MI982

Intel® H81 Based Mini-ITX board Mini ITX Motherboard

USER'S MANUAL

Version 1.0

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Introduction

Product Description

The MI982 Mini ITX motherboard is based on the latest Intel[®] H81 chipset. The platform supports Intel[®] 4th Generation Core[™] DT i7/i5/i3 processors. The latest Intel[®] processors provide advanced performance in both computing and graphics quality. This meets the requirement of customers in the gaming, POS, digital signage and server market segment.

The platform supports two SO-DIMM sockets that can accommodate up to 16GB of DDR3-1600 Non ECC memory. The Intel® 4th Gen. CoreTM DT processor integrated HD graphics supports 3 independent displays, Direct X 11.1, OpenGL 3.2, and Open CL 1.2. Display interfaces are for HDMI, DisplayPort and VGA CRT.

With two Gigabit Ethernets, the MI982 Mini ITX board utilizes the dramatic increase in performance provided Intel's latest cutting-edge technology. Expansion is provided by PCIe(16x), one full sized MiniPCIe and a half sized MiniPCIe. Onboard connectors support 4x SATA III, 4x or 6x USB 2.0 depending on the MI982 model and 6x COM ports. The board measures 170mm x 170mm.

Checklist

Your MI982 package should include the items listed below.

- The MI982 MINI ITX motherboard
- This User's Manual
- 1 CD containing chipset drivers and flash memory utility

MI982 Specifications

Model Name	MI982EF
Form Factor	Mini ITX
CPU Type	- Haswell Refresh 4 th Generation Intel [®] Core [™] i7/i5/i3/Pentium DT
	processor & FCLGA1150 package [37.5 mm x 37.5mm]
	- TDP: 35W ~ 84W
CPU Speed	Up to 4.0GHz
Cache Size	Up to 8MB
CPU Socket	LGA1150 (Socket H3)
Chipset	Intel [®] H81 PCH
	Package =23 mm x 22 mm, 0.65 mm ball pitch
BIOS	AMI BIOS
Memory	Haswell Refresh 4 th Generation Intel [®] Core [™] DT processors integrated
	memory controller,
	- DDR3-1600 MHz@1.5V
	- SO-DIMM x 2, Max. 16GB (Non-ECC)
VGA	Haswell Refresh 4 th Generation Intel [®] DT processor integrated HD Gfx,
	supports 3 independent displays, Direct X 11.1, OpenGL 3.2, Open CL
	1.2
	 DVI-D x 1 (Thru port C, with level shifter ASM1442K)
	 DisplayPort x 1 (Thru port D)
	- VGA x 1 (Thru PCH)
LAN	1. Intel® I217LM PHY GbE
-	2. Intel® I211AT PCIe GbE as 2 nd LAN
USB	USB 2.0 host controller [H81 Integrated], support 8 ports
	- 4 ports via the rear panel I/O
	- 2 ports va MiniPCle socket
	- 2 ports va pin-header
	USB 3.0 host controller [H81 integrated], support 2 ports
Conicl ATA	- 2 ports via the rear panel I/O
Serial ATA	Intel [®] H81 PCH built-in SATA controller, support 4 ports
Audia	- 2 X SATA III (00000) + 2 X SATA II (00000)
Audio	
	Eintek E91966AD L (129 nin LOED [14mm x 14 mm])
	FILLER FOTOTOAD-I (120-PILLQFF [1411111 X 14 11111])
	- CON #1 (R3232/422/403) Support Ing-III with power @300 IIIA (selectable for 5)/ or 12)/) [EYAP SP330EEP1 232/422/485
	(Selectable for 50 of 120) [EARLY OF 555EERT 252/422/465
	COM #2 COM #6 (BS232 only)
	Hardware Monitor (2 thermal inputs 4 voltage monitor inputs & 2 Fan
	headers)
	- CPU FAN x 1(PWN Fan type 4-pin connector)
	- SYS fan x 1(PWM Fan type, 4-pin connector)]
Digital IO	4 in & 4 out

Expansion	- PCI-Express (16x) x1 [Gen 2.0 PEG]		
Slots	- Mini PCI-Express x 2 port [1 x Full-sized, 1 x Half-sized], both support		
	USB 2.0 signal		
Edge	Dual DB9 stack connector for COM #1 / #2		
Connectors	VGA + DVI-D stack connector x1		
	DisplayPort + dual USB (2.0) stack connector x1		
	RJ-45 + dual USB (3.0) stack connector x1		
	RJ-45 + dual USB (2.0) stack connector x1		
	Triplet type Jack 3x1 for Audio port [Line-in / Line-out / Mic-in]		
Onboard	2 ports x SATA III [Blue color]		
Header/Conn	2 ports x SATA II		
ector	DF-11 2x4 header x 1 for 2 ports USB 2.0		
	DF-11 2x5 box header x 4 for COM 3/4/5/6 (RS232 only)		
	2x5 header for Digital IO		
	2x5 header for front Audio		
	2x4 header for front panel I/O (2.54 pitch)		
	2x2 pin ATX power connector x1		
	1x ATX standard 24-pin type for power connector		
Watchdog	Yes (256 segments, 0, 1, 2255 sec/min)		
Timer			
System	ATX standard 24-pins type		
Voltage	4 pin type (+12V only)		
Other	- LAN Wakeup		
	- EuP/ErP		
	- iSMART 3.0		
Environment	Operation Temperature: 0~60 degree C		
	Storage Temperature: -20~80 degree C		
	Relative humidity: 0~90%, non-condensing		
Board Size	170mm x 170mm		
Operation	Windows 7 Windows 8 Linux		
System			

Board Dimensions



Installations

This section provides information on how to use the jumpers and connectors on the MI982 in order to set up a workable system. The topics covered are:

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Setting the Jumpers	7
Connectors on MI982	12

Installing the Memory

The MI982 board supports two DDR3 memory modules for a maximum total of 16GB in DDR3 SODIMM memory type.

