

New DAB Products Proposal



Consumer / Automotive DAB

Feb, 2023

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Company Introduction

Global Leading Supplier, owns a cutting edge technology in digital radio and audio field

Company	Glovane Co., Ltd.
Major business	<ul style="list-style-type: none"> Digital Radio Receiver ICs, Module & S/W solutions Connected Audio Solutions Active Noise Cancellation Solutions
Homepage	http://www.glovane.com
Address/ Contact	<p>HQ : 6Fl. I&C Bldg. Pangyoro255 24, Bundang-gu, Seongnam-si, Gyeonggi-do, 463-400, Korea</p> <p>China : Shenzhen Office (Jangwon.hong@glovane.com)</p>

Consumer



Automotive



Products	Company	Models
NX3131	Sony <ul style="list-style-type: none"> XDR-S40DBP, XDR-S60DBP 	  XDR-S40DBP XDR-S60DBP
GVM130S01	Denon <ul style="list-style-type: none"> RCD-M39/ -M40/ -M41 	
GVM130S01	TEAC <ul style="list-style-type: none"> HR-S101CD 	
GVM130S01	Marantz <ul style="list-style-type: none"> M-CR412 	
GL3511S	Panasonic <ul style="list-style-type: none"> RF-ND50TV-T JP, RF-U100TV 	 
GL3511S	JVC <ul style="list-style-type: none"> KD-DB95BT 	

New Product Introduction - Enhance functionality

DAB EWF Support !

- Emergency Warning & Alert Functionality

SLS !

- Enable Slide Show (SLS) functionality.



Enhance Color LCD !

- Advantages of DAB receiver with Color LCD.

Ultra Low Power Consumption New Chip

New Product Introduction

GL315X



Next Generation
DAB SoC

High Performance

-103 dBm (Band3 Sensitivity)
2Layer PCB Design Available

Variable LCD Support

Character / Starburst LCD
Dot Matrix / Color LCD(16bit ADC)

Ultra Low Power Consumption

Deep sleep mode
40mA

Compact Package

QFN 10 x 10mm 88pin

New Product Introduction - New Chip Improvement Chart

For Middle End Application

Current

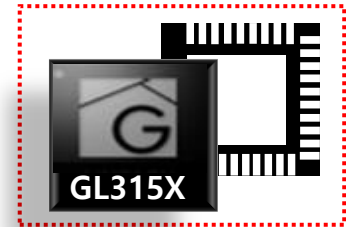


Chip : GL314X

Package	BGA, 11x11, 169 Ball,	2 or 8MB SDRAM
Service Following	DAB to FM (via Ext. I2S)	Seamless
Band3	Sensitivity	-101 dBm
	Fading-RA6	-95 dBm
	ACS	49 dB
	FOS	60 dB
FM	Usable Sensitivity	-110 dBm
	ACS(+/-200KHz / 400KHz)	50 dB / 53 dB
	IMR	48 dB
	SNR	78 dB
Power	65mA (3.3V), 1uA (Sleep-mode)	

For High End Application

Future

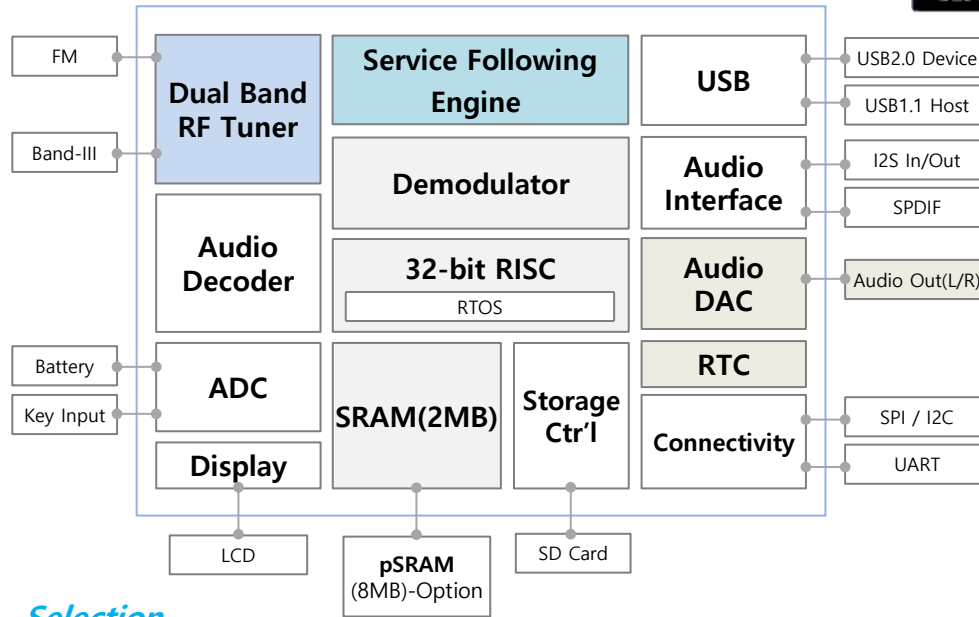


Chip : GL315X

Package	QFN, 12x12, 100pin, 0.4mm	2MB SRAM +8MB(Optional)	↑
Service Following	DAB to FM (via Ext. I2S)	Seamless	
Band3	Sensitivity	-103 dBm	↑
	Fading-RA6	-98 dBm	↑
	ACS	60 dB	↑
	FOS	70 dB	↑
FM	Usable Sensitivity	-111 dBm	↑
	ACS(+/-200KHz / 400KHz)	53 dB / 65 dB	↑
	IMR	50 dB	↑
	SNR	78 dB	
Power	40mA (3.3V), 1uA (Sleep-mode)		↑

New Product Introduction - SoC (GL315x)

Block Diagram



Key Features

- ❖ **RF Tuner**
 - > **Dual-Band RF** : Band-III(168~261MHz), FM(76~108MHZ)
- ❖ **Eureka-147 & FM Demodulator**
- ❖ **Audio Decoder**
 - > MPEG Audio L2, 48K/24K sample rate
 - > MPEG 4 HE-AAC v2, MPEG4 ER-BSAC
 - > MP3/WMA playback
 - > Voice Recording, Equalizer
 - > I2S / SPDIF
- ❖ **MCU**
 - > 32bit RISC CPU up to 100Mhz
 - > RTOS
- ❖ **Service Following Engine**
 - > Seamless DAB/DAB+ to FM (GL315X)
- ❖ **Additional Features**
 - > LDO regulator
 - > Audio DAC
 - ⌘ 96dB Dynamic Range and -86dB THD* D/A Conversion
 - ⌘ Power-on/off Pop-Suppression
 - ⌘ Line output(L/R)
- ❖ **Interface**
 - > Host interface : I2C, UART, Multi-IO SPI
 - > USB 2.0 Device, USB 1.1 Host
- ❖ **Very Low Power Consumption:** 25mA (DAB/DAB+ w/ DAC)

