

TALOS-3012

EtherCAT Master Controller

User's Manual



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Advance Technologies; Automate the World.



Revision History

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2.00	Sept. 10, 2015	Initial Release

Preface

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Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.



Additional information, aids, and tips that help users perform tasks.



Information to prevent *minor* physical injury, component damage, data loss, and/or program corruption when trying to complete a task.



Information to prevent *serious* physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

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1 Introduction

1.1 Overview

ADLINK's EtherCAT solutions comprise a complete package, from hardware to middleware to software, with every element tailored for dedicated EtherCAT functionality. Talos master controllers, EPS slave systems, and remote monitoring and control mechanisms combine with ADLINK's Softmotion one-stop control kernel to deliver flexible and easy-to-use intelligent platforms for nextgeneration Smart Factory environments.

At a compact 100 x 120 x 55 mm (L x W x H), ADLINK's newest Talos-3012 is a palm-size EtherCAT master controller powered by x86 processors. Based on the Intel Atom quad-core processor E3845 1.9GHz, with IEC 61131-3 compliant syntaxes, the Talos master controller allows easy emigration of legacy PLC programming to a PC-based environment, with a single master controller able to connect up to 64 axes and up to 10,000 I/O points of control through a daisy-chained slave system.

In addition, the Talos delivers plug-and-play functionality with numerous leading servo motor systems with more coming online every day.

ADLINK's Talos series provides a complete IEC 61131-3 edition environment supporting 5 common PLC syntaxes, powered by the ADLINK Softmotion kernel, with application-oriented function blocks simplifying use and shortening development time. ADLINK's Softmotion kernel is based on an efficient algorithm to increase precision, speed, and synchronous motion control capability, reducing operational complexity and development period for a wide variety of industrial applications.

An optimized middleware PLC Handler library allows development of owned Human-Machine-Interface (HMI), and the remaining GbE LAN enables terminal function for data exchange to intranet and internet networks. Rugged construction assures operation in harsh environments, with operating shock tolerance up to 100G, an extended operating temperature range of -20°C to 60°C, and optimal EMI resistance with a EN 61000 EMC certification.



1.2 Features

- ▶ Intel® Atom[™] SoC processor E3845
- ADLINK Softmotion
- ► Supports IEC 61131-3-compliant programming environment
- Minimal control cycle time within 250 μs
- Motion control of up to 64 axes and up to 10,000 I/O points of control
- ▶ Supports EtherCAT COE, FOE as well as EOE protocols
- ► Code executable when host Windows system crashes
- ▶ 3 user-defined indicators for CTR diagnostic
- Built-in SD socket for logging manufacturing data
- Rugged, compact construction with fanless design at -20°C to 60°C



Minimal control cycle is based on light workloads on both PLC and EtherCAT transmissions of less than 1,000 I/O.

1.3 Specifications

Specifications			
System Core			
Processor	Intel [®] Atom™ E3845		
Chipset	SoC with processor		
Video	1x HDMI		
	RAM (Program & Data Memory)	2 GB DDR3L 1066 MHz memory down	
Memory	Retain Memory	Configurable on SD card	
	Storage (Data Usage)	16 GB SSD / SD card	
Connectivity			
EtherCAT	1 (1x Intel® I210IT)		
Ethernet	1 GbE (1x Intel® I210I	Г)	
Serial	1x RS-232 (COM1) 1x BIOS-programmable RS-232/422/485 (COM2)		
USB	1 USB 3.0, 2 USB 2.0		
Miscellaneous			
Brogramming	CoDeSys V3.5 (IEC 61131-3 Compliant)		
Environment	ADLINK Softmotion Function Blocks (details in ADLINK Talos Series FLR document)		
Power Supply			
DC Input	Built-in 6-36 VDC wide-range DC input 3P pluggable connectors with latch (GND, V-, V+)		
AC Input	Optional 40W external AC/DC adapter for AC input		
Mechanical			
Dimensions	120 (W) x 100 (D) x 55 (H) mm (4.68" x 3.9" x 2.17")		
Weight	650g (1.43 lb.)		
Mounting	DIN-Rail / Wall-mount kit		
Environmental			



Specifications	
Operating Temperature	Standard: 0°C to 50°C (w/HDD) Extended Temperature: -20°C to 60°C (w/ industrial mSATA)
Storage Temperature	-40°C to 85°C (excl. HDD/SDD/CFAST)
Humidity	Approx. 95% @ 40°C (non-condensing)
Vibration	Operating, 5 Grms, 5-500 Hz, 3 axes (w/ mSATA)
ESD	Contact +/-4 KV and Air +/-8 KV
Shock	Operating, 50 G half sine 11 ms duration (w/ mSATA)
EMC	CE and FCC Class A
Safety	UL, CB



Cold boot of the system at -20°C and operation with 100% loading at 60°C is provided when the industrial solid-state drive storage option is implemented.

Power Consumption			
Power off	0.3W	In shutdown mode with DC input and only USB keyboard/mouse	
System Idle	6.3W	Under Windows Desktop with no application programs executed	
Processor full load	12.5W	Under Windows with 100% CPU utilization and 2D/3D graphics load	
System full load	22W	Under Windows with 100% CPU utilization and simultaneous access to all I/O devices	
Recommended power supply	40W	With consideration of voltage de-rating under high environmental temperature	



Figure 1-1: TALOS-3012 Functional Block Diagram

1.4 Unpacking Checklist

Before unpacking, check the shipping carton for any damage. If the shipping carton and/or contents are damaged, inform your dealer immediately. Retain the shipping carton and packing materials for inspection. Obtain authorization from your dealer before returning any product to ADLINK. Ensure that the following items are included in the package.

- Talos-3012 controller
- DIN-Rail / Wall-mount bracket
- Screw pack for DIN-Rail / Wall-mounting
- Quick Start Guide





The Talos-3012 does not support user-initiated OS reinstall or repair. Talos-3012 performance cannot be guaranteed in the event of configuration changes deviating from the original software installation.

1.5 Mechanical Drawings



All dimensions shown are in millimeters (mm) unless otherwise stated.

◄	120	>	
			100
	Talos		V

Figure 1-2: Top View



Figure 1-3: Front View



Figure 1-4: (Right) Side View



1.6 Front Panel I/O Connectors

This section describes the I/O connectors located on the front panel of the TALOS-3012.