Installing and Removing Memory Modules

To install the DDR3 modules, locate the memory slot on the board and perform the following steps:

- 1. Hold the DDR3 module so that the key of the DDR3 module aligned with that on the memory slot.
- 2. Gently push the DDR3 module in an upright position until the clips of the slot close to hold the DDR3 module in place when the DDR3 module touches the bottom of the slot.
- 3. To remove the DDR3 module, press the clips with both hands.



Setting the Jumpers

Jumpers are used on MI982 to select various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your needs. The following lists the connectors on MI982 and their respective functions.

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JBAT1: Clear CMOS Contents	13



Jumper Locations on MI982

Jumpers on MI982Pag	ge
JP1: COM2 RS232 RI/+5V/+12V Power Setting	1
JP2: COM1 RS232 RI/+5V/+12V Power Setting1	1
JP4: Power Good Selection	2
JP5: Flash Descriptor Security Override (Factory use only)1	3
JBAT1: Clear CMOS Contents	3

JP1: COM2 RS232 RI/+5V/+12V Power Setting



JP1	Setting	Function
1 2	Pin 1-3 Short/Closed	+12V
5 0 0 6	Pin 3-4 Short/Closed	RI
	Pin 3-5 Short/Closed	+5V

JP2: COM1 RS232 RI/+5V/+12V Power Setting



JP2	Setting Function	
1 0 0 2	Pin 1-3	+12V
	Pin 3-4	112 1
5 🗖 🗖 6	Short/Closed	RI
	Pin 3-5	5 1 1
	Short/Closed	+5 V

JP4: Power Good Selection



JP4	Function	
Short	Factory use only	
Open	Normal	

JP5: Flash Descriptor Security Override (Factory use only)



JBAT1: Clear CMOS Contents



JBAT1	Setting	Function
123	Pin 1-2 Short/Closed	Normal
123	Pin 2-3 Short/Closed	Clear CMOS

Connectors on MI982

Connector Locations on MI982	15
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PCIE1: PCI-E X16 Slot	25
CPU_FAN1: CPU Fan Power Connector	26
SYS_FAN1: System Fan1 Power Connector	26

Connector Locations on MI982



	Pin #	Signal Name		
		RS-232	R2-422	RS-485
	1	DCD	TX-	DATA-
	2	RX	TX+	DATA+
0110	3	TX	RX+	NC
COM2	4	DTR	RX-	NC
	5	Ground	Ground	Ground
	6	DSR	NC	NC
	7	RTS	NC	NC
0 9	8	CTS	NC	NC
	9	RI	NC	NC
	10	NC	NC	NC

CN1: COM1 and COM2 Serial Ports

CN2: VGA and DVI-D Connector



Signal Name	Pin #	Pin #	Signal Name
Red	1	2	Green
Blue	3	4	N.C.
GND	5	6	GND
GND	7	8	GND
N.C.	9	10	GND
N.C.	11	12	DDCDATA
HSYNC	13	14	VSYNC
DDCCLK	15		

	Signal Name	Pin #	Pin #	Signal Name
	DATA 2-	1	16	HOT POWER
°	DATA 2+	2	17	DATA 0-
	GROUND	3	18	DATA 0+
	N.C.	4	19	GROUND
	N.C.	5	20	N.C.
	DDC CLOCK	6	21	N.C.
×+======+**	DDC DATA	7	22	GROUND
	N.C	8	23	CLOCK +
	DATA 1-	9	24	CLOCK -
	DATA 1+	10		
	GROUND	11		
	N.C.	12		
	N.C.	13		
	DDC POWER	14		
	GROUND	15		

CN3: USB2.0 Connector

CN4: DP Connector

CN5: Gigabit LAN (Intel I217LM) / USB3.0

CN6, CN7: SATA3 Connectors

CN8, CN9: SATA2 Connectors

CN10: Gigabit LAN (Intel I211AT) / USB2.0

CN11: HD Audio Connector

J1: ATX 12V Power Connector



Pin #	Signal Name
1	Ground
2	Ground
3	+12V
4	+12V

J4: ATX Power Supply Connector





Signal Name	Pin #	Pin #	Signal Name
3.3V	13	1	3.3V
-12V	14	2	3.3V
Ground	15	3	Ground
PS-ON	16	4	+5V
Ground	17	5	Ground
Ground	18	6	+5V
Ground	19	7	Ground
-5V	20	8	Power good
+5V	21	9	5VSB
+5V	22	10	+12V
+5V	23	11	+12V
Ground	24	12	+3.3V

INSTALLATIONS

J7: Digital I/O



Signal Name	Pin	Pin	Signal Name
GND	1	2	VCC
OUT3	3	4	OUT1
OUT2	5	6	OUT0
IN3	7	8	IN1
IN2	9	10	IN0

	acklight Connector	1 4	
Pin #	Signal Name		
1	Backlight Power		
2	Backlight Enable		
3	Brightness Control		
4	Ground		



J10: Mini PCIE Connector



J11: SPI Flash Connector (Factory use only)



J12: MCU Flash Connector (factory use only)



J13: Debug 80 Port Connector (factory use only)



1

2

J14: Front Panel Function Connector



ATX Power ON Switch: Pins 1 and 2

This 2-pin connector is an "ATX Power Supply On/Off Switch" on the system that connects to the power switch on the case. When pressed, the power switch will force the system to power on. When pressed again, it will force the system to power off.

Hard Disk Drive LED Connector: Pins 3 and 4

This connector connects to the hard drive activity LED on control panel. This LED will flash when the HDD is being accessed.

]	Pin #	Signal Name
	4	HDD Active
	3	3.3V

Reset Switch: Pins 5 and 6

The reset switch allows the user to reset the system without turning the main power switch off and then on again. Orientation is not required when making a connection to this header.

