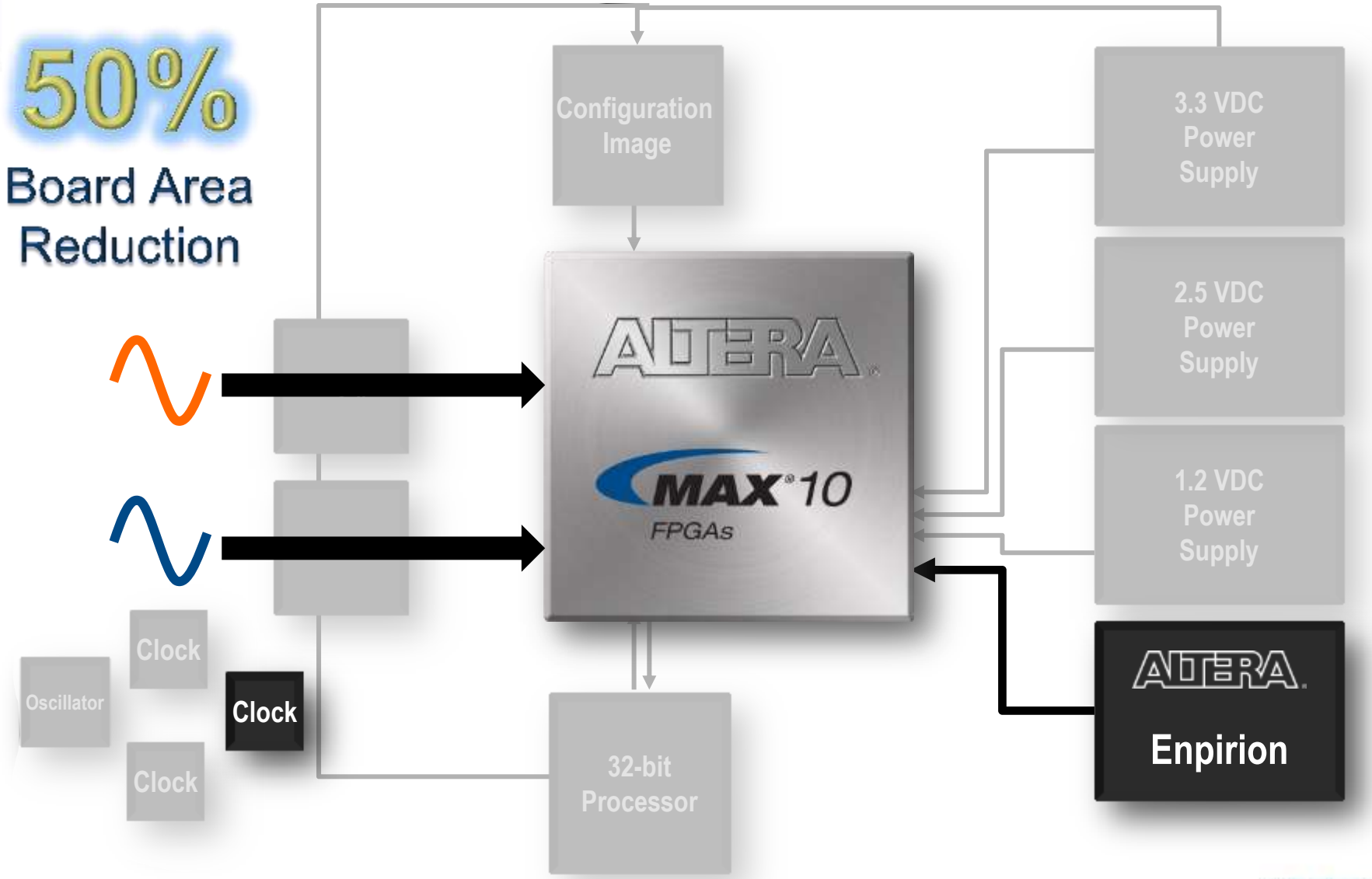
altera.com/max10

- Dual Non Volatile Images
  - Internal Flash to hold two images
  - Faster time to operation
- Secure Configuration
  - Two stage boot feature, AES
- Integrated ADC
  - Flexible sampling
- Soft Processor Support
  - Secure Internal Boot
- Single Supply

