# S32G-VNP-RDB User Guide



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### Chapter 1 Introduction

This user guide gives an overview of S32G-VNP-RDB reference design. The following figure shows the block diagram.



### Chapter 2 S32G-VNP-RDB Features

The following are the S32G-VNP-RDB features.

- · Reference design for Service-oriented gateway and domain controller applications
- · Multiple network interfaces features 16 CAN/CAN FD and 14 Ethernet ports
- Entire board supports low power mode and wake-up mechanisms, including CAN, FlexRay, Ethernet, internal RTC and external wake up sources
- Two Ethernet switches (SJA1105, SJA1110A) provides a variety of types of interfaces, such as 100BASE-T1, 100BASE-TX, 1000BASE-T. secure CAN PHY (TJA1153) supporting black/white list and preventing flooding on CAN bus. CAN PHY TJA1463 can eliminate ringing on communication
- Function safety supporting, includes:
  - ASIL D S32G274A vehicle network processor
  - ASIL D VR5510 power management IC
  - ASIL A SJA1105Q and SJA1110A Ethernet switches
  - Fault management and reset logic circuits
- · Using automotive-qualified connectors
  - TE Connectivity MATEnet and Tyco Electronics 40p HDR
- · Multiple PCIe interfaces to support 2.5G SGMII, SSD and Wi-Fi card
- Entire board supports environment temperature -40 °C to +70 °C



The following are the board features:

- 1 x NOR flash( 64MB )
- 1 x SD card slot/ eMMC (32GB)
- 1 x LPDDR4 (4GB)
- 1 x 100BASE-TX

- 10 x 100BASE-T1
- 3 x 1000BASE-T
- 1 x M.2 slot support for SSD<sup>[1]</sup>
- 1 x PCIe X1 slot
- 1 x USB 2.0 port as host mode
- 12 x LLCE CAN/CAN FD
- 4 x FlexCAN /CAN FD
- 4 x LLCE LIN
- 1 x LLCE FlexRay
- 1 x LLCE SPI interface
- 1 x I2C interface
- 1 x 20-pin debug port
- 2 x UART
- 5 x ADC with 12-bit resolution
- 1 x External wake-up source
- 2 x External interrupts
- 2 x PWMal

NVMe SSD needs to be ordered separately. Please note that Netac N930ES-128GB NVMe SSD is already tested on S32G-VNP-RDB.

## Chapter 3 Hardware Package Overview

The following section describes the hardware package overview of S32G-VNP-RDB. The following hardware and accessories are needed as shown in the following figure.



#### 3.1 Hardware connection instruction

To connect any cable to RDB, follow the instructions shown in the following figure.



### Chapter 4 Switch Settings

### 4.1 S32G-VNP-RDB default switch settings

The following figure shows the default switch settings of S32G-VNP-RDB.



NOTE

The default boot mode is set to boot from SD card.

### 4.2 Switch settings for SD card boot

The following figure shows the switch settings for SD card boot.



#### 4.3 Switch settings for eMMC boot

The following figure shows the switch settings for eMMC boot.



#### 4.4 Switch settings for NOR Flash boot

The following figure shows the switch settings for NOR Flash boot.



### Chapter 5 S32G-VNP-RDB Pinouts

The following figure and table shows the different S32G-VNP-RDB pinouts.



Table 1. S32G-VNP-R	OB pinouts and	signals
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Part Reference	Signals
J1	UART1
J2	UART0
J3	SD Card Slot
J4	USB 2.0 as host mode
J5	12V input, 12V, 5V, 3.3V output, GPIO, PWM, I2C, LLCE_FlexRay , LLCE_SPI, LLCE_LIN
J6	LLCE_CAN, FlexCAN , ADC

Table continues on the next page ...

Table 1.	S32G-VNP-RDB	pinouts and	signals	(continued)
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Part Reference	Signals
J44	10PIN JTAG for SJA1110
J47	M.2 slot for 2242 SSD
J48	20PIN JTAG for S32G
J50	12V FAN
J52	1000BASE-T, 100BASE-TX
J53	100BASE-T1
J54	100BASE-T1
P1	PCI e Gen3 X1

#### CAN, ADC, POWER, GPIO, LLCE\_FlexRay and LLCE\_LIN pinout.



The following figure shows the Ethernet pinouts.



