# **EMX-RLUC**

13th Gen Intel® Core<sup>™</sup> Soc BGA Processor, Thin Mini ITX Motherboard.

# **User's Manual**

1<sup>st</sup> Ed – 15 April 2025

## **Copyright Notice**

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# Document Amendment History

| Revision        | Date       | Ву     | Comment         |
|-----------------|------------|--------|-----------------|
| 1 <sup>st</sup> | April 2025 | Avalue | Initial Release |

#### **Declaration of Conformity**

# FC

This device complies with part 15 FCC rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference.

(2) This device must accept any interference received including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a class "a" 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 which case the user will be required to correct the interference at his own expense.

#### **CE** statement

The product(s) described in this manual complies with all application European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

#### **Notice**

This guide is designed for experienced users to setup the system within the shortest time. For detailed information, please always refer to the electronic user's manual.

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#### Disclaimer

This manual is intended to be used as a practical and informative guide only and is subject

to change without notice. It does not represent a commitment on the part of Avalue. This product might include unintentional technical or typographical errors. Changes are periodically made to the information herein to correct such errors, and these changes are incorporated into new editions of the publication.

### A Message to the Customer

#### **Avalue Customer Services**

Each and every Avalue's product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Avalue device is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Avalue has come to be known.

Your satisfaction is our primary concern. Here is a guide to Avalue's customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

#### **Technical Support and Assistance**

1. Visit the Avalue website at https://www.avalue.com/ where you can find the latest information about the product.

2. Contact your distributor or our technical support team or sales representative for technical support if you need additional assistance. Please have following information ready before you call:

- Product name and serial number
- Description of your peripheral attachments
- · Description of your software (operating system, version, application software, etc.)
- A complete description of the problem
- The exact wording of any error messages

To receive the latest version of the user's manual; please visit our Web site at: <a href="http://www.avalue.com">www.avalue.com</a>

# Product Warranty (Returns & Warranties policy)

#### 1. Purpose

Avalue establishes the following maintenance specifications and operation procedures for providing the best quality of service and shortened repair time to our customers.

#### 2. Warranty

#### 2.1 Warranty Period

Avalue endeavors to offer customers the most comprehensive post-sales services and protection; besides offering a 2-year warranty for standard Avalue products, an extended warranty service can also be provided based on additional request from the customer. Within the warranty period, customers are entitled to receive comprehensive and prompt repair and warranty.

Standard products manufactured by Avalue are offered a 2-year warranty, from the date of delivery from Avalue. For ODM/OEM products manufactured by Avalue or PCBA with conformal coating, will follow up the define warranty of the agreement, otherwise will be offered 1-year warranty for ODM/OEM products but non-warranty for PCBA with conformal coating. For outsourcing parts kit by Avalue (ex: Motherboard, LCD touch panel, CPU, RAM, HDD) are offered a 6-month warranty, and Mobile/Tablet PC battery are offered a warranty of the half year, from the date of delivery by Avalue. Products before the mass production stage, i.e. engineering samples are not applied in this warranty or service policy. For extended warranty and cross-territory services, product defects resulting from design, production process or material are covered by the pre-set warranty period after the date of delivery from Avalue. For non-Avalue products, the product warranty and repair time shall be based on the service standards provided by the original manufacturer; in principle Avalue will provide these products a warranty service for no more than one year.

#### 2.2 Maintenance services within the warranty period

In the case of Avalue product DOA (Defect-on-Arrival) when the customer finds any defect within 1 month after the delivery, Avalue will replace it with a new product in a soonest way. Except for custom products, once the customer is approved of a Cross-Shipment Agreement, which allows for delivery a new product to the customer before receiving the defective one, Avalue will immediately proceed with new product replacement for the said DOA case. On validation of the confirmed defect, Avalue is entitled to reserve the right whether to provide a new product for replacement. For the returned defective new product, it is necessary to verify that there shall be no bruise, alteration, scratch or marking to the appearance, and that none of the delivered accessories missing; otherwise, the customer will be requested to pay a processing fee. On the other hand, if the new product defect is resulting from incorrect configuration or erroneous use by the user instead of any problem of the hardware itself, the customer will also be requested to pay for relevant handling fees.

As for other conditions, Avalue will handle defects by way of repair. The customer will be requested to send the defective product to an Avalue authorized service center, and Avalue will return the repaired product back to the customer as soon as possible.

#### 2.3 Ruling of an out-of-warranty defect

The following situations are not included in the warranty:

- The warranty period has expired.
- Product has been altered or its label of the serial number has been torn off.
- Product functionality issues resulting from improper use by the user, unauthorized dismantle or alteration, unfit operation environment, improper maintenance, accident or other causes. Avalue reserves the right for the ruling of the aforementioned situations.
- Product damage resulting from lightning, flood, earthquake or other calamities.
- The warranty rules of non-Avalue products and accessories shall be in accordance with standards set up by the original manufacturer. These products and accessories include RAM, HDD, FDD, CD-ROM, CPU, FAN, etc.
- Product upgrade request or test request submitted by the customer after expiration of the warranty.
- PCBA with conformal coating.
- Avalue semi-product and outsourced products without Avalue serial number.
- Products before the mass production stage, i.e. engineering samples.

#### 3. Procedure for sending for repair

#### 3.1 Attain a RMA number

A customer's rejected product returned for repair shall have a RMA (Return Merchandise Authorization) number. Without a RMA number, Avalue will not provide any repair service for the rejected product, and the product will be returned to the customer at customer's cost. Avalue will not issue any notice for the return of the product.

Each returned product for repair shall have a RMA number, which is simply the authorization of the return for repair; it is not a guarantee that the returned goods can be repaired or replaced. For applying for a RMA number, the customer may enter the eRMA webpage of Avalue <a href="https://www.avalue.com/en/member">https://www.avalue.com/en/member</a> and log-in with an account number and a password authorized by Avalue. The system will then automatically issue a RMA number.

When applying for the RMA number, it is essential to fill in basic information of the customer and the product, together with detailed description of the problem encountered. If possible, avoid using ambiguous words such as "does not work" or "problematic". Without a substantial description of the problem, it is hard to start the repair and will cause prolonged repair time. Lacking detailed statement of fault steps also makes the problem hard to be identified, sometimes resulting in second-time repairs.

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In case the customer can't define the cause of problem, please contact Avalue application engineers. Sometimes when the problem can be resolved even before the customer sends back the product.

On the other hand, if the customer only returns the key parts to Avalue for repair, it is necessary that the serial number of the entire unit is given in the "Problem Description" field, so that warranty period can be ruled accordingly; or Avalue will handle the case as an Out-of- warranty case.

#### 3.2 Return of faulty product for repair

It is recommended that the customer not to return the accessories (manual, connection cables, etc.) with the products for repair, devices such as CPU, DRAM, CF memory card, etc., shall also be removed from the faulty goods before return for repair. If these devices are relevant to described repair problems and necessary to be returned with the goods; please clearly indicate the items included in the eRMA application form. Avalue shall not be responsible for any item that is not itemized. Moreover, make sure the problem(s) are detailed in the "Problem Description" field.

In the list of delivery, the customer may fill-in a value which is lower than the actual value, to prevent customs levying a higher tax over the excessive value of the return goods. The customer shall be held responsible for extra fees caused by this. We strongly recommend that "Invoice for customs purpose only with no commercial value" be indicated on the delivery note. Also for the purpose of expedited handling, please printout the RMA number and put it in the carton, also indicate the number outside of the carton, with the recipient addressing to Avalue RMA Department.

When returning the defective product, please use an anti-static bag or ESD material to pack it properly. In case of improper packing resulting in damages in the transportation process, Avalue reserves the right to reject the un-repaired faulty good at the customer's costs. Furthermore, it is suggested that the faulty goods shall be sent via a door-to-door courier service. The customer shall be held responsible for any customs clearance fee or extra expenses if Air-Cargo is used for the delivery.

In case of a DOA situation of a new product, Avalue will be responsible for the product and the freight. If the faulty goods are within the warranty period, the sender will take responsibility for the freight. For an out-of-warranty case, the customer shall be responsible for the freight of both trips.

#### 3.3 Maintenance Charge

Avalue will charge a moderate repair fee for the following conditions:

- The warranty period has expired.
- Product has been altered or its label of the serial number has been torn off.
- Product functionality issues resulting from improper use by the user, unauthorized dismantle or alteration, unfit operation environment, improper maintenance, accident

or other causes. Avalue reserves the right for the ruling of the aforementioned situations.

- Product damage resulting from lightning, flood, earthquake or other calamities.
- The warranty rules for non-Avalue products and accessories shall be in accordance with standards set up by the original supplier. These products and accessories include RAM, HDD, FDD, CD-ROM, CPU, FAN, etc.
- Product upgrade request or test request submitted by the customer after expiry of the warranty.
- PCBA with conformal coating.
- Avalue semi-product and outsourced products without Avalue serial number
- Products before the mass production stage, i.e. engineering samples.
- In case the products received are examined as NPF (No Problem Found) within the warranty period, the customer shall be responsible for the freight of both trips.
- Please contact your local distributor to examine in advance to prevent unnecessary freight cost.

For system failure of out-of-warranty products, Avalue will provide a quotation prior to repair service. When the customer applies for the cost, please refer to the Quotation number. In case the customer does not return the DOA product that has already been replaced by a new one, or the customer does not sign back the quotation of the out-of-warranty maintenance, Avalue reserves the right of whether or not to provide the repair service. In case the customer does not reply in 3 months, Avalue shall directly scrap or return the product back to customer at customer's cost without further notice to the customer.

#### 3.4 Maintenance service of phased-out products

For servicing phased-out products, Avalue provides an extended period, starting the date of phase-out, as a guaranteed maintenance period of such products, for continuance of the maintenance service to meet customer's requirements. In case of unexpected factors causing Avalue to be unable to repair/replace a warranted but phased-out product, Avalue will, depending on the availability, upgrade the product (free of charge with continued warranty period as of the original product), or, give partial refund (based on the length of the remaining warranty period) to solve this kind of problem.

#### 3.5 Maintenance Report

On completion of repair of a defective product, a Maintenance Report indicating the maintenance result and part(s) replaced (if any) will be sent to the customer together with the product. If the customer demands an additional maintenance analysis report, a service fee of various level will be charged depending on the warranty status. In case the analysis result shows that the defect attributes to Avalue's faulty design or process, the analysis fee will be exempted.

#### 4. Service Products

Avalue provides service products to manage with different customer needs. Should you have any need, please consult to Avalue Sales Department.

#### **Defect Analysis Report (DAR)**

Avalue provides DAR (Defect Analysis Report) services aiming to elevating customer satisfaction. A DAR includes defect cause identification/verification/suggestion and improvement precautions, with instructions on correct usage for the avoidance of any reoccurrence.

#### **Upgrade Service**

Avalue is capable to provide system upgrade service for customization requirements. This upgrade service is applicable for main parts, such as CPU, memory, HDD, SSD, storage devices; also replacements motherboards of systems. Please contact Avalue sales for details to evaluate the possibility of system upgrade service and obtain information of lead time and price.

# **Safety Instructions**

#### Safety Precautions

Before installing and using this device, please note the following precautions.

- 1. Read these safety instructions carefully.
- 2. Keep this User's Manual for future reference.
- 3. Disconnected this equipment from any AC outlet before cleaning.
- 4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
- 5. Keep this equipment away from humidity.

6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.

7. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.

8. Use a power cord that has been approved for using with the product and that it matches the voltage and current marked on the product's electrical range label. The voltage and current rating of the cord must be greater than the voltage and current rating marked on the product.

9. Position the power cord so that people cannot step on it. 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 by transient overvoltage.

12. Never pour any 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. If one of the following situations arises, get the equipment checked by service personnel:

- The power cord or plug is damaged.
- Liquid has penetrated into the equipment.
- The equipment has been exposed to moisture.
- The equipment does not work well, or you cannot get it work according to the user's manual.
- The equipment has been dropped and damaged.
- The equipment has obvious signs of breakage.

14. CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.

15. Equipment intended only for use in a RESTRICTED ACCESS AREA.

# **Explanation of Graphical Symbols**

|                     | Warning | A WARNING statement provides important information about a potentially hazardous situation which, if not avoided, could result in death or serious injury.   |
|---------------------|---------|--|
| $\underline{\land}$ | Caution | A CAUTION statement provides important information about a potentially hazardous situation which, if not avoided, may result in minor or moderate injury to the user or patient or in damage to the equipment or other property. |
| L                   | Note    | A NOTE provides additional information intended to avoid inconveniences during operation.  |
| DC                  |         | Direct current.  |
|                     |         | Alternating current  |
| С<br>U              |         | Stand-by, Power on   |
| FC                  |         | FCC Certification  |
| CE                  |         | CE Certification   |
|                     |         | Follow the national requirements for disposal of equipment.  |
| <u>3</u>            |         | Stacking layer limit   |
|                     |         | This side up   |

| <b>Y</b> | Fragile Packaging  |
|----------|--|
| Ť        | Beware of water damage, moisture-proof                         |
|          | Carton recyclable  |
|          | Handle with care   |
|          | Follow operating instructions of consult instructions for use. |

# **Disposing of your old product**

#### WARNING:

There is danger of explosion if the battery is mishandled or incorretly replaced. Replace only with the same type of battery. Do not disassemble it or attempt to recharge it outside the system. Do not crush, puncture, dispose of in fire, short the external contacts, or expose to water or ther liquids. Dispose of the battery in accordance with local regulations and instructions from your service provider.

#### CAUTION:

- Lithium Battery Caution: Danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type. Dispose batteries according to manufacturer's instructions.

- Disposal of a BATTERY into fire or a hot oven, or mechanically crushing or cutting of a BATTERY, that can result in an EXPLOSION

- Leaving a BATTERY in an extremely high temperature surrounding environment that can result in an EXPLOSION or the leakage of flammable liquid or gas.

- A BATTERY subjected to extremely low air pressure that may result in an EXPLOSION or the leakage of flammable liquid or gas.

#### Mise en garde!

AVERTISSEMENT : Il existe un risque d'explosion si la batterie est mal manipulée ou remplacée de manière incorrecte. Remplacez uniquement par le même type de batterie. Ne le démontez pas et ne tentez pas de le recharger en dehors du système. Ne pas écraser, percer, jeter au feu, court-circuiter les contacts externes ou exposer à l'eau ou à d'autres liquides. Jetez la batterie conformément aux réglementations locales et aux instructions de votre fournisseur de services.

