



MindMotion Microelectronics

(靈動微電子股份有限公司)

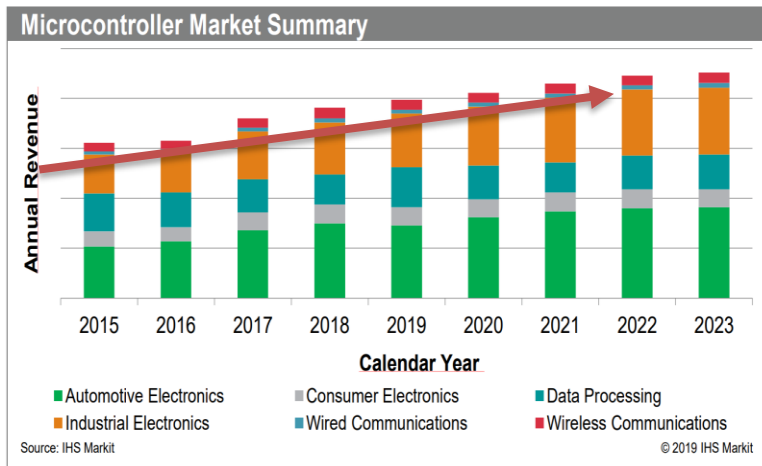
2019.



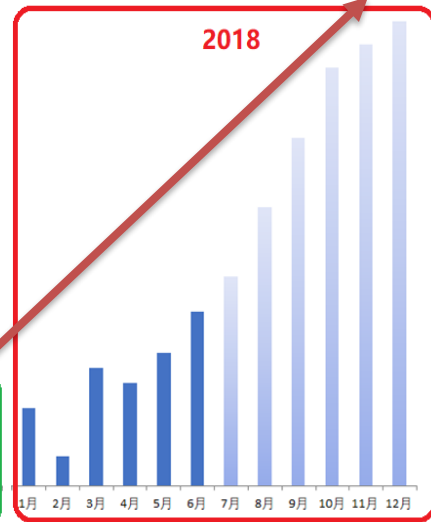
MindMotion MM32™

Growing **MM32** MCU

- ◆ **MM32 MCU 3pcs/sec @ 2019 estimation**
- ◆ **Quality, Safety, Performance, integration, BOM**



10X speed



2019

About Us

- ◆ Shanghai MindMotion Microelectronics Co., Ltd. (**NEEQ:833448, 灵动微电**) is a leading domestic solution provider in both MCU Designs and Applications. The company is certified as an IC design enterprise by the Chinese Ministry of Industry and Information Technology and the Shanghai Information and Technology Office, as well as being designated a high-tech enterprise by Shanghai municipal government. Since its founding in March 2011, MindMotion has successfully completed the design and promotion of hundreds of MCU products. **Based on ARM Cortex-M0 and Cortex-M3 core** are widely used in industrial control systems, smart homes, wearable tech, automotive electronics, instrumentation, and many other fields.
- ◆ Arising from the domestic industry and bearing a deep understanding of the local market and consumers, MindMotion embraces a “**cradling style**” of work via our comprehensive support tailored to our customers needs. Together with the corporate philosophy of "Professionality, Reliability, Convenience and Efficiency", the company is guided by a strategy that maximizes product differentiation while minimizing operating costs. The ecological value of our products is constantly enhanced so as to maintain our reputation within the industry. By engaging early with our customers and learning as much as we can about their needs, we provide an integrated and complete product solution; participating in the definition of product function and completeness analysis, algorithm integration, device driver and application example programs. MindMotion provides customers with accurate market analysis and comprehensive solutions, so that the success of each significant phase can be ensured.
- ◆ With our company vision of “To Become the Foremost Driving Force in Chinese MCU Solutions”, MindMotion is well on its way to the pioneer and leader of China's domestic MCU design and solutions, wishing to share a better future together with all of our partners from the IC industry.

Milestone

Establish in Shanghai

- Embedded Flash architecture build
- 180nm design rule build
- Launched 8051 MCU

Launched MM32 MCU base on ARM® Cortex®-M3 (MM32F1)

- Certified as High-New Technology enterprise by China MST.
- Listed NEEQ (833448)
- MindMotion HK establish

MindMotion MCU win the "Top 5 Innovative Greater China IC Design Companies" award

- MindSafe launched
- MindMotion NJ & TW establish.

