

Nuvoton emWin HMI Solution

Agenda

Why emWin Embedded Graphics Library?

What is emWin Embedded Graphics Library?

MPU N9H Series HMI Solution

MCU Cortex-M4 HMI Solution

MCU Cortex-M0 HMI Solution

Selection Guide for HMI

Why is emWin Embedded Graphics Library

Purpose

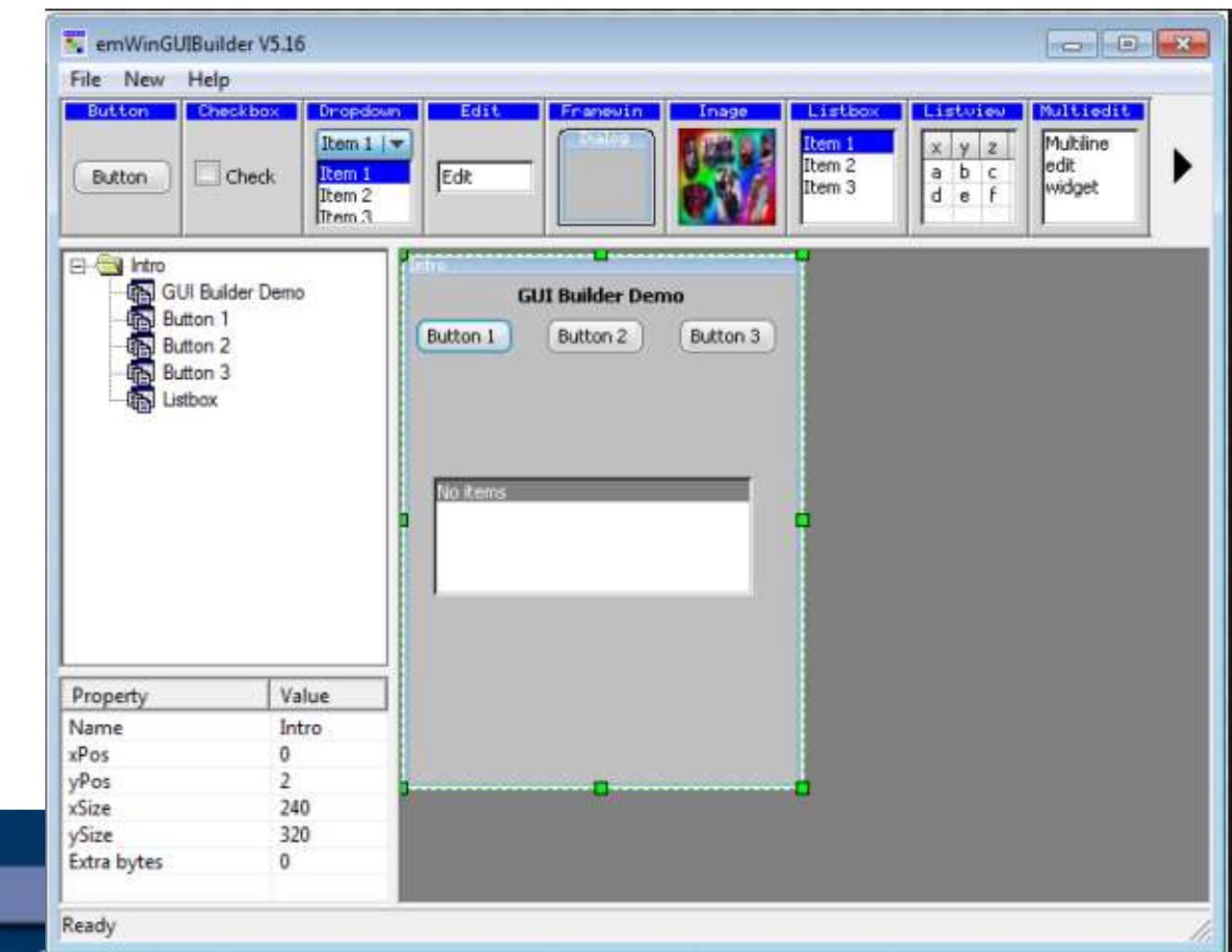
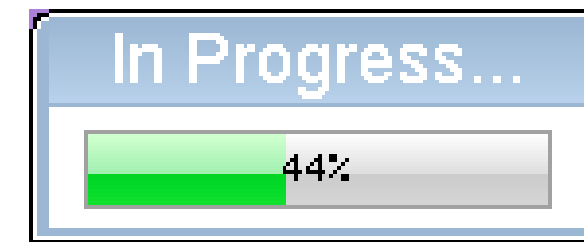
- Easily create GUI windows
- Drawing API to provide the best experience
- Provide effective tools to shorten development time

Nuvoton Advantage

- Hardware LCD Controller up to 1024x768 (24bit Color) resolution
- Hardware H.264 movie decoder up to 720P resolution
- Build-in up to 32MB DDR and Build-in audio codec