#### **MISE EN GARDE:**

- Pile au lithium Attention : Danger d'explosion si la pile n'est pas remplacée correctement. Remplacer uniquement par un type identique ou équivalent. Jetez les piles conformément aux instructions du fabricant.

- L'élimination d'une BATTERIE dans le feu ou dans un four chaud, ou l'écrasement ou le découpage mécanique d'une BATTERIE, pouvant entraîner une EXPLOSION

- Laisser une BATTERIE dans un environnement à température extrêmement élevée pouvant entraîner une EXPLOSION ou une fuite de liquide ou de gaz inflammable.

- UNE BATTERIE soumise à une pression d'air extrêmement basse pouvant entraîner une EXPLOSION ou une fuite de liquide ou de gaz inflammable.

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# **1. Getting Started**

#### **1.1 Safety Precautions**

Warning!



Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.

**Caution!** 



Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

# **1.2 Packing List**

Before installation, please ensure all the items listed in the following table are included in the package.

| ltem | Description          | Q'ty |
|------|----------------------|------|
| 1    | EMX-RLUC Motherboard | 1    |
| 2    | DB9M COM Cable       | 4    |

#### Note:

Before using the motherboard power, ensure the power pinout, cables, and voltage match to avoid equipment damage.



If any of the above items is damaged or missing, contact your retailer.

#### **1.3 Manual Objectives**

This manual describes in details Avalue Technology EMX-RLUC Single Board.

We have tried to include as much information as possible, but we have not duplicated information that is provided in the standard IBM Technical References, unless it proved to be necessary to aid in the understanding of this board.

We strongly recommend that you study this manual carefully before attempting to set up EMX-RLUC or change the standard configurations. Whilst all the necessary information is available in this manual, we would recommend that unless you are confident, you contact your supplier for guidance.

Please be aware that it is possible to create configurations within the CMOS RAM that make booting impossible. If this should happen, clear the CMOS settings, (see the description of the Jumper Settings for details).

If you have any suggestions or find any errors regarding this manual and want to inform us of these, please contact our Customer Service department with the relevant details.

# 1.4 System Specifications

| System            |   |  |  |  |  |  |
|-------------------|---|--|--|--|--|--|
| CPU               | Onboard Raptor Lake U series Intel® BGA Processor (TDP: 15W)                        |  |  |  |  |  |
| BIOS              | AMI uEFI BIOS, 256Mbit SPI Flash ROM for i5 CPU                                     |  |  |  |  |  |
|                   | AMI uEFI BIOS, 128Mbit SPI Flash ROM for i3 CPU                                     |  |  |  |  |  |
| I/O Chip          | Super I/O, ITE IT8786E-I  |  |  |  |  |  |
| System            | 2 x 260-Pin DDR4 3200MHz non-ECC SO-DIMM Socket Supports Up to 2 x 32GB             |  |  |  |  |  |
| Memory            |   |  |  |  |  |  |
| Watchdog<br>Timer | H/W Reset, 1sec. – 65535sec./min.1sec. or 1min. step                                |  |  |  |  |  |
|                   | CPU temperature monitoring  |  |  |  |  |  |
| H/W Status        | Voltage monitoring  |  |  |  |  |  |
| WONITO            | CPU fan speed control   |  |  |  |  |  |
| ТРМ               | Onboard Infineon SLB 9670VQ2.0 support SPI TPM 2.0 By BOM optional                  |  |  |  |  |  |
| Expansion Slot    |   |  |  |  |  |  |
|                   | 1 x M.2 Key-B 2242/3052 with USB3.2 Gen1x1 or PCIe x1 Signal, SIM card wafer for    |  |  |  |  |  |
|                   | LTE/IO Cards support WWAN+GNSS or PCIe x1 SSD, and USB2.0. Default PCI-e x1         |  |  |  |  |  |
|                   | with USB2.0 only, USB 3.2 Gen1x1 by BOM optional                                    |  |  |  |  |  |
|                   | *USB3.0 signal of M.2_Key-B_SSD/WWAN1 colay with R_USB2_UP. (BOM                    |  |  |  |  |  |
|                   | selectable) They could not be used at the same time, Default M.2 Key B USB 3.2 Gen1 |  |  |  |  |  |
|                   | disable.  |  |  |  |  |  |
|                   | *USB2.0 signal of M.2_Key-B_SSD/WWAN1 colay with one of USB2.0 signal for           |  |  |  |  |  |
|                   | F_USB2. They could not be used at the same time.                                    |  |  |  |  |  |
| MO                | Default M.2 Key B USB 2.0 enable.   |  |  |  |  |  |
| 191.2             |   |  |  |  |  |  |
|                   | 1 x 6 pin, pitch 1.25mm wafer connector for SIM Card (J_SIM1)                       |  |  |  |  |  |
|                   | 1 x M.2 Key-E 2230 support Wi-Fi+BT module (1 x PCIe x1 & USB 2.0 Signal)           |  |  |  |  |  |
|                   | *USB2.0 signal of M.2_Key-E_WLAN1 colay with one of USB2.0 signal for Internal      |  |  |  |  |  |
|                   | F_USB2. They could not be used at the same time.                                    |  |  |  |  |  |
|                   | Default M.2 Key E USB 2.0 enable.   |  |  |  |  |  |
|                   |   |  |  |  |  |  |
|                   | 1 x M.2 Key-M 2242/2280 (PCIe x4/SATA) slot for storage NVMe/SATA SSD (Auto         |  |  |  |  |  |
|                   | Detect)   |  |  |  |  |  |
| PCle              | 1 x PCIe x4 Gen4 with PCIex8 slot   |  |  |  |  |  |
| Storage           |   |  |  |  |  |  |

|             | 1 x M.2 Key-M 2242/2280 (PCIe x4/SATA) slot for storage NVMe/SATA SSD (Auto                             |  |  |  |  |  |
|-------------|---|--|--|--|--|--|
| IVI.2       | Detect)   |  |  |  |  |  |
| SATA        | 1 x SATA III (blue color connector)   |  |  |  |  |  |
| Edge I/O    |   |  |  |  |  |  |
|             | 1 x Intel® I210AT Gigabit Ethernet Controller   |  |  |  |  |  |
| LAN         | 1 x Intel® I219-LM for core i5 CPU or 1 x Intel® I219V for i3 CPU Gigabit Ethernet                      |  |  |  |  |  |
|             | Controller  |  |  |  |  |  |
| USB         | 6 x USB3.2 Gen1x1 Type A, (each port) +5VSB/0.9A  |  |  |  |  |  |
| DP          | 1 x DP++  |  |  |  |  |  |
| HDMI        | 1 x HDMI2.0   |  |  |  |  |  |
|             | Line-out + Mic-in 2in1 3.5mm Jack on rear I/O (Default CTIA, OMTP standard                              |  |  |  |  |  |
| Audio       | selectable by resistor.)  |  |  |  |  |  |
| DC Input    | DC in +12V Screw type DC in connector (co-lay Power Input 4Pin Wafer)                                   |  |  |  |  |  |
| Onboard I/O |   |  |  |  |  |  |
|             | COM 1 to 4:   |  |  |  |  |  |
|             | 4 x 1 x 9 pin, pitch 1.25mm wafer for COM1~4: support RS-232 connector (J_COM1_4)                       |  |  |  |  |  |
|             | [1]: PIN1 of COM1~4 can be DCD# (default) /5V, selectable by resistor.                                  |  |  |  |  |  |
|             | [2]: Board header PIN 8 to Cable side Pin 9 of COM1~4can be RI# (default)/ 12V by                       |  |  |  |  |  |
|             | BOM optional production.  |  |  |  |  |  |
|             |   |  |  |  |  |  |
| СОМ         | COM 5~6 support RS-232/485 (TX/RX only)   |  |  |  |  |  |
|             | 2 x 1 x 3 pin, pitch 2.00mm wafer for COM5: support RS-232/485 connector (J_COM5 &                      |  |  |  |  |  |
|             | J_COM6)   |  |  |  |  |  |
|             | 2 x 2 x 3 pin, pitch 2.54mm for COM 5: support RS232/485 selector by Jumper setting.                    |  |  |  |  |  |
|             | (JP1_2)   |  |  |  |  |  |
|             | 2 x 2 x 3 pin, pitch 2.54mm for COM 6: support RS232/485 selector by Jumper setting.                    |  |  |  |  |  |
|             | $(JP3_4)$   |  |  |  |  |  |
| USB         | 1 X 2 X 5 pin, pitch 2.00mm water for 2 USB 2.0, +5V/0.5A (each port) (white color                      |  |  |  |  |  |
|             | water)<br>$2 \times 5$ pip, pitch 2.00mm pip header for 8 bit CPIO, (2.2)/ lovel (1. CPIO1) (Max. 20mA) |  |  |  |  |  |
| GPIO        |   |  |  |  |  |  |
|             | *Pin10 is 51/ by default 3 31/ is available if specified (resistor selectable)                          |  |  |  |  |  |
| SATA Power  | 1 x 4 pin, pitch 2.00mm Wafer for 5/12V Power SATA Power 1A   |  |  |  |  |  |
|             | 1 x 4 pin, pitch 2.54mm Wafer for CPU fan connector with smart fan function                             |  |  |  |  |  |
| CPU/System  | supported.(CPU_FAN1) 12V/1A.  |  |  |  |  |  |
| FAN         | 1 x 4 pin, pitch 2.54mm Wafer for System fan connector with smart fan function                          |  |  |  |  |  |
|             | supported.(SYS_FAN1) 12V/1A.  |  |  |  |  |  |
| Buzzer      | Onboard BUZZER 5V 88dB SMD  |  |  |  |  |  |
| Front Panel | 2 x 4 pin, pitch 2.00mm Wafer for Front panel (F_PANEL1, white color connector)                         |  |  |  |  |  |

|                    | 1 x 2 pin, pitch 1.25mm Wafer horizontal type connector for CR2032(J_BAT1)          |  |  |  |  |  |  |
|--------------------|---|--|--|--|--|--|--|
| <b>RTC Battery</b> | (-20~60C Battery)   |  |  |  |  |  |  |
|                    | Battery 3V/220mAh 35mm CR2032 Lithium Coin Cell.                                    |  |  |  |  |  |  |
| ΑΤ/ΑΤΧ             | 1 x 3 pin_pitch 2 54mm pin header for AT/ATX jumper (J_AT/ATX1) Default ATX mode    |  |  |  |  |  |  |
| Selector           |   |  |  |  |  |  |  |
| Clear CMOS         | 1 x 3 pin, pitch 2.54mm pin header for CMOS clear (CLR_CMOS1)                       |  |  |  |  |  |  |
|                    | 2 x 15 pin, pitch 2.00mm pin header connector for eDP or LVDS (JLVDS1/EDP1)         |  |  |  |  |  |  |
|                    | default LVDS  |  |  |  |  |  |  |
|                    | 2 x 3 pin, pitch 2.54mm pin header connector for LVDS VDD Select (JC_LVDS1) default |  |  |  |  |  |  |
|                    | 3.3V  |  |  |  |  |  |  |
| 2700               | *Panel Power VDD is 3.3V by default, 5V/12V is selectable by LVDS VDD Select        |  |  |  |  |  |  |
|                    | Jumper" (JC_LVDS1)  |  |  |  |  |  |  |
|                    | *Default LVDS   |  |  |  |  |  |  |
|                    | *eDP by BOM Optional production   |  |  |  |  |  |  |
|                    | 1 x 6 pin, pitch 2.00mm Wafer connector LCD backlight brightness adjustment         |  |  |  |  |  |  |
|                    | (PWM/DC) (Jumper default: 1-2 for PWM) (LVDS_P1)                                    |  |  |  |  |  |  |
| LCD Backlight      | *LVDS_BKLT_CTL can be controlled by PWM(Default) /CCFL, selectable by Jumper"       |  |  |  |  |  |  |
| Brightness &       | (JC LVDS2)  |  |  |  |  |  |  |
| LCD Inverter       |   |  |  |  |  |  |  |
|                    | 1 x 2 pip pitch 2 54mm pip booder for LV/DS Booklight DW/M/CCEL coloct lumpor       |  |  |  |  |  |  |
|                    | 1 x 3 pm, pitch 2.54mm pm header for LVDS Backlight PVVV/CCFL select Jumper         |  |  |  |  |  |  |
|                    | (JC_LVDS2)  |  |  |  |  |  |  |
| eSPI               | 2 x 6 pin, pitch 2.00mm connector for eSPI debug (J_ESPI1)                          |  |  |  |  |  |  |
|                    | * Support BUF_PLT_RST_N by default, ESPI_RST0_N optional.                           |  |  |  |  |  |  |
| Amp                | 1 x 4 pin, pitch wafer 2.00mm connector for 3W 8 $\Omega$ x 2 Speaker (J_SPK1)      |  |  |  |  |  |  |
| Connector          |   |  |  |  |  |  |  |
| DC-Input           | DC in +12V (Screw type, co-lay Power Input 4Pin Wafer)                              |  |  |  |  |  |  |
| •                  | 1 x 4 pin, pitch wafer 3.96mm connector for DC 12V Power Input (J_DCIN3)            |  |  |  |  |  |  |
| Power Output       | 1 x 4 pin, pitch wafer 2.5mm connector for DC +12V 2A /+5V 2A Power output          |  |  |  |  |  |  |
|                    | (DC_OUT1)   |  |  |  |  |  |  |
|                    | 1 x 6 pin, pitch 1.25mm wafer connector for SIM Card (J_SIM1)                       |  |  |  |  |  |  |
|                    | (SIM card slot and cable sold separately)   |  |  |  |  |  |  |
|                    | 1 x 6 pin, pitch 1.25mm wafer connector for I2C Touch screen(J_TCH1) By BOM         |  |  |  |  |  |  |
| Other              | optional production.  |  |  |  |  |  |  |
| Ullor              | 1 x 3 pin, pitch 2.54mm pin header for ME flash (J_ME1) for RD debug only, board    |  |  |  |  |  |  |
|                    | without this pin header.  |  |  |  |  |  |  |
|                    | 1 x 4 pin, pitch wafer 1.25mm wafer connector for Power Debug port (J PRM1)         |  |  |  |  |  |  |
|                    |   |  |  |  |  |  |  |
|                    | Onboard Infineon SLB 9670VQ2.0 support SPI TPM 2.0) BOM optional                    |  |  |  |  |  |  |

