

# **User Manual**

# **AIR-150**

Fanless Edge Intelligence System



# Attention!

This product contains a hard copy of the Chinese user manual for China CCC certification purposes. A PDF of the English user manual is included on the accompanying CD. Please disregard the hard copy Chinese user manual if the product is not sold and/or installed in China.

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# **Product Warranty (2 years)**

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

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

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For outof-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

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

# **Declaration of Conformity**

### FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

# **Technical Support and Assistance**

- 1. Visit the Advantech website at http://support.advantech.com where you can find the latest information about the product.
- Contact your distributor, sales representative, or Advantech's customer service 2. center for technical support if you need additional assistance. Please have the 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

# Warnings, Cautions and Notes



Warning! Warnings indicate conditions, which if not observed, can cause personal injury!





**Caution!** Cautions are included to help you avoid damaging hardware or losing data. e.g.



There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.



Notes provide optional additional information.

# Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such comments in writing to: support@advantech.com

# Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
- Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

# **Safety Instructions**

- 1. Read these safety instructions carefully.
- 2. Retain this user manual for future reference.
- 3. Disconnect the equipment from all AC outlets before cleaning. Use only a damp cloth for cleaning. Do not use liquid or sprayed detergent.
- 4. For pluggable equipment, the power outlet should be near the equipment and easily accessible.
- 5. Protect the equipment from humidity.
- 6. Place the equipment on a reliable surface during installation. Dropping or letting the equipment fall may cause damage.
- 7. The openings on the enclosure are for air convection and protect the equipment from overheating. Do not cover the openings.
- 8. By means of a power cord connected to a socket-outlet with earthing connection.
- 9. Position the power cord away from high-traffic areas. Do not place anything over the power cord.
- 10. All cautions and warnings on the equipment should be noted.
- 11. If the equipment is not used for a long time, disconnect the equipment from the power source to avoid damage from transient over-voltage.
- 12. Never pour liquid into an opening as this can cause fire or electrical shock.
- 13. Never open the equipment. For safety reasons, only qualified service personnel should open the equipment.
- 14. If one of the following occurs, have 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 is malfunctioning or does not operate according to the user manual.
  - The equipment has been dropped and damaged.
  - The equipment shows obvious signs of breakage.
- 15. Do not leave the equipment in an environment with a storage temperature of below -40 °C (-40 °F) or above 85 °C (185 °F) as this may cause damage. The equipment should be stored in a controlled environment.
- 16. Any unverified component may cause unexpected damage. To ensure correct installation, always use the components (e.g., screws) provided in the accessory box.
- 17. CAUTION: The equipment is equipped with a battery-powered real-time clock circuit. There is a risk of explosion if a battery is incorrectly replaced. Replace only with same or equivalent type as recommended by the manufacturer. Discard all used batteries according to the manufacturer's instructions.
- 18. Always disconnect the power cord from the chassis before manually handling the hardware. Do not implement connections or configuration changes while the device is powered on. Sudden power surges may damage sensitive electronic components.
- 19. In accordance with IEC 704-1:1982 specifications, the sound pressure level at the operator's position does not exceed 70 dB (A).
- 20. The equipment should only be installed in a restricted access area.
- 21. DISCLAIMER: These instructions are provided according to IEC 704-1 specifications. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

# **Consignes de Sécurité**

- 1. Veuillez lire attentivement ces instructions de sécurité.
- 2. Veuillez conserver ce manuel de l'utilisateur pour référence ultérieure.
- 3. Veuillez débrancher cet équipement de la prise secteur avant le nettoyage. Utilisez un chiffon humide. Ne pas utiliser de détergent liquide ou pulvérisé pour le nettoyage. Utilisez une feuille ou un chiffon humide pour le nettoyage.
- 4. Pour les équipements enfichables, la prise de courant doit être à proximité de l'équipement et doit être facilement accessible.
- 5. S'il vous plaît garder cet équipement de l'humidité.
- 6. Posez cet équipement sur une surface fiable lors de l'installation. Une chute ou une chute pourrait causer des blessures.
- 7. Les ouvertures sur le boîtier sont destinées à la convection d'air, protégeant. ainsi l'équipement de la surchauffe. NE COUVREZ PAS LES OUVERTURES.
- 8. Au moyen d'un cordon d'alimentation connecté à une prise de courant avec mise à la terre.
- 9. Placez le cordon d'alimentation de sorte que personne ne puisse marcher dessus. Ne placez rien sur le cordon d'alimentation.
- 10. Tous les avertissements et mises en garde sur l'équipement doivent être notés.
- 11. Si l'appareil n'est pas utilisé pendant une longue période, débranchez-le du secteur pour ne pas être endommagé par une surtension transitoire.
- 12. Ne jamais verser de liquide dans les ouvertures de ventilation; Cela pourrait provoquer un incendie ou un choc électrique.
- 13. N'ouvrez jamais l'équipement. Pour des raisons de sécurité, seul le personnel de maintenance qualifié doit ouvrir l'équipement.
- 14. Si l'une des situations suivantes se présente, faites vérifier le matériel par le personnel de service:
  - Le cordon d'alimentation ou la fiche est endommagé
  - Un liquide a pénétré dans l'appareil
  - L'équipement a été exposé à l'humidité
  - L'équipement ne fonctionne pas bien ou vous ne pouvez pas le faire fonctionner conformément au manuel d'utilisation
  - Equipment L'équipement est tombé et a été endommagé
  - Equipment L'équipement présente des signes évidents de rupture
- 15. Ne laissez pas cet équipement dans un environnement où la température de stockage peut être inférieure à -40 °C (-40 °F) ou supérieure à 85 °C (185 °F). Cela pourrait endommager l'équipement. L'équipement doit être dans un environnement contrôlé.
- 16. Tout composant non vérifié peut causer des dommages inattendus. Pour garantir une installation correcte, veuillez toujours utiliser les composants (ex. Vis) fournis avec la boîte d'accessoires.
- 17. ATTENTION: L'ordinateur est équipé d'un circuit d'horloge temps réel alimenté par batterie. Il y a un risque d'explosion si la batterie est remplacée de manière incorrecte. Remplacez uniquement avec le même type ou un type équivalent recommandé par le fabricant. Jetez les piles usagées conformément aux instructions du fabricant.
- 18. Débranchez toujours complètement le cordon d'alimentation de votre châssis lorsque vous utilisez du matériel. Ne faites pas de connexion quand l'appareil est sous tension. Les composants électroniques sensibles peuvent être endommagés par des surtensions soudaines.
- 19. Niveau de pression acoustique au poste de l'opérateur selon la norme CEI 704-1: 1982 n'est pas supérieur à 70 dB (A).

- 20. L'équipement ne doit être installé que dans une zone d'accès restreint.
- 21. AVERTISSEMENT: Cet ensemble d'instructions est donné conformément à la norme CEI 704-1. Advantech décline toute responsabilité quant à l'exactitude des déclarations contenues dans ce.

# Packing List

Before installation, check that the following items were included with the product:

- 1 x AIR-150 unit
- 2 x Wallmount
- 1 x User manual (Simplified Chinese)
- 1 x WISE-DeviceOn Package
- 1x Phoenix connector counterpart
- 1x Canbus counterpart

# **Ordering Information**

Model Number	Description
AIR-150-S44A1	Intel Core i5-1345UE
AIR-150-S24A1	Intel Core i3-1315UE

# **Optional Accessories**

Part Number	Description
96PSA-A90W19OT-3	Power adapter (DC 19V, 90W)
1700001524	Power Cable 3-pin 180cm, USA type 1
170203183C	Power Cable 3-pin 180cm, Europe type 1
170203180A	Power Cable 3-pin 180cm, UK type
1700008921	Power Cable 3-pin PSE Mark 183cm
1960018849T000	Clip for Din-rail
1960109258N001	DIN rail Bracket

\*1960018849T000/1960109258N001 for Din-rail binding suite Please place the order together for this two PN.

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# **General Introduction**

This chapter gives background information on the AIR-150 series.

