

**JUKI- 745E Pentium®  
with LCD/CRT & Ethernet  
ISA Bus SBC Ver 3.x**

**User Manual**

**Version 2.1**

November 5, 2003



©Copyright 2003 by ICP Electronics Inc. All Rights Reserved.

## **Copyright Notice**

The information in this document is subject to change without prior notice in order to improve reliability, design and function and does not represent a commitment on the part of the manufacturer.

In no event will the manufacturer be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or inability to use the product or documentation, even if advised of the possibility of such damages.

This document contains proprietary information protected by copyright. All rights are reserved. No part of this manual may be reproduced by any mechanical, electronic, or other means in any form without prior written permission of the manufacturer.

## **Trademarks**

JUKI-745E is a registered trademarks of ICP Electronics Inc. IBM PC is a registered trademark of International Business Machines Corporation. Intel is a registered trademark of Intel Corporation. AMI is registered trademarks of American Megatrends, Inc. Other product names mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective companies.

# Table of Contents

<b>CHAPTER 1. INTRODUCTION</b> .....	<b>2</b>
1.1 SPECIFICATIONS .....	3
1.2 PACKAGE CONTENTS .....	5
<b>CHAPTER 2. INSTALLATION</b> .....	<b>6</b>
2.1 JUKI-745E LAYOUT .....	6
2.2 SETTING THE CPU OF JUKI-745E .....	8
2.3 DISKONCHIP™ FLASH DISK .....	10
2.4 LCD VOLTAGE SETTING .....	10
2.5 CLEAR CMOS SETUP .....	11
2.6 BATTERY BACKUP FOR CMOS SETUP .....	11
2.7 BIOS FLASH CHIP WRITE VOLTAGE SETTING .....	11
<b>CHAPTER 3. CONNECTION</b> .....	<b>12</b>
3.1 FLOPPY DISK DRIVE CONNECTOR.....	12
3.2 PCI E-IDE DISK DRIVE CONNECTOR .....	13
3.3 PARALLEL PORT .....	14
3.4 SERIAL PORTS .....	15
3.5 KEYBOARD / MOUSE CONNECTOR .....	16
3.6 EXTERNAL SWITCHES AND INDICATORS.....	17
3.7 EXTERNAL BATTERY CONNECTOR .....	18
3.8 LCD/CRT CONNECTOR.....	18
3.9 LAN RJ45 CONNECTOR .....	19
3.10 USB PORT .....	20
3.11 IO ADDRESS MAP .....	20
<b>CHAPTER 4. AMI BIOS SETUP</b> .....	<b>23</b>
4.1 GETTING START.....	23
4.2 STANDARD CMOS SETUP .....	24
4.3 ADVANCED CMOS SETUP .....	24
4.4 ADVANCED CHIPSET SETUP.....	24

# Chapter 1. Introduction

Thank you for choosing JUKI-745E Pentium® with HiQPro™ LCD/CRT and Ethernet Single Board Computer. The JUKI-745E board is an half-size ISA bus form factor board, which comes equipped with high performance Pentium® CPU and advanced high performance multi-mode I/O, designed for the system manufacturers, integrators, or VARs that want to provide all the performance, reliability, and quality at a reasonable price.

This factor board has a built-in DiskOnChip™ (DOC) Flash Disk for embedded application. As DOC Flash Disk is 100% software compatible to hard disk, user can use any DOS command without having to go through the trouble to install extra software utility. DOC currently is available from 2MB to 144MB.

The on board RTL8100 network chipset provides 10Mbps or 100Mbps Ethernet with auto-sensing function.

In addition, JUKI-745E has built-in C&T 69000 LCD/CRT Chipset. LCD interface can support up to 1280x1024 with 256 colors in resolution. It also support various type of flat panels such as Mono, Color STN, TFT, EL and so on. The board also supports either 3.3V or 5V version.

