

NuMicro[®] 精采應用方案分享





Stanley Chu

NUC123 in USB DAC HiFi Amplifier Applications

Avnet Technology EM (Taiwan) Co., Ltd, BU2

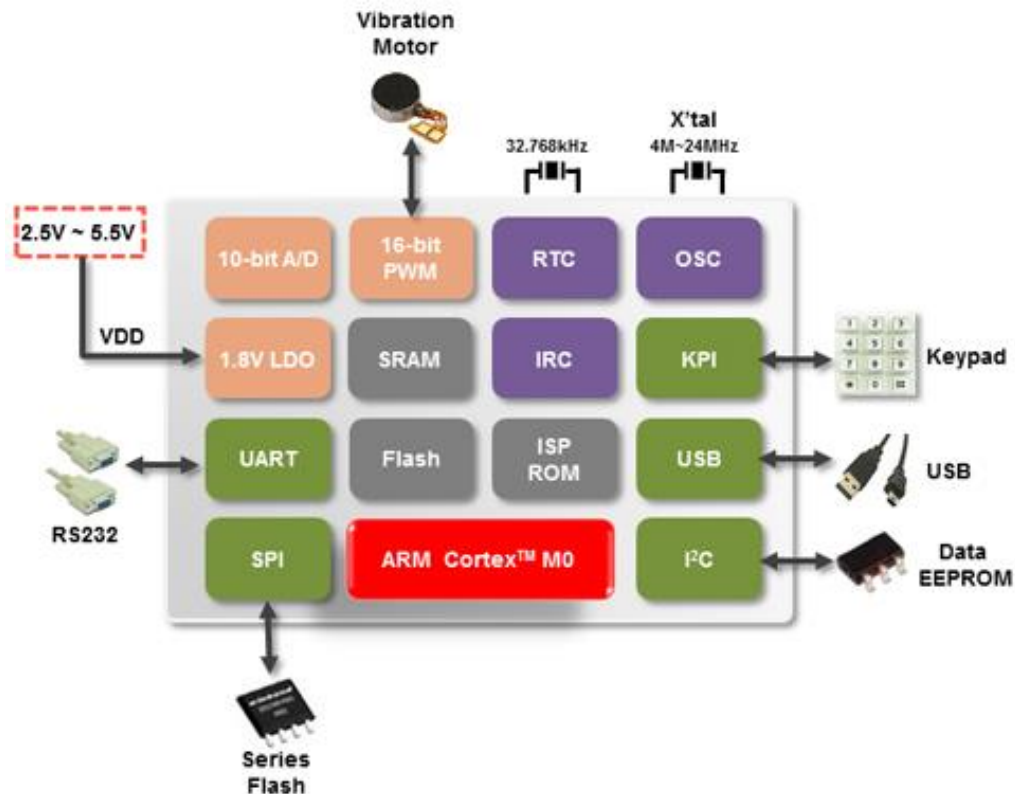
Accelerating Your Success™

Topic

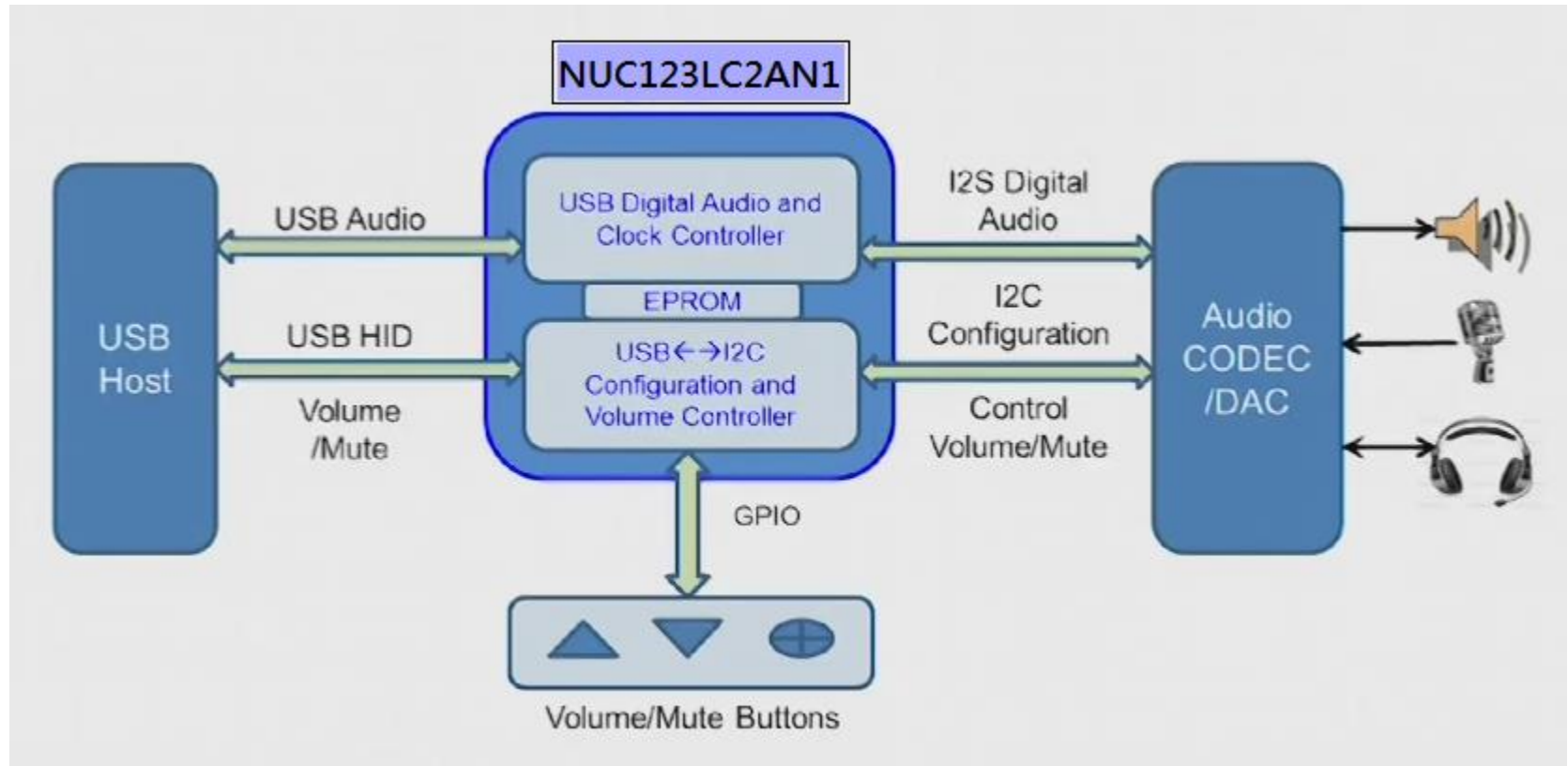
- Audio Digital Bridge of NCU123
- NCU123 in USB DAC HiFi Amplifier
- NUC123 in SRS + Short Cone Headphone with Gamepad Application
- ISD2130 in IoT Sensor Voice Interactive Application

NUC123LC2AN1 功能和特點

- NuMicro™ NUC123系列特色為寬電壓工作範圍2.5V至5.5V，工作溫度：-40°C至85°C，內建22.1184MHz高精度晶振(1%準確度)。備有豐富的外設，如USB2.0 FS、定時器、看門狗定時器、UART、SPI、I²C、I²S、PWM、ADC等。提供多種包裝QFN33,LQFP48, 64。