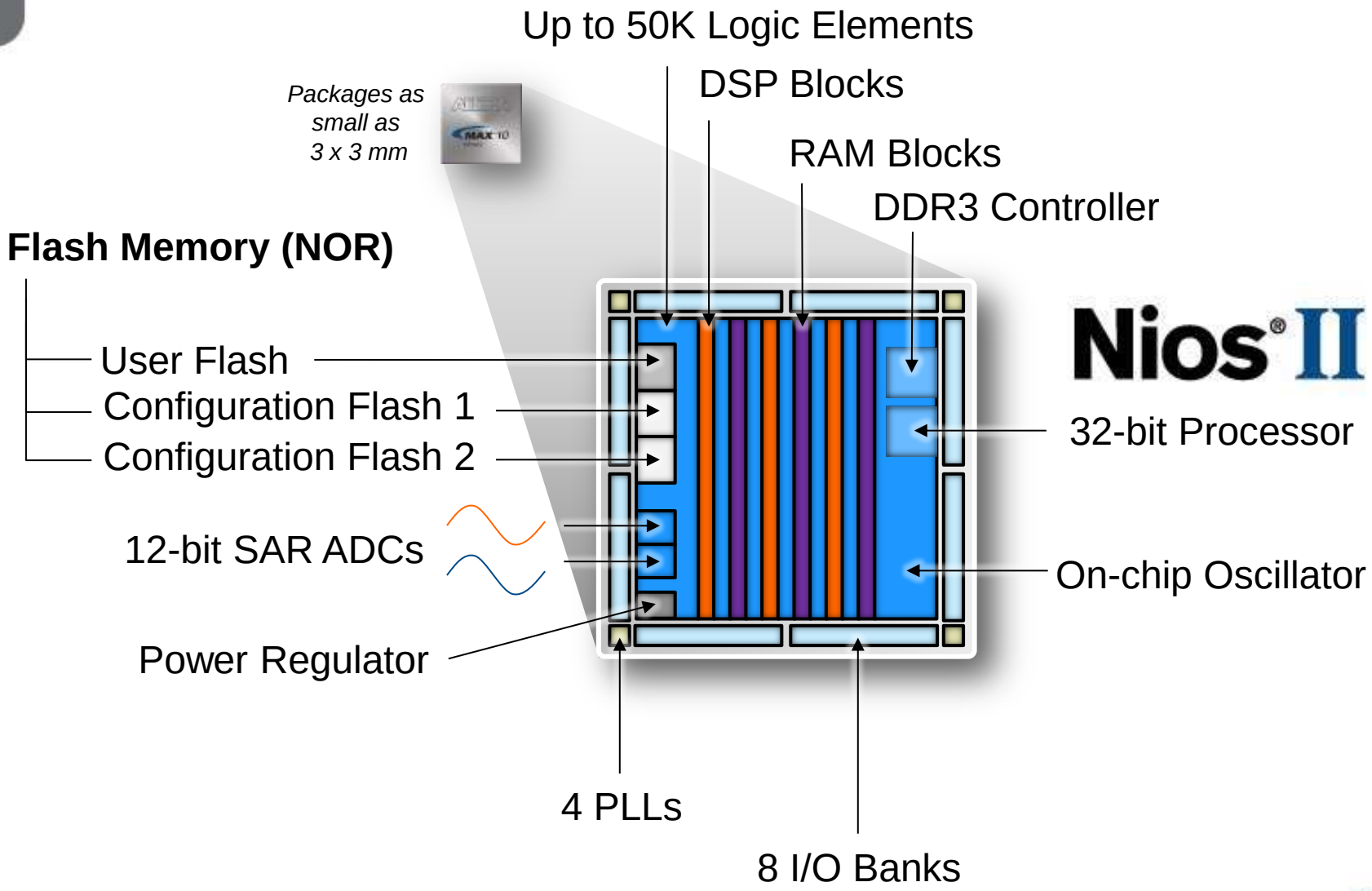
Traditional FPGA System Components



MAX 10 Simplifies Traditional FPGA Systems



Lower BOM, Smaller PCB Area, Instant-on Configuration



Integrated Embedded Flash Increases System Value

- Lower total cost of ownership
  - Reduced BOM
  - Smaller board area
- Reduced system risk
  - Fewer vendors to manage
  - Simpler PCB design
  - Supports long life cycles
- Fail-safe remote updates
  - Store two configuration images
- Improved system management
  - Instant-on configuration
  - Power-up sequencing

Flash Memory (NOR):

User Flash