|                 | Intel® UHD Graphics for 13th Gen Intel® Processors               |           |               |                       |         |              |                    |  |
|-----------------|--|-----------|---------------|-----------------------|---------|--------------|--------------------|--|
| Graphic         | or   |           |               |                       |         |              |                    |  |
| Chipset         | Intel® Iris® Xe Graphics eligible for 12th Gen Intel® Processors |           |               |                       |         |              |                    |  |
|                 | 1 x HDMI 2.0: 4096 x 2340@60 Hz                                  |           |               |                       |         |              |                    |  |
|                 | 1 x DP(DP1.4a): Max: 4096 x 2340@60 Hz                           |           |               |                       |         |              |                    |  |
| Spec. &         | LVDS: 1920 x 1200 Dual channel 18/24-bits LVDS                   |           |               |                       |         |              |                    |  |
| Resolution      | (CapStone CS5211 eDP to LVDS) (Default LVDS)                     |           |               |                       |         |              |                    |  |
|                 | aDP1 2: Max 3840 x 2160@60 Hz (by POM antional production)       |           |               |                       |         |              |                    |  |
| Multiple        |  |           |               |                       |         |              |                    |  |
| Display         | Triple Independent I   | Displa    | ay: 1 x H     | DMI, 1 x DP, 1 x L    | VDS     | or eDP       | (Default LVDS)     |  |
| Audio           | L  |           |               |                       |         |              |                    |  |
| Audio Codec     | Realtek ALC888S a  | udio d    | codec         |                       |         |              |                    |  |
| Amplifier       | TI TPA3113D2PWP  | Stere     | eo Class      | -D 3W 8Ω x 2 Auc      | lio An  | nplifier     |                    |  |
| Ethernet        |  |           |               |                       |         |              |                    |  |
|                 | 1 x Intel® I210AT G  | igabit    | Etherne       | et Controller         |         |              |                    |  |
| LAN Chipset     | 1 x Intel® I219-LM (   | Gigabi    | it Ethern     | et Controller         |         |              |                    |  |
|                 | LAN1: Intel® I210AT 10/100/1000 Base-Tx GbE compatible           |           |               |                       |         |              |                    |  |
| LAN Spec.       | LAN2: Intel® I219-LM 10/100/1000 Base-Tx GbE compatible          |           |               |                       |         |              |                    |  |
|                 |  |           |               |                       |         |              |                    |  |
|                 | Graphic  | Pin       | Definition    |                       | Pin     | Definition   |                    |  |
|                 |  | 1         |               | XMDI_0+ 5             |         |              | XMDI_2+            |  |
|                 | AB   | 2         |               |                       | 6<br>7  |              | XMDI_2-            |  |
|                 | 87654321   | 3         |               |                       | 7<br>8  |              | XMDL 3-            |  |
|                 |  | -         |               | ACT: Twinkling Yellow | 0       | Speed        | 1000M: Turn Orange |  |
|                 |  | А         | Active<br>LED | Only LINK: Lights Off | в       |              | 100M: Turn Green   |  |
|                 |  |           |               | Stop: Lights Off      |         | LED          | 10M: Lights Off    |  |
| LED Indicator   |  |           |               |                       |         |              |                    |  |
|                 | Graphic  | Pin       | Definition    |                       | Pin     | ו Definition |                    |  |
|                 |  | 1 XMDI_0+ |               | 5                     | XMDI_2+ |              |                    |  |
|                 |  | 2         | XMDI_0-       |                       | 6       |              | XMDI_2-            |  |
|                 | AB   | 3         |               | XMDI_1+               | 7       |              | XMDI_3+            |  |
|                 | 87654321   | 4         |               | XMDI_1-               | 8       |              | XMDI_3-            |  |
|                 |  |           | A attice      | ACT: Twinkling Yellow |         |              | 1000M: Turn Orange |  |
|                 |  | Α         |               | Only LINK: Lights Off | В       | I FD         | 100M: Turn Green   |  |
|                 |  |           |               | Stop: Lights Off      |         |              | 10M: Lights Off    |  |
| Mochanical & En | vironmontal Spa  | cific     | ation         |                       |         |              |                    |  |
|                 |  |           | alion         |                       |         |              |                    |  |
| Power           | DC in +12V   |           |               |                       |         |              |                    |  |
| Requirement     |  |           |               |                       |         |              |                    |  |
| ACPI            | Single power ATX Support S0, S3, S4, S5                          |           |               |                       |         |              |                    |  |
|                 | ACPI 5.0 Compliant   |           |               |                       |         |              |                    |  |

| Power Mode     | AT / ATX mode Switchable Through Jumper             |  |  |  |
|----------------|---|--|--|--|
| Operating      | Intel@ standard CPU SKU support: 0~60°C             |  |  |  |
| Temp.          | w/HDD/SSD, ambient with 0.5 m/s Air flow            |  |  |  |
| Storage Temp.  | -20~ +75°C  |  |  |  |
| Operating      | 40°C @ 95% Relative Humidity, Non-condensing        |  |  |  |
| Humidity       |   |  |  |  |
| Size (L x W)   | 6.7" x 6.7" (170mm x 170mm)                         |  |  |  |
| Weight         | 0.88lbs (0.4Kgs)                                    |  |  |  |
|                | Package Vibration Test                              |  |  |  |
|                | Reference IEC60068-2-64 Testing procedures          |  |  |  |
|                | Test Fh: Vibration broadband random Test            |  |  |  |
|                | 1. PSD: 0.026G <sup>2</sup> /Hz, 2.16 Grms          |  |  |  |
|                | 2. Non-operation mode                               |  |  |  |
|                | 3. Test Frequency: 5-500Hz                          |  |  |  |
|                | 4. Test Axis: X,Y and Z axis                        |  |  |  |
|                | 5. 30 min. per each axis                            |  |  |  |
|                | 6. IEC 60068-2-64 Test:Fh                           |  |  |  |
|                |   |  |  |  |
|                | Random Vibration Operation                          |  |  |  |
|                | Reference IEC60068-2-64 Testing procedures          |  |  |  |
|                | Test Fh : Vibration broadband random Test           |  |  |  |
|                | 1. PSD: 0.00454G²/Hz, 1.5 Grms                      |  |  |  |
| Vibration Test | 2. Operation mode                                   |  |  |  |
|                | 3. Test Frequency : 5-500Hz                         |  |  |  |
|                | 4. Test Axis : X,Y and Z axis                       |  |  |  |
|                | 5. 30 minutes per each axis                         |  |  |  |
|                | 6. IEC 60068-2-64 Test:Fh                           |  |  |  |
|                |   |  |  |  |
|                | Random Vibration Non Operation                      |  |  |  |
|                | Reference IEC60068-2-64 Testing procedures          |  |  |  |
|                | Test Fh : Vibration broadband random Test           |  |  |  |
|                | 1. PSD: 0.01818G²/Hz, 3.0 Grms                      |  |  |  |
|                | 2. Non Operation mode                               |  |  |  |
|                | 3. Test Frequency : 5-500Hz                         |  |  |  |
|                | 4. Test Axis : X.Y and Z axis                       |  |  |  |
|                | 5. 30 minutes per each axis                         |  |  |  |
|                | 6. IEC 60068-2-64 Test:Fh                           |  |  |  |
|                | Packing Drop  |  |  |  |
| Drop Test      | Reference ISTA 2A, Method : IEC-60068-2-32 Test: Ed |  |  |  |
|                | Drop Test   |  |  |  |

|                | 1 One corner , three edges, six faces                   |  |  |
|----------------|---|--|--|
|                | 2 ISTA 2A, IEC-60068-2-32 Test:Ed                       |  |  |
| OS Information | Windows 10 IoT Enterprise 2021 LTSC, Windows 10 (21H2), |  |  |
| 05 mormation   | Windows 11 (21H2) or later, Linux Kernel 5.17 or later  |  |  |



**Note:** Specifications are subject to change without notice.

#### 1.5 Architecture Overview—Block Diagram

The following block diagram shows the architecture and main components of EMX-RLUC.



# 2. Hardware Configuration

### 2.1 Product Overview



#### Note:

Before using the motherboard power, ensure the power pinout, cables, and voltage match to avoid equipment damage.

#### 2.2 Jumper and Connector List

You can configure your board to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch.

It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" a jumper you connect the pins with the clip. To "open" a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2, and 3. In this case, you would connect either two pins.



Closed

Closed 2-3

The jumper settings are schematically depicted in this manual as follows:

| Open | Closed | Closed 2-3         |
|------|--------|--------------------|
| 0 0  |        | 1 2 3<br>O <b></b> |

A pair of needle-nose pliers may be helpful when working with jumpers.

Connectors on the board are linked to external devices such as hard disk drives, a keyboard, or floppy drives. In addition, the board has a number of jumpers that allow you to configure your system to suit your application.

If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

The following tables list the function of each of the board's jumpers and connectors.

| Jumpers   |  |                            |
|-----------|--|----------------------------|
| Label     | Function                                 | Note                       |
| CLR_CMOS1 | Clear CMOS                               | 3 x 1 header, pitch 2.54mm |
| JC_LVDS1  | LVDS VDD Select Jumper                   | 3 x 2 header, pitch 2.54mm |
| JC_LVDS2  | LVDS Backlight PWM/CCFL<br>Select Jumper | 3 x 1 header, pitch 2.54mm |
| J_AT/ATX1 | AT/ATX Power Mode Select                 | 3 x 1 header, pitch 2.54mm |
| JP1/2     | COM5 RS232/RS485 Select<br>Jumper 1/2    | 3 x 2 header, pitch 2.54mm |
| JP3/4     | COM6 RS232/RS485 Select<br>Jumper 3/4    | 3 x 2 header, pitch 2.54mm |
|           |  |                            |

| Connectors |                              |      |
|------------|------------------------------|------|
| Label      | Function                     | Note |
| PJ1        | Line-out & Mic-in audio jack |      |

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| R_USB1/2/3     | 6 x USB3.2 Gen1 connector      |                             |
|----------------|--------------------------------|-----------------------------|
| DP++1          | DP connector                   |                             |
| M.2_KEYB_5G    | M.2 KEY-B 5G connector         |                             |
|                | M.2 KEY-M 2242/2280            |                             |
|                | connector                      |                             |
| M.2_KEYE_WLAN1 | M.2 KEY-E 2230 connector       |                             |
| HDMI1          | HDMI connector                 |                             |
| J_PRM1         | Power Debug Wafer              | 4 x 1 wafer, pitch 1.25mm   |
| LAN1/2         | 2 x RJ-45 Ethernet             |                             |
| DC_IN1         | 12V Power connector            |                             |
|                | DC 12V+5V Power Output         | 4 x 1 water pitch 2 50mm    |
|                | Wafer                          | 4 X T water, pitch 2.50mm   |
| J_DCIN3        | DC 12V Power Input Wafer       | 4 x 1 wafer, pitch 3.96mm   |
| SYS_FAN1       | SYS fan connector              | 4 x 1 wafer, pitch 2.54mm   |
| CPU_FAN1       | CPU fan connector              | 4 x 1 wafer, pitch 2.54mm   |
| J_COM1/2/3/4   | Serial port 1/2/3/4 connector  | 9 x 1 wafer, pitch 1.25mm   |
| J_COM5/6       | Serial port 5/6 connector      | 3 x 1 wafer, pitch 2.00mm   |
| J_SPK1         | Amplifier Wafer                | 4 x 1 wafer, pitch 2.00mm   |
| F_USB1         | USB2.0 connector               | 5 x 2 wafer, pitch 2.00mm   |
| SATA1          | Serial ATA connector           |                             |
| P_SATA1        | SATA power connector           | 4 x 1 wafer, pitch 2.00mm   |
| DIMM1/2        | DDR4 SODIMM socket             |                             |
| LVDS1/EDP1     | LVDS/eDP Signal Header         | 15 x 2 header, pitch 2.00mm |
| LVDS_P1        | LVDS Backlight Control Wafer   | 6 x 1 wafer, pitch 2.00mm   |
| J_ESPI1        | ESPI Debug Header              | 6 x 2 header, pitch 2.00mm  |
| J_SIM1         | SIM card slot                  | 6 x 1 wafer, pitch 1.25mm   |
| J_GPIO1        | GPIO Wafer                     | 5 x 2 wafer, pitch 2.00mm   |
| F_PANEL1       | Front Panel Wafer              | 4 x 2 wafer, pitch 2.00mm   |
| J_BAT1         | Battery connector              | 2 x 1 wafer, pitch 1.25mm   |
| PCIE_8X_SLOT1  | PCI-E 8x Slot (PCIE x4 Signal) |                             |



2.3.1 Clear CMOS (CLR\_CMOS1)







| 1 | 3 |
|---|---|
|   |   |

\* Default

#### 2.3.2 LVDS VDD Select Jumper (JC\_LVDS1)



+3.3V\*



**D** 5

0 1

+12V



\* Default



### 2.3.3 LVDS Backlight PWM/CCFL Select Jumper (JC\_LVDS2)



\* Default

#### 2.3.4 AT/ATX Power Mode Select (J\_AT/ATX1)



ATX\*

\* Default

#### 2.3.5 COM5 RS232/RS485 Select Jumper 1/2 (JP1/JP2)



**RS232\*** 



| J | 21 |   |
|---|----|---|
|   |    | 5 |
|   |    |   |
|   |    | 1 |

**RS485** 





\* Default

#### 2.3.6 COM6 RS232/RS485 Select Jumper 3/4 (JP3/JP4)

RS232\*





**RS485** 



\* Default







| Signal    | PIN |
|-----------|-----|
| GND       | 1   |
| IMVP_PE   | 2   |
| VCCIN_SCL | 3   |
| VCCIN_SDA | 4   |

## 2.3.8 SYS fan connector (SYS\_FAN1)





| Signal  | PIN |
|---------|-----|
| GND     | 1   |
| +12V    | 2   |
| FANTAC2 | 3   |
| FANCTL2 | 4   |

### EMX-RLUC User's Manual 2.3.9 CPU fan connector (CPU\_FAN1)





| Signal  | PIN |
|---------|-----|
| GND     | 1   |
| +12V    | 2   |
| FANTAC1 | 3   |
| FANCTL1 | 4   |

2.3.10 Serial port 1 connector (J\_COM1)





| Signal | PIN | RS232_PIN | RS232 Signal |
|--------|-----|-----------|--------------|
| DCD#   | 1   | 1         | DCD#         |
| DSR#   | 2   | 6         | DSR#         |
| RXD    | 3   | 2         | RXD          |
| RTS#   | 4   | 7         | RTS#         |
| TXD    | 5   | 3         | TXD          |
| CTS#   | 6   | 8         | CTS#         |
| DTR#   | 7   | 4         | DTR#         |
| RI#    | 8   | 9         | RI#          |
| GND    | 9   | 5         | GND          |