USB to I2S, Digital Audio Bridge



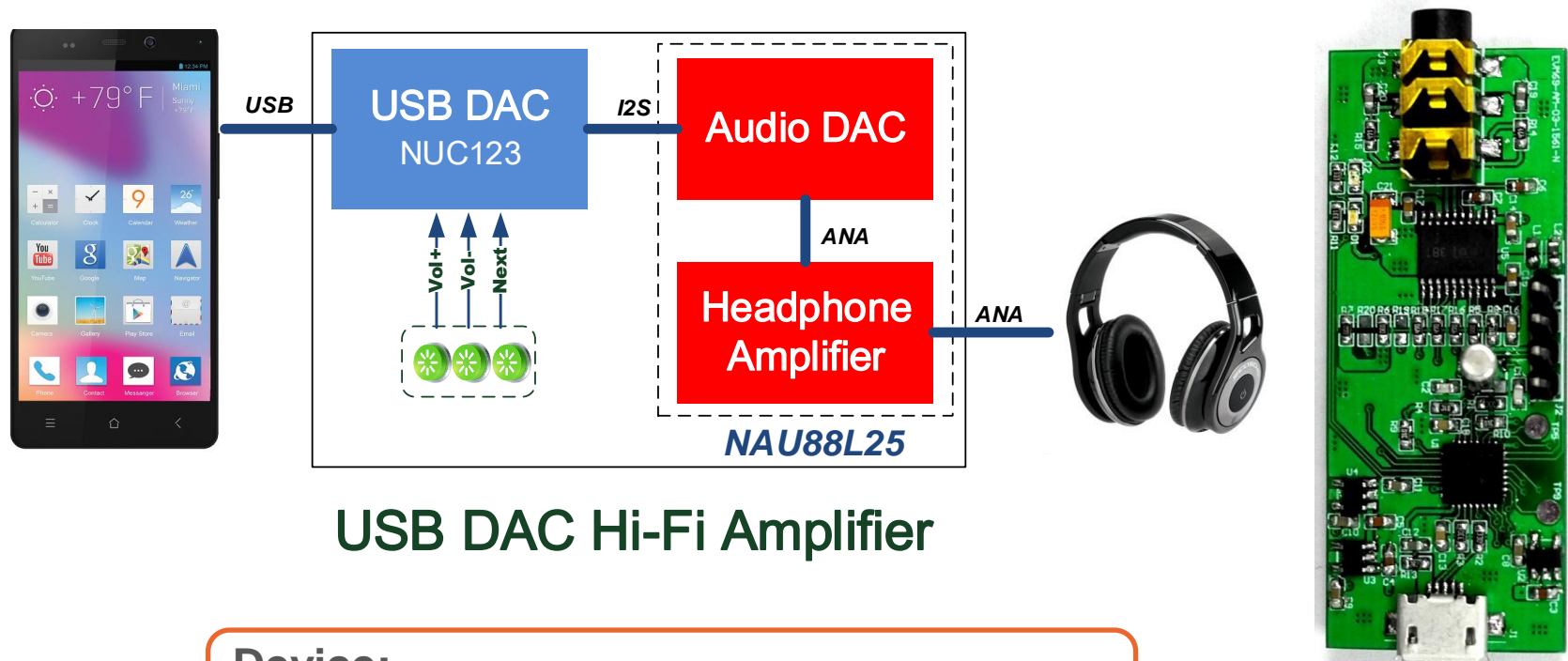
I2S Controller

- Operated as either master or slave
- Capable of handling 8-, 16-, 24- and 32-bit word sizes
- Supports Mono and stereo audio data
- Supports I2S and MSB justified data format
- Provides two 8 word FIFO data buffers, one for transmitting and the other for receiving
- Generates interrupt requests when buffer levels cross a programmable boundary
- Two DMA requests, one for transmitting and the other for receiving

NUC123 in USB DAC with HiFi Audio Application

Solution Feature:

- USB DAC is future trend to substitute for the audio jack
- 48 kHz/16 bit, 113dB SNR USB DAC, 1% THD, 28mW Headphone Amplifier
- HID Volume & Previous/Next control



Device:

NUC123, NAU88L25

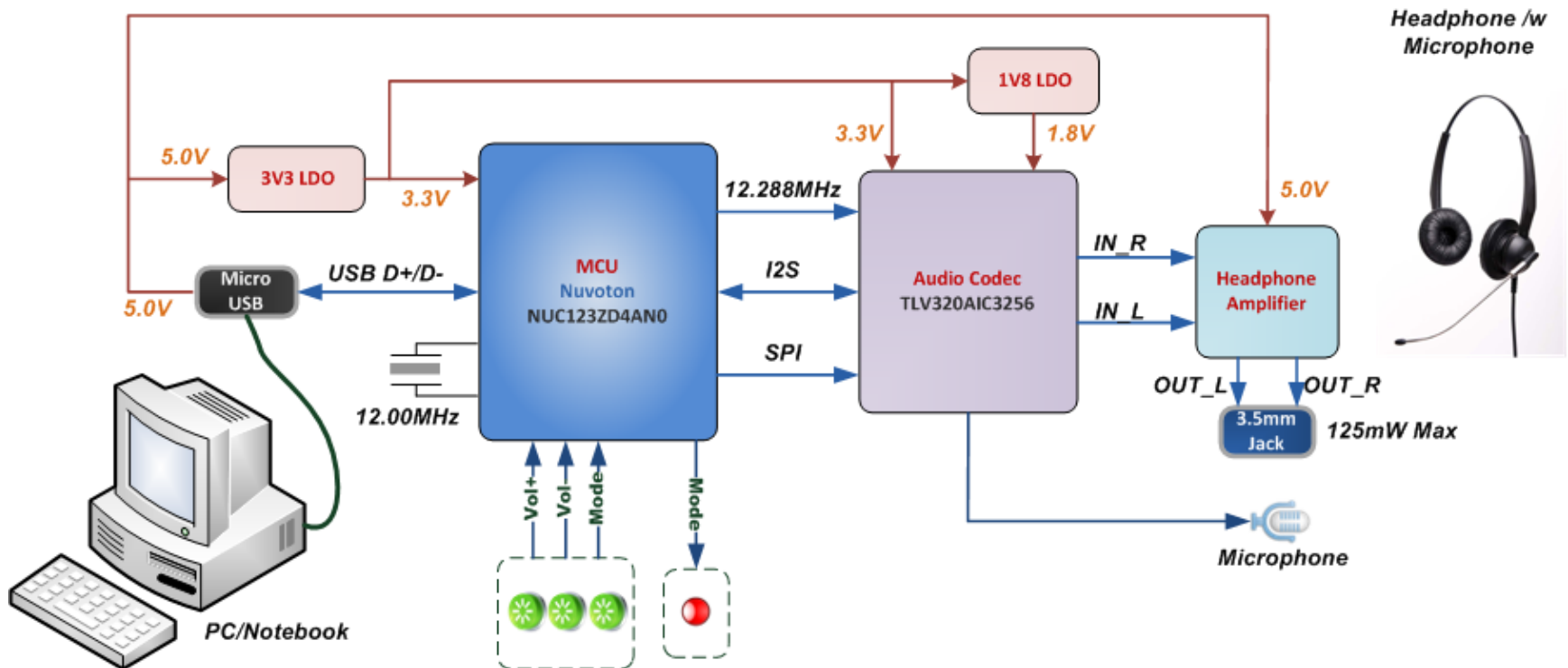
Target Market of HiFi Audio Amplifier

- For long term consideration, the USB audio will substitute for the phone jack in the portable device
- Target market, the audio peripheral of Smartphone and PC
- Target customer, the maker of earphone or headphone