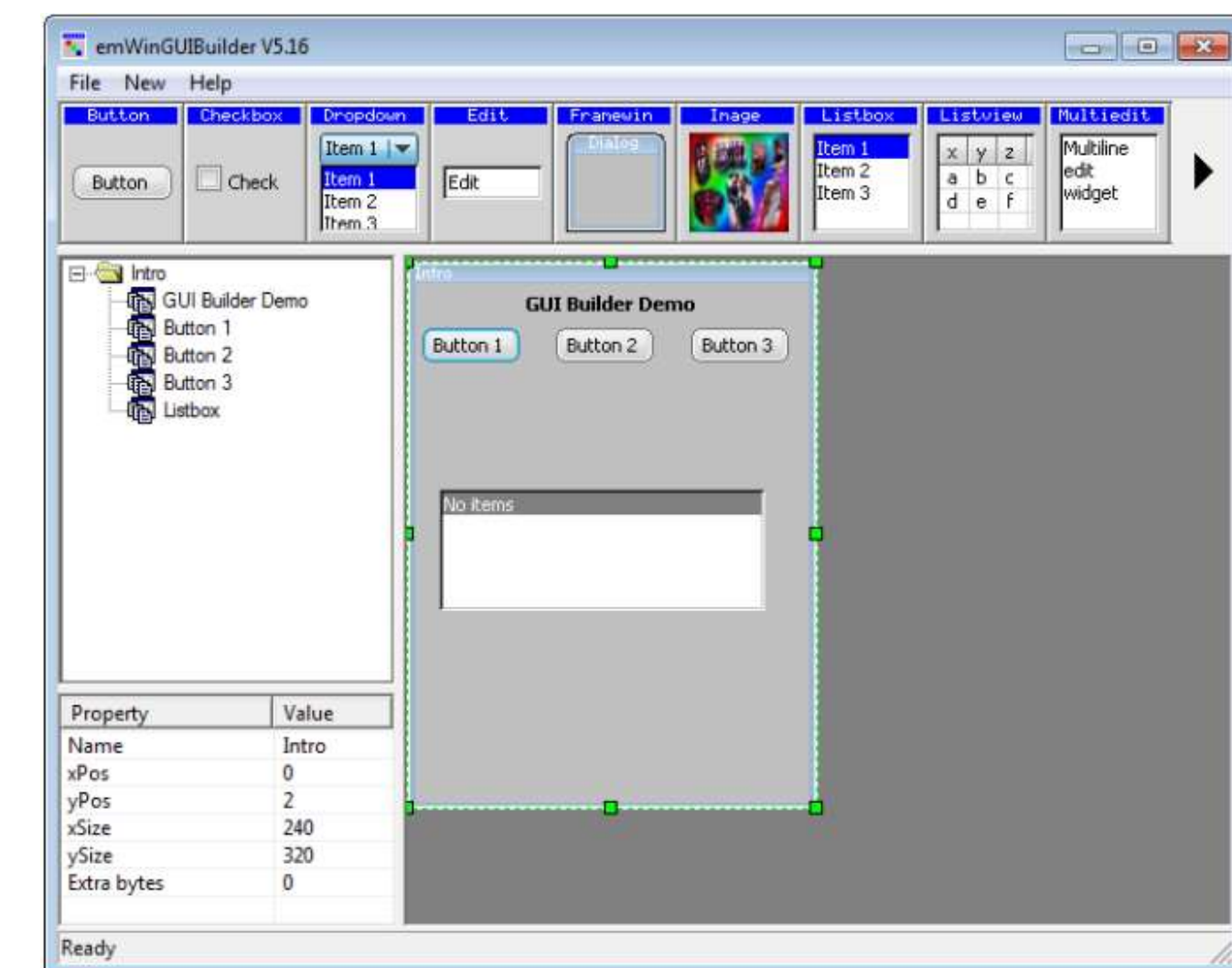
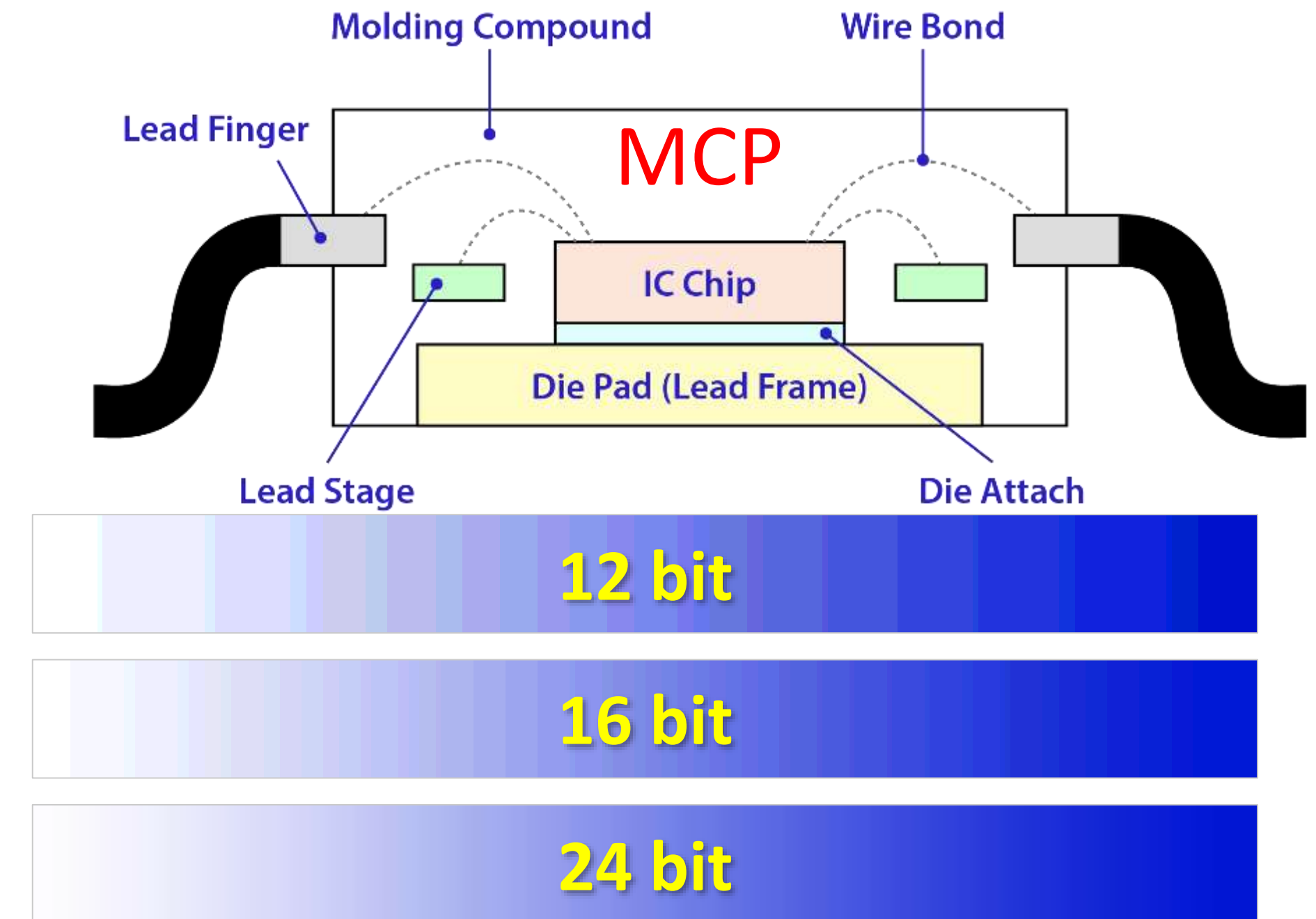
What is emWin Embedded Graphics Library

- GUIBuilder Window Manager
- Widgets Module
- API for line drawing, draw frame, draw circle, etc.
- Font smooth display conversion tool
- Font conversion tools in Windows
- Bitmap conversion tools in Windows
- Include font character ISO 8859-1
- Supports black and white, grayscale and color displays
- Support ADC touch screen and mouse



