User Manual

ROM-2620

NXP i.MX 8ULP 1200 Cortex®-A35
OSM 1.1 Computer-on-Module

ADVANTECH

Enabling an Intelligent Planet

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Acknowledgments

Product Warranty (2 years)

Advantech warrants the original purchaser that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products that have been repaired or altered by persons other than repair personnel authorized by Advantech, or products that have been subject to misuse, abuse, accident, or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced free of charge during the warranty period. For out-of-warranty repairs, customers will be billed according to the cost of replacement materials, service time, and freight. Please consult your dealer for more details.

If you believe your product to be defective, follow the steps outlined below:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages displayed when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain a return merchandize authorization (RMA) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a completed Repair and Replacement Order Card, and a proof of purchase date (such as a photocopy of your sales receipt) into a shippable container. Products returned without a proof of purchase date are not eligible for warranty service.
5. Write the RMA number clearly on the outside of the package and ship the package prepaid to your dealer.

Part No. Edition 1

Printed in Taiwan January 2024

Declaration of Conformity

FCC Class B

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference. In such cases, users are required to correct the interference at their own expense.

Packing List

Before installation, ensure that the following items have been shipped:

- ROM-2620

Safety Precautions – Static Electricity

Follow this simple precaution to protect yourself from harm and the products from damage:

- To avoid electrical shock, always disconnect the power from the PC chassis before manual handling. Do not touch any components on the CPU card or other cards when the PC is powered on.

Safety Instructions

1. Read these safety instructions carefully.
2. Retain this user manual for future reference.
3. Disconnect the equipment from all power outlets before cleaning. Use only a damp cloth for cleaning. Do not use liquid or spray detergents.
4. For pluggable equipment, the power outlet socket must be located near the equipment and easily accessible.
5. Protect the equipment from humidity.
6. Place the equipment on a reliable surface during installation. Dropping or letting the equipment fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. Do not cover the openings.
8. Ensure that the voltage of the power source is correct before connecting the equipment to a power outlet.
9. Position the power cord away from high-traffic areas. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage from transient overvoltage.
12. Never pour liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If any of the following occurs, have the equipment checked by qualified service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated the equipment.
    - The equipment has been exposed to moisture.
    - The equipment is malfunctioning, or does not operate according to the user manual.
    - The equipment has been dropped and damaged.
    - The equipment shows obvious signs of breakage.

DISCLAIMER: These instructions are provided according to IEC 704-1 standards. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Ordering Information

Part No.	Description
ROM-2620CD-MDA1E	i.MX8ULP OSM V1.1 S module, 1GB DDR, 16GB eMMC, 0-60°C (32 ~140 °F)
ROM-2620WD-MDA1E	i.MX8ULP OSM V1.1 S module, 1GB DDR, 16GB eMMC, -40 ~ 85 °C (-40 ~158 °F)

Optional Accessories

Part Number	Description
96PSA-A36W12W7-5	ADP A/D 100-240V 36W 12V C6 LOCK DC JACK 62368
1700001524	Power Cord 3P UL 10A 125V 180cm
170203183C	Power Cord 3P Europe (WS-010+WS-083) 183 cm (72 in)
170203180A	Power Cord 3P UK 2.5A/3A 250V 1.83 m (72 in)
1700008921	Power Cord 3P PSE 183 cm (72 in)
1700034345-01	Debug cable 2*5P-2.0/D-SUB9-Mx2 20cm
1700019474	D-SUB 9P(F)/D-SUB 9P(F) RS232/RS485 100c
1700031429-01	Line out cable
1700026878-01	Mic in cable
96LCM-G070WV40L-A0	21.5" LED panel 300N 1920x1080(G) with 5W touch
1700021882-01	LVDS Cable
1700021883-01	LVDS BKLT Cable
EWM-W194M201E	IEEE802.11ax+BT 5.2 2T2R MT7921L M.2 2230
1750007965-01	Wi-Fi Coaxial Cable, SMA (M) to MHF4, 30 cm
1750008717-01	Wi-Fi 2.4 GHz and 5 GHz Dipole Antenna

Contents

Chapter 1

General Introduction

This chapter details background information on the ROM-2620.

- **Introduction**
- **Specification**

1.1 Introduction

Advantech's ROM-2620 is powered by NXP i.MX 8ULP processor, featuring 2 Arm Cortex-A35 cores. Additionally, it incorporates 2 Arm Cortex-M33 cores for real-time responsiveness. The Cortex-M33 is capable of reducing static power consumption to 36 microwatts, making it suitable for applications that require extended battery life. The Cortex-A35, an upgraded version of the Cortex-A7, transitions from 32-bit to 64-bit architecture, delivering a 40% performance boost with a main operational load of only 1.62 watts. The NXP i.MX 8ULP device also features a 3D/2D GPU and a 4-lane MIPI DSI parallel display interface to meet the graphical demands of industrial HMI. Moreover, this solution provides support for UART, GPIO, I2C, FlexCAN, and Fast Ethernet interfaces for edge data collection, control, and transmission.

Product Features

Model Name		ROM-2620
Form Factor		OSM1.1
Processor System	CPU	NXP i.MX 8ULP Cortex-A35 Dual core (up to 1.0GHz)
	MCU	1 x Arm Cortex-M33 core
Memory	Technology	LPDDR4 4000MT/s
	Capacity	On-board 1GB
	Flash	16 GB eMMC Flash for O.S.
Graphics	LVDS/MIPI DSI	1 x 4 lane MIPI-DSI
	Graphics Engine	GC7000 nanoULTRA/GC328 with 2D/3D Graphic Acceleration supporting 1G Pixel/s, OpenVG 1.1, Open GL ES3.1,Vulkan, and Open CL 1.2 FP.
Ethernet	Chipset	1 x NXP i.MX 8ULP integrated RMII
	Speed	1 x 10/100 Mbps
RTC	RTC	RTC Battery by 2pin type connector
Security		NXP i.MX 8ULP integrated Trust Zone
I/O	USB	1 USB2.0, 1 USB2.0 OTG by serial download mode
	Audio	1 x I2S
	Serial Port	2 x 4-wire UART, 2 x 2-wire UART (1 share with debug port) and 1 console
	SPI	1
	CAN	1
	GPIO	24
	QSPI	1
	I2C	2
	PWM	6
	Camera Input	1 x 2-lane MIPI CSI

Power	Power Supply Voltage	5V
	Power Consumption	TBD
Environment	Operational Temperature	0 ~ 60/-40 ~ 85 °C (0 ~ 140/ -40 ~ 185 °F)
	Operating Humidity	5 ~ 95% Relative Humidity, noncondensing
Mechanical	Dimensions (W x D x H)	30 x 30 mm
Operating System		Yocto Linux
Certifications		CE/FCC Class B

1.1.1 Mechanical Specifications

- Dimensions: 30 x 30 mm
- Height: 2.1mm

1.1.2 Electrical Specifications

- Power Supply: 5V
- RTC Battery:
  - Typical voltage: 3V
  - Normal discharge capacity: 210mAH

1.1.3 Environmental Specifications

- Operating Temperature: 0 ~ 60 °C/32 ~ 140 °F; -40 ~ 85 °C/-40 ~ 185 °F
- Operating Humidity: 5 ~ 95% relative humidity, non-condensing
- Storage Temperature: -40 ~ 85 °C/-40~185 °F
- Storage Humidity: 60 °C/140 °F @ 95% RH non-condensing