Figure 1-5: Front Panel I/O

Α	Power button	F	USB 2.0 port x2
в	B Reset button		USB 3.0 (Push-Push, Type II)
С	LED status indicators	Н	GbE port
D	HDMI	J	EtherCAT port
Е	User-defined LED indicators	Κ	ISD card

Table 1-1: TALOS-3012 Front Panel I/O Connector Legend

1.6.1 Power Button

The power button is a non-latched push button with a blue LED indicator. System is turned on when button is pressed, and the power LED lit. If the system hangs, depressing the button for 5 seconds powers down the system.

1.6.2 LED Indicators

In addition to the LED of the power button, three LEDs on the front panel indicate the following operations.

Indicator	Color	Description	
Watchdog (WDT) Yellow		Indicates watchdog timer status. Flashes when watchdog timer starts, and when timer is expired, system will auto-reboots.	
Hard disk drive	Orange	When blinking, indicates the SATA hard driver is active	
Standby	Blue	Indicates the system is in power standby mode	

Table 1-2: LED Indicators

1.6.3 Reset Button

The reset button executes hard reset for the TALOS-3012.

1.6.4 HDMI Connector

Provides connection to HDMI monitor or VGA, DVI monitor via HDMI-to-VGA adapter cable, and HDMI-to-DVI adapter cable.





PIN	Signal	PIN	Signal
1	TMDS_DATA2+	11	TMDS_CLOCK_SHIELD
2	TMDS_DATA2_SHIELD	12	TMDS_CLOCK-
3	TMDS_DATA2-	13	CEC
4	TMDS_DATA1+	14	RESERVED
5	TMDS_DATA1_SHIELD	15	SCL
6	TMDS_DATA1-	16	SDA
7	TMDS_DATA0+	17	DDC/CEC GROUND
8	TMDS_DATA0_SHIELD	18	+5V POWER
9	TMDS_DATA0-	19	HOT PLUG DETECT
10	TMDS_CLOCK+		

Table 1-3: HDMI Pin Assignment

1.6.5 EtherCAT Port

The dedicated EtherCAT port provides connection to EtherCAT slave devices, implementing the Intel WGI210IT GbE controller, qualified by numerous EtherCAT software master stacks and including the CoDeSys platform.



LED	LED Color	Status	Description
		OFF	Port is disconnected
Active/Link	Yellow	ON	Port is connected with no activity
		Flashing	Port is connected and active

LED	LED Color	Status	Description
		OFF	10 Mbps
Speed	Green/ Orange	Green	100 Mbps
	Orange	Orange	1000 Mbps

Table 1-4: EtherCAT Port LED Function

1.6.6 Gigabit Ethernet Port

The Gigabit Ethernet port is based on an Intel WGI210IT GbE controller.

LED LED Color Statu		Status	Description
		OFF	Port is disconnected
Active/Link	Yellow	ON	Port is connected with no activity
		Flashing	Port is connected and active
	0	OFF	10 Mbps
Speed	Green/ Orange	Green	100 Mbps
	orange	Orange	1000 Mbps

Table 1	1-5: Gigab	it Ethernet	Port LED	Function
---------	------------	-------------	----------	----------

1.6.7 USB 3.0 Port

The USB 3.0 port supports Type A connection, compatible with SuperSpeed, Hi-Speed, full-speed and low-speed USB devices, with support for multiple boot devices, including USB flash, USB external HDD, and USB CD-ROM drivers and boot priority and boot device configured in BIOS.



When using USB CD-ROM via USB 3.0 port to re-install or repair the OS, cold boot should be utilized

1.7 (Right) Side Panel I/O Connectors

This section describes I/O connectors located on the side panel of the TALOS-3012.





Figure 1-6: (Right) Side Panel I/O

Α	DC power supply connector	
В	DB-9P COM Ports	

Table 1-6: TALOS-3012 Rear Panel I/O Connector Legend

2 Getting Started

2.1 Connecting DC power



Before providing DC power to the TALOS-3012, ensure the voltage and polarity provided are compatible with the DC input. Improper input voltage and/or polarity can be responsible for system damage.

The DC power input connector of the TALOS-3012 utilizes V+, V- , and chassis ground pins, and accepts input voltage as shown previously.

- 1. Connect DC power cables as shown.
- 2. Fix the DC connector using the 2 screws.





2.2 DIN Rail Mounting

The TALOS-3012 controller is shipped with DIN rail mounting brackets and accessory screws, with mounting procedures as follows.

1. Prepare the DIN rail mount brackets and 2 M4-F head screws included in the package.



2. Use the 2 included M4-F head screws to fix the DIN rail mount brackets to the chassis, according to the spacing dimensions of the screw holes and brackets, as shown.



2.3 Cooling Considerations

Heat-generating components of the TALOS-3012 (such as CPU and PCH) are all situated on the left side of the system. These components directly contact the heat sink via thermal pads and dissipate heat generated by the components. To maximize efficiency of heat dissipation, maintain a minimum of 2 inches (5 cm) clearance on the top of the TALOS-3012.



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3 Project Creation

3.1 Creating a Project

1. Open CoDeSys IDE and create a Standard Project.

管 New Proje	ject	x
Categories	s: Iemplates: oraries ojects Empty project Standard project w	
An empty p	project	
<u>N</u> ame: Location:	01_new_proj D:\RD\PACwiz\V3\3s test\VA training material	
	OK Cance	L .

 Configure the project with "CODESYS Control RTE V3 (3S – Smart Software Solutions GmbH)" PLC programming format.

Standard Pr	tandard Project					
	You are about to create a new standard project. This wizard will create the following objects within this project:					
	- One prograr - A program P - A cyclic task - A reference	nmable device as specified below LC_PRG in the language specified below which calls PLC_PRG to the newest version of the Standard library currently installed.				
	Device:	CODESYS Control RTE V3 (3S - Smart Software Solutions GmbH)				
	PLC_PRG in:	CODESYS Control for x64 (3S - Smart Software Solutions GmbH) CODESYS Control RTE V3 (SS - Smart Software Solutions GmbH) CODESYS Control Win V3 (3S - Smart Software Solutions GmbH) CODESYS MMI (3S - Smart Software Solutions GmbH) CODESYS SoftMotion RTE V3 (3S - Smart Software Solutions GmbH) CODESYS SoftMotion Win V3 (3S - Smart Software Solutions GmbH) CODESYS SoftMotion Win V3 (3S - Smart Software Solutions GmbH) CODESYS SoftMotion Win V3 (3S - Smart Software Solutions GmbH)				
		OK Cancel				



3. Add an EtherCAT master device in the PLC Device tree view.





To enable proper configuration of related PLC and EtherCAT parameters, ensure that both the CoDeSys RTE and Gateway are enabled in the Windows taskbar.