N9H Series Features

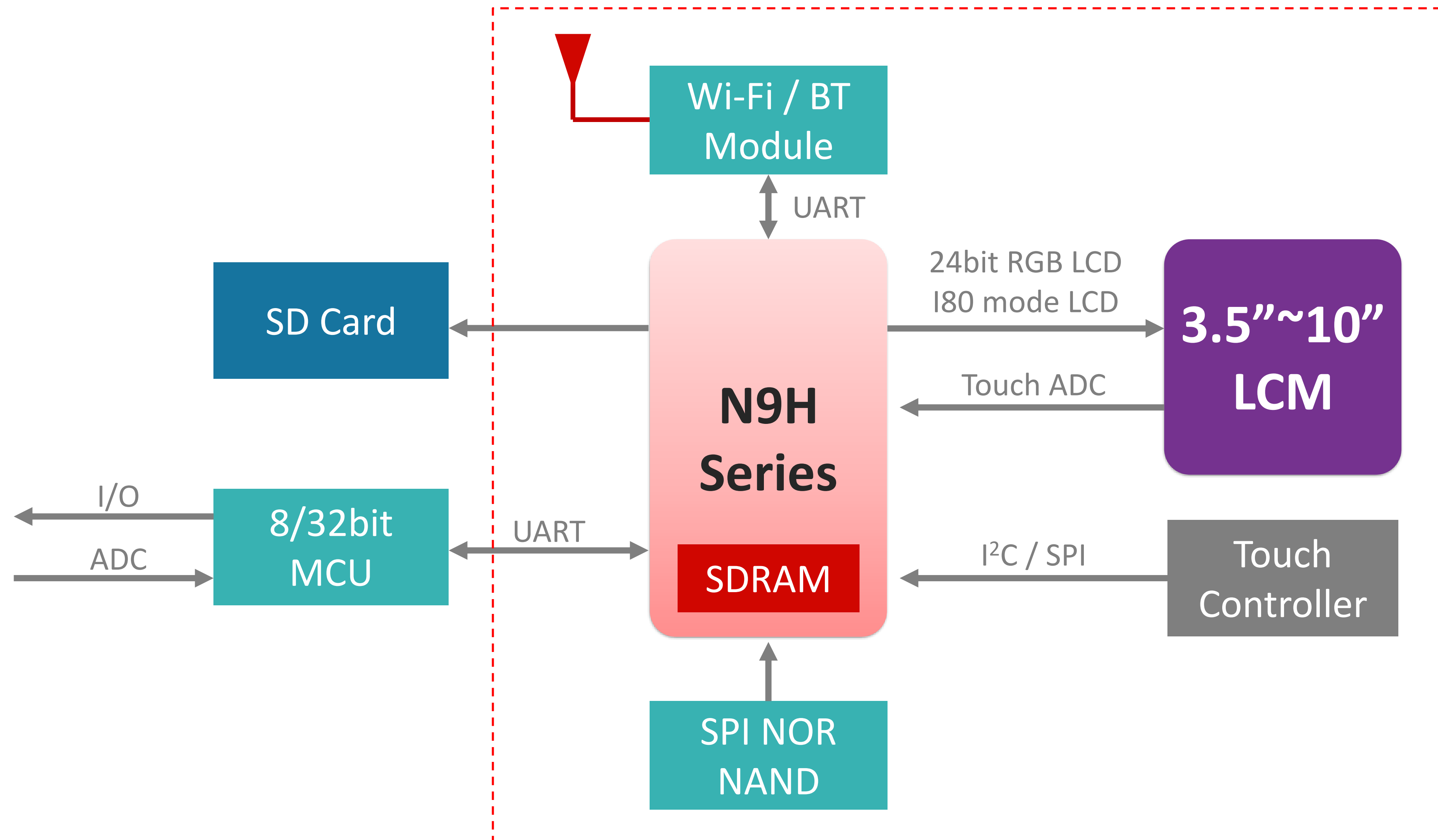
- **MCP Build in SDRAM 2MB to 32MB**
 - Reduce EMI/EMC issues → Speed up Mass product
 - Reduce PCB Layout Layer → Reduce PCB Cost
- **Support LCM i80/RGB 24bit Interface**
 - Increase color depth
- **Support 320x240 to 1024x768 Resolution @ 25 fps**
 - Build in up to 32MB SDRAM
 - Direct Accessible Frame Buffer
- **Build-in H.264 Decoder up to 720P**
- **Build-in Audio Codec**
- **Support emWin Embedded Graphics Library**
 - emWin GUI Builder allows easy user interface creation
 - ANSI C/C++ development environment



