PCI-MPG24

4-CH MPEG4 Hardware

Video Compression Card

User's Manual

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Table of Contents

1 Introduction 1
- 1.1 Features 1
  - Real-time MPEG4 Hardware Video Encoding 1
  - Adjustable Video Quality 2
  - Real-time Raw Data Preview 2
  - Video Decoding 3
  - Save File 3
  - I/O Lines 4
  - Watchdog Timer 4
  - Supported software 5
- 1.2 Applications 5
- 1.3 System Requirement 5
- 1.4 PCI-MPG24 Benchmark 6
  - PCI-33 Platform 6
  - PCI-33 Platform 10
- 1.5 Suggests for Optimizing File I/O 15

2 Hardware Reference 17
- 2.1 PCI-MPG24 Specification 17
  - PCI-MPG24 Appearance 19
  - PCI-MPG24 Interface 21
  - Connectors & Pin Definitions 21
  - DIP switch & Setting 23

3 Installation Guide 25
- 3.1 Software Driver Installation 25
  - Windows Driver Installation 25
  - Linux Driver Installation 33
- 3.2 Hardware Installation 38

4 ViewCreator Utility 41
- 4.1 Overview 41
- 4.2 Component Description 42
- 4.3 Operation Theory 43
  - Preview 43
  - Playback 43
  - Record 43
  - Configurations 44

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Tools 44
Appendix A: Glossary 47
Brightness: 47
CCIR: 47
Composite Video: 47
CIF: 47
EIA: 47
Field: 47
Frame: 48
Gamma: 48
Hue: 48
NTSC: 48
PAL: 48
Saturation: 49
AGC 49
Appendix B: Standard Compliance 50

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List of Tables

Table 1-1: Number of Frames 1
Table 1-2: Configuration 1 – NTSC, CIF (320 x 240) 7
Table 1-3: Configuration 2 – NTSC, Full D1 (720 x 480) 8
Table 1-4: Configuration 3 – PAL, CIF (352 x 288) 9
Table 1-5: Configuration 4 – PAL, Full D1 (720 x 576) 10
Table 1-6: Configuration 1 – NTSC, CIF (320 x 240) 11
Table 1-7: Configuration 2 – NTSC, Full D1 (720 x 480) 12
Table 1-8: Configuration 3 – PAL, CIF (352 x 288) 13
Table 1-9: Configuration 4 – PAL, Full D1 (720 x 576) 14
Table 2-1: Voltage Range 17
Table 2-2: Video Inputs - CN3 21
Table 2-3: GPIO - CN2 22
Table 2-4: Watchdog Timer Reset 22
Table 2-5: S1 Card ID setting & NTSC/PAL mode setting 23
Table 2-6: Pin setting for 8 PCI-MPG24 cards 23

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List of Figures

Figure 1-1: Real-time Raw Data Preview - single channel..... 2
Figure 1-2: Real-time Raw Data Preview - four channels..... 3
Figure 1-3: AVI video file format..... 4
Figure 2-1: PCI-MPG24 19
Figure 2-2: Watchdog reset cable..... 19
Figure 2-3: BNG Interface cable 20
Figure 2-4: All in One CD..... 20
Figure 2-5: Outline Drawing 21
Figure 4-1: Component Description 42

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1 Introduction

The PCI-MPG24 is a MPEG4 hardware video compression card that provides four channels of real-time full D1 size MEGP4 video encoding and decoding with a preview function for digital video surveillance applications.

This 32-bit, 33MHz PCI bus frame grabber simultaneously captures and encodes four video analog streams in real time. It accepts standard composite color (PAL, NTSC) or monochrome video formats (CCIR, EIA) cameras inputs.

Each PCI-MPG24 card has a unique hardware ID number. System integrators can design protections to lock their system product. System integrators will benefit from a watchdog timer (for fault-tolerant applications) and easy-to-use standard connectors.

1.1 Features

Real-time MPEG4 Hardware Video Encoding

Supports real-time full D1* size, quarter or downscale video size encoding.

* D1 size video format:

- NTSC (720 x 480) at 30fps per channel
- PAL (720 x 576) at 25fps per channel
- Encoding Speed

NTSC (720x 480)	1 Camera	2 Cameras	3 Cameras	4 Cameras
Frames	30	60	90	120
PAL (720 x 576)	1 Camera	2 Cameras	3 Cameras	4 Cameras
Frames	25	50	75	100

Table 1-1: Number of Frames

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Adjustable Video Quality

Bit and frame rates are adjustable to fit variable bandwidths, as seen in remote Internet applications.