# 1.1 Introduction

AIR-150 fanless edge intelligence system is based on Intel 13th generation Core i5/i3 processor, built-in Iris Xe/UHD graphics chipsets, and added-on Hailo AI acceleration module, delivering 26 TOPS AI computing performance. Valued up with rich AI software toolkits to realize AI inferencing, AIR-150 also supports Advantech Edge AI SDK, which is suitable for AI-enabled applications in smart access control & security, parking lot management, and smart factories.

### Intel 13th Gen. High Performance Processors

AIR-150 is empowered by Intel 13th generation Core i5/i3 processor, built-in Intel Iris Xe/UHD integrated GPU and vector neural network instruction set (VNNI), which can provide powerful graphics computing performance.

### Edge AI Inference by Hailo-8 AI Acceleration Module

AIR-150 is bundled with Hailo-8 AI acceleration module, which delivered 26 TOPS AI capabilities, and supported a variety of software toolkits, to accelerate AI deployment in edge AI, AIR-150 offers easy-to-use toolkit, Advantech edge AI SDK which provides benchmark tool, runtime SDK, remote monitoring and management. More-over, Hailo TAPPAS and dataflow complier convert AI and pre-train AI models easily deployment.

### Dual HDMI Display & Compact-size with Multiple I/Os

AIR-150 features small and fanless design, which also supports -20~60°C operating temperature, and qualified for IEC standard 61000-6-2 / 61000-6-4 Heavy Industry certification. The system dimensions is 156 x 112 x 60 mm compact size but with multiple I/Os, including 2x CANBus, 1x 2.5GbE, 1x 1GbE, 1x DIO, 2x RS-232/422/ 485, 1x RS-485 (COM3), 3x USB 3.2, 1x USB 2.0 and support M.2 M-key 2280 / E-Key 2230/ B key 3042 (Default bundled with Hailo AI module) expansions.

# **1.2 Product Features**

### 1.2.1 General

- CPU:
  - Intel Core i5-1345UE
  - Intel Core i3-1315UE
- BIOS: AMI 256 Mbit Flash BIOS

### System Memory:

- Dual Channel DDR5 5200 MHz 260 pin SO-DIMM
- Max. capacity 64GB
- Serial Port: 2 x RS-232/422/485, 1 x RS-485 (COM3)
- **USB:** 3 x USB 3.2 Gen1, 1 x USB 2.0
- Audio: High-definition (HD) audio, Mic-in/Line-out
- Storage: 1x Slim SATA/1x M.2 M-key 2280 (SATA, PCIex4 NVMe)

### Expansion Interface:

- 1 x M.2 2280 M key
- 1 x M.2 2230 E key
- 1 x M.2 3042 B key (Default bundled with Hailo AI module)
- 2 x CANBUS
- 1 x 8 pin DIO

- 2x LAN (1x 1GbE/1x 2.5 GbE)

### 1.2.2 Display

- Controller:
  - Controller for Core i5: Intel® Iris® Xe chipset
  - Controller for Core i3: Intel® UHD chipset
- **Resolution:** Supports up to 4096x2160@60Hz
- Dual Display: 2x HDMI 2.0b

### 1.2.3 Ethernet

- Chipset:
  - LAN1 Intel® I219-LM 1x 1GbE
  - LAN2 Intel® I226-LM 1x 2.5 GbE
- LAN1 Speed: 10/100/1000 Mbps
- LAN2 Speed: 10/100/1000/2500 Mbps Mbps
- Interface: 2 x RJ45
- Standard: Compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3x, IEEE 802.3y, IEEE 802.ab.

# 1.3 Chipset

### **1.3.1 Functional Specifications**

### 1.3.1.1 Processor

Table 1.1: Processor		
Brooscor	Intel Core i5-1345UE	
FIDCESSO	Intel Core i3-1315UE	
Momony	Dual Channel DDR5 5200 MHz 260 pin SO-DIMM	
wentory	Max. capacity 64GB	

### 1.3.1.2 Chipset

Table 1.2: Chipset	
Internal Graphics Features	Direct X 12.1, OpenGL 4.6 2 x HDMI 2.0b
Video Accelerator	H/W accelerated video encoding/decoding Video decoder: Support H.265/HEVC, H.264/AVC, VP9, SCC Video encoder: Support H.265/HEVC, H.264/AVC, VP9, SCC
SATA Interface	Supports several optional sections of Serial SATA III: Extensions to Serial ATA 1.0 specification, Revision 1.0 Supports SATA transfers to 300 Mbytes/sec.
USB Interface	USB host interface with support for 3 x USB 3.2 and 1 x USB 2.0 port All ports are High-Speed, Full-Speed, and Low-Speed capable
BIOS	AMI 256 Mbit Flash BIOS

### 1.3.1.3 Others

Table 1.3: Others	
Serial Ports	2 x RS-232/422/485, 1 x RS-485 (COM3), supports auto-flow con- trol
DIO	1 x 8 bit DIO
CANBus	2 x CANBus (2 ports)
USB	3 x USB 3.2, 1 x USB 2.0
	LAN1 Intel I219-LM, LAN2 Intel I226-LM
	Compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3x, IEEE 802.3v, and IEEE 802.ab
Ethernet	LAN1 Supports 10/100/1000 Mbps.
	LAN2 Supports 10/100/1000/2500 Mbps.
	LAN Connectors: Phone Jack RJ45 8P 90D(F)
	Audio Codec: Realtek ALC888S:
	Compliant with HD audio specifications
Audio	Supports 16/20/24-bit DAC and 16/20/24-bit ADC resolution
	Supports Line Out and Mic In audio
	Connectors: 1 x Earphone jack
Battery	1 x 3V/220 mAh battery with wire

# **1.4 Mechanical Specifications**

# **1.4.1 System Dimensions**

156 x 112 x 60 mm





# 1.4.2 Weight

1.3 Kg

# **1.5 Power Requirements**

### 1.5.1 System Power

Power Input: DC In 12V-24V

### 1.5.2 RTC Battery

Lithium: 3V/220mAH

# **1.6 Environmental Specifications**

### **1.6.1** Operating Temperature

■ -20 ~ 60 °C, with 0.7m/s air flow

### 1.6.2 Relative Humidity

■ 95% @ 40 °C (104 °F) (non-condensing)

### 1.6.3 Storage Temperature

■ -40 ~ 85 °C (-40 ~ 185 °F)

### **1.6.4 Vibration Tolerance**

When the system is equipped with an Slim SATA: 3 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1 hr/axis, (x, y, z) 3 axes

### 1.6.5 Shock Tolerance

When the system is equipped with an Slim SATA: 30 G, IEC 60068-2-27, half sine, 11 ms duration

### **1.6.6 Safety Certification**

UL, CB, CCC, BSMI

### **1.6.7 EMC Certification**

CE/FCC Class B, Heavy Industry 61000-6-4, 61000-6-2, CCC, BSMI

6



# Hardware Installation

This chapter details instructions for installing AIR-150 hardware and external I/O.

# 2.1 Introduction

The following sections demonstrate the internal jumper settings and the external connector pin assignments.

# 2.2 Jumpers

### 2.2.1 Jumper Description

AIR-150 can be configured to satisfy specific application requirements by setting jumpers. A jumper is a metal bridge used to close an electric circuit. 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, connect the pins with the clip. To open a jumper, remove the clip. Sometimes a jumper will have three pins, labeled 1, 2, and 3. For these jumpers, connect either pins 1 and 2, or 2 and 3.



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



A pair of needle-nose pliers may be necessary when working with jumpers. Users with concerns regarding the ideal hardware configuration for your application should contact your local distributor or sales representative before making any changes. Usually, only a standard cable is required to make most connections.

