

# RL78/F2x SERIES

## MICROCONTROLLER INTRODUCTION

26/11/2021

AUTOMOTIVE SOLUTION BUSINESS UNIT  
RENESAS ELECTRONICS CORPORATION



# KEY TRENDS

# E/E ARCHITECTURE TREND

- CENTRAL UNIT PERFORMANCE GROWTH WITH CENTRALIZATION
- EVOLVED THROUGH DOMAIN ARCHITECTURE TO ZONE ARCHITECTURE
- MANY PARTIAL INTEGRATIONS IN THE MARKET

FUTURE  
Beyond 2030CY

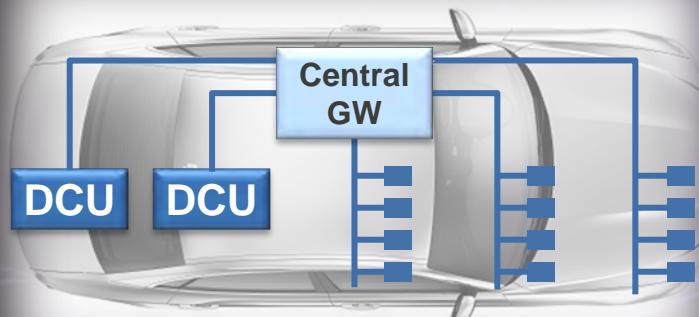
Zonal Architecture

Migration  
2025CY to 2030CY

Domain Architecture



PAST  
Central Architecture



# PRODUCT POSITIONING

# RL78/F2x: CROSS DOMAIN AUTOMOTIVE USAGE



Powertrain



xEV



DCU / Zone /  
Gateway



Chassis  
& Safety



Energy  
Management



Body Control  
/ Actuator & Sensor

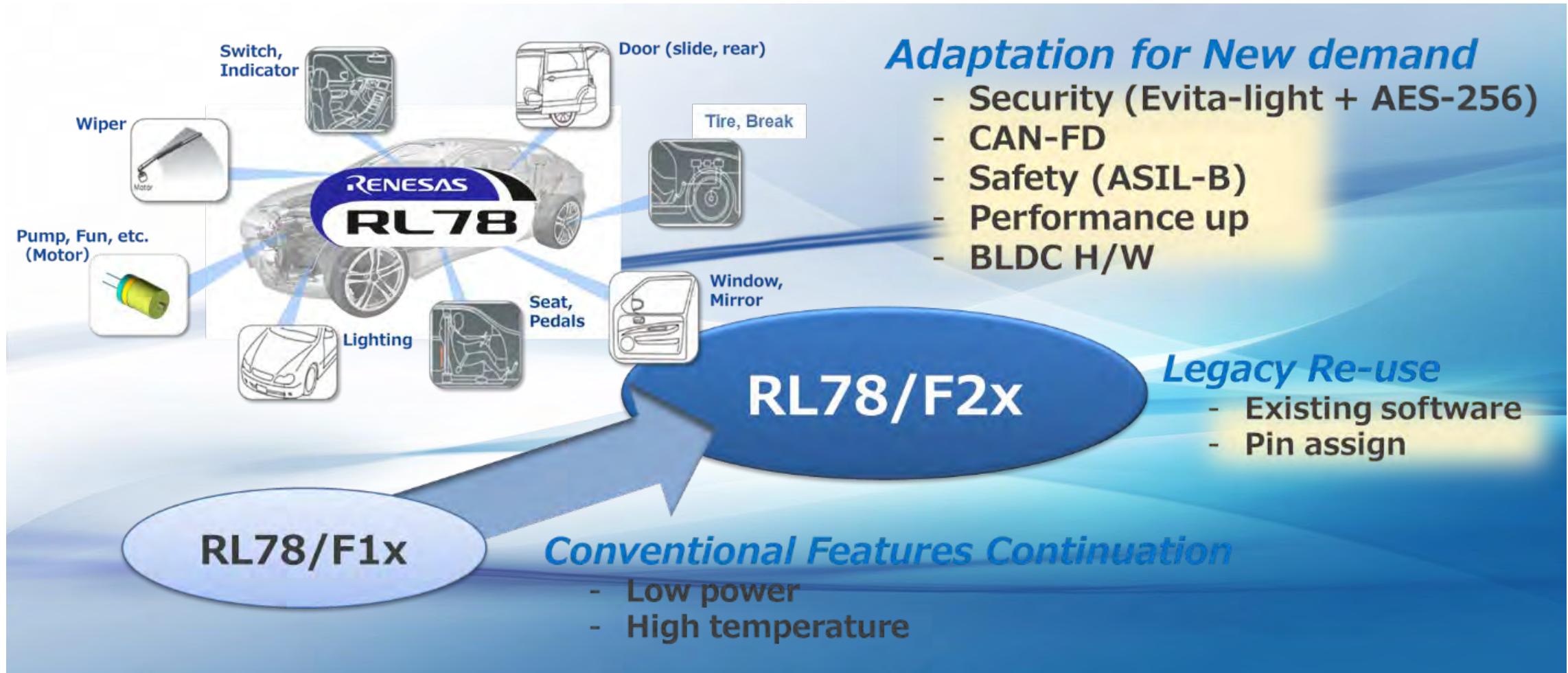
NEW

**RL78/F2x:**  
**Actuator, Sensor,  
Sub-controller MCU**

- Super Low Power
- High Temperature
- Evita-Light Security
- CAN-FD
- FuSa: ASIL-B
- Performance up
- BLCD h/w

Software Reusability

# RL78 EVOLUTION



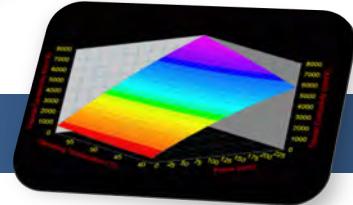