I, IP, IBP, and IBBP GOP structures are programmable for enhanced video quality.

Real-time Raw Data Preview

- Single channel: real-time preview and display by VGA resolution.

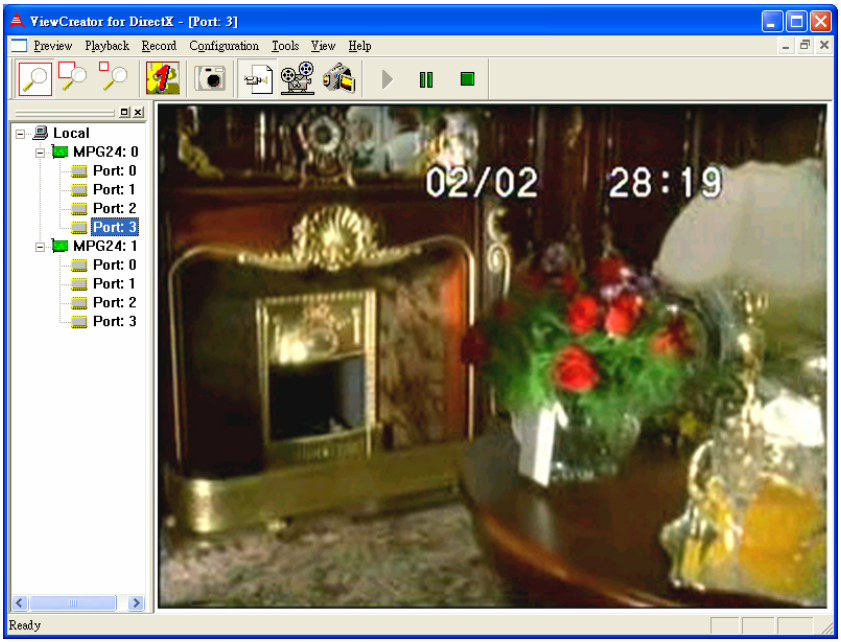


Figure 1-1: Real-time Raw Data Preview - single channel

- Four channels: real-time preview and display by quad format simultaneously.

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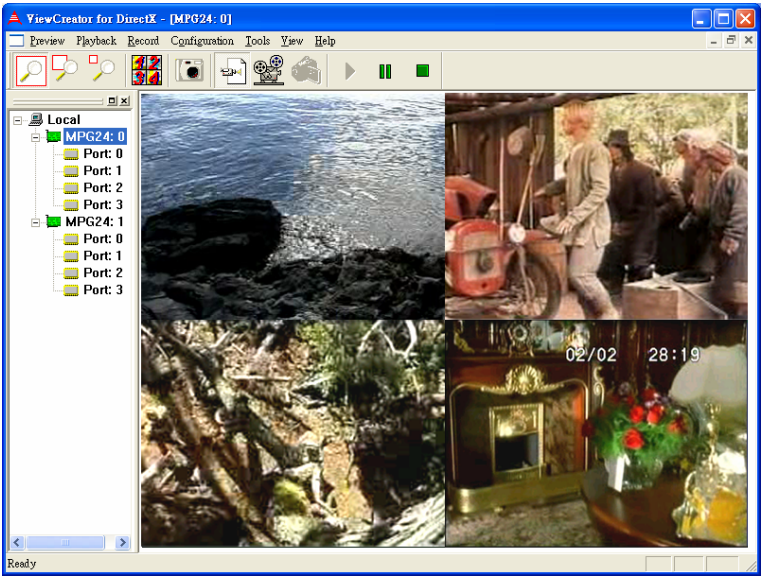


Figure 1-2: Real-time Raw Data Preview - four channels

Video Decoding

Smart software video decoding for playback or remote client monitoring and NO need to plug-in PCI-MPG24 card.

Save File

The video can be saved to AVI video file format. Users can playback AVI file by Microsoft Media Player.