Configuration Flash 1

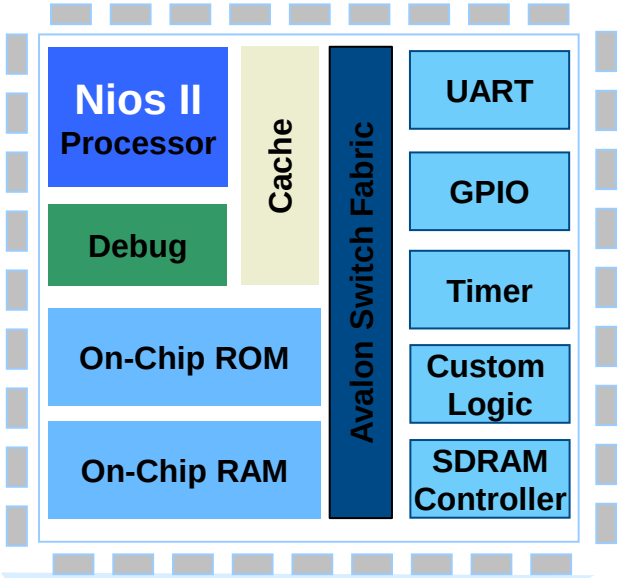
Configuration Flash 2

SPI and I2C soft interfaces supported in Quartus® II

QUARTUS® II

Embedded Processing Capabilities Increase System Value

- Single-chip embedded processor system
  - Soft core Nios II processor support
  - Very small footprint
  - No external RAM or storage needed
- User-customizable processor
  - Flexibility MCUs don't offer
- Supports real-time applications
  - Configuration in under 10 ms
  - Meets automotive and industrial regulatory requirements
- Supports longer life cycles