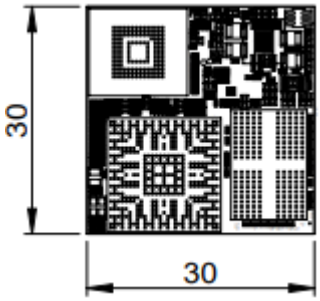
Chapter 2

Hardware Installation

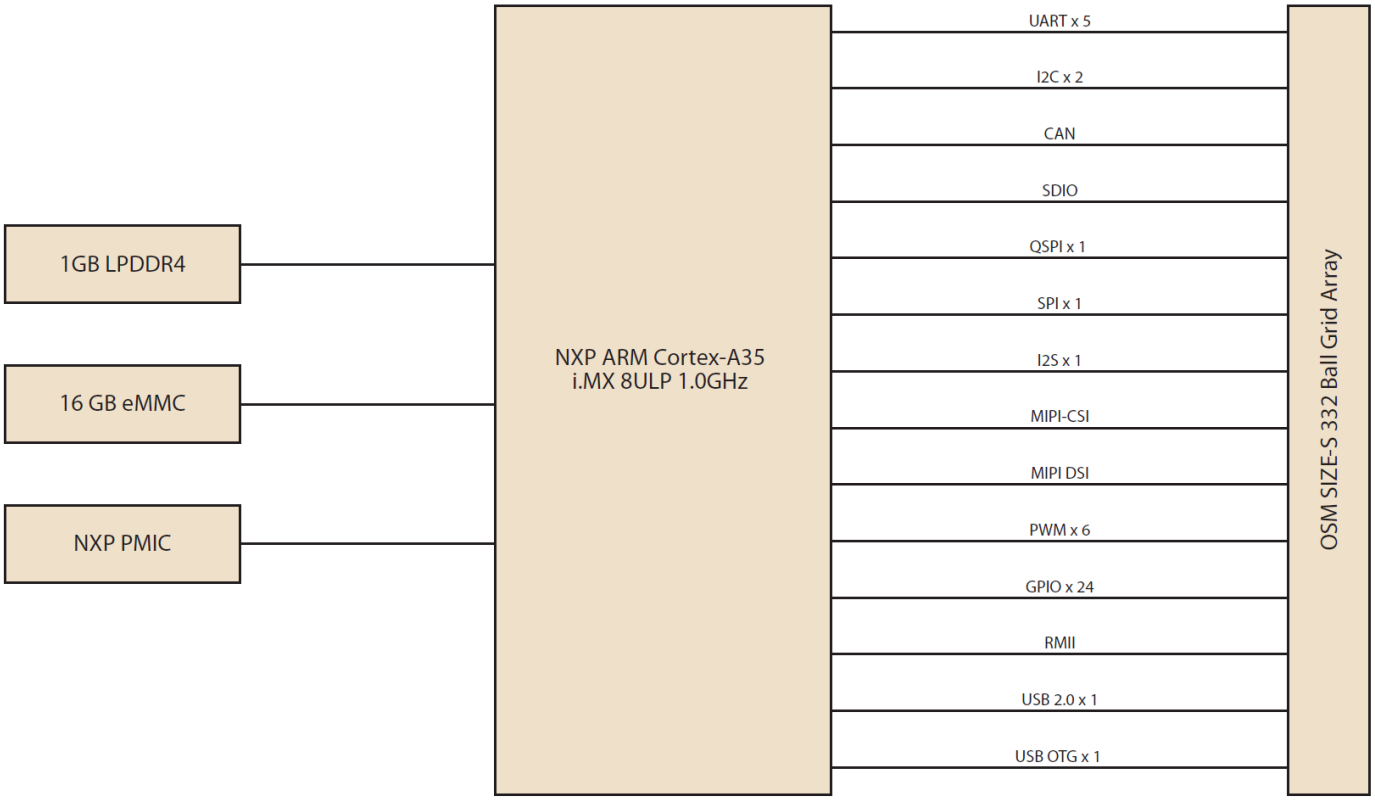
This chapter details mechanical and connector information.

- **Mechanical Drawing**
- **Pin Define**
- **Quick Start Guid**

2.1 Board Dimensions



2.2 Block Diagram



2.3 Pin Define

Power-GND and Control	Contact Name	Contact Acronym	ROM-2620
Size-S	VCC_2_TEST[2]	M19	+VBUCK1_LSW1_CPU_1V8
	VCC_3_TEST	Y16	+VBUCK1_1V8
	VCC_IN_5V	Y17	+VCC_IN_5V
	GND	D18, E15, E21, F16, F20, J16, J20, L18, M16, M20, P18, R16, R20, V16, V20, Y18, AA14, AA17, AA19, AA22, AB15, AB21,A4, A7, A10, B2, B5, B8, B9, C11, D1, D5, D8, E2,H2, H4, L2, L4, P2, P4, R1, U2, U4, V1, W3, Y2, AA1, AA4, AA7, AA8, AA10, AA11, AB3, AB6, AB9, AC4, AC7, AC10	GND
	SYS_RST#	U17	SYS_RST#
	CARRIER_PWR_EN	V17	CARRIER_PWR_EN
	VCC_OUT_IO	U18	+VBUCK1_1V8
	RTC_PWR	W17	+RTC
	BOOT_SEL0#	U19	BOOT_SEL0#
	BOOT_SEL1#	R18	BOOT_SEL1#
	VCC_IN_5V	Y8, Y9, Y10, Y11	+VCC_IN_5V
	PWR_BTN#	AA9	ONOFF

JTAG	Contact Name	Contact Acronym	ROM-2620
Size-S	JTAG_TCK(SWCLK)	N17	JTAG0_TCLK
	JTAG_TMS(SWDIO)	N19	JTAG0_TMS
	JTAG_TDI	P17	JTAG0_TDI
	JTAG_TDO(SWO)	R17	JTAG0_TDO
	JTAG_nTRST	R19	JTAG0_TRST#
UART	Contact Name	Contact Acronym	ROM-2620
Size-S	UART_A_RX	A14	LPUART4_RX
	UART_A_TX	B13	LPUART4_TX
	UART_A_RTS	C13	LPUART4_RTS#
	UART_A_CTS	C14	LPUART4_CTS#
	UART_B_RX	D14	LPUART2_RX
	UART_B_TX	D13	LPUART2_TX
	UART_B_RTS	D15	LPUART2_RTS#
	UART_B_CTS	D16	LPUART2_CTS#
	UART_C_RX	A22	LPUART6_RX
	UART_C_TX	B23	LPUART6_TX
	UART_D_RX	C22	LPUART5_RX
	UART_D_TX	C23	LPUART5_TX
	UART_CON_RX	D22	LPUART1_RX
	UART_CON_TX	D23	LPUART1_TX
Ethernet / LAN	Contact Name	Contact Acronym	ROM-2620
Size-S	ETH_A_(R)(G)MII_CRS	E16	NA
	ETH_A_(R)(G)MII_COL	F15	NA
	ETH_A_(S)(R)(G)MII_TXD0	H15	ENET0_TXD0
	ETH_A_(S)(R)(G)MII_TXD1	G15	ENET0_TXD1
	ETH_A_(S)(R)(G)MII_TXD2	H16	NA
	ETH_A_(S)(R)(G)MII_TXD3	G16	NA
	ETH_A_(R)(G)MII_TX_EN(_ER)	K16	ENET0_TXEN
	ETH_A_(R)(G)MII_TX_CLK	J15	ENET0_REFCLK
	ETH_A_(S)(R)(G)MII_RXD0	K15	ENET0_RXD0
	ETH_A_(S)(R)(G)MII_RXD1	L15	ENET0_RXD1
	ETH_A_(R)(G)MII_RXD2	N15	NA
	ETH_A_(R)(G)MII_RXD3	P15	NA
	ETH_A_(R)(G)MII_RX_ER	L16	ENET0_RXER
	ETH_A_(R)(G)MII_RX_DV(_ER)	M15	ENET0_CRS_DV
	ETH_A_(R)(G)MII_RX_CLK	R15	NA
	ETH_A_SDP	N16	NA
	ETH_MDIO	T15	ENET0_MDIO
	ETH_MDC	T16	ENET0_MDC
	ETH_IOPWR	M17	+VBUCK1_LSW4_CPU_1V8
GPIO	Contact Name	Contact Acronym	ROM-2620

Size-S	GPIO_A_0	D17	GPIO_A_0
	GPIO_A_1	E17	GPIO_A_1
	GPIO_A_2	F17	GPIO_A_2
	GPIO_A_3	G17	GPIO_A_3
	GPIO_A_4	H17	GPIO_A_4
	GPIO_A_5	J17	GPIO_A_5
	GPIO_A_6/SPI_A_CS1#	K17	FLEXSPI0_A_SS1#
	GPIO_A_7/SPI_B_CS1#	L17	LPSPI3_PCS1#
	GPIO_B_0	D19	GPIO_B_0
	GPIO_B_1	E19	GPIO_B_1
	GPIO_B_2	F19	GPIO_B_2
	GPIO_B_3	G19	GPIO_B_3
	GPIO_B_4	H19	GPIO_B_4
	GPIO_B_5	J19	GPIO_B_5
	GPIO_B_6	K19	GPIO_B_6
	GPIO_B_7	L19	GPIO_B_7
	GPIO_C_0	D3	GPIO_C_0
	GPIO_C_1	D4	GPIO_C_1
	GPIO_C_2	E3	GPIO_C_2
	GPIO_C_3	E4	GPIO_C_3
	GPIO_C_4/DISP_VDD_EN	F3	DISP_VDD_EN
	GPIO_C_5/DISP_BL_EN	F4	DISP_BL_EN
	GPIO_C_6/CAM_PWR	G3	CAM_PWR
	GPIO_C_7/CAM_RST#	G4	CAM_RST#
SDIO	Contact Name	Contact Acronym	ROM-2620
Size-S	SDIO_A_CMD	E20	SDHC2_CMD
	SDIO_A_CLK	F21	SDHC2_CLK
	SDIO_A_D0	G20	SDHC2_D0
	SDIO_A_D1	G21	SDHC2_D1
	SDIO_A_D2	H20	SDHC2_D2
	SDIO_A_D3	H21	SDHC2_D3
	SDIO_A_CD#	J21	SDHC2_CD#
	SDIO_A_WP	D20	SDHC2_WP
	SDIO_A_PWR_EN	D21	SDHC2_RESET#
	SDIO_A_IOPWR	C20	+VBUCK1_LSW4_CPU_1V8
PWM	Contact Name	Contact Acronym	ROM-2620
Size-S	PWM_0	E18	DISP_BL_PWM
	PWM_1	F18	PWM_1
	PWM_2	G18	PWM_2
	PWM_3	H18	PWM_3
	PWM_4	J18	PWM_4
	PWM_5	K18	PWM_5
SPI	Contact Name	Contact Acronym	ROM-2620