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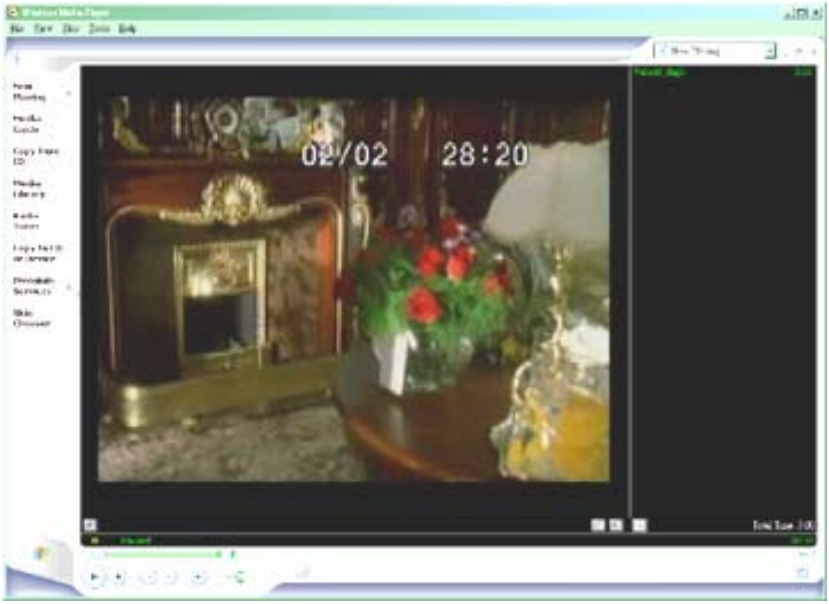


Figure 1-3: AVI video file format

I/O Lines

The PCI-MPG24 is fitted with TTL compatible I/O lines protected against overloads and electrostatic discharges. Each line may be configured as an input or output. They can be used to trigger acquisition or report alarm signals.

Watchdog Timer

A hardware watchdog is available on the PCI-MPG24 that is able to monitor PC application operation and will automatically reset the PC after a programmable inactivity time-out. This ensures reliable operation of remote systems.

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Supported software

- Support Microsoft DirectX
- Support Visual Studio .net, VC++, and C++ Builder programming language
- Support Windows 2000 and Windows XP.
- Sample programs
- 'ViewCreator for DirectX' utility for assistance in the initial test and functional evaluation.

1.2 Applications

- PC Based Surveillance System
- Digital Video Recorder (DVR)
- Intelligent Traffic Monitoring System
- Factory Monitoring System
- Machine Vision Inspection System
- Scientific Research Instrumentation
- Medical Research Instrumentation

1.3 System Requirement

The PCI-MPG24 minimum system requirement as below:

- Platform: Pentium III, 850MHz CPU, and 512MB SDRAM or above.
- VGA display: AGP 4X above (Not recommended VIA or SiS VGA chipset solution).
- Display setting: 800 x 600 above resolution, 16-bit above color format.
- OS: Windows 2000 Professional with SP4 or Windows XP Professional with SP2
- Software requirement:
  - For end users: Microsoft DirectX 9.0 End-User Runtime
  - For developers: Microsoft DirectX 9.0 SDK
  - DivX Video Decoder (Optional)
- As software decoding consumes system resources, a system platform upgrade must be made for system decoding

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requests of more than two channels, full D1 size real-time decode to specifications below:

- ▷ Pentium 4, 2.4GHz CPU, 256MB DDR RAM above.

- ▶ Please refer to 1.4 PCI-MPG24 Benchmark for performance limitations.
- ▶ One PCI-MPG24 consumes an extra 150MB RAM memory for preview and recording.

1.4 PCI-MPG24 Benchmark

PCI-33 Platform

- ▶ SBC: ADLINK NuPRO-780
- ▶ CPU: Intel Pentium III, 850Hz
- ▶ Memory: 512MB SDRAM
- ▶ PCI Bus: 32-bit, 33MHz
- ▶ VGA: AGP 4X
- ▶ OS: Windows XP/SP1
- ▶ HDD: Maxtor 6E040LO 7200RPM

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Configuration 1 – NTSC, CIF (320 x 240), 30 sec. Continuous Recording

Port	Frame Rate	BitRate	Codec: DivX			Codec: Microsoft		
			CPU Load(%)	Saving File Size	Play-back	CPU Load(%)	Saving File Size	Play-back
1	30	4M	22	11829K	O	20	13747K	O
		2M	19	8318K	O	19	8113K	O
		1M	20	4436K	O	24	4342K	O
2	30	4M	31	14356K	O	29	14740K	O
		2M	34	8531K	O	28	8098K	O
		1M	28	4497K	O	30	4371K	O
3	30	4M	36	130492K	O	36	15347K	O
		2M	39	8757K	O	36	8180K	O
		1M	37	4537K	O	34	4318K	O
4	30	4M	44	14265K	O	39	14628K	O
		2M	39	8676K	O	40	8200K	O
		1M	38	4550K	O	36	4333K	O
8	30	4M	58	10546K	O	64	13748K	O
		2M	63	8482K	O	56	6801K	O
		1M	66	4965K	O	71	5547K	O
12	30	4M	87	13497K	O	87	13689K	O
		2M	91	9225K	O	100	-	-
		1M	93	4887K	O	100	-	-