Power LED: Pins 7 and 8

Pin #	Signal Name
7	+5V
8	GND

J15, J16, J17, J18: COM3/COM4/COM5/COM6 Connector



Signal Name	Pin #	Pin #	Signal Name
DCD, Data carrier detect	1	2	RXD, Receive data
TXD, Transmit data	3	4	DTR, Data terminal ready
GND, ground	5	6	DSR, Data set ready
RTS, Request to send	7	8	CTS, Clear to send
RI, Ring indicator	9	10	Not Used

J20: USB Connectors



Signal Name	Pin	Pin	Signal Name
VCC	1	2	GND
D0-	3	4	D1+
D0+	5	6	D1-
GND	7	8	VCC

J22: Audio Front Header





Signal Name	Pin #	Pin #	Signal Name
MIC2_L	1	2	Ground
MIC2_R	3	4	Presence#
Line2_R	5	6	MIC2_ID
Sense	7	8	NC
Line2_L	9	10	Line2_ID

PCIE1: PCI-E X16 Slot



CPU_FAN1: CPU Fan Power Connector



Pin #	Signal Name
1	Ground
2	+12V
3	Rotation detection
4	Control

SYS_FAN1: System Fan1 Power Connector





Pin #	Signal Name			
1	Ground			
2	+12V			
3	Rotation detection			
4	Control			

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BIOS Setup

This chapter describes the different settings available in the AMI BIOS that comes with the board. The topics covered in this chapter are as follows:

BIOS Introduction	
BIOS Setup	
Advanced Settings	
Chipset Settings	
Boot Settings	
CSM parameters	
Security Settings	
Save & Exit Settings	

BIOS Introduction

The BIOS (Basic Input/Output System) installed in your computer system's ROM supports Intel processors. The BIOS provides critical low-level support for a standard device such as disk drives, serial ports and parallel ports. It also has password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

BIOS Setup

The BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the BIOS is immediately activated. Pressing the $\langle Del \rangle$ key immediately allows you to enter the Setup utility. If you are a little bit late pressing the $\langle Del \rangle$ key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup. If you still wish to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the $\langle Ctrl \rangle$, $\langle Alt \rangle$ and $\langle Delete \rangle$ keys. You can also restart by turning the system Off and back On again. The following message will appear on the screen:

Press to Enter Setup

In general, you press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help and <Esc> to quit.

When you enter the Setup utility, the Main Menu screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

Warning: It is strongly recommended that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both AMI and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could cause the system to become unstable and crash in some cases.

Main Settings

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Main Advanced	Chipset	Boot	Securit	y Save & Exit
BIOS Information				Choose the system default language
System Language		[English]		→ ← Select Screen ↑ ↓ Select Item
System Date		[Tue 01/20/20	009]	Enter: Select
System Time		21:25:55		+- Change Field F1: General Help
Access Level		Administrator		F2: Previous Values F3: Optimized Default
				F4: Save ESC: Exit

System Language

Choose the system default language.

System Date

Set the Date. Use Tab to switch between Date elements.

System Time

Set the Time. Use Tab to switch between Time elements.

Advanced Settings

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.

Main	Advanced	Chipset	Boot	Security	Save & Exit
 PCI ACI Wa CPU SA⁻ iSm USI F81 	Subsystem Settings PI Settings keup Event Configur J Configuration TA Configuration art Controller 3.0 3 Configuration 866 Super IO Config	ation			→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Opt.

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BIOS SETUP

► F81866 H/W Monitor	F1: General Help
	F2: Previous Values
	Defaults
	F4: Save & Exit
	ESC: Exit

PCI Subsystem Settings

Main Advance	d Chipset	Boot	Securi	ty Save & Exit
PCI Bus Driver Versio	n	V 2.05.02		$\rightarrow \leftarrow$ Select Screen
				↑↓ Select Item
PCI Common Settings				Enter: Select
PCI Latency Timer		32 PCI Bus Clock	S	+- Change Opt.
VGA Palette Snoop		Disabled		F1: General Help
► PCI Express Setting	IS			F2: Previous Values F3: Optimized Defaults
				F4: Save & Exit
				ESC: Exit

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PCI Latency Timer

Value to be programmed into PCI Latency Timer Register.

VGA Palette Snoop

Enables or disables VGA Palette Registers Snooping.

PCI Express Settings

Change PCI Express devices settings.
PCI Express Settings

Aptio Setup Utility

Main Advanced	Chipset	Boot	Security	Save & Exit
PCI Express Device Regist	er Settings			
Relaxed Ordering		Disabled		
Extended Tag		Disabled		
No Snoop		Enabled		
Maximum Payload		Auto		
Maximum Read Request		Auto		
PCI Express Link Register	Settings			
A SPM Support		Disabled		
WARNING: Enabling ASPIV	Imay cause so	ome		→ ← Select Screen
PCI-E devices	to fail			1 Select Item
Extended Synch		Disabled		Foter: Select
				+- Change Field
Link Training Retry		5		F1: General Help
Link Training Timeout (uS)		100		F2: Previous Values
Unpopulated Links		Keep Link ON	1	F3: Optimized Default
Restore PCIE Registers		Disabled		F4: Save ESC: Exit

Relaxed Ordering

Enables or disables PCI Express Device Relaxed Ordering.

Extended Tag

If ENABLED allows device to use 8-bit Tag field as a requester.

No Snoop

Enables or disables PCI Express Device No Snoop option.

Maximum Payload

Set Maximum Payload of PCI Express Device or allow System BIOS to select the value.

Maximum Read Request

Set Maximum Read Request Size of PCI Express Device or allow System BIOS to select the value.

ASPM Support

Set the ASPM Level: Force L0s – Force all links to L0s State: AUTO – BIOS auto configure: DISABLE – Disables ASPM.

Extended Synch

If ENABLED allows generation of Extended Synchronization patterns.

Link Training Retry

Defines number of Retry Attempts software will take to retrain the link if previous training attempt was unsuccessful.

Link Training Timeout (uS)

Defines number of Microseconds software will wait before polling 'Link Training' bit in Link Status register. Value range from 10 to 1000 uS.

Unpopulated Links

In order to save power, software will disable unpopulated PCI Express links, if this option set to 'Disable Link'.

Restore PCIE Registers

On non-PCI Express aware OS's (Pre Windows Vista) some devices may not be correctly reinitialized after S3.Enabling this restore PCI Express device configuration on S3 resume

Warning: Enabling this may cause issues with other hardware after S3 resume.