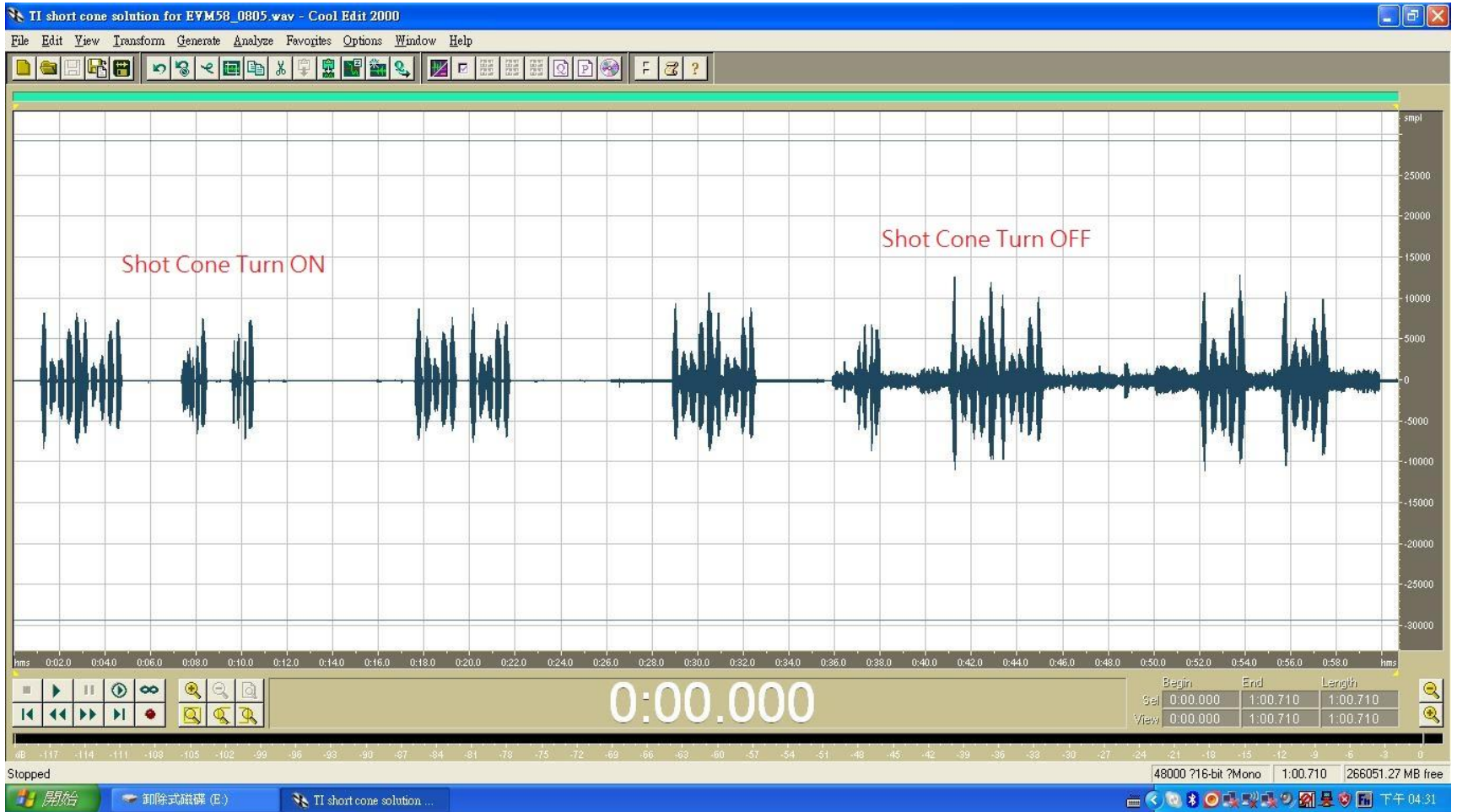
NUC123 in SRS + Short Cone Headphone with Gamepad Application



SRS + Short Cone Earphone Block Diagram



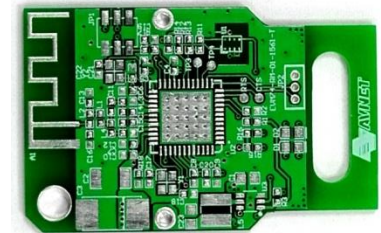
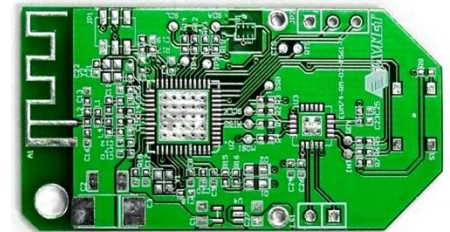
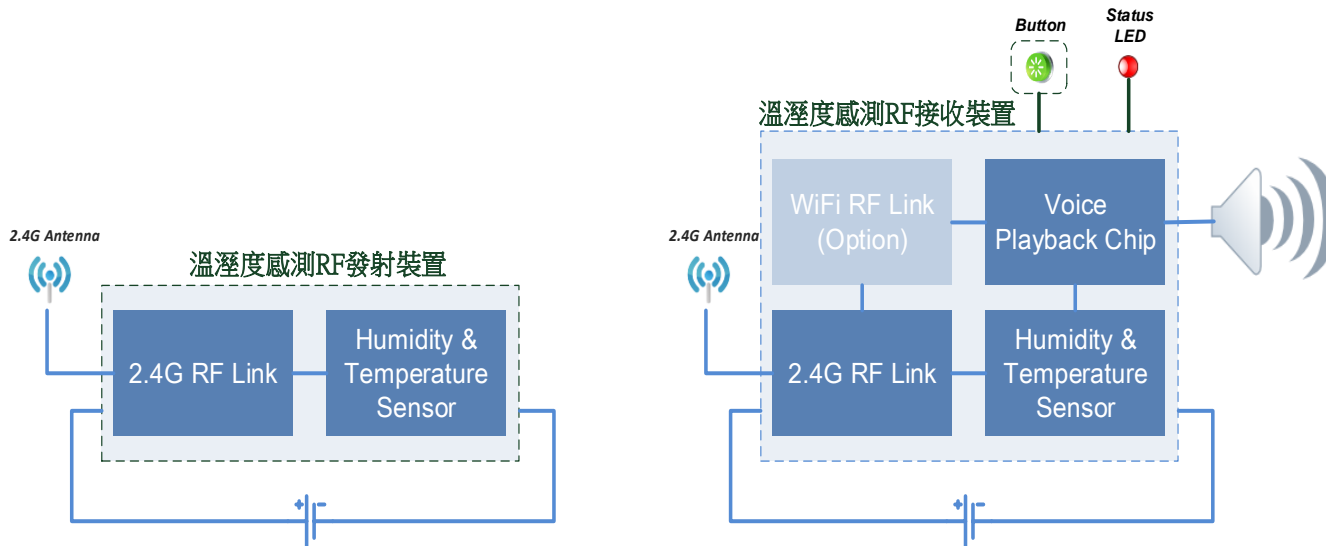
Short Cone Performance



ISD2130 in Humidity Sensor Tag & RF Link

Solution Feature:

- Low cost proprietary 2.4G RF link
- Battery power both for sensor tag and receiver station
- Humidity sensor for Wet Diaper Detector
- Interactive voice prompt with user



Device:
ISD2130

Market Target for Sensor Tag & RF Link

- For the IoT devices, the voice interactive is important for the user interface.
- ISD Chipcorder is suitable for the using of voice interface between the users and IoT devices
- Target Market, health care market, sensor tag market
- Target Customers, IoT marker, 醫院，安養中心，嬰幼兒商品廠商