# RL78/F2X OVERVIEW

# RL78/F2x SERIES – HIGHLIGHTS & KEY FEATURES



## Low Power Consumption & Higher Performance

- Super low power consumption
- High temperature operation: Up to  $T_a = 150^{\circ}\text{C}$
- RL78 CPU: Performance increase to 40MHz
- Application Accelerator: To further boost performance for complex trigonometric & arithmetic processing



## Scalability & Flexibility

- 128kB and 256kB flash memory versions
- Package line-up from 32QFN (5x5mm) up to 100QFP
- Inherit peripheral functions from RL78/F14, F13 → SW re-usability
- Pin compatible to RL78/F14, F13 → reuse of hardware PCBs



## Technologies

- CAN FD communication → supported by RL78/F24
- 12bit A/D converter → up to 31 input channel and 2 x simultaneous Sample & Hold
- 32QFN combined with 256kB flash → unique in the market

## Safety & Security → ASIL B and Evita-Light

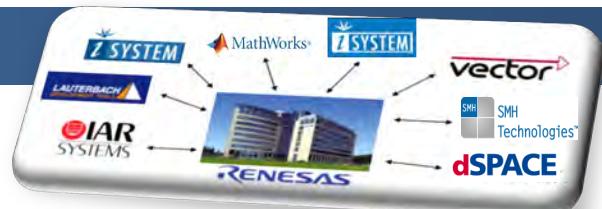


- ISO26262 → support ASIL-B application
- EVITA-Light, with AES-128/192/256 module, authentication, secure boot