ACPI Settings

	Aprilo Setup Utility						
ſ	Main	Advanced	Chipset	Boot	Securit	y Save & Exit	
I	ACPI S	ettings					
	Enable ACPI S Lock L S3 Vid	Hibernation Ieep State egacy Resources eo Repost		Enabled S3 (Suspend Disabled Disabled	to)	<pre>→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit</pre>	

And a Colored Hilling

Enable Hibernation

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

ACPI Sleep State

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

Lock Legacy Resources

Enabled or Disabled Lock of Legacy Resources.

S3 Video Repost

Enable or disable S3 Video Repost.

Wakeup Event Configuration

Main	Advanced	Chipset	Boot	Security	/ Save & Exit
Wake	up by PCIE WAKE#	Cnipset	Disabled	Security	→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
				:	ESC: Exit

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Wake up by PCIE WAKE#

The options are Disabled and Enabled.

CPU Configuration

This section shows the CPU configuration parameters.

Main	Advanced	Chipset	Boot	Securit	y Save & Exit
CPU C	onfiguration				
Intel(R) Celeron(R) CPU G1	820TE @ 2.2	20GHz		
CPU S	ignature		306c3		
Proces	ssor Family		6		
Microo	ode Patch		1d		
FSB S	peed		100MHz		
Max C	PU Speed		2200 MHz		
Min CF	PU Speed		800 MHz		
CPU S	peed		2200 MHz		
Proces	ssor Cores		2		
Intel H	T Technology		Not Supported		
Intel V	T-x Technology		Supported		
Intel S	MX Technology		Not Supported		
64-bit			Supported		
EIST			Supported		\rightarrow \leftarrow Select Screen
					↑↓ Select Item
Active	Processor Cores		All		Enter: Select
Execu	te Disable Bit		Enabled		+- Change Field
Intel V	irtualization Technolo	gy	Enabled		F1: General Help
Boot	performance mode		Turbo Performance	e	F2: Previous Values
EIST			Enabled		F3: Optimized Default
					F4: Save ESC: Exit

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Active Processor Cores

Number of cores to enable in each processor package.

Execute Disable Bit

XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS

Intel Virtualization Technology

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

Boot Performance Mode

Select the performance state that the BIOS will set before OS handoff.

EIST

Enabled/Disabled Intel Speedstep.

SATA Configuration

SATA Devices Configuration.

Main Advanced	Chipset Boot	Security	Save & Exit
SATA Controller(s)	Enabled		
SATA Mode Selection	AHCI		
SATA Controller Speed	Default		
Serial ATA Port 0	Empty		
Software Preserve	Unknow n		
Hot Plug	Disabled		
Serial ATA Port 1	Empty		
Software Preserve	Unknow n		
Hot Plug	Disabled		
Serial ATA Port 2	Empty		
Software Preserve	Unknow n		
Hot Plug	Disabled	-	$\rightarrow \leftarrow$ Select Screen
Serial ATA Port 3	Empty		1 Select Item
Software Preserve	Unknow n	1	Enter: Select
Hot Plug	Disabled		+- Change Opt.
Serial ATA Port 4	Empty	1	F1: General Help
Software Preserve	Unknow n	1	F2: Previous Values
Hot Plug	Disabled	1	F3: Optimized
Serial ATA Port 5	Empty	1	Defaults
Softw are Preserve	Unknow n	1	F4: Save & Exit
Hot Plug	Disabled	1	ESC: Exit

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SATA Controller(s)

Enable or disable SATA Device.

SATA Mode Selection

Determines how SATA controller(s) operate.(1) IDE Mode.(2) AHCI Mode.(3) RAID Mode. (MI982AF only)

SATA Controller Speed

Indicates the maximum speed the SATA controller can support.

Hot Plug

Designates this port as Hot Pluggable.

iSmart Controller 3.0

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Main Advanced	Chipset	Boot	Security Save & Exit
iSmart Controller 3.0			\rightarrow \leftarrow Select Screen
Pow er-On after Pow er f	ailure	Disable	↑↓ Select Item
Temperature Guardian		Disable	Enter: Select
			+- Change Opt.
Schedule Slot 1		None	F1: General Help
Schedule Slot 2		None	F2: Previous Values
			F3: Optimized
			Defaults
			F4: Save & Exit
			ESC: Exit

Power-On after Power failure

This field sets the system power status whether *Disable or Enable* when power returns to the system from a power failure situation.

Temperature Guardian

Generate the reset signal when system hangs up on POST

Schedule Slot 1 / 2

Setup the hour/minute for system power on.

USB Configuration

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Main Advanced	Chipset	Boot	Securit	y Save & Exit
USB Configuration				
USB Module Version		8.10.28		
USB Devices:				
1 Keyboards, 2	Hubs			
Legacy USB Support		Enabled		→ ← Select Screen
USB3.0 Support		Enabled		A Soloct Itom
XHCI Hand-off		Enabled		Fator: Soloat
EHCI Hand-off		Enabled		+- Change Opt.
USB Mass Storage Drive	r Support	Enabled		F1: General Help
				F2: Previous Values
USB hardw are delays ar	nd time-outs:			F3: Optimized
USB transfer time-out		20 sec		Defaults
Device reset time-out		20 sec		F4: Save & Exit
Device pow er-up delay		Auto		ESC: Exit

Legacy USB Support

Enables Legacy USB support.

AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.

USB3.0 Support

Enable/Disable USB3.0 (XHCI) Controller support.

XHCI Hand-off

This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

EHCI Hand-off

This is a workaround for OSes without EHCI hand-off support. The XHCI ownership change should be claimed by EHCI driver.

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 tine-out

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. 'Auto' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor.

F81866 Super IO Configuration

Main	Advanced	Chipset	Boot	Security	/ Save & Exit
Super	IO Configuration				
F8186 ► Set	i6 Super IO Chip rial Port 1 Configurati	on	F81866		
► Sei	rial Port 2 Configurat	on			\rightarrow \leftarrow Select Screen
► Sei ► Sei	ial Port 3 Configurati	on			↑↓ Select Item
► Se	ial Port 5 Configurat	on			Enter: Select +- Change Field
► Se	ial Port 6 Configurat	on			F1: General Help
Sta	ndby Pow er on S5		All Enable		F2: Previous Values F3: Optimized Default
AC	Power Failure Resu	ime	Always Off		F4: Save ESC: Exit

Serial Port Configuration

Set Parameters of Serial Ports. User can Enable/Disable the serial port and Select an optimal settings for the Super IO Device.