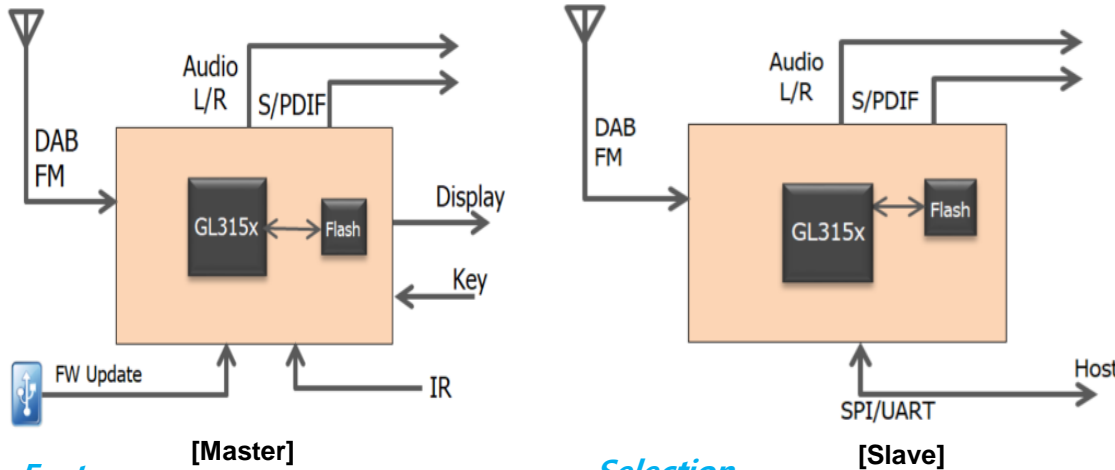
Selection

Items	GL315X
PKG	<ul style="list-style-type: none"> ▪ QFN, 100pin, 10mm * 10mm ▪ 0.4mm pitch
Support	<ul style="list-style-type: none"> ▪ DAB/DAB+/DMB-A/FM-RDS ▪ MOT/SLS support ▪ Recording/ Playback support ▪ Seamless DAB-FM S/F
Memory	<ul style="list-style-type: none"> ▪ SRAM(2MB)+ pSRAM(8MB) – Option

Product Introduction

New module GVM15xD01

Block Diagram



Features

- DAB/DAB+/DMB-A/FM-RDS receiver
- Covers whole Band-III (168MHz~245MHz)/FM(76MHz~108MHz)
- ETSI 300 401 compliant
- DAB+ (ETI TS 102 563)
- TII decoding
- Fast sync acquisition
- Seamless dynamic reconfiguration
- RTC
- Digital audio output (SPDIF) and analog audio output
- USB 2.0 device for user to update FW
- Remote-controller interface
- 4 channel 10-bit ADC for key sensing, battery check-up
- GPIOs for key input or rotary switches
- External Supply voltage: 3.3V only (1.1V/1.4V/1.8V are generated by internal LDOs)
- RoHS compliant

Selection

Items	GVM15x01
Module Size	• 27mm*27mm
Support	• DAB/DAB+/DMB-A/FM-RDS • MOT/SLS support • Recording/ Playback support
Memory	• SDRAM 2MB(GL315x) • pSRAM 8MB

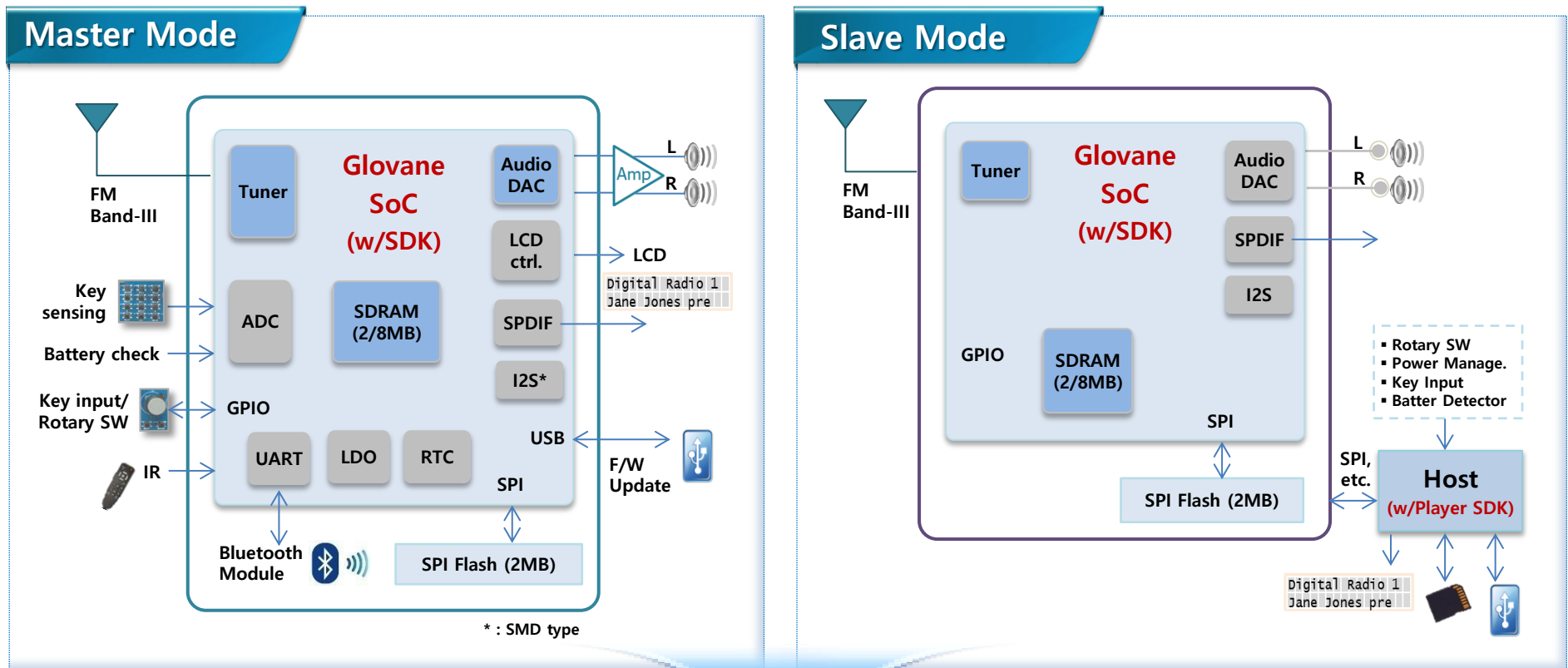
GVM15xG01





Key Features

RF Tuner	B-III (174MHz~260MHz) (5A~17B)	
RF Performance (Main/Sub)	Sensitivity	-101 dBm
	Fading-RA6	-94 dBm
	ACS(N±1)	53 dB
Power	50mA (3.3V only, for Main/Sub DAB+ decoding)	
Temperature	-20 ~ 85°C (Operating) -30 ~ 85°C (Storage)	
Audio Decoder	MPEG1/2 Audio L2, 48K/24K sample rate MPEG4 HE-AAC v2, MPEG4 ER-BSAC, MP3/WMA Playback, Voice Recording, Equalizer, I2S / SPDIF	
Audio Performance	SNR	100 dB (2.4Vpp with A-weighted)
	THD	0.01% (1kHz with 20kHz LPF enabled)
MCU	32bit RISC CPU up to 100MHz, RTOS	
Additional Features	Audio DAC ⚡ 96dB Dynamic Range and -86dB THD*D/A Conversion ⚡ Power-on/off Pop-Suppression ⚡ Line output(L/R), Headset output(L/R)	
Interface	Host interface : I2C, UART, SPI	

New Product Introduction – Modules (GVM15xG)



Module	Pin type	SMD type
Dimensions	T.B.D 	27mm X 27mm 
Variants	GVM15XH01	GVM15XG01

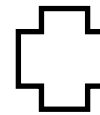
One - chip solution

2 - Chip solution



GL314x or GL351x (RF +Modem+ Audio Decoder)

- ✓ Design Convenience
- ✓ RF performance verification
- ✓ Save cost
- ✓ less burden to manage supplier from 2 vendor to 1 vendor