Size-S	SPI_A_SDI_(IO0)	U15	FLEXSPI0_A_D0
	SPI_A_SDO_(IO1)	V15	FLEXSPI0_A_D1
	SPI_A_/WP_(IO2)	W16	FLEXSPI0_A_D2
	SPI_A_/HOLD_(IO3)	W15	FLEXSPI0_A_D3
	SPI_A_CS0#	Y15	FLEXSPI0_A_SS0#
	SPI_A_CS1# / GPIO_A_6	K17	FLEXSPI0_A_SS1#
	SPI_A_SCK	U16	FLEXSPI0_A_SCLK
	SPI_B_SDI	Y22	LPSPI3_SIN
	SPI_B_SDO	Y23	LPSPI3_SOUT
	SPI_B_CS0#	AA23	LPSPI3_PCS0#
	SPI_B_CS1# / GPIO_A_7	L17	LPSPI3_PCS1#
	SPI_B_SCK	Y21	LPSPI3_SCK

I2S	Contact Name	Contact Acronym	ROM-2620
Size-S	I2S_A_DATA_IN	V21	I2S7_RXD0
	I2S_A_DATA_OUT	W21	I2S7_TXD0
	I2S_MCLK	V18	I2S7_MCLK
	I2S_LRCLK	W18	I2S7_TX_FS
	I2S_BITCLK	W20	I2S7_TX_BCLK

CAN	Contact Name	Contact Acronym	ROM-2620
Size-S	CAN_A_TX	AC17	CAN0_TX
	CAN_A_RX	AB17	CAN0_RX

USB	Contact Name	Contact Acronym	ROM-2620
Size-S	USB_A_D_N	AB13	USB_A_DN
	USB_A_D_P	AC14	USB_A_DP
	USB_A_ID	AB14	USB_A_ID
	USB_A_OC#	AC15	USB_A_OC#
	USB_A_VBUS	AB16	USB_A_VBUS_DET
	USB_A_EN	AC16	USB_A_PWR
	USB_B_D_N	AB23	USB_B_DN
	USB_B_D_P	AC22	USB_B_DP
	USB_B_ID	AB22	USB_B_ID
	USB_B_OC#	AC21	USB_B_OC#
	USB_B_VBUS	AB20	USB_B_PWR
	USB_B_EN	AC20	USB_B_VBUS_DET

I2C	Contact Name	Contact Acronym	ROM-2620
Size-S	I2C_A_SCL	AA15	LPI2C7_SCL
	I2C_A_SDA	AA16	LPI2C7_SDA
	I2C_B_SCL	AA20	LPI2C6_SCL
	I2C_B_SDA	AA21	LPI2C6_SDA

MIPI DSI	Contact Name	Contact Acronym	ROM-2620

Size-S	DSI_DATA0_N	AB11	DSI_DATA0_N
	DSI_DATA0_P	AB10	DSI_DATA0_P
	DSI_DATA1_N	AC9	DSI_DATA1_N
	DSI_DATA1_P	AC8	DSI_DATA1_P
	DSI_DATA2_N	AC6	DSI_DATA2_N
	DSI_DATA2_P	AC5	DSI_DATA2_P
	DSI_DATA3_N	AB5	DSI_DATA3_N
	DSI_DATA3_P	AB4	DSI_DATA3_P
	DSI_CLOCK_N	AB8	DSI_CLK_N
	DSI_CLOCK_P	AB7	DSI_CLK_P
	DISP_VDD_EN /GPIO_C_4	F3	DISP_VDD_EN
	DISP_BL_EN /GPIO_C_5	F4	DISP_BL_EN
	DISP_BL_PWM /PWM_0	E18	DISP_BL_PWM

MIPI CSI	Contact Name	Contact Acronym	ROM-2620
Size-S	CSI_DATA0_N	C1	CSI_DATA0_N
	CSI_DATA0_P	B1	CSI_DATA0_P
	CSI_DATA1_N	A2	CSI_DATA1_N
	CSI_DATA1_P	A3	CSI_DATA1_P
	CSI_DATA2_N	A5	NA
	CSI_DATA2_P	A6	NA

MIPI CSI	Contact Name	Contact Acronym	ROM-2620
Size-S	CSI_DATA0_N	C1	CSI_DATA0_N
	CSI_DATA0_P	B1	CSI_DATA0_P
	CSI_DATA1_N	A2	CSI_DATA1_N
	CSI_DATA1_P	A3	CSI_DATA1_P
	CSI_DATA2_N	A5	NA
	CSI_DATA2_P	A6	NA
	CSI_DATA3_N	B6	NA
	CSI_DATA3_P	B7	NA
	CSI_CLOCK_N	B3	CSI_CLK_N
	CSI_CLOCK_P	B4	CSI_CLK_P
	CAM_MCK	C2	24M OSC Should Design on Carrier Board [1]
	I2C_CAM_SDA / CSI_TX_N	C3	LPI2C0_SDA
	I2C_CAM_SCL / CSI_TX_P	C4	LPI2C0_SCL
	CAM_PWR / GPIO_C_6	G3	CAM_PWR
	CAM_RST# / GPIO_C_7	G4	CAM_RST#

Reserved	Contact Name	Contact Acronym	ROM-2620
Size-S	RESERVED	T18	BT1_CFG7
	RESERVED	T19	BT1_CFG5
	RESERVED	Y13	BT0_CFG0
	RESERVED	Y14,	BT1_CFG4

	RESERVED	AA13	NA
	RESERVED	N2	NA
	RESERVED	AA2	NA

Vendor Defined Contacts	Contact Name	Contact Acronym	ROM-2620
Size-S	Vendor Defined	B22	BT1_CFG9
	Vendor Defined	C16	BT1_CFG11
	Vendor Defined	P16	BT1_CFG6
	Vendor Defined	D6	BT0_CFG1
	Vendor Defined	D7	BT0_CFG4

2.4 Quick Start Guide

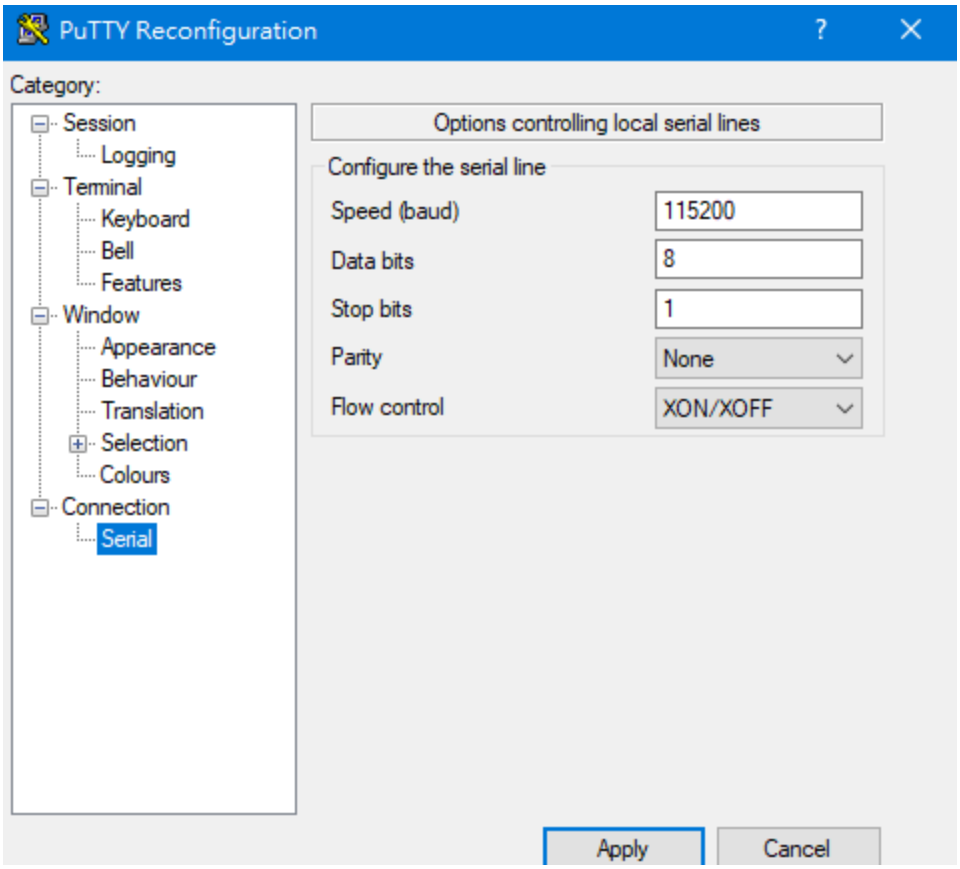
2.4.1 Debug Port Connection and Setting

3 ROM-2620 debug port is shared with A-core Console. Please connect the debug console cable 1700021565-01 & 1700019474. Then connect the USB-to-RS232 Cable to your PC terminal. Connect the cable to COM1 pin header to the nearby the HDMI connector.

Note: The debug cable needs to be purchased separately.

