PARTII

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Metering Competence Center EMEA
Feb 2010

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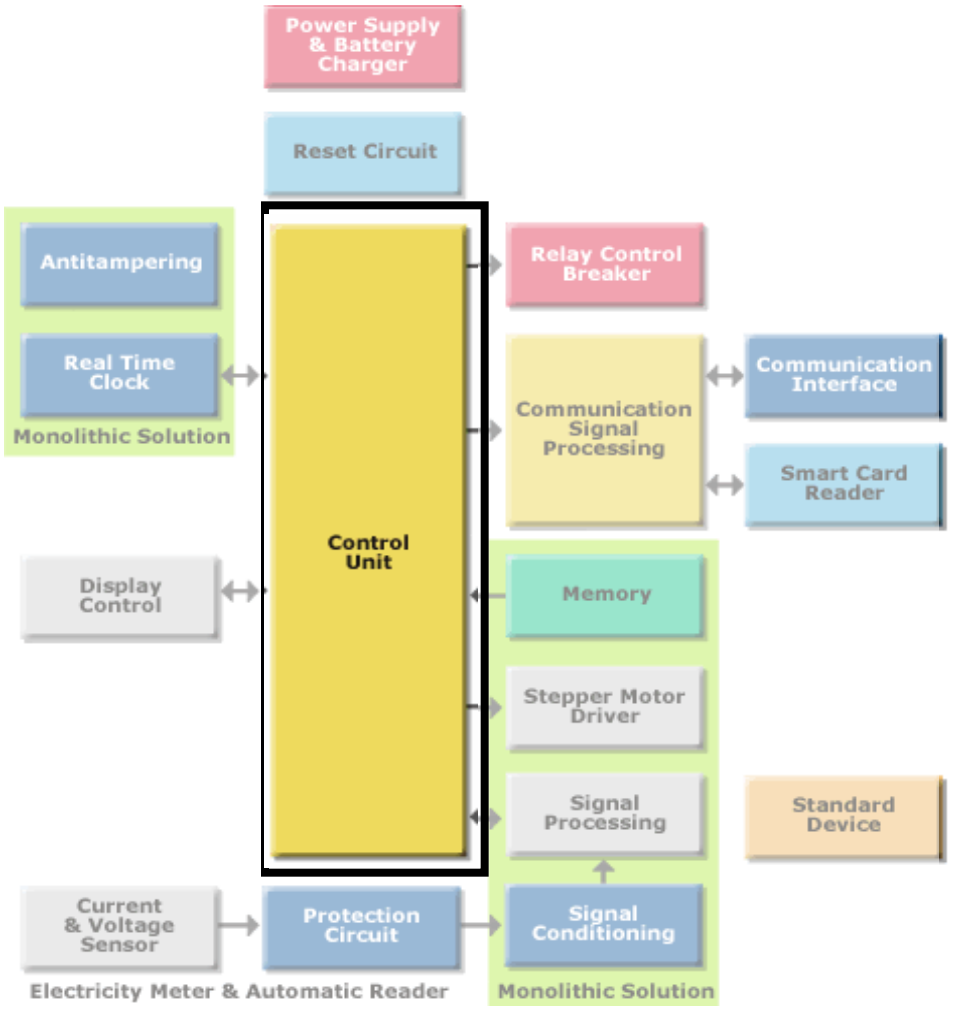
Agenda

- 1) Metering market overview and application technical requirements.
- **2) The Meter architecture : one or 2 microcontroller. Why?**
  - **The advantage of STM32 family.**
- 3) The concentrator, MUC core : SPEAR310
- 4) Power and network quality measurement
  - (STPM01, 10 and C1 + S1)
- 5) Power Line Communication : the main communication medium for Smart Gird in EU.
- 6) ZigBee for HAN
- 6) Specific technical requirement for the SMPS in metering & the ST solutions

MCU / MPU


Power Supply & Battery Charger
Reset Circuit
Antitampering
Real Time Clock
Monolithic Solution
Control Unit
Relay Control Breaker
Communication Signal Processing
Communication Interface
Smart Card Reader
Display Control
Memory
Stepper Motor Driver
Signal Processing
Standard Device
Current & Voltage Sensor
Protection Circuit
Signal Conditioning
Electricity Meter & Automatic Reader
Monolithic Solution

STM32 product series

4 product series

Common core peripherals and architecture:

- Communication peripherals: USART, SPI, I²C
- Multiple general-purpose timers
- Integrated reset and brown-out warning
- Multiple DMA
- 2x watchdogs Real-time clock
- Integrated regulator PLL and clock circuit
- External memory interface (FSMC)
- Dual 12-bit DAC
- Up to 3x 12-bit ADC (up to 0.41 µs)
- Main oscillator and 32 kHz oscillator
- Low-speed and high-speed internal RC oscillators
- -40 to +85 °C and up to 105 °C operating temperature range
- Low voltage 2.0 to 3.6 V or 1.65/1.7 to 3.6 V (depending on series) 5.0 V tolerant I/Os
- Temperature sensor

Gateway and mid –end MUC

STM32 F4 series - High performance with DSP (STM32F405/415/407/417)

168 MHz Cortex-M4 with DSP and FPU	Up to 192-Kbyte SRAM	Up to 1-Mbyte Flash	2x USB 2.0 OTG FS/HS	3-phase MC timer	2x CAN 2.0B	SDIO 2x I²S audio Camera IF	Ethernet IEEE 1588	Crypto/hash processor and RNG

STM32 F2 series - High performance (STM32F205/215/207/217)

120 MHz Cortex-M3 CPU	Up to 128-Kbyte SRAM	Up to 1-Mbyte Flash	2x USB 2.0 OTG FS/HS	3-phase MC timer	2x CAN 2.0B	2x Ca…	…dio …IF	Ethernet IEEE 1588	Crypto/hash processor and RNG

STM32 F1 series - Connectivity line (STM32F105/107)

72 MHz Cortex-M3 CPU	Up to 64-Kbyte SRAM	Up to 256-Kbyte Flash	USB 2.0 OTG FS	3-phase MC timer	2x CAN 2.0B	2x	…dio	Ethernet IEEE 1588

To high com meters

STM32 F1 series - Performance line (STM32F103)

72 MHz Cortex-M3 CPU	Up to 96-Kbyte SRAM	Up to 1-Mbyte Flash	USB FS device	3-phase MC timer	CAN 2.0B	SDIO 2x I²S

Start of the metering platform

STM32 F1 series - USB Access line (STM32F102)

+

48 MHz Cortex-M3 CPU	Up to 16-Kbyte SRAM	Up to 128-Kbyte Flash	USB FS device

To low end market

STM32 F1 series - Access line (STM32F101)

36 MHz Cortex-M3 CPU	Up to 80-Kbyte SRAM	Up to 1-Mbyte Flash

STM32 F1 series - Value line (STM32F100)

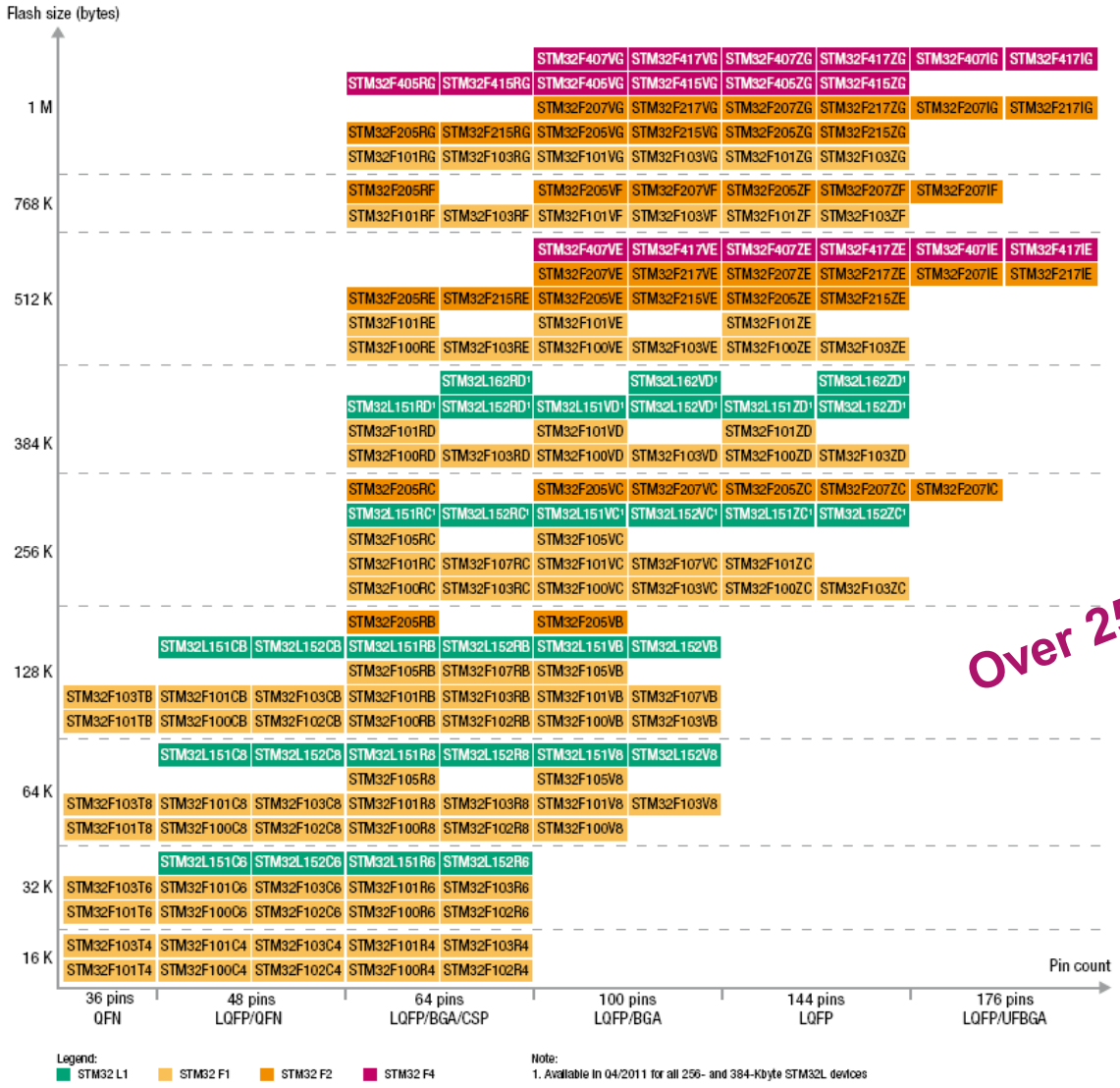
24 MHz Cortex-M3 CPU	Up to 32-Kbyte SRAM	Up to 512-Kbyte Flash	3-phase MC timer	CEC

STM32 L1 series - Ultra-low-power (STM32L151/152)

32 MHz Cortex-M3 CPU	Up to 48-Kbyte SRAM	Up to 384-Kbyte Flash	USB FS device	Data EEPROM up to 12 Kbytes	LCD 8x40 4x44	Comparator	BOR MSI VScal	AES 128-bit

High low power meters

STM32 – leading Cortex-M portfolio

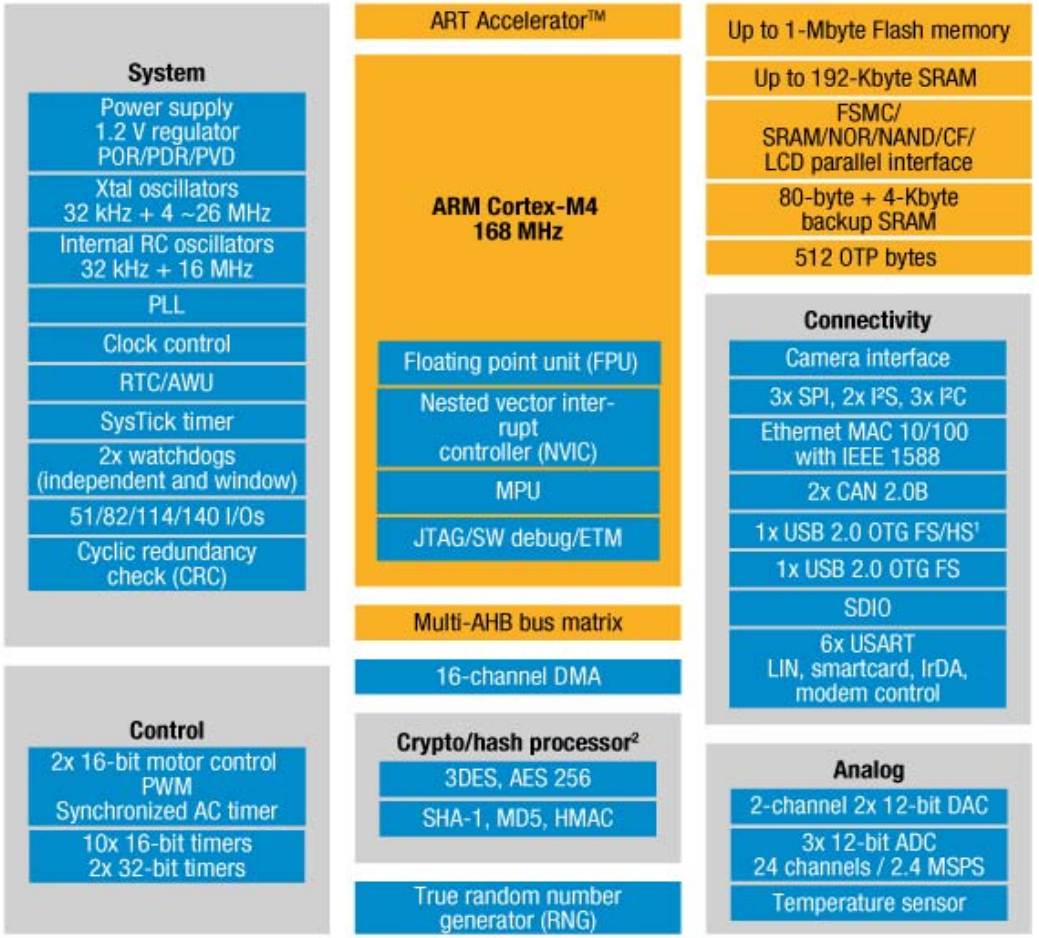


Over 250 pin-to-pin compatible part numbers

STM32 F4 block diagram

Feature highlight

- 168 MHz Cortex-M4 CPU
  - Floating point unit (FPU)
  - ART Accelerator ™
  - Multi-level AHB bus matrix
- 1-Mbyte Flash,
  192-Kbyte SRAM
- 1.7 to 3.6 V supply
- RTC: <1 µA typ, sub second accuracy
- 2x full duplex I²S
- 3x 12-bit ADC
  0.41 µs/2.4 MSPS
- 168 MHz timers



Notes:
1. HS requires an external PHY connected to the ULPI interface
2. Crypto/hash processor on STM32F417 and STM32F415

Key messages to remember

- STM32 F4 series
  - **World's highest performance**
  - **Extends the STM32 portfolio to over 250+ compatible devices**
  - **One-in-two Cortex-M MCUs shipped worldwide is an STM32**

Discovery kits available now

STM32F4DISCOVERY

STM32 encryption Firmware library

- **Optimized crypto library for the STM32 32-bit microcontroller**

STM32 CRYPTO ALGORITHM:

AES 128, **192** and **256** bit :

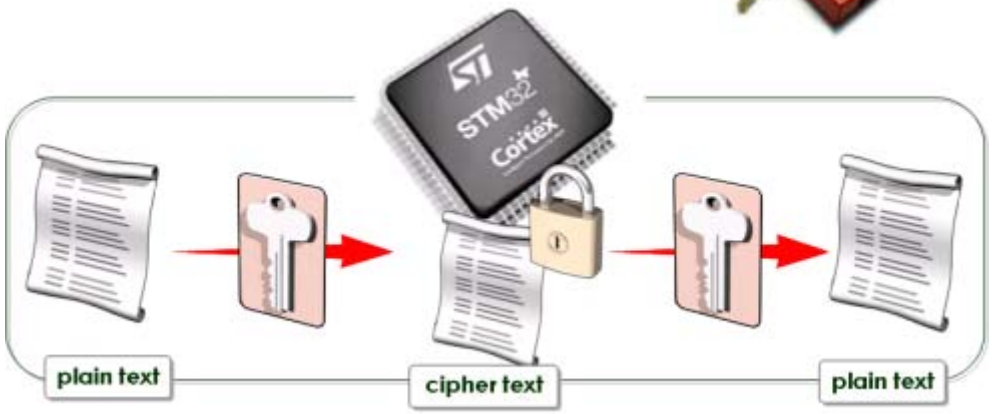
- **ECB** (Electronic Code Block) mode
- **CBC** (Chiper Block Chain) mode
- **CTR** (Counter) mode
- **GCM** (Galois Counter mode)

TDES

HASH

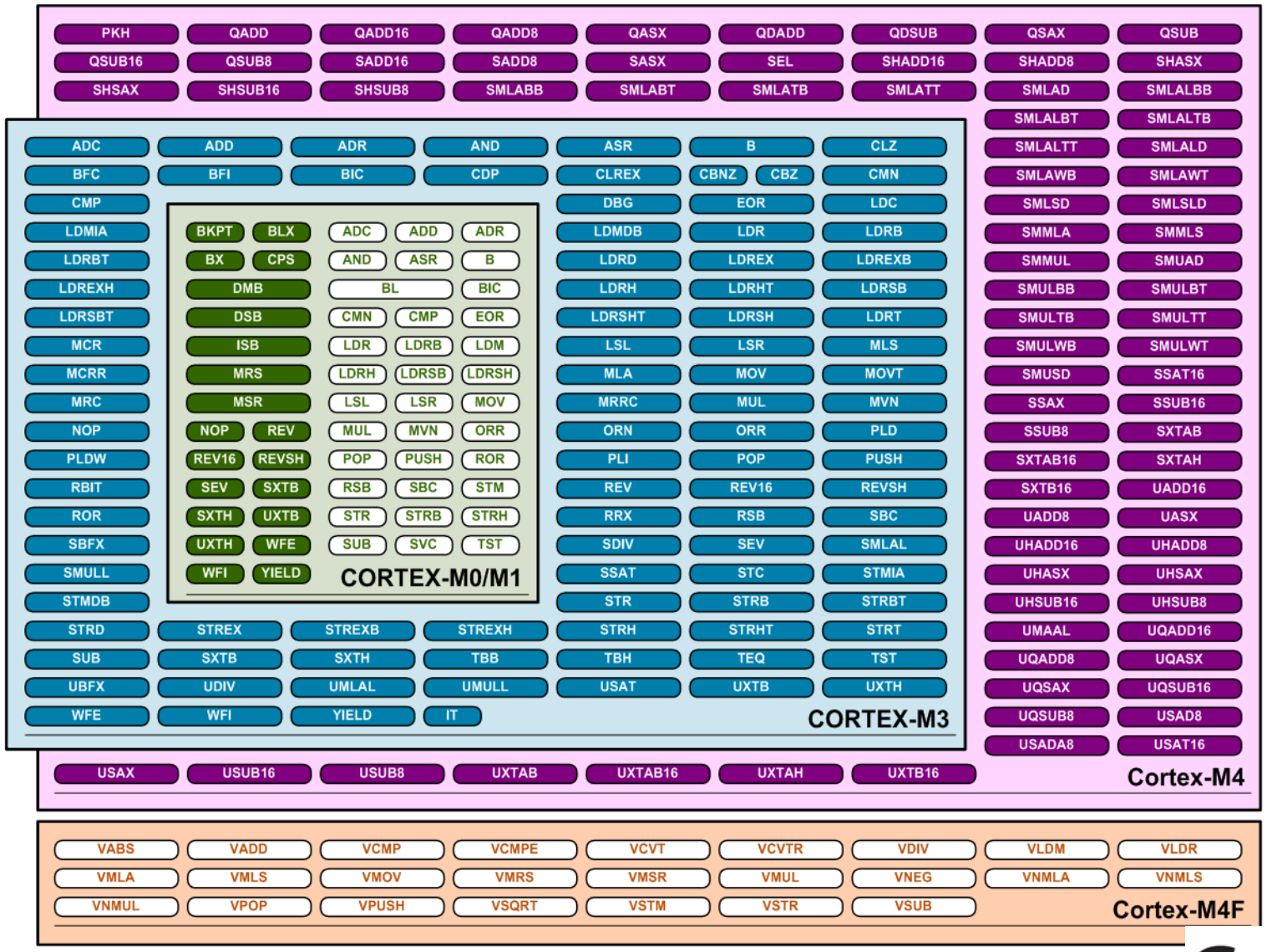
RSA

SHA1



AES 128 ECB (512look-up table):
Footprint 1.4Kb code, 0.5Kb Constant
Encryption 16byte: 11us+32us
Encryption 128byte:11us + 262us
AES 128 ECB (2048 look-up table)
Footprint 1.8Kb code, 2.5Kb Constant
Encryption 16byte: 11us+27us
Encryption 128byte: 11us+220us