MM32SPIN launched

MM32-LINK launched

- MM32-ICP/IAP launched
- MM32-Cube develop

- 32Bit MCU architecture build
- 110nm design platform setup

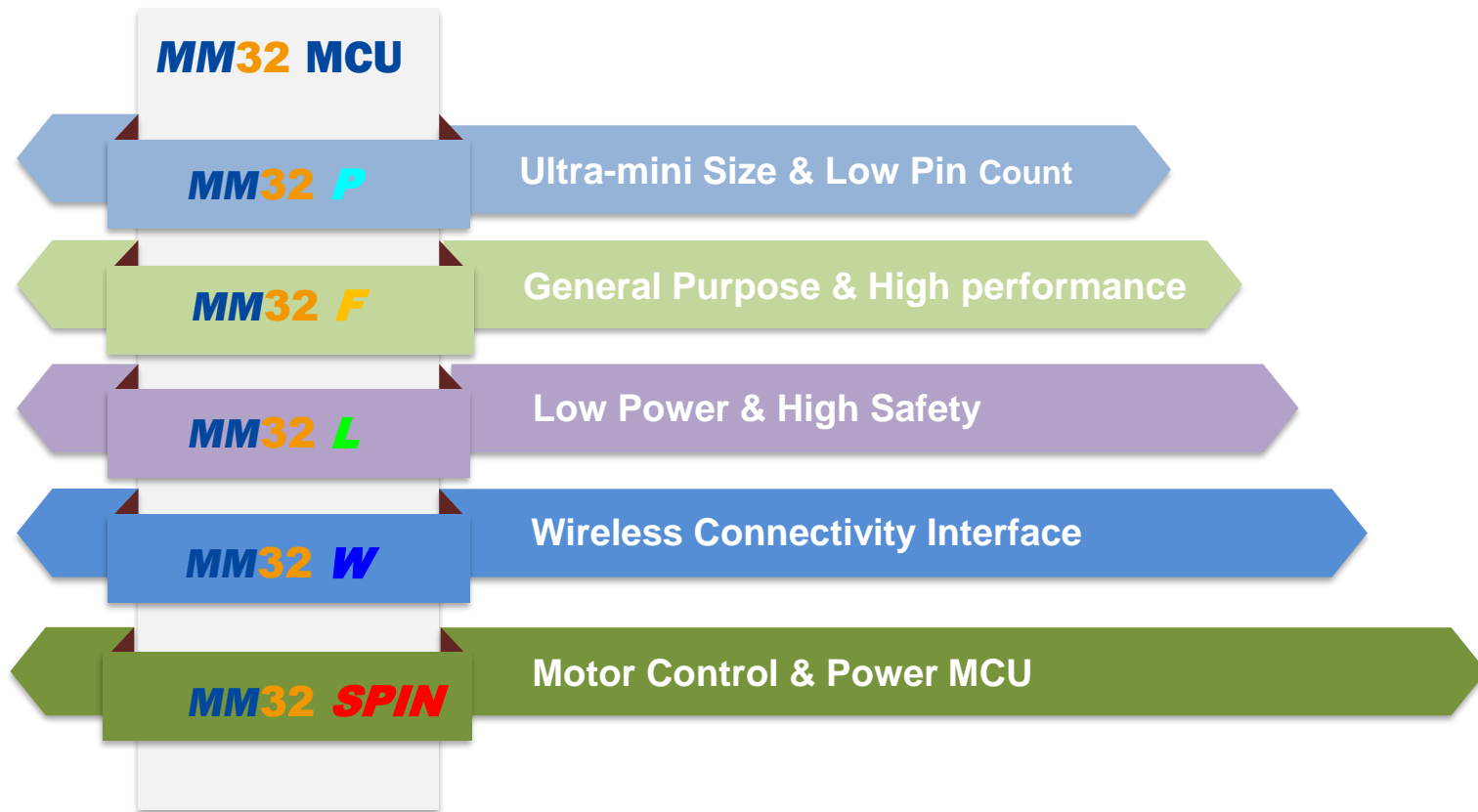
- Develop the Customized low power 32-bit CPU core
- IP develop cooperation agreement with HHGrace
- Awarded ARM® Cortex®-M3 unlimited licenses

- Awarded ARM® Cortex®-M0 unlimited licenses
- Launched MM32 MCU base on ARM® Cortex®-M0 (MM32F0/L0/P0)
- Awarded ISO9001-2008 certification
- Awarded IC Design Industry Outstanding Enterprise reward.
- MM32F103 MCU awarded "the most potential product" in 11th "Chinese Chip Competition"
- MindSafe technology design.
- 55nm design architecture prepared
- MindMotion SZ establish