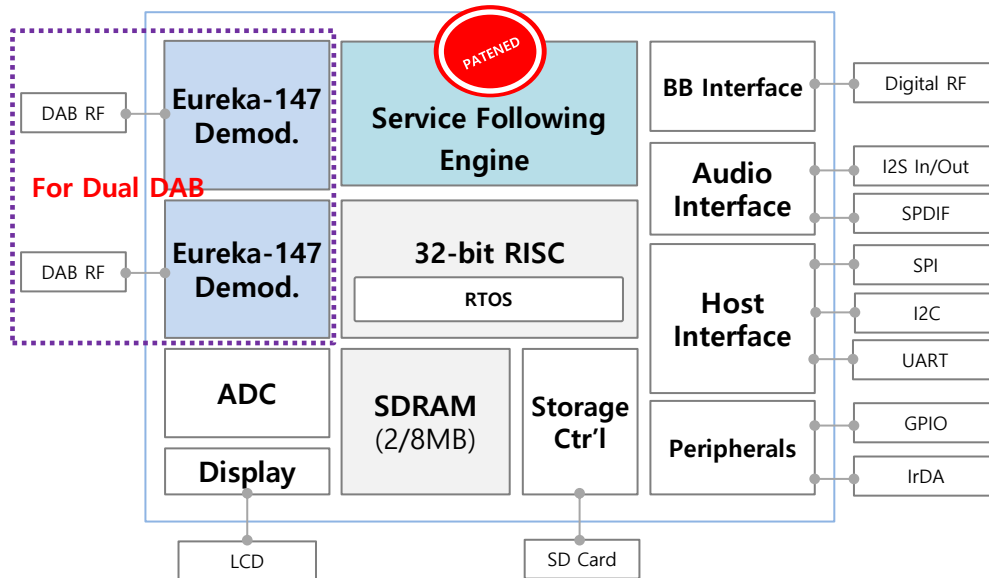


RF + GL3511S or GL3512 (RF +Modem+ Audio Decoder)

- ✓ Design Inconvenience
- ✓ Cost Increasing
- ✓ Increase management points



Block Diagram



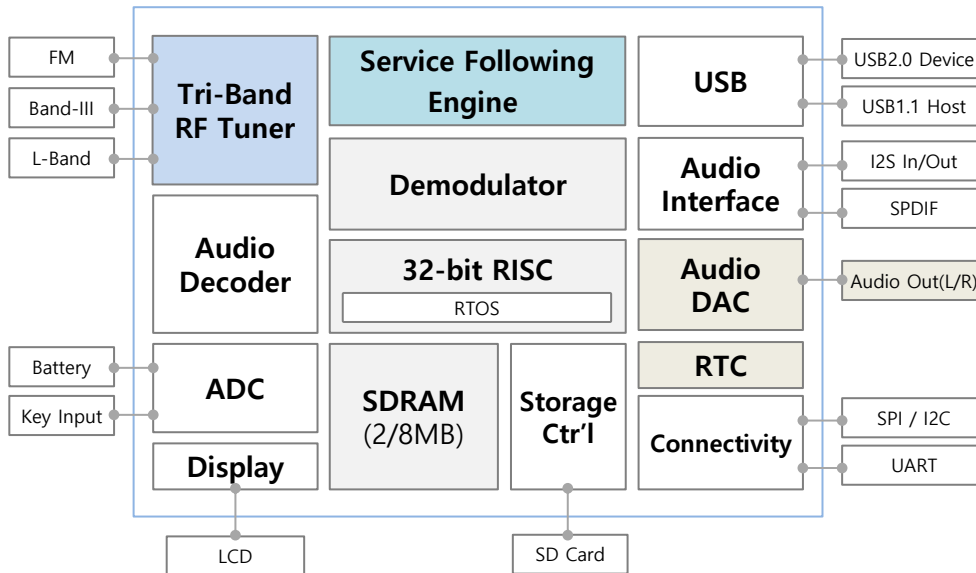
Selection

Items	GL3512D	GL3511S
PKG	169B, 11mm * 11mm (0.8mm pitch)	
Support	Seamless DAB to FM & DAB to DAB	•Seamless DAB to FM S/F
SDRAM	8MB	4MB
Baseband	Dual	Single

Key Features

- ❖ **Automotive application**
 - > **AEC-Q100**
- ❖ **Eureka-147 & FM Demodulator**
- ❖ **Audio Decoder**
 - > MPEG Audio L2, 48K/24K sample rate
 - > MPEG 4 HE-AAC v2, MPEG4 ER-BSAC
 - > MP3/WMA playback
 - > Voice Recording, Equalizer
 - > I2S / SPDIF
- ❖ **MCU**
 - > 32bit RISC CPU up to 100Mhz
 - > RTOS
- ❖ **Service Following Engine**
 - > Seamless DAB/DAB+ DAB to DAB/FM
- ❖ **Additional Features**
 - > LDO regulator
 - > Audio DAC
 - ↳ 96dB Dynamic Range and -86dB THD* D/A Conversion
 - ↳ Power-on/off Pop-Suppression
 - ↳ Line output(L/R), Headset output(L/R)
- ❖ **Interface**
 - > Host interface : I2C, UART, Multi-IO SPI
 - > USB 2.0 Device, USB 1.1 Host
- ❖ **Power Consumption:** 65mW (DAB/DAB+ w/ case)

Block Diagram



Selection

Items	GL3140	GL3142
PKG	169B, 11mm * 11mm	169B, 11mm * 11mm
	Pin Compatible	
Support	• DAB/DAB+/DMB-A/FM-RDS	• DAB/DAB+/DMB-A/FM-RDS • MOT/SLS support • Recording/ Playback support • Seamless DAB-FM S/F
SDRAM	2MB	8MB

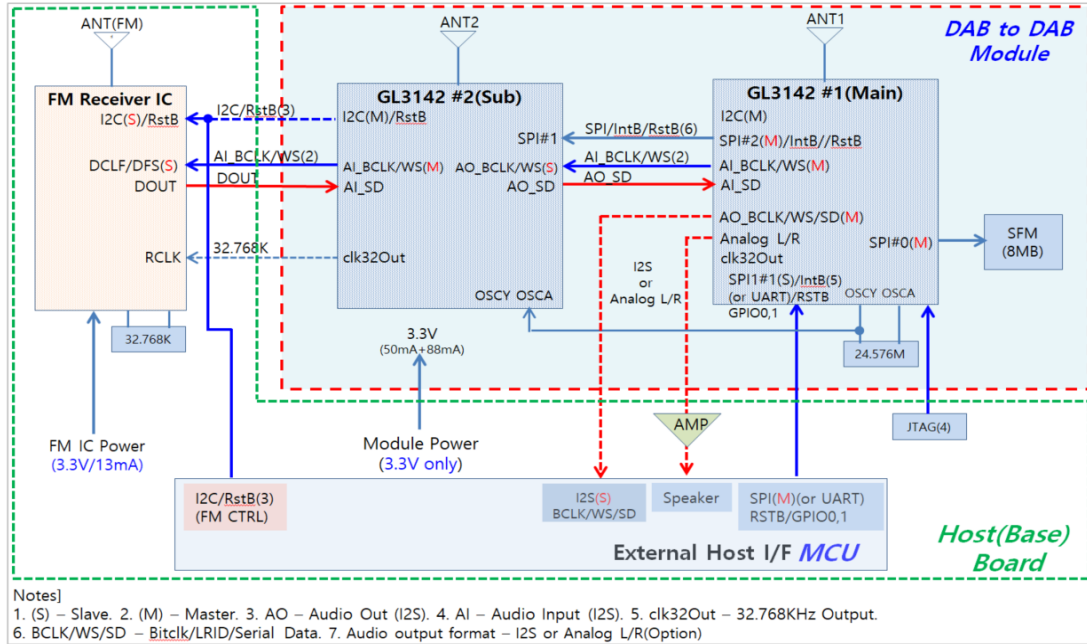
Key Features

- ❖ **RF Tuner**
 - > Triple-Band RF : FM, Band-III, L-Band
- ❖ **Eureka-147 Baseband & FM Demodulator**
- ❖ **Audio Decoder**
 - > MPEG1/2 Audio L2, 48K/24K sample rate
 - > MPEG4 ER-BSAC, MPEG4 HE-AAC v2
 - > Supports all bit rates in ETSI 300 401
 - > MP3/OGG/WMA playback
 - > Voice Recording, Equalizer
 - > I2S / SPDIF
- ❖ **MCU**
 - > 32bit RISC processor up to 100MHz
 - > RTOS
- ❖ **Service Following Engine**
 - > Seamless DAB/DAB+ to FM (GL3142)
- ❖ **Additional Features**
 - > LDO regulators(1.8V/1.2V)
 - > Audio DAC
 - ⌘ 96dB Dynamic Range and -86dB THD* D/A Conversion
 - ⌘ Power-on/off Pop-Suppression
 - ⌘ Line output(L/R), Headset output(L/R)
- ❖ **Interface**
 - > Host interface : I2C, UART, Multi-IO SPI
 - > USB 2.0 Device, USB 1.1 Host
- ❖ **Power Consumption:** 103mW (DAB/DAB+ w/ DAC)