---

## 1.1 Specifications

The JUKI-745E Pentium® with C&T 69000 Chipset LCD/CRT & Ethernet Single Board Computer provides the following specification:

- **CPU** : Pentium® MMX up to 233Mhz, AMD K6 processor up to 300MHz, Cyrix 6x86MX and IDE C6 processor
- **Chipset** : ALI M1531/M1543
- **Bus : ISA Bus**
- **LCD/CRT Interface** : C&T 69000 Chipset  
CRT Resolution : 1280x1024,256 colors  
1024x768, 64K colors  
800x600, 16M colors  
36-bit LCD Interface Resolution :  
1280x1024,256 colors  
1024x768, 64K colors  
800x600, 16M colors  
  
\*\* Please contact [www.chips.com](http://www.chips.com) to get more information.
- **Ethernet** : RTL 8100B Chipset  
IEEE 802.3u 100BASE-TX standard  
Auto-sensing interface to 10Mbps or 100Mbps networks  
Full duplex capability  
  
\*\* More information : [www.realtek.com.tw](http://www.realtek.com.tw)
- **Real-time clock/calendar** : in ALI 4+ chipset, backup by industrial Li-battery,3V/850mAH.
- **RAM memory** : Support up to 128MB EDO RAM
- **Second Cache memory** : 512KB Pipelined Burst SRAM on board



---

## 1.2 Package Contents

In addition to this *User Manual*, the JUKI-745E package includes the following items:

- JUKI-745E Pentium® with C&T 69000 Chipset LCD/CRT & Ethernet
- Single Board Computer
- RS-232/Printer Cable
- FDD/HDD Cable
- 6-pin Mini-Din to 5-pin Din Keyboard and Mouse Adapter Cable

If any of these items is missing or damaged, please contact the dealer from whom you purchased the product. Save the shipping materials and carton in case you want to ship or store the product in the future.

## **Chapter 2. Installation**

This chapter describes how to install the JUKI-745E. First, the layout of JUKI-745E is shown, then comes the unpacking precautions that you should be careful is described. After that comes jumpers and switches setting for JUKI-745E's configuration, such as CPU type selection, system clock setting, and watch dog timer, are all included.