F81866 H/W Monitor

Main A	dvanced	Chipset	Boot	Security	/ Save & Exit
Pc Health \$	Status				
CPU smart System sn ACPI Shute	fan control nart fan control dow n Temperat	ure	Disabled Disabled Disabled		→ ← Select Screen
CPU Temp SYS Temp Fan1 Spee Fan2 Spee Vcore +5V +12V +1.5V	erature erature d		: +31 C : +28 C : N/A : 4021 RPM : +1.736V : +5.171V : +12.232V : +1.512V		<pre>↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

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CPU/System smart fan control

This field enables or disables the smart fan feature. Disabled (default)

- 50 ℃
- 60 ℃
- 70 ℃
- **80** ℃
- **90 ℃**

Temperatures/Voltages

These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status.

Chipset Settings

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.

Main	Advanced	Chipset	Boot	Security Save & Exit
Main ► PCH ► Sys	HO Configuration tem Agent (SA) Cor	figuration	Boot	Security Save & Exit → ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
1				ESC. EXIC

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PCH-IO Configuration

This section allows you to configure the North Bridge Chipset.

Main Advanced	Chipset	Boot	Security	y Save & Exit
Intel PCH RC Version		1.8.0.0		
Intel PCH SKU Name		H81		$\rightarrow \leftarrow$ Select Screen
Intel PCH Rev ID		05/C2		↑↓ Select Item
				Enter: Select
PCI Express Configura	ation			+- Change Opt.
 USB Configuration 				F1: General Help
PCH Azalia Configura	tion			F2: Previous Values
				F3: Optimized
Toggle EC		Disabled		Defaults
PCH LAN Controller		Enabled		F4: Save & Exit
Wake on LAN		Enabled		ESC: Exit
DeepSx Pow er Policies		Disabled		
GP27 Wake From DeepS	x	Disabled		
PCIE Wake From DeepS	(Disabled		
SLP-S4 Assertion Width		4-5 Seconds		
Restore AC Pow er Loss		Pow er Off		
Port 80h Redirection		LPC Bus		
NFC Device		Disabled		

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PCH LAN Controller

Enable or disable onboard NIC.

Wake on LAN

BIOS SETUP

Enable or disable integrated LAN to wake the system. (The Wake On LAN cannot be disabled if ME is on at Sx state.)

SLP_S4 Assertion Width

Select a minimum assertion width of the SLP_S4# signal.

PCI Express Configuration

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Main	Advanced	Chipset	Boot	Securit	y Save & Exit
PCI Ex	press Configuration	on			
PCI Express Clock Gating		Enabled			
DMI Lii	nk ASPM Control		Disabled		
DMI Lii	nk Extended Sync	h Control	Disabled		
PCIe-L	JSB Glitch W/A		Disabled		
Subtractive Decode		Disabled			
					$\rightarrow \leftarrow$ Select Screen
► PCI	Express Root Por	t 1			↑↓ Select Item
► PCI	Express Root Por	t 2			Enter: Select
► PCI	Express Root Por	t 3			+- Change Opt.
► PCI	Express Root Por	t 4			F1: General Help
 PCI Express Root Port 5 				F2: Previous Values	
PCI-E Port 6 is assigned to LAN				F3: Optimized	
► PCI	PCI Express Root Port 7				Defaults
► PCI	PCI Express Root Port 8				F4: Save & Exit
					ESC: Exit

DMI Link ASPM Control

The control of Active State Power Management on both NB side and SB side of the DMI Link.

DMI Link Extended Synch Control

The control of Extended Synch on SB side of the DMI Link.

PCIe-USB Glitch W/A

PCIe-USB Glitch W/A for bad USB device(s) connected behind PCIE/PEG port.

Subtractive Decode

Enable or disable PCI Express Subtractive Decode.

USB Configuration

Main	Advanced	Chipset	Boot	Security	/ Save & Exit
USB (Configuration				
USB F	Precondition		Disabled		Salaat Sanaan
XHCI	Mode		Auto		$\rightarrow \leftarrow$ Select Screen
BTCG			Disabled		Filenter: Select
					+- Change Field
USB F	Ports Per-Port Disa	able Control	Disabled		F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save ESC: Exit

USB Precondition

Precondition work on USB host controller and root ports for faster enumeration.

PCH Azalia Configuration

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Main	Advanced	Chipset	Boot	Securit	y Save & Exit
PCH A	zalia Configuration				
					$\rightarrow \leftarrow$ Select Screen
Azalia			Auto		↑↓ Select Item
					Enter: Select
					+- Change Opt.
					F1: General Help
					F2: Previous Values
					F3: Optimized
					Defaults
					F4: Save & Exit
					ESC: Exit

Azalia

Control Detection of the Azalia device.

Disabled = Azalia will be unconditionally disabled.

Enabled Azalia will be unconditionally Enabled.

Auto = Azalia will be enabled if present, disabled otherwise.

Main	Advanced	Chipset	Boot	Security	y Save & Exit
Syste	m Agent Bridge N	lame	Hasw ell		
Syste	m Agent RC Vers	ion	1.6.2.0		
VT-d	Capability		Unsupported		
CHAP Thern CPU S Enable BDAT	¹ Device (B0:D7:F nal Device (B0:D4 SA Audio Device I e NB CRID • ACPI Table Supp	0) :F0) B0:D3:F0) ort	Disabled Disabled Enabled Disabled Disabled		→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default
► Gra ► Me	aphics Configuration mory Configuration	ion on			F4: Save ESC: Exit

System Agent (SA) Configuration

Aptio Setup Utility

VT-d

Check to enable VT-d function on MCH.

Enable NB CRID

Enable or disable NB CRID WorkAround.