4. Connect to CoDeSys gateway and configure the corresponding NIC number in EtherCAT master usage.





5. Add an EtherCAT Device in the device tree, either by scanning the whole EtherCAT line automatically using Scan for Devices, or, alternatively, adding one EtherCAT device manually, recommended to prevent mismatch between physical devices and corresponding ESI file.



Set EtherCAT device parameters in the relative device page.

▷Address Setting: EtherCAT master will assign the logic slave address automatically, typically starting with 1001 unless the reset manually.

Distributed Clock: synchronizes all EtherCAT slaves reducing jitter as much as possible.

▷**Sync0**: Among Expert Settings, for fine tuning the behavior of sync manager in dedicated slave setting, with the default setting Disabled, to prevent unexpected synch errors.

▷The remaining settings are among Expert Settings. Contact ADLINK service to adjust the parameters properly.

=: INF Device (CODESYS Control RTE V3)	14	
E El R Cloric	Address Additional	
	AutoInc Address: 0	
Application		
GVL	EtherCAT Address: 1001	
Library Manager	Distributed Clock	
POU (PRG)	Select DC: DC-Sunchron	
Task Configuration	be syndricht .	
EtherCAT_Master	I enable 250 Sync Unit Cycle (µs)	
EtherCAT_Master.EtherCAT	Sync0:	
···핸 POU	Finable Sync 0	
MainTask		
🚭 Trace	Sync Unit Cycle x 1 = 250 Cycle Time (μs)	
EtherCAT_Master (EtherCAT Master)	O Liser Defined 0 Shift Time (us)	
EPS_6000 (EPS-6000)		
	Sync1:	
	Enable Sync 1	
	Gran Unit Ovela	
	230 V Cycle lime (µs)	
	🕐 User Defined 0 👘 Shift Time (µs)	
	Station alias	
	V Enable 1001	
	Startup checking Timeouts	
	Check Vendor ID SDO Access 2000	
	Check Product ID	
	V check Floblec 10 1-> p 2000	
	P-> S/S-> 0 9000	
	DC cyclic unit control: assign to local µC	
	Cyclic Unit Latch Unit 0 Latch Unit 1	
	Watchdog	
	Set multiplier (Reg. 16#400) 2498	
	Set PDI watchdog (Reg. 16#410) 1000 = 100.00 ms	
	Set SM watchdog (Reg. 16#420) 1000	

3.2 Starting a Task in CoDeSys IDE Environment

Start a Task

- 1. Add a new POU or place an existing POU in the PLC logic tree.
- 2. Put the POU into task configuration
- Set the priority of all tasks in task configuration, from 1 (highest) to 31 (lowest).
- 4. Set PLC polling type and corresponding cycle time (interval period)
- 5. Enable / Disable PLC watch dog timer (WDT). If no PLC runtime is submitted during a ppreset time, the WDT will issues a notification to the IDE message box.



CAUTION

The EtherCAT master task occupies the highest priority (0) setting by default, do not reset.

Devices	-	
Device (CODESYS Control Win V3) Device (CODESYS Control Win V3)	Task Configuration	
Application Ibrary Manager	Configuration	
PLC_PRG (PRG)	Priority (031): 1 2	
MainTask DLC_PRG	Cyclic Interval (e.g. t#	200ms): t#20ms
E. Contractions	Watchdog 4	
	Time (e.g. t#200ms):	
	Sensitivity:	
	🕂 Add Call 🗙 Remove Call 🗹 Change Cal	II
	POU	Comment
	PLC_PRG	

Build, Log In, and Start the Project

1. Click the "Build" button to compile PLC execution when all POU has been completed.





Ensure that both the CoDeSys RTE and Gateway have been enabled in the Windows taskbar, to allow proper configuration of related PLC and EtherCAT parameters.



 Click Login/Logout to connect the CoDeSys RTE runtime and IDE.



 To start or stop the PLC program in RTE runtime, use the Start/Stop buttons or select the commands from the Debug toolbar.





4. Run a PLC program in RTE and monitor in IDE. If a green icon is displayed, operations are normal. A red icon indicates an operational abnormality.



3.3 Troubleshooting

As mentioned, orange/red icons indicate an error/warning in EtherCAT communication or the failure of EtherCAT slave function. Possible causes are as follows.

test EPS.project* - CODESYS			test EPS.project* - CODESYS				
Elle Edit View Broject Build Online Debug Iools Window Help			Ele Edit View Project Build Online Debug Tools Window Help				
	X B B X M G	B18-01810.00 → ■1	1 1 1 1 1 1 1	~ 3 10 18 7	<1 M %	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	⇔ ¢8 →
Denices	v X v v	Orevice X 95,600 Ormurkation Settings Applications Press Scannetwork	Devices	nected] (CODESYS C cation [stop] V. brary Manager DU (PRG) ski Configuration	v Q X	Communication Settings Scan network Gate	EPS_6000 Applications way - Devic
= \$ er = \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	herCAT_Master] EtherCAT_Master.EtherCAT] POU ainTask Master (EtherCAT Master)	Gateway-1 39-Address Iocalout Port 1217	ູ ຢູ່ ຢູ່ ຢູ່ - <u>ເ</u> ຫຼີ ອາ - <u>ເ</u> ຫຼີ ອາ	EtherCAT_Master EtherCAT_Master POU MainTask acc AT_Master (EtherCAT S_6000 (EPS-6000)	ter.EtherCAT		Gate IP-Ad local Port 1217

Check configuration:

- Ensure cable connection is secure.
- ► Ensure the EtherCAT MAC is properly set.
| Master | EtherCA | Configuration | n 🗯 Ethe | rCAT I/O Mapping | Status | () Information | |
|----------|---------------------------|---------------|------------|-------------------|------------|------------------|-----------|
| | Autoconfi | gMaster/Slave | IS | | | Ether C | AT. |
| Ether | CAT NIC Se | etting | | | | | |
| Des | tination A | ddress(MAC) | FF-FF-FF-F | F-FF-FF | J Broad | cast 📃 Enable Re | edundancy |
| Sou | rce Addre | ss (MAC) | 00-20-9D-8 | EA-10-12 | Browse. | \mathbf{D} | |
| Net | Network Name Local Area G | | | Connection 7 | | | |
| 0 | Select net | work by MAC | O | Select network by | Name | | |
| Distrib | uted Clock | | | Options | | | |
| Cycle | time | 4000 | 🔶 µs | 📄 Use LRW i | nstead of | FLWR/LRD | |
| Sync | Offset | 20 | ÷ % | Enable me | ssages p | ertask | |
| S | ync Windo | w Monitoring | | Muto resta | irt slaves | | |
| Sync | window | 1 | ÷ µs | | | | |

• Ensure RTE is running:



► Ensure the EtherCAT slave is connected properly.