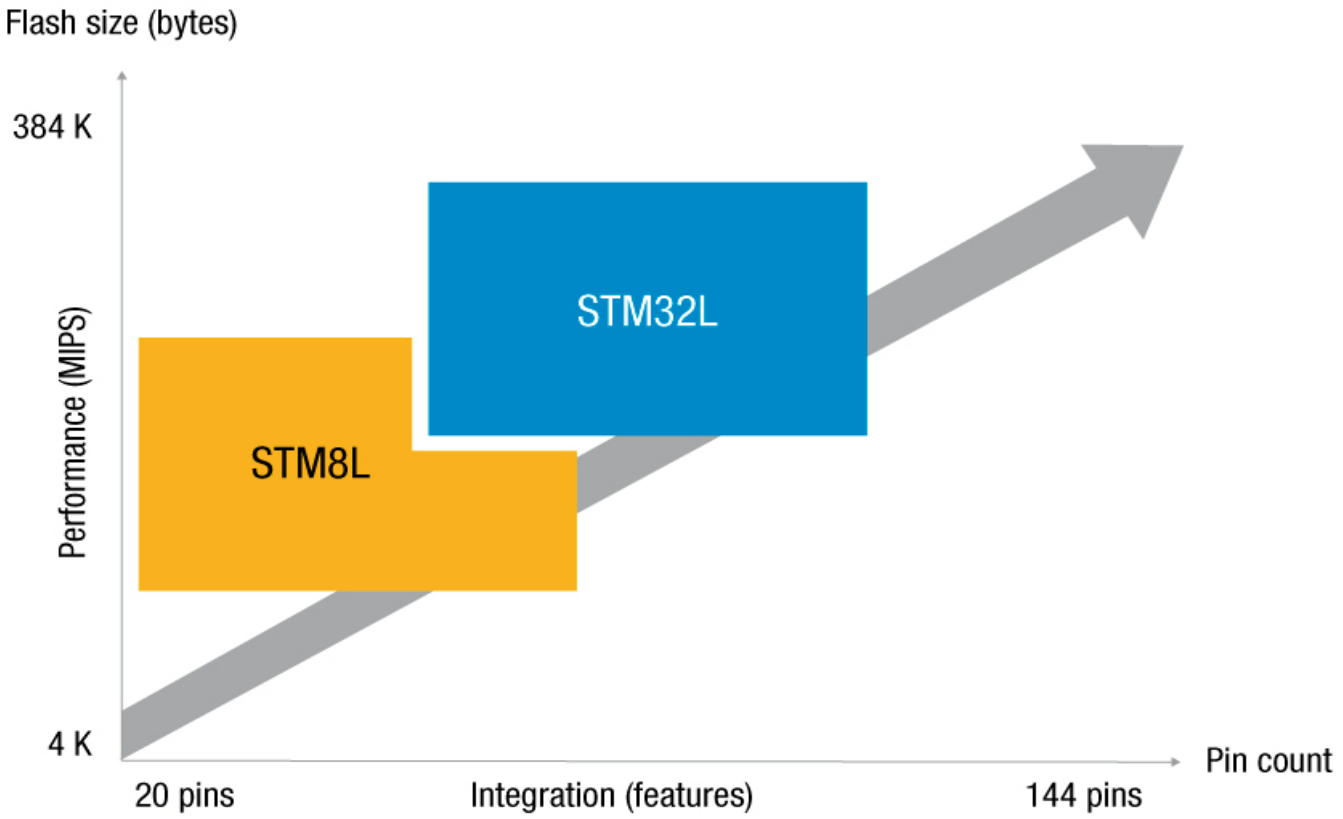
Cortex-M processors binary compatible



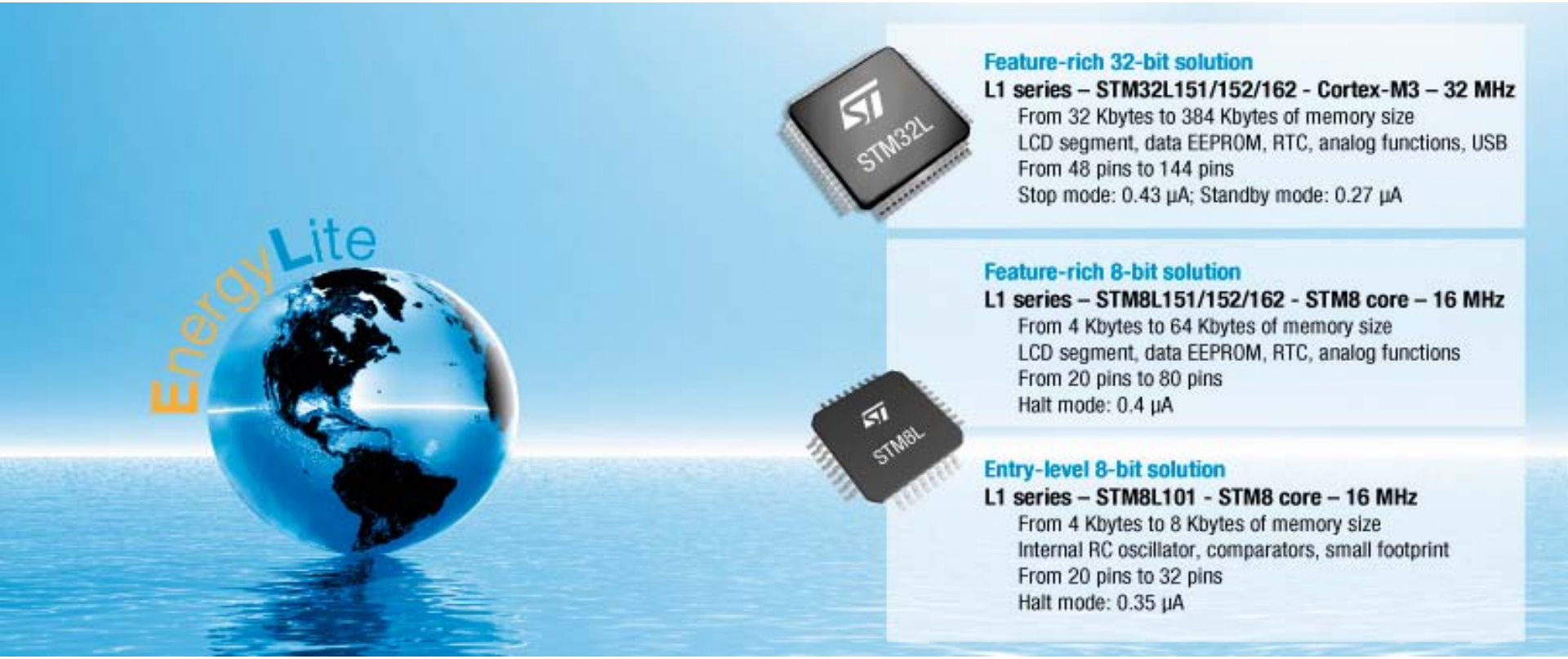
Cortex
Low-Power Leadership from ARM

Ultra-low-power EnergyLite™ platform range

- ST's **ultra-low-leakage** process technology
- Shared technology, architecture and peripherals

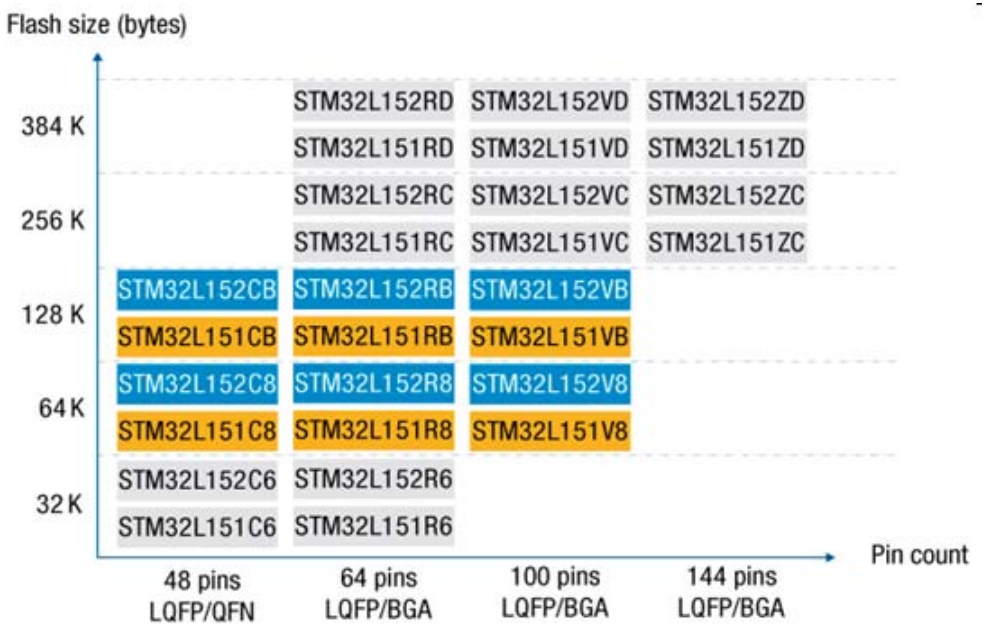


Ultra low power solution for Meters



STM32L - Ultra-low power STM32

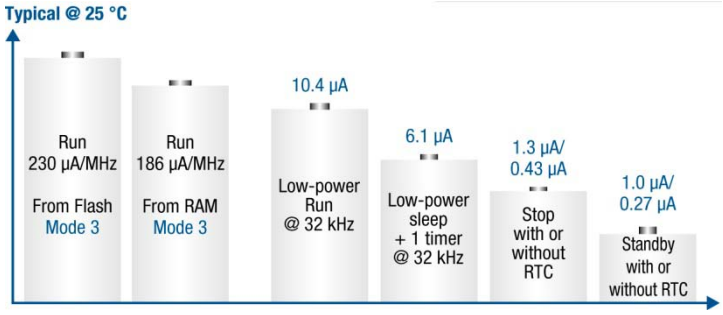
- Energy saving
  - 32-bit ARM Cortex-M3 performance
  - Ultra-low power in dynamic and static modes
- Power supply:
  - 1.65 to 3.6V without BOR
  - 1.8 to 3.6V with BOR
- Special features
  - Segment LCD 8x40
  - 4KBytes EEPROM
  - Comparator
- Pin-to-pin compatible with STM32 family



Legend:

STM32L151 without LCD

STM32L152 with LCD



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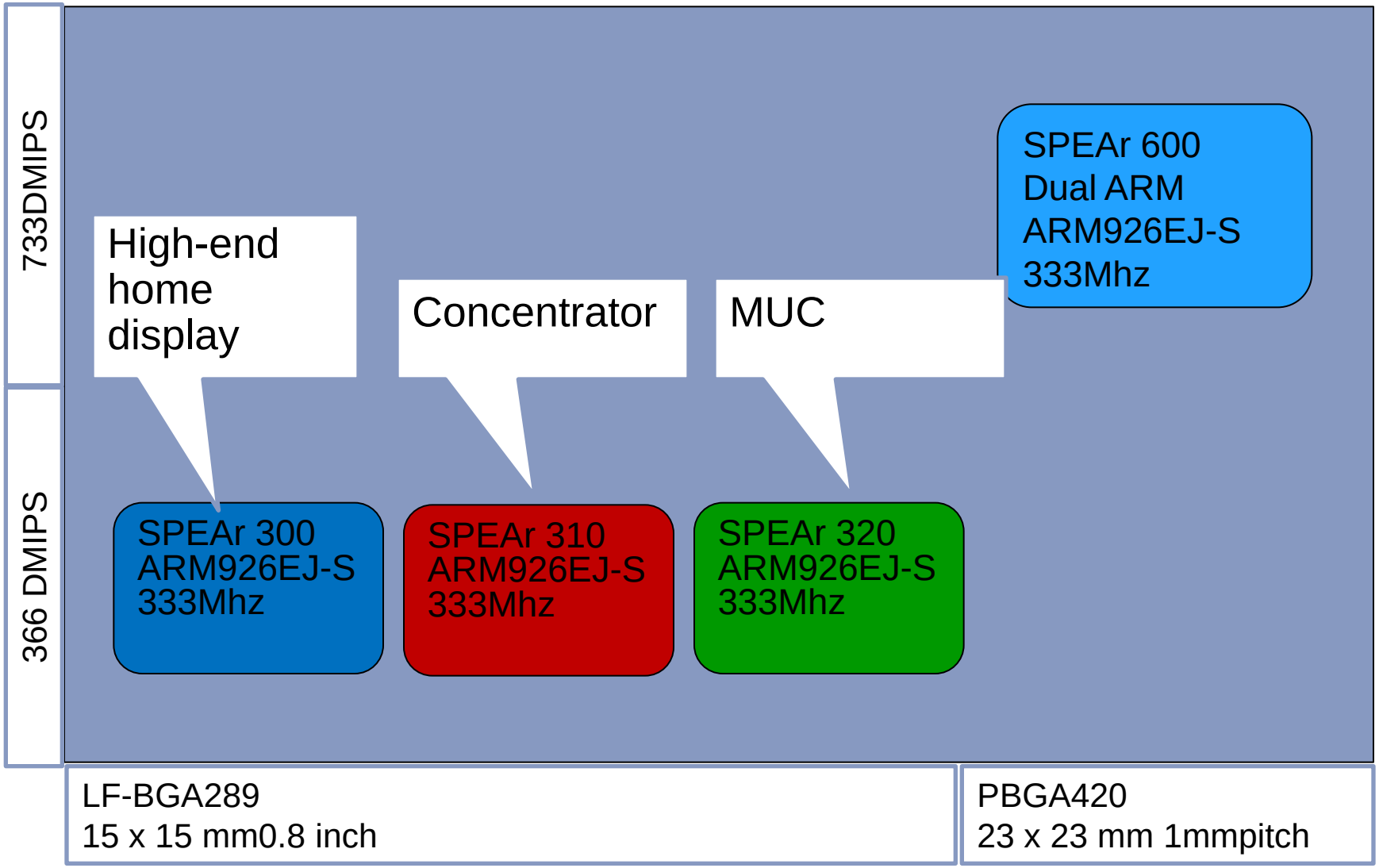
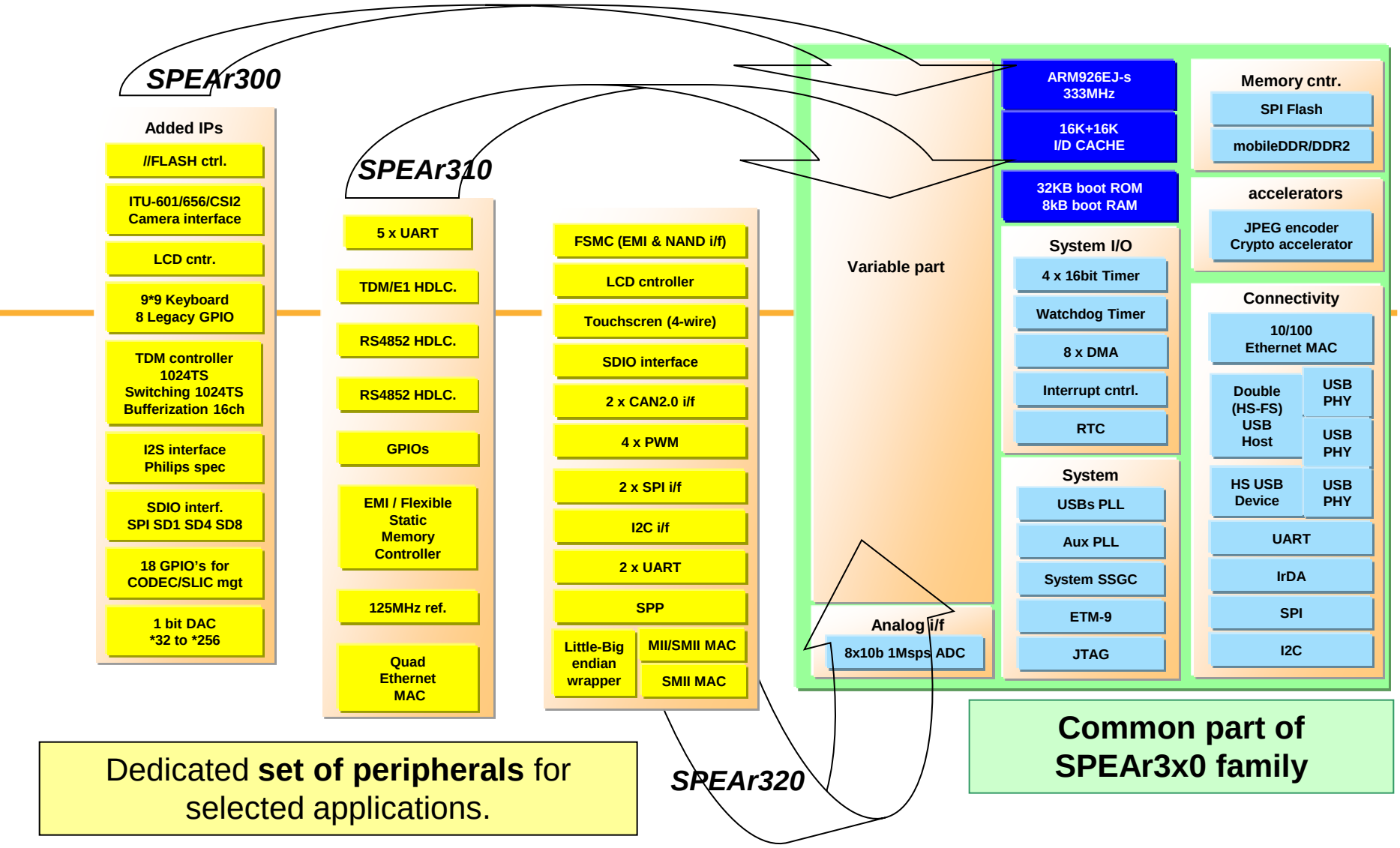
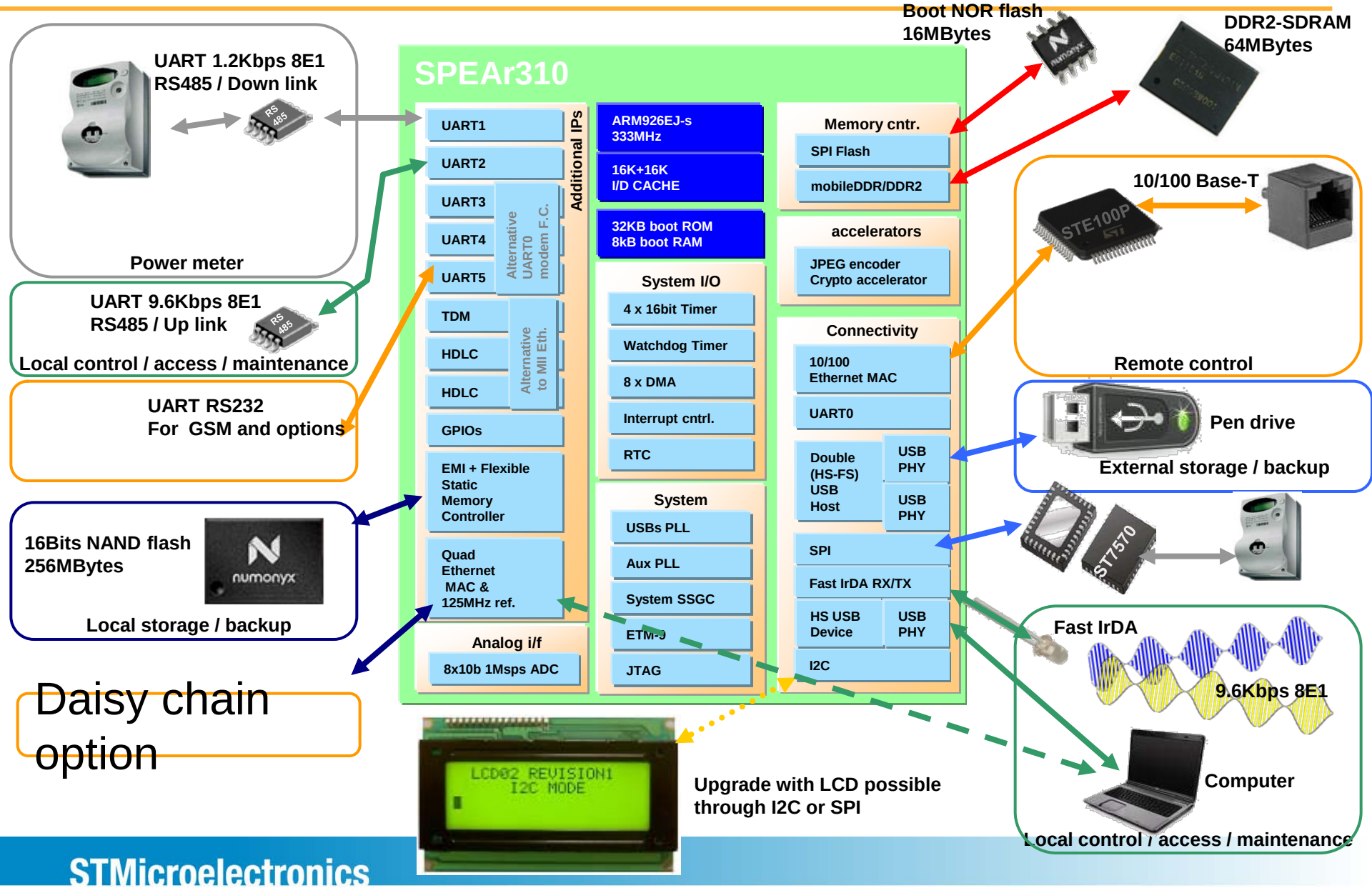
SPEAr eMPU Family : leading performance



SPEAr® 3x0 Family



SPEAr®310 - Data Concentrator and MCU



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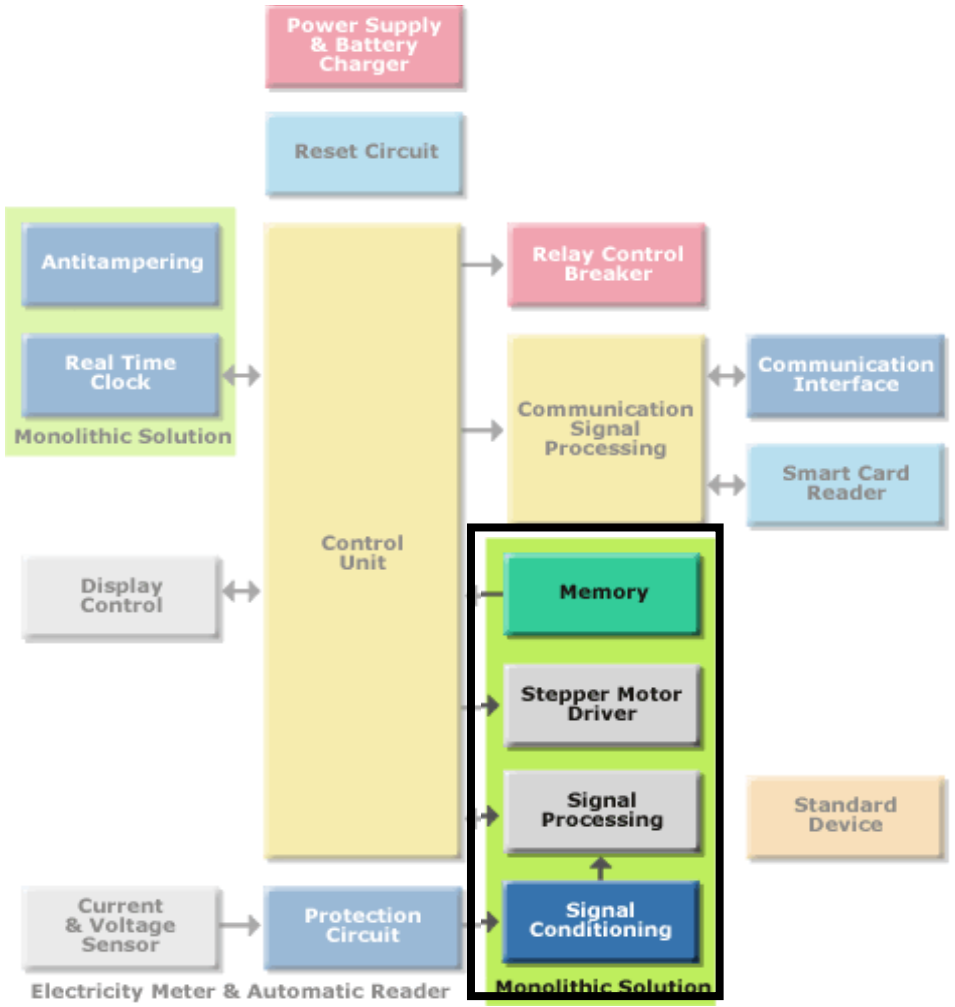
AFE


Power Supply & Battery Charger
Reset Circuit
Antitampering
Real Time Clock
Monolithic Solution
Control Unit
Relay Control Breaker
Communication Signal Processing
Communication Interface
Smart Card Reader
Display Control
Memory
Stepper Motor Driver
Signal Processing
Signal Conditioning
Monolithic Solution
Standard Device
Current & Voltage Sensor
Protection Circuit
Electricity Meter & Automatic Reader

Metering Products Portfolio

Single Phase Line

STPM10
1° order ΣΔ A/D
Accuracy 0.1% in 1:1000 range
SPI

STPM1x (4p/n)
1° order ΣΔ A/D
Accuracy 0.1% in 1:1000 range
OTP, pulsed output

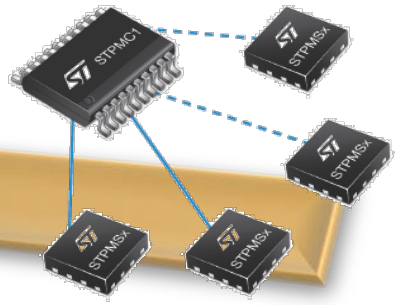
STPM01
1° order ΣΔ A/D
Accuracy 0.1% in 1:1000 range
OTP, SPI, pulsed output