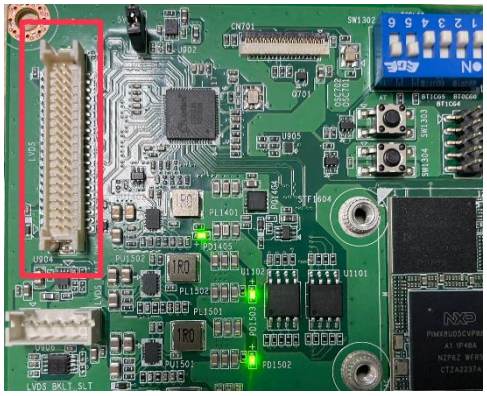
Part Number	Description	Picture
1700034345-01	A Cable 2x5P-2.0/D-SUB 9P(M)x2 20cm	
1700019474	RS-232 Cable DB9 female to DB9 female	

4 ROM-2620 can communicate with a host server using serial cables. Common serial communication programs such as HyperTerminal, Tera Term or PuTTY can be used in such applications. The example demonstrated belowdescribes the serial terminal setup using Tera Term on a Windows host: Open Tera Term on your Windows PC, and select the settings as shown in figure.



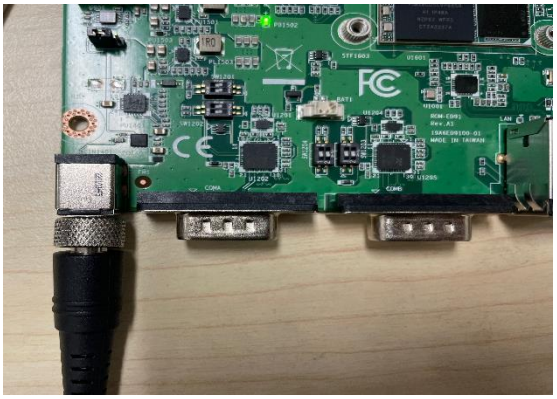
5 Connect a Display:

ROM-2620's default display interface is LVDS. When you use LVDS display as an example, please connect the LVDS display cable to ROM-2620's LVDS connector as shown in Figure 2.24.

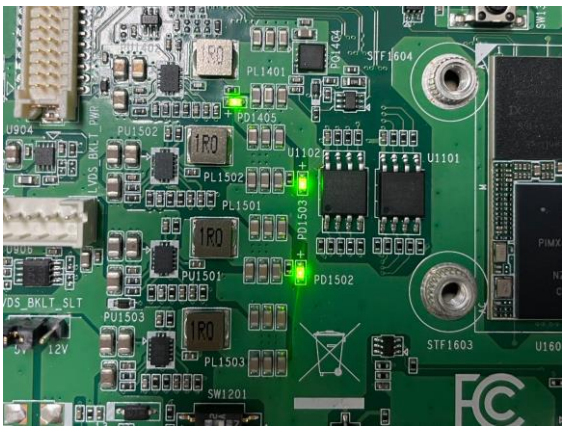


6 Connect the Power Source:

ROM-2620's power input is 12VDC. The power interface's location is DCIN1. Please choose a suitable adapter and power cord to connect the board (please refer to P/Ns on datasheet and Optional Accessories of this manual) as shown in Figure 2.25.

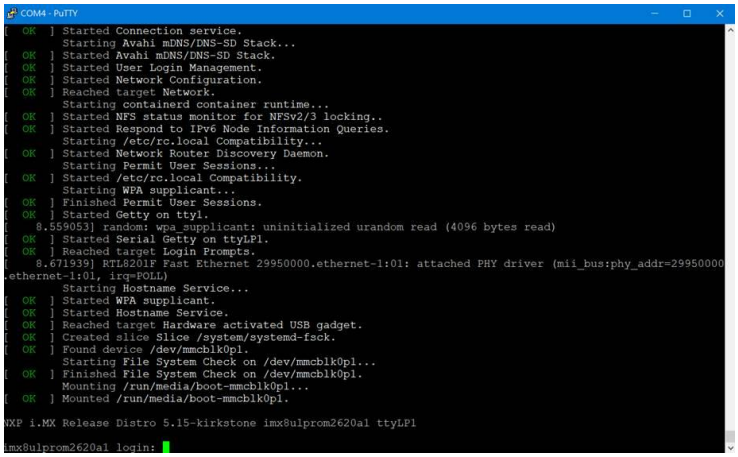


7 When switching on the power, the green LED indicator on BOT side of the board will light up to indicate that the board has booted up normally.



8 After booting, the display boot screen and debug window are shown as pictures below.

Login username: root without password.


COM4 - PuTTY
[OK] Started Connection service.
Starting Avahi mDNS/DNS-SD Stack...
[OK] Started Avahi mDNS/DNS-SD Stack.
[OK] Started User Login Management.
[OK] Started Network Configuration.
[OK] Reached target Network.
Starting containerd container runtime...
[OK] Started NFS status monitor for NFSv2/3 locking..
[OK] Started Respond to IPv6 Node Information Queries.
Starting /etc/rc.local Compatibility...
[OK] Started Network Router Discovery Daemon.
Starting Permit User Sessions...
[OK] Started /etc/rc.local Compatibility.
Starting WPA supplicant...
[OK] Finished Permit User Sessions.
[OK] Started Getty on tty1.
[8.559053] random: wpa_supplicant: uninitialized urandom read (4096 bytes read)
[OK] Started Serial Getty on ttyLP1.
[OK] Reached target Login Prompts.
[8.671939] RTL8201F Fast Ethernet 29950000.ethernet-1:01: attached PHY driver (mii_bus:phy_addr=29950000
.ethernet-1:01, irq=POLL)
Starting Hostname Service...
[OK] Started WPA supplicant.
[OK] Started Hostname Service.
[OK] Reached target Hardware activated USB gadget.
[OK] Created slice Slice /system/systemd-fsck.
[OK] Found device /dev/mmcblk0p1.
Starting File System Check on /dev/mmcblk0p1...
[OK] Finished File System Check on /dev/mmcblk0p1.
Mounting /run/media/boot-mmcblk0p1...
[OK] Mounted /run/media/boot-mmcblk0p1.
NXP i.MX Release Distro 5.15-kirkstone imx8ulprom2620a1 ttyLP1
imx8ulprom2620a1 login:

Chapter 3

Software Functionality

This chapter details software functions on the ROM-2620.

3.1 Display

3.1.1 LVDS

3.1.1.1 Single Channel LVDS: G070VW01 (Single LVDS0 or Single LVDS1) (VDD: 3.3V, Backlight Power: 12V)

Step 1: Connect G070VW01 LVDS panel with the LVDS cable. Connect this to the LVDS. Connect the Backlight cable to LVDS_BKLT_PWR.

Step 2: Power on ROM-2620.

3.1.1.2 Dual Channel LVDS Panel: G215HVN0 (VDD: 5V, Backlight Power: 12V)

Step 1: Connect G215HVN0 LVDS panel with the LVDS cable. Connect this to the LVDS. Connect the Backlight cable to LVDS_BKLT_PWR.

Step 2: Connect another 12V adapter to the DC-Jack on the backlight cable.

Step 3: Power on RSB-2620 and the extra 12V adapter.

Step 4: Press enter after boot. The system will stop at u-boot as demonstrated below, enter the command in red and press enter.

```
Normal Boot
Hit any key to stop autoboot:  0
=> setenv fdtfile imx8ulp-rom2620-a1-lt9211.dtb
=> saveenv
=> boot
```

3.2 Audio

Step 1: Check audio codec

```
# cat /proc/asound/cards
 0 [sgtl5000       ]: sgtl5000 - sgtl5000
                      sgtl5000
```

Step 2: Audio codec (sgtl5000):

1. Set MIC and headphone:

```
# amixer set Mic 100%
#  amixer set Headphone
100%
```

2. Record and playback:

```
Record
# arecord -D plughw:0,0 -r 16000 -f S16_LE ./f-16000.wav
Playback
# aplay -D plughw:0,0 f-16000.wav
```

3.3 M.2

3.3.1 Test Wi-Fi with EWM-W194M201E Module (SDIO Interface)

Step 1: Press enter after boot. The system will stop at u-boot, and change dtb file by below command.

```
# setenv fdtfile imx8ulp-rom2620-a1-m2-sdio-88w8997.dtb
# saveenv
# boot
```

Step 2: Install driver by below command.

```
# rmmod mwifiex_sdio mwifiex
# modprobe moal mod_para=nxp/wifi_mod_para.conf
# modprobe btnxpuart
```

Step 3: WIFI test command.

```
# ifconfig mlan0 up
# wpa_passphrase ASUS-917C qwert12345 > /tmp/wpa.conf
# wpa_supplicant -d -B -i mlan0 -c /tmp/wpa.conf
# udhcpc -i mlan0
```

3.3.2 Test Bluetooth with EWM-W194M201E Module (UART Interface)

Step 1: Please refer to the 3.3.1 step 1.

Step 2: Please refer to the 3.3.1 step 2.

Step 3: Bluetooth test command.

```
# hciconfig hci0 up
# bluetoothctl
# discoverable on
# pairable on
# scan on
[NEW] FC:18:3C:8D:75:F4 myphone
# scan off
# pair FC:18:3C:8D:75:F4
# connect FC:18:3C:8D:75:F4
```

3.4 Serial Port (COM A/C)

3.4.1 RS-232 Loopback Test (eg. ttyLP0)

Step 1: First change ROM-ED91 SW1201 to ‘01’.