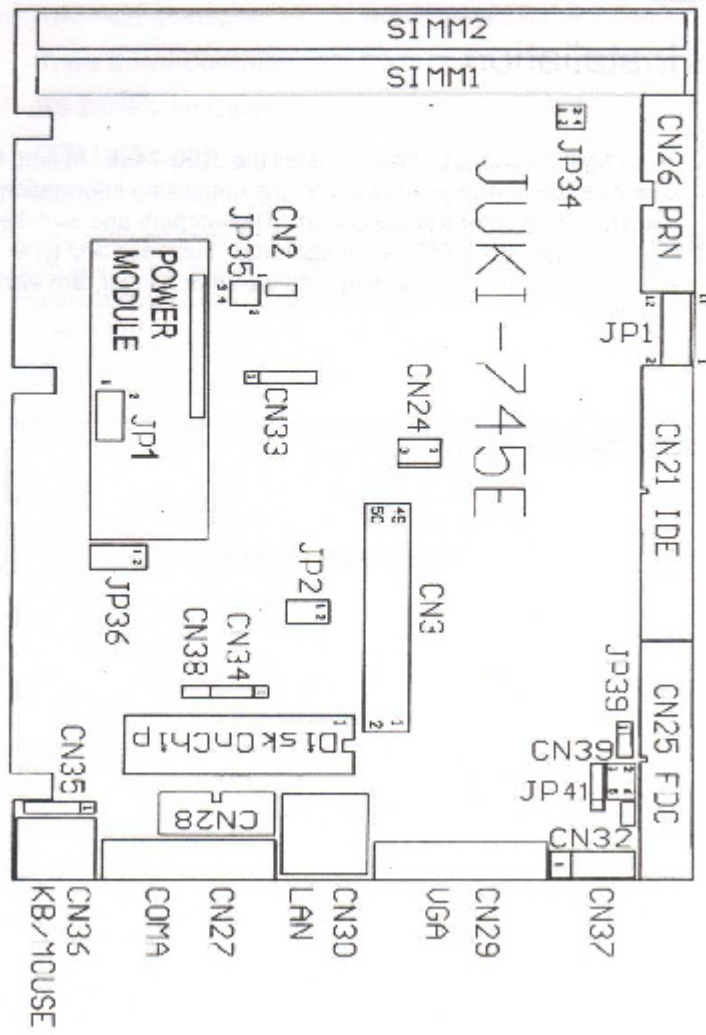
---

### **2.1 JUKI-745E Layout**

< Please turn to the next page.>



## 2.1 JUKI-745E Layout



---

## 2.2 Setting the CPU of JUKI-745E

JP1:BUS Clock & CPU CORE/BUS Freq ratio setting

### • CPU Clock Setting :

S2 11-12	S1 9-10	S0 1-2	CPU/SDRQAM CLK (MHZ)	PCI BUS CLK (MHZ)
OFF	OFF	OFF	66.8	33.4
OFF	OFF	ON	60	30
OFF	ON	OFF	75	37.5
OFF	ON	ON	55	27.5
ON	OFF	OFF	68.5	34.25
ON	OFF	ON	83.3	33.3
ON	ON	OFF	75	30
ON	ON	ON	83.3	41.65

### • FREQ RATIO :

BF2 7-8	BF1 5-6	BF0 3-4	RATIO
OFF	OFF	OFF	1.5 x
OFF	OFF	ON	2.0x
OFF	ON	ON	2.5x
OFF	ON	OFF	3.0 x
OFF	OFF	OFF	3.5 x
ON	OFF	ON	4.0x
ON	ON	ON	4.5x
ON	ON	OFF	5.0x
ON	OFF	OFF	5.5x

**CPU Frequency = CPU Clock x Multiplier for example**

**Pentium® 200MHz = 66MHz CPU Clock x 3**

### • CPU Core Voltage Selection :

Please check the CPU Core Voltage before you install the CPU. Currently, the new Intel MMX CPU utilizes dual voltages for core and I/O, in other words, the I/O is 3.3V but the core is 2.8V. This kind of CPU design will enhance the low power consumption capability. Common type Pentium CPUs utilizes one voltage for both I/O and Core namely, 3.3V,3.4V,or 3.5V.

• **Power module JP1 CPU Core Voltage Select**

1-2	3-4	5-6	7-8	9-10	Voltage
ON	ON	ON	ON	OFF	<b>3.5V</b>
OFF	ON	ON	ON	OFF	<b>3.4V</b>
OFF	OFF	ON	ON	OFF	<b>3.2V</b>
ON	OFF	OFF	ON	OFF	<b>2.9V</b>
OFF	OFF	OFF	ON	OFF	<b>2.8V</b>
OFF	ON	OFF	OFF	OFF	<b>2.2V</b>
OFF	OFF	OFF	OFF	OFF	<b>2.0V</b>