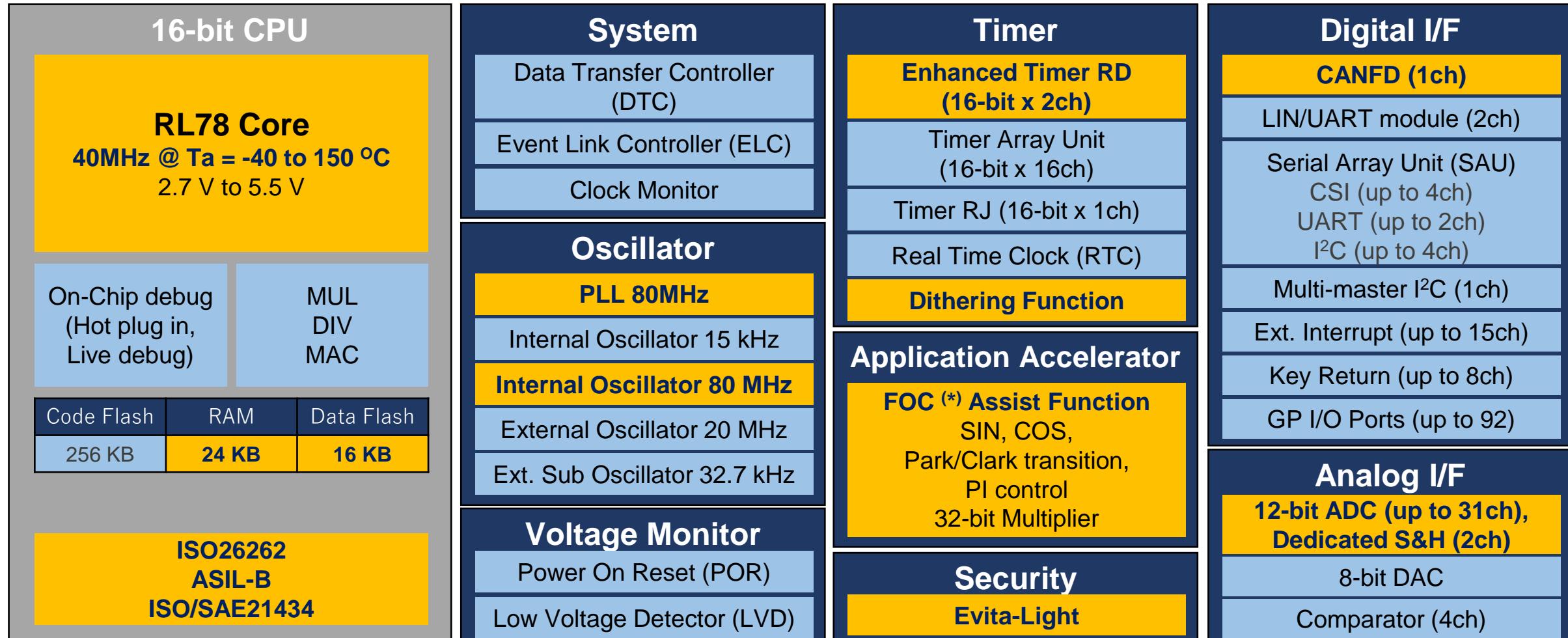
## System Development Environment

- Comprehensive Eco-system including starter kits for first evaluation



# RL78/F24 Block Diagram

Changing point  
from RL78/F14



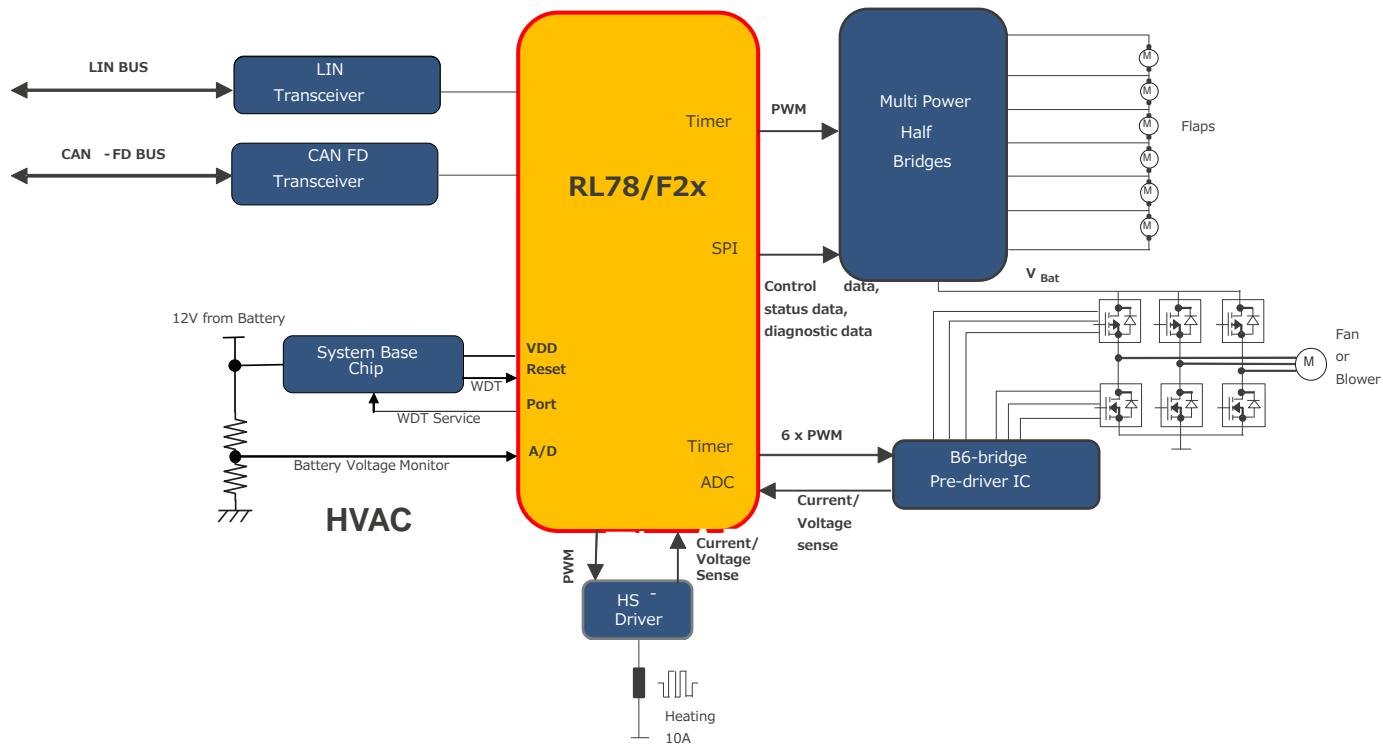
FOC: Field Oriented Control (BLDC motor vector control method)