Graphics Configuration

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Main Adv	vanced	Chipset	Boot	Security	y Save & Exit
Graphics Co	onfiguration				
IGFX VBIOS	Version		2179		
lGfx Freque	ncy		700 MHz		\rightarrow \leftarrow Select Screen
Primary Disp	olay		Auto		↑↓ Select Item Enter: Select
Primary Pl	EG		Auto		+- Change Opt.
Primary P	CIE		Auto		F1: General Help
Internal Grap	ohics		Auto		F2: Previous Values
Aperture Siz	e		256MB		F3: Optimized
DVMT Pre-A	llocated		32M		Defaults
DVMT Total	Gfx Mem		256MB		F4: Save & Exit
					ESC: Exit

Primary Display

Select which of IGFX/PEG/PCI graphics device should be Primary Display or select SG for switchable Gfx.

BIOS SETUP

Primary PEG

Select PEG0/PEG1/PEG2/PEG3 Graphics device should be Primary PEG.

Primary PCIE

Select PCIE0/PCIE1/PCIE2/PCIE3/PCIE4/PCIE5/PCIE6PCIE7 Graphics device should be Primary PCIE.

Internal Graphics

Keep IGD enabled based on the setup options.

Aperture Size

Select the Aperture Size.

DVMT Pre-Allocated

Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory Size used by the Internal Graphics Device.

DVMT Total Gfx Mem

Select DVMT 5.0 Total Graphics Memory Size used by the Internal Graphics Device.

Memory Configuration

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	/ Save & Exit
Memo	ry Information				
Memo Total I Memo DIMME DIMME CAS L Minimu C R A	ry Frequency Wemory ry Voltage 40 41 42 43 	in) Pmin) (tRASmin)	1333 MHz 2048 MB (DDR3) 1.50V Not Present 2048 MB (DDR3) Not Present 9 9 9		 → ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit

Boot Settings

This section allows you to configure the boot settings.

			thue setup ou	iity	
Main	Advanced	Chipset	Boot	Securit	y Save & Exit
Boot Co	onfiguration				
Setup F	Prompt Timeout		1		
Bootup	NumLock State		On		
Quiet B	oot		Disabled		
Fast Bo	oot		Disabled		
Boot mo	ode Select		LEGACY		
FIXED E	300T ORDER Prior	ities			
Boot Op	ption #1		Hard Disk		
Boot Op	otion #2		CD/DVD		
Boot Op	ption #3		USB Hard	Disk	
Boot Op	otion #4		USB CD/D	VD	
Boot Op	otion #5		USB Key		$\rightarrow \leftarrow$ Select Screen
Boot Op	ption #6		USB Flopp	y	↑↓ Select Item
Boot Op	otion #7		Netw ork		Enter: Select
					+- Change Field
					F1: General Help
CSM16	Parameters				F2: Previous Values
CSM pa	arameters				F3: Optimized Default
					F4: Save ESC: Exit

Setup Prompt Timeout

Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

Bootup NumLock State

Select the keyboard NumLock state.

Quiet Boot

Enables/Disables Quiet Boot option.

Fast Boot

Enables/Disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.

FIXED BOOT ORDER Priorities

Sets the system boot order.

CSM parameters

This section allows you to configure the boot settings.

Main	Advanced	Chipset	Boot	Securit	y Save & Exit
Launcl Boot o Launcl Launcl Launcl	h CSM ption filter h PXE OpROM polic h Storage OpROM po h Video OpROM po	y policy licy	Enabled UEFI and I Do not lau Legacy or Legacy or	Legacy Inch nly nly	→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Opt. F1: General Help
Other	PCI device ROM pri	ority	Legacy O	pROM	F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

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Launch CSM

This option controls if CSM will be launched.

Boot option filter

This option controls what devices system can boot to.

Launch PXE OpROM policy

Controls the execution of UEFI and Legacy PXE OpROM.

Launch Storatge OpROM policy

Controls the execution of UEFI and Legacy Storage OpROM.

Launch Video OpROM policy

Controls the execution of UEFI and Legacy Video OpROM.

Other PCI device ROM priority

For PCI devices other than Network, Mass storage or Video defines which OpROM to launch.

Security Settings

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.

		P	optio Setup	Utility	
Main	Advanced	Chipset	Boot	Security	Save & Exit
Passw	ord Description				
If ONLY the Administrator's passw ord is set, then this only limit access to Setup and is only asked for w hen entering Setup. If ONLY the User's passw ord is set, then this is a pow er on passw ord and must be entered to boot or enter Setup. In Setup the User will have Administrator rights					
The pa	assword length mus	st be			$\rightarrow \leftarrow$ Select Screen
in the f	ollow ing range:				↑↓ Select Item
Minimu	m length		3		Enter: Select
Maxim	um length		20		+- Change Field
					F1: General Help
Admin	istrator Password				F2: Previous Values
User F	assw ord				F3: Optimized Default
					F4: Save ESC: Exit

Administrator Password

Set Setup Administrator Password.

User Password

Set User Password.

Save & Exit Settings

Main	Advanced	Chipset	Boot	Security	y Save & Exit
Save	Changes and Exit				
Disca	rd Changes and Exit				
Save	Changes and Reset				
Disca	rd Changes and Rese	et			$\rightarrow \leftarrow$ Select Screen
Save	Options				↑↓ Select Item
Save	Changes				+- Change Opt.
Disca	rd Changes				F1: General Help
Resto	re Defaults				F2: Previous Values F3: Optimized
Save	as User Defaults				Defaults
Resto	re User Defaults				F4: Save & Exit
					ESC: Exit

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Save 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 Defaults 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.

Drivers Installation

This section describes the installation procedures for software and drivers. The software and drivers are included with the motherboard. If you find the items missing, please contact the vendor where you made the purchase. The contents of this section include the following:

Intel Chipset Software Installation Utility	55
VGA Drivers Installation	56
Realtek HD Audio Driver Installation	57
LAN Drivers Installation	58
Intel® Management Engine Interface	59
Intel® USB 3.0 Drivers	60

IMPORTANT NOTE:

After installing your Windows operating system, you must install first the Intel Chipset Software Installation Utility before proceeding with the drivers installation.

Intel Chipset Software Installation Utility

The Intel Chipset Drivers should be installed first before the software drivers to enable Plug & Play INF support for Intel chipset components. Follow the instructions below to complete the installation.