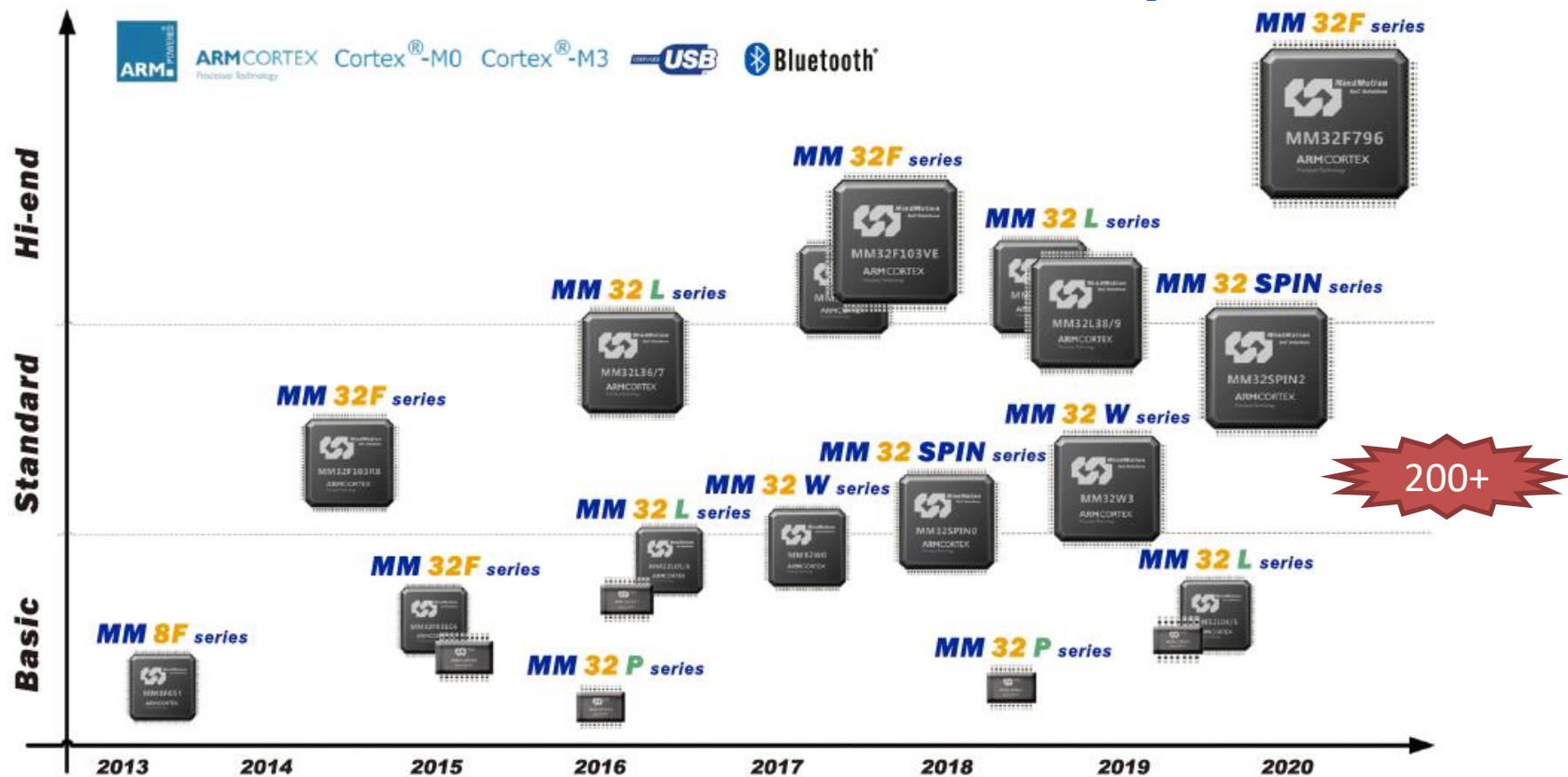
Location



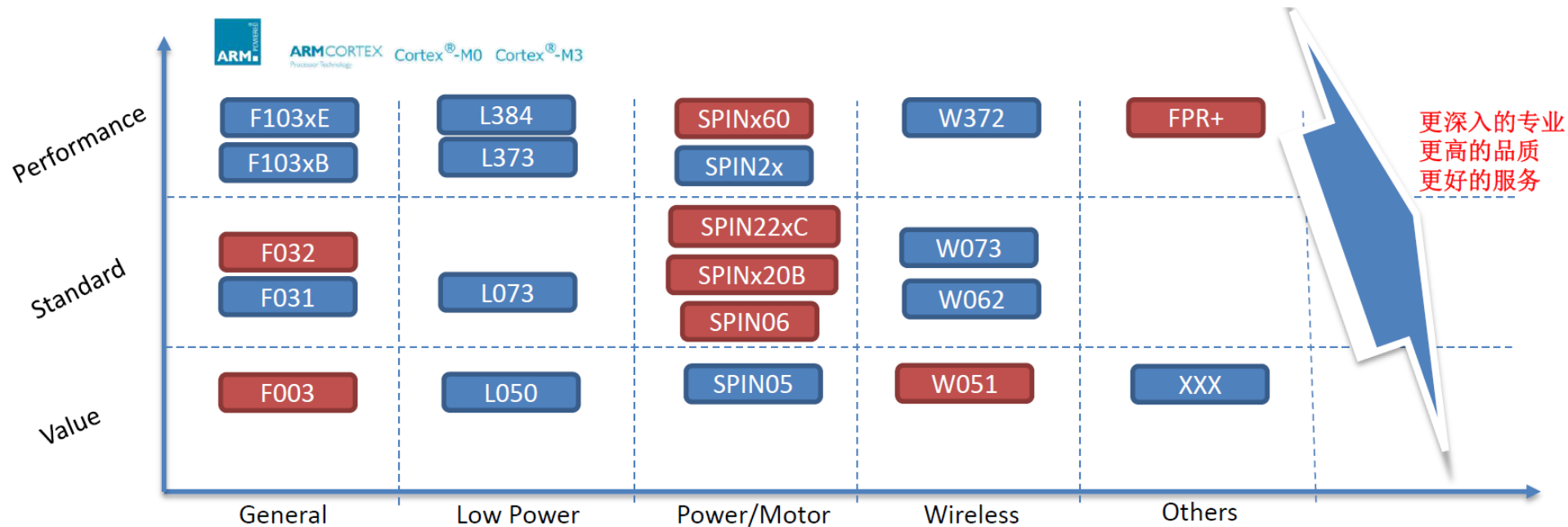
MindMotion[®] MM32[™] MCU Family



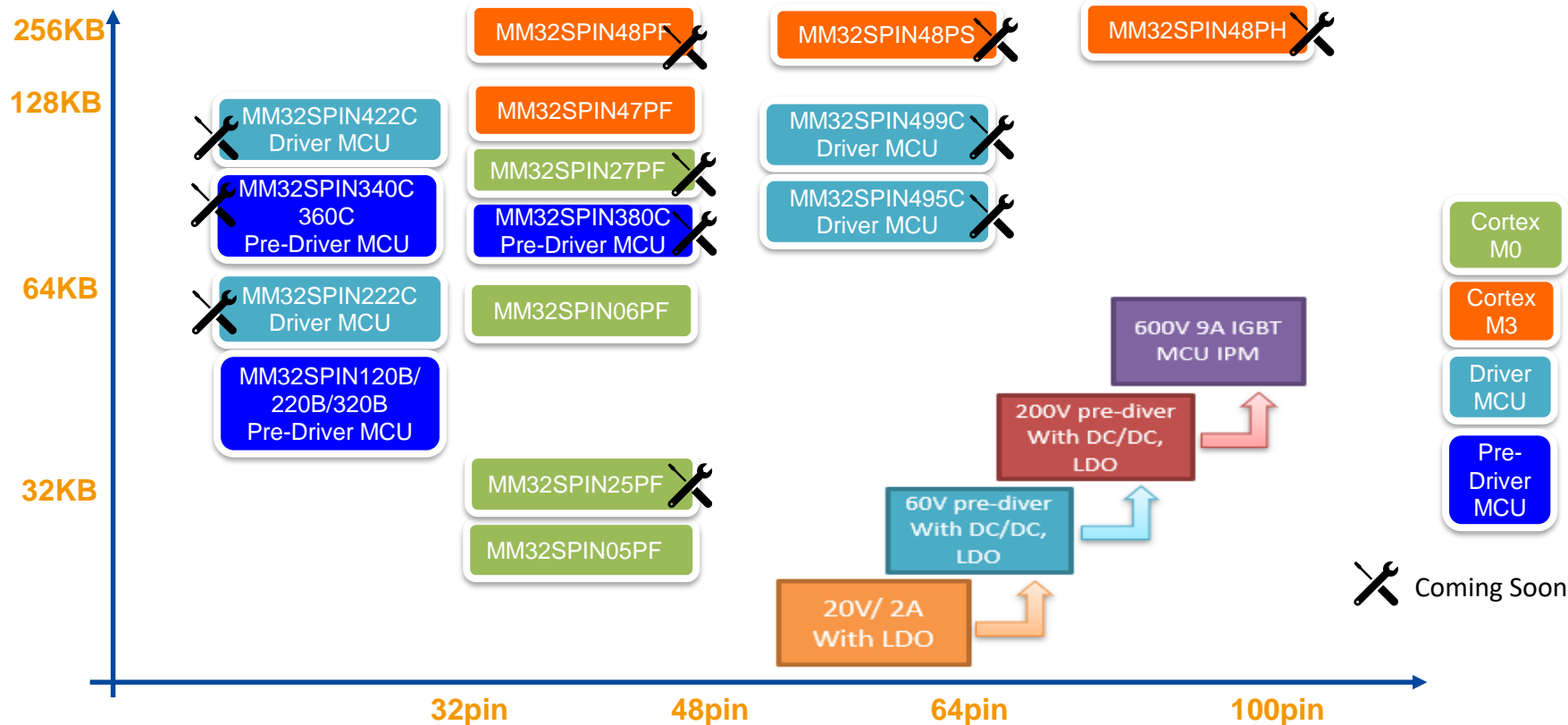
MindMotion® MM32™ MCU Roadmap



MindMotion[®] MM32[™] MCU Roadmap



MM32SPIN MCU Roadmap




Coming Soon

MindMotion[®] MM32[™] F series

- ◆ Core:   Cortex[®]-M0 Cortex[®]-M3
- ◆ Package: 20pin ~ 100pin
- ◆ Frequency: 24MHz ~ 144MHz
- ◆ Flash ROM: 16KByte ~ 512KByte
- ◆ SRAM: 2KByte ~ 128KByte
- ◆ Whole parts support 2~5.5V wide range supply voltage

MindMotion[®] MM32[™] L series



- ◆ Core:  ARM CORTEX Processor Technology Cortex[®]-M0 Cortex[®]-M3
- ◆ Standby current: 0.2uA
- ◆ package: 20pin ~ 64pin
- ◆ Frequency: 48MHz ~ 96MHz
- ◆ Flash ROM: 32KByte ~ 512KByte
- ◆ SRAM: 4KByte ~ 128KByte
- ◆ The world's main stream low-power MCU level Strong code protection and data stream encryption