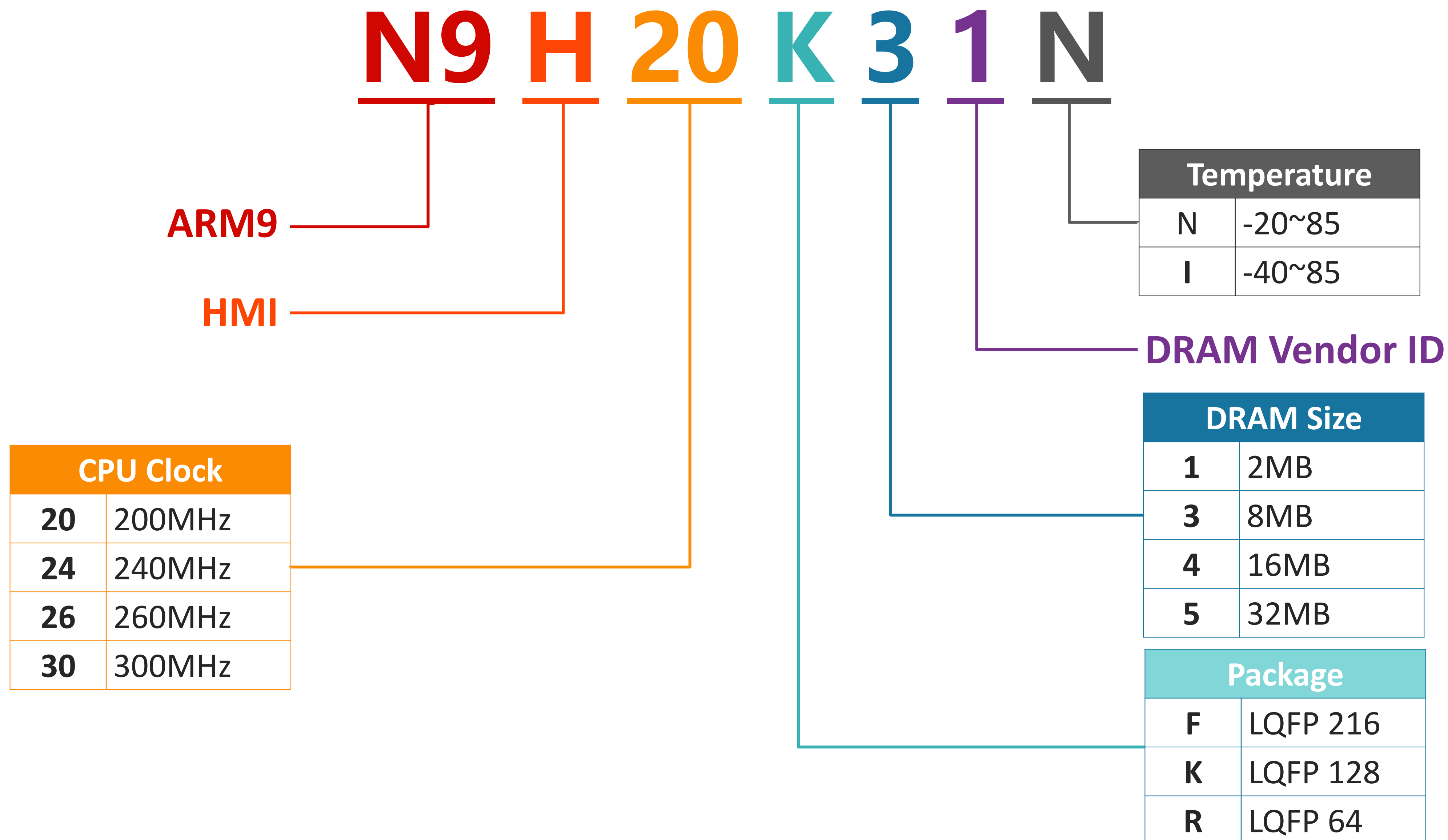
MPU for emWin Part Number

Part No.	N9H20K11N	N9H20K31N	N9H20K51N	N9H26K51N	N9H30K41I	N9H30F51I
CPU Clock	200MHz	200MHz	200MHz	260MHz	300MHz	300MHz
LCM color bit Interface	RGB mode 24-bit i80 mode	RGB mode 24-bit i80 mode	RGB mode 24-bit i80 mode	RGB mode 24-bit i80 mode	RGB mode 16-bit i80 mode	RGB mode 16/24-bit i80 mode
LCM Res.	320x240 @30fps 2.3"~4.5"	320x240~640x480 @30fps 2.3"~7"	800x480 @25fps 5"~7"	800x480~1024x768 @25fps 7"~10"	800x480~1024x768 @25fps 7"~10"	800x480~1024x768 @25fps 7"~10"
Video Codec	MJPEG	MJPEG	MJPEG	MJPEG/H.264	MJPEG	MJPEG
UART	2 +2 SPI extern 2 UART	2+2 SPI extern 2 UART	2+2 SPI extern 2 UART	2 SPI extern 2 UART	9	10
SPI	2	2	2	2	2	2
I²C	1	1	1	1	2	2
Touch ADC	V	V	V	V	V	V
Audio	Stereo DAC	Stereo DAC	Stereo DAC	Stereo Codec	I2S	I2S
DRAM Size	2M	8M	32M	32M	16M	32M
Package	LQFP128	LQFP128	LQFP128	LQFP128	LQFP128	LQFP216
Temperature	-20~85	-20~85	-20~85	-20~85	-40~85	-40~85