► Ensure the EtherCAT Master Task has been properly set:

and Peerfectual/schempinger(- CCCRTP)			
a he best by best by the best he best he	Serences PPIE	1. (a)	
• • • • A mea	ture (a) no mo (A) mertan	A Deep M Journman & DeetAl Hader #	
e en feorikciuefiseter Devo 2000/15 Careni P/E VS			
B Pictage Proving (3.31)			
N NC/NE PRE Sell	• Stand (e.g. (#250mg) #00		
B theory pade Wething			
() Northal () N.C./MG Torre(1.6.147) () N.C./MG			
B INNER THE PARTY			
ALL CALL	Remova Call (Change Call) In Monoco	a Mosthese ** Darriella	
PON BiterCAT_Head	CatherGAT, Tank	and and a second s	
O rise		(To one off reasoning on of the lash build, you can double clock the status hald in prefer	the activate the S
		CK CK	
6 🔠 🛛 🗶			
ster EtherCAT Configu	ation 🗮 Ethe	rCAT I/O Mapping Status 🕕 Information	
			100
Autoconfig Master/	Slaves	EtherCAT	-
		Etheren a	
therCAT NIC Setting			
Destination Address (A		n nn nn	lanov
Destination Address (AC) [+++++++		ancy
Source Address (MAC)	00-20-9D-E	A-10-12 Browse	
	-		
Network Name	Local Area	Connection 7	
Calact astuark built	110	Calact astwark by Nama	
Select network by	IAC O	Select network by Name	
Distributed Clock		Options	
C 111 4000		Itee I PW instead of I WP/I PD	
Cycletime 4000	Ψus	Dise ERW INSTEAD OF EWRYERD	
Sync Offset 20	÷ %	Enable messages pertask	
		E Auto contrat alguna	
Sync Window Monit	iring	Auto restart sidves	
Suns window	A 115		
Sync window 1	Ψ		

If the EtherCAT Slave icon is not green, please check the configuration as follows.

Ensure that the Basic and Expert settings for EtherCAT slave conform to the specific device requirements.

Slave	Expert Process D	ata Process D	ata Start	up parameters	Eth	erCAT Configu	ration	🗮 EtherC	AT I
Addre	ess	1.5		Additional	t				
Aut	oInc Address:	0	(A). (W)	🔽 Enab	le Exp	ert Settings	Eth	er CAT	
Eth	erCAT Address:	1001	4	🔽 Optic	onal				-Basic
Distrib	outed Clock								
Sel	ect DC:	DC-Synchron				•			
V	enable	4000	Sync Unit	Cycle (µs)					
Sync	.0:						-		
	Enable Sync 0								
۲	Sync Unit Cycle	x 1	•	4000		Cycle Time (µs)		
0	User Defined			20	-	Shift Time (µ	is)		
Sync	:1:								
	Enable Sync 1								
۲	Sync Unit Cycle	x 1	w	4000		Cycle Time (µs)		
	User Defined			0		Shift Time (µ	is)		Exper
Start	up checking		Timeouts						
🔽 Ch	eck Vendor ID		SDO Acce	ess 1000		A. T	ms		
V Ch	eck Product ID		I -> P	6000		<u>_</u>	ms		
Ch	eck Revision Num	ber	P-> 5/5	-> 0 5000		4	ms		
E		*							
DC cy	clic unit control: as	sign to local µC							
Cy	clic Unit	Latch Unit 0	E Li	atch Unit 1					
Watch	ndog								
V Se	t multiplier (Reg.	16#400)	25000	×					
Se Se	t PDI watchdog (F	Reg. 16#410)	1000		=	1000.08	ms		
🔽 Se	t SM watchdog (R	eg. 16#420)	100	-	=	100.01	ms		
Static	on alias								
[√] En	able 1001		A.						

- If an alarm has been issued for the EtherCAT slave, reset the alarm.
- ► Ensure that EtherCAT cables are connected properly.



3.4 Errors

To identify the error, open the Log tab in the Device page and locate the error listing.

	E Device A	tings Applications Flos. 1-18 FLCs	ethige [FLC shat] Libers and Distans] Access Rights] Task Bachamerti [Detas] Defamation]
	Office Logan	a El UTCTINA	
	A 2 very ski	O Lavorb) 🗧 a exception(d) 🛛 steller	mananta) and amammitan
	Severity	Time Stamp	Description
		19,02,2014 13:38:04	Inclines successful
		19.62.2114 13.38.08	All playeds done 1
		19.42.211+12.38.04	All since operational
Devices v 4 2		19.52,2014 13:38:38	Set operational mode
R At new prot		19.02.2014 13:38:38	All sloves adv operational
	•	19,42,2114 13:38:38	SDD write ok: Address: 1991 Index: UK41C13 SubDidex: 6 Data: UK41A030802 Result: 18490
Device (CODESYS Control Win V3)		18.82.2014 (2138:38	\$50 write sit: Address: 1011 Index: 1841C12 SubIndex: 0 Date: 1841800002 Result: 16400
w Mill Matania	•	19.02.2914 12.38.08	Set safe operational
- mail by he code	•	19.42.2114 12.38.38	Syndronipe Saves
Application	•	19.42.2114 12:38:38	Carligues distributed dock settings
41	•	18.82.2014 13:38:38	All staves pre-operational
Library Manager	•	18.52201412:28:28	prepare claves
PLC PRG (PRG)	•	18.02.2014 10:38:38	All shaves init mode
	•	18.02.2014 12:38:38	SetAPPsycDirecture increased
Task Configuration	•	18.02.2114 13:38:38	Set physical addresses
A CR MainTack	•	18.22.2014 12.28.08	Rand slave informations
10	•	10.02.2014 12:38:39	ResetAllSaver successful
- OL PLC_PRG	•	18-12-2114 13:38:04	Preparation successful
	•	18.82.2014 12:38:08	Networksdapteropenel
	0	19.82.2014 13:38:38	wetchdog for spinade expired

To isolate the error, first check the EtherCAT status in the Diagnostic Message of the Master setting tab.