MindMotion[®] MM32[™] W series

- ◆ Core:  ARM[®] CORTEX[®] Cortex[®]-M0 Cortex[®]-M3
- ◆ Connectivity Type: BLE 、 2.4GHz ^{**}、 sub 1GHz ^{**}
- ◆ Package: compatible with F & L series
- ◆ “Wireless MCU in-place replacement of general purpose MCU” and “wireless being a standard MCU interface” concept.

^{**}: under development

MindMotion[®] MM32[™] P series

- ◆ Core:   ARM CORTEX Cortex[®]-M0
- ◆ Package: 8pin ~ 16pin
- ◆ OTP ROM: 4KByte
- ◆ The smallest package ARM Cortex-M0 MCU

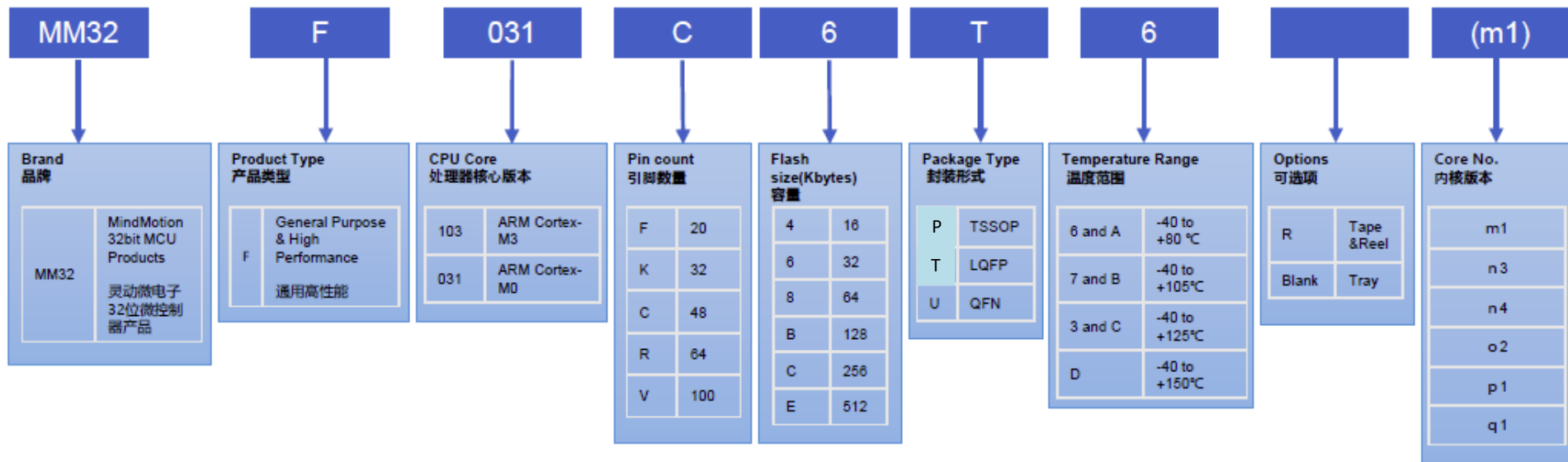
Series	Part No.	Max Speed (MHz)	Memory		I/O	Timer Functions		Analog Interface	Package
			OTP (KB)	RAM (B)		GPTM (8bit)	WDG	ADC	
MM32P021	MM32P021SE	16	4	128	5	2	1	3×12bit	SOP8
	MM32P021MN	16	4	128	7	2	1	4×12bit	MSOP10
	MM32P021SR	16	4	128	11	2	1	5×12bit	SOP14