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# 2.3.11 Serial port 2 connector (J\_COM2)





| Signal | PIN | RS232_PIN | RS232 Signal |
|--------|-----|-----------|--------------|
| DCD#   | 1   | 1         | DCD#         |
| DSR#   | 2   | 6         | DSR#         |
| RXD    | 3   | 2         | RXD          |
| RTS#   | 4   | 7         | RTS#         |
| TXD    | 5   | 3         | TXD          |
| CTS#   | 6   | 8         | CTS#         |
| DTR#   | 7   | 4         | DTR#         |
| RI#    | 8   | 9         | RI#          |
| GND    | 9   | 5         | GND          |

## 2.3.12 Serial port 3 connector (J\_COM3)





| Signal | PIN | RS232_PIN | RS232 Signal |
|--------|-----|-----------|--------------|
| DCD#   | 1   | 1         | DCD#         |
| DSR#   | 2   | 6         | DSR#         |
| RXD    | 3   | 2         | RXD          |
| RTS#   | 4   | 7         | RTS#         |
| TXD    | 5   | 3         | TXD          |
| CTS#   | 6   | 8         | CTS#         |
| DTR#   | 7   | 4         | DTR#         |
| RI#    | 8   | 9         | RI#          |
| GND    | 9   | 5         | GND          |

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### EMX-RLUC User's Manual 2.3.13 Serial port 4 connector (J\_COM4)





| Signal | PIN | RS232_PIN | RS232 Signal |
|--------|-----|-----------|--------------|
| DCD#   | 1   | 1         | DCD#         |
| DSR#   | 2   | 6         | DSR#         |
| RXD    | 3   | 2         | RXD          |
| RTS#   | 4   | 7         | RTS#         |
| TXD    | 5   | 3         | TXD          |
| CTS#   | 6   | 8         | CTS#         |
| DTR#   | 7   | 4         | DTR#         |
| RI#    | 8   | 9         | RI#          |
| GND    | 9   | 5         | GND          |

## 2.3.14 Serial port 5 connector (J\_COM5)





| RS232  |     |  |  |
|--------|-----|--|--|
| Signal | PIN |  |  |
| GND    | 3   |  |  |
| TXD    | 2   |  |  |
| RXD    | 1   |  |  |

|   | К  | S | 4        | 8 | D |  |
|---|----|---|----------|---|---|--|
| c | ia | n | <u>л</u> |   |   |  |

| Signal | PIN |  |
|--------|-----|--|
| GND    | 3   |  |
| RS485- | 2   |  |
| RS485+ | 1   |  |


## 2.3.15 Serial port 6 connector (J\_COM6)



RS232 Signal PIN GND 3 TXD 2

1

| R   | S | 4 | 8 | 5 |
|-----|---|---|---|---|
| ••• | - | - | v | v |

RXD

| Signal | PIN |
|--------|-----|
| GND    | 3   |
| RS485- | 2   |
| RS485+ | 1   |

2.3.16 Amplifier Wafer (J\_SPK1)





| Signal     | PIN |
|------------|-----|
| SPK_OUT_R+ | 4   |
| SPK_OUT_R- | 3   |
| SPK_OUT_L+ | 2   |
| SPK_OUT_L- | 1   |

#### **EMX-RLUC User's Manual**

## 2.3.17 USB2.0 connector (F\_USB1)





| Signal | PIN | PIN | Signal |
|--------|-----|-----|--------|
| GND    | 9   | 10  | GND    |
| GND    | 7   | 8   | GND    |
| DATA+  | 5   | 6   | DATA+  |
| DATA-  | 3   | 4   | DATA-  |
| +5V    | 1   | 2   | +5V    |

## 2.3.18 SATA Power connector (P\_SATA1)





| Signal | PIN |
|--------|-----|
| +12V   | 1   |
| GND    | 2   |
| GND    | 3   |
| +5V    | 4   |

#### Note:

Before using the motherboard power, ensure the power pinout, cables, and voltage match to avoid equipment damage.

## 2.3.19 ESPI Debug Header (J\_ESPI1)



|  | 11 |
|--|----|
|  |    |
|  |    |
|  |    |
|  |    |
|  | 1  |

| Signal       | PIN | PIN | Signal        |
|--------------|-----|-----|---------------|
| ESPI_RST0_N  | 12  | 11  | ESPI_ALERT0_N |
| +3.3V        | 10  | 9   | ESPI_CS0_N    |
| GND          | 8   | 7   | ESPI_IO3_SIO  |
| ESPI_CLK_SIO | 6   | 5   | ESPI_IO2_SIO  |
|              |     | 3   | ESPI_IO1_SIO  |
| +3.3V        | 2   | 1   | ESPI_IO0_SIO  |

# 2.3.20 DC Power Output Wafer (DC\_OUT1)



| Г |  |
|---|--|
|   |  |
| ſ |  |
|   |  |
| 1 |  |
| L |  |

| Signal | PIN |
|--------|-----|
| +5V    | 4   |
| GND    | 3   |
| GND    | 2   |
| +12V   | 1   |

#### Note:

The maximum supply current for DC\_OUT1 pin 1 and pin 4 is 5A per pin.

## EMX-RLUC User's Manual 2.3.21 LVDS Backlight Control Wafer (LVDS\_P1)





| Signal        | PIN |
|---------------|-----|
| +12V          | 6   |
| +12V          | 5   |
| LVDS _BKLT_EN | 4   |
| LVDS_BKLTCTL  | 3   |
| GND           | 2   |
| GND           | 1   |

#### Note:

The maximum supply current for LVDS\_P1 pin 5 and pin 6 is 2A per pin.

#### 2.3.22 SIM card slot (J\_SIM1)





| Signal   | PIN |
|----------|-----|
| UIM1_VPP | 6   |
| UIM1_RST | 5   |
| UIM1_CLK | 4   |
| GND      | 3   |
| UIM1_DAT | 2   |
| UIM1_PWR | 1   |

#### Note:

- 1. UIM1\_PWR: Module power supply, dependent on the specific 4G module
- 2. UIM1\_VPP: Module power supply, dependent on the specific 4G module..

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## 2.3.23 GPIO Wafer (J\_GPIO1)





| Signal    | PIN | PIN | Signal    |
|-----------|-----|-----|-----------|
| GND       | 9   | 10  | +5V       |
| SIO_GPO76 | 7   | 8   | SIO_GPI77 |
| SIO_GPO74 | 5   | 6   | SIO_GPI75 |
| SIO_GPO73 | 3   | 4   | SIO_GPI72 |
| SIO_GPO71 | 1   | 2   | SIO_GPI70 |

# 2.3.24 Front Panel Wafer (F\_PANEL1)



|   | _   |   |
|---|-----|---|
|   | 1 - | - |
|   |     | - |
|   |     |   |
| 1 |     |   |
|   |     | _ |

| Description | Signal   | PIN | PIN | Signal   | Description |
|-------------|----------|-----|-----|----------|-------------|
| Power       | PWR-     | 7   | 8   | RESET+   | Reset       |
| button      | PWR+     | 5   | 6   | RESET-   | button      |
|             | PWR LED- | 3   | 4   | HDD_LED- |             |
| PVVK LED    | PWR LED+ | 1   | 2   | HDD_LED+ | ΠΟΟ ΓΕΟ     |

#### **EMX-RLUC User's Manual**

## 2.3.25 Battery connector (J\_BAT1)





| Signal  | PIN |
|---------|-----|
| VCC_BAT | 1   |
| GND     | 2   |

2.3.26 DC 12V Power Input Wafer (J\_DCIN3)





| Signal | PIN |
|--------|-----|
| VCC_IN | 1   |
| VCC_IN | 2   |
| GND    | 3   |
| GND    | 4   |



# 2.3.27 LVDS Signal Header (LVDS1)

| Signal      | PIN | PIN | Signal      |
|-------------|-----|-----|-------------|
| VDD_PANEL   | 1   | 2   | VDD_PANEL   |
| VDD_PANEL   | 3   | 4   | N/A         |
| LVDS_PRSNT# | 5   | 6   | LVDS_PRSNT# |
| LVDS_DA_N0  | 7   | 8   | LVDS_DA_P0  |
| LVDS_DA_N1  | 9   | 10  | LVDS_DA_P1  |
| LVDS_DA_N2  | 11  | 12  | LVDS_DA_P2  |
| GND         | 13  | 14  | GND         |
| LVDS_CLKA_N | 15  | 16  | LVDS_CLKA_P |
| LVDS_DA_N3  | 17  | 18  | LVDS_DA_P3  |
| LVDS_DB_N0  | 19  | 20  | LVDS_DB_P0  |
| LVDS_DB_N1  | 21  | 22  | LVDS_DB_P1  |
| LVDS_DB_N2  | 23  | 24  | LVDS_DB_P2  |
| GND         | 25  | 26  | GND         |
| LVDS_CLKB_N | 27  | 28  | LVDS_CLKB_P |
| LVDS_DB_N3  | 29  | 30  | LVDS_DB_P3  |

### Note:

VDD\_PANEL is +3.3V by default, +5V/+12V is selectable by  $Jumper(JC\_LVDS1)$ 

| 3. | Drivers | Instal | lation |
|----|---------|--------|--------|
| -  |         |        |        |

All the drivers are available on Avalue Downloads Area (<u>https://www.avalue.com/en/support/download</u>). Type the model name and press Enter to find all the relevant software, utilities, and documentation.

|     |                     | Chipset 1                                   | Audio 1                           | Graphics 1                  | LAN 1              | Other 1        |                            |
|-----|---------------------|---|-----------------------------------|-----------------------------|--------------------|----------------|----------------------------|
| Chi | pset                |   |                                   |                             |                    |                | Total <mark>1</mark> Files |
| No. | Release Date        | Title                                       | Description                       |                             |                    |                | Download                   |
| 01  | 2023-09-20          | Intel Chipset<br>Driver for Win10<br>x64    | Windows 1                         | 0 64bit                     |                    |                |                            |
| Aud | dio                 |   |                                   |                             |                    |                | Total <b>1</b> Files       |
| No. | Release Date        | Title                                       | Description                       |                             |                    |                | Download                   |
| 01  | 2023-09-20          | Realtek Audio<br>Driver for Win10<br>x64    | Windows 1                         | 0 64bit                     |                    |                |                            |
|     | }                   |   | (For re                           | ference or                  | nly)               |                |                            |
|     | Note: Ir<br>fo<br>s | nstallation p<br>or your refe<br>hown on yo | procedur<br>erence a<br>pur scree | es and sc<br>and may<br>en. | reen she<br>not be | ots in this se | ection are<br>same as      |

# 3.1 Install Chipset Driver

All drivers can be found on the Avalue

Official Website:

#### www.avalue.com.



Note: The installation procedures and screen shots in this section are based on Windows 11 operation system.



#### Step 3. Click Install.



| Intel(R) Chipset Device Software<br>Completion   | (intel)       |
|--|---------------|
| You have successfully installed the following product:<br>Intel(R) Chipset Device Software |               |
| You must restart this computer for the changes to take effect.                             |               |
|  |               |
|  |               |
| View Log Files   |               |
| Restart Now  | Restart Later |

#### Step1. Click Next.



Step 2. Click Accept.

Step 4. Click Finish to complete setup.

# EMX-RLUC User's Manual 3.2 Install VGA Driver

All drivers can be found on the Avalue Official Website:

#### www.avalue.com.



**Note:** The installation procedures and screen shots in this section are based on Windows 11 operation system.

| intel. <sub>Gra</sub> | phics Driver Installer   |
|-----------------------|--|
| Pre-Install           | The installer will install the following components:<br>- Intel® Graphics Driver<br>- Intel® Are" Control<br>- Intel® Are" Control |
| Setup                 |  |
| Install               |  |
| Done!                 |  |
|                       | Customize Start >  |
| ● O 500               | urah 💼 🐂 🔜 🛷 🔥 🖓 11:04 PM 😝 💏  |

Step 3. Click Accept.



Step 1. Click Begin installation.



Step 2. Click I agree.



Step 4. Click Finish to complete setup.

#### User's Manual

#### 3.3 Install ME Driver

All drivers can be found on the Avalue Official Website:

#### www.avalue.com.



**Note:** The installation procedures and screen shots in this section are based on Windows 11 operation system.



#### Step 3. Click Next.



#### Step 1. Click Next to continue installation.



Step 2. Click Next.



Step 4. Click Finish to complete setup.

# EMX-RLUC User's Manual 3.4 Install Audio Driver

All drivers can be found on the Avalue Official Website:

#### www.avalue.com.



**Note:** The installation procedures and screen shots in this section are based on Windows 11 operation system.



#### Step 1. Click Next.



Step 2. Click Finish to complete setup.

# 3.5 Install Serial IO Driver

All drivers can be found on the Avalue Official Website:

#### www.avalue.com.



**Note:** The installation procedures and screen shots in this section are based on Windows 11 operation system.



#### Step 1. Click Next to continue installation.



Step 2. Click Next.

| ntel® Serial IO   |   |                         |
|---|---|-------------------------|
| Readme File Information   |   | Intel                   |
| *****   | *****   | ******                  |
|   |   |                         |
| * Production Version Release  |   |                         |
| *   |   |                         |
| * Microsoft Windows* 11 64 bit  |   |                         |
| *   |   |                         |
| *<br>   |   |                         |
| * Intel(R) Serial IO Driver   |   |                         |
| *   |   |                         |
| * NOTE: This document refers to systems con<br>* following Intel processors/chipsets:<br>*                | taining the                                       |                         |
| <ul> <li>Intel(R) 600 Series Chipset Family Pla</li> <li>Intel(R) 600 Series Chipset Family Or</li> </ul> | atform Controller Hub (P<br>Package Platform Cont | CH)<br>roller Hub (PCH) |
| * Installation Information  |   |                         |
|   |   |                         |
| * This document makes references to products  | s developed by                                    |                         |

#### Step 3. Click Next.

| Setup  |              | ×      |
|--|--------------|--------|
| Intel® Serial IO<br>Confirmation                   | (inte        |        |
| You are about to install the following components: |              |        |
| - Intel® Serial IO I2C Driver                      |              |        |
|  |              |        |
|  |              |        |
|  |              |        |
|  |              |        |
|  |              |        |
|  |              |        |
|  |              |        |
| Intel Corporation                                  | Rade Novet > | Consel |

#### Step 4. Click Next.

| ntel()<br>Comp | ® Serial IO<br>letion  |            | (intel | ) |
|----------------|--|------------|--------|---|
|                | You have successfully installed the following Intel® Serial IO 30.100.2148.1 | g product: |        |   |
| Click 6        | eres to open log file location.  |            |        |   |

Step 5. Click Finish to complete setup.