Then check the EtherCAT status in the Diagnostic Message of the Slave setting tab.

Devices 👻 🤻 🛪 🗙	POU I PL	C_PRG	EtherCAT	Master	1	MainTask	Tas	k Configu
test027_single axis_panasonic	Slave Expert Process D	ata Process Dat	ta Startup	parameters	Online	EtherCAT	Configuration	🗮 Eth
Operation of the second s	Address		1	Additional				
F III Pic Logic	AutoInc Address:	0					EtherCA	T.T
Application [run]	EthorCATAddroom	1001			nal			
Library Manager	Culerca i Address.	1001			11541			
El pou (ppg)	Distributed Clock							
	Select DC:	DC SYNC0				*		
Task Configuration	💟 enable	4000	Sync Unit Cy	cle (µs)				
EtherCAT Master.EtherCAT Task	Sync0:							
PLC_PRG	Enable Sync 0							
- DOU	Sync Unit Cycle	(und	- 40	no 🗠	1 0	la Tima (u	-	
MainTask	() syncolic cycle	X 1	· ·			tie inne (p	5)	
- 🗬 Trace	O User Defined		0	1 V	Shi	ft Time (µs	i)	
EtherCAT Master (EtherCAT Master)	Svnc1:							
- 5 MADHT1505BA1 (MADHT1505BA1)	Enable Sync 1							
	Sync Linit Cycle			10	1	da Tima (u	-	
	() Sync Sinc Sync	XI				tie mile (p	5)	
	💍 User Defined		0	× 	Shi	ft Time (µs	;)	
			_					
	Diagnostics							
	Current State	Operational						
			_					

In addition to the default Op mode, the slave state can be set to Init, Pre-Op, and Safe-Op modes.

Devices 💌 🔻	×	1	POU	Ŧ	PLC_PRG	1	EtherCA	_Master	MainTas	c 🔛	Task Cor
test027_single axis_panasonic		Slave	Evpert	Proces	Data Pro	cess Da	ata Startur	narameters	Online	AT Configur	ation
		Slave State File a Dou E PR	Expert Machine Init re-Op Op ccess ov vnload OM acce ite E ² PR	t Process a b c c c c c c c c c c c c c	EData Pro Bootstr Safe-O CAT Upload Read E ²	rap p P PROM.	Current Request	state: state: sed state:	Operational Operational Operational	AT Configur	ation



The error code produced by the slave can be checked in object dictionary 0x60F3, by SDO command in CoDeSys IDE.



3.5 RTE Setting

1. Select Control RTE from the taskbar



2. Select PLC Configuration



3. The PLC Configuration window opens. Select the Scheduler tab.

iagnostic Startup Component M	anager Application Logger Scheduler File	Target
Kernel Information		
Target Name: n/a		
Target Address: n/a	Target Version: 3.5.5.20	
Target Type: n/a	Target ID: n/a	
Kemel State:		
Kemel State: NOT LOADED		
Scheduler State: INACTIVE		
PLC Load: n/a		
0%		100%
Application		
1.		
2.		
3.		
4.		
5.		
Last System Error		



4. Set the maximum CPU loading (as a percent value).

System Configuration		? X
Diagnostic Statup Component Manager Application Logger Schedule Processor Load 100 Max. Processor Load Behavior, when max. processor load is reached: © Generate Exception © Activate Timeslicing 0 PLC slice in percent Max CPU Load by RTE Maximum CPU time for RTE Tasks in percent: 50 50	r File Targe	t]
	ОК	Cancel

5. Open Task Configuration to monitor task time consumption.



6. In the Application context menu, select Add Object and then Trace to show the traced plot link to the variable in the program.





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Appendix A PLC Handler

PLC handler manages data exchange between CoDeSys RTE and any Windows executions to support customized visualization with C tools such as Microsoft C#, Microsoft Visual Studio, Borland C and other C-based software tools.

A.1 In CoDeSys

A.1.1 Configuring Symbols

1. In the **Application** context menu, select **Add Object** and then **Symbol configuration**.





2. Select the desired object



3. Select relative Variables/POU





4. Set the Codesys gateway to PLCHandlerGateway3.ini

A.2 In Windows

Copy the PLCHandlerGateway3.ini file into the corresponding folder for execution.

A.2.1 Mapping Variables

1. On the DESample tab, select Create and then Connect.



2. Select **Get All Symbol Name**, corresponding variables are displayed.

Cicale	Connect	Disconnect	Delete	version: v1.0.0.0
Get Status		Reset		
Set Status		Get All Sym	bol Name	
plication.PLC	PRG.C7_fault	reset		
plication.PLC plication.PLC	PRG.C7_fault PRG.en03	reset		
		Write B	OOL	
		Read B	YTE	
		Write B	YTE	

3. Select the desired variable and double-click to R/W.

Cleate	Connect	Disconnect	version: v1.0.0.0
Get Status		Reset	
Set Status	[Get All Symbol Name	
plication.PLC	PRG.en03	Read BYTE	
oplication.PLC	_PRG.en03	Write BYTE	

Appendix B BIOS Setup



BIOS options in the manual are for reference only, and are subject to configuration. Users are welcome to download the latest BIOS version from the ADLINK website.

The Basic Input/Output System (BIOS) is a program that provides a basic level of communication between the processor and peripherals. In addition, the BIOS also contains codes for various advanced features applied to the TALOS-3012. The BIOS setup program includes menus for configuring settings and enabling features of the TALOS-3012. Most users do not need to use the BIOS setup program, as the TALOS-3012 ships with default settings that work well for most configurations.



Changing BIOS settings may lead to incorrect controller behavior and possible inability to boot.



B.1 Main

Aptio Setup Utilit Main Advanced Security Boot	y – Copyright (C) 2013 Ameri Save & Exit	can Megatrends, Inc.
BIOS Information BIOS Vendor Core Version Compliancy Project Version Build Date and Time	American Megatrends 5.009 UEFI 2.3; PI 1.2 200I093 2014/11/24 11:41:49	▲ System Management
CPU Configuration Microcode Patch BayTrail SoC	901 DO Stepping	
Memory Information Total Memory	2048 MB (DDR3L)	++: Select Screen
GUP Information Intel(R) GOP Driver	[7.2.1008]	14: Select Item Enter: Select +/-: Change Opt. E1: General Help
Sec RC Version TXE FW Version	00.05.00.00 01.01.00.1089	F2: Previous Values F9: Optimized Defaults F10: Save & Exit
		ESC: Exit
System Date System Time	[Mon 2014/11/24] [13:34:17]	•
Version 2.16.1242	. Copyright (C) 2013 America	n Megatrends, Inc.