### 2.2.2 Jumper List

Table 2.1: Jumper List		
Location	Function	
JCMOS1	Clear CMOS	
CN22	Auto Power On Setting	
SW_422_1	RS485/RS422 Fail Safe Enabled/Disabled	
SW_422_2	RS485/RS422 Fail Safe Enabled/Disabled	
ERP1	For ERP Power-saving Mode	

## 2.2.3 Jumper Location



Figure 2.1 Jumper Location

### 2.2.4 Jumper Settings

	1
0	2
0	3

Table 2.2: JCMOS1	Clear CMOS
Part Number	1653003101
Description	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS
Default Setting	(1-2)
Jumper Setting	(2-3): Clear CMOS



Table 2.3: CN22 Auto Power On Setting		
Part Number	1653004101	
Description	PIN HEADER 4x1P 2.0mm 180D(M) DIP 21N12050	
Default Setting	(1-2): ATX mode	
Jumper Setting	(3-4): AT mode	



Table 2.4: SW_422 COM Port Failsafe Setting					
SW 422 1	Mode/Description	Pin1	Pin2	Pin3	Pin4
(COM1_SAFE1)	Default	OFF	OFF	OFF	OFF
SW_422_2 (COM2_SAFE2)	RS422_TX/RX external pull up/down	ON	ON	ON	ON
	RS-485 TX external pull up/down	ON	ON	OFF	OFF



Table 2.5: Table 2	2.5: ERP1 ERP Power-saving Mode
Part Number	1653000014
Description	PIN HEADER 2x2P 2.00mm 180D(M) SMD 21N22050
Default Setting	(1-2 short): Normal mode
Jumper Setting	(3-4 short): Enable ERP Power-saving mode

# 2.3 System I/O



Figure 2.2 Front View



# 2.4 External I/O

### 2.4.1 Power On/Off Button

AIR-150 features a Power On/Off button with an LED indicators on the top side that show On status (Green LED).



### Figure 2.4 Power On/Off Button

### 2.4.2 Power Input Connector

AIR-150 supports one 2-pin Phoenix terminal power input connector. Connect the positive and negative power cables to the terminals in the power distribution connector correctly at the same time.



### Figure 2.5 Phoenix Terminal Connector



- *1.* For supply connections use wires suitable for at least 75°C.
- 2. The terminal block is suitable for 14 AWG. Torque value 7lb-in User copper conductors only. Must be installed by skilled person.
- 3. The terminal block uses two sets of interfaces to make it split to meet the maximum current limit, and a single pin will be limited below 16A.

### 2.4.3 Ethernet Connector (LAN1/2)

AIR-150 is equipped with one Intel® I219-LM and one Intel® I226-LM Ethernet controllers that are fully compliant with IEEE 802.3u and 802.3bz 10/100/1000/2500 Mbps CSMA/CD standards and connected to LAN1 and LAN2. The Ethernet port provides a standard RJ45 jack connector with LED indicators on the front side to show its Active/Link status (Green LED) and Speed status (Orange/Yellow LED).



Figure 2.6 Ethernet Connector

Table 2.6: Ethernet Connector Pin Assignments		
Pin	10/100/1000BaseT Signal Name	
1	TX+	
2	TX-	
3	RX+	
4	MDI2+	
5	MDI2-	
6	RX-	
7	MDI3+	
8	MDI3-	

### 2.4.4 USB 3.2 Gen1 Connector

AIR-150 supports three USB 3.2 interfaces, which support Plug-and-Play functionality and hot swapping for up to 127 external devices. The USB interfaces comply with USB UHCI, Rev. 3.2.

USB 3.2 connectors contain legacy pins to interface to USB 2.0 devices and a new set of pins for USB 3.2 connectivity.



Figure 2.7 USB 3.2 Connector

Table 2.7: USB Connector Pin Definition		
Pin	Signal Name	
1	+5V	
2	D0	
3	D+_0	
4	GND	
5	USB0_SSRX-	
6	USB0_SSRX+	
7	GND	
8	USB0_SSTX-	
9	USB0_SSTX+	

### 2.4.5 USB 2.0 Connector

AIR-150 supports one USB 2.0 interfaces, which support Plug-and-Play functionality.



Figure 2.8 USB 2.0 Connector

Table 2.8: USB 2.0 Pin Definition	
Pin	Signal Name
1	VCC
2	USB_data
3	USB_data+
4	GND

### 2.4.6 Audio Connector

AIR-150 features one phone jack connectors that support stereo Line Out and Mic In audio ports. The audio chip is controlled by ALC888S and compliant with the Azalea standard.



Figure 2.9 Audio Connector

### 2.4.7 COM Connector

AIR-150 provides two 9-pin COM connector, which supports RS232/422/485 serial communication interface ports. The default setting is RS-232, if you want to use RS-422/485, you can use the BIOS manual to change settings. Furthermore, the third one is only for RJ485.



Figure 2.10 COM Connector

Table 2.9: COM Connector Pin Definition				
Pin	RS-232	RS-422	RS-485	
1	DCD	Tx-	DATA-	
2	RxD	Tx+	DATA+	
3	TxD	Rx+	NC	
4	DTR	Rx-	NC	
5	GND	GND	GND	
6	DSR	NC	NC	
7	RTS	NC	NC	
8	CTS	NC	NC	
9	RI	NC	NC	
NC represents "No	NC represents "No Connection".			

### 2.4.8 HDMI Connector

AIR-150 offers two integrated 19-pin receptacle connector HDMI 2.0b interfaces. The HDMI link supports resolutions up to 4096 x 2160 @ 60 Hz.



### Figure 2.11 HDMI Connector

Table 2.10: HDMI C	onnector Pin Definition
Pin	Signal Name
1	HDMI_TX2+
2	GND
3	HDMI_TX2-
4	HDMI_TX1+
5	GND
6	HDMI_TX1-
7	HDMI_TX0+
8	GND
9	HDMI_TX0-
10	HDMI_CLK+
11	GND
12	HDMI_CLK-
13	NC
14	NC
15	HDMI_DCLK
16	HDMI_DDAT
17	GND
18	+V5_HDMI-HPD
19	DDP0_HPD
NC represents "No Connection".	

### 2.4.9 Antenna Socket

AIR-150 reserves four antenna sockets for installing wireless/LTE device antennas. Each antenna socket is labeled "ANT" for easy identification.



### 2.4.10 CANBUS Port and Pin Definition

AIR-150 offers CANBUS port and pin definition as below.



Figure 2.13 CANBUS Port

Table 2.11: CANBUS Port and Pin Definition		
Pin	Signal Name	
1	CAN0_D-	
2	CAN1_D+	
3	GND	
4	GND	
5	CAN0_D+	
6	CAN1_D-	

### 2.4.11 DIO Connector

AIR-150 offers 9-bit DI/O and pin definition as below.



Figure 2.14 DIO Connector

Table 2.12: DIO Connector and Pin Definition		
Pin	Signal Name	
1	DIO bit 0	
2	DIO bit 1	
3	DIO bit 2	
4	DIO bit 3	
5	DIO bit 4	
6	DIO bit 5	
7	DIO bit 6	
8	DIO bit 7	
9	GND	

# Chapter 2 Hardware Installation

# 2.5 Installation

### 2.5.1 M.2 B key/M-key/E-key Installation

1. Loosen the 7 screws affixing screws and remove the bottom cover.





- 2. Install the M.2 2280 M/ 2230 E key module.
- Install the M.2 E-Key 2230 (with round head screw).
- Install the M.2 M-Key 2280 module (with round head screw).



### 2.5.2 Memory Installation

1. Loosen 4 screws affixing screws and remove the TOP cover.



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- 2. Use two thermal pad from accessory box.
- If only one memory slot is used, the memory must be inserted into the NO.2 socket without using any thermal pad.

PS: NO.1 socket is not recommended.



- If two memory (full slots) are used, two types of thermal pads are required (available in the Accessory bag).
  - First, use a larger thermal pad, attach to the back of the first memory (near the MB face), and plug in the NO.1 socket.





- Finally, use smaller one for rest memory for NO.1 Slot





### 2.5.3 Slim SATA Installation

1. Loosen the 7 screws affixing screws and remove the bottom cover.





2. Let Slim SATA to Fasten 4 screws onto bottom cover.



3. Insert SATA Cable into MB.



### 2.5.4 AIR-150 Wall Mount Installation

- 1. AIR-150 default supports wall mount with the two wings on the bottom cover.
- 2. Use 4x existed screw (with flat head screw) which already attached on side cover.






# Chapter 2 Hardware Installation

### 2.5.5 AIR-150 DIN-Rail Installation

- 1. AIR-150 supports optional DIN-Rail.
- 2. Use 7x 19300086506 Screw (with flat head screw), which is the same with wall Mount screw. (P.S. 3x screw in the accessory bag.)





# **BIOS Settings**

This chapter details the BIOS configuration instructions.