• **JP34 & JP35 : CPU Single / Dual Power type setting**

	JP34	JP35
SINGLE	1-2 ON 3-4 ON	1-2 OFF 3-4 OFF
DUAL	1-2 OFF 3-4 OFF	1-2 ON 3-4 ON

• **Cyrix 6x86MX PR Rating Table  
( Vcore : 2.9V,dual voltage )**

PR Rating	Bus MHz	CPU Core MHz	Clock Multiplier
<b>6x86MX-PR133</b>	<b>50</b>	<b>100</b>	<b>2x</b>
<b>6x86MX-PR133</b>	<b>55</b>	<b>110</b>	<b>2x</b>
<b>6x86MX-PR150</b>	<b>60</b>	<b>120</b>	<b>2x</b>
<b>6x86MX-PR150</b>	<b>50</b>	<b>125</b>	<b>2.5x</b>
<b>6x86MX-PR166</b>	<b>66</b>	<b>133</b>	<b>2x</b>
<b>6x86MX-PR166</b>	<b>55</b>	<b>138</b>	<b>2.5x</b>
<b>6x86MX-PR166</b>	<b>50</b>	<b>150</b>	<b>3x</b>
<b>6x86MX-PR166</b>	<b>60</b>	<b>150</b>	<b>2.5x</b>
<b>6x86MX-PR200</b>	<b>55</b>	<b>165</b>	<b>3x</b>
<b>6x86MX-PR200</b>	<b>66</b>	<b>166</b>	<b>2.5x</b>
<b>6x86MX-PR200</b>	<b>60</b>	<b>180</b>	<b>3x</b>
<b>6x86MX-PR233</b>	<b>66</b>	<b>200</b>	<b>3x</b>
<b>6x86MX-PR266</b>	<b>66</b>	<b>233</b>	<b>3.5x</b>

• **AMD K6 MMX Rating Table, dual voltage**

Product Name	Core Freq	Vcore	Bus MHz	Multiplier
<b>K6-233 model 6</b>	<b>233MHz</b>	<b>3.2V</b>	<b>66</b>	<b>3.5x</b>
<b>K6-200 model 6</b>	<b>200MHz</b>	<b>2.9V</b>	<b>66</b>	<b>3x</b>
<b>K6-166 model 6</b>	<b>166MHz</b>	<b>2.9V</b>	<b>66</b>	<b>2.5x</b>
<b>K6-300 model 7</b>	<b>300MHz</b>	<b>2.2V</b>	<b>66</b>	<b>4.5x</b>
<b>K6-266 model 7</b>	<b>266MHz</b>	<b>2.2V</b>	<b>66</b>	<b>4x</b>
<b>K6-233 model 7</b>	<b>233MHz</b>	<b>2.2V</b>	<b>66</b>	<b>3.5x</b>

---

## 2.3 DiskOnChip™ Flash Disk

The DiskOnChip™ Flash Disk Chip(DOC) is produced by M-Systems. Since the DOC is 100% software compatible to hard disk and DOS, customer don't need to install any extra software utility. Its "plug and play" function is not only easy to use but also reliable. It will share 8KB memory of window.

• **JP36 : DiskOnChip Memory Address Setting**

Address	JP36
<b>CE000</b>	1-2
<b>D6000</b>	<b>3-4</b>
<b>DE000</b>	5-6
<b>RESERVE</b>	7-8

---

## 2.4 LCD Voltage Setting

The JUKI-745E supports 3.3V or 5V LCD panel through jumper setting. This setting will control the CN3's Pin 29 & 30 as 3.3V or 5V output.

• **JP39 : LCD Voltage Setting**

Function	JP39
<b>+3.3V</b>	1-2
<b>+5V</b>	<b>2-3</b>

---

## 2.5 Clear CMOS Setup

If you want to clear CMOS Setup (for example you have forgotten the password then you should clear setup, then reset the password), you should close the CN34 pin 2-3 about 3 seconds, then open it again. To set back to normal operation mode, close pin 2-3.

- **CN34 : Clear CMOS Setup (Reserve Function)**

CN34	DESCRIPTION
2-3	Normal Operation
3-4	Clear CMOS Setup

---

## 2.6 Battery Backup for CMOS Setup

JUKI-745E provides a 4-pin header CN34 used for battery backup function. When set to close, pin 2-3 will use the on board battery. When you want to use external battery, you should take off the jumper and use the connector as an external battery connector.

- **CN34: Battery Backup Function**

1	External battery +
2	Internal battery +
3	To CMOS power (Note:2-3 ON, use internal battery)
4	GROUND (Note: 3-4 ON, Clear CMOS)

---

## 2.7 BIOS Flash Chip Write Voltage Setting

There are two types of BIOS Flash Chip, one is 12V write voltage and the other is 5V.