Step 2: Run test command.

```
# stty -F /dev/ttyLP0 speed 115200 -echo
# cat /dev/ttyLP0 &
# echo test > /dev/ttyLP0
```

3.4.2 RS-422 Test

Step 1: First change ROM-ED91 SW1201 to ‘11’.

Step 2: Test RS-422 with Adam-4520. Connect Adam-4520 with COMA with DB9 as the following:

Adam-4520 RX- <-->ROM-2620 COMA DB9 Pin 1,
Adam-4520 RX+ <-->ROM-2620 COMA DB9 Pin 2,
Adam-4520 TX- <-->ROM-2620 COMA DB9 Pin 4,
Adam-4520 TX+ <--> ROM-2620 COMA DB9 Pin 3

Step 3: Run below command:

```
# stty -F /dev/ttyLP0 speed 115200 ignbrk -brkint -icrnl -imaxbel -opost -onlcr -isig -icanon -
iexten -echo -echoe -echok -echoctl -echoke
# cat /dev/ttyLP0 &
# echo "Serial Test" > /dev/ttyLP0
```

3.4.3 RS-485 Test

Step 1: First change ROM-ED91 SW1201 to '10'.

Step 2: Test RS-485 with Adam-4520. Connect Adam-4520 with COMA with DB9 as the following:

Adam-4520 Data- <-->ROM-2620 COMA DB9 Pin 1,

Adam-4520 Data+ <-->ROM-2620 COMA DB9 Pin 2

Step 3: Run below command:

```
# stty -F /dev/ttyLP0 speed 115200 ignbrk -brkint -icrnl -imaxbel -opost -onlcr -isig -icanon -iexten -echo -echoe -echok -echoctl -echoke
# cat /dev/ttyLP0 &
# echo "Serial Test" > /dev/ttyLP0
```

3.5 I²C

Step 1: Plug in ROM-EG70

Step 2: Test by below command (eg. I2C-6):

```
# modprobe at24
# echo -n $'\x06\x05\x04\x03\x02\x01' > test
# dd if=test of=/sys/bus/i2c/devices/6-0050/eeprom
# hexdump -C /sys/bus/i2c/devices/6-0050/eeprom -n 64
```

3.6 USB

USB disk test (USB 2.0)

Step 1: Issue the following command (lsusb -t) after inserting a USB disk into the USB 2.0 port to check if the USB device is listed.

Step 2: Test (eg. if usb disk is /dev/sda)

```
# dd if=/dev/urandom of=data bs=1 count=1024
# dd if=/dev/sda of=backup bs=1 count=1024 skip=4096
# dd if=data of=/dev/sda bs=1 seek=4096
# dd if=/dev/sda of=data1 bs=1 count=1024 skip=4096
# diff data data1
# dd if=backup of=/dev/sda bs=1 seek=4096
```

3.7 RTC

Step 1: Set system time to current, then write to RTC

```
root@imx8ulprom2620a1:~# date 021010452023 && hwclock -w && date
Feb 17
```

Step 2: Set one incorrect time, then read time from RTC to verify

```
root@imx8ulprom2620a1:~# date 010100002000 && hwclock -r && date
00:00:00
```

Step 3: Restore the RTC time to system time

```
root@imx8ulprom2620a1:~# hwclock -s && date
```

3.8 eMMC/SD

Device Routes

eMMC: /dev/mmcblk0

SD: /dev/mmcblk2

3.8.1.1 Test (eg. emmc)

Step 1: Test command:

```
# dd if=/dev/urandom of=data bs=1 count=1024
# dd if=/dev/mmcblk0 of=backup bs=1 count=1024
skip=4096
# dd if=data of=/dev/mmcblk0 bs=1 seek=4096
# dd if=/dev/mmcblk0 of=data1 bs=1 count=1024
skip=4096
# diff data data1
# dd if=backup of=/dev/mmcblk0 bs=1 seek=4096
```

3.9 Ethernet

Step 1: Check the Ethernet device

```
root@imx8ulprom2620a1:~# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 172.22.16.13  netmask 255.255.252.0  broadcast 172.22.19.255
        inet6 fe80::dc11:e3ff:fe67:5c4d  prefixlen 64  scopeid 0x20<link>
        ether de:11:e3:67:5c:4d  txqueuelen 1000  (Ethernet)
        RX packets 57  bytes 8000 (7.8 KiB)
        RX errors 0  dropped 14  overruns 0  frame 0
        TX packets 50  bytes 7221 (7.0 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 5574  bytes 343734 (335.6 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 5574  bytes 343734 (335.6 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Step 2: Connect the cable and ping test (eg. Eth0)

```
root@imx8ulprom2620a1:~# ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=56 time=3.88 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=56 time=5.96 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=56 time=3.52 ms
^C
--- 8.8.8.8 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 3.523/4.452/5.959/1.075 ms
```

3.10 GPIO

3.10.1 GPIO Pins

Table 3.1: GPIO1101 (Pin Header)

Pin	Numbers	
GPIO1	416	
GPIO2	417	
GPIO3	418	
GPIO4	419	
GPIO5	420	
GPIO6	428	
GPIO7	434	
GPIO8	435	
GPIO9	436	
GPIO10	437	(Use for SDIO)
GPIO11	438	(Use for M2_UART)
GPIO12	439	(Use for M2_UART)
GPIO13	448	
GPIO14	449	
GPIO15	140	
GPIO16	141	
GPIO17	193	
GPIO18	199	(Use for LVDS_RST)
GPIO19	454	
GPIO20	485	

3.10.2 GPIO Loopback Test (Using GPIO1 and GPIO2 as examples)

Step 1: Connect GPIO1 and GPIO2

Step 2: Export GPIO interface

```
# echo 416 > /sys/class/gpio/export
# echo 417 > /sys/class/gpio/export
```

Step 3: Set GPIO direction

```
# echo out > /sys/class/gpio/gpio1/direction
# echo in > /sys/class/gpio/gpio2/direction
```

Step 4: Read value and set output value than check

```
# cat /sys/class/gpio/gpio2/value 0
# echo 1 > /sys/class/gpio/gpio1/value
# cat /sys/class/gpio/gpio2/value
1
```

3.11 Camera

3.11.1 MIPI-CSI0 (Tested with OV5640 + mini-SAS to MIPI-CSI Cable)

Step 1: Take pictures

```
# gst-launch-1.0 v4l2src num-buffers=1 device=/dev/video0 ! video/x-
raw,width=640,height=480 ! jpegenc ! filesink location=sample.jpeg
```

Step 2: View on panel

```
# gplay-1.0 sample.jpeg
```

3.12 PWM

Please use oscilloscope to check waveform.

PWM1:

```
# echo 4 > /sys/class/pwm/pwmchip0/export
# echo 1000000 > /sys/class/pwm/pwmchip0/pwm4/period
# echo 500000 > /sys/class/pwm/pwmchip0/pwm4/duty_cycle
# echo 1 > /sys/class/pwm/pwmchip0/pwm4/enable
```

PWM2:

```
# echo 5 > /sys/class/pwm/pwmchip6/export
# echo 1000000 > /sys/class/pwm/pwmchip6/pwm5/period
# echo 500000 > /sys/class/pwm/pwmchip6/pwm5/duty_cycle
# echo 1 > /sys/class/pwm/pwmchip6/pwm5/enable
```

PWM3:

```
# echo 2 > /sys/class/pwm/pwmchip6/export
# echo 1000000 > /sys/class/pwm/pwmchip6/pwm2/period
# echo 500000 > /sys/class/pwm/pwmchip6/pwm2/duty_cycle
# echo 1 > /sys/class/pwm/pwmchip6/pwm2/enable
```

PWM4:

```
# echo 3 > /sys/class/pwm/pwmchip6/export
# echo 1000000 > /sys/class/pwm/pwmchip6/pwm3/period
# echo 500000 > /sys/class/pwm/pwmchip6/pwm3/duty_cycle
# echo 1 > /sys/class/pwm/pwmchip6/pwm3/enable
```

PWM5:

```
# echo 4 > /sys/class/pwm/pwmchip6/export
# echo 1000000 > /sys/class/pwm/pwmchip6/pwm4/period
# echo 500000 > /sys/class/pwm/pwmchip6/pwm4/duty_cycle
# echo 1 > /sys/class/pwm/pwmchip6/pwm4/enable
```

3.13 M33 Function

We use default M-core firmware to verify each of IO feature. User should connect COME_DEBUG port to PC and there were show screen as demonstration below:

```
#####################  Power Mode Switch Task #####################

    Build Time: Jun 27 2023--09:44:46
    Core Clock: 160000000Hz
    Boot Type: Single Boot Type

Select the desired test mode
<Need system reboot first if you want to change to another mode>

Press  C for test mode of CAN bus
Press  Q for test mode of QSPI
Press  M for test mode of LPSPI master
Press  S for test mode of LPSPI slave
Press  U for test mode of LPUART