## EMX-RLUC User's Manual 3.6 Install Ethernet Driver

All drivers can be found on the Avalue Official Website:

www.avalue.com.



| 3   |          |  |
|---|----------|--|
| stall or update drivers for Intel® Network Conn | ections. |  |
|   |          |  |
| (   |          |  |
| OK  | Cancel   |  |

## Step 1. Click OK.

| Installing Drivers         |  |  |
|----------------------------|--|--|
| Drivers for Intel® Network | Connections were successfully installed. |  |
|                            |  |  |
|                            | Close                                    |  |

Step 2. Setup completed.

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# 3.7 Install Intel\_iSST Driver

All drivers can be found on the Avalue Official Website:

#### www.avalue.com.

Ø

**Note:** The installation procedures and screen shots in this section are based on Windows 11 operation system.

| Device Manager                                   | - | × |
|--|---|---|
| le <u>A</u> ction <u>V</u> iew <u>H</u> elp      |   |   |
| • 🔿   🗃   🔛   📾   🕮   🖳 💺 🏵                      |   |   |
| 🗸 🏣 System devices                               |   |   |
| To ACPI Fan                                      |   |   |
| 🏣 ACPI Fan                                       |   |   |
| 🏣 ACPI Fan                                       |   |   |
| 🏣 ACPI Fan                                       |   |   |
| To ACPI Fan                                      |   |   |
| Tan ACPI Fixed Feature Button                    |   |   |
| To ACPI Power Button                             |   |   |
| E ACPI Processor Aggregator                      |   |   |
| To ACPI Thermal Zone                             |   |   |
| 🏣 ACPI Wake Alarm                                |   |   |
| to Composite Bus Enumerator                      |   |   |
| T High Definition Audio Controller               |   |   |
| The High precision event timer                   |   |   |
| to Intel(R) Host Bridge/DRAM Registers - 4601    |   |   |
| Intel(R) LPC Controller - 5182                   |   |   |
| to Intel(R) Management Engine Interface #1       |   |   |
| intel(R) PCI Express Root Port #6 - 51BD         |   |   |
| Intel(R) PCI Express Root Port #8 - 51BF         |   |   |
| te Intel(R) PEG60 - 464D                         |   |   |
| To Intel(R) PEG62 - 463D                         |   |   |
| time Intel(R) Power Engine Plug-in               |   |   |
| to Intel(R) Serial IO I2C Host Controller - 51E8 |   |   |
| Intel(R) Shared SRAM - 51EF                      |   |   |
| intel(R) SMBus - 51A3                            |   |   |
| Intel(R) SPI (flach) Controller - 51Δ4           |   |   |

# Step 1. Click High Definition Audio Controller.



Step 2. Click Browes my computer for drivers.

|     | Browse for drivers on your computer   |
|-----|---|
| 100 | Search for drivers in this location:  |
|     | C:\Users\EMX-ALUC\Documents   |
|     | → Let me pick from a list of available drivers on my computer<br>This list will show available drivers compatible with the device, and all drivers in the<br>same category as the device. |
|     |   |

Step 3. Click Next.

|   | ×  | < |
|---|--|---|
| ~ | ☐ Update Drivers - Intel® Smart Sound Technology BUS         |   |
|   | Windows has successfully updated your drivers                |   |
|   | Windows has finished installing the drivers for this device: |   |
|   | Intel® Smart Sound Technology BUS                            |   |
|   |  |   |
|   |  |   |
|   |  |   |
|   |  |   |
|   | Close  |   |
| L |  | 1 |

Step 4. Setup completed.



#### 4.1 Introduction

The BIOS setup program allows users to modify the basic system configuration. In this following chapter will describe how to access the BIOS setup program and the configuration options that may be changed.

#### 4.2 Starting Setup

AMI BIOS<sup>™</sup> is immediately activated when you first power on the computer. The BIOS reads the system information contained in the NVRAM and begins the process of checking out the system and configuring it. When it finishes, the BIOS will seek an operating system on one of the disks and then launch and turn control over to the operating system.

While the BIOS is in control, the Setup program can be activated in one of two ways: By pressing <ESC> or <Del> immediately after switching the system on, or By pressing the < ESC> or <Del> key when the following message appears briefly at the left-top of the screen during the POST (Power On Self Test).

#### Press <ESC> or <Del> to enter SETUP

If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the "RESET" button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

## 4.3 Using Setup

In general, you use the arrow keys to highlight items, press <Enter> to select, use the PageUp and PageDown keys to change entries, press <F1> for help and press <Esc> to quit. The following table provides more detail about how to navigate in the Setup program using the keyboard.

| Button        | Description  |
|---------------|--|
| ↑             | Move to previous item  |
| $\downarrow$  | Move to next item  |
| <i>←</i>      | Move to the item in the left hand  |
| $\rightarrow$ | Move to the item in the right hand   |
| Esc key       | Main Menu Quit and not save changes into NVRAM<br>Status Page Setup Menu and Option Page Setup Menu Exit current page and<br>return to Main Menu |
| + key         | Increase the numeric value or make changes   |
| - key         | Decrease the numeric value or make changes   |
| F1 key        | General help, only for Status Page Setup Menu and Option Page Setup Menu   |
| F2 key        | Previous Values  |
| F3 key        | Optimized defaults   |
| F4 key        | Save & Exit Setup  |

#### • Navigating Through The Menu Bar

Use the left and right arrow keys to choose the menu you want to be in.

Note: Some of the navigation keys differ from one screen to another.

#### • To Display a Sub Menu

Use the arrow keys to move the cursor to the sub menu you want. Then press <Enter>. A " $\geq$ " pointer marks all sub menus.

#### 4.4 Getting Help

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window press <Esc> or the <Enter> key again.

#### 4.5 In Case of Problems

If, after making and saving system changes with Setup, you discover that your computer no longer is able to boot, the AMI BIOS supports an override to the NVRAM settings which resets your system to its defaults.

The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both BIOS Vendor and your systems manufacturer to provide the absolute maximum performance and reliability. Even a seemingly small change to the chipset setup has the potential for causing you to use the override.

#### EMX-RLUC User's Manual 4.6 BIOS setup

Once you enter the Aptio Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from several setup functions and exit choices. Use the arrow keys to select among the items and press <Enter> to accept and enter the sub-menu.

## 4.6.1 Main Menu

This section allows you to record some basic hardware configurations in your computer and set the system clock.

| Main Advanced Chipset Securit                           | Aptio Setup – AMI<br>y Boot Save & Exit MEBx    |   |
|---|---|---|
| BIOS Information<br>BIOS Version<br>Build Date and Time | EMXRLUCB01<br>02/07/2025 09:45:05               | Set the Date. Use Tab to<br>switch between Date elements.<br>Default Ranges:<br>Year: 1998–9999<br>Months: 1–12<br>Days: Dependent on month<br>Range of Years may vary.                 |
| System Date<br>System Time<br>Access Level              | [Fri 02/07/2025]<br>[13:15:05]<br>Administrator |   |
|   |   | <pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt, F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit F12: Print Screen ESC: Exit</pre> |
| Versio  | n 2.22.1289 Copyright (C) 2029                  | 5 AMI   |

#### 4.6.1.1 System Date

Use the system date option to set the system date. Manually enter the Month, day and year.

## 4.6.1.2 System Time

Use the system time option to set the system time. Manually enter the hours, minutes and seconds.



**Note:** The BIOS setup screens shown in this chapter are for reference purposes only, and may not exactly match what you see on your screen. Visit the Avalue website (<u>www.avalue.com</u>) to download the latest product and BIOS information.

### 4.6.2 Advanced Menu

This section allows you to configure your CPU and other system devices for basic operation through the following sub-menus.

| Aptio Setup – AMI<br>Main <mark>Advanced</mark> Chipset Security Boot Save & Exit MEBx   |                                  |
|--|----------------------------------|
| <ul> <li>CPU Configuration</li> <li>PCH-FW Configuration</li> <li>Trusted Computing</li> <li>ACPI Settings</li> <li>Super ID Configuration</li> <li>Hardware Monitor</li> <li>Display Configuration</li> <li>Power Control</li> <li>SS RTC Wake Settings</li> <li>USB Configuration</li> <li>Network Stack Configuration</li> <li>NVMe Configuration</li> <li>Intel(R) I210 Gigabit Network Connection - 68:ED:A4:78:18:4E</li> <li>Intel(R) Ethernet Connection (16) I219-LM - 68:ED:A4:78:18:4D</li> </ul> | CPU Configuration Parameters<br> |
| Version 2.22.1289 Copyright (C) 2025   | 6 AMI                            |

## 4.6.2.1 CPU Configuration

Use the CPU configuration menu to view detailed CPU specification and configure the CPU.

| Advanced  | Aptio Setup — AMI   |   |
|---|---|---|
| CPU Configuration   |   | Displays the E-core Information   |
| <ul> <li>Efficient-core Information</li> <li>Performance-core Information</li> </ul>  |   |   |
| ID<br>Brand String<br>VMX<br>SMX/TXT<br>TXT Crash Code<br>TXT SPAD<br>Boot Guard Status<br>Boot Guard ACM Policy Status<br>Boot Guard SACM Information                          | 0x906A4<br>12th Gen Intel(R)<br>Core(TM) i5-1235U<br>Supported<br>Supported<br>0x000000000000000000<br>0x00000000000000 | ++: Select Screen<br>11: Select Item  |
| Turbo Mode<br>Intel (VMX) Virtualization<br>Technology<br>C states<br>Intel(R) SpeedStep(tm)<br>Intel(R) Speed Shift Technology<br>Hyper-Threading<br>Config TDP Configurations | [Enabled]<br>[Enabled]<br>[Disabled]<br>[Enabled]<br>[Enabled]<br>[Enabled]   | Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit |
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| Item                        | Options           | Description                                    |
|-----------------------------|-------------------|--|
| Turbo Modo                  | Enabled[Default], | Enable/Disable processor Turbo Mode (requires  |
|                             | Disabled          | EMTTM enabled too). AUTO means enabled.        |
| Intel (VMX) Virtualization  | Disabled          | When enabled, a VMM can utilize the additional |
| Technology Enabled[Default] |                   | hardware capabilities provided by Vanderpool   |

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| Technology.                   |  | Technology.  |
|-------------------------------|--|--|
| C States                      | Enabled                                | Enable/Disable CPU Power Management. Allows          |
| C States                      | Disabled[Default],                     | CPU to go to C states when it's not 100% utilized.   |
| Intel® SpeedStep™             | Enabled[Default],                      | Allows more than two frequency ranges to be          |
|                               | Disabled                               | supported.   |
|                               | Enabled <b>[Default]</b> ,<br>Disabled | Eanble/Disable Intel® Speed Shift Technology         |
| Intel® Speed Shift Technology |  | support. Enabling will expose the CPPC v2            |
|                               |  | interface to allow for hardware controlled P-states. |
| Hyper-Threading               | Disabled,                              | Enable or Disable Hyper-Threading Technology         |
| ingper-intreading             | Enabled[Default]                       |  |

# 4.6.2.1.1 Efficient-core Information

| Advanced  | Aptio Setup – AMI                              |   |
|---|--|---|
| Efficient-core Information                                    |  |   |
| L1 Data Cache<br>L1 Instruction Cache<br>L2 Cache<br>L3 Cache | 32 KB × 8<br>64 KB × 8<br>2048 KB × 2<br>12 MB | ++: Select Screen<br>14: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit |
| Version 2   | .22.1289 Copyright (C) 2025                    | AMI   |

## 4.6.2.1.2 Performance-core Information

| Advanced  | Aptio Setup – AMI                              |   |
|---|--|---|
| Performance-core Information                                  |  |   |
| L1 Data Cache<br>L1 Instruction Cache<br>L2 Cache<br>L3 Cache | 48 KB x 2<br>32 KB x 2<br>1280 KB x 2<br>12 MB | ++: Select Screen<br>11: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit |
| Version 2   | 2.22.1289 Copyright (C) 2025                   | AMI   |

# 4.6.2.1.3 Config TDP Configurations

| Advanced                                 | Aptio Setup – AMI                    |   |  |
|--|--------------------------------------|---|--|
| Config TDP Configurations                | i i                                  | Applies Configurable Processor<br>Base Power (cTDP) |  |
| Enable Configurable TDP                  | [Applies to cTDP]                    | initialization settings based                       |  |
| Configurable TDP Lock                    | [Nominal]<br>[Disabled]              | is 1: Applies to cTDP: if 0                         |  |
| CTDP BIOS control                        | [Disabled]                           | then applies non-cTDP and BIOS                      |  |
| ConfigTDP Levels                         | 2                                    | will bypass cTDP initialzation                      |  |
| ConfigTDP Turbo Activation Ratio         | 12 (Unlocked)                        | flow  |  |
| Power Limit 2                            | 15.0W (MSR:15.0)<br>55.0W (MSR:55.0) |   |  |
| 10001 EIMIC 2                            | 33.0M (Hall:33.07                    |   |  |
| Custom Settings Nominal                  |                                      |   |  |
| ConfigTDP Nominal                        | Ratio:13 TAR:12                      |   |  |
| Rowon Limit 1                            | PL1:15.0W                            | ++: Select Screen                                   |  |
| Power Limit 2                            | 0                                    | Fnter: Select                                       |  |
| Power Limit 1 Time Window                | [0]                                  | +/-: Change Opt.                                    |  |
| ConfigTDP Turbo Activation Ratio         | 0                                    | F1: General Help                                    |  |
|  |                                      | F2: Previous Values                                 |  |
| Custom Settings Leveli                   | DetionOF TAD.04                      | F3: Uptimized Defaults                              |  |
| CONTIGIDE LEVELI                         | PL1:28 OW                            | F4: Save & EXIL<br>F12: Print Screen                |  |
| Power Limit 1                            | 0                                    | ESC: Exit   |  |
| Power Limit 2                            | 0                                    |   |  |
| Power Limit 1 Time Window                | [0]                                  |   |  |
|  |                                      |   |  |
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| Item                       | Options   | Description  |
|----------------------------|---|--|
| Enable Configurable TDP    | Applies to non-cTDP<br>Applies to cTDP <b>[Default]</b> , | Applies Configurable Processor Base Power<br>(cTDP) initialization settings based on<br>non-cTDP or cTDP. Default is 1: Applies to<br>cTDP; if 0 then applies non-cTDP and BIOS<br>will bypass cTDP initialization flow.   |
| Configurable TDP Boot Mode | Nominal <b>[Default]</b><br>Level1<br>Deactivate          | Configurable Processor Base Power (cTDP)<br>Mode as Nominal/Level1/Level2/Deactivate<br>TDP selection. Deactivate option will set<br>MSR to Nominal and MMIO to Zero.  |
| Configurable TDP Lock      | Enabled<br>Disabled <b>[Default]</b> ,                    | Configurable Processor Base Power (cTDP)<br>Mode Lock bits on<br>TURBO_ACTIVATION_RATIO and<br>CONFIG_TDP_CONTROL.<br>Note: When CTDP Lock is enabled Custom<br>ConfigTDP Count will be forced to 1 and<br>Custom ConfigTDP Boot Index will be forced<br>to 0.   |
| CTDP BIOS control          | Enabled<br>Disabled <b>[Default]</b> ,                    | Enables Configurable Processor Base<br>Power (cTDP) control via runtime ACPI<br>BIOS methods. This "BIOS only" feature<br>does not require EC or driver support.   |
| Power Limit 1/2            | 0   | Power Limit 1/2 in Milli Watts. BIOS will<br>round to the nearest 1/8W when<br>programming. 0= no custom override. For<br>12.50w, enter 12500. Overclocking SKU:<br>Value must be between Max and Min Power<br>Limits (specified by<br>PACKAGE_POWER_SKU_MSR). Other<br>SKUs: This value must be between Min<br>Power Limit and Processor Base Power |