- **JP2: Flash ROM setting**

Flash ROM Voltage		Flash ROM Size	
1-3	+12V	2-4	1MB
3-5	+5V	4-6	2MB

## Chapter 3. Connection

This chapter describes how to connect peripherals, switches and indicators to the JUKI-745E board.

---

### 3.1 Floppy Disk Drive Connector

JUKI-745E board is equipped with a 34-pin daisy-chain driver connector cable.

#### • CN25 : FDC CONNECTOR

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	2	REDUCE WRITE
3	GROUND	4	N/C
5	GROUND	6	N/C
7	GROUND	8	INDEX#
9	GROUND	10	MOTOR ENABLE A#
11	GROUND	12	DRIVE SELECT B#
13	GROUND	14	DRIVE SELECT A#
15	GROUND	16	MOTOR ENABLE B#
17	GROUND	18	DIRECTION#
19	GROUND	20	STEP#
21	GROUND	22	WRITE DATA#
23	GROUND	24	WRITE GATE#
25	GROUND	26	TRACK 0#
27	GROUND	28	WRITE PROTECT#
29	GROUND	30	READ DATA#
31	GROUND	32	SIDE 1 SELECT#
33	GROUND	34	DISK CHANGE#

---

## 3.2 PCI E-IDE Disk Drive Connector

You can attach up to four IDE( Integrated Device Electronics) hard disk drives to the JUKI-745E IDE controller. The IDE support Ultra DMA/33 interface.

### • CN21: IDE Interface Connector

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RESET#	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	N/C
21	IDE DRQ	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	IDE CHRDY	28	GROUND
29	IDE DACK	30	GROUND
31	INTERRUPT	32	N/C
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND

---

### 3.3 Parallel Port

This port is usually connected to a printer. JUKI-745E includes an on-board parallel port, accessed through a 26-pin flat-cable connector CN26.

- **CN26 : Parallel Port Connector**

<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	STROBE#	14	AUTO FORM FEED #
2	DATA 0	15	ERROR #
3	DATA 1	16	INITIALIZE
4	DATA 2	17	PRINTER SELECT LN #
5	DATA 3	18	GROUND
6	DATA 4	19	GROUND
7	DATA 5	20	GROUND
8	DATA 6	21	GROUND
9	DATA 7	22	GROUND
10	ACKNOWLEDGE	23	GROUND
11	BUSY	24	GROUND
12	PAPER EMPTY	25	GROUND
13	PRINTER SELECT	26	NC



---

### 3.4 Serial Ports

The JUKI-745E offers two high speed NS16C550 compatible UARTs with Read/Receive 16 byte FIFO serial ports.

• **CN27 : Serial Port DB-9 Connector( COM1 )**

PIN NO.	DESCRIPTION
1	DATA CARRIER DETECT (DCD)
2	RECEIVE DATA (RXD)
3	TRANSMIT DATA (TXD)
4	DATA TERMINAL READY (DTR)
5	GROUND (GND)
6	DATA SET READY (DSR)
7	REQUEST TO SEND (RTS)
8	CLEAR TO SEND (CTS)
9	RING INDICATOR (RI)

• **CN28 : Serial Port 10-pin Header( COM2)**

PIN NO.	DESCRIPTION
1	DATA CARRIER DETECT (DCD)
2	RECEIVE DATA (RXD)
3	TRANSMIT DATA (TXD)
4	DATA TERMINAL READY (DTR)
5	GROUND (GND)
6	DATA SET READY (DSR)
7	REQUEST TO SEND (RTS)
8	CLEAR TO SEND (CTS)
9	RING INDICATOR (RI)
10	NC

---

## 3.5 Keyboard / Mouse Connector

The JUKI-745E provides two keyboard/Mouse connectors.