STPMS2 (H/L)
2° order ΣΔ A/D
Accuracy 0.5% in 1:10000 range (H)
Accuracy 0.5% in 1:5000 range (L)

STPMS1
1° order ΣΔ A/D
Accuracy 0.1% in 1:1000 range

STPMC1
Digital calculator
Up to 5 channels input ΣΔ streaming
4 DSPs for ΣΔ i/u streaming
112 configuration bits
OTP, SPI, pulsed output

Poly Phase Line



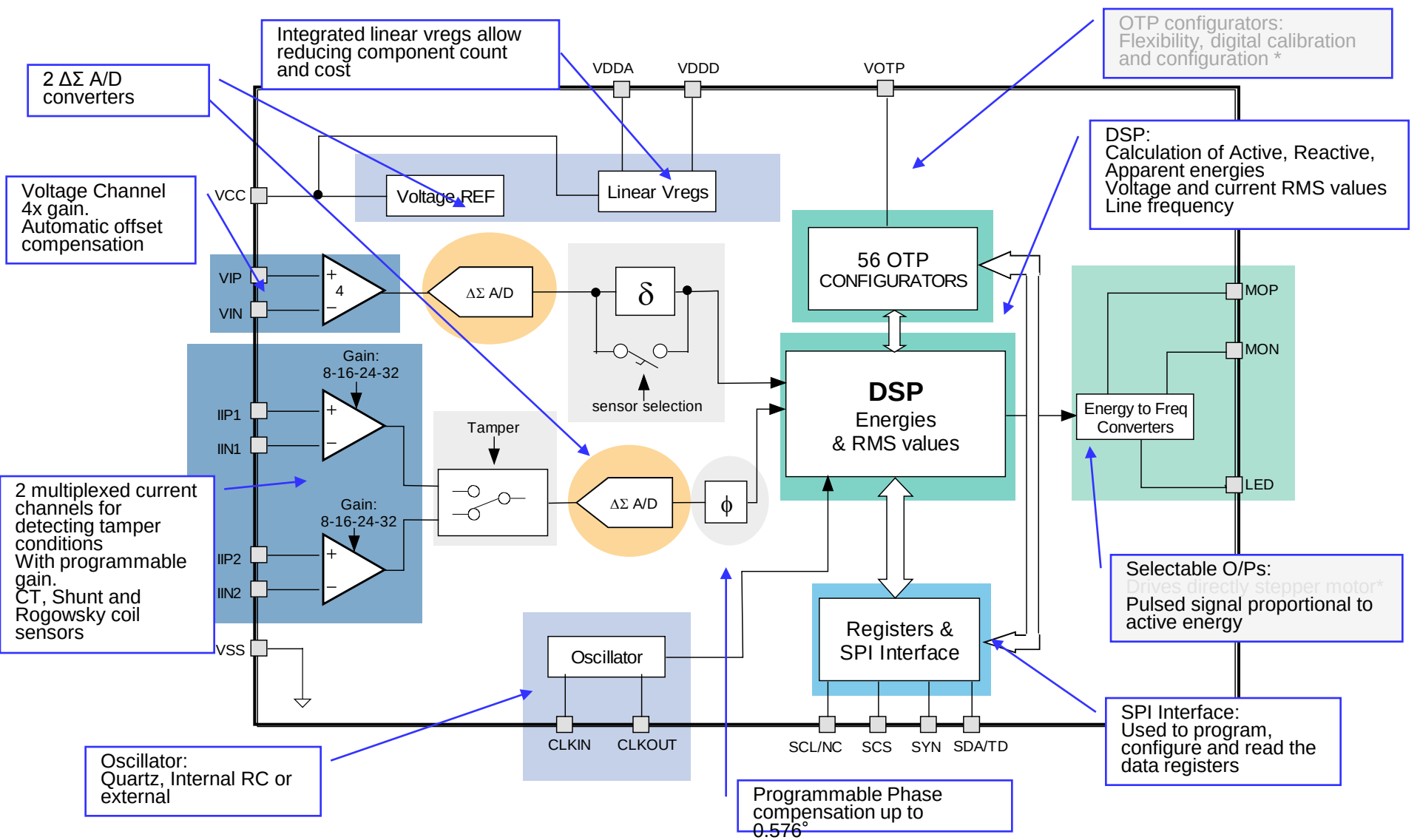
STPM01/10 : Features

TSSOP20

- **MEASUREMENT**
  - Active, Reactive, Apparent Energies,
  - Signed Accumulaton
  - V, I, Frequency
- **SENSORS**
  - Rogowski*
  - Current Transformer
  - Shunt
- **OPERATION**
  - Standalone*
  - MCU based
- **ACCURACY**
  - 0.1% in 1:1000 range
- **TAMPER PROOF**
  - 2 current channels available
- **SUPPORT IEC61036 AND ANSI C12.1**
- *** NOT present on STPM10**

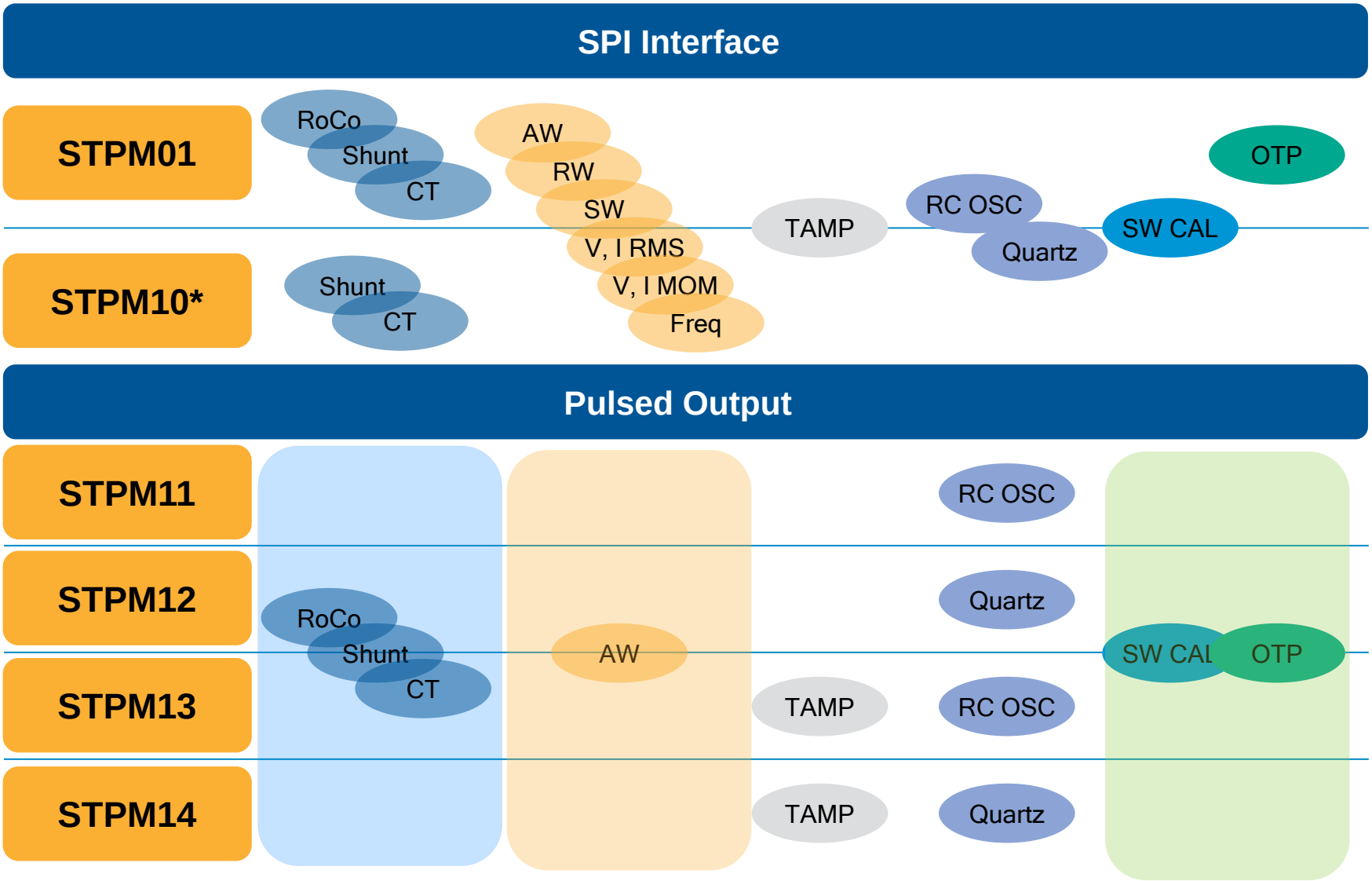
- **CALIBRATION**
  - Very short calibration time
  - No ripple in the active energy
  - Separated for voltage and current
- **FLEXIBILITY**
  - from low to high end allows re-use of already tested boards layouts
- **OTP***
  - Prevention of tamper by changing calibration data
  - No need of loading the configuration data from MCU at startup
  - Perfect data retention in harsh environment
- **2 CURRENT CHANNELS**
  - STPM01 manages itself the anti-tamper features, even without MCU

STPM01/10: Device block diagram



* NOT present on STPM10

STPM Family Overview



* Product in roadmap

STPM01 and 10 demonstration board

STEVAL-IPE003V1

STPM01/1x Board:
CT + Shunt

STPM01/10 3-phase Board:
3xSTPM (CT only)

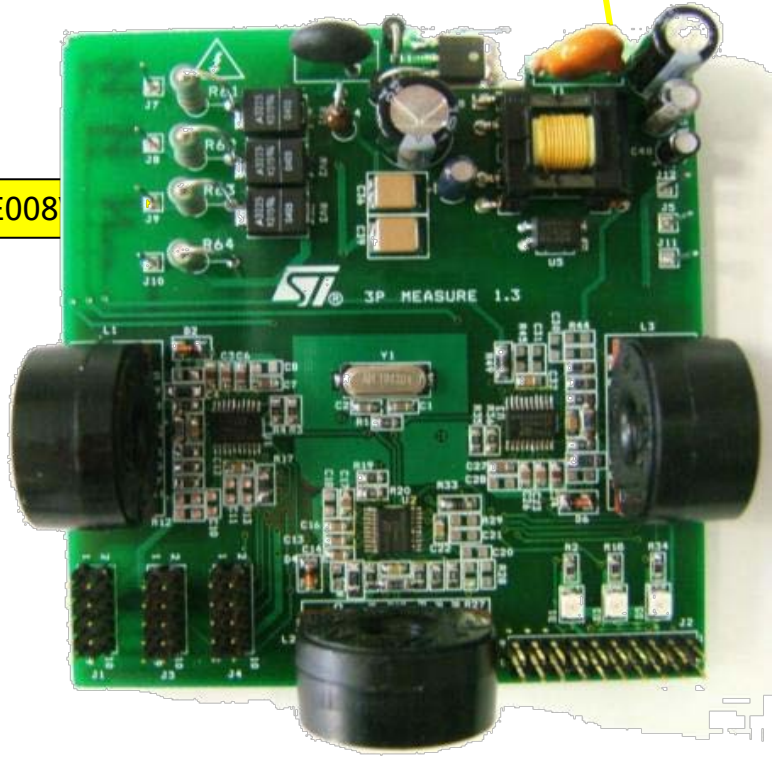
STEVAL-IPE004V1

STPM01/1x Board:
Shunt

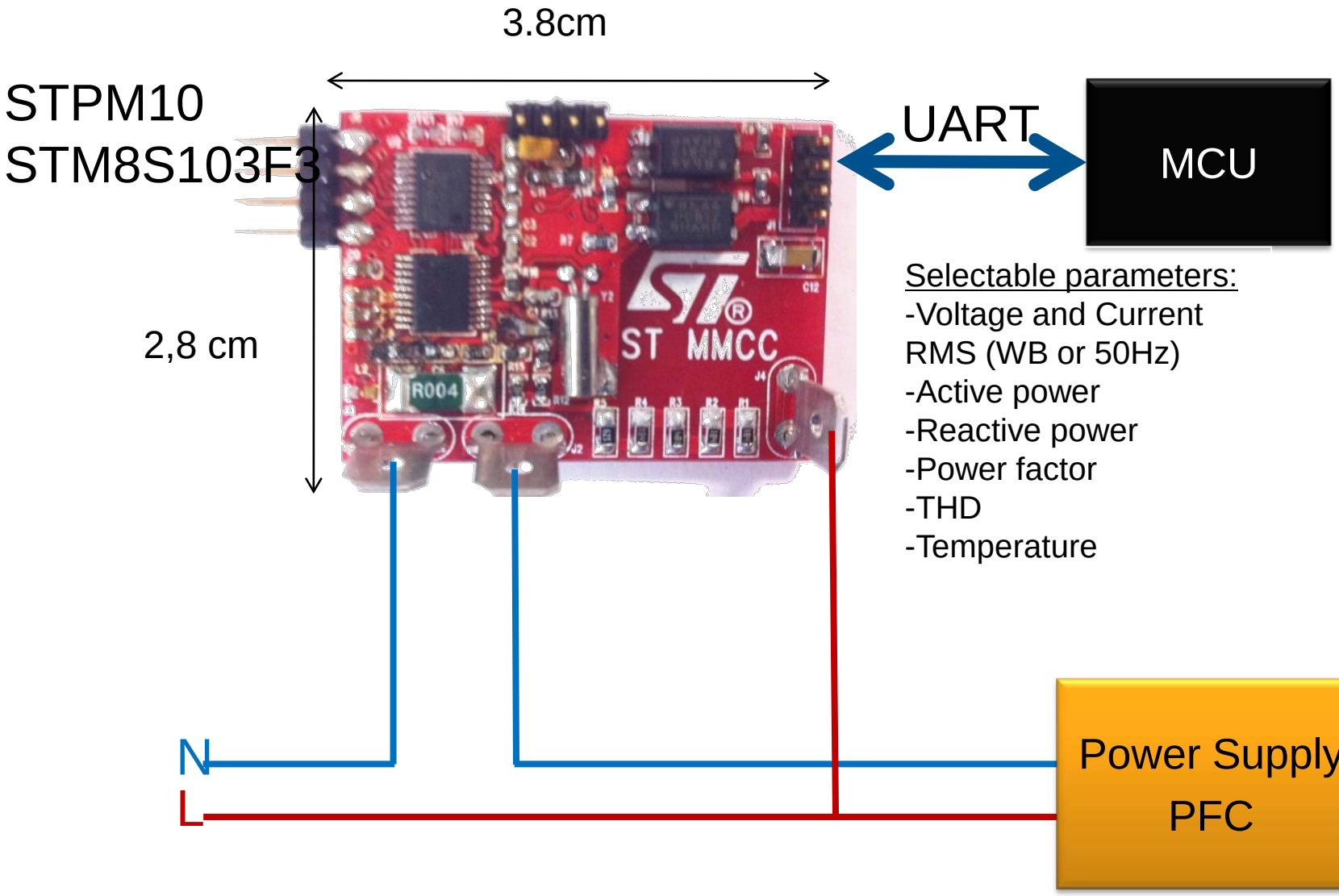
STEVAL-IPE008

STEVAL-IPE002V1

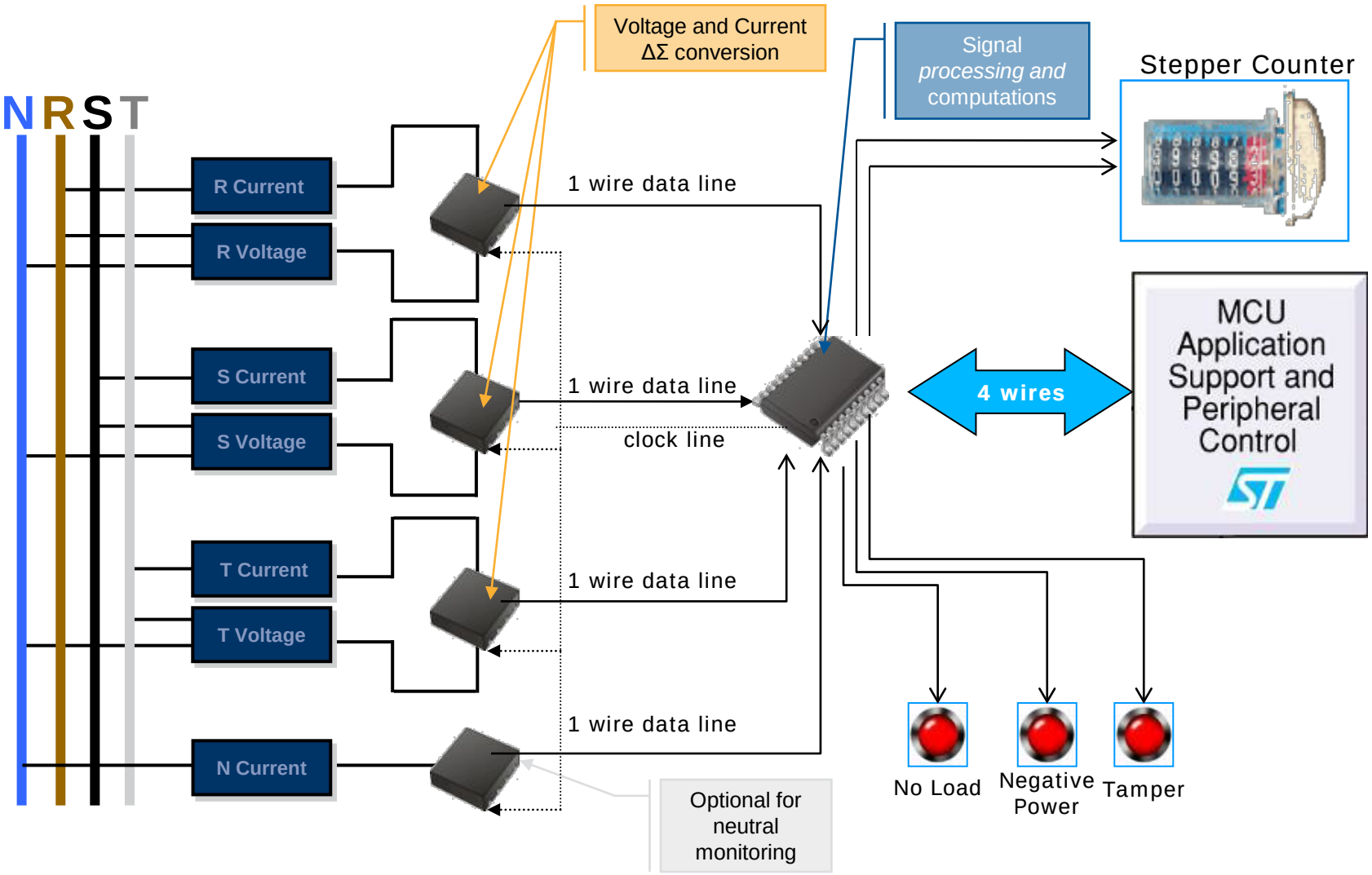
STPM01/1x Board:
CT+CT



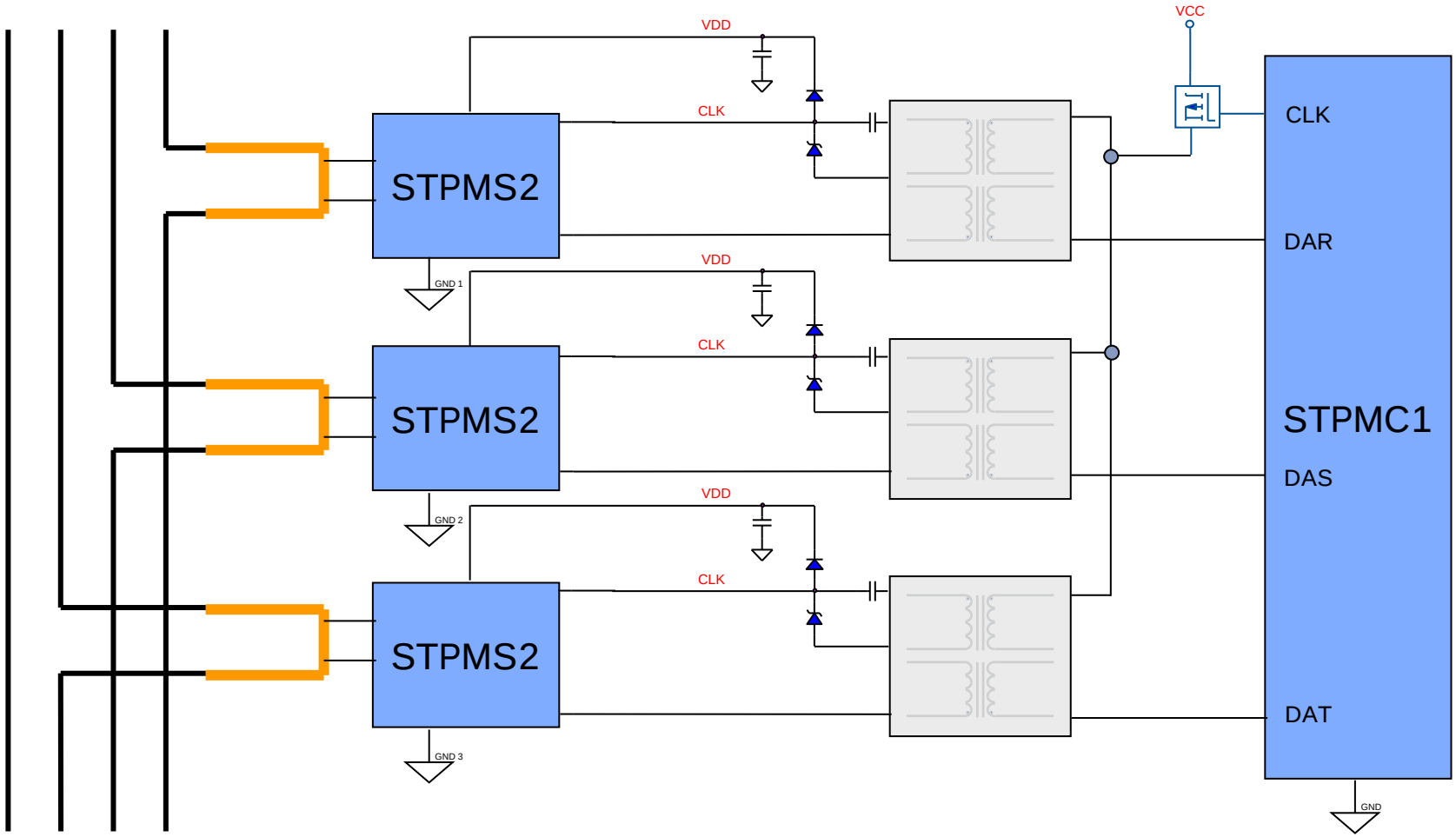
Metering module



3-phase 4-wire with tamper

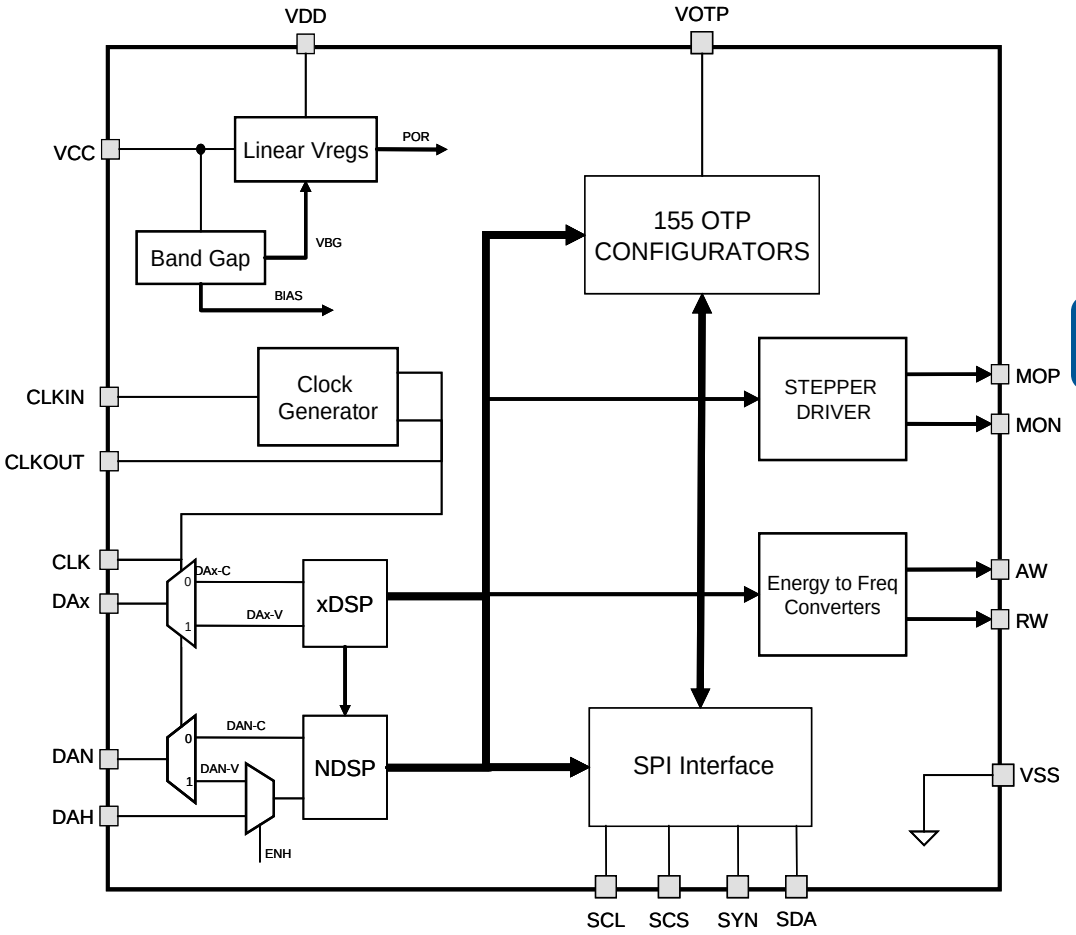


3 Shunts Metering Application



STPMC1 – CALCULATOR

STPMC1 can be implemented as a single chip 1-, 2- or 3-phase energy meter or as a measurement peripheral in a microprocessor based 1-, 2- or 3-phase energy meter.