# APPLICATION EXAMPLES

## THE VALUE THAT RL78/F2X OFFERS



# BENEFITS FOR A HVAC ECU



## Super Low Power Consumption

- Super low-power consumption in Standby (STOP, HALT and SNOOZE) and NORMAL mode

## Excellent connectivity

- Supports multiple Interfaces (CAN-FD, LIN, SPI, SENT)
- Secure encrypted connectivity to Central ECU

## Small package with 256kB flash

- Small 32QFN (5x5mm) package for minimum footprint

## Optimized Peripheral Set for BLDC Control

- Application accelerator and 12bit A/D with 2x sample & hold

# FUNCTIONAL SAFETY SUPPORT PROGRAM FOR AUTOMOTIVE

# FUNCTIONAL SAFETY

## SUPPORT PROGRAM FOR AUTOMOTIVE



**SAFETY SUPPORT PROGRAM** for AUTOMOTIVE

**RENESAS**

**Hardware**  
Safety mechanisms  
MCU, SoC, A&P



**Software**  
CPU Core self-test  
Safety Software



**Work Products**  
Safety analysis tool,  
Report, etc.

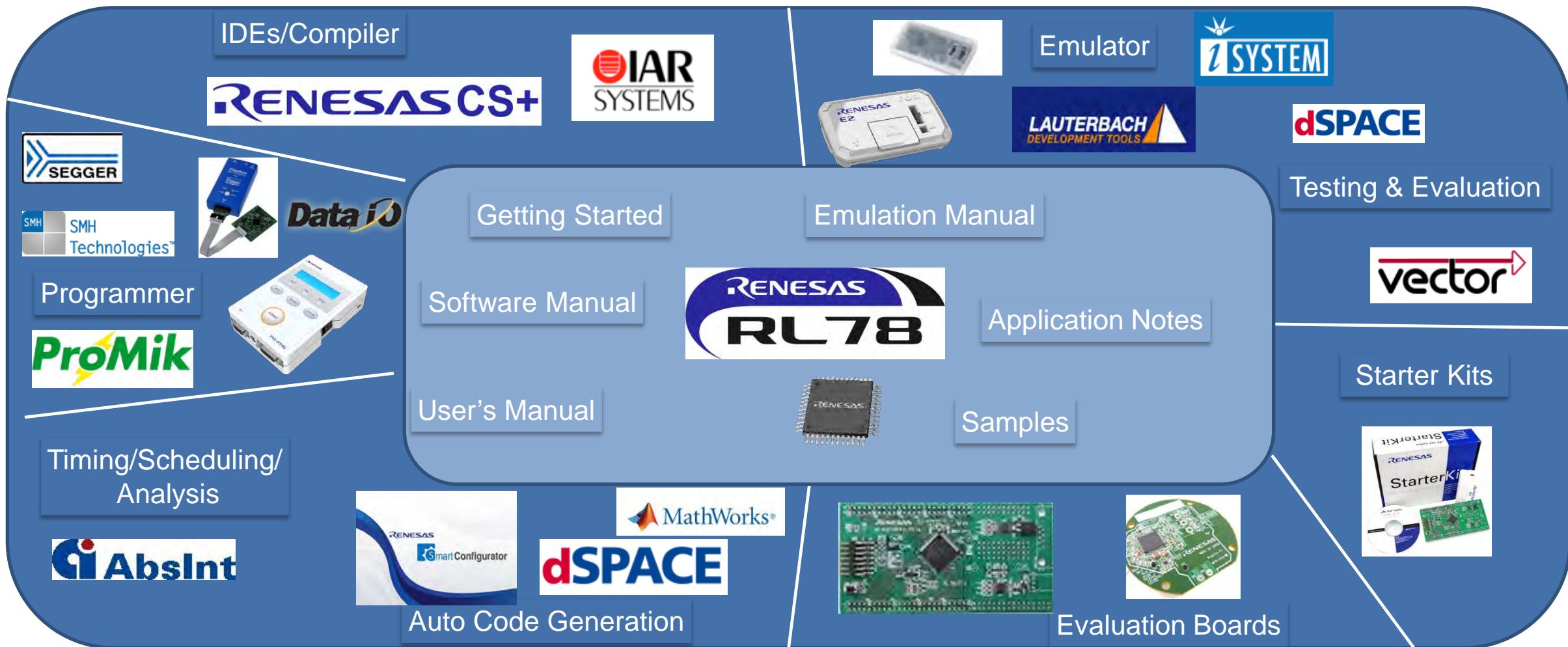


**Consulting**  
Workshop  
Development support



# RL78/F2X ECOSYSTEM

# RL78/F2X TOOLS ECO SYSTEM OVERVIEW



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