- **CN37 : 5-pin Header Keyboard Connector**

PIN NO.	DESCRIPTION
1	KEYBOARD CLOCK
2	KEYBOARD DATA
3	N/C
4	GROUND
5	+5V

- **CN35 : 5-pin Header Mouse Connector**

PIN NO.	DESCRIPTION
1	MOUSE DATA
2	N/C
3	GROUND
4	+5V
5	MOUSE CLOCK

- **CN36 : 6-pin Mini-DIN Keyboard/Mouse Connector**

PIN NO.	DESCRIPTION
1	KEYBOARD DATA
2	MOUSE DATA
3	GROUND
4	+5V
5	KEYBOARD CLOCK
6	MOUSE CLOCK

---

## 3.6 External Switches and Indicators

There are many external switches and indicators for monitoring and controlling your CPU board.

- **CN2: Speaker Connector**

PIN NO.	DESCRIPTION
1	+5V
2	Speaker Signal

- **CN38 : Reset Connector**

PIN NO.	DESCRIPTION
1	External Reset
2	GROUND

- **CN32 : IDE LED Connector**

PIN NO.	DESCRIPTION
1	+5V
2	HDD LED

- **CN24 : FAN Connector**

PIN NO.	DESCRIPTION
1	N/C
2	+12V
3	GROUND

---

### 3.7 External Battery Connector

The JUKI-745E has built-in a 3V/850mAH industrial Li-battery for CMOS and RTC backup. During normal operation, it will not need external battery to backup the data. If you want to connect an external battery to the board, you could take off the CN34's pin 2-3 jumper, then connect the external battery to pin 1-4.

#### • CN34 : External Battery Connector

1	External Battery +
2	Internal battery +
3	To CMOS power (Note: 2-3 ON, use Internal battery)
4	GROUND (Note: 3-4 ON, Clear CMOS)

---

### 3.8 LCD/CRT Connector

The JUKI-745E has built-in 15-pin VGA connector that can be connected directly to your CRT monitor. It also has a built-in 50-pin connector for LCD Interface.

#### • CN29 : 15-pin Female Connector

1	RED
2	GREEN
3	BLUE
4,9,11	NC
5-8,10	GROUND
12	DDDA
13	H-SYNC
14	V-SYNC
15	DDCK

#### • CN3 : 50-pin LCD Interface Connector

1	VPCLK	2	P33
3	P34	4	P31
5	P35	6	P32
7	P30	8	P28

9	P29	10	P27
11	P25	12	P26
13	P24	14	P21
15	P23	16	P22
17	P16	18	P20
19	P17	20	P18
21	P19	22	P14
23	P13	24	P12
25	P15	26	P11
27	P7	28	P10
29	PLCD	30	PLCD
31	P9	32	P8
33	P4	34	P6
35	P3	36	P5
37	P2	38	P1
39	M	40	P0
41	SHFCLK	42	ENABKL`
43	FPVDD	44	FLM
45	FPVEE	46	LP
47	GND	48	GND
49	+12V	50	+12V

---

### 3.9 Lan RJ45 Connector

The JUKI-745E built-in a RJ45 Lan connector.

• **CN30 : Lan RJ45 Connector**

1	TX+	5.	NC
2	TX-	6.	RX-
3.	RX+	7.	NC
4.	NC	8.	NC

• **CN39 LED Connector(2-pin header) for Lan**

2.	LED2: 10M
4.	LED1: 100M
6.	LED0: TX/RX

**(Note: 1,3,5: VCC)**

---

## 3.10 USB Port

The JUKI-745E has one built-in USB port for the future new I/O bus expansion.