## 3.1 Introduction

The AMI BIOS ROM has a built-in setup program - the BIOS Setup Utility - that allows users to modify the basic system configuration. All configuration data is stored in battery-backed CMOS to ensure the setup information is retained when the power is turned off.

This chapter describes the basic navigation of the AIR-150 BIOS setup screens.

Main Advanced Chipset Security	Aptio Setup – AMI Boot Save & Exit NVMe RPM	B Key Migration MEBx
BIOS Information BIOS Vendor Core Version Compliancy Project Version Build Date and Time Access Level Project Board Version Power Type	American Megatrends 5.0.2.7 0.14 x64 UEFI 2.8; PI 1.7 AI15000R060X002 12/06/2023 12:31:22 Administrator AIR-150 ATX	Set the Time. Use Tab to switch between Time elements.
Memory Information Total Memory Memory Frequency System Date System Time	16384 MB 4800 MT/s [Tue 12/26/2023] [15:21:13]	<pre> ++: Select Screen  tl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
Version	2.22.1290 Copyright (C) 2023	AMI

Figure 3.1

## 3.2 Entering BIOS Setup

Turn on the computer and then press ESC or DEL to enter the BIOS Setup menu.

### 3.2.1 Main Setup

Upon accessing the BIOS Setup Utility, users are presented with the Main setup page. Users can always return to the Main setup page by selecting the Main tab. The Main BIOS Setup page is shown below.

Main Advanced Chipset Security	Aptio Setup – AMI Boot Save & Exit NVMe RPM	B Key Migration MEBx
BIOS Information BIOS Vendor Core Version Compliancy Project Version Build Date and Time Access Level Project Board Version Power Type	American Megatrends 5.0.2.7 0.14 x64 UEFI 2.8; PI 1.7 AI15000R060X002 12/06/2023 12:31:22 Administrator AIR-150 ATX	Set the Time. Use Tab to switch between Time elements.
Memory Information Total Memory Memory Frequency System Date System Time	16384 MB 4800 MT/s [Tue 12/26/2023] [15:21:13]	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version :	2.22.1290 Copyright (C) 2023	AMI

Figure 3.2

The Main BIOS setup page has two main frames. The left frame displays all the items accessible on the Main page. Items that are grayed out cannot be configured, whereas items presented in blue text can be configured. The right frame displays the key legend.

Located above the key legend is an area reserved for a text message. When an item is selected in the left frame, the item is presented in white text and often accompanied by a text message.

### System Time/System Date

Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values via the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format, and the time must be entered in HH:MM:SS format.

### 3.2.2 Advanced BIOS Setup

Select the Advanced tab from the BIOS Setup Utility to enter the Advanced BIOS Setup page. Select any of the items in the left frame of the screen, such as CPU Configuration, to access the sub menu for that item. The options for any of the Advanced BIOS Setup items can be displayed by highlighting the item using the <Arrow> keys.

### 3.2.2.1 WWAN Configuration



Figure 3.3

### WWAN DEVICE

When Disabled, Select the M.2 WWAN Device options to enable 4G - 7360/ 7560 (Intel), 5G - M80 (MediaTek) Modems.

# Chapter 3 BIOS Settings

### 3.2.2.2 CPU Configuration

Main Advanced Chipset Security	Aptio Setup – AMI Boot Save & Exit NVMe RPMB Key Migration MEBx
Nain Advanced Chipset Security          WWAN Configuration         POWEr & Performance         PCH-FW Configuration         Trusted Computing         ACPI Settings         IManager Configuration         SS RTC Wake Settings         Serial Port Console Redirection         Intel TXT Information         PCM Configuration         Network Stack Configuration         CSM Configuration         NVMe Configuration	CPU Configuration Parameters CPU Configuration Parameters ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version	2.22.1290 Copyright (C) 2023 AMI

Figure 3.4

Advanced	Aptio Setup – AMI	
CPU Configuration		▲ Displays the E-core Information
CPU Configuration Efficient-core Information Performance-core Information Brand String ID Microcode Revision VMX SMX/TXT TXT Crash Code TXT SPAD Boot Guard Status Boot Guard Status Boot Guard SACM Information C6DRAM CPU Flex Ratio Override CPU Flex Ratio Override CPU Flex Ratio Settings Hardware Prefetcher Adjacent Cache Line Prefetch Intel (VMX) Virtualization	13th Gen Intel(R) Core(TM) i3-1315UE 0xB06A3 4114 Supported Not Supported 0x00000000 0x904000000000000 0x00008000 0x000000000000	<ul> <li>▲ Displays the E-core Information</li> <li>★+: Select Screen</li> <li>★+: Select Item</li> <li>Enter: Select</li> <li>★/-: Change Opt.</li> <li>F1: General Help</li> <li>F2: Previous Values</li> <li>F3: Optimized Defaults</li> <li>F4: Save &amp; Exit</li> <li>ESC: Exit</li> </ul>
Technology PECI	[Enabled]	
Versio	n 2 22 1290 Conunight (C)	) 2022 AMT

Figure 3.5



Figure 3.6

### Efficient-core Information

Table 3.1: Displays the E-core Information			
L1 Data Cache	32 KB X 8	Displays the Efficient-core L1 Data Cache size.	
L1 Instruction Cache	64 KB	Displays the Efficient-core L1 Instruction Cache size.	
L2 Cache	2048 KB X 2	Displays the Efficient-core L2 Cache size.	
L3 Cache	12 MB	Displays the Efficient-core L3 Cache size.	



Figure 3.7

### Performance-core Information

Table 3.2: Displays the P-core Information			
L1 Data Cache	48 KB X 2	Displays the Performance-core L1 Data Cache size.	
L1 Instruction Cache	32 KB x 2	Displays the Performance-core L1 Instruction Cache size.	
L2 Cache	1280 KB X 2	Displays the Performance-core L2 Cache size.	
L3 Cache	12 MB	Displays the Performance-core L3 Cache size.	

### 3.2.2.3 Power & Performance

Main Advanced Chipset Securi	Aptio Setup – Al ty Boot Save & Exit	ⅠI NVMe RPMB Key Migration MEBx
<ul> <li>WWAN Configuration</li> <li>CPU Configuration</li> <li>POWER &amp; Performance</li> <li>PCH-FW Configuration</li> <li>Trusted Computing</li> <li>ACPI Settings</li> <li>iManager Configuration</li> <li>SS RTC Wake Settings</li> <li>Serial Port Console Redirection</li> <li>Intel TXT Information</li> <li>PCI Subsystem Settings</li> <li>USB Configuration</li> <li>Network Stack Configuration</li> <li>CSM Configuration</li> <li>NVMe Configuration</li> </ul>		Power & Performance Options ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Versi	on 2.22.1290 Copyrigh	t (C) 2023 AMI

Figure 3.8



Figure 3.9

### **CPU - Power Management Control**

View/Configure Turbo Options View/Configure Turbo Options.

Turbo Ratio Limit Options
 View/Configure Turbo Ratio Limit Options.

### CPU VR Setting

Current VccIn AUX Icc Max.

### GT VR Settings

Configure GT VR Settings.

- GT VR Fast Vmode
  - GT VR Fast Vmode. Use to control GT Fast Vmode Enable/Disable.
- VR Voltage Limit

Voltage Limit (VMAX). This value represents the Maximum instantaneous voltage allowed at any given time. Range is 0 - 7999mV. Uses BIOS VR mailbox command 0x8.

### RFI Settings

Configure RFI Settings

- RFI Current Frequency 139.200MHZ
- RFI Frequency Set desired RFI frequency, in increments of 100KHz. (For a frequency of 100.6MHz, enter 1006.)
- Custom P-state Table
   Add Custom P-state Table.

### GT - Power Management Control

- RC6(Render Standby) Check to enable render standby support.
- Maximum GT frequency
   Maximum GT frequency limited by the user.