~Thank you for your time~



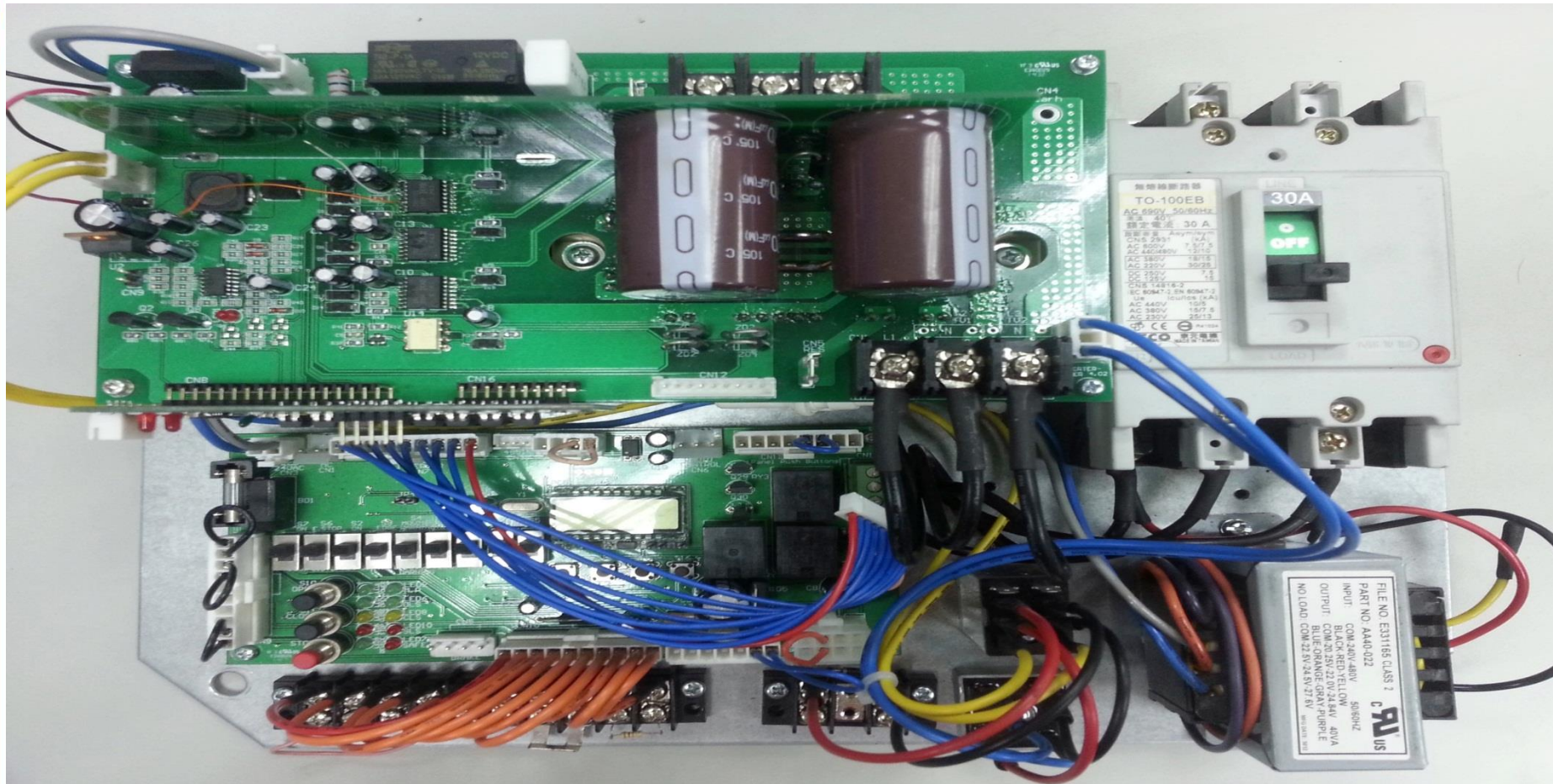
智亮科技股份有限公司
Brighteam Technology Co.,Ltd.

BTL R&D TEAM

- **Customer Code Design** – LCD Game , Time Piece C-Watch , Heater, Education Toy....etc
- **BTL Controller** -- USB Peripheral Products, Thermal Printer, Power bank ...etc
- **BLDC Motor Control** – Single phase to 3 phase motor control solution provider
- **BT Module solution** – Toshiba BT IC + Cortex Mo MCU Module provider

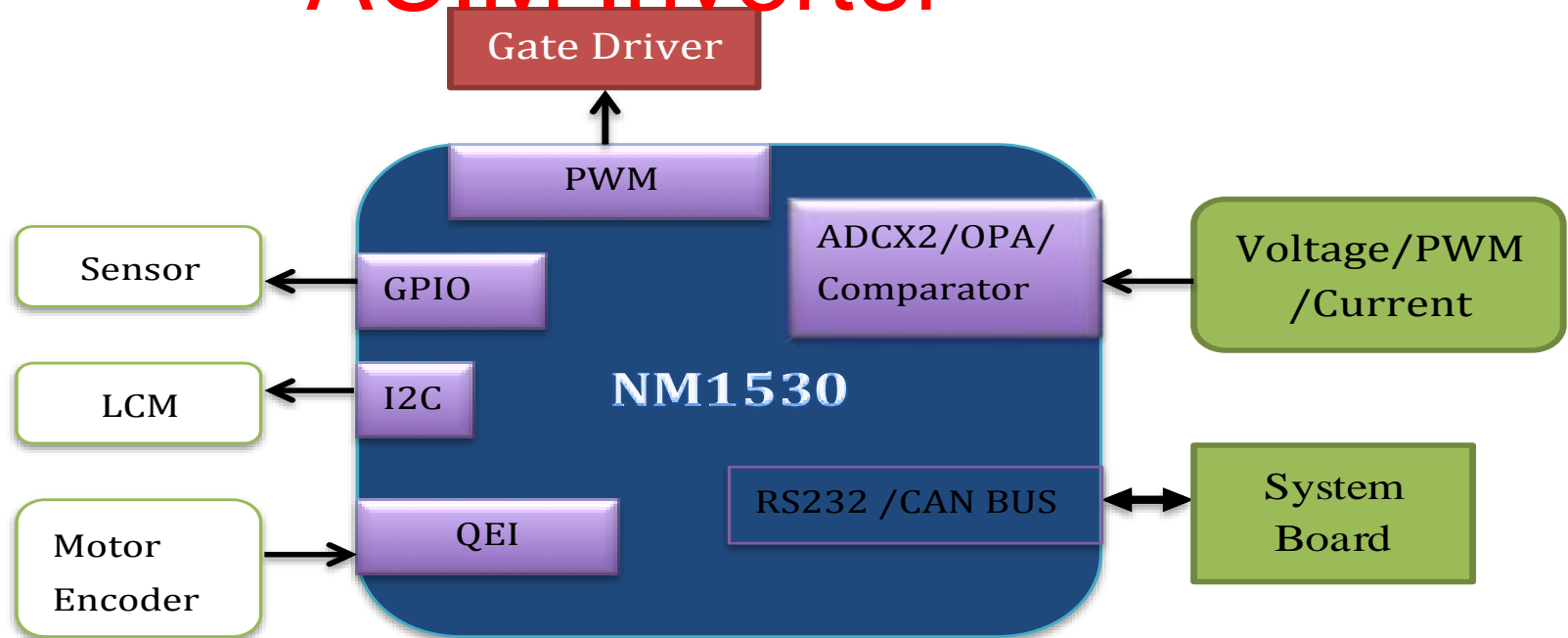


Successful Project (220V 1~3HPs) We innovate **NUVOTON**



- Typical inverter design
- OCP / OVP / OTP function support
- Soft start /stop support
- Output frequency adjustable