MindMotion[®] MM32[™] SPIN series

- ◆ Core:  ARM[®] CORTEX[®] Cortex[®]-M0 Cortex[®]-M3
- ◆ Computing power: 72 ~ 120MHz
- ◆ Flash ROM: 32KByte ~ 256KByte
- ◆ SRAM: 4KByte ~ 64KByte
- ◆ Support H/W Divider, High Speed PWM and OP embedded.
- ◆ Gate Driver, MOS embedded

Series	Part No.	Max Speed (MHz)	Memory (KBytes)		I/O	Timer Functions				Connectivity				Analog Interface		Driver	Mosfet	Package
			Flash	RAM		Advanced TM (16bit)	GPTM (16bit)	GPTM (32bit)	WDG	UART	SPI	I ² C	CAN 2.0B	ADC 12bit	COMP			
MM32SPIN Driver MCU	MM32SPIN120B	72	32	4	14	1	4	1	2	1	0	1		8×12bit	1	2phase		QFN32
	MM32SPIN220B	96	64	8	10	1	4	1	2	1	0	1		8×12bit	2	2phase		QFN32
	MM32SPIN320B	96	64	12	14	1	4	1	2	1	0	1		8×12bit	2	2phase		QFN32
	MM32SPIN222C	96	64	8	11	1	4	1	2	1	0	1		6×12bit	2	3phase	2A	QFN32
	MM32SPIN422C	96	64	12	11	1	4	1	2	1	0	1		8×12bit	3	3phase	2A	QFN32

MindMotion[®] MM32[™] Naming Rules – F103/031



MindMotion[®] MM32[™] Naming Rules – F003

MM32

Brand
品牌

MM32

MindMotion
32bit MCU
Products

灵动微电子
32位微控制
器产品

F

Product Type
产品类型

F

General
Purpose &
High
Performance

通用高性能

003

CPU Core
处理器核心版本

003

ARM
Cortex-
M0

T

Package Type
封装形式

T

TSSOP

N

QFN

W

Pin Count
引脚数量

W

20

Options
可选项

R

Tape
& Reel

Blank

Tray

(m1)