Waiting for mode select..
```

Press C for test mode of CAN bus
Press Q for test mode of QSPI
Press M for test mode of LPSPI master
Press S for test mode of LPSPI slave
Press U for test mode of LPUART

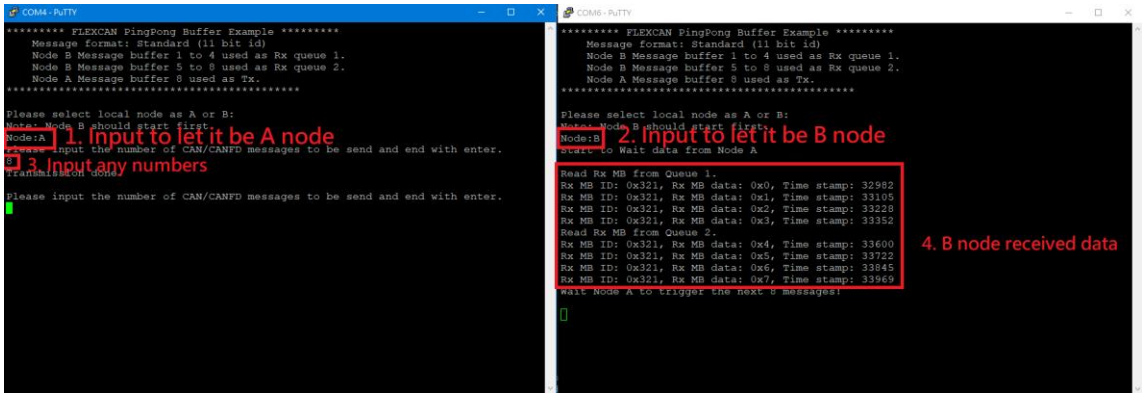
About this firmware, user should note that if you want to switch to another test mode, you must reboot the system.

3.13.1 CAN Bus

Step 1: Prepare two pcs rom-2620. One for 'Node A' one for 'Node B'

Step 2: Connect these two boards (HI-HI/LO-LO)

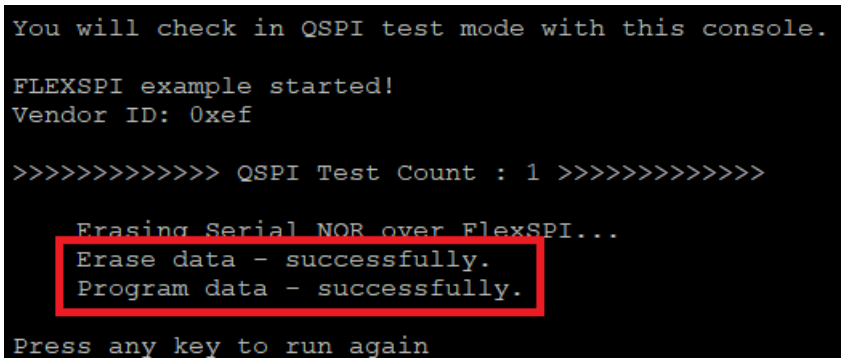
Step 3: The test steps and screen are as below :



Step 4: Follow the figure (step1 - step4). If B node received data means test successful.

3.13.2 QSPI

Step 1: After select the test mode 'Q' to verify QSPI, you will see below screen.



Step 2: This test program will perform QSPI erase/write automatically and show **'successfully'** when it's done.

Step 3: User can press any key to run again.

3.13.3 LPSPI

Step 1: Two pcs rom-2620. One for 'Master' one for 'Slave'.

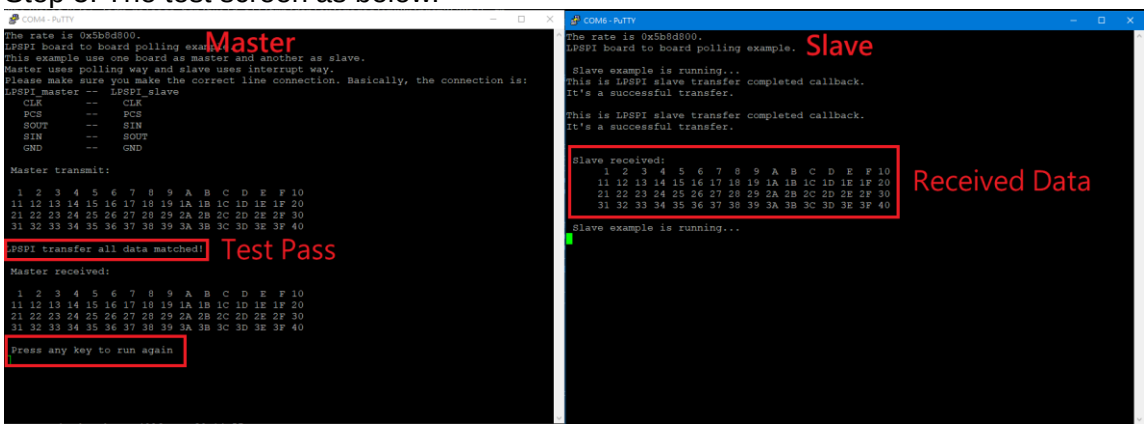
Step 2: Connection with these two boards by SPI Bus as below:

LPSPI3_PCS0	--	LPSPI3_PCS0
LPSPI3_GND	--	LPSPI3_GND
LPSPI3_PCS1	--	LPSPI3_PCS1
LPSPI3_SCK	--	LPSPI3_SCK
LPSPI3_SOUT	--	LPSPI3_SIN
LPSPI3_SIN	--	LPSPI3_SOUT

Step 3: One board select mode **'M'** to be Master.

Step 4: The second board is specified to Slave by select mode **'S'**.

Step 5: The test screen as below:



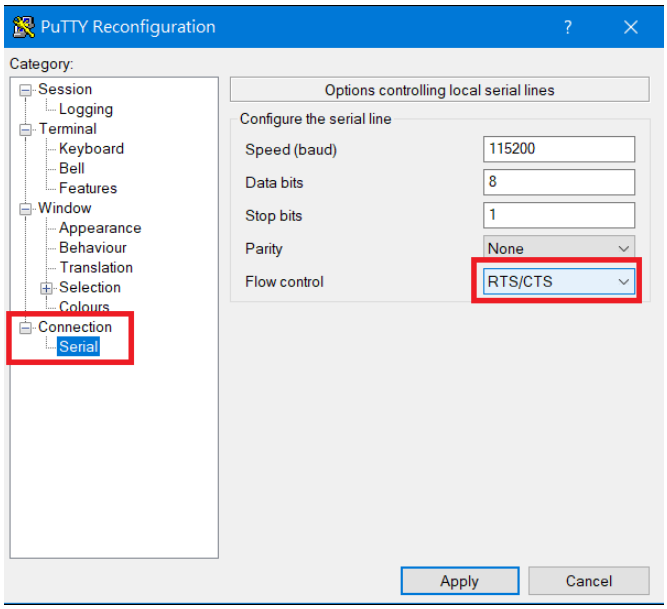
Step 6: Press any key at terminal of node master, it will execute the test again.

3.13.4 LPUART

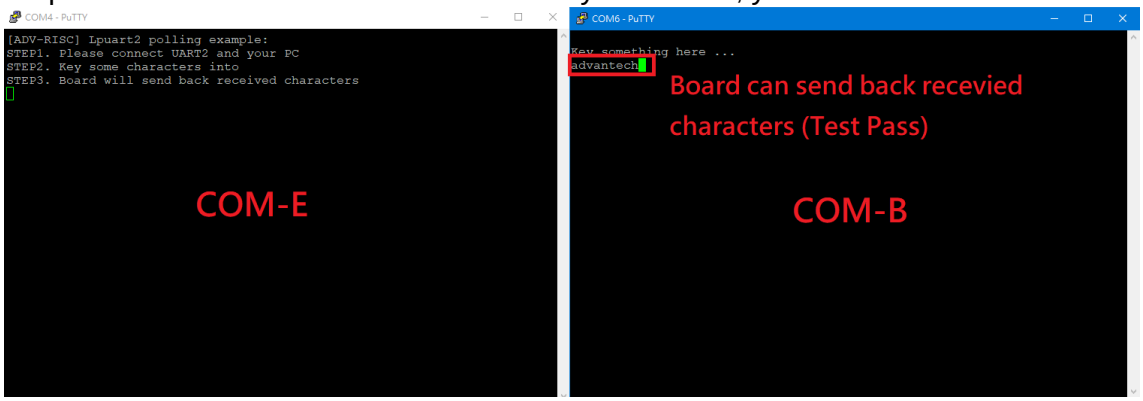
Step 1: Change ROM-ED91 SW1203 to '01'.

Step 2: Connect COM-B and COM-E to PC.

Step 3: Set RTS/CTS flow control for COM-B in Putty.exe



Step 4: After select the test mode **'U'** to verify LPUART2, you will see below screen.



Step 5: If tester can input any characters/strings and show that at COM-B means test successful.

Chapter 4

Embedded O.S

This chapter details instructions for building Linux systems

4.1 Introduction

Advantech's ROM-2620 platform comes preloaded with Yocto 4.0 based embedded O.S. (Linux kernel 5.15.52). It contains all the system-required shell commands and drivers needed to operate the platform. We do not offer IDE developing environment on ROM-2620 BSP. Users can evaluate and develop their device using the Ubuntu 20.04 LTS environment.

This chapter introduces the software configuration and development of ROM-2620. It enables users to develop their application(s) efficiently.

For detailed operation, please refer to the Yocto Linux BSP Version A User Guide. The following link directs you to the iMX8 series Wikipedia page: http://ess-wiki.advantech.com.tw/view/IoTGateway/BSP/Linux/iMX8/Yocto_LBVA_User_Guide

4.1.1 Device Tree Source File Select for ROM-2620

4.1.1.1 Display

A. LVDS Single Channel (Default)

1. g070vw01(LVDS0/LVDS1)

   imx8ulp-rom2620-a1.dtb

B. LVDS Dual Channel

1. g215hvn01

   imx8ulp-rom2620-a1-lt9211.dtb

4.1.1.2 Module

1. EWM-W167M201E

   imx8ulp-rom2620-a1-m2-sdio.dtb

2. EWM-W194M201E

   imx8ulp-rom2620-a1-m2-sdio-88w8997.dtb

Chapter 5

System Recovery

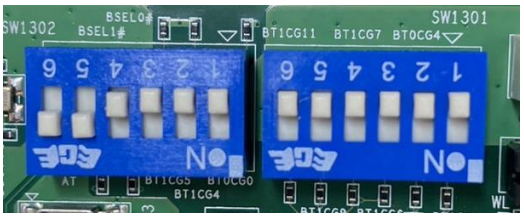
This chapter details system recovery procedures for a damaged Linux OS.

5.1 System Recovery

This section provides detailed procedures for restoring the eMMC image. If you destroy the onboard flash image by accident, you can recover the system by following these steps.

5.1.1 Recovery by UUU Tool

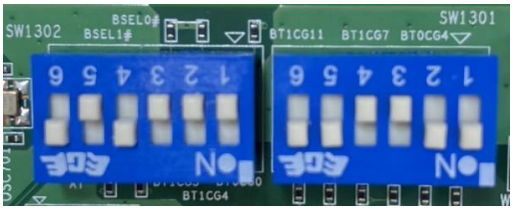
1. Copy 2620A1AIM36LIVD0032_iMX8ULP_1G_imx-boot.tgz and 2620A1AIM36LIVD0032_iMX8ULP_1G_flash_tool.tgz package to your desk-top.
2. Enter ROM-2620 download mode by change SW1301 and SW1302 as below:



3. Connect OTG to desk-top.
4. UUU command to flash eMMC.