B.1.1 BIOS Information

Shows current system BIOS core version, BIOS version and Board version.

B.1.2 System Time/System Date

Changes system time and date. Highlight System Time or System Date using the up or down <Arrow> keys. Enter new values using the keyboard then <Enter>. Use < Tab > to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.



The time is in 24-hour format, for example, 5:30 A.M. appears as 05:30:00, and 5:30 P.M. as 17:30:00.

B.1.3 System Management

	Aptio Setup Utility – Copyright (C) 2013 American Main	Megatrends, Inc.
Γ	System Management Version: 1.03	Board Information
	Overview Board Information	
A A A A	System Health Temperatures and Fan Speed Power Consumption Runtime Statistics Flags	
Þ	Hardware Controls Power Up	++: Select Screen †↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
L	Version 2.16.1242. Copyright (C) 2013 American Mu	egatrends, Inc.

Board Information

Provides SEMA Board Information.

Temperatures and Fan Speed

Displays system temperatures and fan speed.

Power Consumption

Provides system power consumption information.



Runtime Statistics

Displays runtime statistics for the system.

Flags

Shows SEMA flags.

Power Up



Power-Up Watchdog

Resets the system after a preset period after power up has passed.

ECO Mode

Reduces power consumption of the system. After shutdown, at least 5 seconds must pass before restart can be executed.

Power-Up Mode

Selecting Turn On starts the device automatically when the power supply is turned on.

Selecting Remain Off starts the device when the power button is pressed.

Selecting Last State powers up to the last power state

B.2 Advanced

Aptio Setup Utility – Copyright (C) 2013 American Main <mark>Advanced</mark> Security Boot Save & Exit	Megatrends, Inc.
 CPU Configuration SATA Configuration USB Configuration SOLO Configuration Network Configuration Baytrail Features Configuration ACPI Settings Thermal Configuration Security Configuration Miscellaneous Configuration 	CPU Configuration Parameters ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.16.1242. Copyright (C) 2013 American M	egatrends, Inc.



Setting incorrect or conflicting values in Advanced BIOS Setup may cause system malfunction.



B.2.1 CPU Configuration

Aptio Setup Utility – Copyright (C) 2013 American Main <mark>Advanced</mark> Security Boot Save & Exit	Megatrends, Inc.
 CPU Configuration SATA Configuration USB Configuration SDIO Configuration Network Configuration Baytrail Features Configuration ACPI Settings Thermal Configuration Security Configuration Miscellaneous Configuration 	CPU Configuration Parameters ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.16.1242. Copyright (C) 2013 American Me	egatrends, Inc.

Limit CPUID Maximum

Disabled for Windows XP.

Execute Disable Bit

XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, RedHat Enterprise 3 Update 3.)

Intel Virtualization Technology

When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology

Power Technology

Enables power management features.

Socket 0 CPU Information

Aptio Setup Utility - Advanced	Copyright (C) 2013 American	Megatrends, Inc.
Socket 0 CPU Information Intel(R) Atom(TM) CPU E3826 @ 1.466H CPU Signature Microcode Patch Max CPU Speed Min CPU Speed Processor Cores Intel HT Technology Intel VT-x Technology L1 Data Cache L1 Code Cache L2 Cache L3 Cache	2 30679 901 1460 MHz 533 MHz 2 Not Supported Supported 24 kB x 2 32 kB x 2 1024 kB x 1 Not Present	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit</pre>
	pyright (C) 2013 American M	

Feature	Description
CPU Brand Name	Displays CPU rand name
CPU Signature	Displays CPU signature
Microcode Patch	Displays microcode patch
Max CPU speed	Displays max CPU speed
Min CPU speed	Displays min CPU speed
Processor Cores	Displays processor cores
Intel HT Technology	Displays Intel HT Technology support status
Intel VT-x Technology	Displays Intel VT-x Technology support status



Feature	Description
L1 Data Cache	Displays cache info
L1 Code Cache	Displays cache info
L2 Cache	Displays cache info
L3 Cache	Displays cache info

CPU Thermal Configuration

Aptio Setup Utility Advanced	– Copyright (C) 2013 American	Megatrends, Inc.
Cpu Thermal Configuration DTS	[Enabled]	Enabled/Disable Digital Thermal Sensor. ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.16.1242.	Copyright (C) 2013 American M	egatrends, Inc.

DTS

Enables/Disables Digital Thermal Sensor.

PPM Configuration

Aptio Setup Advanced	Utility – Copyright (C) 2013 Ameria	can Megatrends, Inc.
Advanced PPM Configuration CPU C state Report Max CPU C-state SOix	[Enabled] [C1] [Disabled]	Enable/Disable CPU C state report to OS ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.1	6.1242. Copyright (C) 2013 America	n Megatrends, Inc.

CPU C state Report

Enables/Disables reports of CPU C state to OS.

Max CPU C-state

Determines which Max C state the processor supports.

S0ix

Enables/Disables CPU S0ix state



B.2.2 SATA Configuration

Aptio Setup Utility - Advanced	– Copyright (C) 2013 America	n Megatrends, Inc.
IDE Configuration		Enable / Disable Serial ATA
Serial-ATA (SATA)		
SATA Speed Support SATA ODD Port SATA Mode	[Gen2] [No ODD] [AHCI Mode]	
Serial-ATA Port O SATA PortO HotPlug	[Enabled] [Disabled]	
SATA PortO InnoDisk Corp. (16.0GB)		++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit

Serial-ATA (SATA)

Enables/Disables Serial ATA

SATA Speed Support

Selects SATA Speed Support Gen1 or Gen2

SATA Mode

Selects IDE/AHCI modes

Serial-ATA Port 0

Enables/Disables Serial ATA Port 0

SATA Port0 HotPlug

Enables/Disables Port O HotPlug capability

B.2.3 USB Configuration

Aptio Setup Utility - Advanced	Copyright (C) 2013 American	Megatrends, Inc.
USB Configuration		Enables Legacy USB support.
USB Module Version	8.11.01	AUTO option disables legacy support if no USB devices are
USB Devices:		connected. DISABLE option will keep USB devices available
1 Drive, 1 Keyboard, 1 Mouse,	2 Hubs	only for EFI applications.
Legacy USB Support		
XHCI Hand-off	[Enabled]	
EHCI Hand-off	[Disabled]	
USB Mass Storage Driver Support	[Enabled]	
USB hardware delays and time-outs:		
USB transfer time-out	[20 sec]	↔+: Select Screen
Device reset time-out	[20 sec]	14: Select Item
Device power-up delay	[Auto]	Enter: Select
		+/-: Change Opt.
USB Host Controller Configuration		F1: General Help
Bab Host Controller Contiguration		F9: Ontimized Defaults
Mass Storage Devices:		F10: Save & Exit
JetFlashTranscend 4GB 8.07	[Auto]	ESC: Exit
Version 2.16.1242. Dr	nouright (C) 2013 American M	egatrends. Inc.