Core No
内核版本

m1

n3

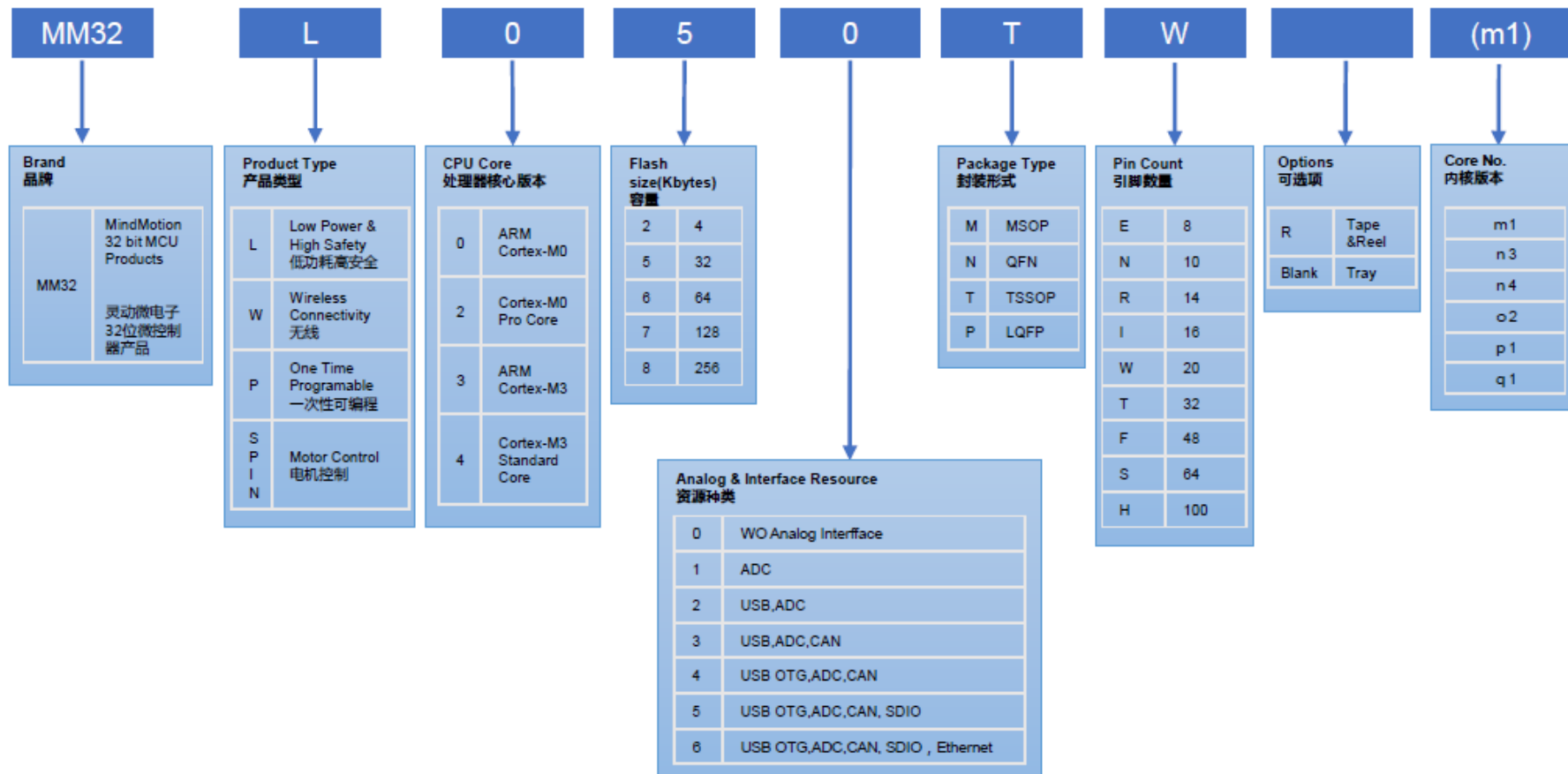
n4

o2

p1

q1

MindMotion[®] MM32[™] Naming Rules – L/W/P/SPIN



MindMotion[®] MM32[™] Package format

Package Type	Lead Qty	Package Size (unit:mm^2)	Standard Qty (Tray)			Standard Qty (Tube)			Standard Qty (Reel)				
			pcs		box	pcs		box	pcs				box
			颗/盘	盘/盒	颗/盒	颗/管	管/盒	颗/盒	颗/卷	卷/盒	颗/盒	卷/外箱	颗/外箱
LQFP	100	14X14	90	10+1(cover Tray)	900	/	/	/	/	/	/	/	/
LQFP	64	10X10	160	10+1(cover Tray)	1600	/	/	/	1500	5	1500	5	7500
LQFP	48	7X7	250	10+1(cover Tray)	2500	/	/	/	2000	1	2000	6	12000
LQFP	32	7X7	250	10+1(cover Tray)	2500	/	/	/	2000	1	2000	6	12000
QFN	48	7X7	250	10+1(cover Tray)	2500	/	/	/	/	/	/	/	/
QFN	32	5X5	490	10+1(cover Tray)	4900	/	/	/	3000	1	3000	6	18000
QFN	28	4X4	490	10+1(cover Tray)	4900	/	/	/	3000	1	3000	6	18000
QFN	20	3X3	/	/	/	/	/	/	3000	1	3000	6	18000
		4X4							3000	1	3000	5	15000
LGA	32	5X5	490	10+1(cover Tray)	4900	/	/	/	/	/	/	/	/
LGA	16	3X3	490	10+1(cover Tray)	4900	/	/	/	3000	1	3000	8	24000
TSSOP	20	6.5X4.4	/	/	/	70	200	14000	3000	1	3000	8	24000
MSOP	10	3X3	/	/	/	160	140	22400	/	/	/	/	/
SOP	14	8.65X3.9	/	/	/	54	140	7560	/	/	/	/	/
SOP	8	4.8X3.9	/	/	/	96	140	13440	/	/	/	/	/
SOP	14	8.65X3.9	/	/	/	50	140	7000	/	/	/	/	/
SOP	8	4.8X3.9	/	/	/	100	100	10000	/	/	/	/	/

MindMotion[®] MM32[™] ECO System



Security and Protection

Code Protection

1. Flash code protection
 - Read protection
 - Region protection
 - Security space
2. Flash physical data scramble
3. Debug Port protection



Encryption

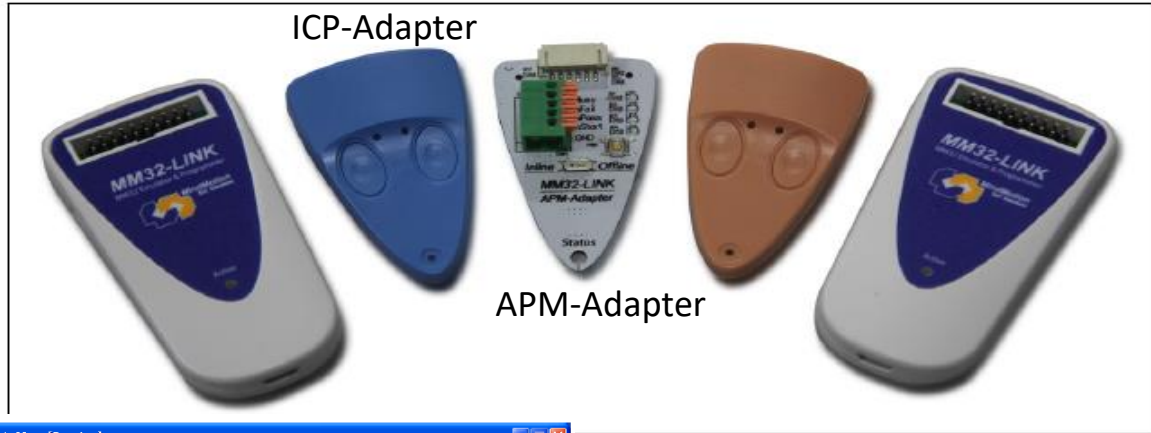
1. AES encryption
 - 128/192/256 bit
2. True Random Number Generation
3. CRC