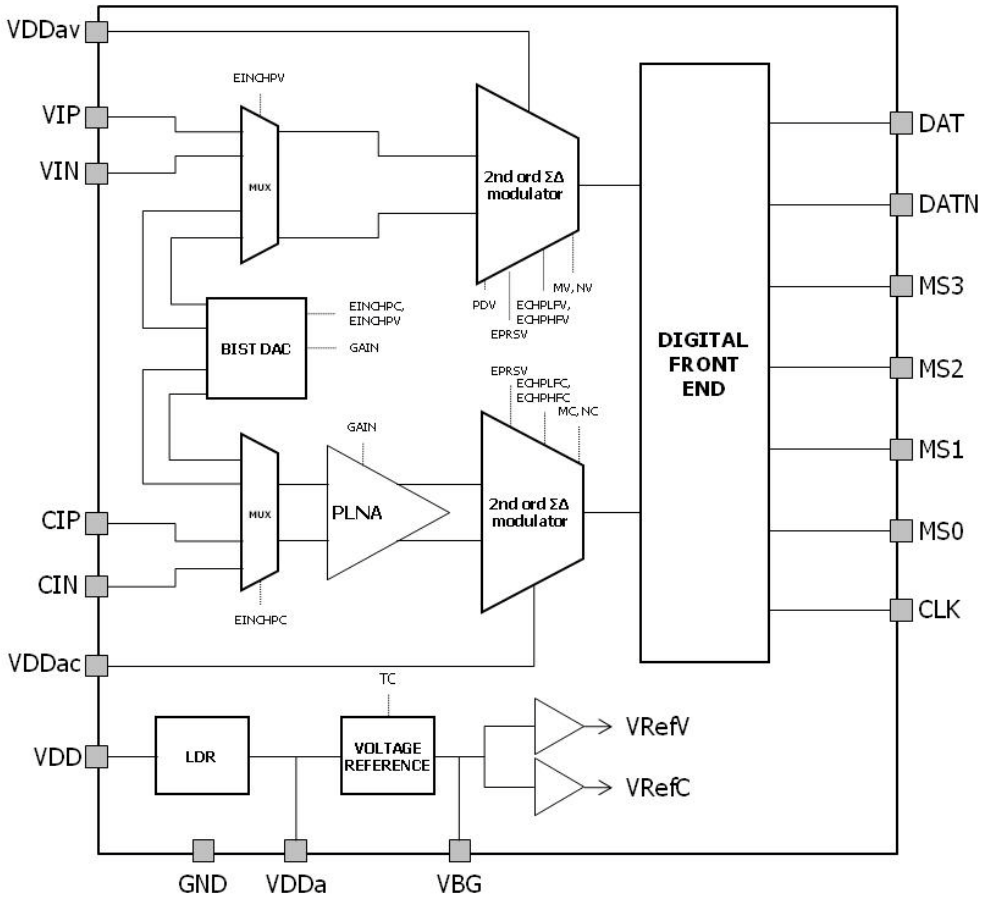
TSSOP20

MAIN FEATURES

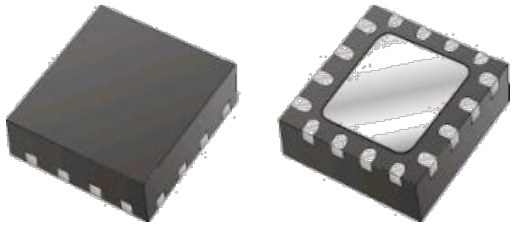
- 4 DSPs processing Sigma Delta current/voltage streamings delivered by STPMSx
- Basic computational functions plus integrators, decimators, filters
- Measurement of active, reactive, apparent energy, current/voltage RMS and frequency values
- Software calibration and mutual compensation

STPMS2 – SMART SENSOR II

Dual channel SD modulator for Power Metering application



QFN16 4x4

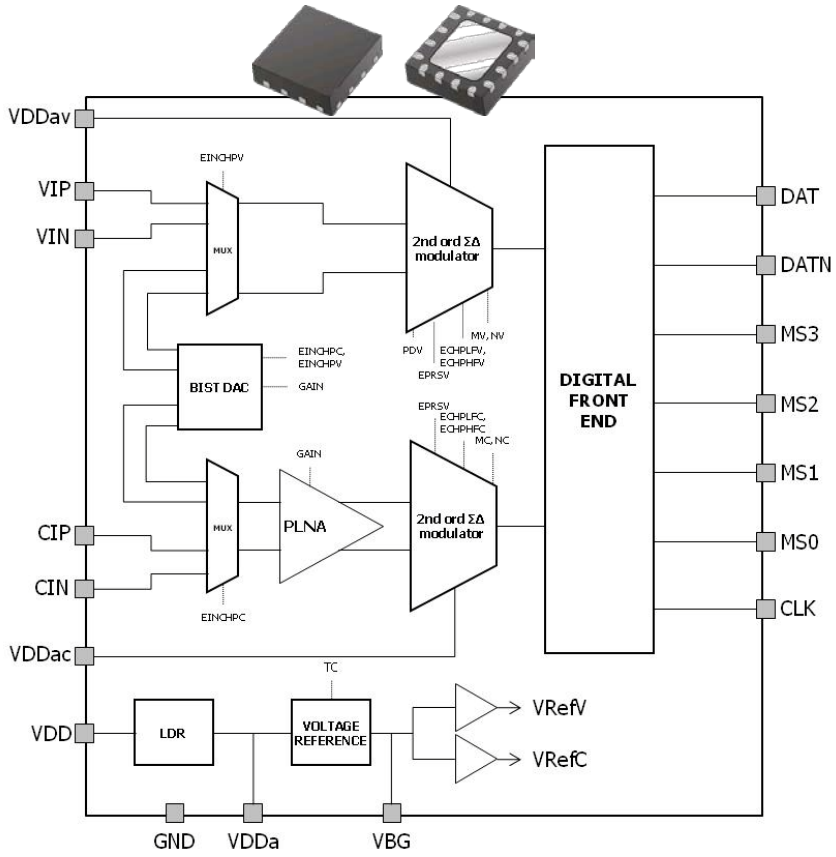


MAIN FEATURES

- Vcc supply range 3 – 5.5V
- 2nd order Sigma Delta Modulators
- Programmable chopper stabilized low noise and low offset amplifier
- Exceed 50-60 Hz IEC 687/1036 spec for class1, class0.5 and class0.2 AC watt meters
- Less than 0.1% error over 1:5000 range
- Internal low drop regulator @ 3V typ
- Precision voltage reference: 1.23V and 30 ppm/° C Max (only STPMS2L)

STPMS2 – Key features

- Two part numbers:
  - STPM02H Less than 0.5% error over 1:10000 range
  - STPM02L Less than 0.5% error over 1:5000 range
- Two 2nd order sigma-delta modulators $f_{SPL} = f_{CLK}$, $f_{BWD} = 4$ kHz
- Two pins for data exchange: CLK, DAT to STPMC1 or other DSP
- Operating modes:
  - **Hard mode**: configuration pins MS0-3
  - **Soft mode**: when MS3 = CLK, internal configuration bits can be programmed through SPI pins MS0-2
- Selectable precision/consumption modes
- Built-in self-test capability

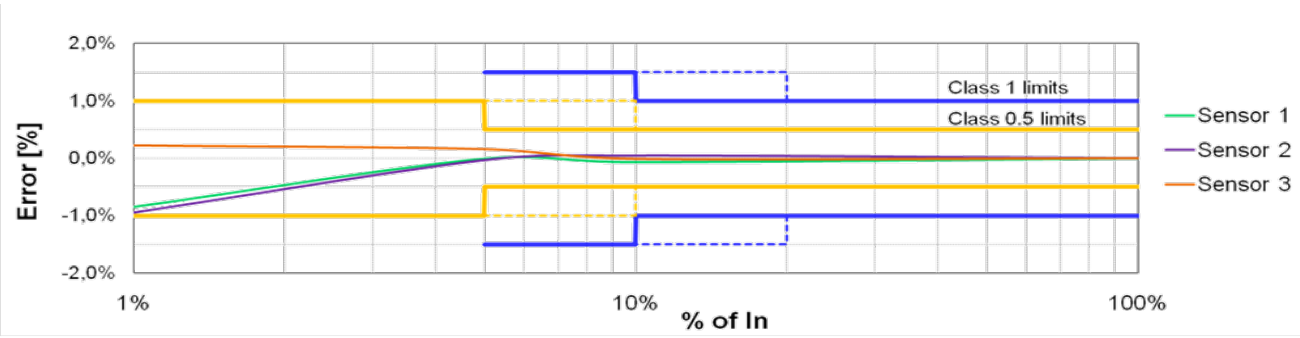


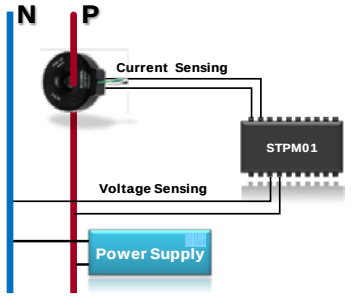
STPMxx and Pulse current sensor

- Pulse current sensor is a di/dt sensors, based on Rogowski coil principle:
  - It offers by design high electrical isolation from line
  - No magnetic core ensures very high linearity over current, frequency and temperature
  - Insensitive to DC magnetic fields
  - Flexible in size and shape

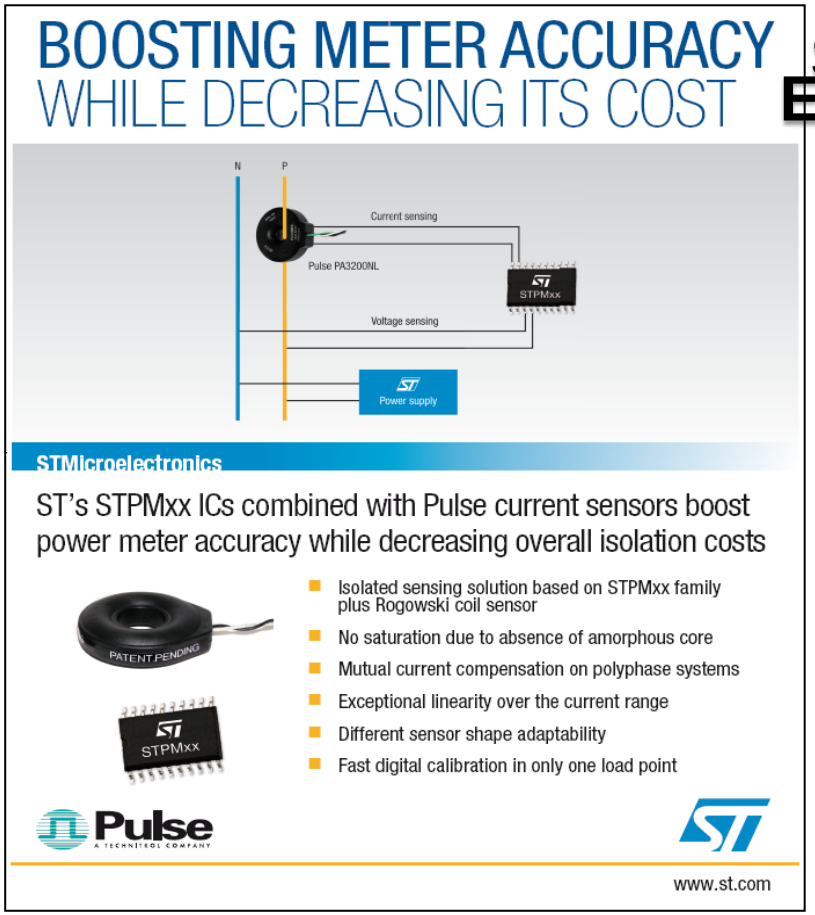
- Using the Pulse current sensor together with the STPMxx presents multiple benefits because of:
  - a proprietary power calculation and digital signal processing algorithm developed specifically for Rogowski coil-based sensors
  - the capability of mutual current compensation when multiple sensors are used

- PA2999.006NL sensor and STPM01 were tested together with the following results:

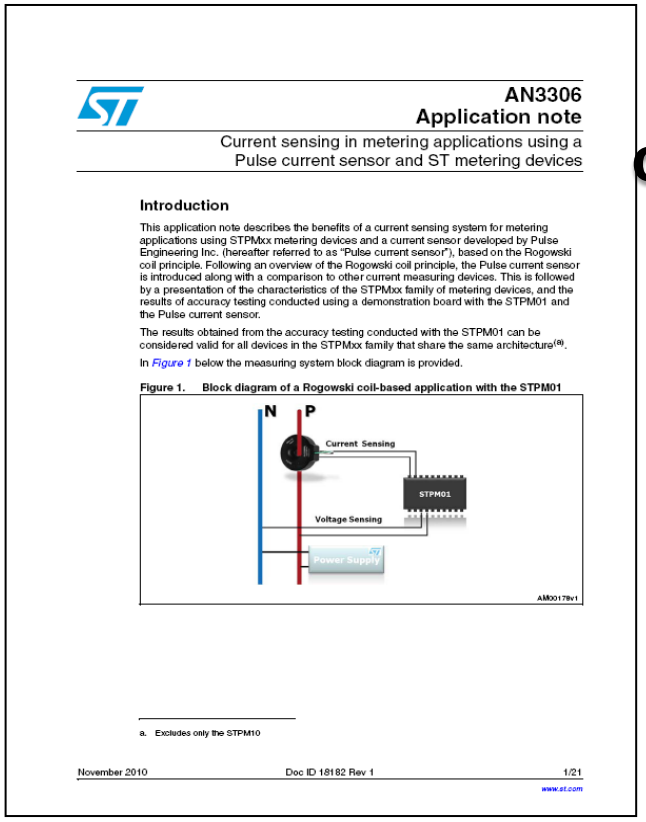




STPMxx and Pulse current sensor



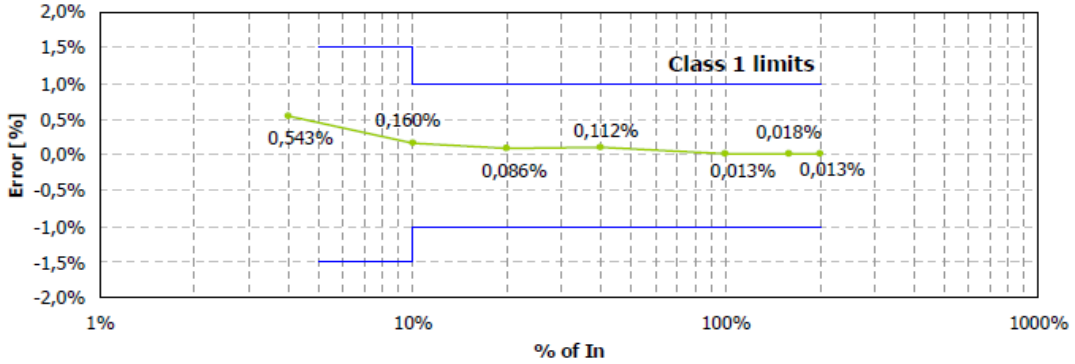
Shown at Pulse booth at Electronica 2010 in Munich



AN3306 online on st.com

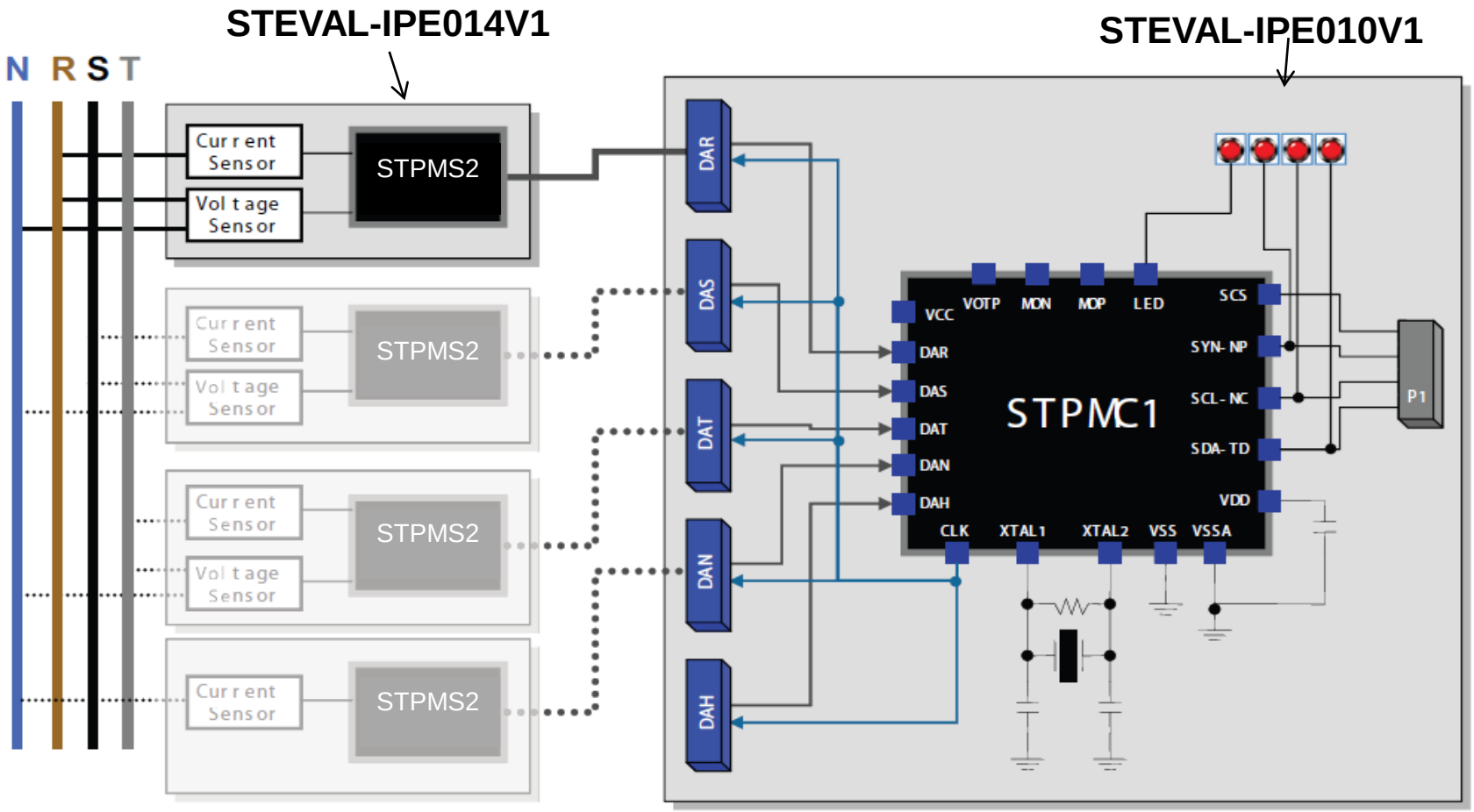
STPMC1 + STPMS2 Promotion tool

- Demonstration boards for modular approach
  - STPMC1 board : STEVAL-IPE010V1
  - STPMS2 Daughter board : STEVAL-IPE014V1
- Application note and user manual
  - AN 3157 : how to use SPTMC1 +S1/2 and performances



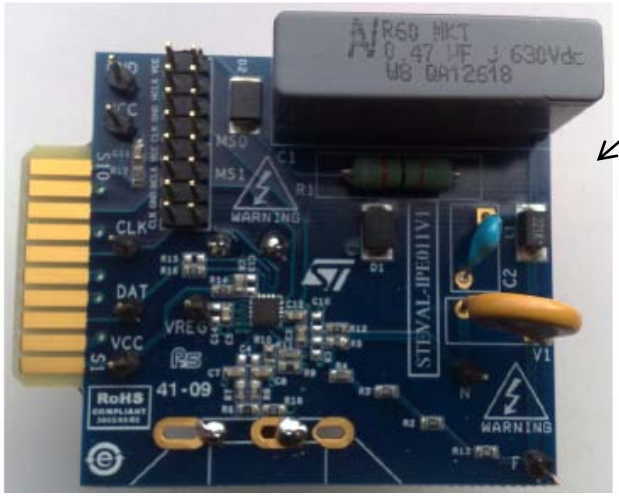
  - UM 0746 : Evaluation kit getting started