Table 1-2: Configuration 1 – NTSC, CIF (320 x 240)

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Configuration 2 – NTSC, Full D1 (720 x 480), 30 sec. Continuous Recording

Port	Frame Rate	BitRate	Codec: DivX			Codec: Microsoft		
			CPU Load(%)	Saving File Size	Play-back	CPU Load(%)	Saving File Size	Play-back
1	30	4M	22	14953K	O	22	14956K	O
		2M	22	7632K	O	21	7642K	O
		1M	23	4000K	O	22	3962K	O
2	30	4M	29	14963K	O	28	14966K	O
		2M	26	7638K	O	26	7669K	O
		1M	28	4015K	O	26	3971K	O
3	30	4M	35	14955K	O	35	14960K	O
		2M	33	7643K	O	34	7647K	O
		1M	34	4021K	O	32	3987K	O
4	30	4M	36	14812K	O	40	14610K	O
		2M	33	7649K	O	39	7657K	O
		1M	34	4044K	O	37	3999K	O
8	30	4M	71	14571K	O	70	14609K	O
		2M	67	7654K	O	64	7651K	O
		1M	55	4007K	O	57	3992K	O
12	30	4M	87	14029K	O	89	13976K	O
		2M	89	7673K	O	88	7687K	O
		1M	78	4018K	O	82	4103K	O

Table 1-3: Configuration 2 – NTSC, Full D1 (720 x 480)

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Configuration 3 – PAL, CIF (352 x 288), 30 sec. Continuous Recording

Port	Frame Rate	BitRate	Codec: DivX			Codec: Microsoft		
			CPU Load(%)	Saving File Size	Play-back	CPU Load(%)	Saving File Size	Play-back
1	25	4M	35	12226K	O	36	12868K	O
		2M	36	8485K	O	38	8205K	O
		1M	38	4308K	O	43	4224K	O
2	25	4M	40	12727K	O	40	14577K	O
		2M	40	8342K	O	47	8264K	O
		1M	42	4453K	O	50	4287K	O
3	25	4M	45	13444K	O	45	14690K	O
		2M	50	8452K	O	51	8216K	O
		1M	57	4447K	O	53	4255K	O
4	25	4M	45	14429K	O	49	14405K	O
		2M	51	8477K	O	58	8207K	O
		1M	60	4478K	O	65	4280K	O
8	25	4M	63	11618K	O	67	12335K	O
		2M	78	8463K	O	76	8417K	O
		1M	80	4457K	O	79	4208K	O
12	25	4M	84	13438K	O	92	13635K	O
		2M	86	8406K	O	88	8291K	O
		1M	90	4384K	O	91	4264K	O

Table 1-4: Configuration 3 – PAL, CIF (352 x 288)

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Configuration 4 – PAL, Full D1 (720 x 576), 30 sec. Continuous Recording

Port	Frame Rate	BitRate	Codec: DivX			Codec: Microsoft		
			CPU Load(%)	Saving File Size	Play-back	CPU Load(%)	Saving File Size	Play-back
1	25	4M	32	14290K	O	35	14904K	O
		2M	40	7604K	O	38	7596K	O
		1M	39	3914K	O	42	3934K	O
2	25	4M	38	14919K	O	41	14932K	O
		2M	50	7604K	O	51	7605K	O
		1M	47	3942K	O	50	3937K	O
3	25	4M	44	14912K	O	51	14904K	O
		2M	52	7596K	O	52	7594K	O
		1M	49	3939K	O	52	3954K	O
4	25	4M	46	14444K	O	47	14450K	O
		2M	57	7613K	O	54	7610K	O
		1M	57	3961K	O	58	3956K	O
8	25	4M	72	14370K	O	68	14505K	O
		2M	59	7612K	O	58	7651K	O
		1M	66	3992K	O	53	3968K	O
12	25	4M	92	13571K	O	89	13589K	O
		2M	87	7615K	O	83	7647K	O
		1M	79	3991K	O	79	4498K	O

Table 1-5: Configuration 4 – PAL, Full D1 (720 x 576)

PCI-33 Platform

- SBC: ADLINK NuPRO850
- CPU: Intel Pentium 4, 3.2GHz Hyper Threading enabled
- Memory: DDR266 1GB
- PCI Bus: 32-bit, 33MHz
- VGA: AGP 8X
- OS: Windows 2000/SP4
- HDD: HITACHI ST340014A 7200RPM

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Configuration 1 – NTSC, CIF (320 x 240), 30 sec. Continuous Recording