```
# tar zxvf 2620A1AIM36LIVD0032_iMX8ULP_1G_imx-boot.tgz
# tar zxvf 2620A1AIM36LIVD0032_iMX8ULP_1G_flash_tool.tgz
# sudo ./uuu -b emmc_all
2620A1AIM36LIVD0032_iMX8ULP_1G_imx-boot/imx-boot-
imx8ulprom2620a1-1G.bin-flash_singleboot_m33
2620A1AIM36LIVD0032_iMX8ULP_1G_flash_tool/image/imx
-image-full-imx8ulprom2620a1-20240117122318.rootfs.wic
```

5. Enter ROM-2620 eMMC Boot mode by change SW1301 and SW1302 as below:



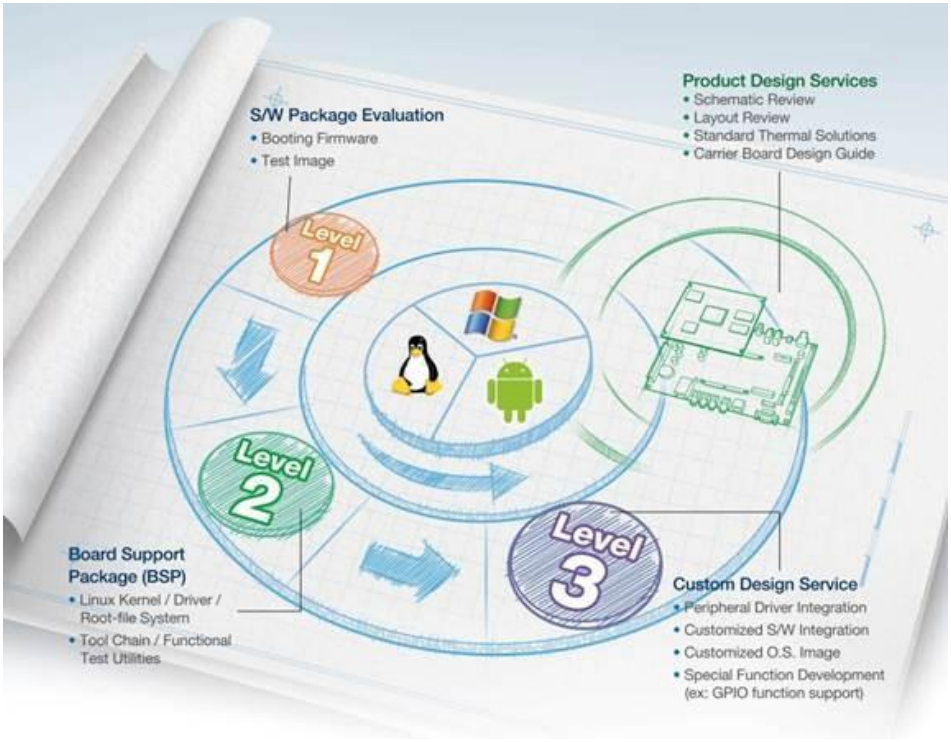
6. Reboot the system.

Chapter 6

Advantech Services

This chapter outlines Advantech's Design-In services, technical support, and warranty policy for RSB-3720.

6.1 RISC Design-In Services



Advantech's RISC Design-In Services help customers reduce the time and work required to design new carrier boards. We handle the complexities of technical research, greatly minimizing the development risks associated with carrier boards.

Easy Development

Advantech offers support firmware, root file systems, board support packages, and other development tools that help customers easily develop unique carrier boards and differentiate their embedded products and applications.

- Full range of RISC-based product offerings
- Comprehensive document support

Design Assistance Service

Advantech provides engineers with a schematic checklist and review services based on customer carrier board specifications. These services prevent design errors before they occur. This saves time and reduces the costs associated with developing carrier boards.

- Schematic review
- Placement and layout review
- Debugging assistance services
- General/special reference design database

Thermal Solution Services

Advantech provides thermal solution services — including modularized and/or customized thermal solutions — that quickly accommodate customers' designs.

- Standard thermal solutions
- Customized thermal solutions

Embedded Software Services

This service provides support drivers, software integration/customized firmware, root file-system, and Linux image — enabling users to save time and focus on their core development.

- Embedded Linux/ Android OS
- Advantech boot loader Customization

With the spread of industrial computing, a whole range of new applications has been developed, resulting in a fundamental change in the IPC industry. Due to diverse market demands and intense competition, cooperation on vertical integration is an effective way to create competitive advantages. As a result, ARM-based CPU modules have grown in popularity. Concentrating all necessary components on CPU modules and placing other parts on the carrier board provides greater flexibility while retaining low power consumption credentials.

Advantech has identified the following common questions concerning the implementation of modular designs.

General I/O Design Capability

Users can typically perform vertical integration. However, lack of expertise and experience in general power and I/O design can cause challenges; especially when integrating CPU modules into carrier boards.

Data Acquisition

Despite obtaining sufficient information for making decisions concerning specialized vertical applications, some customers encounter difficulties dealing with platform design, and communicating with the CPU/chipset manufacturers. These challenges in carrier board design can negatively impact time-to-market at the expense of market opportunities.

Software Development and Modification

Compared to x86 architectures, RISC architectures use simpler instruction sets. Software support for x86 platforms cannot be used on RISC platforms. System integrators (SI) need to develop software for their system and integrate it with hardware themselves. Unlike x86 platforms, RISC platforms are not well supported by Board Support Packages (BSP) and drivers. While driver support is provided, system integration still requires a lot of effort. The BSP provided by CPU manufacturers is usually tailored for carrier board design, making system integration for software difficult.

Addressing this, Advantech introduced Streamlined Design-in Support Services for RISC-based Computer on Modules (COM). With a dedicated professional design-in services team, Advantech actively participates in carrier board design and problem

solving. Advantech's services not only enable customers to effectively distribute their resources, but also reduce R&D costs and hardware investment.

By virtue of a cooperative relationship with leading original manufacturers of CPUs and chipsets — such as ARM, TI, and NXP — Advantech helps solve communication and technical support difficulties. This can reduce the uncertainties in product development. Advantech's professional software team focuses on providing complete Board Support Packages. They also help customers create a software development environment for their RISC platforms.

Advantech RISC design-in services helps customers reduce time to market by overcoming their problems through streamlined services.

Along with our multi-stage development process which includes: planning, design, integration, and validation, Advantech's RISC design-in service provides comprehensive support during the following different phases:

Planning Stage

Before deciding to adopt Advantech RISC COM, customers must go through a complete survey process, detailing product features, specifications, and compatibility testing with software. Advantech offers a RISC Customer Solution Board (CSB) as an evaluation tool for carrier boards which are simultaneously designed when developing RISC COMs. In the planning stage, customers can use this evaluation board to assess RISC modules and test peripheral hardware. Advantech provides standard software Board Support Packages (BSP) for RISC COM, so that customers can define their product's specifications while simultaneously verifying I/O and perfor- mance. Advantech also offers software evaluation and peripheral module recommen- dations (such as Wi-Fi, 3G, and BT). At this stage, Advantech seeks to resolve customer concerns. Product evaluation with a focus on performance and specifica- tion is vital during the planning period. Therefore, Advantech helps their customers conduct all the necessary tests for their RISC COM.

Design Stage

Advantech will supply a reference carrier board design guide when a product moves into the design stage. The carrier board design guide provides pin definitions for the COM connectors with limitations and recommendations for carrier board design. This design guide gives customers clear guidelines during their carrier board development. Advantech offers a complete pin-out check list for different form factors such as Q7, ULP and RTX 2.0, enabling carrier board signals and layout design examination. Advantech's team helps customers review the placement/layout and schematics. This helps carrier board designs fulfill customers' requirements. Advantech's RISC software team assists in establishing an environment for software development while evaluating the time and resources needed. Advantech can also cooperate with third parties to provide proficient consulting services in software development. With Advantech's professional support, the design process is eased and product quality is improved; thus meeting customer targets.

Integration Stage

This phase comprises HW/SW integration, application development, and peripheral module implementation. Due to the lack of knowledge and experience using platforms, customers need to spend time analyzing integration problems. In addition, peripheral module implementation is relevant to driver designs on carrier boards. RISC platforms usually have less support for ready-made drivers on carrier boards, therefore users need to learn by trial and error to get the best solution with the least

effort. Advantech's team has years of experience in customer support and HW/SW development. Advantech supports customers with professional advice and information — shortening development time and enabling effective product integration.

Validation Stage

After the completion of a customer's ES sample there is a series of verification steps. In addition to verifying a product's functionality, testing a product's efficiency is an important stage for RISC platforms. Through an efficient verification process, backed by Advantech's technical support, customers optimize their applications with ease. Advantech's team can provide professional consulting services

6.2 Contact Information

Region/Country	Contact Information
America	1-888-576-9688
Brazil	0800-770-5355
Mexico	01-800-467-2415
Europe (toll free)	00800-2426-8080
Singapore & SAP	65-64421000
Malaysia	1800-88-1809
Australia (toll free)	1300-308-531
China (toll free)	800-810-0345 800-810-8389 Sales@advantech.com.cn
India (toll free)	1-800-425-5071
Japan (toll free)	0800-500-1055
Korea (toll free)	080-363-9494 080-363-9495
Taiwan (toll free)	0800-777-111
Russia (toll free)	8-800-555-01-50

Alternatively, you can contact the Advantech service team via our website.