STPMC1 + S2 evaluation kit



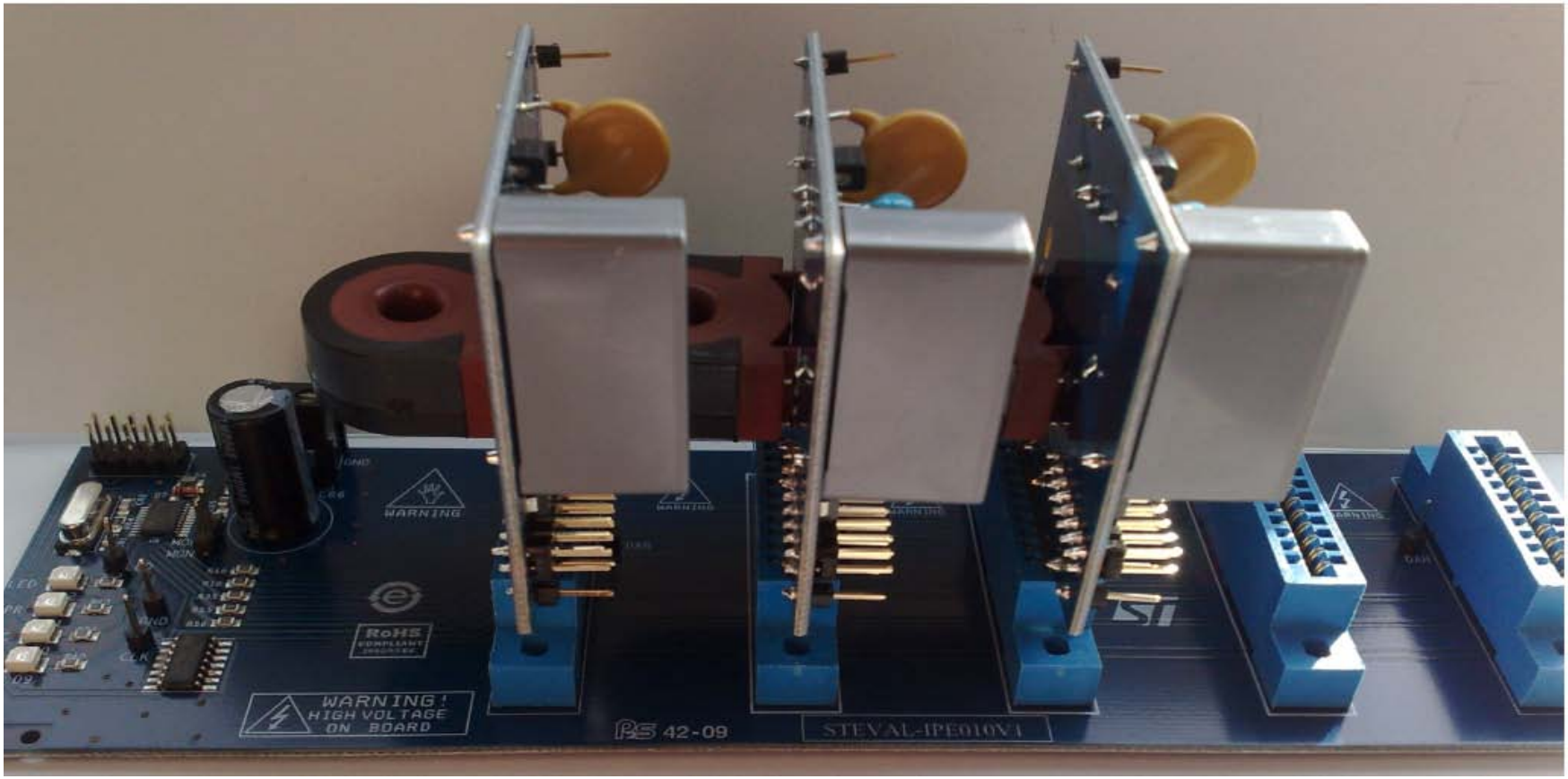
STPMC1 + S2 evaluation kit

STEVAL-IPE010V1 ** come w

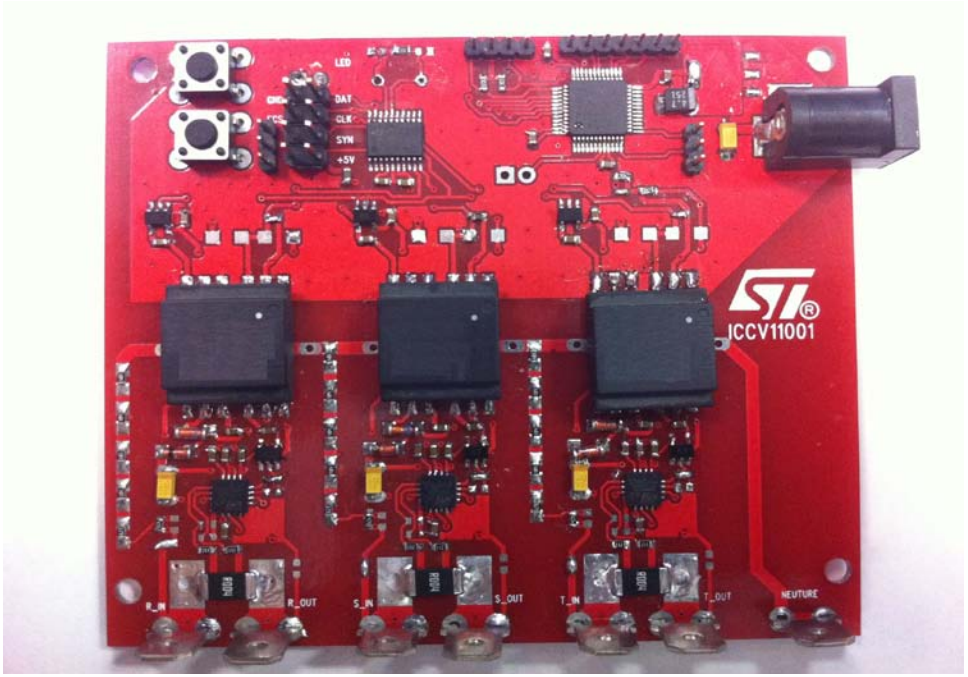


STEVAL-IPE014V1

STPMC1 + S2 evaluation kit



All-shunt 3ph evaluation board



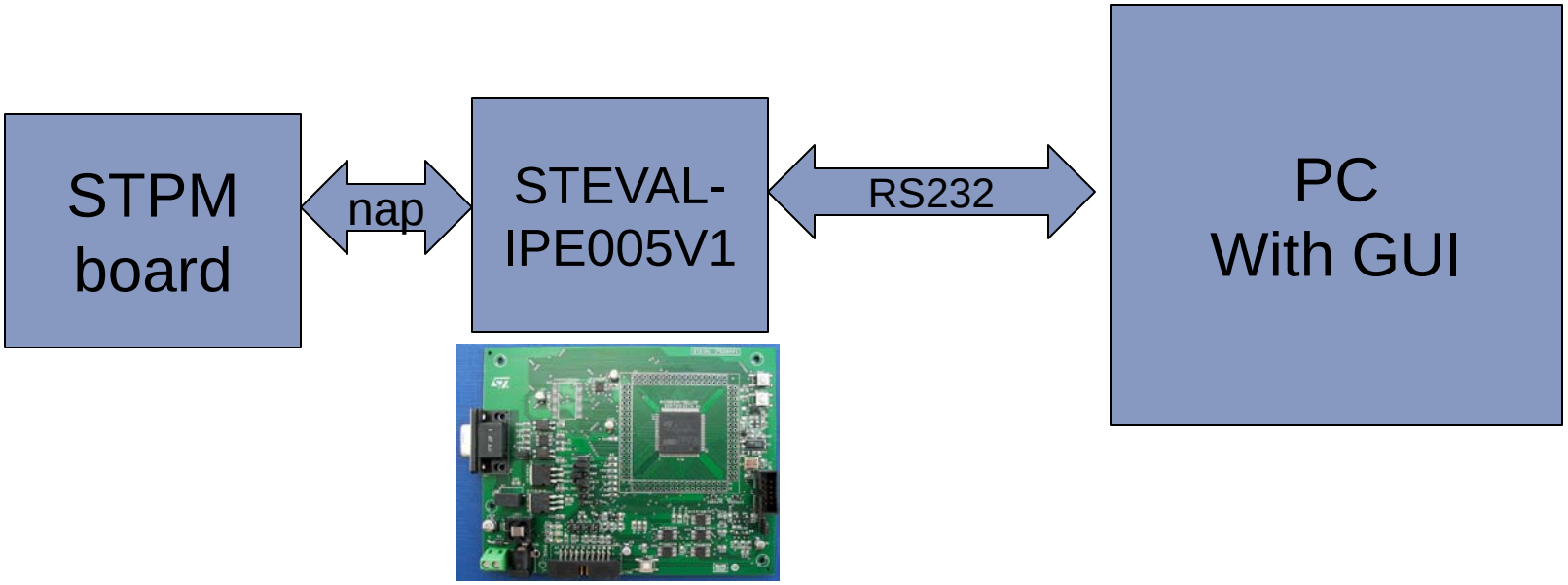
Key Feature

Complete Isolation
Magnetic based Isolation
Single supply voltage
Class 0.5 accuracy
Modular system

Today the schematic is available,
The baord is to come later.

How to connect STPM board to a PC

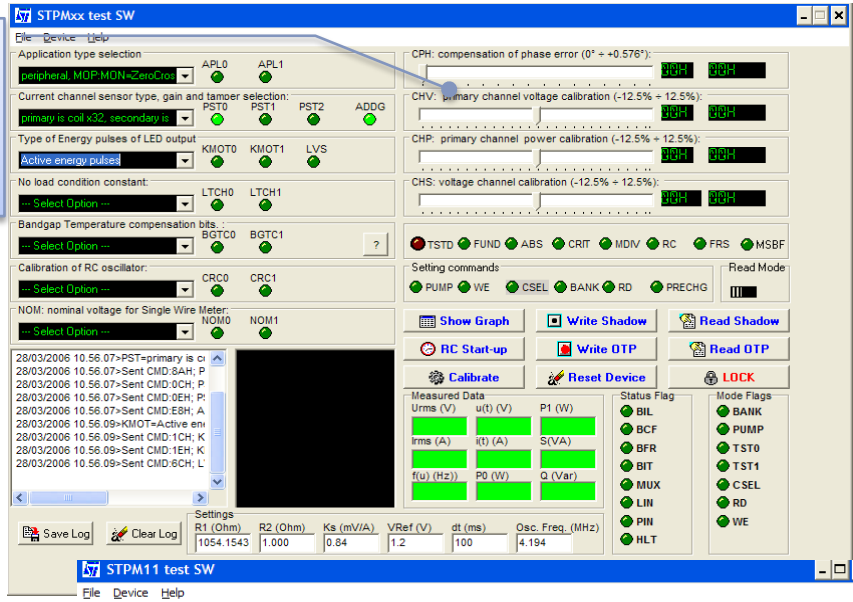
- **STEVAL-IPE005V1**

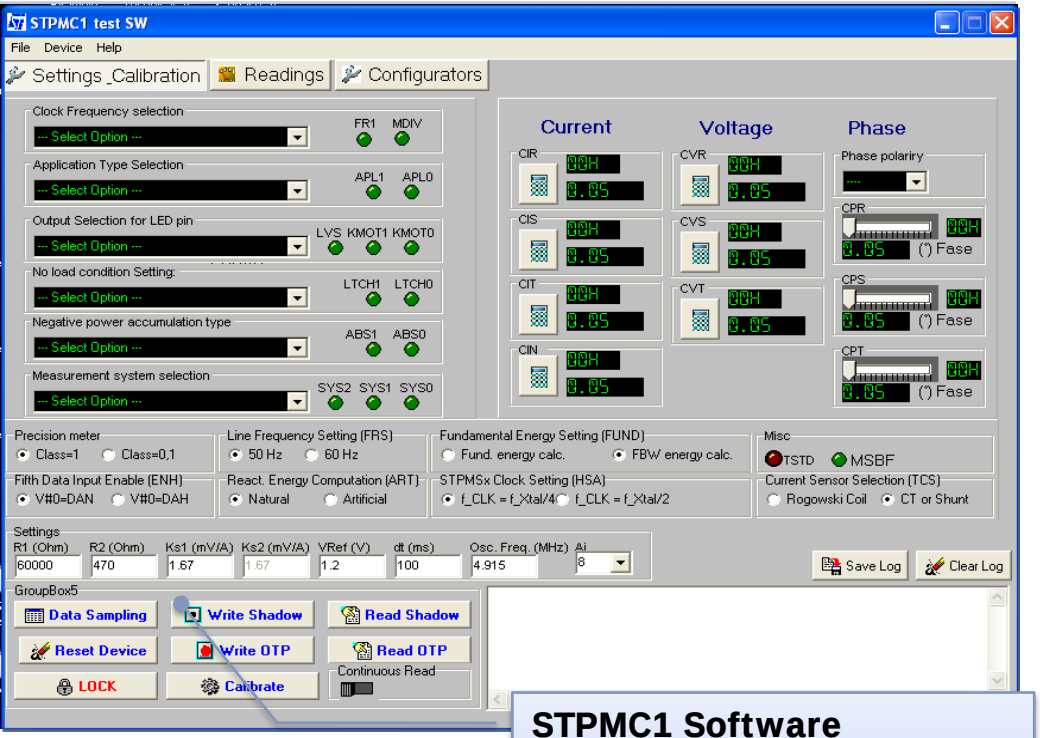


- USB connection board in development

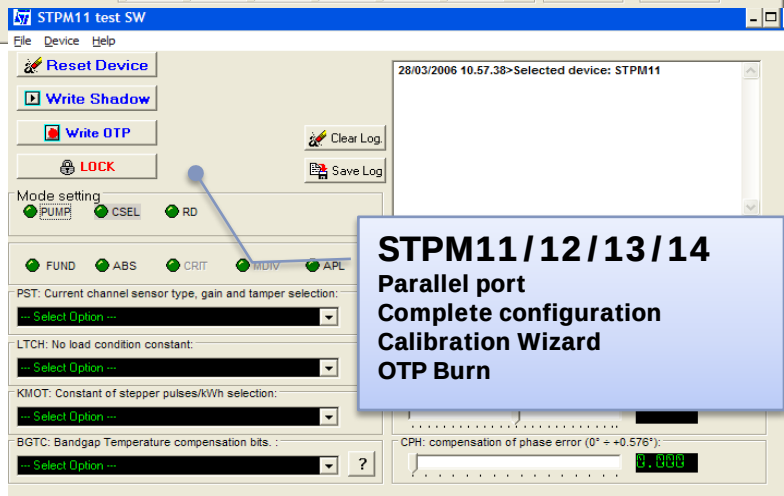
GUI interface

STPM01/10 Software
Parallel port
Complete configuration
Calibration Wizard
OTP burn





STPMC1 Software
Parallel port
Complete configuration
Calibration Wizard
OTP burn

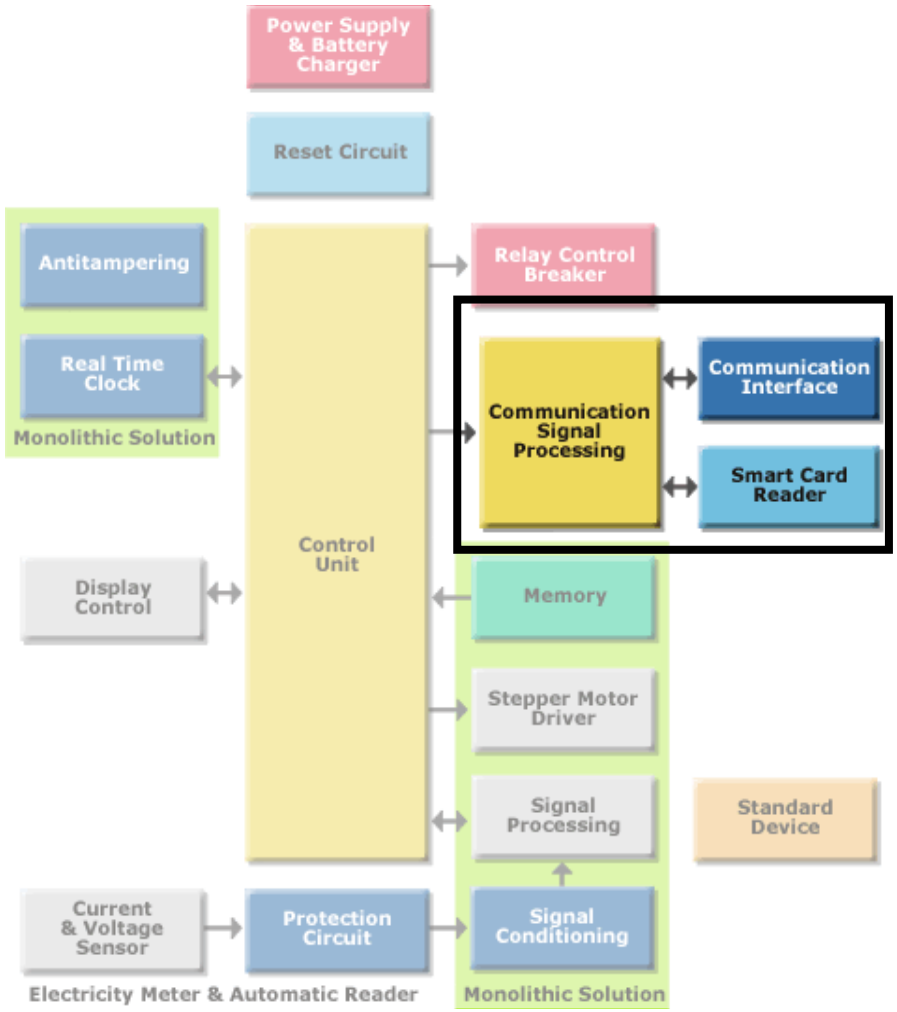


STPM11/12/13/14
Parallel port
Complete configuration
Calibration Wizard
OTP Burn

Agenda

- 1) Metering market overview and application technical requirements.
- 2) The Meter architecture : one or 2 microcontroller. Why?
  - The advantage of STM32 family.
- 3) The concentrator, MUC core : SPEAR310
- 4) Power and network quality measurement
  - (STPM01, 10 and C1 + S1)
- 5) **Power Line Communication : the main communication medium for Smart Gird in EU.**
- 6) ZigBee for HAN
- 6) Specific technical requirement for the SMPS in metering & the ST solutions

The communication modules: PLM + Wireless



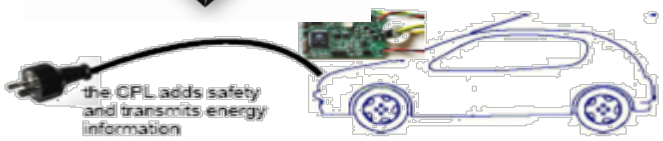
ST leading PLC market delivering field proven and cost-effective solutions for more than 20 years

More than 30 Million PLC transceivers sold in the last 5 years!

Smart Meters

Home Area Networking (HAN)
Home and Building automation,
Smart Energy control
Connectivity….

PV Monitoring,
Street lighting

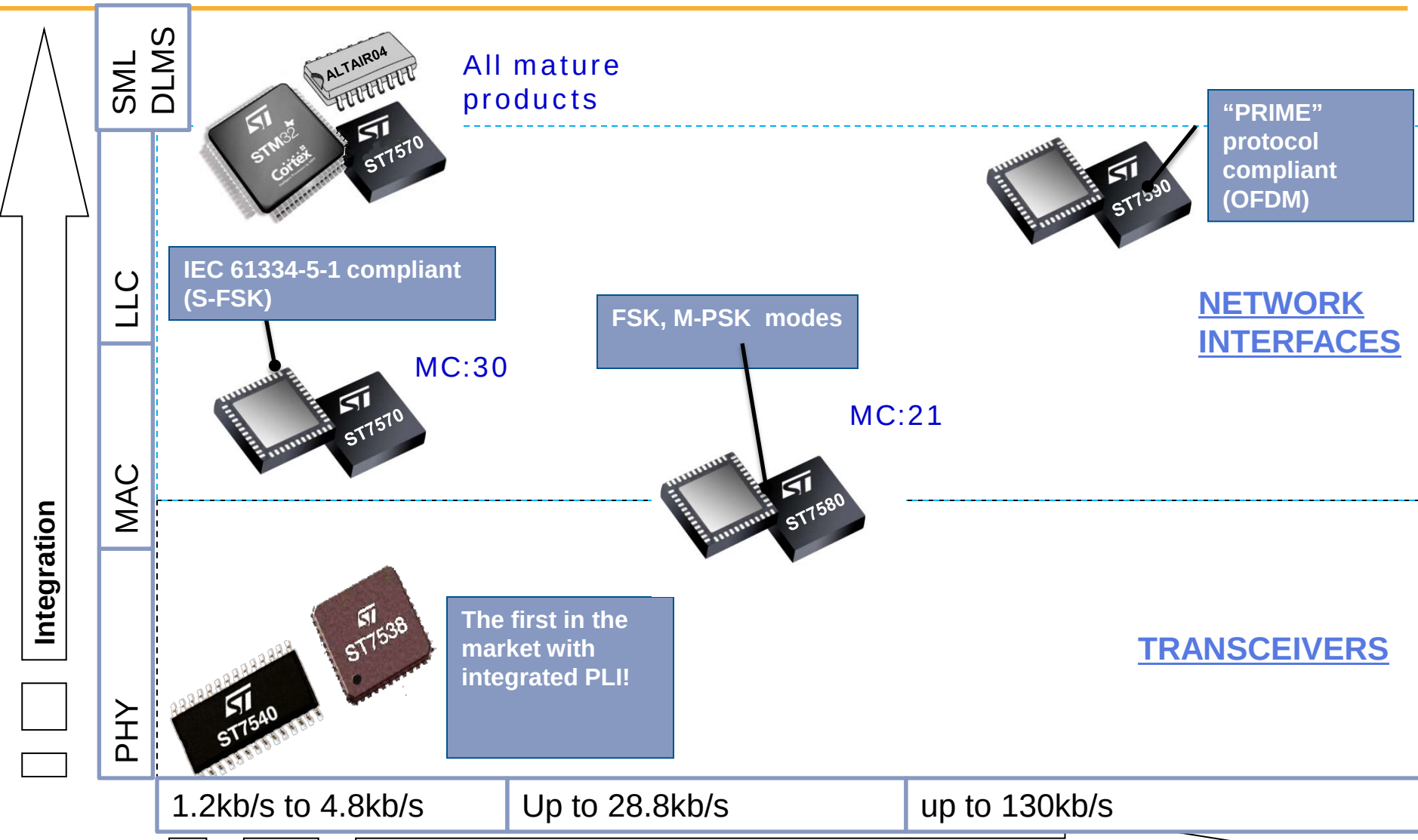


PEV communication

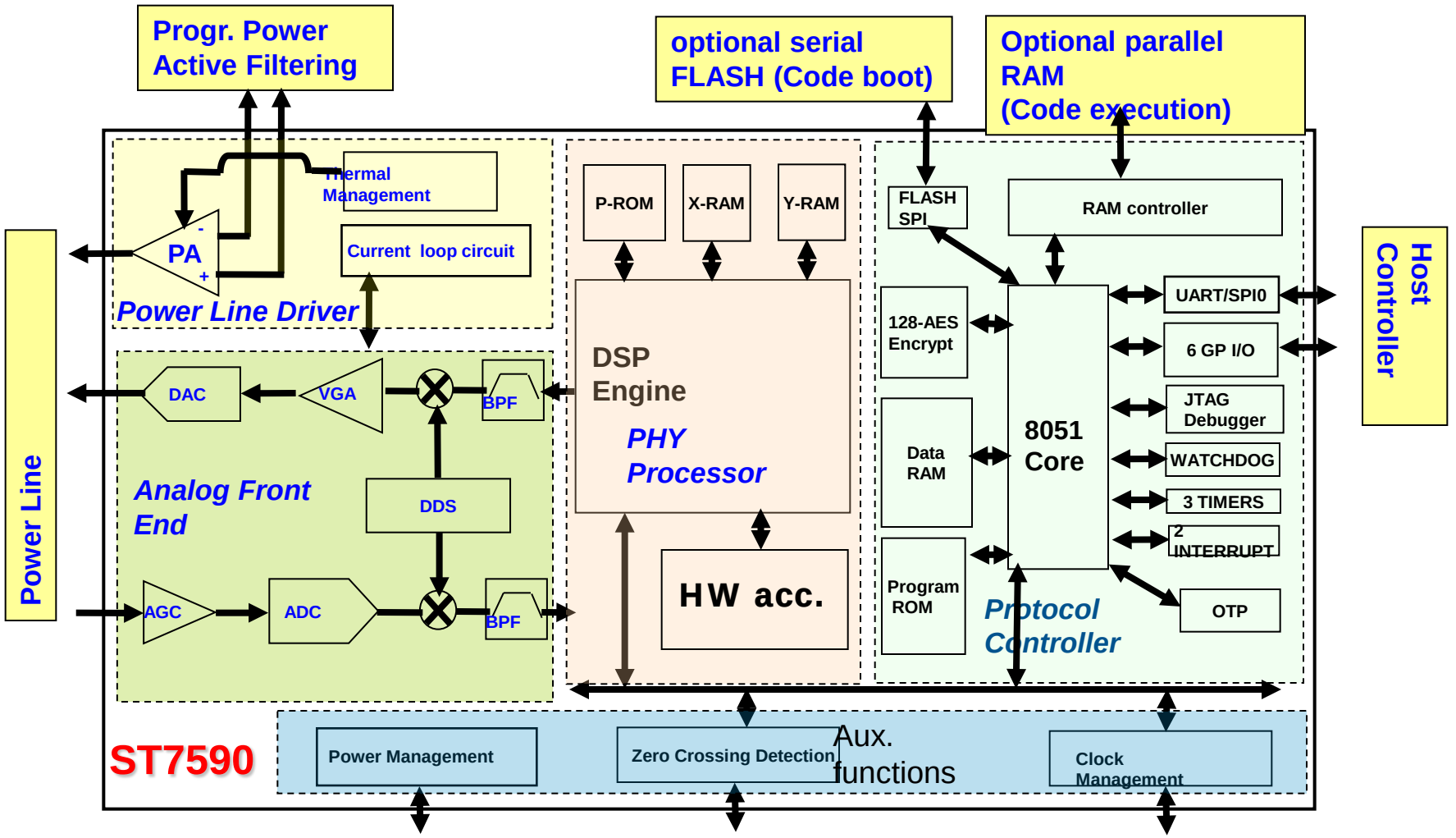
ST PLC strategic approach: Cover all open standards