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|                                     |   | (TDP) Limit.  |
|-------------------------------------|---|---|
| Power Limit 1 Time Window           | 0 | Power Limit 1 Time Window value in<br>seconds. The value may vary from 0 to<br>128.0= default value (28sec for Mobile and 8<br>sec for Desktop). Defines time window which<br>Processor Base Power (TDP) value should<br>be maintained. |
| ConfigTDP Turbo Activation<br>Ratio | 0 | Custom value for Turbo Activation Ration.<br>Needs to be configured with valid values<br>from LFM to Max Turbo. 0 means don't use<br>custom value.  |

# 4.6.2.2 PCH-FW Configuration

| ME Firmware Version       16.1.25.2101         ME Firmware Mode       Normal Mode         ME Firmware SKU       Corporate SKU         ##: Sele       11: Sele         I1: Sele       Enter: S         #: Corporate SKU       Firmware SKU | ct Screen<br>ct Item<br>elect<br>nge Opt.<br>ral Help<br>ious Values<br>mized Defaults<br>& Exit<br>t Screen<br>t |
|---|---|

# 4.6.2.3 Trusted Computing

| Advanced   | Aptio Setup – AMI                       |  |
|--|---|--|
| TPM 2.0 Device Found   | 600-18                                  | Enables or Disables BIOS   |
| Vendor:  | INTC                                    | 0.S. will not show Security<br>Device. TCG EFI protocol and      |
| Security Device Support<br>Active PCR banks<br>Available PCR banks | [Enable]<br>SHA256<br>SHA256,SHA384,SM3 | INT1A interface will not be<br>available.                        |
|  |   |  |
|  |   |  |
|  |   | ++: Select Screen<br>14: Select Item<br>Enter: Select            |
|  |   | +/-: Change Opt.<br>F1: General Help                             |
|  |   | F2: Previous values<br>F3: Optimized Defaults<br>F4: Save & Exit |
|  |   | F12: Print Screen<br>ESC: Exit                                   |
|  |   |  |
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| Item                    | Options                             | Description   |
|-------------------------|-------------------------------------|---|
| Security Device Support | Disable,<br>Enable <b>[Default]</b> | Enables or Disables BIOS support for security device.<br>O.S. will not show Security Device. TCG EFI protocol<br>and INT1A interface will not be available. |

# 4.6.2.4 ACPI Settings

| ACPI Settings                          |                                    | Enables or Disables System<br>ability to Hibernate (OS/S4<br>Sleen State), This option may                             |
|--|------------------------------------|--|
| Enable Hibernation<br>ACPI Sleep State | [Enabled]<br>[S3 (Suspend to RAM)] | not be effective with some operating systems.  |
|  |                                    | ++: Select Screen<br>fl: Select Item<br>Ente: Select<br>+/-: Change Ont  |
|  |                                    | F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit |
|  |                                    |  |

| ltem               | Options   | Description   |
|--------------------|---|---|
| Enable Hibernation | Disabled<br>Enabled <b>[Default]</b> ,                    | Enables or Disables System ability to<br>Hibernate (OS/S4 Sleep State). This option<br>may not be effective with some OS. |
| ACPI Sleep State   | Suspend Disabled,<br>S3 (Suspend to RAM) <b>[Default]</b> | Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.                             |

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## 4.6.2.5 Super IO Configuration

You can use this item to set up or change the Super IO configuration for serial ports. Please refer to  $4.6.2.5.1 \sim 4.6.2.5.6$  for more information.

| Advanced   | Aptio Setup – AMI   |
|--|---|
| Super IO Configuration<br>Super IO Chip<br>> Serial Port 1 Configuration<br>> Serial Port 2 Configuration<br>> Serial Port 3 Configuration<br>> Serial Port 4 Configuration<br>> Serial Port 5 Configuration | Set Parameters of Serial Port 1   |
| ▶ Serial Port 6 Configuration  | <br>≁+: Select Screen<br>↑↓: Select Item  |
|  | Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit |
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| Item                        | Description                             |
|-----------------------------|---|
| Serial Port 1 Configuration | Set Parameters of Serial Port 1 (COM1). |
| Serial Port 2 Configuration | Set Parameters of Serial Port 2 (COM2). |
| Serial Port 3 Configuration | Set Parameters of Serial Port 3 (COM3). |
| Serial Port 4 Configuration | Set Parameters of Serial Port 4 (COM4). |
| Serial Port 5 Configuration | Set Parameters of Serial Port 5 (COM5). |
| Serial Port 6 Configuration | Set Parameters of Serial Port 6 (COM6). |

# 4.6.2.5.1 Serial Port 1 Configuration

| Advanced                       |             | Aptio Setup – AMI            |   |
|--------------------------------|-------------|------------------------------|---|
| Serial Port 1 Co               | nfiguration |                              | Enable or Disable Serial Port                         |
| Serial Port<br>Device Settings |             | [Enabled]<br>IO=3F8h; IRQ=4; | (0017)  |
| Change Settings                |             | [Auto]                       |   |
|                                |             |                              |   |
|                                |             |                              |   |
|                                |             |                              | ++: Select Screen<br>↑↓: Select Item                  |
|                                |             |                              | Enter: Select<br>+/-: Change Opt.<br>E1: General Heln |
|                                |             |                              | F2: Previous Values<br>F3: Optimized Defaults         |
|                                |             |                              | F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit     |
|                                |             |                              |   |
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| Item        | Option                                 | Description                          |
|-------------|--|--------------------------------------|
| Serial Port | Enabled <b>[Default]</b> ,<br>Disabled | Enable or Disable Serial Port (COM). |

# 4.6.2.5.2 Serial Port 2 Configuration

| Advanced                       | Aptio Setup – AMI            |   |
|--------------------------------|------------------------------|---|
| Serial Port 2 Configuration    |                              | Enable or Disable Serial Port             |
| Serial Port<br>Device Settings | [Enabled]<br>IO=2F8h; IRQ=3; |   |
| Change Settings                | [Auto]                       |   |
|                                |                              |   |
|                                |                              |   |
|                                |                              | ++: Select Screen                         |
|                                |                              | T↓: Select Item<br>Enter: Select          |
|                                |                              | F1: General Help                          |
|                                |                              | F3: Optimized Defaults<br>F4: Save & Evit |
|                                |                              | F12: Print Screen<br>ESC: Exit            |
|                                |                              |   |
|                                |                              |   |
| Versio                         | on 2.22.1289 Copyright (C)   | 2025 AMI                                  |

| Item        | Option                                 | Description                          |
|-------------|--|--------------------------------------|
| Serial Port | Enabled <b>[Default]</b> ,<br>Disabled | Enable or Disable Serial Port (COM). |

# EMX-RLUC User's Manual 4.6.2.5.3 Serial Port 3 Configuration

| Advanced                       | Aptio Setup – AMI              |   |
|--------------------------------|--------------------------------|---|
| Serial Port 3 Configuratio     | n                              | Enable or Disable Serial Port   |
| Serial Port<br>Device Settings | [Enabled]<br>IO=3E8h; IRQ=6;   | (CUM)   |
| Change Settings                | [Auto]                         |   |
|                                |                                |   |
|                                |                                |   |
|                                |                                | ++: Select Screen<br>14: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit |
|                                | Version 2.22.1289 Copyright (C | ) 2025 AMI  |

| Item        | Option                                 | Description                          |
|-------------|--|--------------------------------------|
| Serial Port | Enabled <b>[Default]</b> ,<br>Disabled | Enable or Disable Serial Port (COM). |

# 4.6.2.5.4 Serial Port 4 Configuration

| Advanced                       | Aptio Setup – AMI             |   |
|--------------------------------|-------------------------------|---|
| Serial Port 4 Configuration    |                               | Enable or Disable Serial Port                 |
| Serial Port<br>Device Settings | [Enabled]<br>IO=2E8h; IRQ=10; |   |
| Change Settings                | [Auto]                        |   |
|                                |                               |   |
|                                |                               |   |
|                                |                               |   |
|                                |                               | ↑↓: Select Item<br>Enter: Select              |
|                                |                               | +/–: Change Opt.<br>F1: General Help          |
|                                |                               | F2: Previous Values<br>F3: Optimized Defaults |
|                                |                               | F4: Save & Exit                               |
|                                |                               | ESC: Exit                                     |
|                                |                               |   |
|                                |                               |   |
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| Item        | Option                                 | Description                          |
|-------------|--|--------------------------------------|
| Serial Port | Enabled <b>[Default]</b> ,<br>Disabled | Enable or Disable Serial Port (COM). |

# 4.6.2.5.5 Serial Port 5 Configuration

| Advanced                       | Aptio Setup - AMI             |   |
|--------------------------------|-------------------------------|---|
| Serial Port 5 Configuration    |                               | Enable or Disable Serial Port   |
| Serial Port<br>Device Settings | [Enabled]<br>IO=4F8h; IRQ=11; | (COM)   |
| Change Settings                | [Auto]                        |   |
|                                |                               |   |
|                                |                               |   |
|                                |                               | ++: Select Screen<br>14: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit |
|                                |                               | AMI   |

| Item        | Option                                 | Description                          |
|-------------|--|--------------------------------------|
| Serial Port | Enabled <b>[Default]</b> ,<br>Disabled | Enable or Disable Serial Port (COM). |

# 4.6.2.5.6 Serial Port 6 Configuration

| Serial Port 6 Configuration          | Enabled]       | Enable or Disable Serial Port<br>(COM)    |
|--------------------------------------|----------------|---|
|                                      |                | Coony                                     |
| Serial Port [E<br>Device Settings IC | O=4E8h; IRQ=6; |   |
| Change Settings [f                   | Auto]          |   |
|                                      |                |   |
|                                      |                |   |
|                                      |                | ++: Select Screen                         |
|                                      |                | T∔: Select Item<br>Enter: Select          |
|                                      |                | F1: General Help<br>F2: Previous Values   |
|                                      |                | F3: Optimized Defaults<br>F4: Save & Exit |
|                                      |                | F12: Print Screen<br>ESC: Exit            |
|                                      |                |   |
|                                      |                |   |

| Item        | Option                                 | Description                          |
|-------------|--|--------------------------------------|
| Serial Port | Enabled <b>[Default]</b> ,<br>Disabled | Enable or Disable Serial Port (COM). |

## EMX-RLUC User's Manual 4.6.2.6 Hardware Monitor

| Advanced   | Aptio Setup – AMI  |  |
|--|--|--|
| Advanced<br>Pc Health Status<br>Fan Function<br>CPU Temp<br>SYS Temp<br>CPU_FAN1<br>SYS_FAN1<br>VCC_DDU<br>VCC_DDR<br>+12V<br>+5V<br>+3.3V<br>VBAT | : +36 C<br>: +22 C<br>: 3947 RPM<br>: N/A<br>: +1.232 V<br>: +1.199 V<br>: +12.078 V<br>: +5.170 V<br>: +3.303 V<br>: +2.926 V | Fan function setting<br>++: Select Screen<br>14: Select Item<br>Enter: Select<br>+/: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit |
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## 4.6.2.6.1 Fan Function

| Advanced                       | Aptio Setup - AMI                |   |
|--------------------------------|----------------------------------|---|
| Pc Health Status               |                                  | CPU_FAN1 Mode Select  |
| CPU_FAN1 Mode<br>SYS_FAN1 Mode | [Full on Mode]<br>[Full on Mode] |   |
|                                |                                  | ++: Select Screen<br>14: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit |
|                                | /ersion 2.22.1289 Copyright (C)  | 2025 AMI  |

| ltem          | Option                 | Description           |
|---------------|------------------------|-----------------------|
|               | Full on Mode[Default], |                       |
| CPU_FAN1 Mode | Automatic Mode         | CPU_FAN1 Mode Select. |
|               | Manual Mode            |                       |
|               | Full on Mode[Default], |                       |
| SYS_FAN1 Mode | Automatic Mode         | SYS_FAN1 Mode Select. |
|               | Manual Mode            |                       |

# 4.6.2.7 Display Configuration

| Advanced                       | Aptio Setup – AMI                 |   |
|--------------------------------|-----------------------------------|---|
| LVDS Control<br>LCD Panel Type | [Enabled]<br>[1024x768 24 Single] | <pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit F12: Print Screen ESC: Exit</pre> |
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| ltem           | Options   | Description            |
|----------------|---|------------------------|
| LVDS Control   | Disabled,<br>Enabled <b>[Default]</b>   | LVDS Control           |
| LCD Panel Type | 1024x768 18 Single<br>1680x1050 24 Dual<br>1600x1200 24 Dual<br>1600x900 24 Dual<br>1440x900 24 Dual<br>1366x768 24 Single<br>1366x768 18 Single<br>1280x1024 24 Dual<br>1024x768 24 Single[ <b>Default]</b><br>1920x1080 24 Dual<br>1024x600 24 Single<br>1024x600 18 Single<br>800x600 18 Single<br>800x600 18 Single | Select LCD Panel Type. |