Port	Frame Rate	BitRate	Codec: DivX			Codec: Microsoft		
			CPU Load (%)	Saving File Size	Play -back	CPU Load(%)	Saving File Size	Play -back
1	30	4M	7	11827K	O	7	13382K	O
		2M	5	8156K	O	5	7936K	O
		1M	7	4303K	O	8	4248K	O
2	30	4M	8	13562K	O	8	14713K	O
		2M	7	8146K	O	7	8026K	O
		1M	8	4341K	O	8	4227K	O
3	30	4M	11	13566K	O	11	15008K	O
		2M	11	8360K	O	8	8036K	O
		1M	10	4342K	O	8	4249K	O
4	30	4M	13	14049K	O	11	14840K	O
		2M	10	8276K	O	10	7998K	O
		1M	10	4368K	O	10	4226K	O
8	30	4M	18	14705K	O	15	14883K	O
		2M	14	8652K	O	13	8492K	O
		1M	16	4598K	O	15	4477K	O
12	30	4M	22	14765K	O	18	14730K	O
		2M	16	8712K	O	13	8359K	O
		1M	16	4481K	O	15	4438K	O
16	30	4M	36	9319K	O	39	13225K	O
		2M	39	7121K	O	49	8300K	O
		1M	41	4470K	O	48	4439K	O
24	30	4M	40	10021K	O	47	1123K	O
		2M	56	7733K	O	58	8152K	O
		1M	58	4357K	O	60	4129K	O

Table 1-6: Configuration 1 – NTSC, CIF (320 x 240)

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Configuration 2 – NTSC, Full D1 (720 x 480), 30 sec. Continuous Recording

Port	Frame Rate	BitRate	Codec: DivX			Codec: Microsoft		
			CPU Load (%)	Saving File Size	Play-back	CPU Load(%)	Saving File Size	Play-back
1	30	4M	7	14240K	O	8	14952K	O
		2M	7	7673K	O	7	7630K	O
		1M	7	3962K	O	7	3976K	O
2	30	4M	10	14718K	O	10	14988K	O
		2M	10	7642K	O	10	7661K	O
		1M	7	3980K	O	8	3986K	O
3	30	4M	8	14521K	O	10	14967K	O
		2M	11	7657K	O	10	7662K	O
		1M	10	3985K	O	10	4023K	O
4	30	4M	10	14930K	O	11	14934K	O
		2M	10	7674K	O	13	7665K	O
		1M	8	3993K	O	15	3992K	O
8	30	4M	13	14950K	O	19	14924K	O
		2M	16	7637K	O	18	7648K	O
		1M	13	4048K	O	11	4290K	O
12	30	4M	18	14912K	O	18	14940K	O
		2M	18	7650K	O	21	7680K	O
		1M	18	4036K	O	19	4597K	O
16	30	4M	41	14254K	O	41	14499K	O
		2M	54	8124K	O	54	8110K	O
		1M	53	4323K	O	52	4119K	O
24	30	4M	64	14263K	O	58	14304K	O
		2M	71	8285K	O	71	8116K	O
		1M	74	4135K	O	75	4112K	O

Table 1-7: Configuration 2 – NTSC, Full D1 (720 x 480)

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Configuration 3 – PAL, CIF (352 x 288), 30 sec. Continuous Recording

Port	Frame Rate	BitRate	Codec: DivX			Codec: Microsoft		
			CPU Load (%)	Saving File Size	Play-back	CPU Load(%)	Saving File Size	Play-back
1	25	4M	5	12051K	O	5	14389K	O
		2M	5	8413K	O	4	8307K	O
		1M	5	4359K	O	5	4346K	O
2	25	4M	5	12549K	O	7	14812K	O
		2M	5	8364K	O	7	8330K	O
		1M	5	4337K	O	8	4326K	O
3	25	4M	7	12381K	O	7	14935K	O
		2M	8	8315K	O	8	8313K	O
		1M	5	4362K	O	8	4254K	O
4	25	4M	8	12374K	O	7	14860K	O
		2M	7	8413K	O	8	8339K	O
		1M	7	4336K	O	7	4300K	O
8	25	4M	13	14430K	O	10	14756K	O
		2M	11	8429K	O	11	8465K	O
		1M	13	4324K	O	11	4396K	O
12	25	4M	18	14775K	O	18	14645K	O
		2M	16	8368K	O	16	8437K	O
		1M	18	4339K	O	13	4398K	O
16	25	4M	31	9673K	O	32	12450K	O
		2M	32	6916K	O	39	8260K	O
		1M	44	4001K	O	43	4301K	O
24	25	4M	36	8545K	O	42	11658K	O
		2M	44	6591K	O	55	8019K	O
		1M	51	4365K	O	56	4483K	O