- ST has been playing a key active role in all most important PLC standardization initiatives: EHS; KONNEX / EN 50090; IEC PRIME alliance; OPEN meter project, and will continue to do
- ST7538/40 are protocol “agnostic” and comply with EN 50090 and **IEC 61334-5-2** standards
- ST7570 complies with present **IEC 61334-5-1** standard (S-FSK) and its evolutions for ERDF **(LINKY)** or Netherland NTA8030
- ST7580 : **Meters and More** M-PSK : Endesa, Enel, IBM, SAGEM, STM. (open meter and Cenelec TC1
- ST7590 complies with PRIME specifications for OFDM communication. (open meter project and Cenelec TC13 for standardization)
- The future ready G.hnem P1901.2 of IEEE

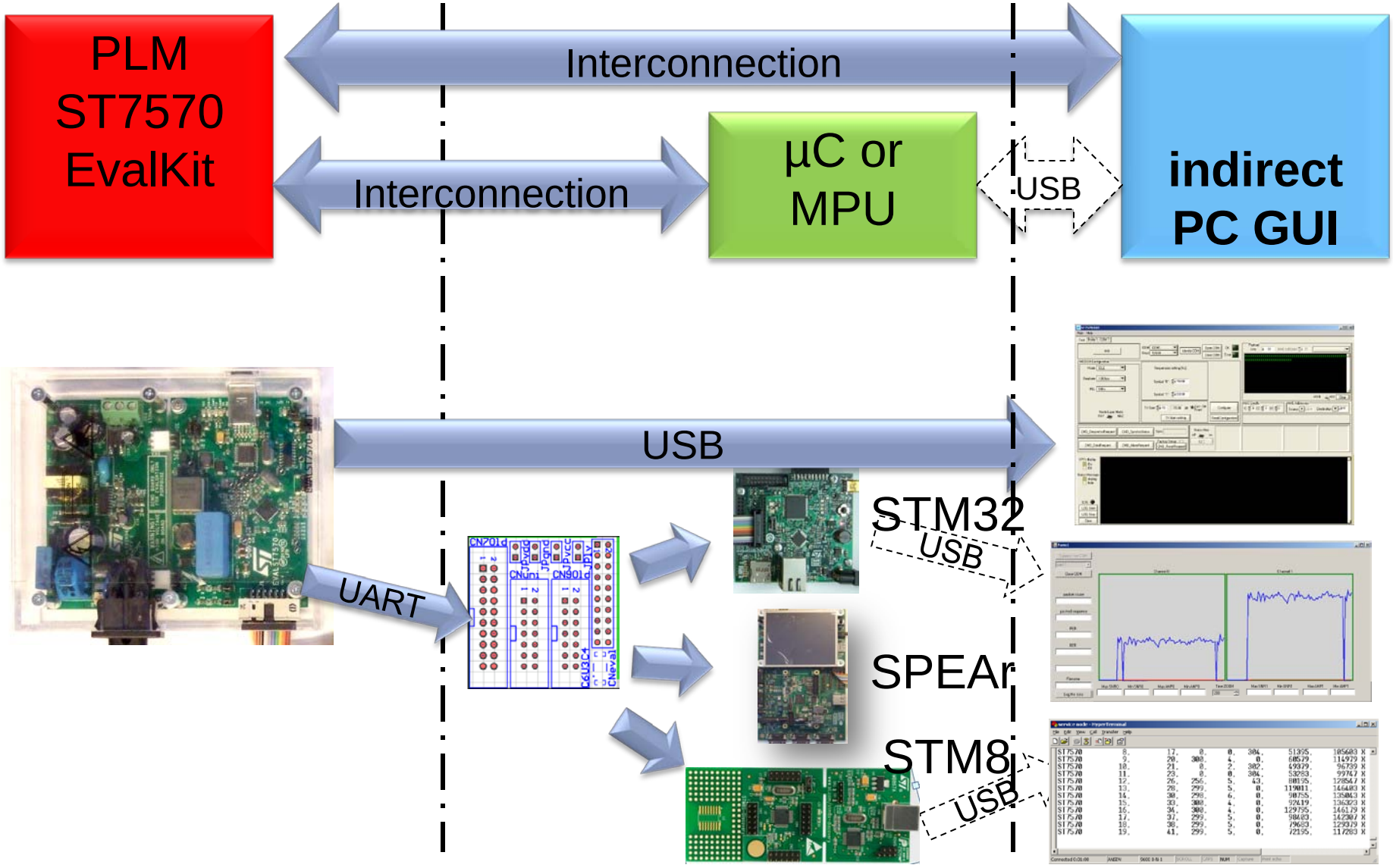
Power Line Communication Solution



ST7590 Block Diagram



PLM ST7570 tools overview



DLSM COSEM Stack

- STMicroelectronics and Andrea Informatique have agreed to promote the protocol DLMS COSEM in the STM32 microcontroller and in the STarGRID components.

ANDREA

DLMS COSEM LIBRARY

STarGRID™

STM32

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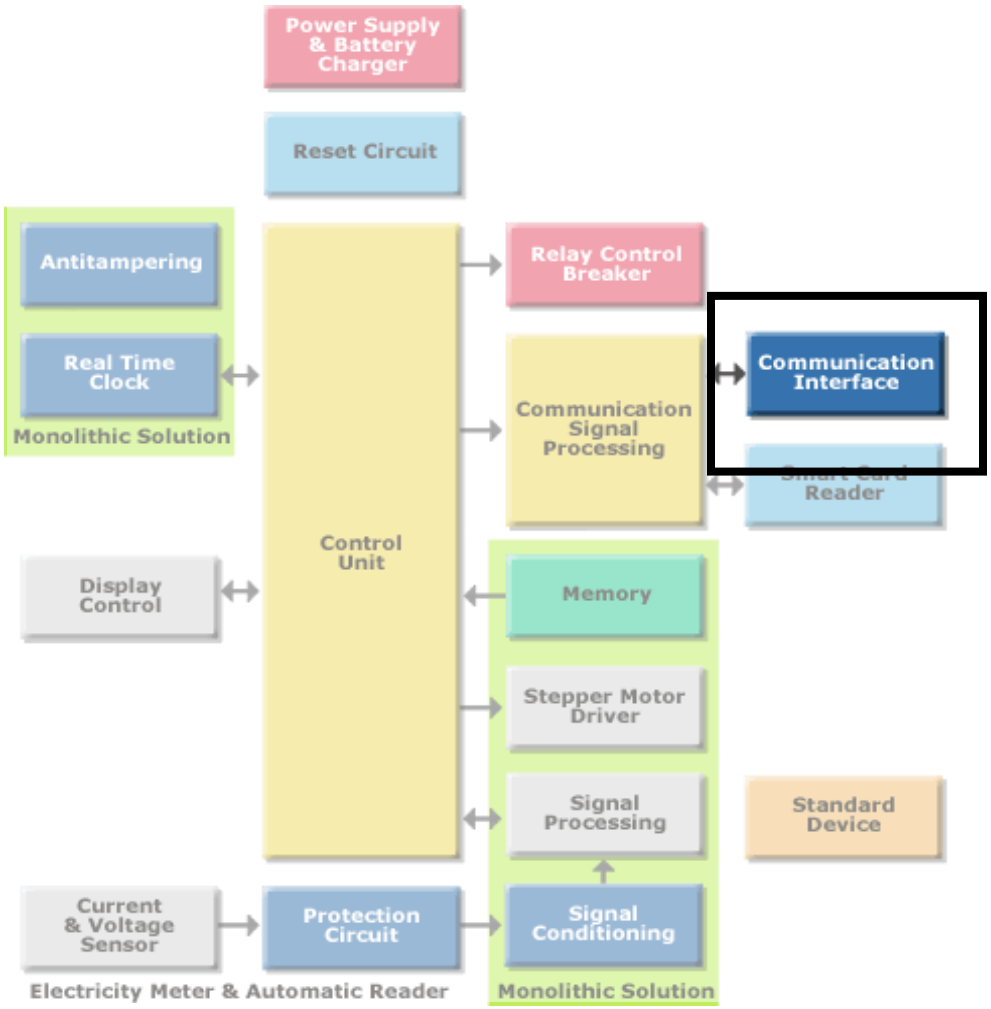
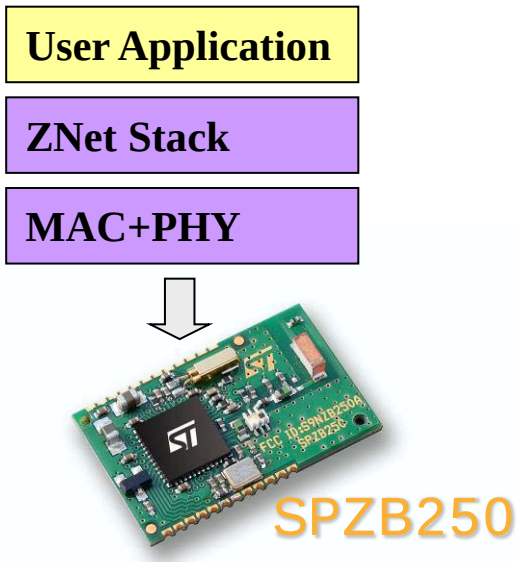
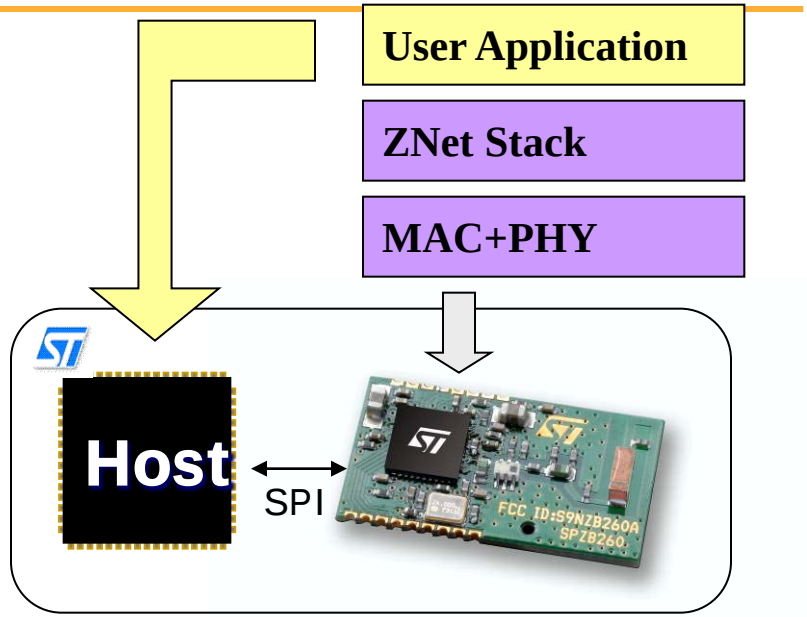
RF communication solutions



ZigBee Modules



STR711
ST7Lite
STR750
STR912
STM32

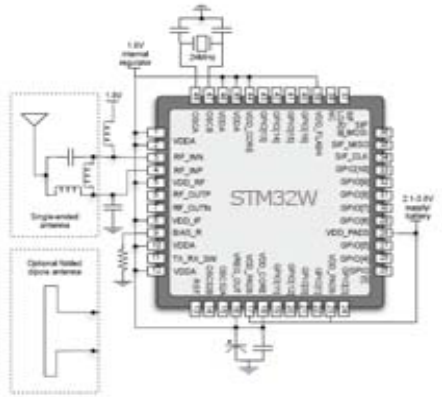


COMMON Features

- On board 24 MHz stable Xtal and Selectable Integrated RC Oscillator
- Pins available for non intrusive debug interface (SIF)
- Single 3V Supply, deep sleep power consumption <1uA, suitable for battery supply
- Integrated MURATA antenna aboard for 0dBm (+2dBm in boost mode) output power allow a top class reach: 30 meters indoor/urban
  100 meters and more, outdoor line-of-sight

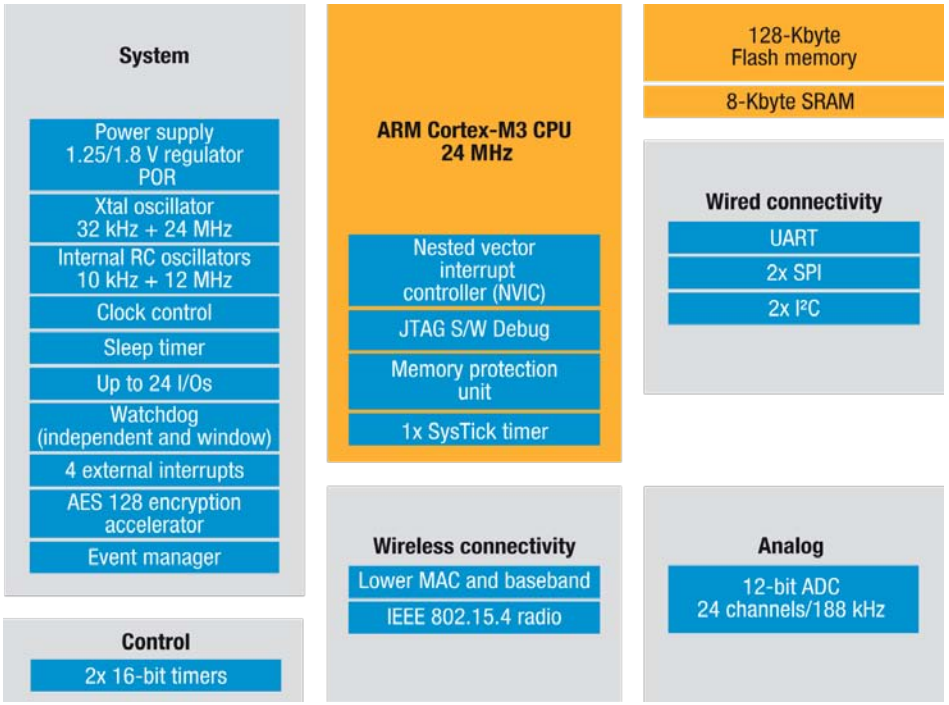
STM32W – IEEE 802.15.4 radio

- Microcontroller
  - ARM Cortex-M3 core architecture
  - Embedded memory (eFlash 16kx64, SRAM 4kx16)
- IEEE 802.15.4 2.4 GHz radio
  - Transmitter: 2-point direct synthesizer modulation
  - Receiver: low IF super heterodyne architecture
  - Digital baseband DSP and MAC support
  - -100 dBm sensitivity and up to 7 dBm output power
- Networking
  - ZigBee compliant PRO and RF4CE stacks
  - 128-Kbyte Flash for stack and apps codes
  - IEEE 802.15.4 simple MAC library
- Peripherals
  - AES encryption HW accelerator
  - Debug channel via JTAG
  - USART, SPI, I²C, 24 GPIOs
- Other
  - Compatible with SN2xx series
  - QFN48 and QFN40 packages available



STM32W architecture overview

- 32-bit ARM Cortex-M3 core running @ 24 MHz
- 128-Kbyte Flash, 8-Kbyte RAM (256k soon)
- Fully IEEE 802.15.4 compliant radio @ 2.4 GHz
- Power management
  - Deep sleep mode <1 µA with RAM retention
- On-chip debug support
  - ARM JTAG/SWD
  - Packet trace interface enables remote monitoring of radio messages
- ARM memory protection unit
  - To detect erroneous software accesses
- Sleep timer, watchdog timer and GP timers
- AES 128 encryption acceleration
- Serial communication (UART/SPI/I²C)
- GPIO
- ADC (6 channels, first order 12 bits sigma delta)



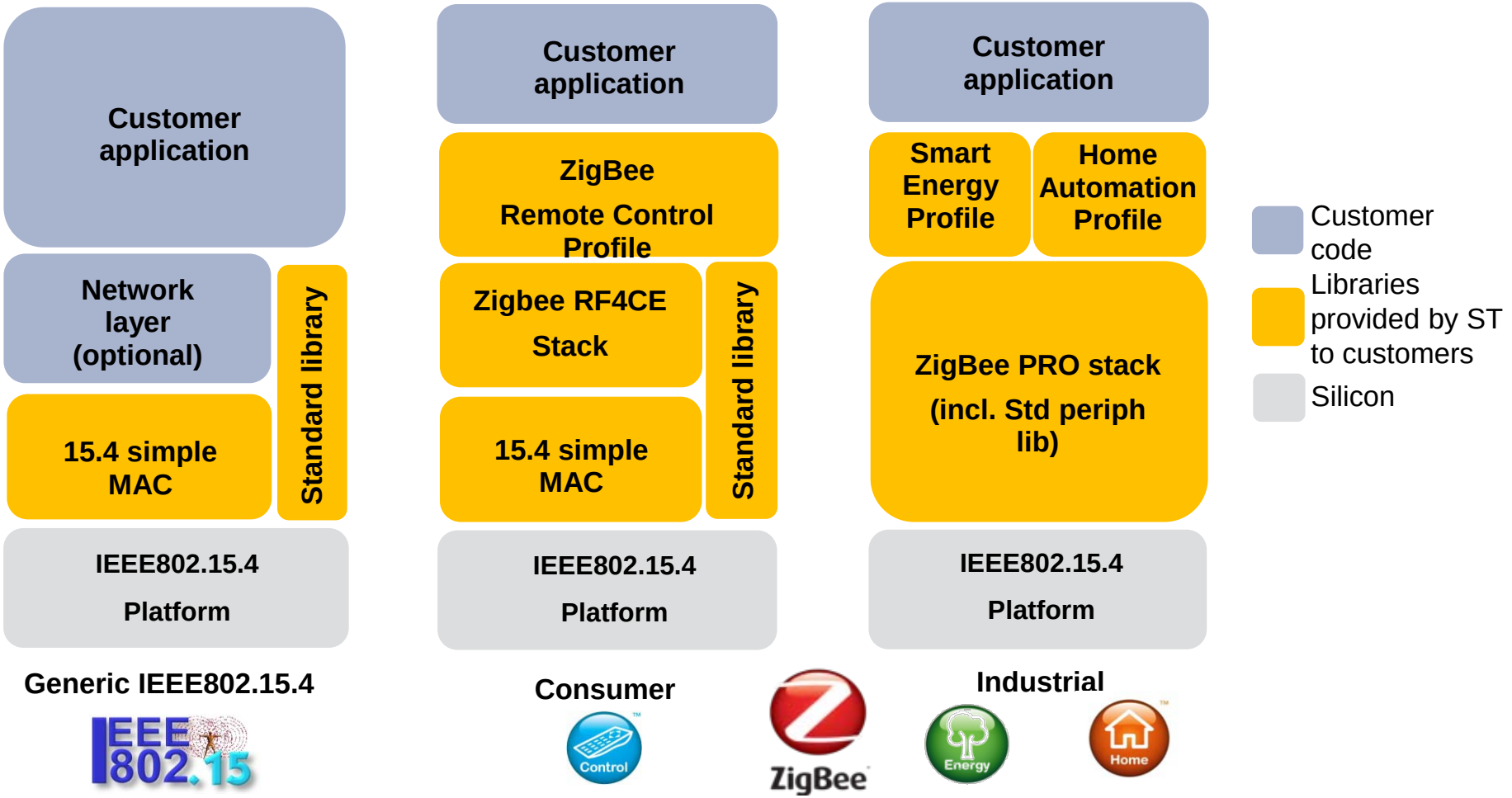
Power management modes

Native Cortex-M3 sleep mode is a perfect foundation to implement several STM32W system low-power modes