ACIM Inverter



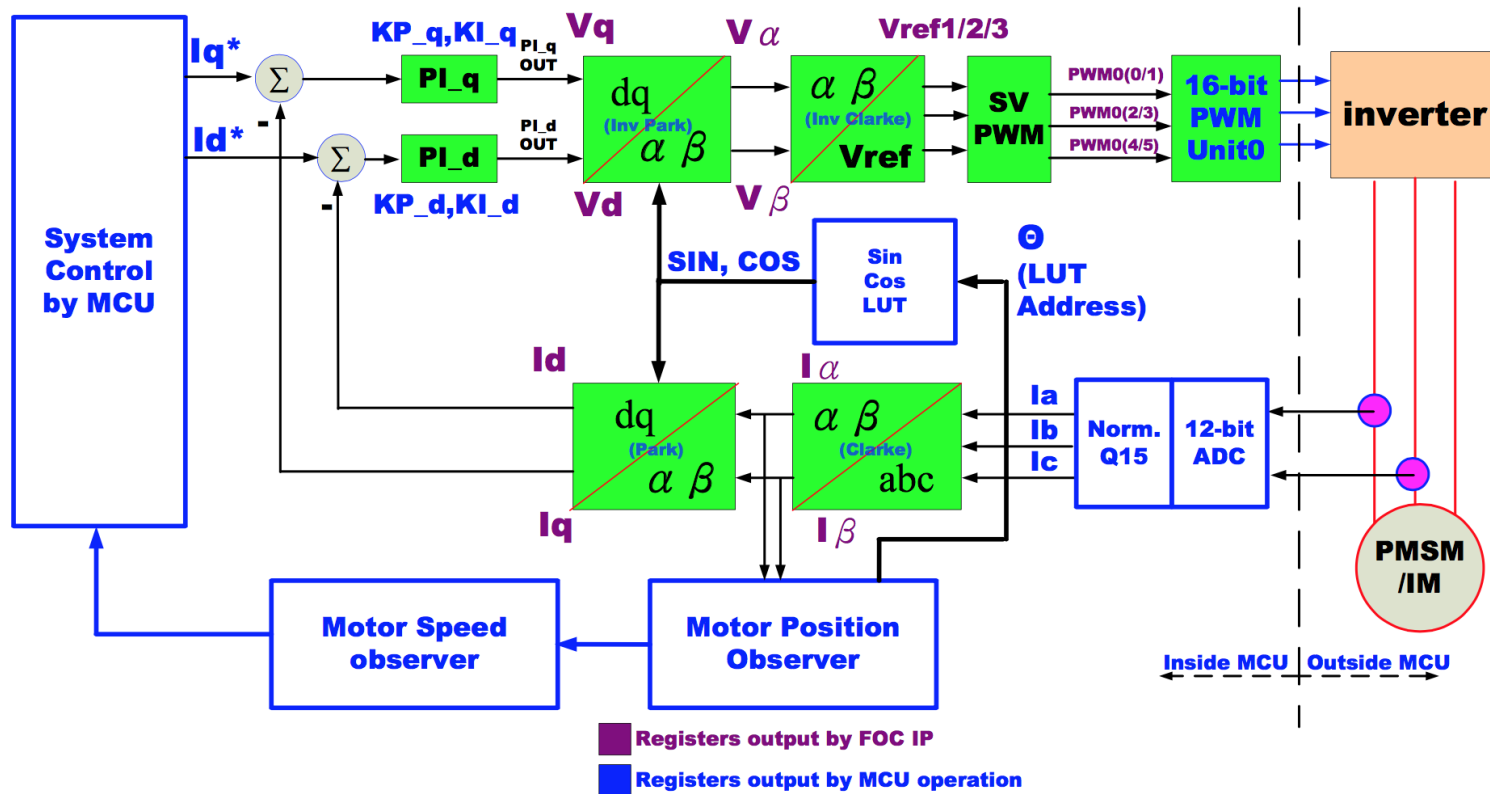
產品應用Application

- 水泵
- 鐵捲門
- 電梯門
- 抽油煙機
- 工業排風機

NM1530/520/510系列之主要特性

- ✓ **ARM® Cortex™-M0 core runs up to 50 MHz**
- ✓ **Operating Voltage/Temperature: 2.5V ~ 5.5V / -40°C ~ 105°C**
- ✓ **Memory**
 - 128K/64K/32KB Flash APROM with *ISP/ICP*
 - 16K/8K/4K SRAM, 4KB Data Flash
- ✓ **Serial Interface: Two UART, Three SPI, One I2C, One CAN2.0b, Two QEI**
- ✓ **One Divider: 32-bit ÷ 16-bit with signed**
- ✓ **3% accuracy of 22MHz internal RC over voltage & temperature**
- ✓ **Advanced PWM x 2 units for driving two motors**
 - Two units of 16-bit x 6ch PWM outputs with Brake control
 - Dead-zone and Polarity control
- ✓ **MDU (Motor Drive Unit): PI + FOC + SVPWM**
- ✓ **Analog device**
 - 16~7 channels, 800KSPS by Two 12-bit ADC
 - OP Amp x 2, Analog Comparator x 3
- ✓ **Package: LQFP100/ LQFP64/ LQFP48**

MDU & 磁場導向控制(FOC)架構圖



= NM1530 Series Motor-Driving Unit (MDU)

NM1530/1520/1510系列之產品編號和特性列表

	NM1530VE3AE, NM1530VD3AE	NM1520RD2AE, NM1520RC2AE	NM1520LD2AE, NM1520LC2AE	NM1510LC1AE
CPU	Cortex-M0, 50MHz	Cortex-M0, 50MHz	Cortex-M0, 50MHz	Cortex-M0, 50MHz
AP Flash	128KB/64KB	64KB/32KB	64KB/32K	32KB
RAM	16KB	8KB	8KB	4KB
Data Flash	4KB	4KB	4KB	4KB
Timer	4 x 24-bit	4 x 24-bit	4 x 24-bit	4 x 24-bit
16-bit PWM	6ch PWM0, 6ch PWM1, 2ch PWM2,	6ch PWM0, 6ch PWM1, 1ch PWM2,	6ch PWM0, 3ch PWM1,	6ch PWM0, 3ch PWM1,
QEI/Input Capture	3ch x 2 sets	3ch x 1 set	3ch x 1 set	3ch x 1 set
UART	2	2	2	2
SPI	3	1	1	1
I2C	1	1	1	1
CAN 2.0b	1	1	1	-
12-bit ADC, 800KHz	8ch ADCA 8ch ADCB	7ch ADCA 7ch ADCB	5ch ADCA 4ch ADCB	5ch ADCA 4ch ADCB
Comparator	CMP0, CMP1, CMP2	CMP1, CMP2	CMP1	CMP1
OP	OP0, OP1	OP0, OP1	OP0, OP1	OP0, OP1
Package	LQFP100(14x14x1.4mm)	LQFP64(10x10x1.4mm)	LQFP48(7x7x1.4mm)	LQFP48(7x7x1.4mm)

Successful Project (24V/24~60W)

•Function Requirement

- OCP,OVP,UVP,OTP
- Positive/Negative Going Motion
- Locked Rotor
- RPM /Voltage Control

•Nuvoton NM1100 advantage

- ARM Cortex M0 with High Performance
- Low Cost
- Turn-Key Solution

•Application & potential

- Fanner
- EAU: 50K



Successful Project (24V/24W)

•Function Requirement

- OCP,OVP,UVP,OTP
- RPM /Voltage Control

•Nuvoton NM1100 advantage

- ARM Cortex M0 with High Performance
- Low Cost
- Turn-Key Solution

•Application & potential

- 吸頂式排風扇
- EAU: 30K



Successful Project (110~220V/80~500W)

•Function Requirement

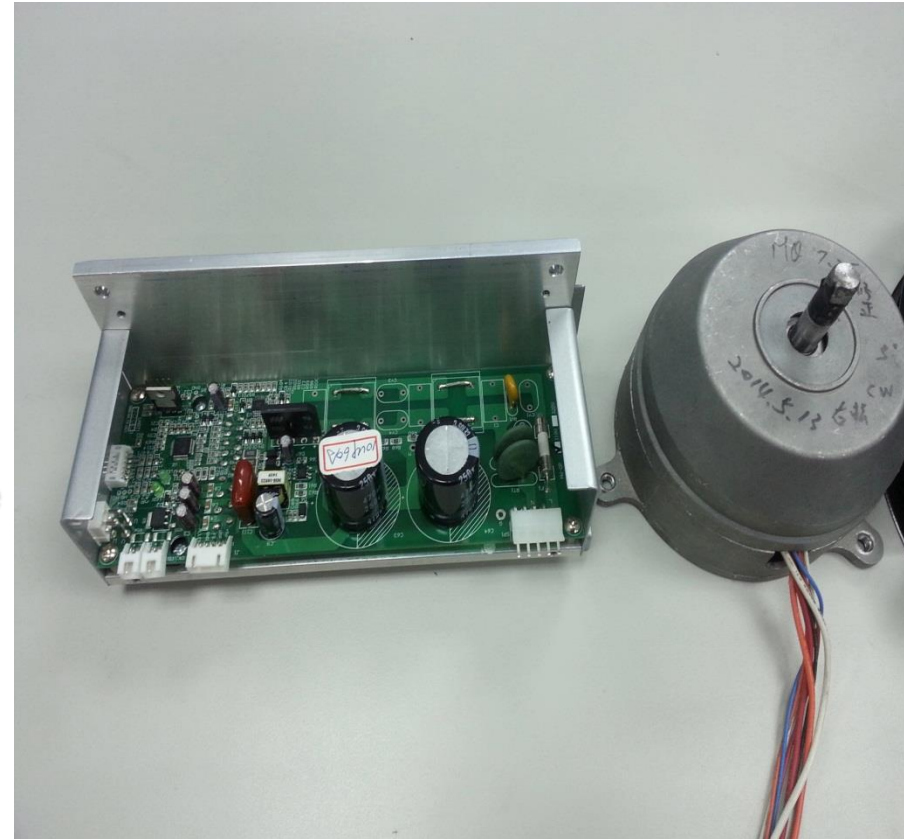
- OCP,OVP,UVP,OTP
- Positive/Negative Going Motion
- Locked Rotor
- RPM/Voltage Control

•Nuvoton NM1200 advantage

- ARM Cortex M0 with High Performance
- Low Cost
- Turn-Key Solution

•Application & potential

- Range Hood
- EAU: 20K



Successful Project (Meter for TAXI)