Product Introduction

DAB to DAB Seamless S/F Module | GVM142D01

Block Diagram



Features

- DAB(DAB+) to DAB(DAB+) & DAB to FM seamless service following receiver
- Covers whole Band-III
- ETSI 300 401 compliant
- DAB+ (ETI TS 102 563)
- TII decoding
- Fast sync acquisition
- Seamless dynamic reconfiguration
- Digital audio output (I2S, master only) or Analog audio Left/Right output
- Digital audio input (I2S, master only) to get data from external FM receiver
- Supply voltage: 3.3V only
- RoHS compliant

Selection

Items	GVM142D01
Module Size	• 43.0mm*25.5mm
Support	• DAB/DAB+/DMB-A/FM-RDS • MOT/SLS support • Recording/ Playback support • Seamless DAB-FM S/F
Memory	• SDRAM 16MB(GL3142*2ea) • SFM 8MB

GVM142D01

Seamless Service Following
- DAB to DAB



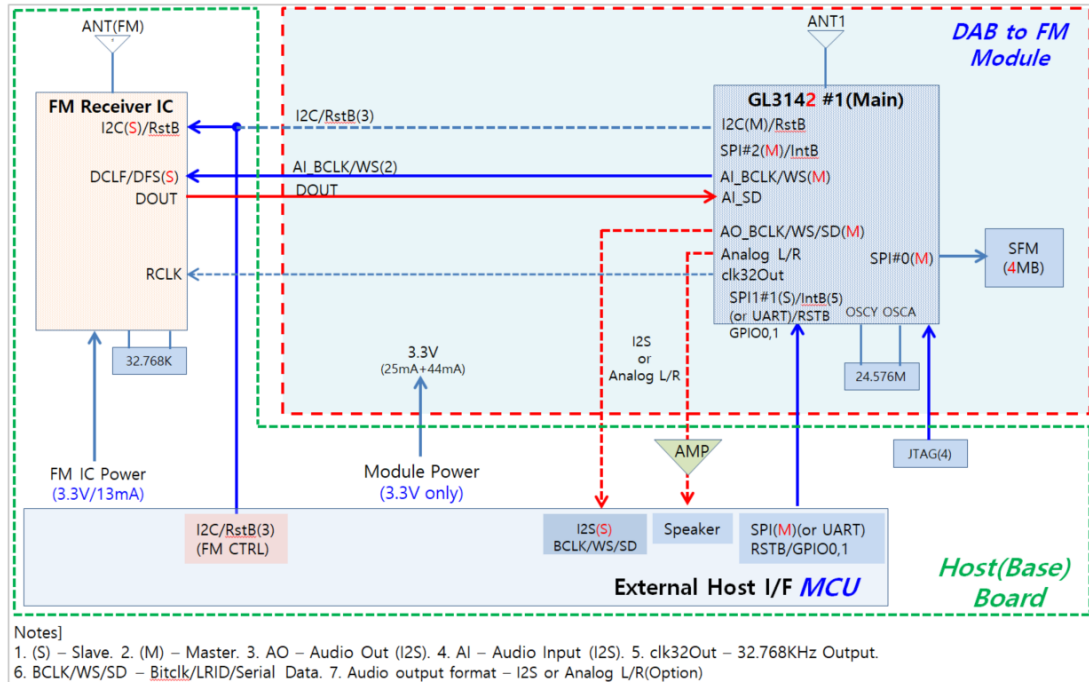
Key Features

Seamless	DAB to DAB (GL3142 combo)	
RF Tuner	B-III (174MHz~260MHz) (5A~17B)	
RF Performance (Main/Sub)	Sensitivity	-101 dBm
	Fading-RA6	-94 dBm
	ACS(N±1)	50 dB
Power	138mA (3.3V only, for Main/Sub DAB+ decoding)	
Temperature	-40 ~ 85°C (Operating) -40 ~ 125°C (Storage)	
Audio Decoder	MPEG1/2 Audio L2, 48K/24K sample rate MPEG4 HE-AAC v2, MPEG4 ER-BSAC, MP3/WMA Playback, Voice Recording, Equalizer, I2S / SPDIF	
Audio Performance	SNR	94 dB (2.4Vpp with A-weighted)
	THD	0.01% (1kHz with 20kHz LPF enabled)
MCU	32bit RISC CPU up to 100MHz, RTOS	
Additional Features	Audio DAC ⚡ 96dB Dynamic Range and -86dB THD*D/A Conversion ⚡ Power-on/off Pop-Suppression ⚡ Line output(L/R), Headset output(L/R)	
Interface	Host interface : I2C, UART, SPI	

Product Introduction

DAB to DAB Seamless S/F Module | GVM14xFD01

Block Diagram



Features

- DAB/DAB+ receiver
- Covers whole Band-III
- ETSI 300 401 compliant
- DAB+ (ETI TS 102 563)
- TII decoding
- Fast sync acquisition
- Seamless dynamic reconfiguration
- Digital audio output (I2S, master only) or Analog audio Left/Right output
- Digital audio input (I2S, master only) to get data from external FM receiver
- Supply voltage: 3.3V only
- RoHS compliant

Selection

Items	GVM140F01(Non-Seamless) GVM142F01(Seamless)
Module Size	• 26.0mm*25.5mm
Support	• DAB/DAB+/DMB-A/FM-RDS • MOT/SLS support • Recording/ Playback support • Seamless DAB-FM S/F
Memory	• SDRAM 8MB(GL3142*1ea) • SFM 4MB