# EMX-RLUC User's Manual 4.6.2.8 Power Control

| Advanced  | Aptio Setup – AMI            |   |
|---|------------------------------|---|
| PowerOn after PowerFail<br>Soft-Off by PKR-BTTN | [Power Off]<br>[Instant-Off] | Specify what state to go to<br>when power is re-applied after<br>a power failure (G3 state).  |
|   |                              | <pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit F12: Print Screen ESC: Exit</pre> |
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| Item                    | Options  | Description   |
|-------------------------|--|---|
| PowerOn after PowerFail | Power On<br>Power Off <b>[Default]</b><br>Last State | Specify what state to got to when power is re-applied after a power failure (G3 state). |
| Soft-Off by PWR-BTTN    | Instant-Off <b>[Default]</b><br>Delay 4 Sec.         | Soft-Off by PWR-BTTN.   |

# 4.6.2.9 S5 RTC Wake Settings

| Advanced            | Aptio Setup – AMI               |  |
|---------------------|---------------------------------|--|
| Wake system from S5 | [Disabled]                      | Enable or disable System wake<br>on alarm event. Select<br>FixedTime, system will wake on<br>the hr::min::sec specified.<br>Select DynamicTime , System<br>will wake on the current time<br>+ Increase minute(s) |
|                     |                                 | <pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit F12: Print Screen ESC: Exit</pre>                          |
|                     | /ersion 2.22.1289 Copyright (C) | 2025 AMI   |

| Item                | Options    | Description   |
|---------------------|------------|---|
| Disabled[Default    |            | Enable or disable System wake on alarm event. Select        |
| wake system from S5 | Fixed Time | Fixed Time, system will wake on the hr::min::sec specified. |

| Dynamic Time | Select Dynamic Time, System will wake on the current time |
|--------------|---|
|              | + Increase minute(s).                                     |

# 4.6.2.10 USB Configuration

The USB Configuration menu helps read USB information and configures USB settings.

| Advanced                              | Aptio Setup – AMI           |  |
|---------------------------------------|-----------------------------|--|
| USB Configuration                     |                             | Select 'Disabled' for                                    |
| USB Module Version                    | 31                          | debug is enabled but USB<br>overcurrent is not disabled, |
| USB Controllers:<br>2 XHCIs           |                             | USB DbC does not work.                                   |
| USB Devices:<br>1 Drive, 1 Keyboard   |                             |  |
| USB Overcurrent                       | [Disabled]                  |  |
| XHCI Hand-off                         | [Enabled]                   |  |
| USB Mass Storage Driver Support       | [Enabled]                   |  |
|                                       |                             | ++: Select Screen  |
| USB hardware delays and time-outs:    | [20, cec]                   | I↓: Select Item  |
| Device reset time-out                 | [20 Sec]                    | +/-: Change Ont  |
| Device power-up delay                 | [Auto]                      | F1: General Help   |
|                                       |                             | F2: Previous Values                                      |
| Mass Storage Devices:                 |                             | F3: Optimized Defaults                                   |
| JetFlashTranscend 8GB 1100            | [Auto]                      | F4: Save & Exit  |
|                                       |                             | F12: Print Screen  |
|                                       |                             | ESC: EXIT  |
|                                       |                             |  |
|                                       |                             |  |
| · · · · · · · · · · · · · · · · · · · | 0 00 1000 Copunisht (0) 000 | DE ANT   |
| VENSIUN                               | 2.22.1209 COPYRIght (C) 202 | TUH C  |

| Item                            | Options   | Description   |
|---------------------------------|---|---|
| USB Overcurrent                 | Disabled <b>[Default]</b><br>Enabled                  | Select 'Disabled' for pin-based debug. if<br>in-based debug is enabled but USB<br>overcurrent is not disabled, USB DbC does<br>not work.  |
| Legacy USB Support              | Enabled <b>[Default]</b><br>Disabled<br>Auto          | Enables Legacy USB support. AUTO option<br>disables legacy support if no USB devices are<br>connected. DISABLE option will keep USB<br>devices available only for EFI applications.                 |
| XHCI Hand-off                   | Enabled <b>[Default]</b><br>Disabled                  | This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.  |
| USB Mass Storage Driver Support | Disabled<br>Enabled <b>[Default]</b>                  | Enable/Disable USB Mass Storage Driver<br>Support.  |
| USB transfer time-out           | 1 sec<br>5 sec<br>10 sec<br>20 sec <b>[Default]</b>   | The time-out value for Control, Bulk, and Interrupt transfers.  |
| Device reset time-out           | 10 sec<br>20 sec <b>[Default]</b><br>30 sec<br>40 sec | USB mass storage device Start Unit command time-out.  |
| Device power-up delay           | Auto <b>[Default]</b><br>Manual                       | Maximum time the device will take before it<br>properly reports itself to the Host Controller.<br>'Auto' uses default value: for a Root port it is<br>100ms, for a Hub port the delay is taken form |

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|                      |               | Hub descriptor.                             |
|----------------------|---------------|---|
|                      | Auto[Default] | Mass storage device emulation type. 'AUTO'  |
|                      | Floppy        | enumerates devices according to their media |
| Mass Storage Devices | Forced FDD    | format. Optical drives are emulated as      |
|                      | Hard Disk     | 'CDROM', drives with no media will be       |
|                      | CD-ROM        | emulated according to a drive type.         |

# 4.6.2.11 Network Stack Configuration

| Advanced      | Aptio Setup – AMI                  |   |
|---------------|------------------------------------|---|
| Network Stack | [Disabled]                         | Enable/Disable UEFI Network<br>Stack  |
|               |                                    | <pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit F12: Print Screen ESC: Exit</pre> |
|               | Version 2.22.1289 Copyright (C) 20 | 25 AMI  |

| Item          | Options                              | Description                        |
|---------------|--------------------------------------|------------------------------------|
| Network Stack | Enabled<br>Disabled <b>[Default]</b> | Enable/Disable UEFI Network Stack. |

# 4.6.2.12 NVMe Configuration

| Aptio Setup – AMI<br>Advanced        |   |
|--------------------------------------|---|
| NVMe Configuration                   |   |
| No NVME Device Found                 |   |
|                                      |   |
|                                      |   |
|                                      |   |
|                                      |   |
|                                      | ++: Select Screen                             |
|                                      | †∔: Select Item<br>Enter: Select              |
|                                      | +/−: Change Opt.<br>F1: General Help          |
|                                      | F2: Previous Values<br>F3: Optimized Defaults |
|                                      | F4: Save & Exit<br>F12: Print Screen          |
|                                      | ESC. EXIL                                     |
|                                      |   |
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# 4.6.2.13 Intel® I210 Gigabit Network Connection

| Advanced  | Aptio Setup — AMI  |  |
|---|--|--|
| Advanced  Firmware Image Properties NIC Configuration Device Level Configuration Blink LEDs UEFI Driver Adapter PBA Device Name Chip Type PCI Device ID PCI Address Link Status Link Speed Status MAC Address Virtual MAC Address | 0<br>Intel(R) PRD/1000<br>9.7.06 PCI-E<br>N/A<br>Intel(R) I210 Gigabit<br>Network Connection<br>Intel i210<br>1578<br>01:00:00<br>[Disconnected]<br>[Auto Negotiated]<br>68:ED:A4:78:18:4E | View device firmware version<br>information.<br>++: Select Screen<br>14: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen |
|   |  | ESC: EXIT  |

# 4.6.2.13.1 Firmware Image Properties

| Aptio Setup - AMI<br>Advanced   |                                 |   |
|---|---------------------------------|---|
| Option ROM version<br>Unique NVM/EERROM ID<br>NVM Version<br>Family Firmware Version<br>EFI Version | N/A<br>N/A<br>N/A               | ++: Select Screen<br>14: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit |
| Vens  | sion 2.22.1289 Copyright (C) 20 | 25 AMI  |

### EMX-RLUC User's Manual 4.6.2.13.2 NIC Configuration



## 4.6.2.13.3 iSCSI Configuration

| Aptio Setup – AMI<br>Advanced   |   |
|---|---|
| <ul> <li>iSCSI General Parameters</li> <li>iSCSI Initiator Parameters</li> <li>iSCSI First Target Parameters</li> </ul> | Configure general iSCSI<br>parameters.  |
|   | <pre>++: Select Screen f1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit F12: Print Screen ESC: Exit</pre> |
#### 4.6.2.13.3.1 iSCSI General Parameters

| Advanced   | Aptio Setup – AMI  |   |
|--|--|---|
| TCP/IP Parameters via DHCP<br>iSCSI Parameters via DHCP<br>CHAP Authentication<br>CHAP Mutual Authentication<br>IP Version | [Disabled]<br>[Disabled]<br>[Disabled]<br>[Disabled]<br>[IPv4] | This option is specific to<br>IPv4. Controls the source of<br>the initiator IP address, DHCP<br>or static assignment.   |
|  |  | <pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit F12: Print Screen ESC: Exit</pre> |
|  | n 2.22.1289 Copyright (C) 20                                   | 25 AMI  |

### 4.6.2.13.3.2 iSCSI Initiator Parameters

| Advanced   | Aptio Setup – AMI             |   |
|--|-------------------------------|---|
| IP Address<br>Subnet Mask<br>Default Gateway<br>iSCSI Name<br>CHAP ID<br>CHAP Secret | 0.0.0.0<br>0.0.0<br>0.0.0.0   | Specifies the IP address of<br>the iSCSI initiator.   |
|  |                               | <pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit F12: Print Screen ESC: Exit</pre> |
|  | Version 2.22.1289 Copyright ( | C) 2025 AMI   |

## EMX-RLUC User's Manual 4.6.2.13.3.3 iSCSI First Target Parameters

| Advanced  | Aptio Setup – AMI           |   |
|---|-----------------------------|---|
| IP Address<br>TCP Port<br>Boot LUN<br>ISCSI Name<br>CHAP Secret | 0.0.0.0<br>3260<br>0        | Specifies the IP address of<br>the iSCSI target.  |
|   |                             | ++: Select Screen<br>14: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit |
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## 4.6.2.13.4 Device Level Configuration

| Advanced   | Aptio Setup – AMI            |   |
|--|------------------------------|---|
| Virtualization Mode<br>Shared Memory Features<br>Active Physical Functions | [None]<br>[Enabled]<br>[All] | Disable usage of reserved<br>memory regions to allow direct<br>assignment of device to guest<br>virtual machines.   |
|  |                              | ++: Select Screen<br>14: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit |

# 4.6.2.14 Intel® Ethernet Connection (16) I219-LM

| Aptio Setup - AMI<br>Advanced   |  |   |
|---|--|---|
| Autonegotiation Timeout   | 8  | How long the UEFI PXE driver<br>should wait for link  |
| PORT CONFIGURATION INFORMATION<br>UEFI Driver:<br>Adapter PBA:<br>PCI Device ID<br>PCI Address<br>MAC Address | Intel(R) Ethernet<br>Connection I219 0.2.02<br>FFFFFF-OFF<br>1A1E<br>00:1F:06<br>68:ED:A4:78:18:4D |   |
|   |  | <pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit F12: Print Screen ESC: Exit</pre> |
| Version 2.22.1289 Copyright (C) 2025 AMI  |  |   |

#### 4.6.3 Chipset

| Main Advanced Chipset Securit   | Aptio Setup – AMI<br>, Boot Save & Exit MEBx  |  |
|---|---|--|
| <ul> <li>▶ System Agent (SA) Configuration</li> <li>▶ PCH-IO Configuration</li> </ul> | 3   | System Agent (SA) Parameters   |
|   | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- | <ul> <li>Select Screen</li> <li>Select Item</li> <li>Select Item</li> <li>Select</li> <li>Change Opt.</li> <li>General Help</li> <li>Previous Values</li> <li>Optimized Defaults</li> <li>Save &amp; Exit</li> <li>Save &amp; Exit</li> <li>Seren</li> <li>Screen</li> <li>Screen</li> </ul> |
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## EMX-RLUC User's Manual 4.6.3.1 System Agent (SA) Configuration

| Chipset   | Aptio Setup – AMI           |   |
|---|-----------------------------|---|
| System Agent (SA) Configuration   |                             | Memory Configuration Parameters   |
| VT-d  | Supported                   |   |
| Memory Configuration<br>Graphics Configuration<br>VMD setup menu<br>PCI Express Configuration |                             | ++: Select Screen<br>14: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit |
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# 4.6.3.1.1 Memory Configuration

| Chipset   | Aptio Setup – AMI  |  |
|---|--|--|
| Chipset<br>Memory Configuration<br>Memory RC Version<br>Memory Frequency<br>tCL-tRCD-tRP-tRAS<br>MC 0 Ch 0 DIMM 0<br>Size<br>Number of Ranks<br>Manufacturer<br>MC 1 Ch 0 DIMM 0<br>Size<br>Number of Ranks<br>Manufacturer | 0.0.4.112<br>3200 MHz<br>22-22-22-52<br>Populated & Enabled<br>16384 MB (DDR4)<br>1<br>UnKnown<br>Populated & Enabled<br>16384 MB (DDR4)<br>1<br>UnKnown | ++: Select Screen<br>++: Select Screen<br>14: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit |
| Ve  | ersion 2.22.1289 Copyright (C) 20  | D25 AMI  |

# 4.6.3.1.2 Graphics Configuration

| Chipset  | Aptio Setup – AMI             |   |
|--|-------------------------------|---|
| Graphics Configuration<br>Primary Display<br>Internal Graphics<br>Above 4GB MMIO BIOS assignment | [Auto]<br>[Auto]<br>[Enabled] | Select which of IGFX/PEG/PCI<br>Graphics device should be<br>Primary Display Or select HG<br>for Hybrid Gfx.  |
|  |                               | <pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit F12: Print Screen ESC: Exit</pre> |
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| Item              | Option            | Description                                    |
|-------------------|-------------------|--|
|                   | Auto[Default]     |  |
|                   | IGFX              | Select which of IGFX/PEG/PCI Graphics device   |
| Primary Display   | PEG Slot          | should be Primary Display Or select HG for     |
|                   | PCH PCI           | Hybrid Gfx.                                    |
|                   | HG                |  |
|                   | Auto[Default]     |  |
| Internal Graphics | Disabled          | Keep IGFX enabled based on the setup options.  |
|                   | Enabled           |  |
|                   | Enchlad [Default] | Enable/Disable above 4GB MemoryMappedIO        |
| assignment Disa   |                   | BIOS assignment. This is enabled automatically |
|                   | Disabled          | when Aperture Size is set to 2048MB.           |