•Function Requirement

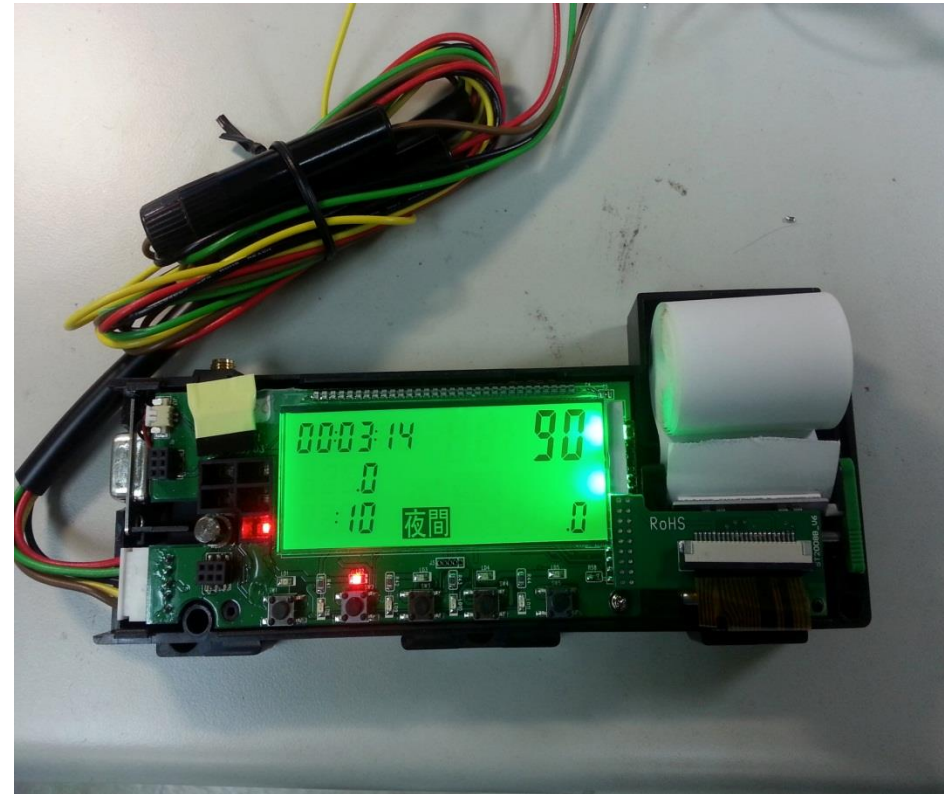
- GPS
- ETC
- Thermal Printer
- Bluetooth & Wifi (future)

•Nuvoton M451 & I2360 advantage

- ARM Cortex M4 32-bit & FPU
- Low Cost
- Speech OUT

•Application & potential

- Meter for Taxi
- EAU: 50K



電子煙 solution



- Nuvoton M052 base
- Input : 3.7V 2200mA or adjustable
- Output : 10~30V /10W~30W
- Auto detect Tar stock
- O-LED display support
- OLVP / OCP / OTP function support
- USB Port power charger function.
- **Customize design regarding end customer requirement.**



Thank you

何謂智能家居？



Smart Home ?

Dr. Welson Lin
Unified Packet Systems Corp.
Springers International Corp.

智慧家庭 – 系統架構



智慧家庭產業的系統架構涵蓋:

- & 人機交互控制中心(手機、平板…)
- & 末端智慧硬體單品、
- & 家庭主機系統、
- & 雲平臺
(包含雲管理、雲控制、雲儲存)
- & 雲數據分析

智慧家居行業分析



(一) 規模及前景：下一個兆元市場

(二) 現狀

& 智能家居現處於探索成長期。

& 影響市場蓬勃發展的障礙，可歸納為三方面：

1) 缺乏創新技術→無法創造需求

2) 缺乏流暢完整的運營平臺→無法滿足需求

3) 缺乏新型商業模式→無法導入市場

(三) 發展方向

1) 智能端末：物聯網的基礎載體→抱團

2) 智慧系統：物聯網的神經系統→完整穩定

3) 智能平臺：物聯網的思考中樞→方便接入

智慧家居商業模式



模式一：末端產品 \leftrightarrow 衍生對應應用

典型公司：

Nest、小米等

模式二：借力平臺用戶粘性，開發應用

典型公司：

騰訊、**Revolv**、**全研**

等平臺/初創公司

模式三：**B2B**整合、**B2C**通路行銷

典型公司：

IBM、**Honeywell**、**Siemens**、**Control4**等

各大系統集成商

Trend #1...wired←→wireless



- **傳統 有線**傳輸技術



- **傳統 有線**傳輸技術

其光鮮亮麗的背後，其實是：

A) 複雜的網路架構

需富經驗的系統工程師，負責設計、建構網路控制系統

B) 複雜的管路配線

需富經驗、長期搭配的工班，負責網路控制系統之管線配置

C) 複雜的建築空間設計

建築師、或室內設計師，須預留網路控制系統“機房”的設計，徒增困擾

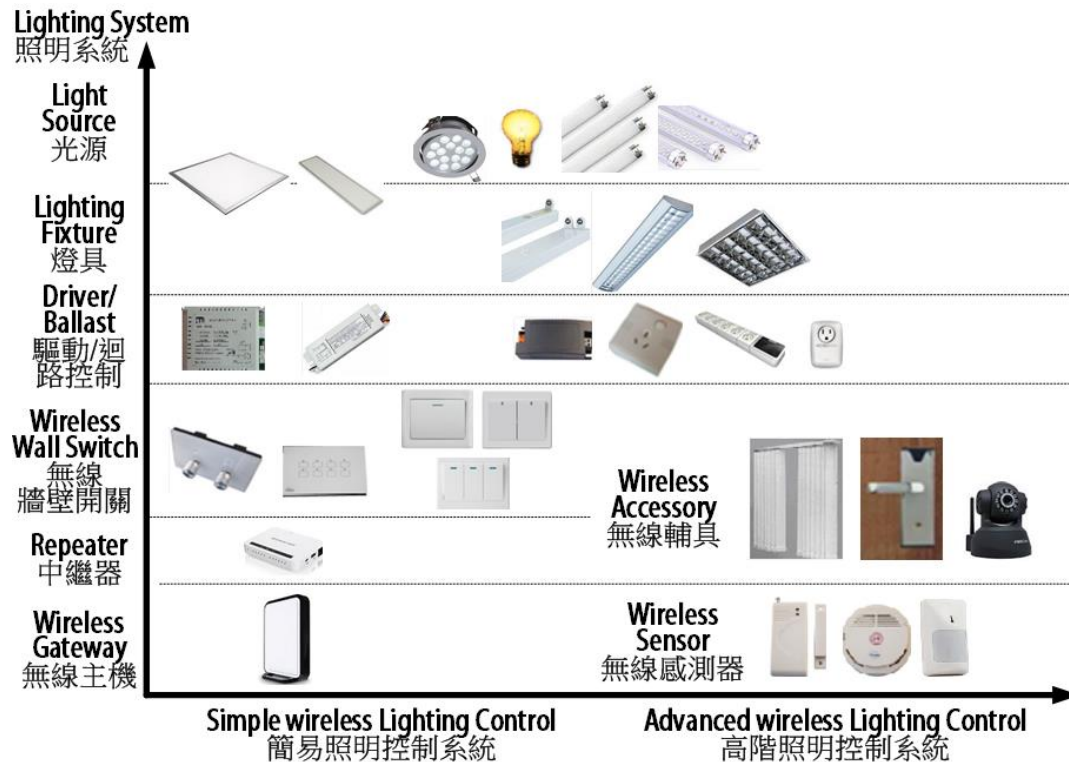
D) 空間設計的浪費

由於預埋的硬體系統，作業流程變冗長複雜，也占實體空間

Trend #2...plug & play



• 無線傳輸技術



• 特徵優勢為:

A) 建立網路架構

LEGO玩具般的獨立模塊設計，建構網路控制系統輕鬆愉快

B) 管路配線

簡單的管路配線邏輯，僅需交代工班單純上電，省時省力省材料

C) 建築空間設計

土建時，不須預留龐大網路控制機房的空間規劃，省時省力省材料、省空間

Trend #3.... low cost



- 無線傳輸技術



D.I.Y



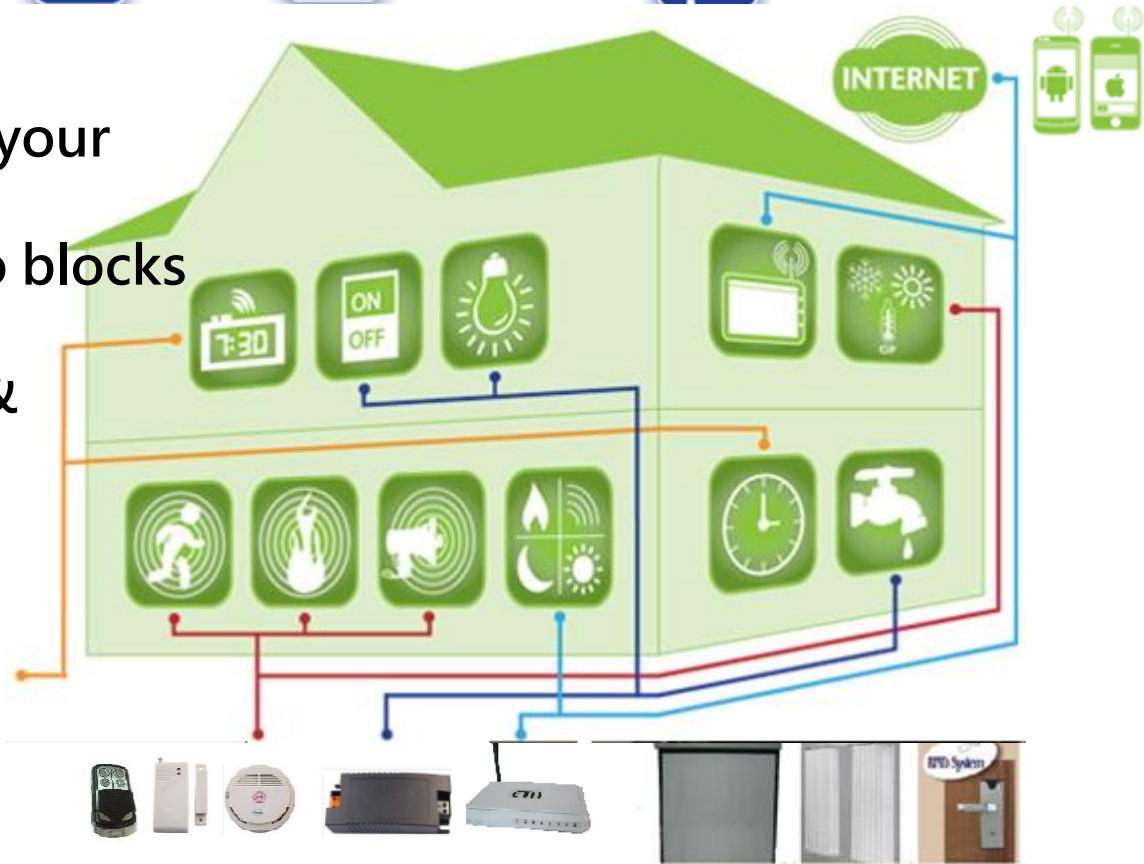
Low Cost



Expandable

Install, Setup and Manage your Smart Home by yourself.
It's easy & intuitive as Lego blocks

Start with several devices & expand your Smart Home as you satisfied.



Wireless Solutions ...



- 全研 (*Springers*) 無線傳輸技術
& 採用Zigbee無線傳輸技術
& 優勢為:
 - A)組網方便: LEGO玩具般的獨立模塊設計，容易建構、維護系統
 - B)一站購足：產品線完整
 - C)無線網關系統穩定: 網關系統，功能強大。本身為具管理、儲存功能的本地平台，兼具公有雲端管理能力。已有大型成功市場案例
 - D)成本: 原廠支援，且無須授權維護費用
 - E)私有/標準協議: 系統架構彈性，且具兼容性優勢

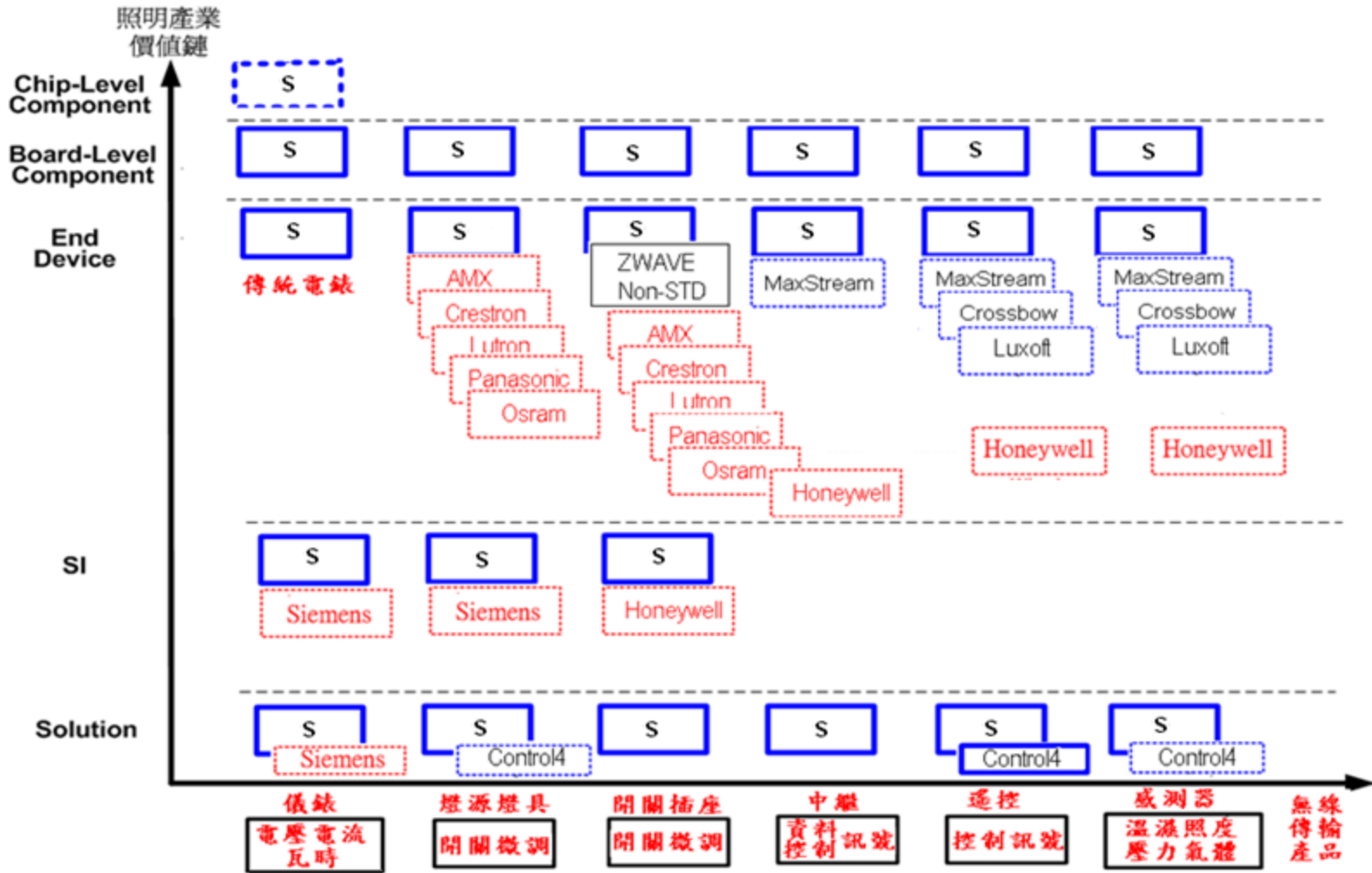


Nuvoton's MCU +
Zigbee Transceiver

Product Portfolio 完整產品線



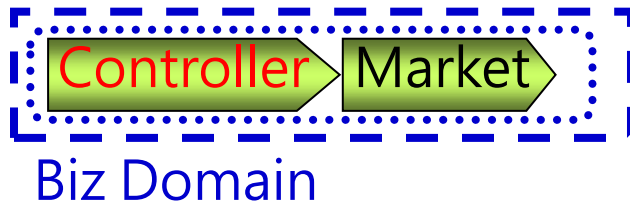
Where's the target?