Nuvoton N9H series HMI Solution



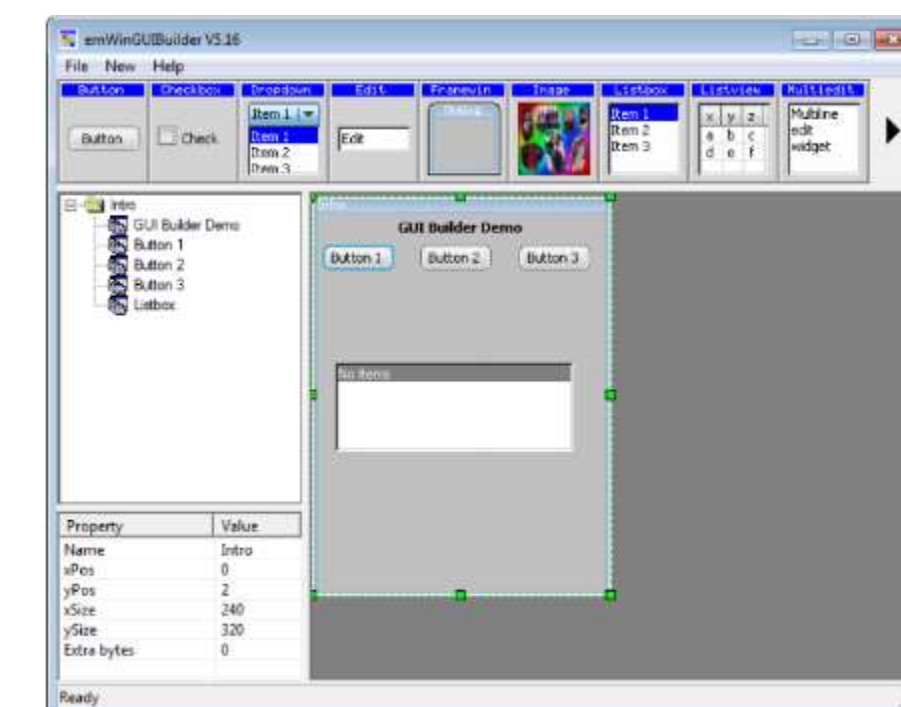
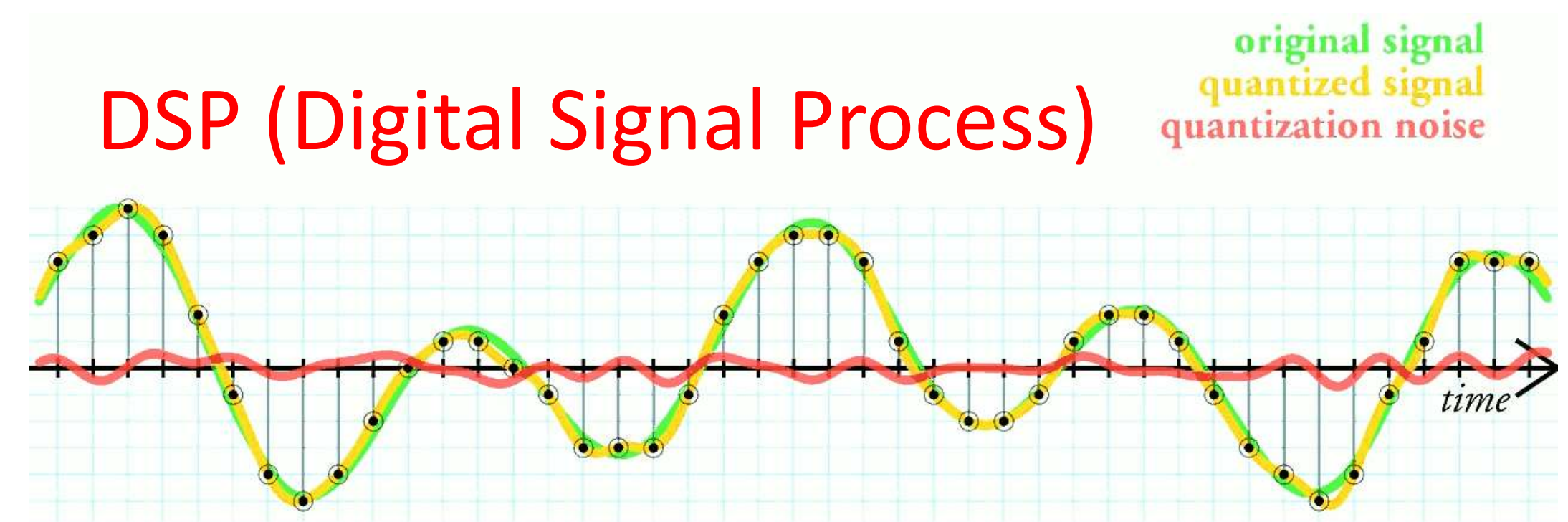
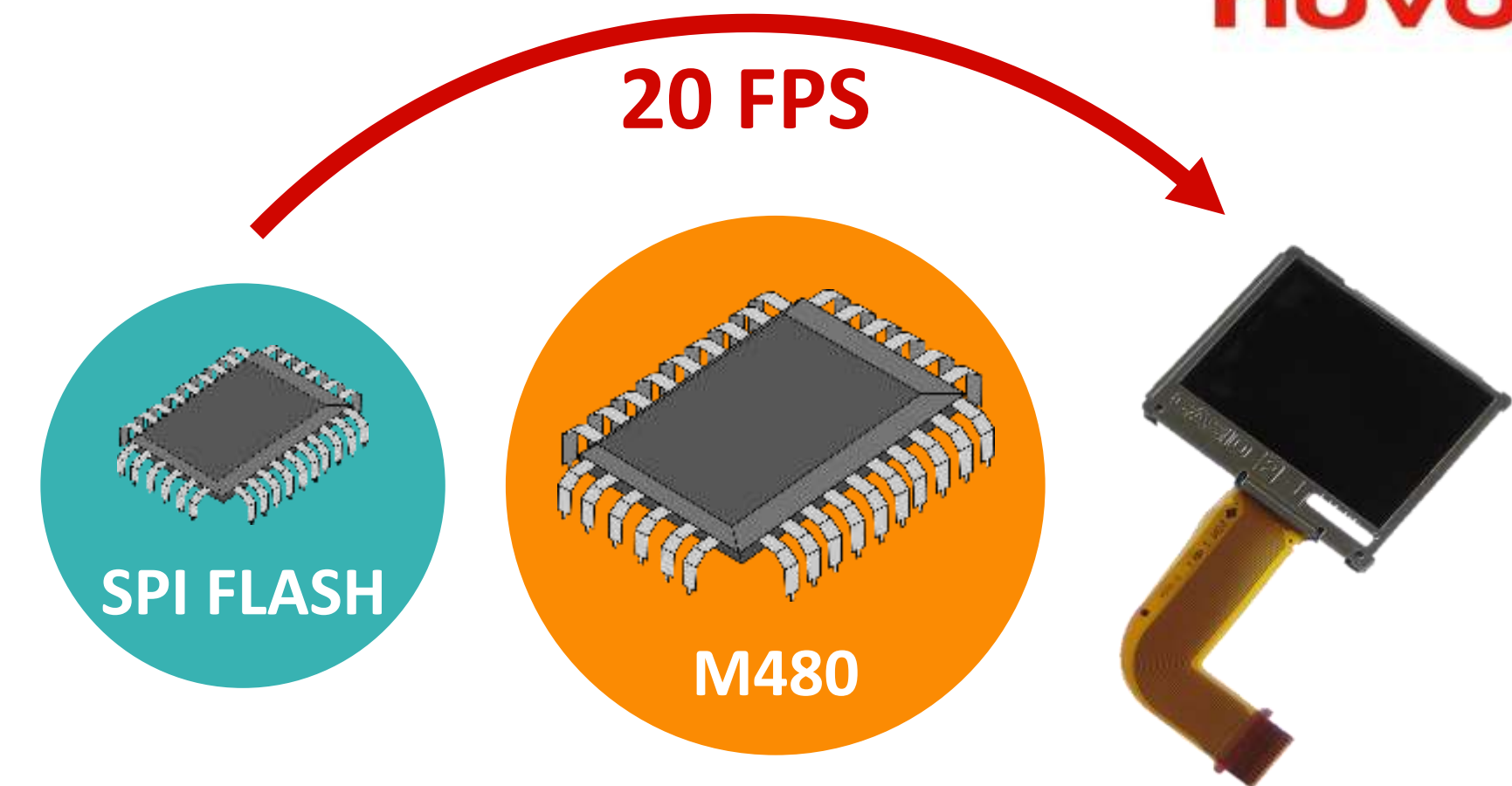
MPU HMI Part Naming Rule