# EMX-RLUC User's Manual 4.6.3.1.3 VMD setup menu

| Chipset           | Aptio Setup — AMI           |   |
|-------------------|-----------------------------|---|
| VMD Configuration |                             | Enable/Disable to VMD   |
|                   |                             | CONTRACTOR  |
|                   |                             | ++: Select Screen<br>11: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit |
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| ltem                  | Option                               | Description                       |
|-----------------------|--------------------------------------|-----------------------------------|
| Enable VMD controller | Disabled <b>[Default]</b><br>Enabled | Enable/Disable to VMD controller. |

# 4.6.3.1.4 PCI Express Configuration

| Aptio Setu<br>Chipset  | цр – АМІ   |
|--|--|
| PCI Express Configuration  | PCI Express Root Port Settings.  |
| <ul> <li>▶ PCI Express Root Port 1</li> <li>▶ PCI Express Root Port 3</li> </ul> | ++: Select Screen<br>11: Select Item<br>Enter: Select<br>+/-: Change Opt.  |
|  | F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit |
| Version 2.22.1289 Cop  | Jyright (6) 2025 HMI   |

## 4.6.3.1.4.1 PCI Express Root Port 1

| PCIEX8_SLOT1 [Enabled]<br>PCIe Speed [Auto] |   |
|---|---|
|   | Control the PCI Express Root<br>Port.   |
|   | <pre>till Select Item till Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit F12: Print Screen ESC: Exit</pre> |

| Item         | Option            | Description                        |
|--------------|-------------------|------------------------------------|
|              | Disabled          | Control the BCI Everage Post Port  |
| PCIEX6_SLUTT | Enabled[Default], | Control the PCI Express Root Port. |
|              | Auto[Default]     |                                    |
|              | Gen1              |                                    |
| DCIa Speed   | Gen2              | Configure BCIe Speed               |
| Pole Speed   | Gen3              | Conligure PCIe Speed.              |
|              | Gen4              |                                    |
|              | Gen5              |                                    |

## 4.6.3.1.4.2 PCI Express Root Port 3

| Chipset                         | Aptio Setup – AMI           |   |
|---------------------------------|-----------------------------|---|
| M.2_KEYM_PCIESSD1<br>PCIe Speed | [Enabled]<br>[Auto]         | Control the PCI Express Root<br>Port.   |
|                                 |                             | ++: Select Screen<br>14: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit |
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| ltem              | Option                     | Description                        |
|-------------------|----------------------------|------------------------------------|
| MA KEYN DOLESSDA  | Enabled <b>[Default]</b> , | Control the DCI Everges Rest Part  |
| M.2_KETM_PCIESSD1 | Disabled                   | Control the PCI Express Root Port. |
|                   | Auto[Default]              |                                    |
|                   | Gen1                       |                                    |
| PCIe Speed        | Gen2                       | Configure DCIe Speed               |
|                   | Gen3                       | Configure PCIe Speed.              |
|                   | Gen4                       |                                    |
|                   | Gen5                       |                                    |

# 4.6.3.2 PCH-IO Configuration

| Chipset   | Aptio Setup — AMI            |   |
|---|------------------------------|---|
| PCH-IO Configuration  |                              | PCI Express Configuration                 |
| <ul> <li>PCI Express Configuration</li> <li>SATA Configuration</li> </ul> |                              | Settings                                  |
| I2C Touch Panel   | [Disabled]                   |   |
|   |                              |   |
|   |                              |   |
|   |                              |   |
|   |                              | ↔: Select Screen<br>↑↓: Select Item       |
|   |                              | Enter: Select<br>+/−: Change Opt.         |
|   |                              | F1: General Help<br>F2: Previous Values   |
|   |                              | F3: Uptimized Defaults<br>F4: Save & Exit |
|   |                              | F12: Print Screen<br>ESC: Exit            |
|   |                              |   |
| Version 2   | .22.1289 Converight (C) 2025 | АМТ                                       |

| Item            | Option             | Description                               |
|-----------------|--------------------|---|
| I2C Touch Panel | Enabled            | Indicates what type of I2C Touch Panel is |
|                 | Disabled[Default], | connected to this SerialIO controller.    |

# 4.6.3.2.1 PCI Express Configuration

| PCI Express Configuration<br>▶ M.2_KEYE_WLAN1<br>▶ LAN2 | PCI Express Root Port Settings.  |
|---|--|
|   |  |
|   | +: Select Screen   |
|   | <pre>fl: Select Item<br/>Enter: Select<br/>+/-: Change Opt.<br/>F1: General Help<br/>E2: Previous Values</pre> |
|   | F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit                                    |
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#### 4.6.3.2.1.1 M.2\_KEYE\_WLAN1

| Chipset                      | Aptio Setup – AMI            |   |
|------------------------------|------------------------------|---|
| M.2_KEYE_NLAN1<br>PCIe Speed | [Enabled]<br>[Auto]          | Control the PCI Express Root<br>Port.   |
|                              |                              | ++: Select Screen<br>11: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit |
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| Item           | Option                                 | Description                        |
|----------------|--|------------------------------------|
| M.2_KEYE_WLAN1 | Enabled <b>[Default]</b> ,<br>Disabled | Control the PCI Express Root Port. |
|                | Auto[Default]                          |                                    |
| PCIe Speed     | Gen1                                   | Configure BCIe Speed               |
|                | Gen2                                   | Configure PCIe Speed.              |
|                | Gen3                                   |                                    |

# EMX-RLUC User's Manual 4.6.3.2.1.2 LAN2

| Chipset            | Aptio Setup – AMI          |   |
|--------------------|----------------------------|---|
| LAN2<br>PCIe Speed | [Enabled]<br>[Auto]        | Control the PCI Express Root<br>Port.   |
|                    |                            | <pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit F12: Print Screen ESC: Exit</pre> |
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| ltem       | Option                     | Description                        |
|------------|----------------------------|------------------------------------|
|            | Enabled <b>[Default]</b> , | Control the BCI Everage Post Port  |
| LANZ       | Disabled                   | Control the PCI Express Root Port. |
|            | Auto[Default]              |                                    |
| PCIe Speed | Gen1                       | Configure DCIe Speed               |
|            | Gen2                       | Conligure PCIe Speed.              |
|            | Gen3                       |                                    |

# 4.6.3.2.2 SATA Configuration

| Chipset                                   | Aptio Setup – AMI           |   |
|---|-----------------------------|---|
| SATA Configuration                        |                             | Enable/Disable SATA Device.   |
| SATA Controller(s)<br>SATA Mode Selection | [Enabled]<br>[AHCI]         |   |
| SATA1<br>Port 1                           | Empty<br>[Enabled]          |   |
|   |                             |   |
|   |                             | 11: Select Item         Enter: Select         +/-: Change Opt.  |
|   |                             | F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen |
|   |                             | ESC: Exit   |
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| Item                | Options                               | Description                                |
|---------------------|---------------------------------------|--|
| SATA Controller(s)  | Enabled <b>[Default]</b><br>Disabled, | Enable/Disable SATA Device.                |
| SATA Mode Selection | AHCI[Default]                         | Determines how SATA controller(s) operate. |
| Port 1              | Enabled <b>[Default]</b><br>Disabled  | Enable or Disable SATA Port.               |

## 4.6.4 Security

| Main Advanced Chipset  | Aptio Setup - AMI<br>Security Boot Save & Exit MEBx  |  |
|--|--|--|
| Password Description   |  | Set Administrator Password   |
| If ONLY the Administrator<br>then this only limits acc<br>only asked for when enter<br>If ONLY the User's passwo<br>is a power on password an<br>boot or enter Setup. In S<br>have Administrator rights<br>The password length must<br>in the following range: | 's password is set,<br>ess to Setup and is<br>ing Setup.<br>rd is set, then this<br>d must be entered to<br>etup the User will<br>be |  |
| Minimum length   | 3  |  |
| Maximum length   | 20   | ++: Select Screen  |
| Administration Decouverd   |  | I+: Select Item  |
| Huministrator Password   |  | Enter: Select  |
| 0561 1 055001 0  |  | F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit |
| ▶ Secure Boot  |  | F12: Print Screen<br>ESC: Exit   |
|  | Version 2.22.1289 Convright (C) 20   | 25 AMT   |
|  | 101 01010 C.CC. 1007 00099 18/10 (0) 20  |  |

#### • Administrator Password

Set setup Administrator Password

### • User Password

Set User Password

# EMX-RLUC User's Manual 4.6.4.1 Security Boot





## 4.6.4.1.1 Key Management

| Secur   | Aptio Setup – AMI<br><mark>ity</mark>   |   |
|---|---|---|
| Vendor Keys   | Valid   | Install factory default Secure  |
| Factory Key Provision<br>• Restore Factory Keys<br>• Reset To Setup Mode<br>• Enroll Efi Image<br>• Export Secure Boot variables                              |   | reset and while the System is<br>in Setup mode  |
| Secure Boot variable   Siz<br>> Platform Key (PK)   (<br>> Key Exchange Keys (KEK)   (<br>> Authorized Signatures (db)   (<br>> Forbidden Signatures(dbx)   ( | e  Keys  Key Source<br>)  0  No Keys<br>)  0  No Keys<br>)  0  No Keys<br>)  0  No Keys |   |
| <ul> <li>Authorized TimeStamps(dbt) </li> <li>OsRecovery Signatures(dbr) </li> </ul>  | )  O NoKeys<br>)  O NoKeys  | <pre>++: Select Screen f1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit F12: Print Screen ESC: Exit</pre> |
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#### 4.6.5 Boot

| Main Advanced Chipset Security  | Aptio Setup – AMI<br>Boot Save & Exit MEBx   |  |
|---|--|--|
| Boot Configuration<br>Setup Promot Timeout<br>Bootup NumLock State<br>FullScreen Logo                                 | <mark>3</mark><br>[Off]<br>[Enabled]   | Number of seconds to wait for<br>setup activation key.<br>65535(0xFFFF) means indefinite<br>waiting.                                       |
| FIXED BOOT ORDER Priorities<br>Boot Option #1<br>Boot Option #2<br>Boot Option #3<br>Boot Option #4<br>Boot Option #5 | [UEFI NVME]<br>[UEFI Hand Disk]<br>[UEFI USB Hand Disk]<br>[UEFI USB CD/DVD]<br>[UEFI USB Keg:UEFI:<br>JetFlashTranscend 86B |  |
| Boot Option #6<br>Boot Option #7  | 1100, Partition 1]<br>[UEFI USB Lan]<br>[UEFI Network]   | ++: Select Screen<br>†↓: Select Item<br>Enter: Select  |
| ▶ UEFI USB Key Drive BBS Priorities   |  | +/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit |
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| Item                       | Option                   | Description |
|----------------------------|--------------------------|-------------|
| Boot Option #1/2/3/4/5/6/7 | Set the system boot orde | er.         |

#### 4.6.6 Save and Exit

| Aptio Setup – AMI<br>Main Advanced Chipset Security Boot <mark>Save &amp; Exit</mark> MEBx                          |  |
|---|--|
| Save Options<br>Save Changes and Exit<br>Discard Changes and Exit   | Exit system setup after saving the changes.  |
| Save Changes and Reset<br>Discard Changes and Reset   |  |
| Save Changes<br>Discard Changes   |  |
| Default Options<br>Restore Defaults<br>Save as User Defaults  |  |
| Restore User Defaults<br>Boot Override  | ++: Select Screen<br>†↓: Select Item<br>Enter: Select  |
| UEFI: JetFlashTranscend 8GB 1100, Partition 1<br>(JetFlashTranscend 8GB 1100)                                       | +/-: Change Opt.<br>F1: General Help   |
| (JetFlashTranscend 8GB 1100) Partition 2<br>(JetFlashTranscend 8GB 1100)<br>Launch EFI Shell from filesystem device | F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit |
|   |  |
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| Main Advanced Chipset Secur  | Aptio Setup - AMI<br>ity Boot Save & Exit MEBx  |  |
|--|---|--|
| Main Advanced Chipset Secur<br>Save Options<br>Save Changes and Exit<br>Discard Changes and Exit<br>Save Changes and Reset<br>Discard Changes<br>Default Options<br>Restore Defaults<br>Save as User Defaults<br>Restore User Defaults<br>Boot Override<br>UEFI: JetFlashTranscend 8GB 1100<br>(JetFlashTranscend 8GB 1100)<br>UEFI: JetFlashTranscend 8GB 1100)<br>(JetFlashTranscend 8GB 1100)<br>Launch EFI Shell from filesystem | Save & Exit Setup<br>Save configuration and exit?<br>Yes No<br>),<br>), Partition 2<br>n device | Exit system setup after saving<br>the changes. |
|  |   |  |
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#### 4.6.6.1 Save Changes and Exit

Use the save changes and reset option to save the changes made to the BIOS options and to exit the BIOS configuration setup program.

#### 4.6.6.2 Discard Changes and Exit

Use the Discard changes and Exit option to exit the system without saving the changes made to the BIOS configuration setup program.

#### 4.6.6.3 Save Changes and Reset

Reset the system after saving the changes.

#### 4.6.6.4 Discard Changes and Reset

Any changes made to BIOS settings during this session of the BIOS setup program are discarded. The setup program then exits and reboots the controller.

#### 4.6.6.5 Save Changes

Changes made to BIOS settings during this session are committed to NVRAM. The setup program remains active, allowing further changes.

#### 4.6.6.6 Discard Changes

Any changes made to BIOS settings during this session of the BIOS setup program are

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discarded. The BIOS setup continues to be active.

#### 4.6.6.7 Restore Defaults

This option restores all BIOS settings to the factory default. This option is useful if the controller exhibits unpredictable behavior due to an incorrect or inappropriate BIOS setting.

#### 4.6.6.8 Save as User Defaults

This option saves a copy of the current BIOS settings as the User Defaults. This option is useful for preserving custom BIOS setup configurations.

#### 4.6.6.9 Restore User Defaults

This option restores all BIOS settings to the user defaults. This option is useful for restoring previously preserved custom BIOS setup configurations.

#### 4.6.6.10 Boot override

This option lists all possible bootable devices and allows the user to override the **Boot Option Priorities** list for the current boot. If no changes have been made to the BIOS setup options, the system will continue booting to the selected device without first rebooting. If BIOS setup options have been changed and saved, a reboot will be required and the boot override selection will not be valid.

#### 4.6.7 MEBx

| Aptio Setup – AMI<br>Main Advanced Chipset Security Boot Save & Exit MEBX |   |
|---|---|
| Configuration locked after<br>EndOfPost                                   | ++: Select Screen<br>14: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F12: Print Screen<br>ESC: Exit |
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