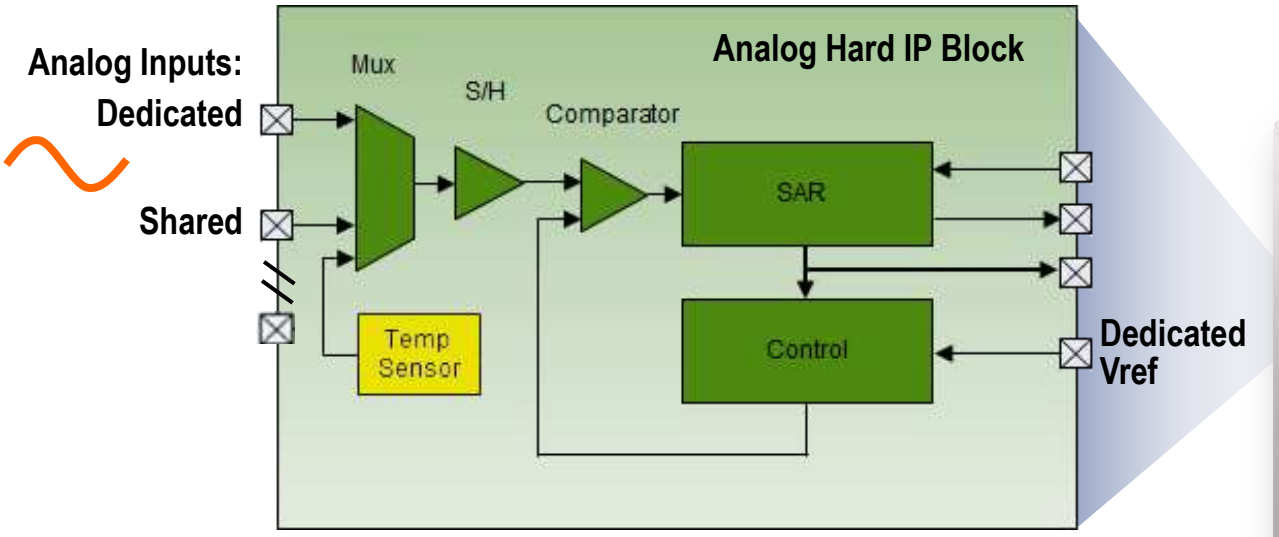


Customizable logic

Nios II

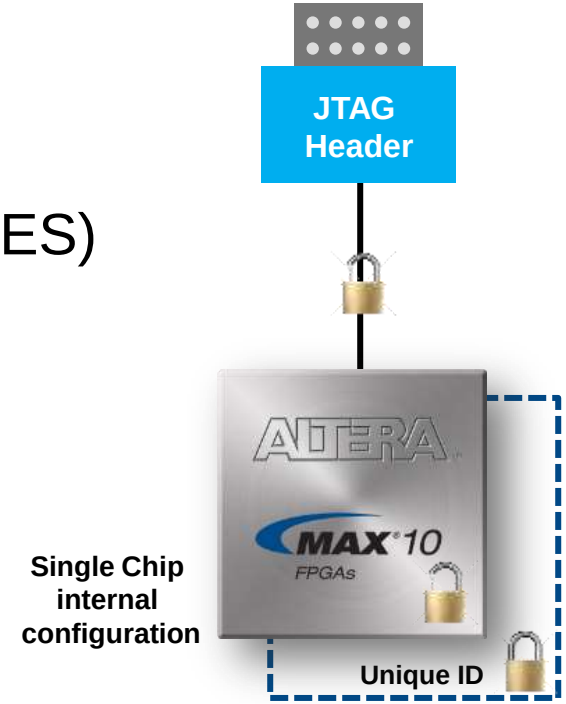
Increase System Value with Integrated Analog Blocks

- In-chip system monitoring
  - Integrated ADCs
  - Reduce board space
  - Flexible sample sequencing
  - Lower latency
- Measure environmental conditions
  - Integrated temperature sensor



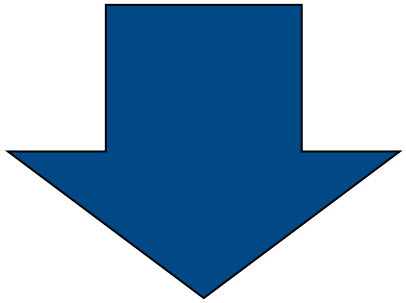
Increase Security by adding Anti Tamper Features

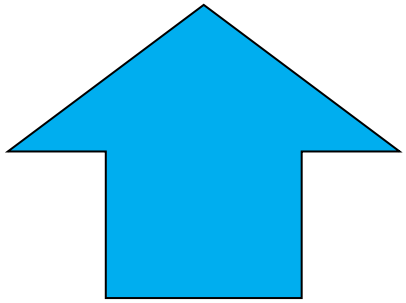
- Single chip solution with up to 2 secure images
- Advanced Encryption Standard (128-bit AES) protection
  - Non-volatile key for external & internal configuration
- JTAG port security protection
  - Read disable or Read/Write disable (OTP)
  - Prevents reverse engineering
- Chip ID
  - Non volatile 64 bit unique ID for asset traceability
- Verify Protect
  - Allows disabling of CFM read back