# Disable Turbo GT frequency Enabled: Disables Turbo GT frequency. Disabled: GT frequency is not limited.

### 3.2.2.4 PCH-FW Configuration

Main Advanced Chipset Security	Aptio Set Boot Save	up – AMI & Exit NVMe	e RPMB Key Migration MEBx
<ul> <li>WWAN Configuration</li> <li>CPU Configuration</li> <li>Power &amp; Performance</li> <li>PCH-FW Configuration</li> <li>Trusted Computing</li> <li>ACPI Settings</li> <li>iManager Configuration</li> <li>SS RTC Wake Settings</li> <li>Serial Port Console Redirection</li> <li>Intel TXT Information</li> <li>PCI Subsystem Settings</li> <li>USB Configuration</li> <li>Network Stack Configuration</li> <li>CSM Configuration</li> <li>NVMe Configuration</li> </ul>			Configure Management Engine Technology Parameters ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version	2.22.1290 Co	pyright (C)	2023 AMI

Figure 3.10

Advanced	Aptio Setup – AMI	
ME Firmware Version ME Firmware Mode ME Firmware SKU ME Firmware Status 1 ME Firmware Status 2 ME Firmware Status 3 ME Firmware Status 4 ME Firmware Status 5 ME Firmware Status 6	16.1.27.2225 Normal Mode Corporate SKU 0x90000255 0x38858106 0x0000030 0x00004000 0x00004000 0x00000103 0x80400002	Configure Intel(R) Active Management Technology Parameters
ME State Manageability Features State AMT BIOS Features AMT Configuration Local Platform Erase Configuration ME Unconfig on RTC Clear Core Bios Done Message CSE Data Resilience Support	[Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled]	<pre>→+: Select Screen f↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values</pre>
<ul> <li>Firmware Update Configuration</li> <li>PTT Configuration</li> <li>OEM Key Revocation Configuration Extend CSME Measurement to TPM-PCR</li> </ul>	[Disabled]	F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2	2.22.1290 Copyright (C) 2023	AMI

Figure 3.11

	Advanced	Aptio Setup – AMI	
		16 1 07 0005	Configure Management Engine
	ME Firmware Mode	Normal Mode	Technologu Parameters
	ME Firmware SKU	Corporate SKU	recimology fundictors
	ME Firmware Status 1	0x90000255	
	ME Firmware Status 2	0x3B858106	
	ME Firmware Status 3	0x00000030	
	ME Firmware Status 4	0x00004000	
	ME Firmware Status 5	0x00000103	
	ME Firmware Status 6	0x80400002	
	ME State	[Enabled]	
	Manageability Features State	[Enabled]	
	AMT BIOS Features	[Enabled]	Mar On best Orenand
Ľ	AMI Configuration		↔: Select Screen
1	LUCAI FIALTURM ERASE CONTIguration -	[Epobled]	T+: Select Item
	Cone Rice Done Messade	[Enabled]	Litter, Select
	CSE Data Resilience Sunnort	[Enabled]	F1: General Heln
	Cor Data Restricted Support	[Endbied]	F2: Previous Values
	Firmware Undate Configuration		F3: Ontimized Defaults
	PTT Configuration		F4: Save & Exit
	OEM Key Revocation Configuration		ESC: Exit
	Extend CSME Measurement to TPM-PCR	[Disabled]	

Figure 3.12

Advanced	Aptio Setup – AMI	
Ме FW Image Re-Flash FW Update	[Disabled] [Enabled]	Enable/Disable Me FW Image Re-Flash function.
Version 2	.22.1290 Copyright (C) 2023	AMI

Figure 3.13

### ME State

When Disabled ME will be put into ME Temporarily Disabled Mode.

### Manageability Features State

Enable/Disable Intel(R) Manageability features.

### AMT BIOS Features

When disabled AMT BIOS Features are no longer supported and user is no longer able to access MEBx Setup.

### ME Unconfig on RTC Clear

When Disabled ME will not be unconfigured on RTC Clear.

### **Firmware Update Configuration**

- Me FW Image Re-Flash
   Enable/Disable Me FW Image Re-Flash function.
- FW Update
   Enable/Disable ME FW Update function.

### **OEM Flags Settings**

### MEBx hotkey Pressed

Enable automatic MEBx hotkey press.

### MEBx Selection Screen

Enable MEBx selection screen with 2 options: Press 1 to enter ME Configuration Screens. Press 2 to initiate a remote connection.

### Hide Unconfigure ME Confirmation Prompt Hide Unconfigure ME confirmation prompt when at

Hide Unconfigure ME confirmation prompt when attempting ME unconfiguration.

### MEBx OEM Debug Menu Enable Enable OEM debug menu in MEBx.

### Unconfigure ME

Unconfigure ME with resetting MEBx password to default.

### 3.2.2.5 ACPI Settings



Figure 3.14

Advanced	Aptio Setup – AMI	
ACPI Settings		Enables or Disables BIOS ACPI
Enable ACPI Auto Configuration	[Disabled]	huto con igu ation.
Enable Hibernation ACPI Sleep State	[Enabled] [S3 (Suspend to RAM)]	
		<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
Version	2.22.1290 Copyright (C) 2023	AMI

Figure 3.15

### Enable ACPI Auto Configuration

Enables or Disables BIOS ACPI Auto Configuration.

### Enable Hibernation

Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems.

### ACPI Sleep State

Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

### 3.2.2.6 iManager Configuration

Main Advanced Chipset Security	Apt Boot	tio Setup – AM Save & Exit	I NVMe RP	MB Key Migration MEBx
<ul> <li>WWAN Configuration</li> <li>CPU Configuration</li> <li>Power &amp; Performance</li> <li>PCH-FW Configuration</li> <li>Trusted Computing</li> <li>ACPI Settings</li> <li>iManager Configuration</li> <li>SS RTC Wake Settings</li> <li>Serial Port Console Redirection</li> <li>Intel TXT Information</li> <li>PCI Subsystem Settings</li> <li>USB Configuration</li> <li>Network Stack Configuration</li> <li>CSM Configuration</li> <li>NVMe Configuration</li> </ul>				<pre>iManager Parameters. iManager Parameters.  +*: Select Screen 1!: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
Version	2.22.:	1290 Copyright	(C) 202	3 AMI

Figure 3.16



Figure 3.17

### **Serial Port 1 Configuration**

### Serial Port

Enable or Disable serial port.

- Change Settings
   Select an optional settings for Super IO device.
- COM1 Mode COM1 mode select.

### **Serial Port 2 Configuration**

- Serial Port Enable or Disable serial port.
- Change Settings
   Select an optional settings for Super IO device.
- COM2 Mode COM2 mode select.

### Hardware Monitor

Provide hardware monitor information.

### Watch Dog Timer Configuration

Watch Dog Timer
 Enabled or Disabled.

Watch Dog Timer function (Start before boot to OS and must stop by self).

### **GPIO** Configuration

# GPIO Control Enable Choose to control GPIO by EC or user override during POST stage.

### **ACPI Report Method Control**

Select ACPI Reporting Method for EC Devices.

### 3.2.2.7 Trusted Computing

Main Advanced Chipset Security	Ap <sup>.</sup> Boot	tio Setup – AM Save & Exit	II NVMe I	RPMB Key Migration MEBx
<ul> <li>WWAN Configuration</li> <li>CPU Configuration</li> <li>Power &amp; Performance</li> <li>PCH-FW Configuration</li> <li>Trusted Computing</li> <li>ACPI Settings</li> <li>iManager Configuration</li> <li>SS RTC Wake Settings</li> <li>Serial Port Console Redirection</li> <li>Intel TXT Information</li> <li>PCI Subsystem Settings</li> <li>USB Configuration</li> <li>Network Stack Configuration</li> <li>CSM Configuration</li> <li>NVMe Configuration</li> </ul>				Trusted Computing Settings ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version	2.22.1	1290 Copyright	: (C) 20	U23 AMI

Figure 3.18

Advanced	Aptio Setup — AMI	
TPM Device Selection	[fTPM]	Selects TPM device: fTPM or dTPM _ fTPM _ Enables fTPM
TPM 2.0 Device Found		dTPM - Disables fTPM and
Firmware Version:	600.18	Enable dTPM. Warning !
Vendor:	INTC	fTPM/dTPM will be disabled and all data saved on it will be
Security Device Support	[Enable]	lost.
Active PCR banks	SHA256	
Available PCR banks	SHA256,SHA384,SM3	
SHA256 PCR Bank	[Enabled]	
SHA384 PCR Bank	[Disabled]	
SM3_256 PCR Bank	[Disabled]	
		++: Select Screen
Pending operation	[None]	T4: Select Item
Platform Hierarchy	[Enabled]	Enter: Select
Storage Hierarchy	[Enabled]	+/-: Unange upt.
Endorsement Hierarchy Dhuaisal Dasaanaa Oraa Vanaian	[Enabled]	F1: General Help
TRN 2 0 Interference Spec Version	[1.3]	F2: Previous values
Dewise Select		F3: Optimized Defaults
Device Select	[Huto]	ECC. EVIT
		LSC. EXIC
Version	2.22.1290 Copyright (C) 202	3 AMI

Figure 3.19

# Security Device Support Enables or Disables BIOS support for security device.

SHA256 PCR Bank

Enable or Disable SHA256 PCR Bank.

