

JUKI- 745E Pentium®
with LCD/CRT & Ethernet
ISA Bus SBC

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1

Introduction

Welcome to the 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 board built-in DiskOnChip™(DOC) Flash Disk for embedded application. The DOC Flash Disk is 100% compatible to hard disk. User can use any DOS command without any extra software utility. The DOC currently is available from 2MB to 72MB.

The on board RTL8139 network chipset provides 10Mbps or 100Mbps Ethernet with auto-sensing function..

In addition, the JUKI-745E built-in C&T 65555 HiQPro™ LCD/CRT Chipset and 2MB EDO RAM. The LCD interface can drive up to 1280x1024 with 256 colors. The support flat panel will cover Mono,Color STN,TFT,EL,..etc. and also 3.3V or 5V version.

1.1 Specifications :

The JUKI-745E Pentium® with HiQPro™ 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 65555 Chipset with 2MB EDO RAM

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 to get more information.

- **Ethernet** : RTL 8139 Chipset
 - IEEE 802.3u 100BASE-TX standard
 - Auto-sensing interface to 10Mbps or 100Mbps networks
 - Full duplex capability
 - More information : www.realtek.com.tw
- **Real-time clock/calendar** : in ALI 4+ chipset, backup by industrial Li-battery, 3V/850mAH.
- **RAM memory** : up to 128MB EDO RAM
- **Second Cache memory** : 512KB Pipelined Burst SRAM on board

If any of these items is missing or damaged, 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.

2

Installation

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

2.1 JUKI-745E Layout

< reference next page >

2.2 Setting the CPU of JUKI-745E

- CPU Clock Setting :

CPU Speed/Clock	JP1 11-12	JP1 9-10	JP1 1-2
55MHz	OPEN	CLOSE	CLOSE
60MHz	OPEN	OPEN	CLOSE
66MHz	OPEN	OPEN	OPEN
75MHz	CLOSE	CLOSE	OPEN

- CPU to Bus Multiple :

Multiplier	JP1 3-4	JP1 5-6	JP1 7-8
1.5 x	OPEN	OPEN	OPEN
2x	CLOSE	OPEN	OPEN
2.5x	CLOSE	CLOSE	OPEN
3 x	OPEN	CLOSE	OPEN
3.5 x	OPEN	OPEN	OPEN
4 x	CLOSE	OPEN	CLOSE
4.5x	CLOSE	CLOSE	CLOSE
5x	OPEN	CLOSE	CLOSE
5.5x	OPEN	OPEN	CLOSE

**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. Right now new Intel MMX CPU is dual voltages for core and I/O, the I/O is 3.3V but the core is 2.8V. This kind of CPU design will enhance the low power consumption capability. As for the general Pentium CPU is one voltage for I/O and Core - 3.3V, 3.4V, or 3.5V

- **JP1 CPU Core Voltage Setting :**
(JP1 is in the power module)

CPU Core Voltage	JP1 1-2	JP1 3-4	JP1 5-6	JP1 7-8
3.5V(P54C/CS) VRE	CLOSE	CLOSE	CLOSE	CLOSE
3.4V(P54C/CS) STD	OPEN	CLOSE	CLOSE	CLOSE
3.3V	CLOSE	OPEN	CLOSE	CLOSE
3.2V	OPEN	OPEN	CLOSE	CLOSE
3.1V	CLOSE	CLOSE	OPEN	CLOSE
3.0V	OPEN	CLOSE	OPEN	CLOSE
2.9V	CLOSE	OPEN	OPEN	CLOSE
2.8V	OPEN	OPEN	OPEN	CLOSE
2.2V	OPEN	CLOSE	OPEN	OPEN
2.0V	OPEN	OPEN	OPEN	OPEN

- **Dual / Single CPU Voltage setting :**

Vcore & VIO	JP34 1-2	JP34 3-4	JP35 1-2	JP35 3-4
Pentium® (P54C) IDT C6	CLOSE	CLOSE	OPEN	OPEN
Pentium® MMX AMD K6 Cyrix 6x86MX Dual Voltage	OPEN	OPEN	CLOSE	CLOSE

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

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

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

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

2.3 DiskOnChip™Flash Disk

The DiskOnChip™Flash Disk Chip(DOC) is produced by M-Systems. Because the DOC is 100% compatible to hard disk and DOS.Customer don't need any extra software utility. It is just "plug and play",easy and reliable. The share memory window is 8KB.