Table 1-8: Configuration 3 – PAL, CIF (352 x 288)

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Configuration 4 – PAL, Full D1 (720 x 576), 30 sec. Continuous Recording

Port	Frame Rate	BitRate	Codec: DivX			Codec: Microsoft		
			CPU Load(%)	Saving File Size	Play back	CPU Load(%)	Saving File Size	Play-back
1	25	4M	7	13755K	O	7	13720K	O
		2M	7	7625K	O	7	7614K	O
		1M	4	3942K	O	5	3935K	O
2	25	4M	7	14055K	O	8	24301K	O
		2M	8	7592K	O	7	7608K	O
		1M	8	3939K	O	5	3944K	O
3	25	4M	10	13707K	O	11	13971K	O
		2M	11	7675K	O	10	7615K	O
		1M	11	3994K	O	8	3954K	O
4	25	4M	11	14072K	O	10	14151K	O
		2M	11	7600K	O	11	7687K	O
		1M	8	3938K	O	10	4005K	O
8	25	4M	15	14707K	O	13	14890K	O
		2M	11	7611K	O	13	7613K	O
		1M	10	3952K	O	11	3962K	O
12	25	4M	16	14752K	O	15	14831K	O
		2M	13	7611K	O	18	7606K	O
		1M	15	3956K	O	15	4540K	O
16	25	4M	45	14395K	O	47	13939K	O
		2M	60	8132K	O	60	8069K	O
		1M	63	4128K	O	58	4048K	O
24	25	4M	74	14482K	O	70	14127K	O
		2M	84	8461K	O	83	8083K	O
		1M	85	5281K	O	82	4156K	O

Table 1-9: Configuration 4 – PAL, Full D1 (720 x 576)

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1.5 Suggests for Optimizing File I/O

1. Format each physical hard disk drive with only one partition.
2. Format the disk drive with NTFS (Windows only).
3. Format the disk driver with a larger cluster size (at least 64 KB in size).
4. Regularly defragment the partition.
5. Do not use NTFS compression on the partition (only for Windows only).
6. If you have a separate hard disk for data files, use a separate IDE controller.

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2 Hardware Reference

2.1 PCI-MPG24 Specification

Video Input

- Four composite video color digitizers.
- Video input interface: DB15 pin female connector
- Support PAL/NTSC/CCIR/EIA standard cameras.

Video compress

- Four channels full D1 real time MPEG-4 video compress
- Advanced MPEG-4 bit-rate control (CBR/VBR) from 1Kbps to 6Mbps

Video preview

- Single channel full D1 size real-time preview
- Four channels quarter size real time preview

General Purpose I/O Lines

- The I/O lines are TTL compatible and support four inputs, four GPIO interfaces
- DB15 high density male connectors onboard
- The I/O lines are internally pulled up

Voltage	MIN	MAX
Input high voltage (5µA)	2.0V	5.25V
Input low voltage (-5µA)	0.0V	0.80V
Output high voltage (-1.0mA)	5.0V	-
Output low voltage (100.0mA)	-	0.5V

Table 2-1: Voltage Range

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Watch Dog Timer

- For monitoring the PC's application operation and will reset the PC after a programmable inactivity time-out.
- Interface: 2-pin header

User EEPROM

- Support 1K bit EEPROM for user defined purposes

Form Factor

- 32bit/ 33MHz PCI bus half size board.

Power Consumption

- 3.3V @ 2.8A max
- 5V @ 0.8A max
- +12V @ 0.1A max
- -12V @ 0.1A max

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PCI-MPG24 Appearance



Figure 2-1: PCI-MPG24

PCI-MPG24 Standard accessories



Figure 2-2: Watchdog reset cable

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Figure 2-3: BNG Interface cable