- Pending operation
   Schedule an Operation for the security device.
- Platform Hierarchy
   Enable or Disable Platform Hierarchy.
- Storage Hierarchy Enable or Disable Storage Hierarchy.
- Endorsement Hierarchy Enable or Disable Endorsement Hierarchy.
- Physical Presence Spec Version

Select to Tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.

### 3.2.2.8 S5 RTC Wake Settings

### Wake System from S5

Enable or disable System wake on alarm event. When enabled, System will wake on the hr::min::sec specified.

Aptio Setup - AMI Main Advanced Chinest Security Rost Save & Evit NUMe RRMR Key Mignation MERy					
Main Advanced Chipset WWAN Configuration CPU Configuration Power & Performance PCH-FW Configuration Trusted Computing ACPI Settings iManager Configuration S5 RTD Wake Settings Serial Port Console Redir Intel TXT Information PCI Subsystem Settings USB Configuration	Security	Boot	Save & Exit	NVME RPMI	B Key Migration MEBx Enable system to wake from S5 using RTC alarm
<ul> <li>Network Stack Configurati</li> <li>CSM Configuration</li> <li>NVMe Configuration</li> </ul>	on				<pre> ++: Select Screen  14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
	Version	2.22.1	290 Copyright	(C) 2023	AMI

Figure 3.20



Figure 3.21

### 3.2.2.9 Serial Port Console Redirection

### Console Redirection

Console Redirection Enable or Disable.

Main Advanced Chipset	A Security Boo	ptio Setup – A⊬ t Save & Exit	II NVMe RPM	B Key Migration MEBx
<ul> <li>WWAN Configuration</li> <li>CPU Configuration</li> <li>Power &amp; Performance</li> <li>PCH-FW Configuration</li> <li>Trusted Computing</li> <li>ACPI Settings</li> <li>iManager Configuration</li> <li>SS RTC Wake Settings</li> <li>Serial Port Console Redir</li> <li>Intel TXT Information</li> <li>PCI Subsystem Settings</li> <li>USB Configuration</li> <li>Network Stack Configurat:</li> <li>CSM Configuration</li> <li>NVMe Configuration</li> </ul>	ection .on			Serial Port Console Redirection ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
	Version 2.22	.1290 Copyright	: (C) 2023	AMI

Figure 3.22

Advanced	Aptio Setup — AMI	
COM1 Console Redirection ► Console Redirection Settings COM1(Pci Bus0,Dev0,Func0) (Disabled) Console Redirection Legacy Console Redirection ► Legacy Console Redirection Settings	[Disabled] Port Is Disabled	Console Redirection Enable or Disable.
Serial Port for Out-of-Band Managemer Windows Emergency Management Services Console Redirection EMS ▶ Console Redirection Settings	nt/ s (EMS) [Disabled]	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
Version 2	.22.1290 Copyright (C) 2023	AMI

Figure 3.23

### 3.2.2.10 Intel TXT Information

Main Advanced Chipset Security	Aptio Setup – AMI Boot Save & Exit NVMe RPMB Key Migration MEBx
<ul> <li>WWAN Configuration</li> <li>CPU Configuration</li> <li>Power &amp; Performance</li> <li>PCH-FW Configuration</li> <li>Trusted Computing</li> <li>ACPI Settings</li> <li>iManager Configuration</li> <li>S5 RTC Wake Settings</li> <li>Serial Port Console Redirection</li> <li>Intel TXT Information</li> <li>PCI Subsystem Settings</li> <li>USB Configuration</li> <li>Network Stack Configuration</li> <li>CSM Configuration</li> <li>NVMe Configuration</li> </ul>	Display Intel TXT information ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version	2.22.1290 COPYRIght (C) 2023 HM1

Figure 3.24



Figure 3.25

Provide Intel TXT information.

### 3.2.2.11 PCI Subsystem Settings



Figure 3.26



Figure 3.27

### Re-Sized BAR Support

If system has Resizable BAR capable PCIe Devices, this option Enables or Disables Resizable BAR Support.

### BME DMA Mitigation

Re-enable Bus Master Attribute disabled during Pci enumeration for PCI Bridges after SMM Locked.

### 3.2.2.12 USB Configuration

Main Advanced Chipset Secur	Ap ity Boot	tio Setup – AM Save & Exit	I NVMe F	RPMB Key Migration MEBx
<ul> <li>WWAN Configuration</li> <li>CPU Configuration</li> <li>Power &amp; Performance</li> <li>PCH-FW Configuration</li> <li>Trusted Computing</li> <li>ACPI Settings</li> <li>iManager Configuration</li> <li>SS RTC Wake Settings</li> <li>Serial Port Console Redirection</li> <li>Intel TXT Information</li> <li>PCI Subsystem Settings</li> <li>USB Configuration</li> <li>Network Stack Configuration</li> <li>CSM Configuration</li> <li>NVMe Configuration</li> </ul>				USB Configuration Parameters ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Vers	ion 2.22.	1290 Copyright	(C) 20	023 AMI

Figure 3.28

Advanced	Aptio Setup — AMI	
USB Configuration		Enables Legacy USB support.
USB Module Version	31	support if no USB devices are connected. DISABLE option will
USB Controllers: 2 XHCIs		keep USB devices available only for EFI applications.
USB Devices: 1 Drive, 1 Keyboard, 1 Mouse,	1 Hub	
Legacy USB Support XHCI Hand-off USB Mass Storage Driver Support	[Enabled] [Enabled] [Enabled]	
USB hardware delays and time-outs:	[20, coc]	++: Select Screen
Device reset time-out	[20 sec]	Enter: Select
Device power-up delay	[Auto]	+/-: Change Opt.
		F1: General Help
Mass Storage Devices:		F2: Previous Values
JetFlashTS4GJEV30 8.07	[Auto]	F3: Uptimized Defaults
		FSC: Exit
	.22.1290 Copyright ( <u>C)</u> 2023	AMI

Figure 3.29

Advanced	Aptio Setup – AMI	
USB Configuration		Enables Legacy USB support.
USB Module Version	26	support if no USB devices are connected. DISABLE option will
USB Controllers: 1 XHCI		keep USB devices available only for EFI applications.
USB Devices: 1 Drive, 1 Keyboard, 1 Mouse,	1 Hub	
Legacy USB Support XHCI Hand-off USB Mass Storage Driver Support	(Enabled) (Enabled) (Enabled)	
USB handware delows and time outer	[cnabled]	the Colort Concer
USB transfer time-out	[20 sec]	tl: Select Item
Device reset time-out	[20 sec]	Enter: Select
Device power-up delay	[Auto]	+/-: Change Opt.
		F1: General Help
Mass Storage Devices:		F2: Previous Values
JetFlashTS4GJFV30 8.07	(Auto)	F3: Optimized Defaults F4: Save & Exit
		ESU: EXIT
Version :	2.21.1278 Copyright (C) 202	1 AMI

Figure 3.30

### Legacy USB Support

Enables Legacy USB support.

### XHCI Hand-Off

This is a workaround for OSes without XHCI hand-off support.

USB Mass Storage Driver Support: Enable/Disable USB Mass Storage Driver Support.

### USB transfer time-out

The time-out value for Control, Bulk, and Interrupt transfers.

### Device Reset Timeout

USB mass storage device Start Unit command time-out.

### Device Power-Up Delay

Maximum time the device will take before it properly reports itself to the Host Controller.