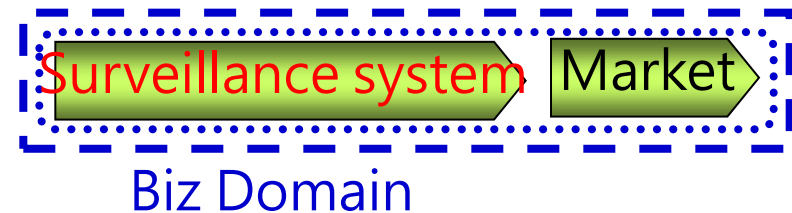
Integrated Solutions



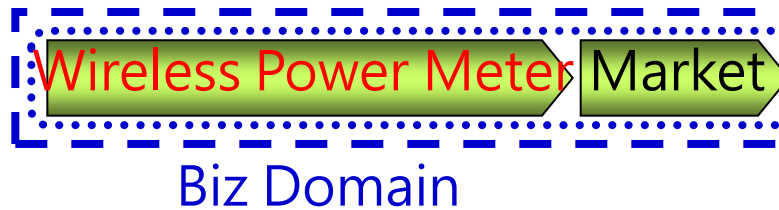
■ Lighting Business



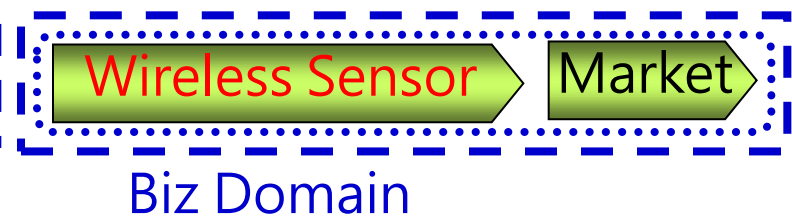
Surveillance Business



■ Green Energy Business



Security Business



■ Cloud Business



Business Vision



定位: Wireless Device Manufacturer (無線電氣控制系統製造商)

aiming at Networked **Home Automation & Building Automation (IoT)** markets

目標: 開發智能控制系統，簡化系統架構，便於安裝、維護，價格親民

Who may ease the system integration efforts and costs through increasing the installation efficiency & freedom from wiring materials

服務: 提供各式無線智能控制端末裝置

- Providing **seamless integrations** among various **Solutions** such as Lighting, Security & Surveillance, Energy Management systems
- Providing **customer easy + abundant choices** of **End Devices**
- Providing **customer instant reports** of device status with **Cloud services**

What Springers does ?



- Provides : 提供ZB無線芯片、照明控制、安防、感測器、電表及雲端控制管理 a wide spectrum of wireless 802.15.4/ZigBee **standard modules** for various *applicable end products* covering from :
 - Lighting control gears,
 - Surveillance systems,
 - Analog plus digital sensors,
 - Power meter modules.....

- Provides : 提供完整解決系統方案 **integration service** for solutions covering various applications among
 - lighting,
 - security control and
 - surveillance sensor controls
 - Health Care sensors.....

There's no existing company who can offer Cross-domain integrated solutions with user-friendly experiences.

Why Springers ?



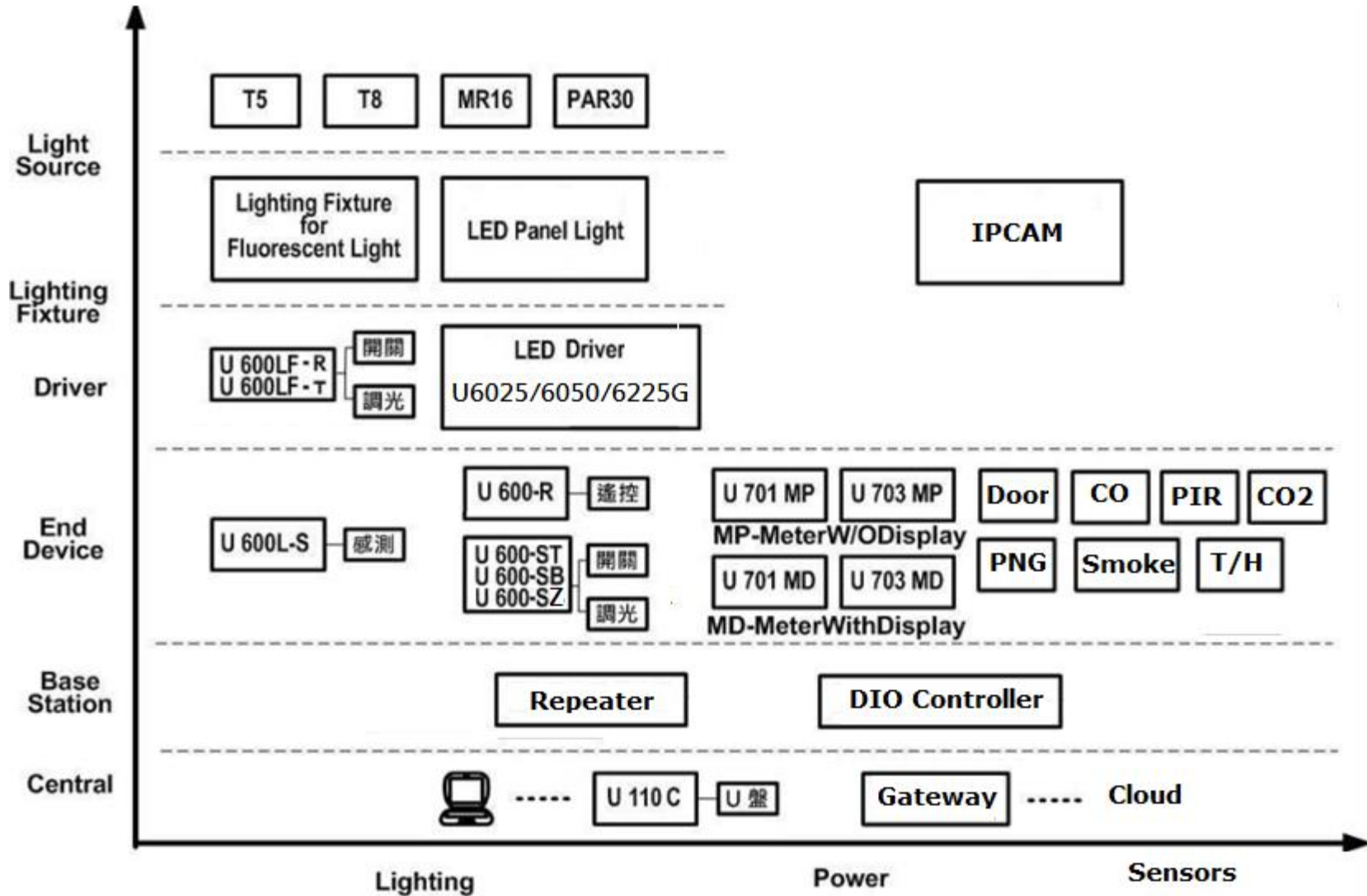
□ 非“全研”不可？

- A) 一條龍服務：提供從芯片、無線終端、到解決方案的整體服務
- B) 原廠最核心的支援：從芯片設計、製造出發，完全自主
- C) 完整供應鏈：無須東拼西湊，辛苦集成，至“全研”一站購足
- D) 技術領先：設計用心，簡單滿足各式集成應用需求
- E) 穩定可靠：從芯片、無線終端、到方案，已在市場多年成功淬鍊

□ Why Springers ?

- A) Features its unique **completeness & simplicity**
- B) Not pieces, but basic building blocks solutions – **speed integration**
- C) UPSC proves its **Core competence** from Zigbee IC to solution

舉例： Market → Smart Lighting



Company Briefs



1. Founded in 2006 in Taipei
2. Capital : NTD 52.9M /
Unified Packet Systems Corp.
Springers International Corp. Ltd.
1. Chip, Module → Solution Provider
2. Field-proven products
3. Abundant SI experiences & reference sites
4. Well-established supply chain

易聯全數位科技股份有限公司
全研國際有限公司



Thanks for your Attention !

**Unified Packet Systems Corp.
Springers International Corp.**