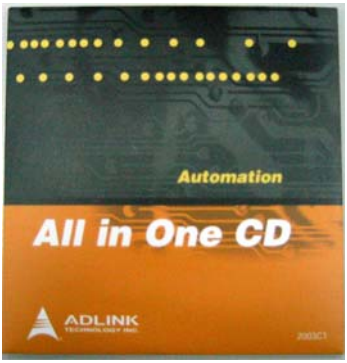


Figure 2-4: All in One CD

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PCI-MPG24 Interface

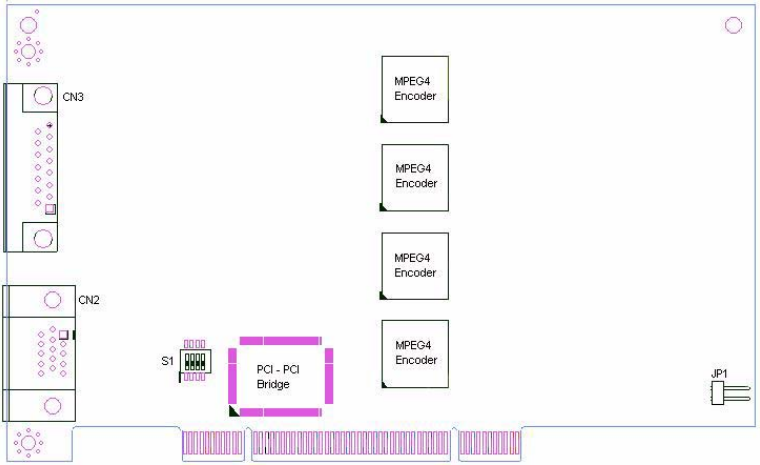
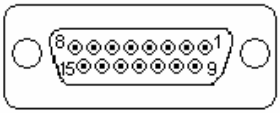


Figure 2-5: Outline Drawing

Connectors & Pin Definitions

Video Inputs: CN3

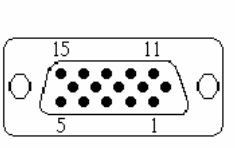


Pin	Type	Function	Pin	Type	Function
1	IN	Video Port 0	9	--	GND
2	IN	Video Port 1	10	--	GND
3	IN	Video Port 2	11	--	GND
4	IN	Video Port 3	12	--	GND
5	--	--	13	--	GND
6	--	--	14	--	--
7	--	--	15	--	--
8	--	--			

Table 2-2: Video Inputs - CN3

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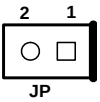
GPIO: CN2



Pin	Type	Function
1	IN	GPIO IN 1
2	IN	GPIO IN 2
3	IN	GPIO IN 3
4	IN	GPIO IN 4
5	G	GND
6	OUT	GPIO OUT 1
7	OUT	GPIO OUT 2
8	OUT	GPIO OUT 3
9	OUT	GPIO OUT 4
10	G	GND
11	G	GND
12	G	GND
13	G	GND
14	G	GND
15	P	+5V power output

Table 2-3: GPIO - CN2

Watchdog Timer Reset



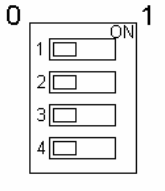
Pin	Function
1	System reset
2	GND

Table 2-4: Watchdog Timer Reset

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DIP switch & Setting

S1: Card ID setting & NTSC/PAL mode setting



S1 Pin	Function	ON	OFF (Default)
1	Card ID BIT 0	1	0
2	Card ID BIT 1	1	0
3	Card ID BIT 2	1	0
4	NTSC / PAL	PAL	NTSC

Table 2-5: S1 Card ID setting & NTSC/PAL mode setting

Maximum support for 8 PCI-MPG24 cards in a single system

Card ID	S1 Pin3	S1 Pin2	S1 Pin1
0	OFF	OFF	OFF
1	OFF	OFF	ON
2	OFF	ON	OFF
3	OFF	ON	ON
4	ON	OFF	OFF
5	ON	OFF	ON
6	ON	ON	OFF
7	ON	ON	ON

Table 2-6: Pin setting for 8 PCI-MPG24 cards

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3 Installation Guide

3.1 Software Driver Installation

Windows Driver Installation

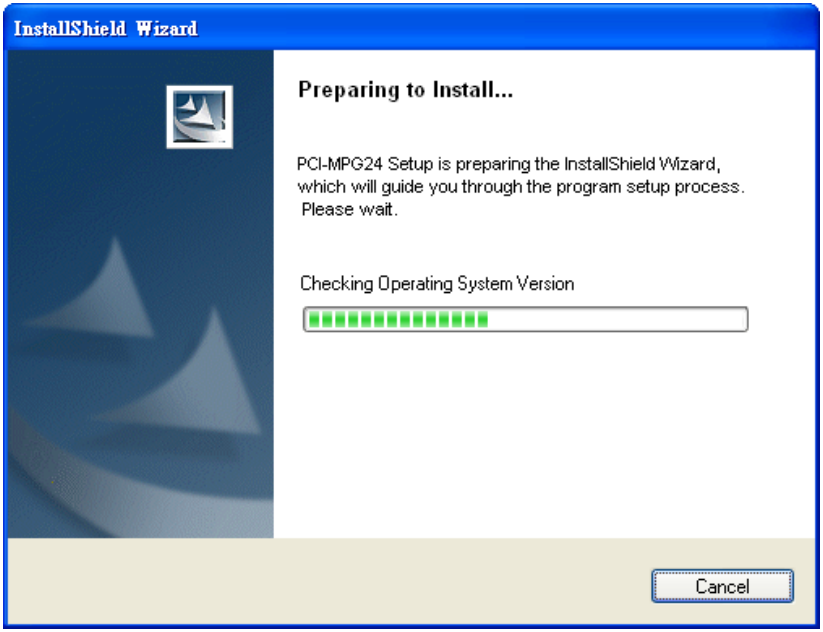
1. Operating Systems Supported
   - ▷ Windows 2000 Professional with SP4
   - ▷ Windows XP Professional with SP2
   - ▷ Windows Vista
2. Other necessary software packages
   - ▷ Microsoft DirectX 9.0