Programming Protection

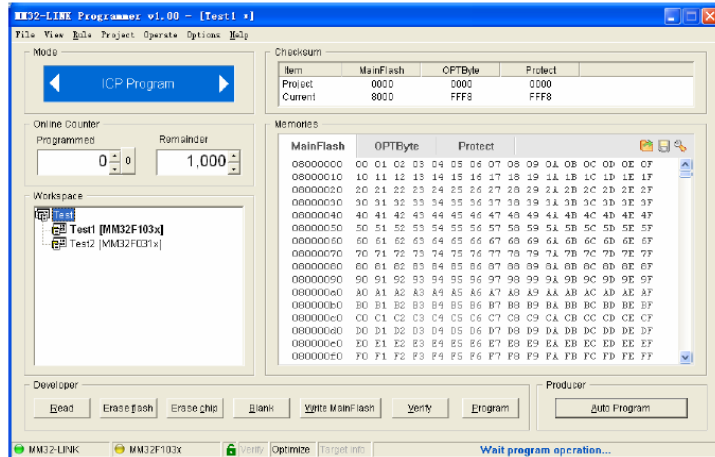
MM32-LINK

- Remote Control
- Burning Time Control
- Encrypted Code Transfer

MindMotion® MM32™ MCU Debug Tool



MM32-LINK Family



1st Local ICP programmer
128KB download 2.8s

3rd Party Downloader



MindMotion[®] MM32[™] - Target Application



◆ Automotive

- ◆ OBD / OBD II
- ◆ CAN Adapter
- ◆ Car Infotainment
- ◆ Networking
- ◆ Window/Tailgate con.



◆ Industrial & Motor

- ◆ Power Tool
- ◆ Meter
- ◆ E-Vehicle
- ◆ Robot
- ◆ Water Pump/Cooling



◆ HA & Healthy

- ◆ BLDC Fan
- ◆ Vacuum
- ◆ Food Processor
- ◆ Glucose monitor
- ◆ Wearable device



◆ Consumer & Toy

- ◆ E-Cig
- ◆ RC Toy
- ◆ Smart Door Locker
- ◆ Gaming accessory
- ◆ Barcode Scanner/Printer