http://www.advantech.com.tw/contact/default.aspx?page=contact_form2&subject=Technical+Support

Our technical support engineers will provide a quick response to your queries.

6.3 Global Service Policy

6.3.1 Warranty Policy

The warranty policy for Advantech products is provided below.

6.3.1.1 Warranty Period

Advantech branded off-the-shelf products and third-party off-the-shelf products used to assemble Advantech's Configure-to-Order products are entitled to a two-year

global warranty. Products defect in design, materials, or workmanship are covered from the date of shipment.

All customized products will have a 15-month regional warranty by default. The actual product warranty terms and conditions may vary based on the sales contract.

All third-party products purchased separately will be covered by the original manufacturer's warranty and time period, and shall not exceed one year of coverage through Advantech.

6.3.1.2 Repairs Under Warranty

It is possible to obtain a replacement product (cross-shipment) within the first 30 days after purchase. Contact your original Advantech supplier to arrange a replacement if the product was purchased directly from Advantech and was DOA (dead-on-arrival). The DOA cross-shipment excludes any shipping damage, customized and/or build-to-order products.

For products that are not DOA, the return fee to an authorized Advantech repair facility will be at the customer's expense. The shipping fee for reconstructed products from Advantech back to the customer will be at Advantech's expense.

6.3.1.3 Exclusions from Warranty

The product is excluded from warranty if

- The product has been found to be defective after expiry of the warranty period.
- Warranty has been voided by removal or alternation of the product or part identification labels.
- The product has been misused, abused, or subjected to unauthorized disassembly/modification; placed in an unsuitable physical or operating environment; improperly maintained by the customer; or failure from which Advantech is not responsible whether by accident or other cause. Such conditions will be determined by Advantech at its sole discretion.
- The product is damaged beyond repair due to a natural disaster, such as a lighting strike, flood, earthquake, etc.
- The product is sent for updates, upgrades, or tests at the request of the customer who is without warranty.

6.3.2 Repair Process

6.3.2.1 Obtaining an RMA Number

All returns from customers must be authorized with an Advantech RMA (return merchandise authorization) number. Any returns of defective units or parts without valid RMA numbers will not be accepted; they will be returned to the customer at the customer's cost without prior notice.

An RMA number is only an authorization for returning a product; it is not an approval for repair or replacement. To request an RMA number, visit Advantech's RMA website: http://erma.advantech.com.tw and use an authorized user ID and password.

You must fill out basic product and customer information and describe the problems encountered in detail in "Problem Description". Vague entries such as "does not work" and "failure" are not acceptable.

If you are uncertain about the cause of the problem, please contact Advantech's application engineers. They may be able to find a solution that does not require sending the product in for repair.

The serial number of the entire product is required even if only a component is returned for repair. Otherwise, the case will be regarded as out-of-warranty.

6.3.2.2 Returning the Product for Repair

Customers may be able to save time and meet end-user requirements by returning defective products to any authorized Advantech repair facility without an extra cross-region charge. Customers are required to contact their local repair center before global repair service will be offered.

We recommend sending cards without accessories (manuals, cables, etc.). Remove any unnecessary components from the card, such as the CPU, DRAM, and CF card. If you send all these parts back (because you believe they may be part of the problem), please clearly state that they are included. Otherwise, Advantech will not be responsible for any items not listed. Ensure that the Problem Description is enclosed.

European customers who are located outside the European community are requested to use UPS as the shipping company. We strongly recommend adding a packing list to all shipments. Please prepare a shipment invoice according to the fol- lowing guidelines to minimize goods clearance time:

1. Give a low value to the product on the invoice, or additional charges will be levied by customs that will be borne by the sender.
2. Add information “Invoice for customs purposes only with no commercial value” on the shipment invoice.
3. List RMA numbers, product serial numbers, and warranty status on the shipment invoice.
4. Add information about the country of origin of the goods

In addition, attach an invoice with the RMA number to the carton, write the RMA number on the outside of the carton, and attach the packing slip to save handling time. Please also address the parts directly to the Service Department and mark the package “Attn. RMA Service Department”.

All products must be returned in properly packed ESD material or anti-static bags. Advantech reserves the right to return unrepaired items at the customer's cost if inappropriately packed.

Door-to-Door transportation, such as speed post, is recommended for delivery. Otherwise, the sender should bear additional charges such as clearance fees if air cargo shipment methods are used.

Should DOA cases fail, Advantech will take full responsibility for the product and transportation charges. If the items are not DOA, but fail within warranty, the sender will bear the freight charges. For out-of-warranty cases, customers must cover the cost and take care of both outward and inward transportation.

6.3.2.3 Service Charges

The product is excluded from warranty if

- The product is sent for repair after the warranty period is expired.
- The product is tested or calibrated after the warranty period is expired, and a NPF (no problem found) result is obtained.
- The product, though repaired within the warranty period, has been misused, abused, or subjected to unauthorized disassembly/modification; placed in an unsuitable environment; improperly maintained by the customer; or failure for which Advantech is not responsible whether by accident or other cause. Such conditions will be determined by Advantech at its sole discretion.
- The product is damaged beyond repair due to a natural disaster, such as a lighting strike, flood, earthquake, etc.
- The product is sent for updates, upgrades, or tests at the request of the customer who is without warranty.

If a product has been repaired by Advantech, and within three months after such a repair the product requires another repair for the same problem, Advantech will conduct the repair free of charge. However, free repairs do not apply to products that have been misused, abused, or subjected to unauthorized disassembly/modification; placed in an unsuitable environment; improperly maintained by the customer; or failure for which Advantech is not responsible whether by accident or other cause. Please contact your nearest regional service center for detailed service quotations.

Before beginning out-of-warranty repairs, we will send you a pro forma invoice (P/I) with the repair charges stated. When you remit the funds, reference the P/I number listed under “Our Ref”. Advantech reserves the right to deny repair services to customers who do not return the DOA unit or sign the P/I. Additionally, Advantech will scrap defective products without prior notice if customers do not return the signed P/I within three months.

6.3.2.4 Repair Report

Advantech returns each product with a repair report that shows the result of the repair. A repair analysis report can also be provided upon request. If the defect is not caused by Advantech’s design or manufacturing, customers will be charged US$60 or US$120 for in-warranty or out-of-warranty repair analysis reports, respectively.

6.3.2.5 Custody of Products Submitted for Repair

Advantech will retain custody of a product submitted for repair for one month while waiting for the return of a signed P/I or payment (A/R). If the customer fails to respond within this period, Advantech will close the case automatically. Advantech will take reasonable measures to contact the customer during this one month period.

6.3.2.6 Shipping Back to Customer

The forwarding company for RMA returns from Advantech to customers is selected by Advantech. Other express services, such as UPS or FedEx, can be used upon request. However, the customer must bear the extra costs of alternative shipment methods. If you require any special arrangements, please specify this when shipping the product to us.

ADVANTECH

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