M480 Series Features

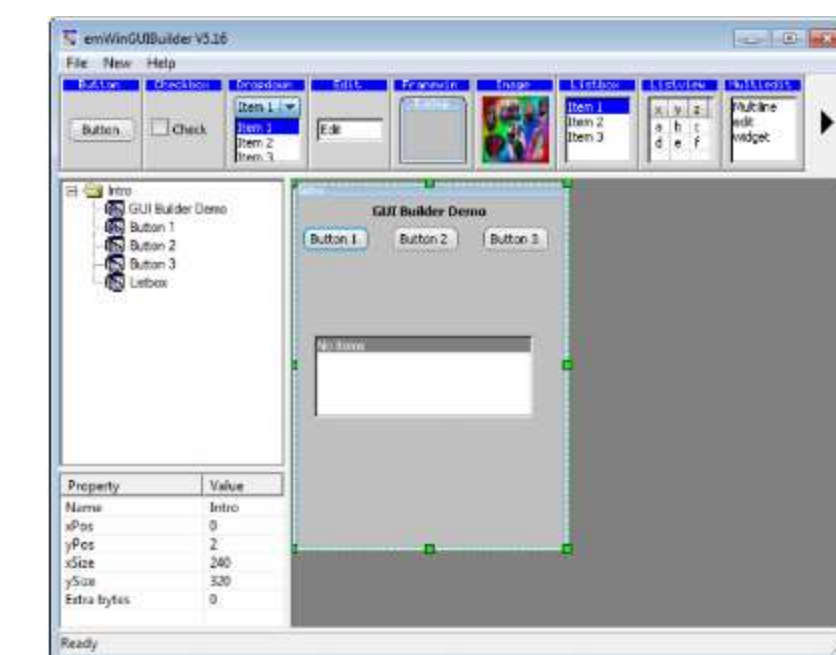
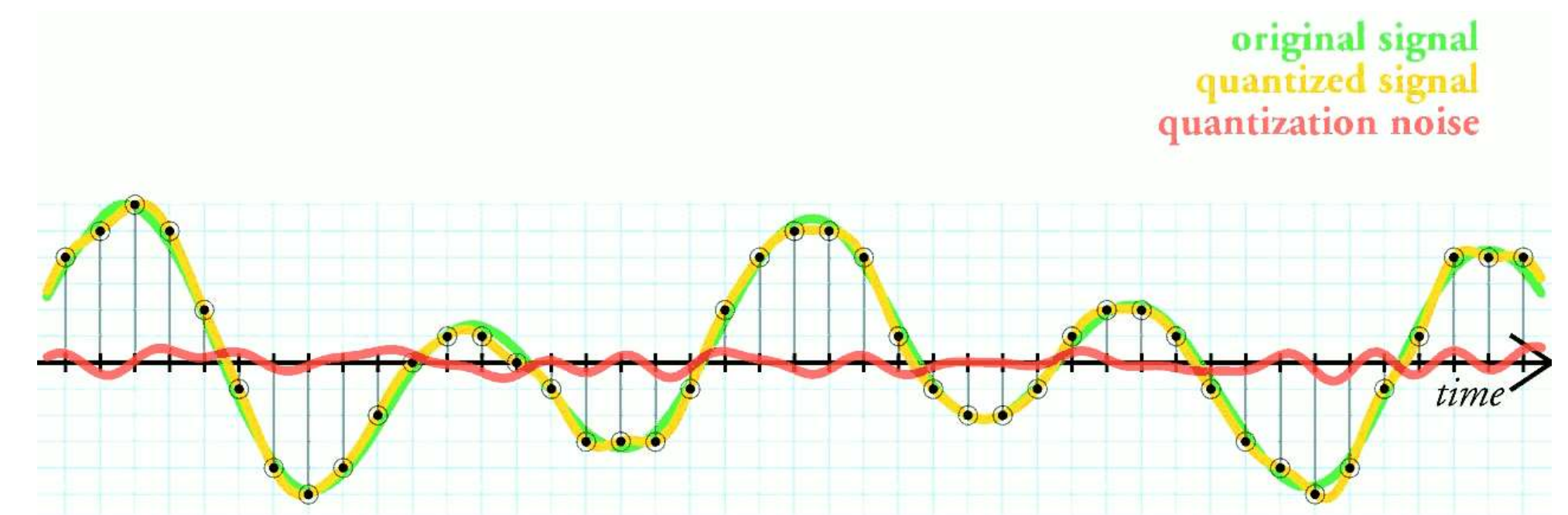
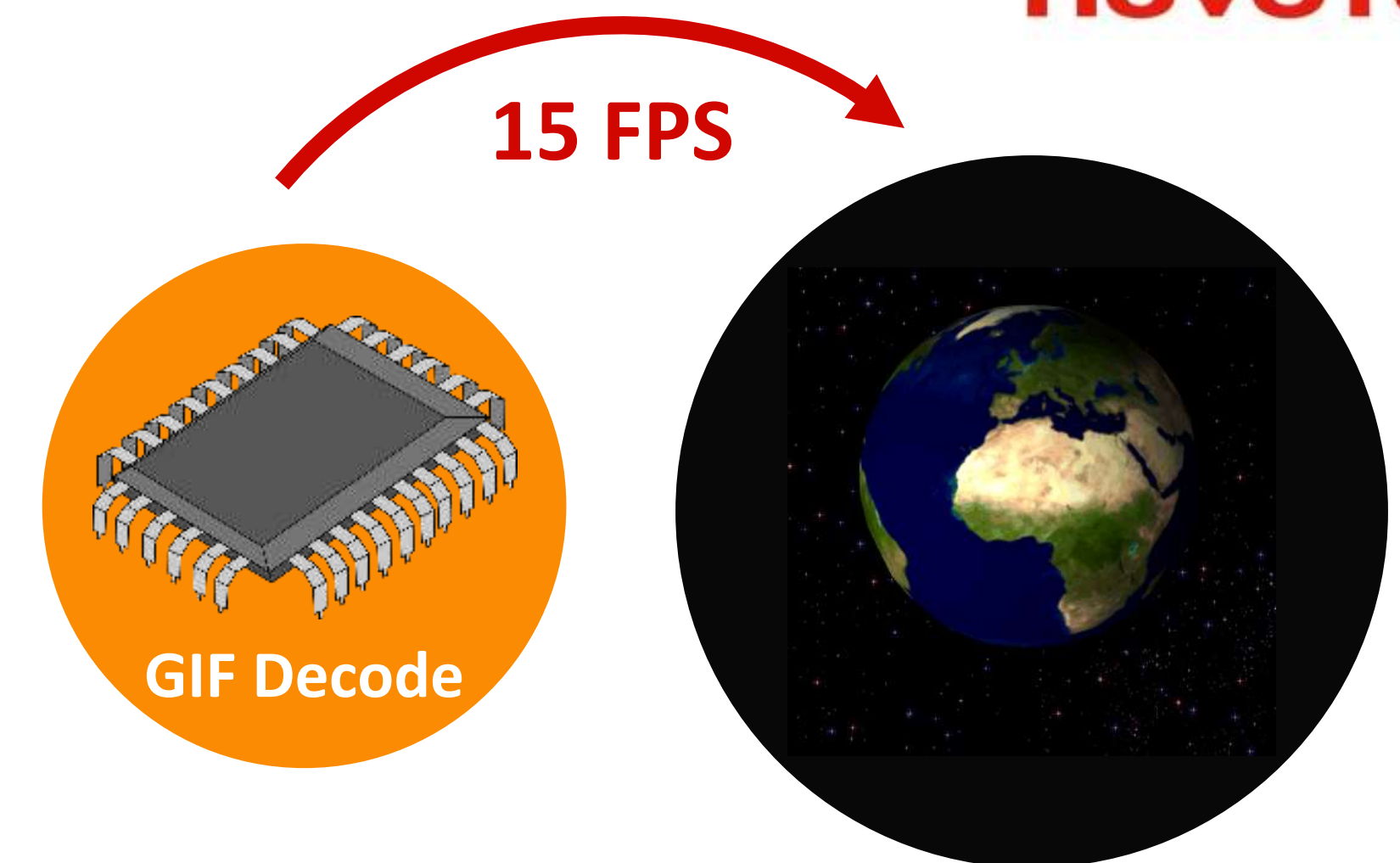
- **SPIM Support External 32MB Flash**
 - Store mass audio and image data
 - High performance access speed as internal flash (72MHz)
- **Support MPU SPI and i80 8/16bit Interface**
- **Support 320x240 Resolution @ 20 fps**
 - Build in up to 160KB SRAM
 - DMA Frame Buffer
- **Embedded 512KB internal Flash**
- **Build-in FPU and DSP**
 - Support high performance image decoder
 - Speedup image process
- **Support emWin Embedded Graphics Library**
 - Standard Graphic API – Easy Portable GUI
 - GUI Builder – Easy Create Fantastic GUI