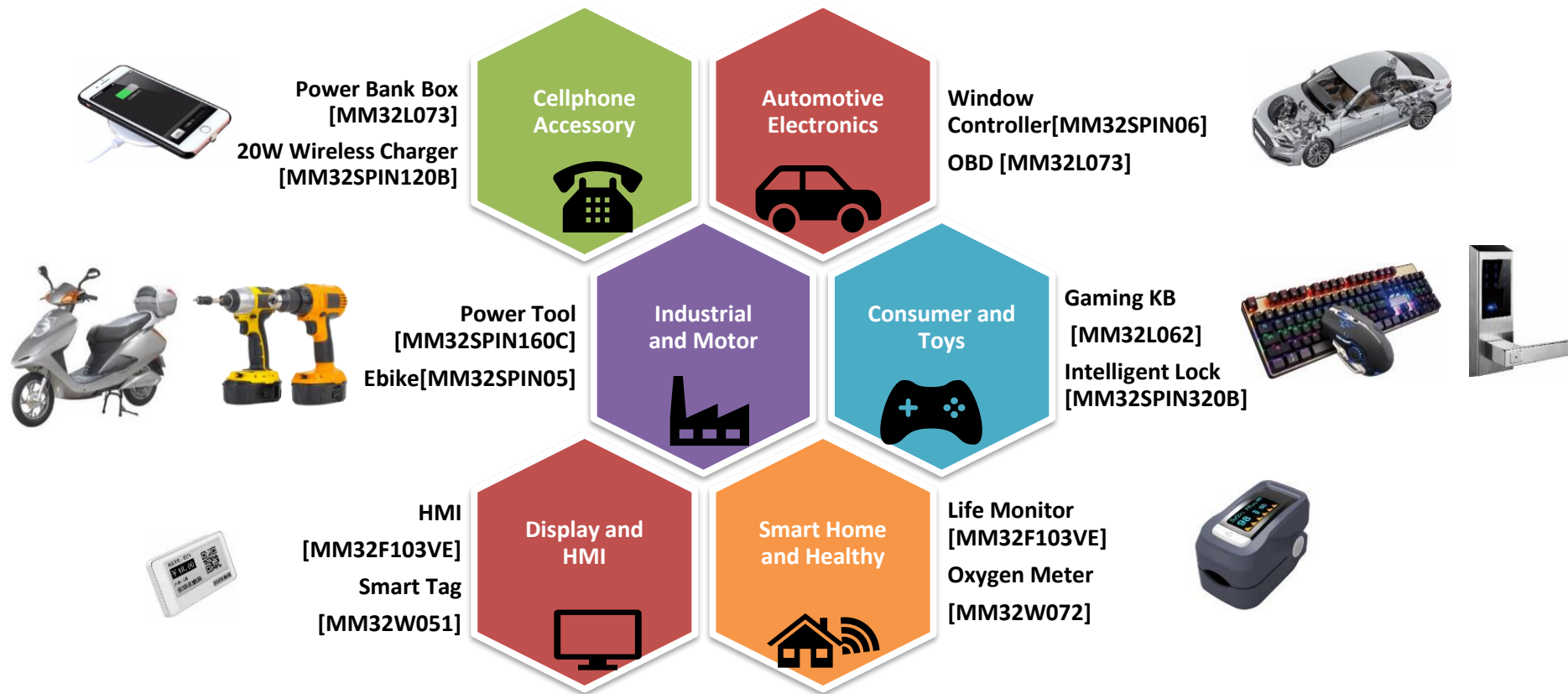
◆ Accessories

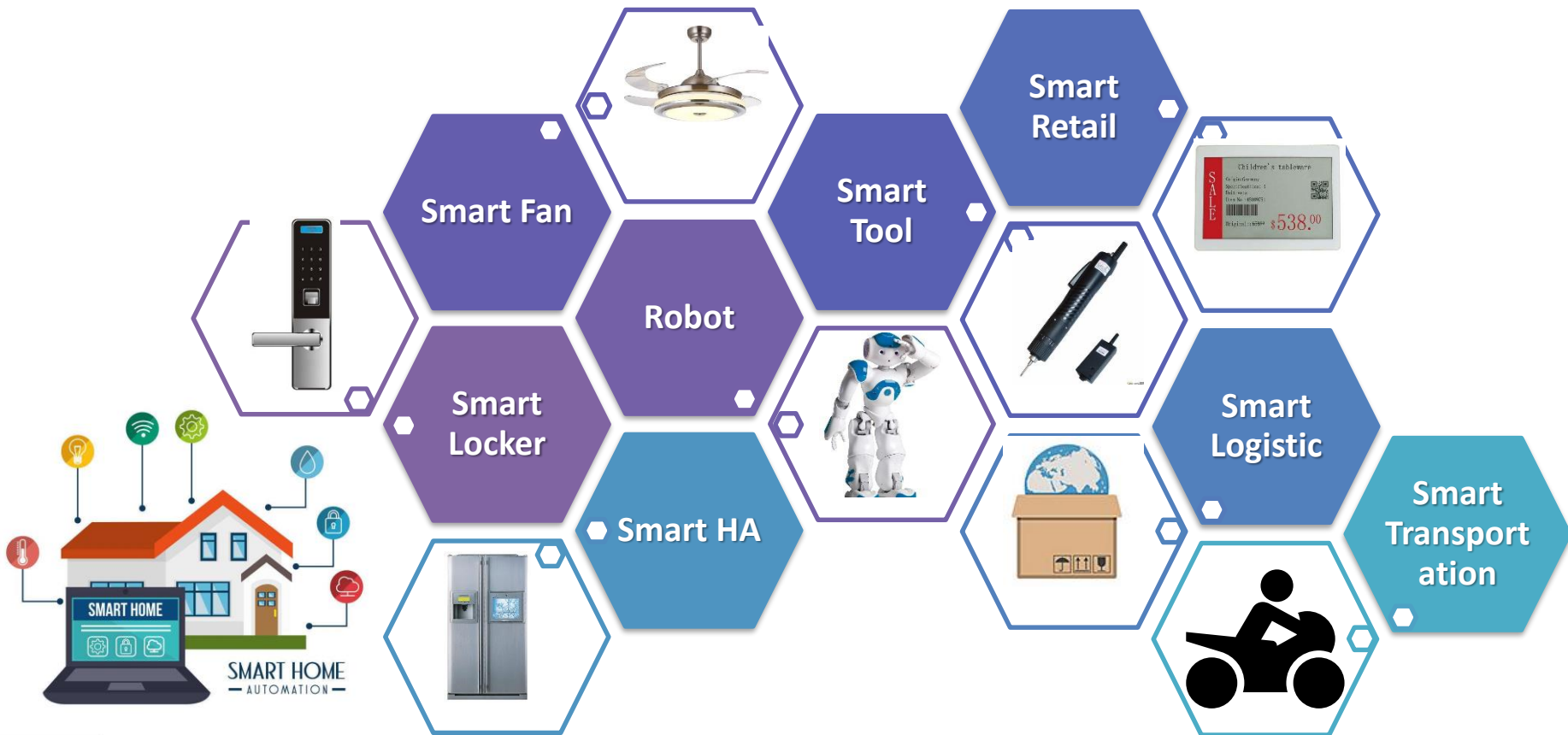
- ◆ Wireless Charger
- ◆ Power Bank
- ◆ Adapter
- ◆ Protocol Switch
- ◆ Smart Speaker



◆ Display & HMI

- ◆ HMI
- ◆ Digital Signage
- ◆ E-label
- ◆ LED Display
- ◆ E-paper Display





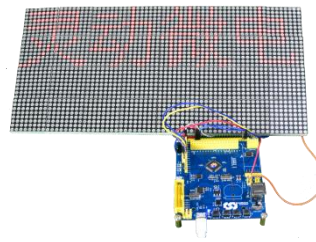
Success Stories



Drone



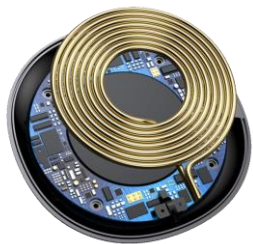
LCD Display



LED Display



E-tag



Wireless Charger



BLE Solution



Smoke Detector



Thermal Printer



E-Cig



BLDC Motor



eVehicle



Power Tool



Vacuum



Servo

MindMotion[®] MM32[™] Partners

MM32



**Build a well-known domestic MCU brand,
establish a secure domestic MCU system**



**Provide the most convenient MCU
Products and Solutions to Customers**



**Professionality, Reliability, Convenience
and Efficiency**

In The Final...

How to make a right recommendation to customer...???

1. Directly replacement

- Simulated P/N to S... company
- E.g. STM32**F103CBT6** → MM32**F103CBT6**
- E.g. STM32**F030C8T6** → MM32**F031C8T6**

2. Demand creation

- How about the sockets that have no simulated P/N??
 - Discuss and investigate about the requirement of MCU base on
 - » Computing power requirement → operating speed and core power
 - » Density → Flash, SRAM
 - » Specified peripheral → Ethernet, USB, CAN...,etc
 - » Totally GPIOs they need
 - » E.g. Smart Metering (Single phase) : 64KB Flash, 2KB SRAM,4chs 12bits ADC and LQFP64 → which MM32 MCU can be fulfilled?
 - **MM32F032R8T6 ?**
 - **MM32SPIN06PS ?**
 - **MM32F103R8T6 ?**
- Comparator need ?**
DSP need ?



THANK YOU !