MAX 10 FPGA Customer Benefits

Lowers System Cost



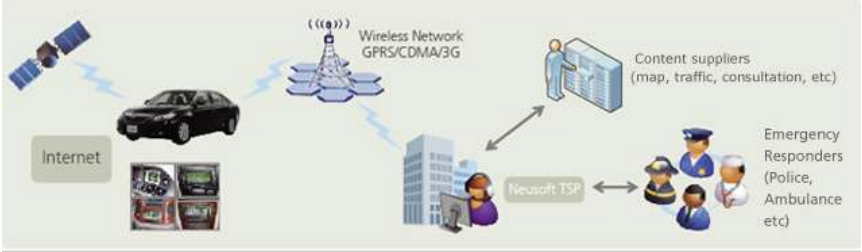


Increase Board Reliability

Single-chip integration item	Customer Benefits
N-components → 1 component	Higher system reliability (less failure points)
	Reduced BOM/System Cost
Reduced PCB Footprint	Simpler PCB Design
	Fewer PCB layers → Lower PCB cost
Fewer Suppliers	Less vendors to manage
PLD have Longer Life-cycles	Avoids EOL vs. other technologies

So where does it fit ?

- No right or wrong answer



Consumer

Motor Driving

Automotive - Infotainment

Commercial

Secure Applications

Industrial – Factory Automation

Machine Vision

MAX 10 FPGA – Family Plan

Device	LEs	Block Memory (Kbits)	18x18 Mults	PLLs	Internal Config.	User Flash [1] (KBytes)	ADC, TSD	External RAM I/F
10M02	2,000	108	16	1, 2	Single	12	-	Yes [2]
10M04	4,000	189	20	1, 2	Dual	16 – 156	1, 1	Yes [2]
10M08	8,000	378	24	1, 2	Dual	32 – 172	1, 1	Yes [2]
10M16	16,000	549	45	1, 4	Dual	32 – 296	1, 1	Yes [3]
10M25	25,000	675	55	1, 4	Dual	32 – 400	2, 1	Yes [3]
10M40	40,000	1,260	125	1, 4	Dual	64 – 736	2, 1	Yes [3]
10M50	50,000	1,638	144	1, 4	Dual	64 – 736	2, 1	Yes [3]

Notes:

1. ***User Flash depends upon configuration option.***
2. ***SRAM only.***
3. ***SDR SDRAM, SRAM, DDR3, DDR2, or LPDDR2.***
4. ***ADC blocks available on die but may not be available in low pin count packages.***

Preliminary and subject to change without notice.

Development Tools and Solutions

Quartus II Software and IP Support

- Quartus® II software
  - Number one design software in performance and productivity
  - MAX 10 FPGA compilation & EPE support
    - Flash and ADC Megawizards (New!)
    - Analog Tool Kits for ADC evaluation and debug (New!)
- Includes Qsys system integration and DSP Builder for increased productivity
  - Nios II support and DSP Builder + Advanced Block-set
- Abundant IP & reference designs
  - Altera Design Store (New!)

Quartus II Web Edition Software
Complete MAX 10 support at no Cost!