Joy of innovation
nuvoton

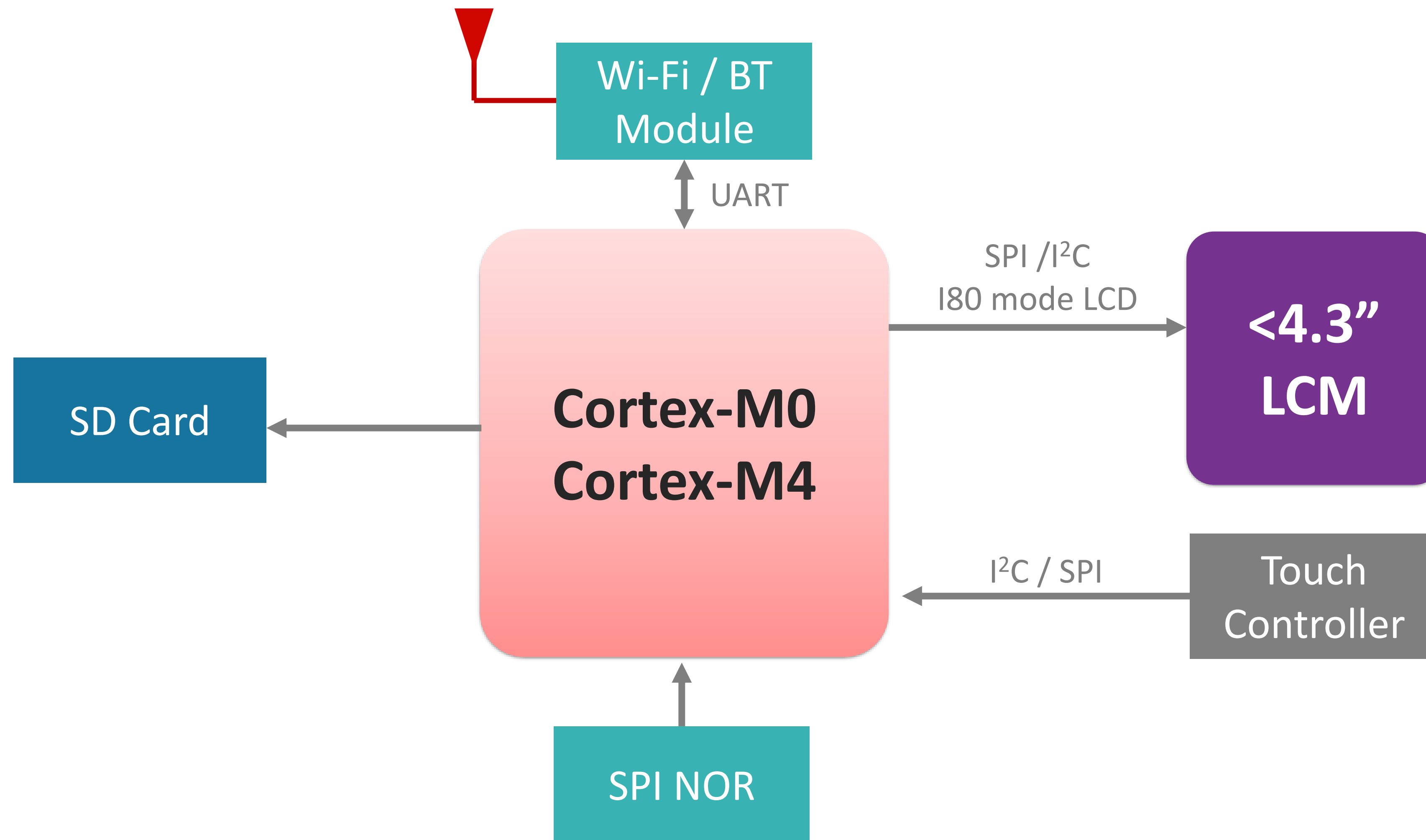


NUC126 Series Features

- **SPIM Support External 32MB Flash**
 - Store mass audio and image data
- **Support SPI/I2C Interface**
 - SPI speed can be up to 24 MHz
- **Embedded 256KB internal Flash**
- **Support 240x120 Resolution GIF animation @ 15 fp**
 - Build in up to 20 KB RAM
- **Build-in Hardware divider**
 - Support high performance image decoder
 - Speed up image process
- **Support emWin Embedded Graphics Library**
 - Standard Graphic API – Easy Portable GUI
 - GUI Builder – Easy Create Fantastic