- Strictly Confidential -

GVM14xF01

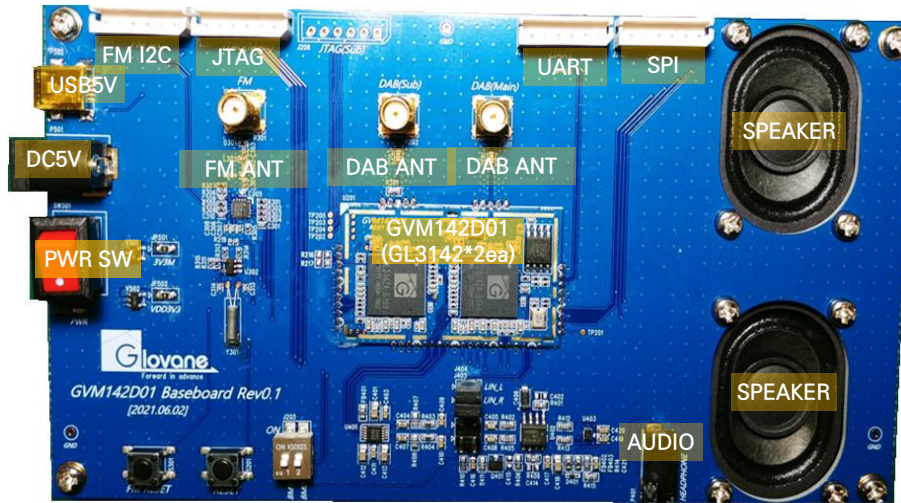
Seamless Service Following
- DAB to FM



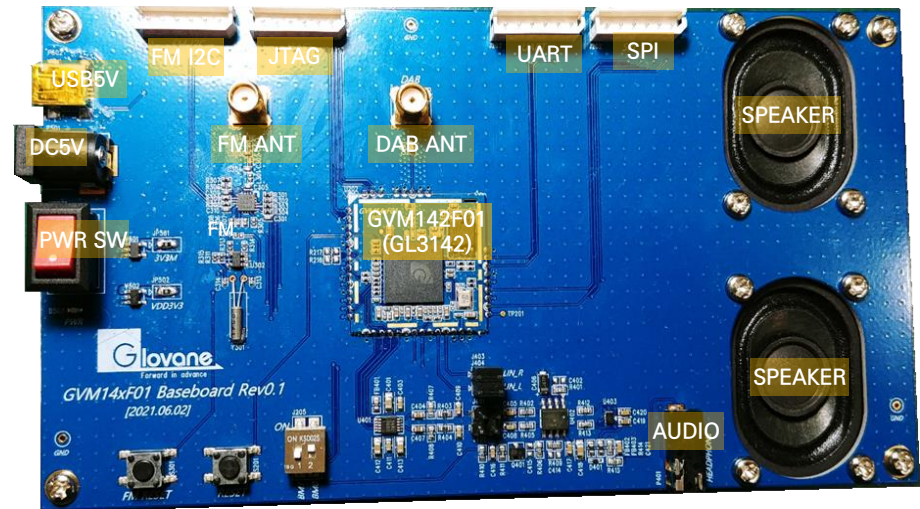
Key Features

Seamless	DAB to FM (GL3142 combo)	
RF Tuner	B-III (174MHz~260MHz) (5A~17B)	
RF Performance (Main/Sub)	Sensitivity	-101 dBm
	Fading-RA6	-94 dBm
	ACS(N±1)	50 dB
Power	69mA (3.3V only, for DAB+ decoding)	
Temperature	-40 ~ 85°C (Operating)	
	-40 ~ 125°C (Storage)	
Audio Decoder	MPEG1/2 Audio L2, 48K/24K sample rate MPEG4 HE-AAC v2, MPEG4 ER-BSAC, MP3/WMA Playback, Voice Recording, Equalizer, I2S / SPDIF	
Audio Performance	SNR	94 dB (2.4Vpp with A-weighted)
	THD	0.01% (1kHz with 20kHz LPF enabled)
MCU	32bit RISC CPU up to 100MHz, RTOS	
Additional Features	Audio DAC ⌘ 96dB Dynamic Range and -86dB THD*D/A Conversion ⌘ Power-on/off Pop-Suppression ⌘ Line output(L/R), Headset output(L/R)	
Interface	Host interface : I2C, UART, SPI	

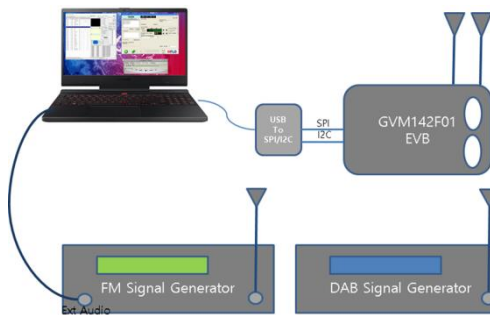
1. EVB Layout (DAB to DAB)



2. EVB Layout (DAB to FM)

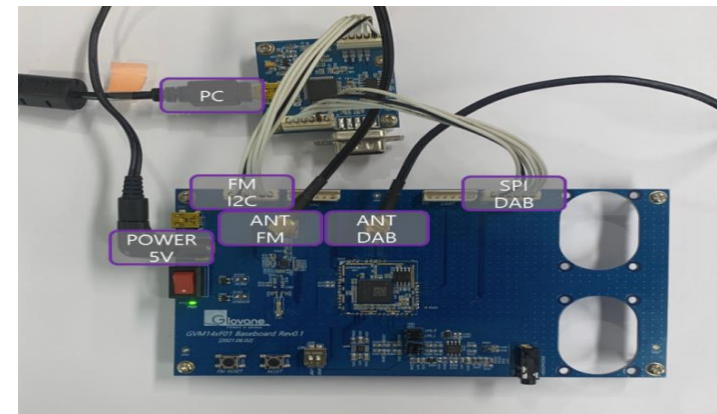


3. Environment Setup



- ✓ DAB signal generator
- ✓ FM signal generator
 - ✓ FM RDS support required
 - ✓ External audio source must be supported
 - ✓ Must be able to modify PI (Program Identification) of RDS.
- ✓ Notebook or desktop
- ✓ GVM142F01 EB
- ✓ USB to SPI/I2C Dongle
- ✓ NX Player

4. EVB Cable Connection



Hyundai & Kia

- **DAB Solution : GL3512D**
- **Tier1 : LGE**
 - ✓ Over 14 models adopted GL3512D for seamless linking dual DAB receiver
 - ✓ Recently, Hyundai & KIA motors have also adapted GL3512D for their premium line-up (K9 and Genesis model) as well



Renault

- **DAB Solution : GL3512D**
- **Tier1 : LGE**
 - ✓ Representative vehicle model information of all over 10 Renault vehicle models



GM

- **DAB Solution : GL3512D**
- **Tier1 : LGE**
 - ✓ Adopted BYOM2/3 model (single solution) so far



PSA-Peugeot and Citroën

- **DAB Solution : GL3512D**
- **Tier1 : LGE**
 - ✓ Various vehicle models of Peugeot
 - ✓ Citroën are implementing GL3512D
 - ✓ Currently, information of the numbers
 - ✓ Vehicle models are strictly confidential.