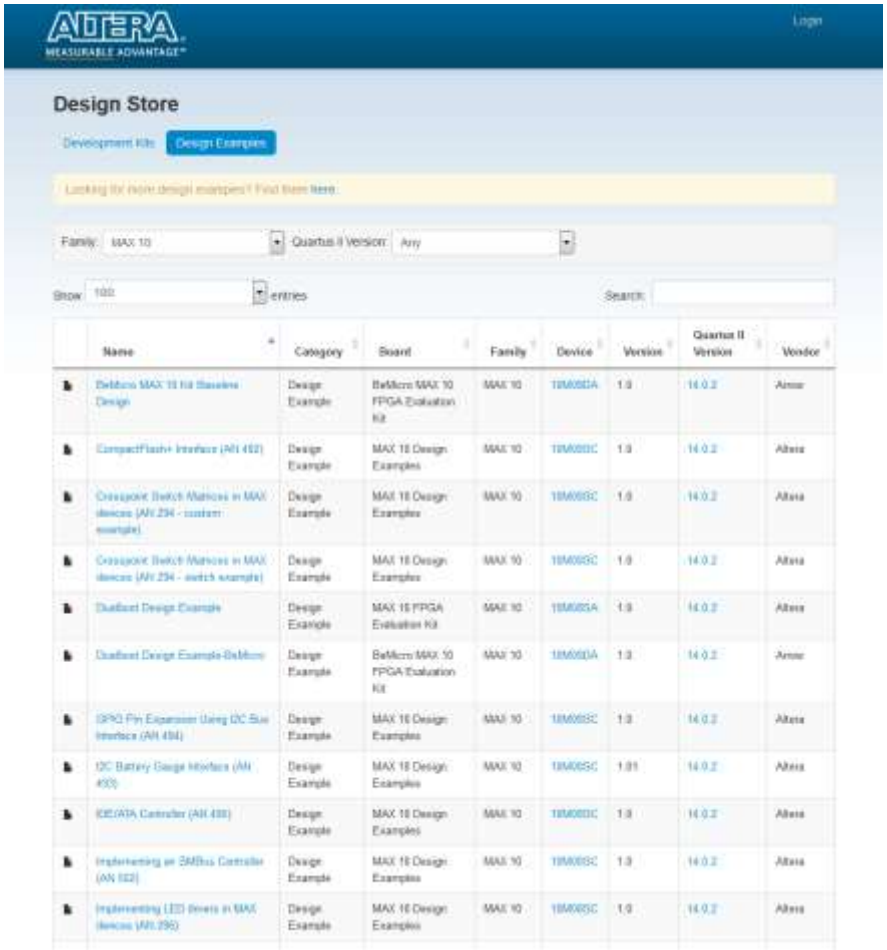
MAX10 FPGAs App Notes & Design Examples

Available on Design Store

AN 496 - Using the Internal Oscillator in Altera MAX Series
AN 547: Putting Altera MAX Series in Hibernation Mode Using User Flash Memory
AN 425: Using the Command-Line Jam STAPL Solution for Device Programming
AN 502: Implementing an SMBus Controller in Altera MAX Series
AN 630: Real-time ISP and ISP Clamp for Altera MAX Series
AN 494: GPIO Pin Expansion using I2C Bus Interface in Altera MAX Series
AN 485: Serial Peripheral Interface Master in Altera MAX Series
AN 486: SPI to I2C Using Altera MAX Series
AN 488 - Stepper Motor Controller using Altera MAX Series
AN 294: Crosspoint Switch Matrices in Altera MAX Series
AN 501: Pulse Width Modulations Using Altera MAX Series
AN 500: NAND Flash Memory Interface with Altera MAX Series
AN 509: Multiplexing SDIO Devices Using Altera MAX Series
AN 490: Altera MAX Series as Voltage Level Shifters
AN 265: Using Altera MAX Series as a Microcontroller I/O Expander
AN 286: Implementing LED Drivers in Altera MAX Series
AN 498: LED Blink Using Power Sequencing in Altera MAX Series
AN 495: IDE/ATA Controller Using Altera MAX Series
AN 492: CF+ Interface using Altera MAX Series
AN 493: I2C Battery Gauge Interface using Altera MAX Series
AN 491: Power Sequence Auto-start Using Altera MAX Series

MAX 10 Designs in the Design Store

- Long list of MAX 10 designs - tested, packaged, and ready to use with Quartus



https://cloud.altera.com/devstore/platform

Altera MAX 10 Kit Demos / Design Examples

Kit Demos and Design Examples	Available	Target	Location
Sleep Mode Demo Design Dev Kit	Now	10M50 Dev Kit	Kit installed
Dual Configuration Dev Kit	Now	10M50 Dev Kit	Kit installed
Remote System Update Dev Kit	Now	10M50 Dev Kit	Design Store
Board Management Controller Reference Design	Q3'15	10M50 Dev Kit	Design Store
Nios II Golden HW Reference Design	Now	10M50 Dev Kit	Design Store
Nios II NEEK Full Featured Design	Q3'15	MAX 10 NEEK	Design Store
Nios II Ethernet Design	Now	10M50 Dev Kit	Design Store
Nios II MCU Replacement Designs	Now	--	Design Store
MAX 10 Kit Base Designs (pin assignments)	Now	All Kits	Design Store
Nios II Arduino LCD Design (Eval Kit)	Now	10M08 Eval Kit	Design Store