Nuvoton MCU HMI Solution



HMI Solution Support emWin

LCM Resolution	< 240 x 120	< 320 x 240	320 x 240 ~ 1024x 768
MCU / MPU Part No.	NUC126 series M0564 series M251 series	M451 series M480 series	N9H20 series N9H26 series N9H30 series
CPU Type	Cortex –M0 @ 72MHz	Cortex-M4 @ 72~196MHz	ARM9 @ 200~300MHz
LCM Interface Type	SPI / I2C	SPI / I2C / i80	i80 / RGB16/RGB24
Color Deep	Mono OLED 65K TFT	Mono OLED 65K TFT	65K / 16M TFT
Input Type	Key buttons	Resistive Touch Capacitive Touch (External Touch Controller)	Resistive Touch (Built-in ADC) Capacitive Touch (External Touch Controller)
Flash / RAM Size	128KB/ 32KB	256KB/ 32KB 512KB/ 160KB	External Flash 2MB/ 8MB/ 16MB/ 32MB
Video Codec	N/A	N/A	MJPEG H.264
Audio DAC	External I2S DAC	External I2S DAC	Internal DAC External I2S DAC

emWin Demo Board

NK- N9H20



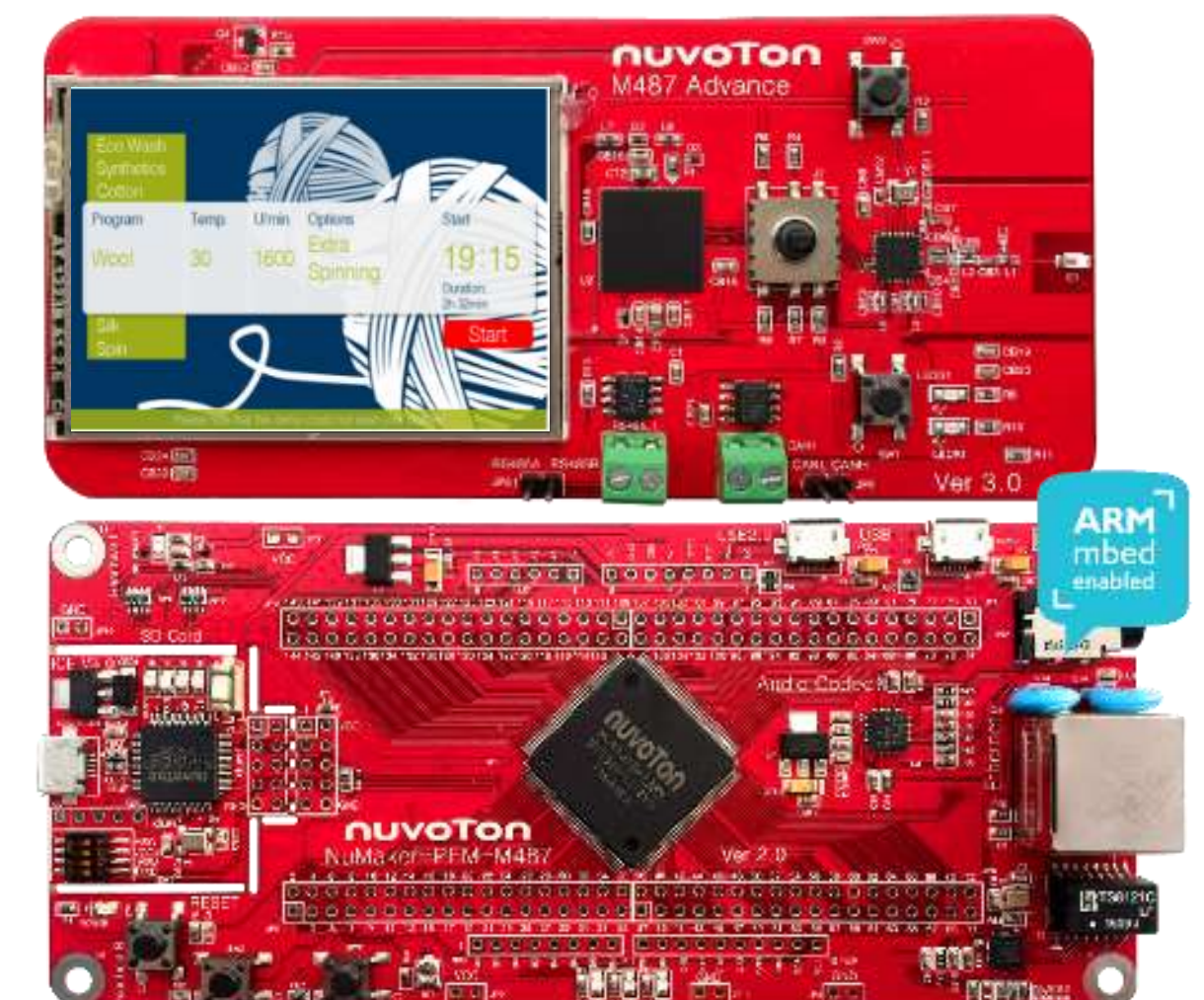
External SPI to UART Module

NK- N9H30



NK-N9H26 contact marketing
NUC126 demo board coming soon

NK-BEDM487LCD



For More Information Visit



Official Website

www.nuvoton.com

Forum

NuForum

English

<http://forum.nuvoton.com/>



牛卧堂

Simplified Chinese

<http://www.nuvoton-MCU.com>



21ic 中国电子网

Simplified Chinese

<http://bbs.21ic.com/iclist-187-1.html>



BSP Updates

GitHub

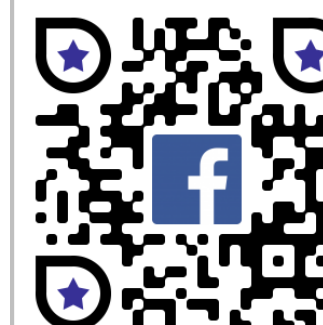
<https://github.com/OpenNuvoton>



Social Media

facebook

<https://www.facebook.com/NuvotonNuMicro/>



WeChat

ID: nuvoton_mcu



Online Store

nuvoton DIRECT

Global

<https://direct.nuvoton.com/>



天猫 Tmall.com

China

<http://nuvoton.tmall.com/>



Thank You



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