- **JP36 : DiskOnChip Memory Address Setting**

Address	JP36
CE000	1-2
D6000	3-4
DE000	5-6

2.4 LCD Voltage Setting

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

- **JP39 : LCD Voltage Setting**

Function	JP39
3.3V	1-2
5V	2-3

2.5 Clear CMOS Setup

If want to clear the CMOS Setup(for example forgot the password you should clear the setup and then set the password again.),you should close the CN34 pin 2-3 about 3 seconds,then open again. Set back to normal operation mode,close pin 1-2.

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

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

2.6 Battery Backup for CMOS Setup

There have one 4-pin header CN34 using for battery backup function. When close the pin 2-3 will use the on board battery.

When use external battery you should take off the jumper and use the connector as external battery connector.

- **CN34: Battery Backup Function**

CN34	DESCRIPTION
2-3 CLOSE	Using Internal Battery
Connect Battery to Pin 1-4	Use as External Battery Connector

2.7 BIOS Flash Chip Write Voltage Setting

The BIOS Flash Chip could be two types, one is 12V write voltage and other one is 5V.

Please note the jumper is setting by production people.

Flash Type	JP2
+12V / 1MB	1-3 , 2-4
+12V / 2MB	1-3 , 4-6
+5V / 1MB,2MB	3-5 , 4-6

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

CN21 : Primary IDE Connector

• 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	N/C	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	N/C	28	BALE - DEFAULT
29	N/C	30	GROUND - DEFAULT
31	INTERRUPT	32	IOCS16#-DEFAULT
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, The JUKI-745E includes an on-board parallel port, accessed through a 26-pin flat-cable connector CN26.

- **CN26 : Parallel Port Connector**

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

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	Pin No.	Description
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTX
4	DTR	9	RI
5	GND	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 ACTIVE#

- **CN24 : FAN Connector**

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

3.7 External Battery Connector

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

• **CN34 : External Battery Connector**

PIN NO.	DESCRIPTION
1	External Battery +
2	NC
3	N/C
4	Ground

3.8 LCD/CRT Connector

The JUKI-745E built-in 15-pin VGA connector directly to your CRT monitor. And the built-in 50-pin connector for LCD interface.

• **CN29 : 15-pin Female Connector**

1	RED	2	GREEN
3	BLUE	4	NC
5	GROUND	6	GROUND
7	GROUND	8	GROUND
9	NC	10	GROUND
11	NC	12	NC
13	HSYNC	14	VSYNC
15	NC		

• **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	5V or 3.3V	30	5V or 3.3V
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(V SYS)
45	FPVEE	46	LP(H SYS)
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**

1.	5V
2.	10Mbps
3.	5V
4.	100Mbps
5.	5V
6.	Active

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 for end-user requirements. 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 and initialization and system configuration verification. After the POST routines are completed, the following message appears :

" Hit DEL if you want to run SETUP"

To access AMI BIOS Setup program, press key, then you could see the screen to make some options as follows,

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

When choose **Load Setup Defaults** 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. Please refer the following screen for this setup.

For IDE hard disk drive setup, please check the following possible setup procedure,

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

4.3 Advanced CMOS Setup

This Advanced CMOS Setup is designed for customer's tuning best performance of the 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 also can option the system keyboard, primary display, PS/2 mouse to enable or disable. The system boot sequence is also set here by first, second, third and fourth boot device setting.

4.4 Advanced Chipset Setup

This setup functions are almost working for ChipSet(ALI 4+). These options are used to change the ChipSet' s registers. Please carefully change any default setting ,otherwise the system could be running un-stable.