Base designs great, fast way to start a kit design

End Market BU Reference Designs

Demos and Design Examples	BU Segment	Location	Target Date*
Industrial Ethernet Multi-protocol	Industrial-Ethernet	By request	Q3
Drive-on-Chip FOC	Industrial – Motor Control	By request	Q3
DC-DC Conversion	Industrial -Motor Control	Design Store	Available Now
I/O Module Controller	Industrial – I/O	By request	Late Q2
Info: MIPI Demo	Automotive	By request	Q3
Advanced Driver Assist	Automotive	By request	Q3

MAX® 10 FPGA Kit Portfolio

~$29 - $69

MAX 10 FPGA Evaluation Kits

- Ultra Low Cost Eval
- Logic, I/O, power Eval
- Arduino
- 4 package/density options to choose
- Enpirion PowerSoCs

~$199

MAX 10 FPGA Development Kit

- High Density Development
- Ref Design Platform
- 300 MHz DDR3
- ADC Evaluation (SMAs)
- HDMI TX, HSMC
- Enpirion PowerSoCs

~$359

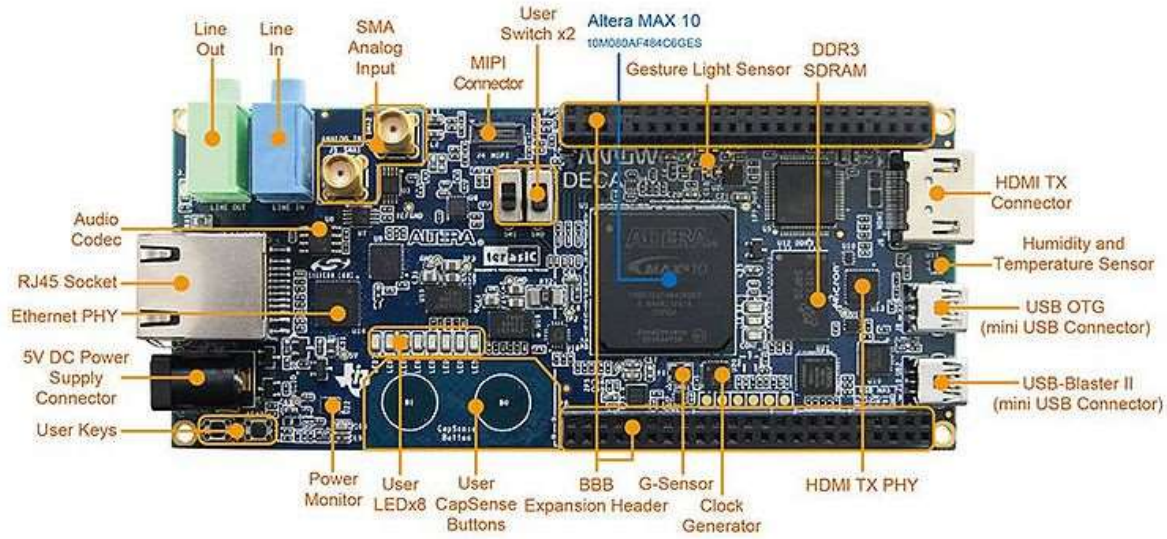
Altera NEEK 10 Kit

- CIII NEEK Evolution with applications ported
- Large multi-touch screen
- Sensors, accelerometers, wireless
- Available end of July 2015

More Kits and Solutions in Back-Up

Arrow DECA 10 Workshops

- Build Hands-On Experience
  - Silkeborg, Arrow office, October 6th
  - Herlev, Arrow office, October 7th



http://www.arroweurope.com/news-events/events-webinars/detail/article/arrow-altera-deca-workshops.html

Thank You

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