JVC

JVC KENWOOD

- **DAB Solution : GL3511S**
- **Tier1 : JVC**

✓ Adopted Glovane's GL3511S (single solution) so far

Nissan



- **DAB Solution : GL314x**
- **Tier1 : Humax**

✓ Totally, 16 GM models adopted Glovane's GL3511S (single solution) so far

Renault

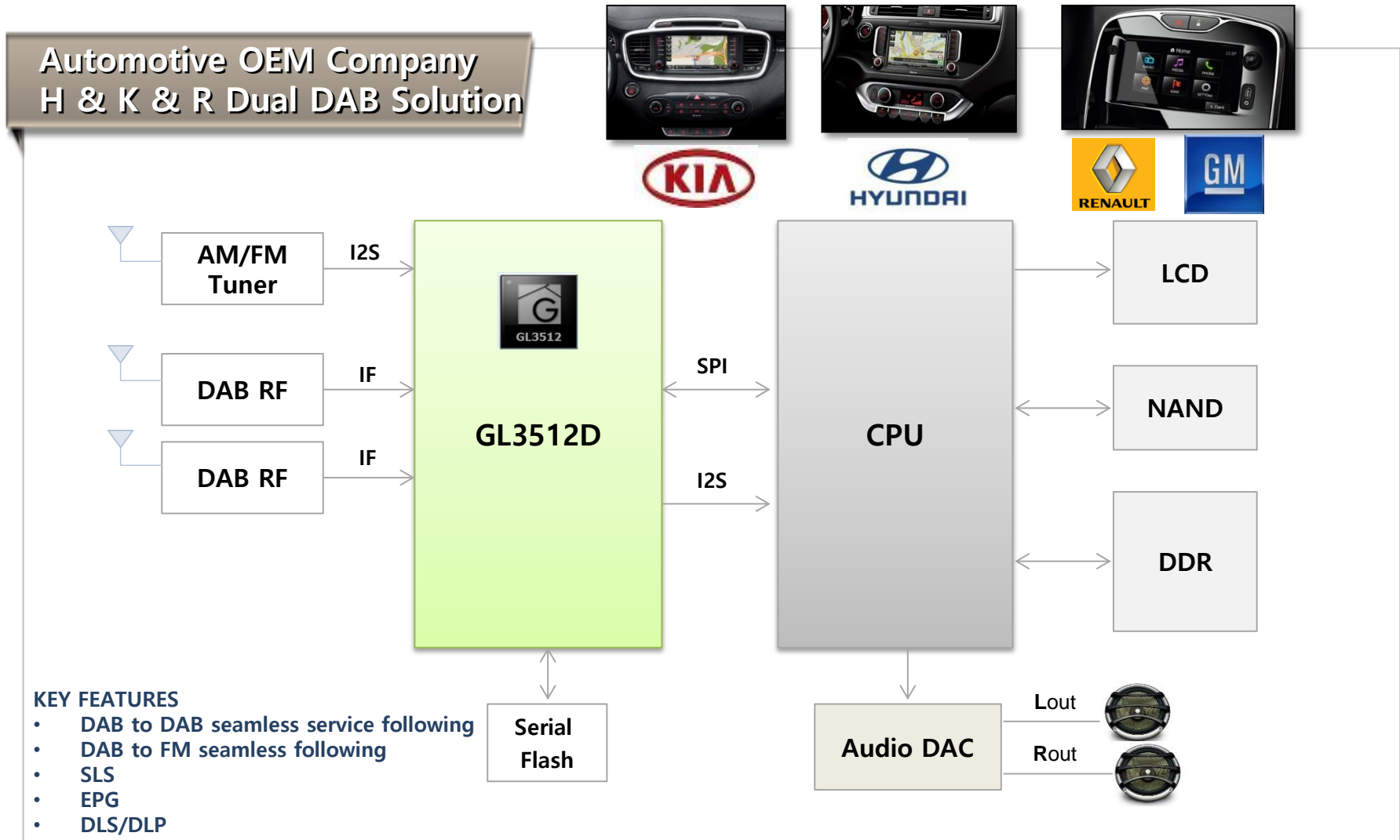


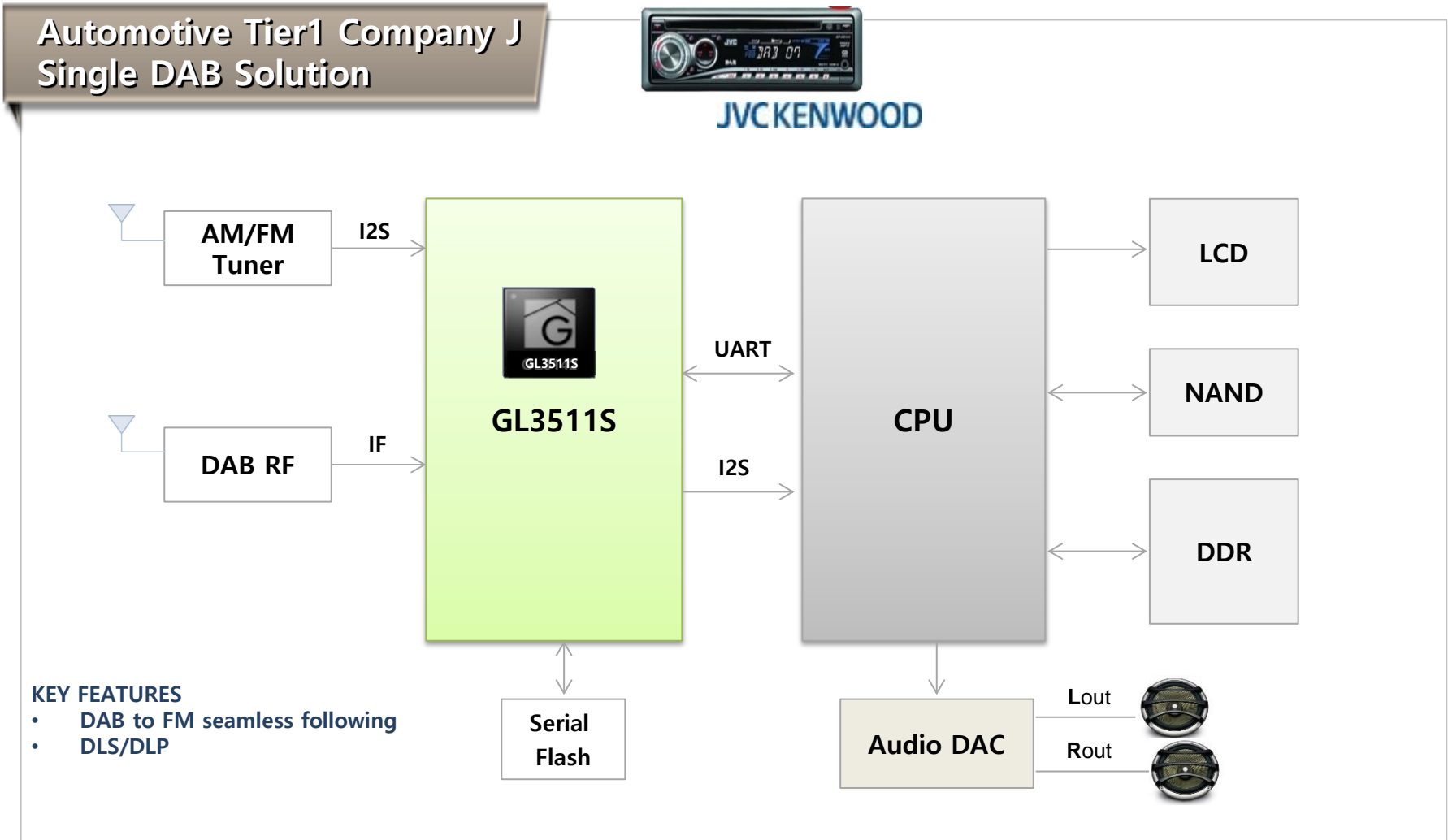
- **DAB Solution : GL314x**
- **Tier1 : Humax**