Legacy USB Support

Selecting AUTO disables legacy support if no USB devices are connected, and DISABLE keeps USB devices available for only EFI applications.

XHCI Hand-Off

A workaround for OSs without XHCI handoff support. XHCI ownership change should be claimed by XHCI driver.



EHCI Hand-Off

A workaround for OSs without EHCI handoff support. EHCI ownership change should be claimed by EHCI driver

USB Mass Storage Driver Support

Enables/disables USB Mass Storage Driver support.

USB transfer time-out

Timeout value for Control, Bulk, and Interrupt transfers.

Device reset time-out

USB mass storage device Start Unit command timeout.

Device power-up delay

Maximum time the device will take before reporting to the Host Controller. Selecting Auto employs the default value, ie for a Root port, 100 ms and for a Hub port the delay is taken from Hub descriptor.

Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc. Advanced		
Advanced USB Host Controller Configuration XHCI Mode USB2 Link Power Management USB 2.0(EHCI) Support USB Port Control USB Port 0 USB Port 1 USB Port 2 USB Port 3	[Smart Auto] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled]	Mode of operation of XHCI controller ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.16.1242. C	opyright (C) 2013 American ⊧	Megatrends, Inc.

USB Host Controller Configuration

XHCI mode

Sets operating mode of XHCI controller.

USB2 Link Power Management

Enables/disables USB2 Link Power Management.

USB Per Port Control

Controls each USB port 0 to 3, Enabling USB per port, or Disable by USB port x settings.

USB Port #0~3

Enables/disables USB Ports 0 to 3.



B.2.4 SDIO Configuration

Aptio Setup Advanced	Utility – Copyright (C) 2013	3 American Megatrends, Inc.
SDIO Configuration		Auto Option: Access SD device
SDIO Access Mode		supports it,otherwise in PIO mode.DMA Option: Access SD device in DMA mode.PIO Option: Access SD device in PIO mode.
		<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help</pre>
		F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.3	16.1242. Copyright (C) 2013 f	American Megatrends, Inc.

SDIO Access Mode

Selecting Auto accesses SD device in DMA mode if controller supported, otherwise in PIO mode. Selecting DMA accesses SD device in DMA mode, and selecting PIO Accesses SD device in PIO mode.

Aptio Advanced	Setup Utility – Copyright (C) 2013 American	Megatrends, Inc.
Network Stack	[Disabled]	Enable/Disable UEFI Network Stack ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Vers		

B.2.5 Network Configuration

Network Stack

Enables/disables UEFI Network Stack



B.2.6 Baytrail Feature Configuration

Aptio Setup Utili Advanced	ty – Copyright (C) 2013 Ame	rican Megatrends, Inc.
LPSS & SCC Devices Mode	[PCI mode]	LPSS & SCC Devices Mode
SCC Configuration SCC SD Card Support SDR25 Support for SDCard DDR50 Support for SDCard MIPI HSI Support	[Enabled] [Disabled] [Enabled] [Disabled]	occcingo
LPSS Configuration LPSS HSUART #1 Support LPSS HSUART #2 Support	[Enabled] [Enabled]	
		++: Select Screen 14: Select Item Enter: Select +/-: Change Opt.
		F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit

LPSS & SCC Devices Mode

Sets LPSS & SCC Device Mode.

SCC SD Card Support

Enables/Disables SCC SD Card support

DDR50 Support for SD Card

Enables/Disables DDR50 capability in SD card controller.

MIPI HSI Support

Enables/Disables MIPI HSI support.

LPSS HSUART # Support

Enables/Disables LPSS HSUART # support.

HSUART Port Mode

Sets HSUART port mode.

B.2.7 ACPI Setting



Enable ACPI Auto Configuration

Enables/Disables BIOS ACPI Auto Configuration.

Enable Hibernation

Enables/Disables hibernation capability (OS/S4 Sleep State), when supported by OS.

ACPI Sleep State

Selects the highest ACPI sleep state the system will enter when SUSPEND is selected.



Lock Legacy Resources

Enables/Disables Legacy Resource lock.

B.2.8 Thermal Configuration

Aptio Setup Utility - Advanced	Copyright (C) 2013 American	Megatrends, Inc.
Thermal Configuration Parameters Critical Trip Point Passive Trip Point Active Cooling Trip Point	[Disabled] [Disabled] [BMC Default]	This value controls the temperature of the ACPI critical Trip Point in which the OS will shut the system off. ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.16.1242. C		

Critical Trip Point

Sets the ACPI critical trip point temperature at which the OS will shut the system down.

Passive Trip Point

Sets the temperature of the ACPI critical trip point at which the OS will begin throttling the processor

Active Cooling Trip Point

Sets the Active Cooling trip point.

B.2.9 Security Configuration

Aptio Setup Utility – Main	Copyright (C) 2013 American	Megatrends, Inc.
Intel(R) TXE Configuration TXE HMRFPO TXE Firmware Update TXE EOP Message TXE Unconfiguration Perform Intel(R) Anti-Theft Technology Config Intel(R) AT Suspend Mode	[Enabled] [Disabled] [Enabled] [Enabled] guration [Disabled]	Send EOP Message Befor Enter OS ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.		

TXE

Enables/Disables TXE firmware

TXE HMRFBO

Enables/Disables TXE HMRFBO

TXE Firmware Update

Enables/Disables TXE firmware update.

TXE EOP Message

Sends EOP Message Before OS starts up.

TXE Unconfiguration Perform

Reverts TXE Settings to factory defaults.



B.2.10 Miscellaneous Configuration

Ap Advanced	ptio Setup Utility – C	opyright (C) 2013 American	Megatrends, Inc.
Miscellaneous Co OS Selection	onfiguration	[Windows 7		0S Selection ++: Select Screen f4: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
(

OS Selection

Selects active OS.