### • JP41:USB Port

PIN NO.	DESCRIPTION
1	VCC
2	USBP0-
3	USBP0+
4	GROUND

---

## 3.11 IO Address Map

### IO Address Map

I/O Address Range	DESCRIPTION
000-01F	DMA Controller # 1
020-021	Interrupt Controller # 1, Master
040-05F	8254 timer
060-06F	8042 (Keyboard Controller)
070-07F	Real time Clock, NMI (non-maskable interrupt) Mask
080-09F	DMA Page Register
0A0-0BF	Interrupt Controller # 2
0C0-0DF	DMA Controller # 2
0F0	Clear Math Coprocessor Busy
0F1	Reset Math Coprocessor
0F8-0FF	Math Coprocessor
1F0-1 F8	Fixed Disk
200-207	Game I/O
278-27F	Parallel Printer Port 2 (LPT3)
2E8-2EF	Serial Port 4
2F8-2FF	Serial Port 2
300-31F	Prototype Card
360-36F	Reserved
378-37F	Parallel Printer Port (LPT2)

380-38F	SDLC, Bisynchronous 2
3A0-3AF	Bisynchronous 1
3B0-3BF	Monochrome Display and Printer Adapter (LPT1)
3C0-3CF	Reserved
3D0-3DF	Color/Graphics Monitor Adapter
3E8-3EF	Serial Port 3
3F0-3F7	Diskette Controller,ALI1543 SIO CONFIG INDEX PORT(3F0)
3F8-3FF	Serial Port 1
443	Watch dog timer enable
843	Watch dog timer disable

### 1 st MB Memory Address Map

Memory address	Description
00000-9FFFF	System memory
A0000-BFFFF	VGA buffer
C0000-CBFFF	VGA BIOS
*D6000-DA000	DOC 2000
E0000-FFFFFF	System BIOS
1000000-	Extend BIOS

\*Default setting

### IRQ Mapping Chart

IRQ0	System Timer	IRQ8	RTC clock
IRQ1	Keyboard	IRQ9	Unused
IRQ2	Cascade to IRQ Controller	IRQ10	Unused
IRQ3	COM2/COM4	IRQ11	Unused
IRQ4	COM1/COM3	IRQ12	PS2 moues
IRQ5	Unused	IRQ13	FPU
IRQ6	FDC	IRQ14	Primary IDE
IRQ7	Printer	IRQ15	Secondary IDE

### DMA Channel Assignments

Channel	Function
0	Available
1	Available
2	Flopp disk (8-bit transfer)
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available



## Chapter 4. AMI BIOS Setup

The JUKI-745E uses the AMI BIOS for system configuration. The AMI BIOS setup program is designed to provide maximum flexibility in configuring the system by offering various options which may be selected to meet end-user's needs. This chapter is written to assist you in the proper usage of these features.

---

### 4.1 Getting Start

When power on the system, the BIOS will enter the Power-On-Self-Test routines. These routines will be executed for system test, initialization and system configuration verification. After POST routines are completed, the following message appears:

**" Hit DEL if you want to run SETUP"**

To access AMI BIOS Setup program, press <Del> key, then you could see the screen to select from the following options:

When you choose **Load BIOS Defaults**, the system will load minimized settings for Troubleshooting. The performance should be very poor when you use this setting.

When you choose **Load Setup Defaults**, the system will load optimized defaults for regular use. Choosing this setting, will modify all applicable settings.

---

## 4.2 Standard CMOS Setup

The Standard CMOS Setup is used for basic hardware system configuration. The main function is for Date/Time setting and Floppy/Hard Disk Drive setting. For IDE hard disk drive setup, please check the following possible setup procedure:

1. Use Auto setting for detection during boot up.
2. Use IDE HDD AUTO DETECTION in the main menu to automatically enter drive specifications.
3. Manually enter the specifications from the "User" option.

---

## 4.3 Advanced CMOS Setup

This Advanced CMOS Setup is designed for customers tuning best performance out of JUKI-745E board. As for normal operation, customers don't have to change any default setting. The default setting is pre-set for most reliable operation. You can also enable or disable system keyboard, primary display, PS/2 mouse in this option. The system boot sequence is also modified through this setup page to first, second, third and fourth boot device setting.

---

## 4.4 Advanced Chipset Setup

This setup function are mostly related to ChipSet(ALI 4+). These options are used to change the ChipSet's registers. Please carefully change any default setting, otherwise the system could become unstable.