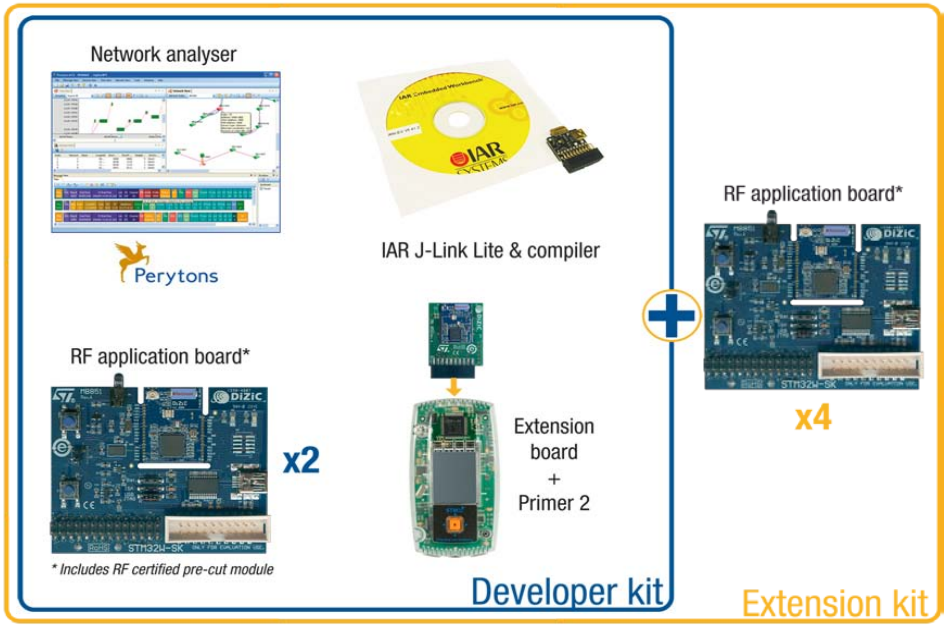
Mode	Regulators	Low-frequency 10 kHz RC oscillator	32 kHz crystal oscillator	High-frequency 12 MHz RC oscillator	24 MHz crystal oscillator	Power consumption
Deep sleep 2	off	off	off	off	off	0.7 µA
Deep sleep 1	off	off	optional	off	off	0.4 µA
Standby	on	on	optional	off	off	2 mA
Active at 12 MHz	on	on	optional	off	on	6 mA

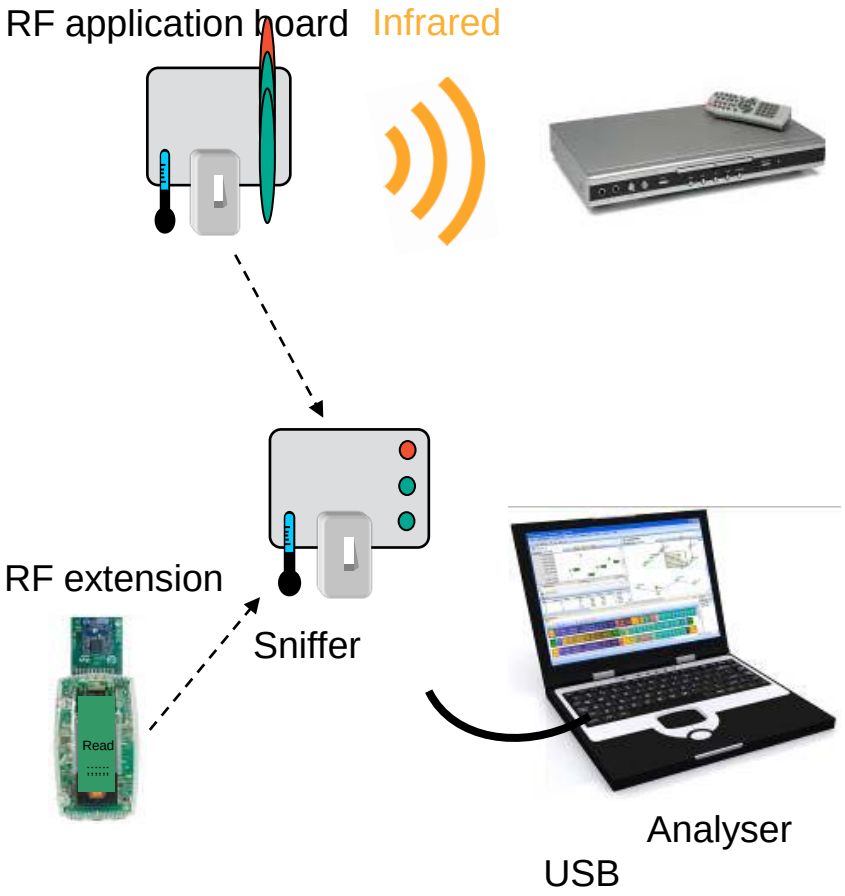
Active mode	Sensitivity	Rx current	Tx current	Tx current
Radio peripheral	dBm	mA	mA at 0 dBm	mA at -32 dBm
	-100	20	24	15

F/W & Libraries IEEE802.15.4 (1/3)



STM32W development tools





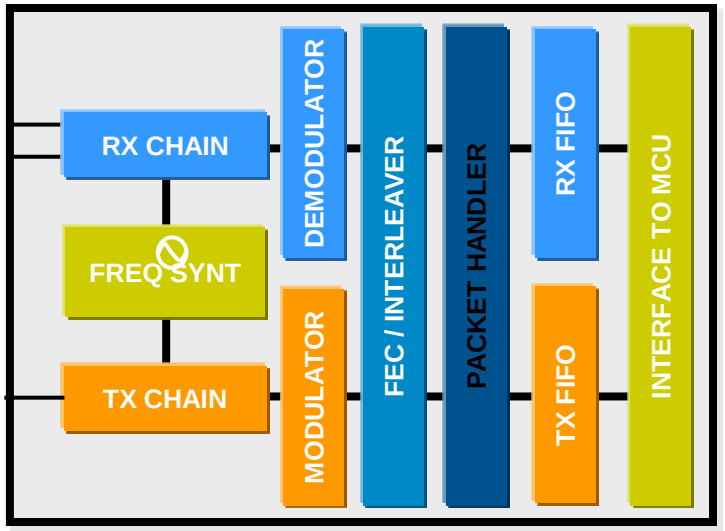
SPIRIT1

Sub 1GHz Proprietary Transceiver

Full production Q1'12

- **RF PERFORMANCE**
  - Freq Bands: 300-348 MHz, 387-470 MHz, 779-956 MHz
  - Programmable output power: from -30dBm to +12dBm
  - Programmable Data Rate: from 1 to 500 kbps
  - Low current consumption (6mA RX, 433 MHz, FSK, 38.4kbps)

- **ANALOG FEATURE**
  - Modulations: FSK, GFSK, MSK, OOK and ASK
  - Frequency Hopping is allowed
  - Automatic Frequency Offset Compensation
  - Battery indicator and low battery detection



- **DIGITAL FEATURE**
  - 4 **pre-defined packets**:
    - Basic
    - Virtual Multi Channel
    - STack
    - **Wireless M-BUS**
  - Hardware support for packet handling and burst transmission
  - Link quality indicators and received signal qualifier (RSSI, LQI, PQI, SQI, CS)
  - Supports CSMA/CA

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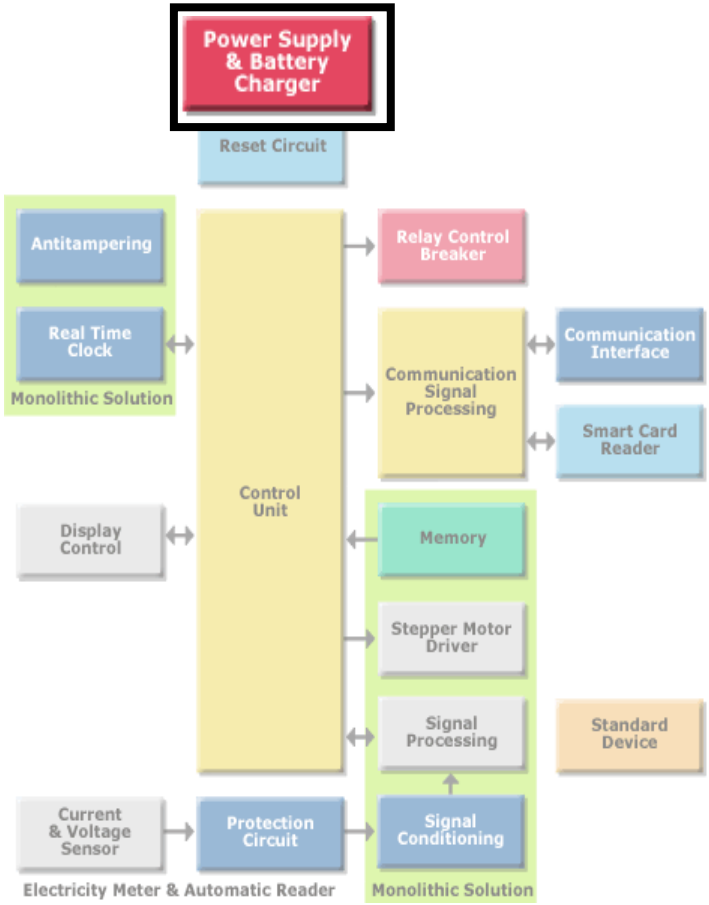
Power Supply.



ST approach in metering Power supply

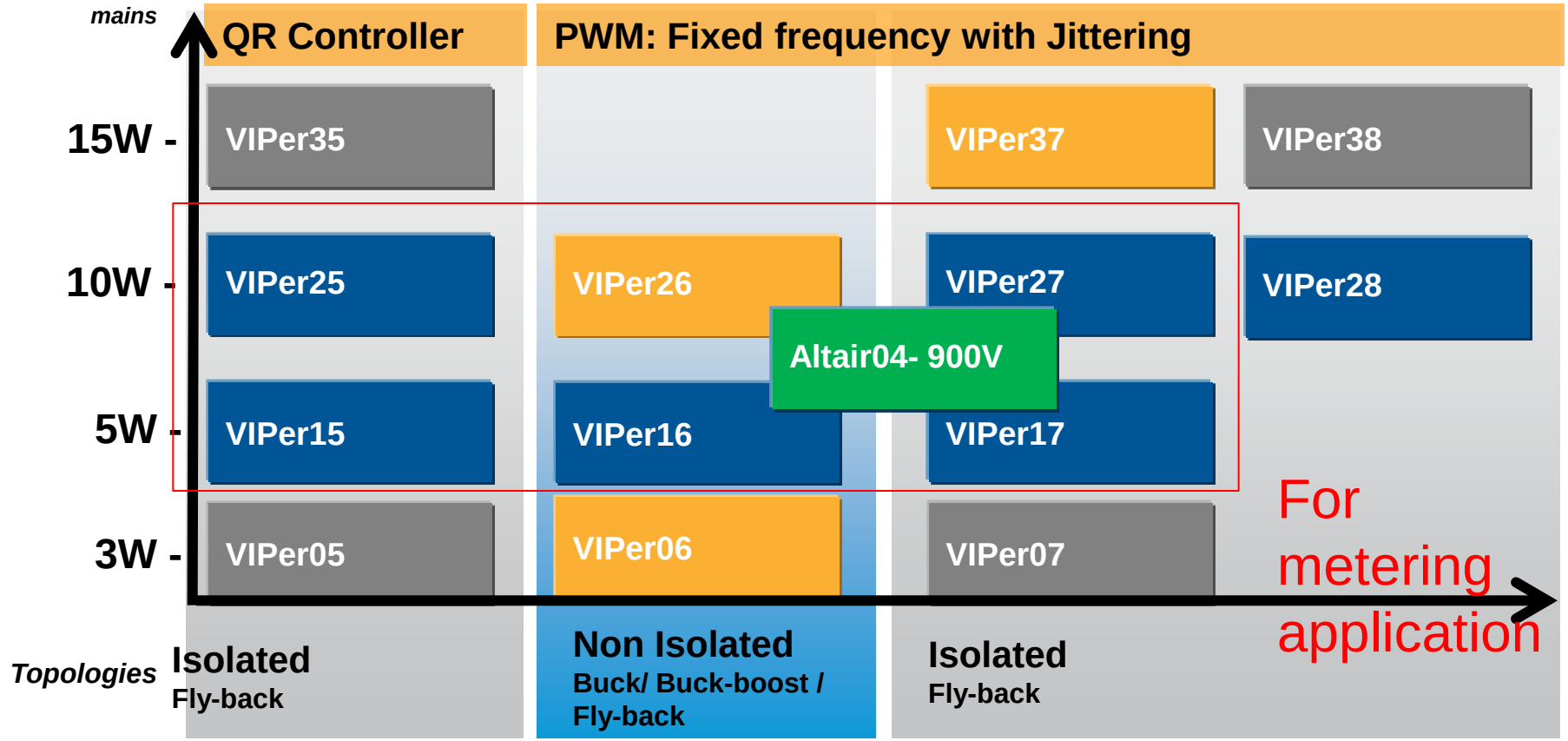
- We offer solutions not only a components
  - We take the needs
  - We give schematic + MOB for each request.

- A Power Supply Competence Center to serve you:
  - More than 10 years of experiences.
  - Design for or with you to save your time.
  - Hot line.

- We adapt the products to the market need:
  - Low end meter <1W: regulator and DC/DC converter: Viper12
  - Multifunction meter > 1W: buck and fly back with viper12, viper16
  - Ultra wide voltage range : AN2625
  - AMM >5 W + ultra wide voltage range: L6565 + MOS or Viper 17
  - Concentrator #20 W L6565 + MOS

ST SMSP Offer for metering

Direct Conversion from AC Mains to DC Low Voltage DC
Very low stand by consumption 30mW



In production | *Production Q1 2010* | *Production Q2 2010*

65

Application: metering with Altair04

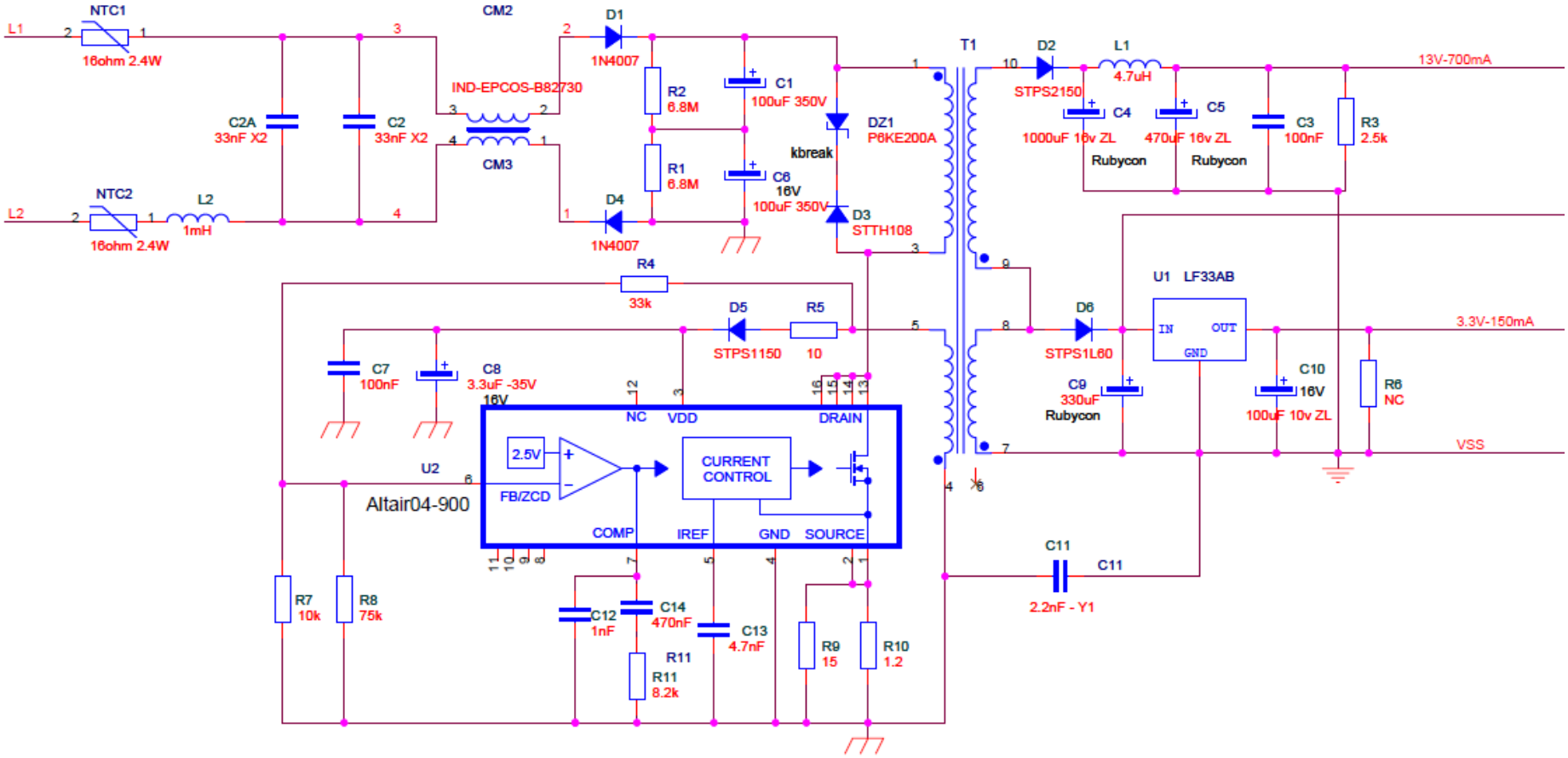
Metering SMSP needs at a glance

- Fault tolerant (connection between to phase) => high break down voltage
- Up to 5 W output
- Strong efficency in low load condition (95%) of the time
- Topologies : **Standard not/isolated flyback**

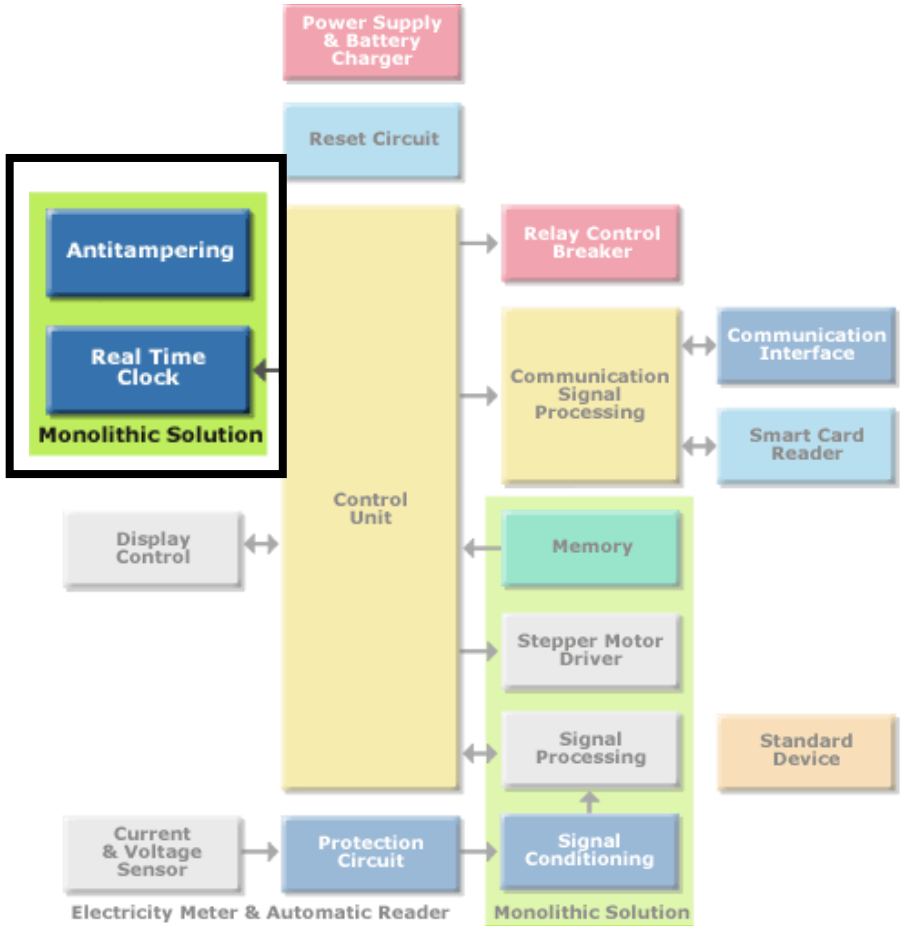
SELLING POINTS:

900V MOSFET → RELIABILITY + BOM REDUCTION +
COMPLIANCY WITH SYSTEM SPECS,
COMPACTNESS
EXTREMELY LOW COST (NO NEED OF OPTO)

ALTAIR04-900 : ST7590 demo



Serial RTC and Supervisor



Advanced Analog in Electricity Metering

Serial RTC with Switch Over
M41T00S, M41T81S, M41T56, M41T11 – I2C RTC optimized for a lithium battery back-up

Serial RTC
M41T6x – I2C RTC optimized for a supercap back-up

Serial RTC with Security Fearures M41ST87 – I2C RTC in an embedded crystal package, physical tamper detect and Microprocessor Supervisor

Serial RTC with Microprocessor Supervisor
M41ST84 – I2C RTC with reset and PFI/PFO
M41ST85 – I2C RTC with reset, PFI/PFO and Switch Over

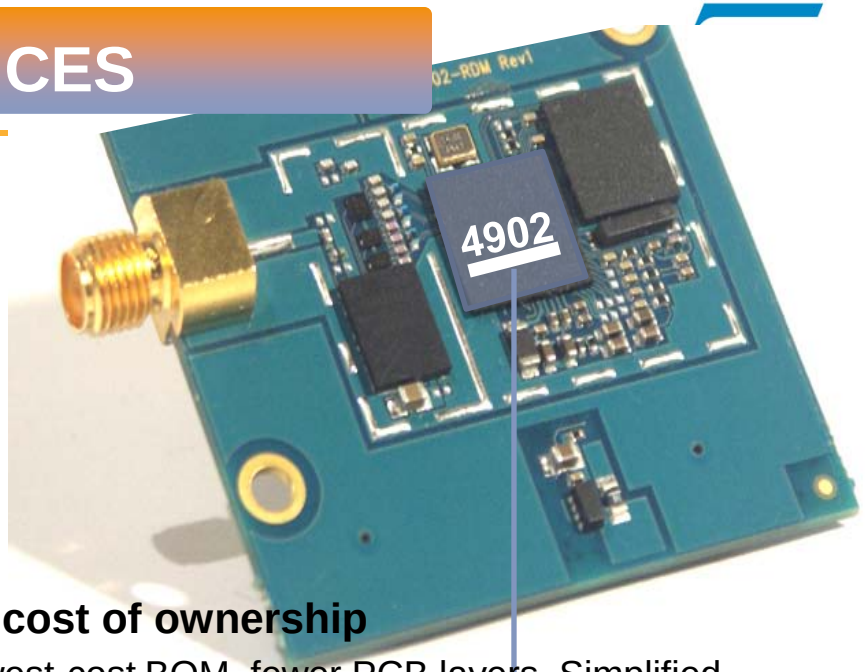
Serial RTC with Analog Calibration
M41T82 – I2C RTC with reset
M41T83/93 – I2C/SPI RTC with reset and programmed calibration in embedded package

Microprocessor Supervisors
STM69x/ STM7xx / STM8xx / STM63xx /STM68xx – Reset, Watchdog, Early Power Fail Warning, Switch Over

Single Voltage Reset
STM8xx/ STM1001 / STM18xx -Reset with Push-Pull, Open drain, Open Drain with pull-up resistor or Open Drain bi-directional output

Temperature Sensor
STLM75 : Digital Temperature Sensor
STLM20 : Analog Temperature Sensor