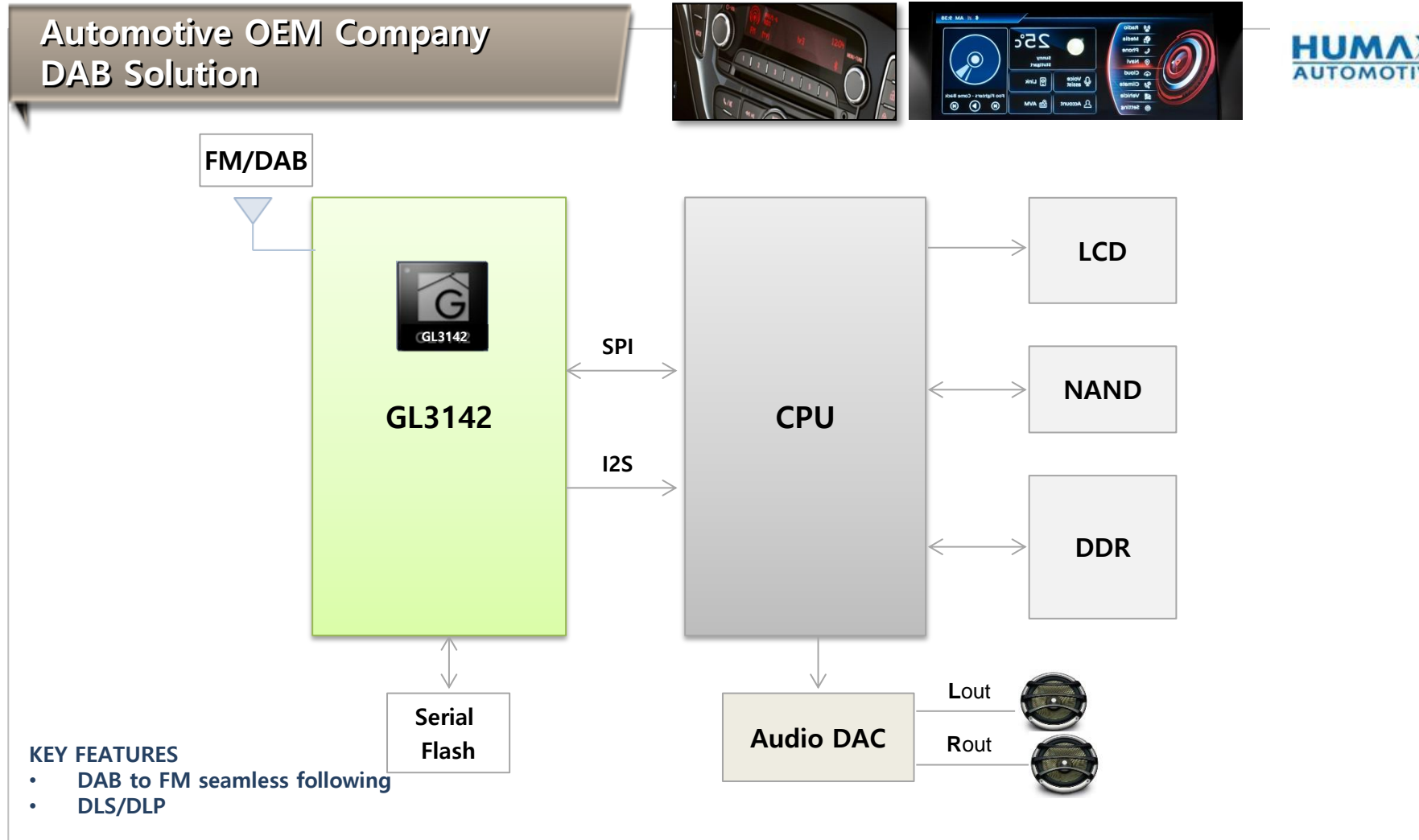
✓ Adopted Glovane's GL314x for new project

Products

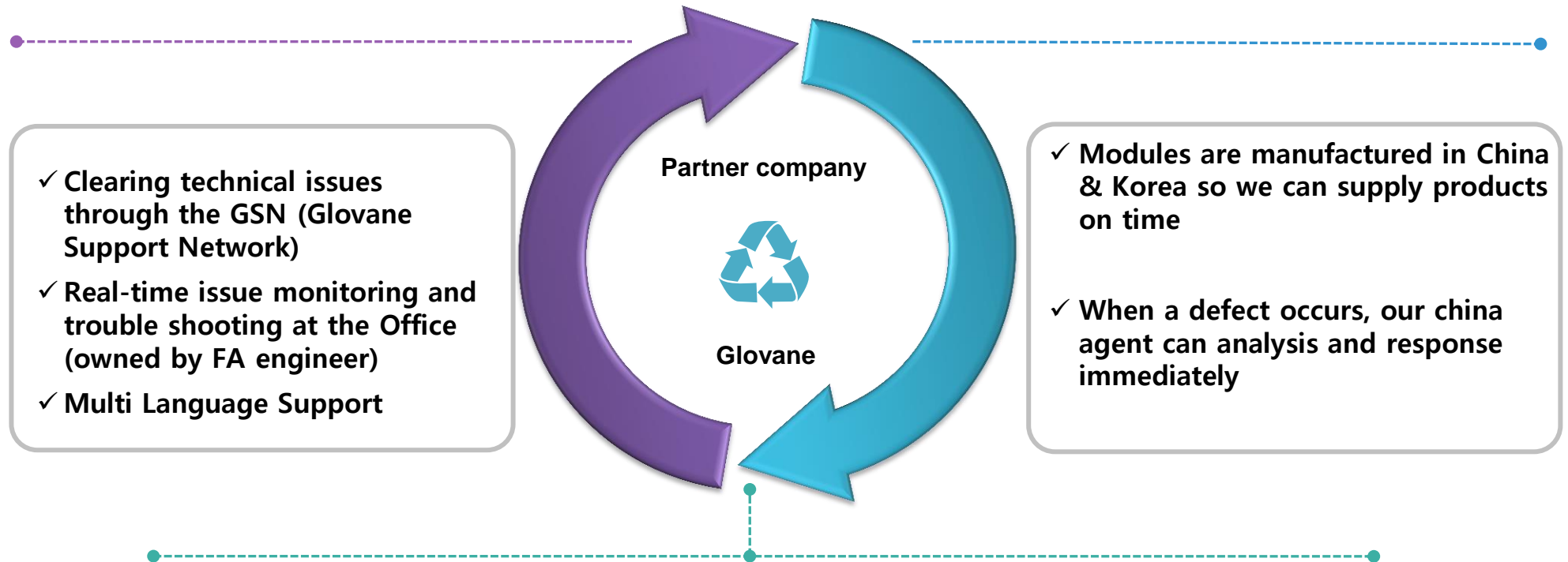
Application for Automotive Audio/AVN Systems







Glovane Technical Support

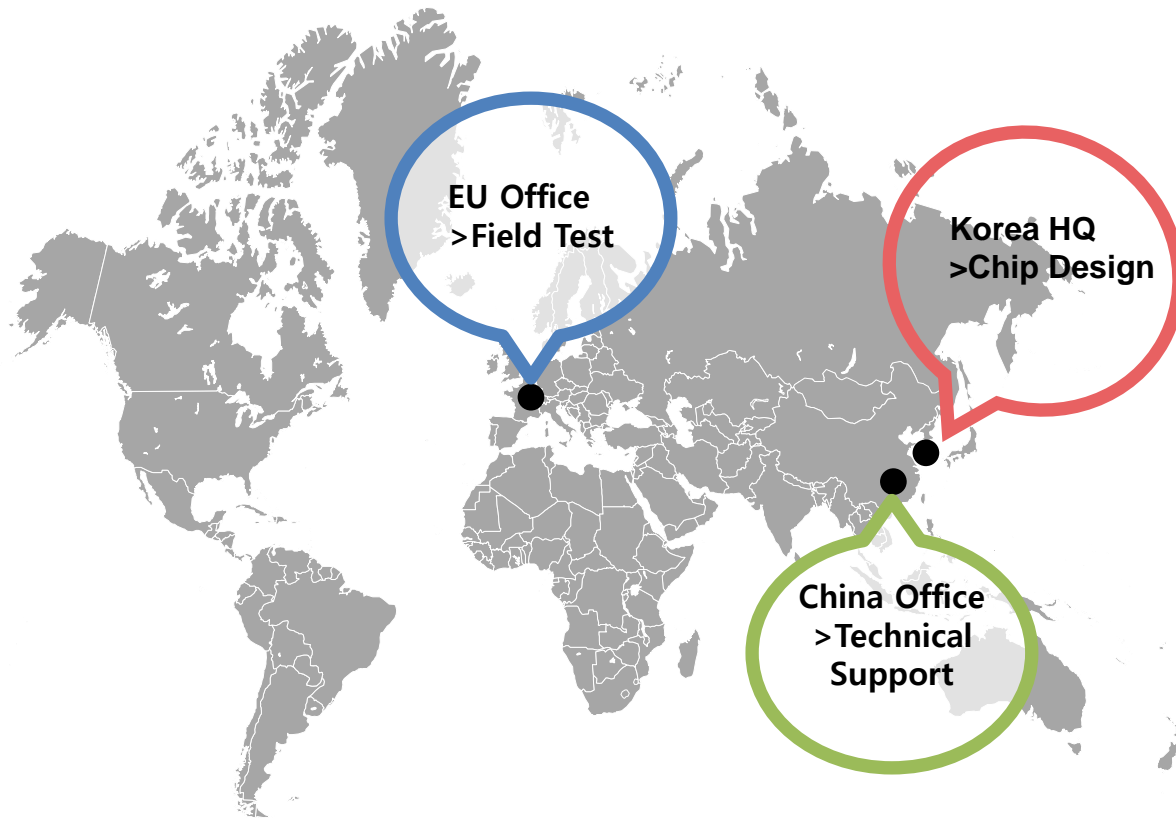


Success of the ongoing project !
Joint development of the next project !