### 3.2.2.13 Network Stack Configuration

Main Advanced Chipset Security	Aptio Setup – AMI Boot Save & Exit NVMe RPMB Key Migration MEBx
<ul> <li>WWAN Configuration</li> <li>CPU Configuration</li> <li>Power &amp; Performance</li> <li>PCH-FW Configuration</li> <li>Trusted Computing</li> <li>ACPI Settings</li> <li>iManager Configuration</li> <li>S5 RTC Wake Settings</li> <li>Serial Port Console Redirection</li> <li>Intel TXT Information</li> <li>PCI Subsystem Settings</li> <li>USB Configuration</li> <li>Network Stack Configuration</li> <li>CSM Configuration</li> <li>NVMe Configuration</li> </ul>	Network Stack Settings ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version	.22.1290 Copyright (C) 2023 AMI

Figure 3.31

Advanced	Aptio Setup – AMI	
Compatibility Support Mod	ule Configuration	Enable/Disable CSM Support.
CSM Support	[Disabled]	
		<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. Fl: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
Version 2.22.1290 Copyright (C) 2023 AMI		

Figure 3.32

### Network Stack

Enable/Disable UEFI network stack.

# Chapter 3 BIOS Settings

### 3.2.2.14 CSM Configuration

Main Advanced Chipset Security	Aptio Setup – AMI Boot Save & Exit NVMe RPMB Key Migration MEBx
<ul> <li>WWAN Configuration</li> <li>CPU Configuration</li> <li>Power &amp; Performance</li> <li>PCH-FW Configuration</li> <li>Trusted Computing</li> <li>ACPI Settings</li> <li>iManager Configuration</li> <li>S5 RTC Wake Settings</li> <li>Serial Port Console Redirection</li> <li>Intel TXT Information</li> <li>PCI Subsystem Settings</li> <li>USB Configuration</li> </ul>	CSM configuration: Enable/Disable, Option ROM execution settings, etc.
<ul> <li>CSM Configuration</li> <li>NVMe Configuration</li> </ul>	++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version	2.22.1290 Copyright (C) 2023 AMI

Figure 3.33

Aptio Setup – AMI Advanced				
Compatibility Support Mod	dule Configuration	Enable/Disable CSM Support.		
CSM Support	[Disabled]			
		<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>		
	Version 2.22.1290 Copyright (C)	) 2023 AMI		

Figure 3.34

### CSM Support

Enable/Disable CSM support.

### 3.2.3 Chipset Configuration

### 3.2.3.1 System Agent (SA) Configuration

### **Memory Configuration**

Display memory information.

### VT-d

VT-d capability.

### Above 4GB MMIO BIOS assignment

Enable/Disable above 4GB MemoryMappedIO BIOS assignment. This is enabled automatically when Aperture Size is set to 2048MB.

Main Advanced Chipset	f Security Boo	p <mark>tio Setup – AM</mark> ≀t Save & Exit	II NVMe RPMI	B Key Migration MEBx
<ul> <li>System Agent (SA) Config</li> <li>PCH-IO Configuration</li> </ul>	uration			System Agent (SA) Parameters ++: Select Screen 1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
	Version 2.22	1290 Copyright	: (C) 2023	AMI

Figure 3.35

Chipset	Aptio Setup – AMI	
System Agent (SA) Configuration		Memory Configuration Parameters
VT-d	Supported	
<ul> <li>Memory Configuration</li> <li>Graphics Configuration</li> <li>VMD setup menu</li> <li>PCI Express Configuration</li> </ul>		
VT-d Control Iommu Pre-boot Behavior Above 4GB MMIO BIOS assignment IPU Device (B0:D5:F0) IPU 1181 Dash Camera	[Enabled] [Disable IOMMU] [Enabled] [Disabled] [Disabled]	<pre>++: Select Screen 1↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
Version	2.22.1290 Convright (C) 2023	ант ант

Figure 3.36

Chipset	Aptio Setup — AMI	
System Agent (SA) Configuration		Graphics Configuration
VT-d	Supported	
<ul> <li>Memory Configuration</li> <li>Graphics Configuration</li> <li>VMD setup menu</li> <li>PCI Express Configuration</li> </ul>		
VT-d Control Iommu Pre-boot Behavior Above 4GB MMIO BIOS assignment IPU Device (B0:D5:F0) IPU 1181 Dash Camera	[Enabled] [Disable IOMMU] [Enabled] [Disabled] [Disabled]	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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Figure 3.37

### **Graphics Configuration**

Dvmt Total Gfx Mem 256MB. Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.

RAV Enable
 Enabled

- VMD setup menu
- VMD Configuration settings
- **PCI Express Configuration**
- PCI Express Root Port 1 Select to enable or disable M.2 M Key.

### 3.2.3.2 PCH-IO Configuration

Main Advanced	Chipset Security	Apt. Boot	io Setup – AM Save & Exit	I NVMe RPME	8 Key Migration MEBx
<ul> <li>System Agent (SA)</li> <li>PCH-IO Configurat</li> </ul>	Configuration ion				PCH Parameters ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
	Version	2.22.1	290 Copyright	(C) 2023	AMI

Figure 3.38

Chipset	Aptio Setup — AMI	
PCH-IO Configuration		PCI Express Configuration
<ul> <li>PCI Express Configuration</li> <li>SATA Configuration</li> <li>USB Configuration</li> <li>Security Configuration</li> <li>HD Audio Configuration</li> </ul>		Settings
LAN1 Controller Wake on LAN Enable LAN1 PXE ODROM LAN2 Controller LAN2 PXE ODROM PCIE Wake Restore AC Power Loss Flash Protection Range Registers (FPRR) SPD Write Disable	[Enabled] [Disabled] [Disabled] [Enabled] [Disabled] [Disabled] [Disabled] [TRUE]	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>

Figure 3.39

Chipset	Aptio Setup — AMI	
PCI Express Configuration		The control of Active State
DMI Link ASPM Control PCIe function swap PCH PCIE Clock Gating PCH PCIE Power Gating ▶ PCIE EQ settings	[Auto] [Enabled] [Enabled] [Enabled]	Link.
▶ PCI Express Root Port 5(M.2E)		
		++: Select Screen ↑↓: Select Item Enter: Select
		+/-: Change Opt. F1: General Help
		F2: Previous Values F3: Optimized Defaults F4: Save & Exit
		ESC: Exit
Version 2	.22.1290 Copyright (C) 2023	AMI

Figure 3.40

### **PCI Express Configuration**

PCH PCIE Clock Gating
 Select to enable, PCH PCI Express Clock Gating Enable/Disable for all port.

### PCH PCIE Power Gating

PCH PCI Express Power Gating Enable/Disable for all port.

### PCIe EQ settings

This form contains options for controlling PCIe EQ process.

PCH-IO Configuration       SATA Device Options Settings         > PCI Express Configuration       SATA Configuration         > SATA Configuration       Security Configuration         > Becurity Configuration       Security Configuration         > HD Audio Configuration       Enabled]         LAN1 Controller       [Enabled]         LAN1 PXE OpROM       [Disabled]         LAN2 Controller       [Enabled]         LAN2 Controller       [Enabled]         LAN2 PXE OpROM       [Disabled]         PCIE Wake       [Disabled]         Restore AC Power Loss       [Power Off]         Flash Protection Range Registers       [Disabled]         Flash Protection Range Registers       [Disabled]         SPD Write Disable       [TRUE]         F2: Previous Values       F3: Optimized Defaults	Chipset	Aptio Setup – AMI	
Flash Protection Range Registers       [Disabled]       +/-: Change Opt.         (FPRR)       F1: General Help         SPD Write Disable       [TRUE]       F2: Previous Values         F3: Optimized Defaults	Chipset PCH-IO Configuration > PCI Express Configuration > SATA Configuration > USB Configuration > Security Configuration > HD Audio Configuration LAN1 Controller Wake on LAN Enable LAN1 PXE OpROM LAN2 Controller LAN2 PXE OpROM PCIE Wake Restore AC Power Loss	[Enabled] [Disabled] [Disabled] [Enabled] [Disabled] [Disabled] [Power Off]	SATA Device Options Settings ++: Select Screen 1: Select Item Enter: Select
F4: Save & Exit ESC: Exit	Flash Protection Range Registers (FPRR) SPD Write Disable	(Disabled) [TRUE]	+/-: Change Upt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