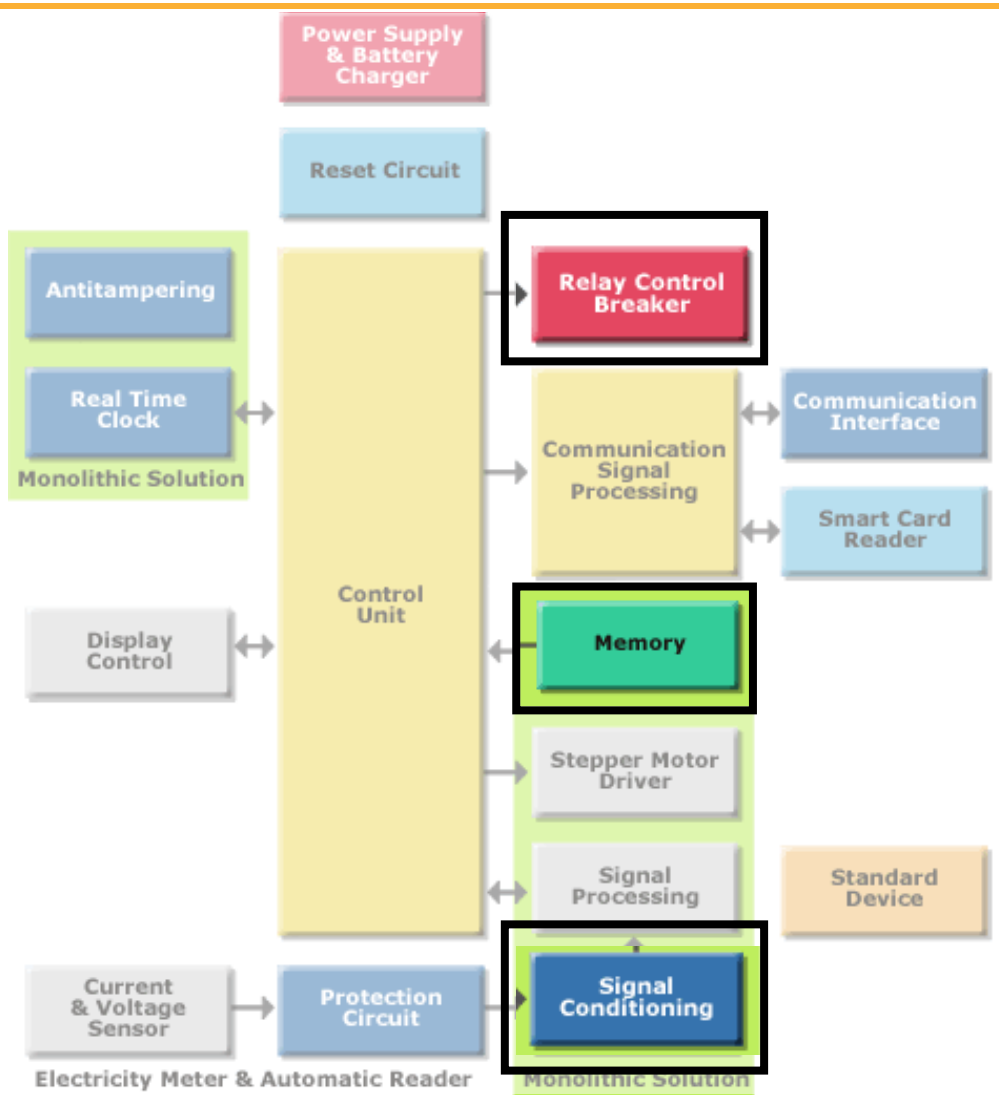
Low cost single Chip GPRS solutions: PNX4902



- **Highest integration and smallest footprint**
  - Integration in a single chip for best-in-class power consumption and cost-driven solutions
  - Industry's smallest footprint
- **Robust, powerful and cost-effective**
  - Platforms are thoroughly tested and operator approved before
  - market release
  - Reduced cost through optimized platform size and minimal external components

- **Lowest cost of ownership**
  - Lowest-cost BOM, fewer PCB layers, Simplified supply chain
  - Enhanced yield and reliability
  - Optimized factory test times
    - More system specs pre-tested at IC-level
- **Highest performance**
  - Best-in-class RF performance
    - Based on proven Aero XCVR, over 500M handsets shipped worldwide
    - Large margin to all GCF RF specs
  - Industry-lowest power consumption

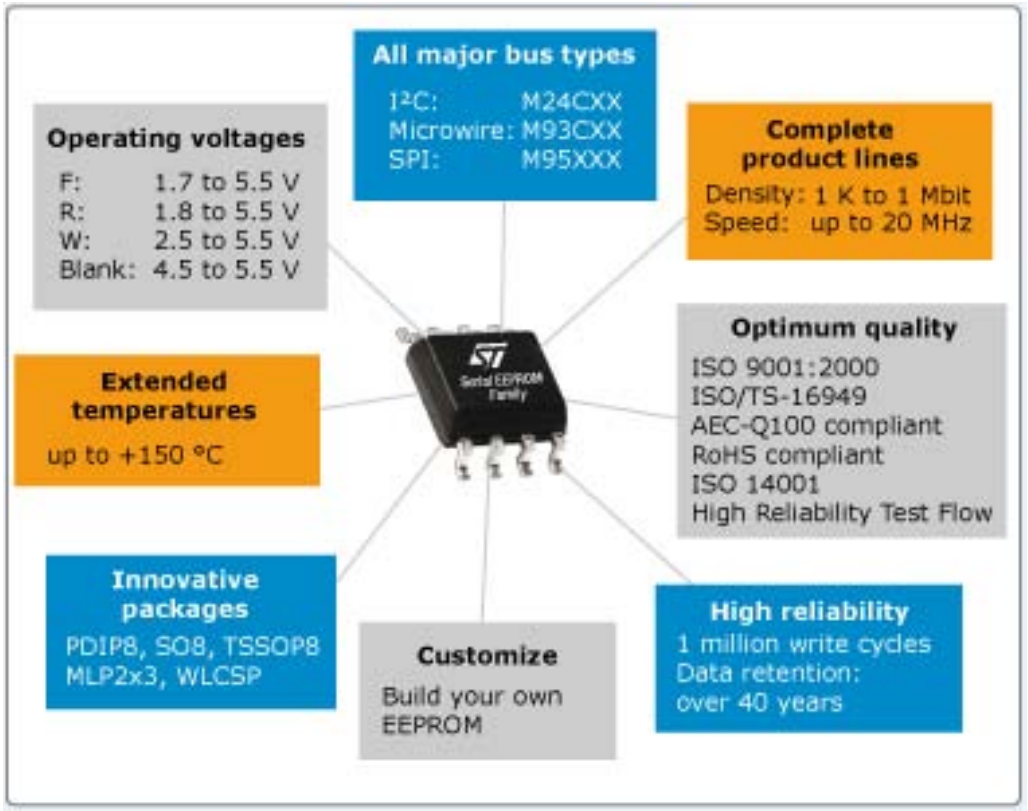
Commodities



EEPROM

ST N° 1 WW supplier

Source : Actual iSuppli, Competitive landscape March 08



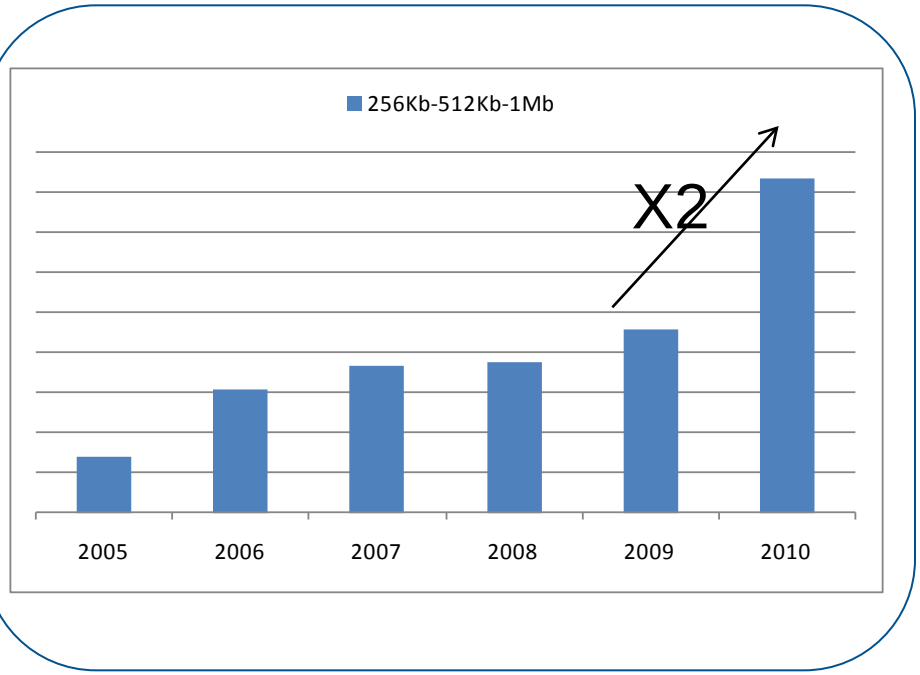
Broadrange Portfolio of EEPROM

Bus	Density	1Kb	2Kb	4Kb	8Kb	16Kb	32Kb	64Kb	128Kb	256Kb	512Kb	1 Mb	2 Mb
I²C		M24C01	M24C02	M24C04	M24C08	M24C16	M24C32	M24C64	M24128	M24256	M24512	M24M01	M24M02
	SO8	•	•	•	•	•	•	•	•	•	•	•	•
	TSSOP8	•	•	•	•	•	•	•	•	•	•	Q3 2011	
	MLP 2x3		•	•	•	•	•	•	•	•	•		
	WLCSP				•	•		Q2 2011	•	•	•	•	• *
SPI			M95020	M95040	M95080	M95160	M95320	M95640	M95128	M95256	M95512	M95M01	M95M02
	SO8	•	•	•	•	•	•	•	•	•	•	•	•
	TSSOP8	•	•	•	•	•	•	•	•	•	•	Q3 2011	
	MLP 2x3		•	•	•	•	•	•	•	•	•		
	WLCSP					•				•	•	•	• *
MICROWIRE		M93C46	M93C56	M93C66	M93C76	M93C86							
	SO8	•	•	•	•	•							
	TSSOP8	•	•	•	•	•							
	MLP 2x3			•									
		M93S46	M93S56	M93S66									
	SO8	•	•	•									
DRAM SPD			M34E02										
	TSSOP8		•										
	MLP 2x3		•										

NEW

- * Under developpement
- PDIP package available for I²C 1Kb to 64Kb, and for MICROWIRE 1Kb
- M93S series feature programmable write protect

Innovative in High Density



2007
1Mb SO8N in full prod

FIRST

2009
512Kb in MLP 2x3

- LCD Panel
- TV
- Metering
- Bluetooth
- Hearing Aids

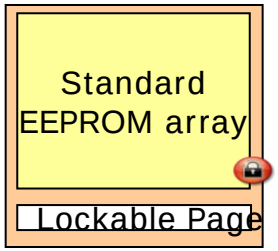
NEW

Since Q1 2011
2Mb I²C & SPI
in SO8N

Lockable Page EEPROM

NEW

- **Helps you to store parameters, which must remain permanently protected** :
  - ST Device ID
  - Unique ID
  - Serial Number
  - Board description
  - Traceability code
  - Packages : SO8N, TSSOP8 and MLP 2x3



Product	Salestype	Availability
2Mb I²C & SPI	M24M02-DRxxx M95M02-DRxxx	**Q1 2011** **Q1 2011**
1Mb I²C & SPI	M24M01-DRxxx M95M01-DRxxx	**2011**
512Kb I²C & SPI	M24512-DRxxx M95512-DRxxx	**Available**
256Kb I²C & SPI	M24256-DRxxx M95256-DRxxx	**Available** **Q1 2011**
128Kb I²C & SPI	M24128-DRxxx M95128-DRxxx	**2011**
64Kb I²C & SPI	M24C64-DRxxx M95640-DRxxx	**Available** **Q1 2011**
32Kb I²C & SPI	M24C32-DRxxx M95320-DRxxx	**2011**

New Specific product : Event recorder

- **Enables design for real time and fast data recording in EEPROM**
  - **Record 256bytes of data in one shot in less than 1ms**
  - **Low power consumption makes it easy to supply from small size capacitor (unlike Flash).**
  - **Ideal to handle unexpected power off situation**

NEW

- **Suited for Metering, Industrial applications**

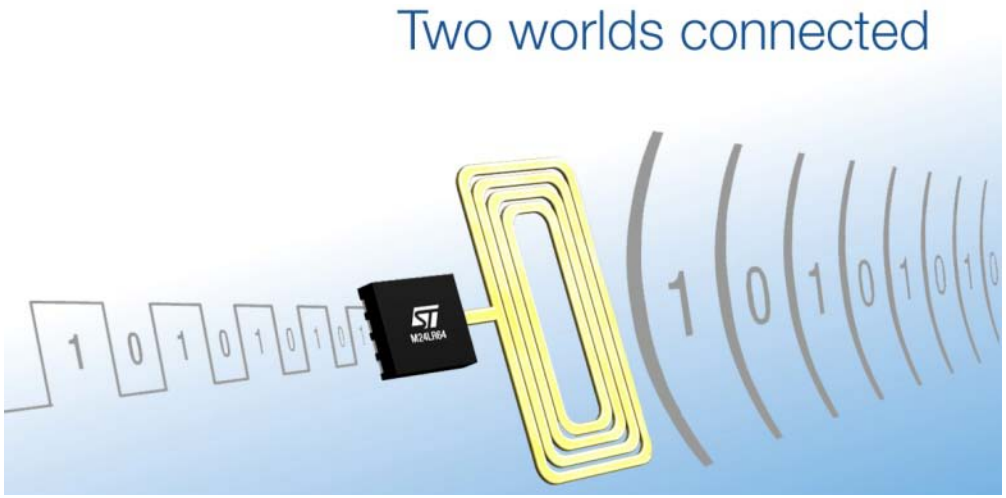
- **Product features**
  - 32Kb SPI EEPROM
  - Large page size of 256bytes
  - Fast write EE area: program in less than 1ms for 256bytes !
  - SO8 & TSSOP8 and MLP2x3 packages
  - Fast clock frequency: >10Mhz at 2.5V

→Product name : M35B32, samples available March'11

Dual Interface EEPROM – Introduction

The Dual Interface EEPROM is an electrically-erasable memory which communicates with Read and Write attributes through :

- **a wired I²C interface with MCU or chipset**
- **RF, using an industry-standard ISO 15693 which does not require any on-board power**



I²C interface	EEPROM	RF interface

Enabling a wide range of use cases…

Parameter setting

Activation key

MANUFACTURING & LOGISTICS

Factory settings

Traceability

Model ID

Customer ID

Usage/load information

END USER

Event recorder

SERVICING & MAINTENANCE

Fault report

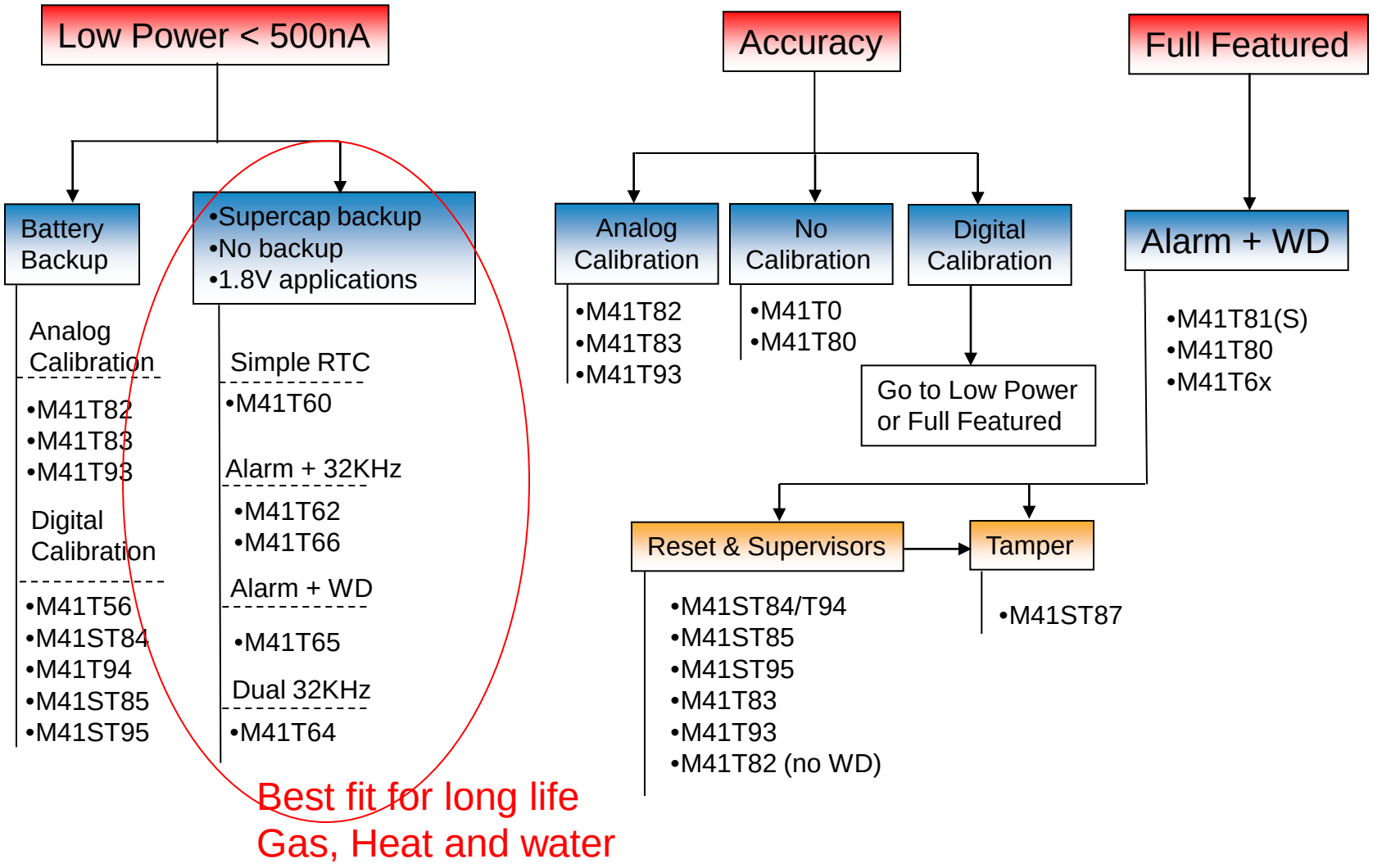
Traceability

Wear-out information

Tamper Detection

Activation parameters

Portfolio of serial RTCs



Commodities Kit for Electricity Meter

POWER I/Os

POWER SUPPLY

Turbo II diodes:

STTH8R06D/ STTH8L06D

STTH5R06D/STTH5L06D

STTH110

150V Schottky:

STPS1150

STPS2150

Linear regulator

L78xx

PROTECTION / VOLTAGE REFERENCE

Transils:

P6KExx, SM6Txx, SMBJxx

SM15Txx, SMCJxx

BZW06xx, BZW50xx

ESD PROTECTION

RS232 / 422

ESDA25B1+ESDA25SC6

ESD for display

ESDA6V1-5W6

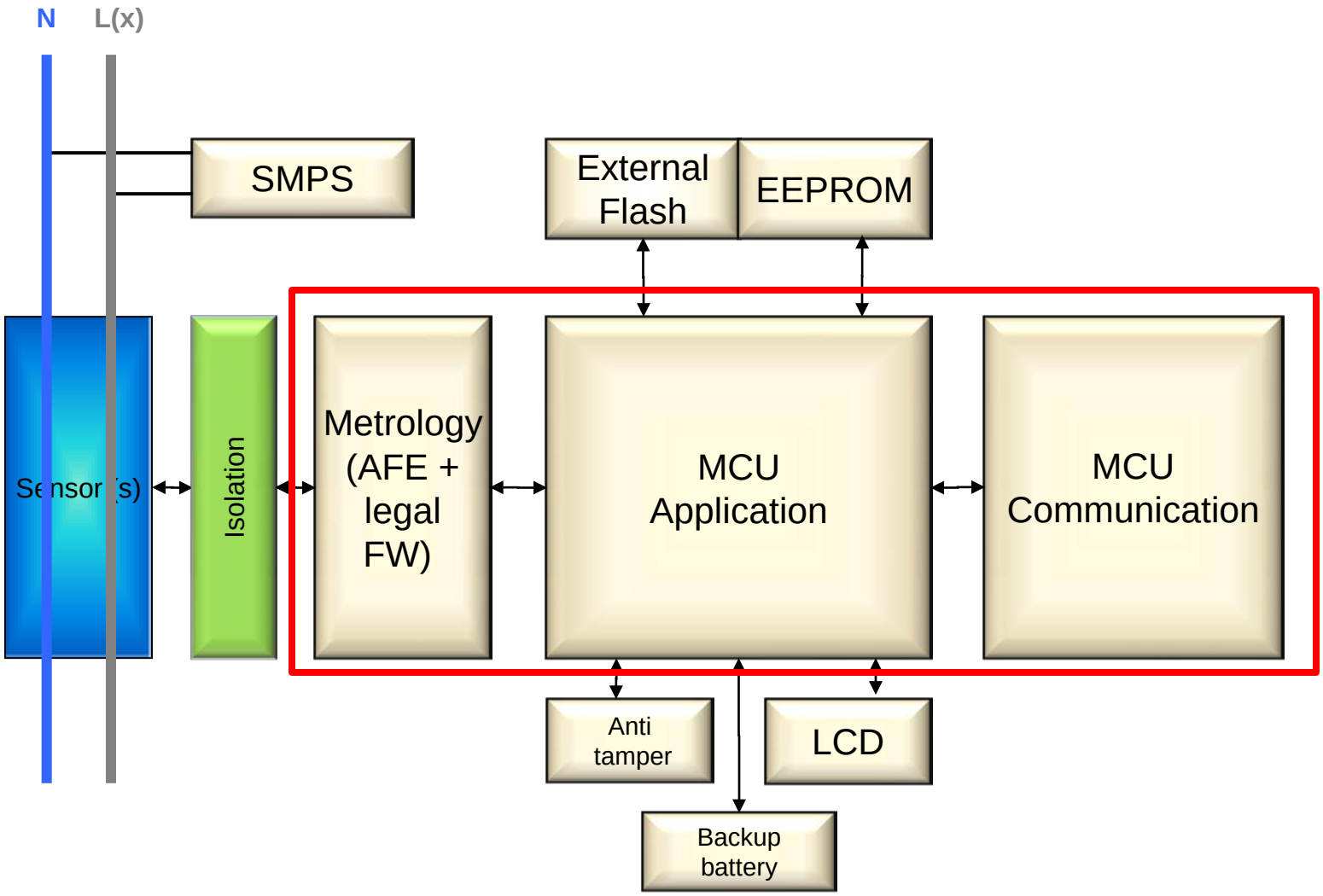
REVERSE BATTERY

Schottky diodes:

STPS1L60 / STPS0560Z

Other Smart Grid tools

ST : Meter with communication interface



STEVAL-IPP002V
Smart meter system for AMI

- Compatible to STPMxx AFE application
- DLMS/COSEM Application available by 3th party
- PLC communcation integrated based on SFSK modulation (ST7570)
- Compatible to Linky Spec G1

ST technology and qualifying factors in Smart Metering

ST offers a unique mix of qualifying factors :

- **Reliable and independent Semiconductor vendor**
- **World wide support and supply chain to any subcontractor**
- **Wide electronic meter system coverage with a complete kit of advanced semiconductor devices**
- **Ability to identify, support and adapt to market evolution trends and changes**
- **ST approach is to promote open standards and provide cost effective royalty-free solutions**
- **Long term presence in the AMR market and strong field based system know-How**