1. Insert the DVD that comes with the board. Click *Intel* and then *Intel(R)* 8 Series Chipset Drivers.

Inside T	his CD Version : 9.0.4i @1
Intel Image: LAN Card Image: LAN Card Image: LAN Card Image: LAN Card	Intel(R) Cedarview Chipset Drivers Intel(R) 6 Series Chipset Drivers Intel(R) 7 Series Chipset Drivers Intel(R) 8 Series Chipset Drivers

2. Click Intel(R) Chipset Software Installation Utility.

Inside This CD Version : 9.0.4i @1				
Intel Intel IAN Card Second Content	Intel(R) Chipset Software Installation Utility Intel(R) HD Graphics Driver Realtek High Definition Audio Driver Intel(R) PRO LAN Network Drivers Intel(R) ME 9.0 Drivers Intel(R) USB 3.0 Drivers			

3. When the Welcome screen to the Intel® Chipset Device Software appears, click *Next* to continue.

4. Click *Yes* to accept the software license agreement and proceed with the installation process.

5. On the Readme File Information screen, click *Next* to continue the installation.

6. The Setup process is now complete. Click *Finish* to restart the computer and for changes to take effect.

VGA Drivers Installation

1. Insert the DVD that comes with the board. Click *Intel* and then *Intel(R)* 8 Series Chipset Drivers. Click *Intel(R)* Graphics Driver.



2. When the Welcome screen appears, click Next to continue.

3. Click *Yes* to to agree with the license agreement and continue the installation.

4. On the Readme File Information screen, click *Next* to continue the installation of the Intel[®] HD Graphics Driver.

5. On the screen shown below, click Install to continue.



6. On the Setup Progress screen, click Next to continue.

7. Setup complete. Click *Finish* to restart the computer and for changes to take effect.

Realtek HD Audio Driver Installation

1. Insert the DVD that comes with the board. Click *Intel* and then *Intel(R)* 8 Series Chipset Drivers. Click Realtek High Definition Audio Driver.



2. On the Welcome to the InstallShield Wizard screen, click *Next* to proceed with and complete the installation process.

3. The InstallShield Wizard Complete. Click *Finish* to restart the computer and for changes to take effect.

LAN Drivers Installation

Insert the DVD that comes with the board. Click *Intel* and then *Intel(R)* 8 Series Chipset Drivers. Click *Intel(R)* PRO LAN Network Drivers.



- 2. Click Install Drivers and Software.
- 4. When the Welcome screen appears, click Next.
- 5. Click *Next* to to agree with the license agreement.

6. Click the checkbox for **Drivers** in the Setup Options screen to select it and click **Next** to continue.

7. The wizard is ready to begin installation. Click *Install* to begin the installation.

8. When InstallShield Wizard is complete, click *Finish*.

Intel® Management Engine Interface

-

The following application requires Microsoft .NET Framework 3.5 or later: Intel® Management Engine Components. Please install the latest version of Microsoft .NET Framework from Microsoft Download Center to run this application correctly.

Follow the steps below to install the Intel Management Engine.

1. Insert the DVD that comes with the board. Click *Intel* and then *Intel(R)* 8 Series Chipset Drivers and then *Intel(R)* ME 9.0 Drivers.



2. When the Welcome screen to the InstallShield Wizard for Intel® Management Engine Components, click the checkbox for Install Intel® Control Center & click *Next*.

3. Click Yes to to agree with the license agreement.

4. When the Setup Progress screen appears, click *Next*. Then, click *Finish* when the setup progress has been successfully installed.

Intel® USB 3.0 Drivers

1. Insert the DVD that comes with the board. Click *Intel* and then *Intel(R)* 8 Series Chipset Drivers. Click *Intel(R)* USB 3.0 Drivers.



2. When the Welcome screen to the InstallShield Wizard for Intel® USB 3.0 eXtensible Host Controller Driver, click *Next*.

3. Click *Yes* to to agree with the license agreement and continue the installation.

4. On the Readme File Information screen, click *Next* to continue the installation of the Intel[®] USB 3.0 eXtensible Host Controller Driver.

5. When the Setup Progress screen appears, click *Next*. Setup complete. Click *Finish* to restart the computer and for changes to take effect.

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Appendix

A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device. The following table lists the I/O port addresses used.

Address	Device Description
0000h-001Fh	Direct memory access controller
0000h-001Fh	PCI bus
0040h-0043h	System timer
0050h-0053h	System timer
0070h-0077h	System CMOS/real time clock
0081h-0091h	Direct memory access controller
0093h-009Fh	Direct memory access controller
00C0h-00DFh	Direct memory access controller
00F0h-00F0h	Numeric data processor
02E0h-02E7h	Communications Port (COM6)
02E8h-02EFh	Communications Port (COM4)
02F0h-02F7h	Communications Port (COM5)
02F8h-02FFh	Communications Port (COM2)
03B0h-03BBh	Intel(R) HD Graphics 4600
03C0h-03DFh	Intel(R) HD Graphics 4600
03E8h-03EFh	Communications Port (COM3)
03F8h-03FFh	Communications Port (COM1)
0D00h-FFFFh	PCI bus
E000h-EFFFh	Intel(R) 8 Series/C220 Series PCI Express Root Port #3 -
	8U14
F000h-F03Fh	Intel(R) HD Graphics 4600
F040n-F05Fn	Intel(R) 8 Series/C220 Series SMBus Controller - 8C22
F060n-F07Fn	Intel(R) 8 Series/C220 Series SATA AHCI Controller - 8C02
F0A0h-F0A3h	Intel(R) 8 Series/C220 Series SATA AHCI Controller - 8C02
F0B0h-F0B7h	Intel(R) 8 Series/C220 Series SATA AHCI Controller - 8C02
F0C0h-F0C3h	Intel(R) 8 Series/C220 Series SATA AHCI Controller - 8C02
F0D0h-F0D7h	Intel(R) 8 Series/C220 Series SATA AHCI Controller - 8C02

B. Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

Level	Function
IRQ0	System Timer
IRQ3	Serial Port #2
IRQ4	Serial Port #1
IRQ7	Serial Port #3
IRQ7	Serial Port #4
IRQ8	System CMOS/real time clock
IRQ 10	Intel(R) 8 Series/C220 Series SMBus Controller -
	8C22
IRQ 13	Numeric data processor
IRQ 16	High Definition Audio Controller
IRQ 16	Intel(R) 8 Series/C220 Series USB EHCI #2 - 8C2D
IRQ 16	Intel(R) Management Engine Interface
IRQ 19	Intel(R) 8 Series/C220 Series SATA AHCI Controller
	- 8C02
IRQ 22	High Definition Audio Controller
IRQ 23	Intel(R) 8 Series/C220 Series USB EHCI #1 - 8C26

C. Watchdog Timer Configuration

The WDT is used to generate a variety of output signals after a user programmable count. The WDT is suitable for use in the prevention of system lock-up, such as when software becomes trapped in a deadlock. Under these sorts of circumstances, the timer will count to zero and the selected outputs will be driven. Under normal circumstance, the user will restart the WDT at regular intervals before the timer counts to zero.

SAMPLE CODE:

//-----// // THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY // KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE // IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR // PURPOSE. // //-----#include <dos.h> #include <conio.h> #include <stdio.h> #include <stdlib.h> #include "F81866.H" int main (int argc, char *argv[]); void EnableWDT(int); void DisableWDT(void); //----int main (int argc, char *argv[]) { unsigned char bBuf; unsigned char bTime; char **endptr: char SIO; printf("Fintek 81866 watch dog program\n"); SIO = Init F81866(): if (SIO == 0)printf("Can not detect Fintek 81866, program abort.\n"); return(1); $\frac{}{100} = 0$ if (argc != 2) { printf(" Parameter incorrect !!\n"); return (1); } bTime = strtol (argv[1], endptr, 10); printf("System will reset after %d seconds\n", bTime); if (bTime) EnableWDT(bTime); { } else DisableWDT();

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return 0;

```
}
         _____
void EnableWDT(int interval)
{
     unsigned char bBuf;
     bBuf = Get_F81866_Reg(0x2B);
     bBuf &= (~0x20);
     Set_F81866_Reg(0x2B, bBuf);
                                                       //Enable WDTO
     Set F81866 LD(0x07);
                                                       //switch to logic device 7
     Set_F81866_Reg(0x30, 0x01);
                                                       //enable timer
     bBuf = Get_F81866_Reg(0xF5);
     bBuf &= (~0x0F);
     bBuf \models 0x52;
     Set_F81866_Reg(0xF5, bBuf);
                                                       //count mode is second
     Set_F81866_Reg(0xF6, interval);
                                                //set timer
     bBuf = Get_F81866_Reg(0xFA);
     bBuf = 0x01;
     Set_F81866_Reg(0xFA, bBuf);
                                                       //enable WDTO output
     bBuf = Get\_F81866\_Reg(0xF5);
     bBuf \models 0x20:
     Set_F81866_Reg(0xF5, bBuf);
                                                       //start counting
}
//-----
void DisableWDT (void)
{
     unsigned char bBuf;
     Set_F81866_LD(0x07);
                                                       //switch to logic device 7
     bBuf = Get_F81866_Reg(0xFA);
     bBuf &= ~0x01;
     Set_F81866_Reg(0xFA, bBuf);
                                                       //disable WDTO output
     bBuf = Get\_F81866\_Reg(0xF5);
     bBuf &= \sim 0x20:
     bBuf \models 0x40;
     Set_F81866_Reg(0xF5, bBuf);
                                                       //disable WDT
//-----
```

```
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#include "F81866.H"
#include <dos.h>
//-----
unsigned int F81866_BASE;
void Unlock F81866 (void);
void Lock_F81866 (void);
//-----
unsigned int Init_F81866(void)
{
     unsigned int result;
    unsigned char ucDid;
    F81866_BASE = 0x4E;
    result = F81866_BASE;
     ucDid = Get_F81866_Reg(0x20);
     if (ucDid == 0x07)
                                             //Fintek 81866
     {
         goto Init Finish:
                       }
     F81866\_BASE = 0x2E;
     result = F81866_BASE;
     ucDid = Get_F81866_Reg(0x20);
     if (ucDid == 0x07)
                                             //Fintek 81866
         goto Init_Finish;
     {
                       }
     F81866_BASE = 0x00;
    result = F81866 BASE;
Init_Finish:
    return (result);
}
//-----
void Unlock_F81866 (void)
{
     outportb(F81866_INDEX_PORT, F81866_UNLOCK);
     outportb(F81866_INDEX_PORT, F81866_UNLOCK);
void Lock_F81866 (void)
{
    outportb(F81866_INDEX_PORT, F81866_LOCK);
}
//-----
void Set_F81866_LD( unsigned char LD)
     Unlock_F81866();
     outportb(F81866_INDEX_PORT, F81866_REG_LD);
     outportb(F81866_DATA_PORT, LD);
     Lock_F81866();
}
//-----
void Set_F81866_Reg( unsigned char REG, unsigned char DATA)
     Unlock_F81866();
     outportb(F81866_INDEX_PORT, REG);
    outportb(F81866_DATA_PORT, DATA);
```

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APPENDIX

Lock_F81866();	
```
unsigned char Get_F81866_Reg(unsigned char REG)
    unsigned char Result;
    Unlock_F81866();
    outportb(F81866_INDEX_PORT, REG);
    Result = inportb(F81866_DATA_PORT);
    Lock_F81866();
    return Result;
}
//--
//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#ifndef __F81866_H
#define __F81866_H
                              1
//-----

        #define
        F81866_INDEX_PORT
        (F81866_BASE)

        #define
        F81866_DATA_PORT
        (F81866_BASE+1)

//-----
#define F81866_REG_LD 0x07
//-----
#define F81866_UNLOCK 0x87
#define F81866_LOCK
                                   0xAA
//-----
unsigned int Init_F81866(void);
void Set_F81866_LD( unsigned char);
void Set_F81866_Reg( unsigned char, unsigned char);
unsigned char Get_F81866_Reg( unsigned char);
//-----
```

#endif //__F81866_H