### Figure 3.41

Aptio Setup – AMI Chipset	
SATA Configuration	Enable/Disable SATA Device.
SATA Controller(s)[Enabled]SATA Mode Selection[AHCI]SATA Controller Speed Limit[Default]Aggressive LPM Support[Disabled]Serial ATA Port 1EmptySoftware PreserveUnknownPort 1[Enabled]External[Disabled]SATA Device Type[Solid State Drive]Topology[Unknown]SATA Port 1 DevSlp[Disabled]DITO Configuration[Disabled]DITO Value625DM Value15M.2 SATA/Serial ATA PortEmptySoftware PreserveUnknownPort 2[Enabled]Spin Up Device[Disabled]DITO Configuration[Disabled]DITO Value625DM Value15M.2 SATA/Serial ATA PortEmptySoftware PreserveUnknownPort 2[Enabled]External[Disabled]Spin Up Device[Disabled]Shin Up Device[Disabled]SATA Device Type[Solid State Drive]Topology[Unknown]	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

### Figure 3.42

### **SATA** Configuration

# SATA Controller(s) Enable/Disable SATA Device.

### Spin Up Device

If enabled for any of ports Staggerred Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.

SATA Device Type Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.

### Topology

Identify the SATA Topology if it is Default or ISATA or Flex or DirectConnect or M2.

### DITO Configuration

Enable/Disable DITO Configuration.

Chipset	Aptio Setup – AMI	
PCH-IO Configuration		USB Configuration settings
<ul> <li>PCI Express Configuration</li> <li>SATA Configuration</li> <li>USB Configuration</li> <li>Security Configuration</li> <li>HD Audio Configuration</li> </ul>		
LAN1 Controller Wake on LAN Enable LAN1 PXE OpROM	[Enabled] [Disabled] [Disabled]	
LAN2 Controller LAN2 PXE OpROM	[Enabled] [Disabled]	↔: Select Screen
PCIE Wake Restore AC Rower Loss	[Disabled] [Rower_Off]	†↓: Select Item Enter: Select
Flash Protection Range Registers (FPRR)	[Disabled]	+/−: Change Opt. F1: General Help
SPD Write Disable	[TRUE]	F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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Figure 3.43



Figure 3.44

### **USB** Configuration

- USB PDO Programming
   Select 'Enabled' if Port Disable Override functionality is used.
- USB Overcurrent
   Select 'Disabled' for pin-based debug.
- USB Overcurrent Lock

Select 'Enabled' if Overcurrent functionality is used. Enabling this will make xHCl controller consume the Overcurrent mapping data.

### USB Port Disable Override

Selectively Enable/Disable the corresponding USB port from reporting a Device Connection to the controller.

Chipset	Aptio Setup – AMI	
<ul> <li>PCH-IO Configuration</li> <li>PCI Express Configuration</li> <li>SATA Configuration</li> <li>USB Configuration</li> <li>Security Configuration</li> <li>HD Audio Configuration</li> </ul>		Security Configuration settings
LAN1 Controller Wake on LAN Enable LAN1 PXE OpROM LAN2 Controller LAN2 PXE OpROM PCIE Wake Restore AC Power Loss Flash Protection Range Registers (FPRR) SPD Write Disable	[Enabled] [Disabled] [Disabled] [Enabled] [Disabled] [Disabled] [Power Off] [Disabled] [TRUE]	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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Figure 3.45

Chipset	Aptio Setup – AMI	
Security Configuration	(Enabled)	Enable will lock bytes 38h–3Fh in the lower/upper 128–byte bank of RTC RAM
BIOS Lock Force unlock on all GPIO pads	[Enabled] [Disabled]	
		→+: Select Screen ↑↓: Select Item Enter: Select
		+/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit Ecc: Evit
		Lot. Exit
Version :	2.22.1290 Copyright (C) 2023	AMI

Figure 3.46

### **Security Configuration**

- RTC Memory Lock Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM.
- BIOS Lock

Enable/Disable the PCH BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.

Chipset	Aptio Setup – AMI		
PCH-IO Configuration PCI Express Configuration SATA Configuration USB Configuration Security Configuration HD Audio Configuration		HD Audio Subsystem Configuration Settings	
LANI Controller Wake on LAN Enable LAN1 PXE OpROM LAN2 Controller LAN2 PXE OpROM PCIE Wake Restore AC Power Loss Flash Protection Range Registers (FPRR) SPD Write Disable	[Enabled] [Disabled] [Enabled] [Disabled] [Disabled] [Power Off] [Disabled] [TRUE]	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
Version 2.22.1290 Copyright (C) 2023 AMI			

Figure 3.47



Figure 3.48

### HD Audio Configuration HD Audio
Control Detection of the HD-Audio device.

### PCH LAN Controller

Enable/Disable onboard NIC.

## LAN1 PXE OpROM

Enable or disable boot option for LAN1 Controller.

### Wake on LAN Enable

Enable/Disable integrated LAN to wake the system.

#### **Onboard LAN2 Controller**

Select to Enable or Disable Onboard LAN2 Controller.

#### LAN2 PXE OpROM

Enable or disable boot option for LAN2 Controller.

#### **PCIE Wake**

Enable or disable PCIE to wake the system from S5.

#### **Restore AC Power Loss**

Specify what state to go to when power is re-applied after a power failure (G3 state).

## 3.2.4 Security

Aptio Setup – AMI Main Advanced Chipset <mark>Security</mark> Boot Save & Exit NVMe RPMB Key Migration MEBx				
Password Description		Set Administrator Password		
If ONLY the Administrator' then this only limits acce only asked for when enteri If ONLY the User's passwor is a power on password and boot or enter Setup. In Se have Administrator rights. The password length must b in the following range: Winnym length				
Maximum length	20	++: Select Screen		
Administrator Password User Password		t∔: Select Item Enter: Select +/-: Change Opt. F1: General Help		
▶ Secure Boot		F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit		
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Figure 3.49



Figure 3.50

### Security

- Administrator Password Set Administrator Password.
- User Password
   Set User Password.
- Secure Boot Mode
   Secure Boot mode options: Standard or Custom.
- Restore Factory Keys

Force System to User Mode. Install factory default Secure Boot key databases.

Reset To Setup Mode
 Delete all Secure Boot key databases from NVRAM.

#### Key Management

Enables expert users to modify Secure Boot Policy variables without variable authentication.

## 3.2.5 Boot



Figure 3.51

### Boot

- Setup Prompt Timeout
   Number of seconds to wait for setup activation key.
- Bootup NumLock State Select the keyboard NumLock state.

### Quiet Boot Enables or disables Quiet Boot option.

# 3.2.6 Save & Exit

Aptio Setup – AMI Main Advanced Chipset Security Boot Save & Exit NVMe RPM	MB Key Migration MEBx			
Save Options Save Changes and Exit Discard Changes and Reset Discard Changes and Reset Save Changes Discard Changes Default Options Restore Defaults Save as User Defaults Restore User Defaults Boot Override UEFI: JetFlashTS46JFV30 8.07, Partition 1 (JetFlashTS46JFV30 8.07)	<pre>Exit system setup after saving the changes.  ++: Select Screen 1!: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>			
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Figure 3.52

Changes and Exit
Exit system setup after saving the changes.
Discard Changes and Exit
Exit system setup without saving any changes.
Save Changes and Reset
Reset the system after saving the changes.
Discard Changes and Reset
Reset system setup without saving any changes.
Save Changes
Save Changes done so far to any of the setup options.
Discard Changes
Discard Changes done so far to any of the setup options.
Restore Defaults
Restore/Load Default values for all the setup options.
Save as User Defaults
Save the changes done so far as User Defaults.
Restore User Defaults

Restore the User Defaults to all the setup options.

## 3.2.7 NVMe RPMB KEY Migration

Main Advanced Chipset Sec	Aptio Setup – A curity Boot Save & Exit	MI NVMe RPMB Key Migration <u>MEBx</u>		
Invoke Key migration	[None]	Invoke Key migration		
		++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit		
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Figure 3.53

## 3.2.8 **MEBX**



Figure 3.54



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