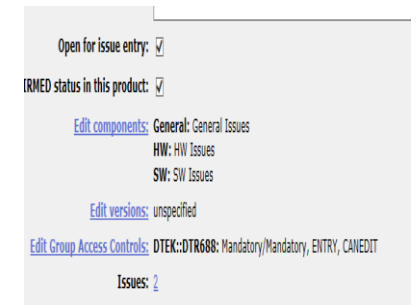
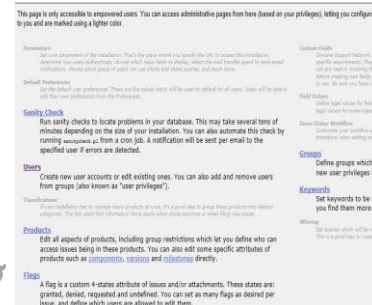
Glovane Technical Support

✓ On Site R&D Resource Support

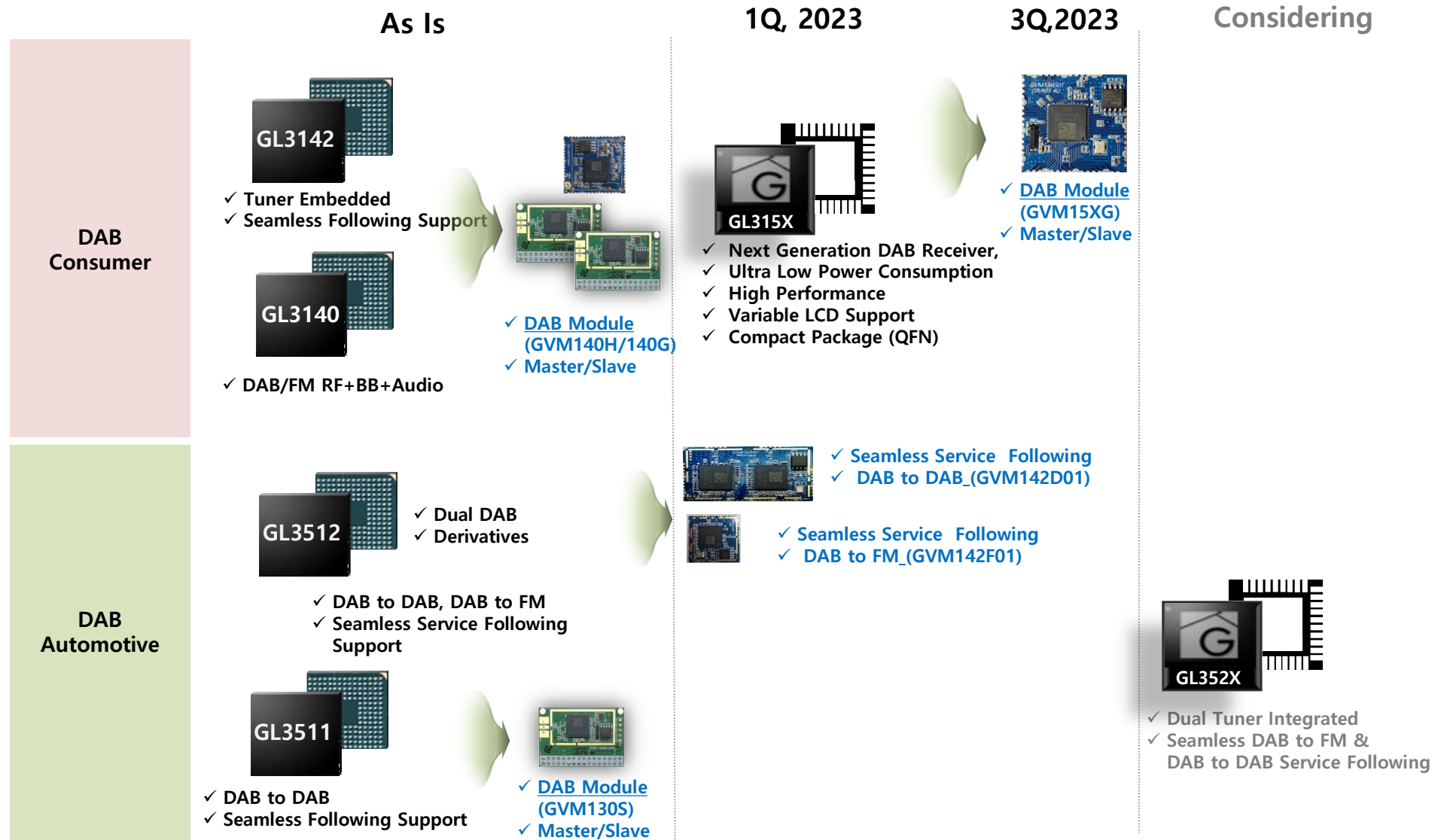
- Multi national Language Support
- Support regardless of location

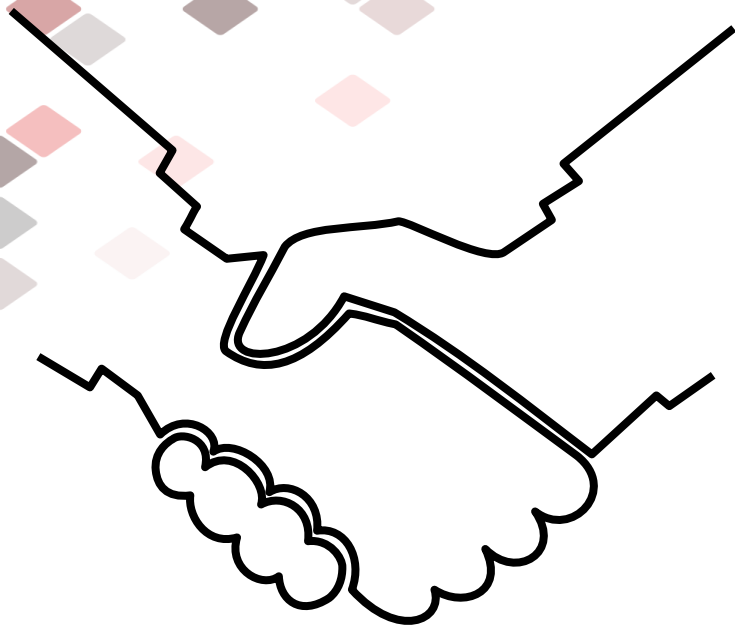


✓ On/Off-line Technical Support via GSN



Roadmap





<http://www.glovane.com>

- Address : 6Fl. I&C Bldg. Pangyoro255 24, Bundang-gu, Seongnam-si, Gyeonggi-do., 463-400, Korea
- Tel : +82-31-698-8000, Fax : +82-31-698-8090
- China Sales(@Shenzhen) : jangwon.hong@glovane.com
- Overseas Sales : pilgoo.choi@glovane.com

*Thank
you*