B.3 Security

Aptio Setup Utility — Copyrigh Main Advanced <mark>Security</mark> Boot Save & Exit	: (C) 2013 American Megatrends, Inc.
Password Description If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup. If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights. The password length must be in the following range: Minimum length 3 Maximum length 20 Administrator Password User Password	Set Administrator Password ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
version 2.16.1242. Copyright	c) zota Hilerican Megatrenos, INC.



If only the Administrator's password is set, only access to Setup is limited and authorization requested only when entering Setup. If only the User's password is set, a password must be entered to boot or enter setup. In Setup the user has Administrator rights.

Administrator Password

Sets Administrator password.

User Password

Sets boot/setup User password.



B.4 Boot

Main	Aptio Setup Utility – (Advanced Security <mark>Boot</mark> Save	Copyright (C) 2013 American e & Exit	Megatrends, Inc.
Boot C Setup Bootup Quiet Fast E	configuration Prompt Timeout) NumLock State Boot Joot Joot	1 [On] [Enabled] [Disabled]	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Boot C Boot C Boot C Boot C Boot C • Add Na • Delets	uption Priorities uption #1 uption #2 uption #3 uption #4 w Boot Option : Boot Option	[UEFI: JetFlashTrans] [P0: InnoDisk Corp] [UEFI: Built-in EFI] [JetFlashTranscend 4]	++: Select Screen 1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.			

Setup Prompt Timeout

Sets number of seconds to wait for setup activation key.

Bootup Num-Lock State

Allows Number Lock setting to be modified during boot.

Quiet Boot

When Disabled, directs BIOS to display POST messages, when Enabled, directs BIOS to display the OEM logo.

Fast Boot

Enables or disables boot with initialization of the minimal set of devices required to launch active boot option. Has no effect on BBS boot options.
Boot Option Priorities

Specifies the priority of boot devices, with all installed boot devices detected during POST and displayed, where selecting Boot Option # specifies the desired boot device.

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc. Compatibility Support Module Configuration Enable/Disable CSM Support. CSM16 Module Version 07.75 GateA20 Active [Upon Request] [Force BIOS] Option ROM Messages INT19 Trap Response [Immediate] Boot option filter [UEFI and Legacy] Option ROM execution ++: Select Screen Network [UEFI only] 1↓: Select Item Storage [UEFI only] Enter: Select [Legacy first] +/-: Change Opt. Other PCI devices [UEFI only] F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit

CSM Configuration

CSM Support

Enables/disables CSM support.

GateA20 Active

Selecting Upon Request allows GA20 to be disabled using BIOS services, and selecting Always disallows disabling of GA20, useful when any RT code exceeding 1MB is executed.

Option ROM Messages

Sets display mode for Options.



INT19 Trap Response

Sets BIOS reaction to INT19 trapping by Option ROM, where selecting Immediate executes the trap immediately, and Postponed executes the trap during a legacy boot.

Boot option filter

Sets Legacy/UEFI ROM priority.

Network

Sets execution of UEFI and Legacy PXE OpROM.

Storage

Sets execution of UEFI and Legacy Storage OpROM.

Video

Sets execution of UEFI and Legacy Video OpROM.

Other PCI devices

Determines OpROM execution policy for devices other than Network, Storage, or Video.

B.5 Exit

Aptio Setup Utility – Copyright (C) 2013 American Main Advanced Security Boot <mark>Save & Exit</mark>	Megatrends, Inc.
Save Changes and Exit Discard Changes and Exit Save Changes and Reset Discard Changes and Reset Save Options Save Changes Discard Changes Restore Defaults Save as User Defaults Restore User Defaults	Exit system setup after saving the changes.
Boot Overnide PO: InnoDisk Corp mSATA 3ME UEFI: Built-in EFI Shell UEFI: JetFlashTranscend 4GB 8.07 JetFlashTranscend 4GB 8.07 Launch EFI Shell from filesystem device ► Reset System with ME disable ModeMEUD000	++: Select Screen †4: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.16.1242. Copyright (C) 2013 American Me	egatrends, Inc.

Save Changes and Exit

Exits Setup after saving changes.

Discard Changes and Exit

Exits Setup without saving any changes.

Save Changes and Reset

Resets the system after saving changes.

Discard Changes and Reset

Resets system setup without saving any changes.

Save Changes

Saves all changes made to Setup options.



Discard Changes

Discards changes made to Setup options.

Restore Defaults

Returns all BIOS options to Default settings, providing maximum system stability with limited performance. Applicable in the event of system configuration problems.

Save as User Defaults

Save changes as User Defaults.

Restore User Defaults

Restores User Defaults to all Setup options.

Launch EFI Shell from filesystem device

Initiates launch of EFI Shell application (Shellx64.efi) from an available filesystem device.

Reset System with ME disable ModeMEUD000

ME runs in temporary disable mode, not applicable if ME Ignition FWMEUD001.

Important Safety Instructions

For user safety, please read and follow all **instructions**, **WARNINGS**, **CAUTIONS**, and **NOTES** marked in this manual and on the associated equipment before handling/operating the equipment.

- ▶ Read these safety instructions carefully.
- ► Keep this user's manual for future reference.
- Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- When installing/mounting or uninstalling/removing equipment:
 - ▷ Turn off power and unplug any power cords/cables.
- ► To avoid electrical shock and/or damage to equipment:
 - ▷ Keep equipment away from water or liquid sources;
 - ▷ Keep equipment away from high heat or high humidity;
 - Keep equipment properly ventilated (do not block or cover ventilation openings);
 - Make sure to use recommended voltage and power source settings;
 - Always install and operate equipment near an easily accessible electrical socket-outlet;
 - Secure the power cord (do not place any object on/over the power cord);
 - Only install/attach and operate equipment on stable surfaces and/or recommended mountings; and,
 - If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.



- Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.
- A Lithium-type battery may be provided for uninterrupted, backup or emergency power.



Risk of explosion if battery is replaced with an incorrect type; please dispose of used batteries appropriately.

- Equipment must be serviced by authorized technicians when:
 - ▷ The power cord or plug is damaged;
 - > Liquid has penetrated the equipment;
 - ▷ It has been exposed to high humidity/moisture;
 - It is not functioning or does not function according to the user's manual;
 - ▷ It has been dropped and/or damaged; and/or,
 - ▷ It has an obvious sign of breakage.

Please pay strict attention to all warnings and advisories appearing on the device, to avoid injury or damage.



Getting Service

Contact us should you require any service or assistance.

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