### Chapter 6 S32G-VNP-RDB Set Up

To set up S32G-VNP-RDB follow these steps:

1. Download and Install the terminal emulator, if not installed already.

About the terminal tool, you can choose any one which is familiar for you, such as Tera Term, Putty and so on.

- 2. Download and Install the FT232R USB-to-UART driver, if not installed already. Go to FT232R USB-to-UART driver link .Scroll down and select correct version. Follow the installation guides to install the driver.
- 3. Plug the SD card in the J3 slot. The SD card has pre-loaded Linux BSP image which runs on Cortex-A53 cores.
- 4. Connect UART0 cable and open terminal console. Select the corresponding COM port which can be found in "Device Manager" of the PC and set 115200 as the baud rate.
- 5. Connect the power supply and J5 cable. Open the switch of power switch board, the running logs will appear in the console as shown below.

NOTE

For more information on S32G boot, such as other boot mode, building project, making image and so on, refer to S32G-VNP-RDB Reference Manual and S32G-VNP-RDB Software Enablement Guide. Fri Nov 20 06:06:14 UTC 2020 INIT: Entering runlevel: 5 Configuring network interfaces... [ 6.971933] 002: s32cc-dwmac 4033c000.ethernet eth0: **Enabling Safety Features** [ 6.971969] 002: s32cc-dwmac 4033c000.ethernet eth0: IEEE 1588-2008 Advanced Timestamp supported [ 6.972248] 002: s32cc-dwmac 4033c000.ethernet eth0: registered PTP clock 6.972265] 002: s32cc-dwmac 4033c000.ethernet eth0: configuring for fixed/rgmii link mode [ 6.972637] 002: s32cc-dwmac 4033c000.ethernet eth0: Link is Up - 1Gbps/Full - flow control off 6.973229] 002: 8021g: adding VLAN 0 to HW filter on device eth0 Starting rpcbind daemon...[ 7.417472] 002: urandom\_read: 4 callbacks suppressed [ 7.417495] 002: random: sshd: uninitialized urandom read (32 bytes read) done Starting OpenBSD Secure Shell server: sshd starting statd: [ 7.470443] 001: random: sshd: uninitialized urandom read (32 bytes read) done. done Starting irgbalance: done Starting network benchmark server: netserver. exportfs: can't open /etc/exports for reading NFS daemon support not enabled in kernel Starting syslogd/klogd: done Starting internet superserver: xinetd. Starting random number generator daemon. 7.681356] 003: random: rngd: uninitialized urandom read (4 bytes read) 7.682729] 000: random: crng init done Auto Linux BSP 1.0 s32g274ardb ttyLF0 s32g274ardb login:

# Chapter 7 Revision history

#### Table 2. Revision history

Revision Number	Release date	Changes
0	June, 2020	Intitial release
1	November, 2020	Editorial fixes
2	March, 2021	<ul> <li>Updated the figure in S32G-VNP- RDB Set Up.</li> <li>Removed the section Running logs of applications.</li> </ul>

## Appendix A Appendix

- Documents
  - S32G Data Sheet
  - S32G Reference Manual
  - S32G-VNP-RDB Factsheet
  - S32G-VNP-RDB Reference Manual
  - S32G-VNP-RDB Software Enablement Guide
  - Auto\_Linux\_BSP\_XX.X\_S32G274A\_User\_Manual
  - Auto\_Linux\_BSP\_XX.X\_S32G274A\_Quick\_Start
- Useful links
  - S32 Design Studio
  - S32 Debug Probe
- Support https://community.nxp.com/
- Enablement Tools
  - IDE: S32 Design Studio, Yocto , EB tresos
  - Software: Linux BSP, FreeRTOS , Real-Time Drivers(RTD)
  - Compiler: Green Hills, gcc
  - Debugger: Lauterbach, S32G Debug Probe

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