Auto Configuration : Enable or Disable

When use the 60nS general type DRAM,please enable the setting to get the optimal timings.

DRAM Speculative Read : Enable or Disable

When enable this option, the CPU will send predict commands to the SDRAM, if a miss happens, the CPU will cancel this command. Because some OS under certain situations have problem for this feature, it is normally disable.

4.5 Peripheral Setup

This setup is almost working for Multi-I/O Chip(W83877F and ALI Alladin 4+ chipset). These options are used to change the ChipSet' s registers. Please carefully change any default setting to meet your application need perfectly. The only special concern is Onboard Serial Port2. If you are using the IrDA port,you have to set this port accordingly.

The most important setting in this setup is **LCD Type setting**. In the most right bottom item – Panel Type selection, customer can choose 15 different panel type. The 15 panel types are :

1. **1024x768 Dual Scan STN Color**
2. **1280x1024 TFT**
3. **640x480 STN**
4. **800x600 STN**
5. **640x480 TFT**
6. **640x480 18bit**
7. **1024x768 TFT**
8. **800x600 TFT**
9. **800x600 TFT**
10. **800x600 TFT**
11. **800x600 STN**
12. **800x600 STN**
13. **1024x768 TFT**
14. **1280x1024 STN**
15. **1024x600 STN**

4.6 Power Management Setup

Power Management Setup help user handles the JUKI-745E board's "green" function. The features could shut down the video display and hard disk to save energy for example. The power management setup screen is as following,

Power Management/APM : Disable, Max Saving, Min Saving, or User Defined

Note : Advanced Power Management(APM) have to be installed to keep the system time updated when the computer enters suspend mode activated by the Power Management. Under DOS environment, you need to add `DEVICE=C:\DOS\POWER.EXE` in your `CONFIG.SYS`
Under Windows 3.x and Windows 95, you have to install Windows with APM feature. A battery and power cord icon labeled "Power" Will appear in the "Control Panel"

Appendix A. FP24-01 Flat Panel Connection Module

The FP24-01 connection module is installed on the JUKI-745E as a standard product. The FP24-01 converts JUKI-740E's on board 50pin LCD interface signal to the 44-pin (2x20 pin header) and 41pin (Hirose DF9-41P-1V) LCD connectors. The 44-pin or 41-pin connector will only support 24-bit flat pane.

• J3 : 44-pin LCD Interface Connector

1	+12V	2	+12V
3	GND	4	GND
5	5V or 3.3V	6	5V or 3.3V
7	FPVVEE	8	GND
9	P0	10	P1
11	P2	12	P3
13	P4	14	P5
15	P6	16	P7
17	P8	18	P9
19	P10	20	P11
21	P12	22	P13
23	P14	24	P15
25	P16	26	P17
27	P18	28	P19
29	P20	30	P21
31	P22	32	P23
33	GND	34	GND
35	SHFCLK	36	FLM
37	M	38	LP
39	GND	40	ENABKL
41	N/C	42	N/C
43	FPVDD	44	5V or 3.3V

• **J1 : 41-pin LCD Interface Connector**

1	P20	2	GND
3	P16	4	5V or 3.3V
5	P21	6	P0
7	P17	8	P8
9	P22	10	P1
11	P18	12	P9
13	P23	14	P2
15	P19	16	P10
17	5V or 3.3V	18	P3
19	FLM	20	P11
21	M	22	P4
23	LP	24	P12
25	SHFCLK	26	P5
27	5V or 3.3V	28	P13
29	5V or 3.3V	30	P6
31	ENABKL	32	P14
33	FPVDD	34	P7
35	FPVEE	36	P15
37	GND	38	+12V
39	GND	40	+12V
41	N/C		

• **J2 : LCD Backlight Power Connector**

PIN NO.	DESCRIPTION
1	N/C
2	GND
3	3.3V or 5V
4	GND
5	FPVEE Inverter Enable