Note:	Install DirectX SDK before installing the PCI-MPG24 driver onto your system

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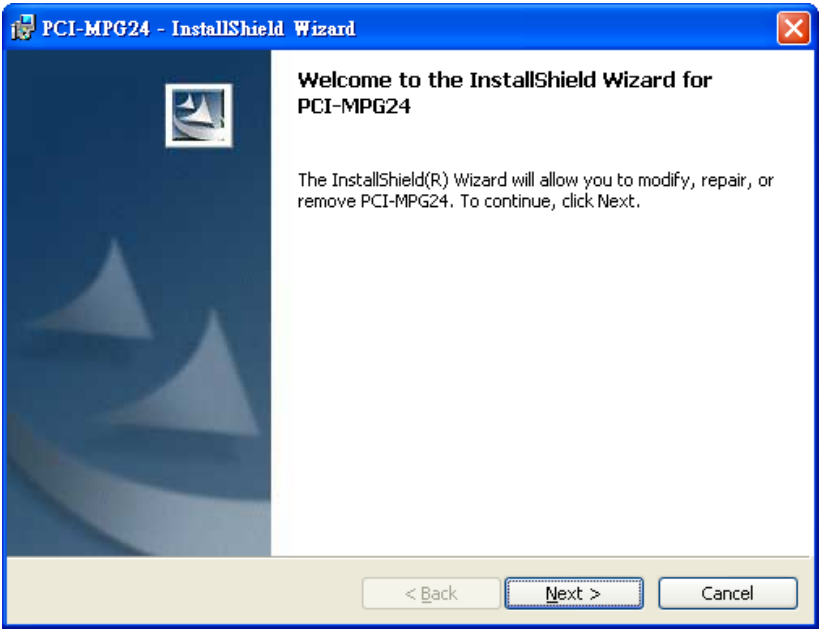
To install the driver:

1. Insert PCI-MPG24 cards to your system. Power the computer on.
2. Cancel **Found New Hardware** wizards.
3. Double click **SETUP.exe** in the PCI-MPG24 setup disk. The driver will begin installing.

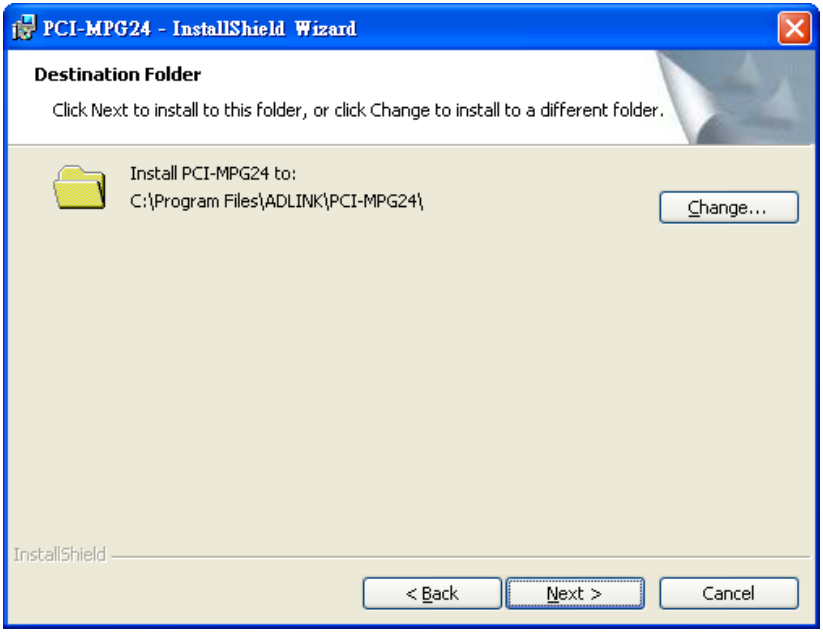


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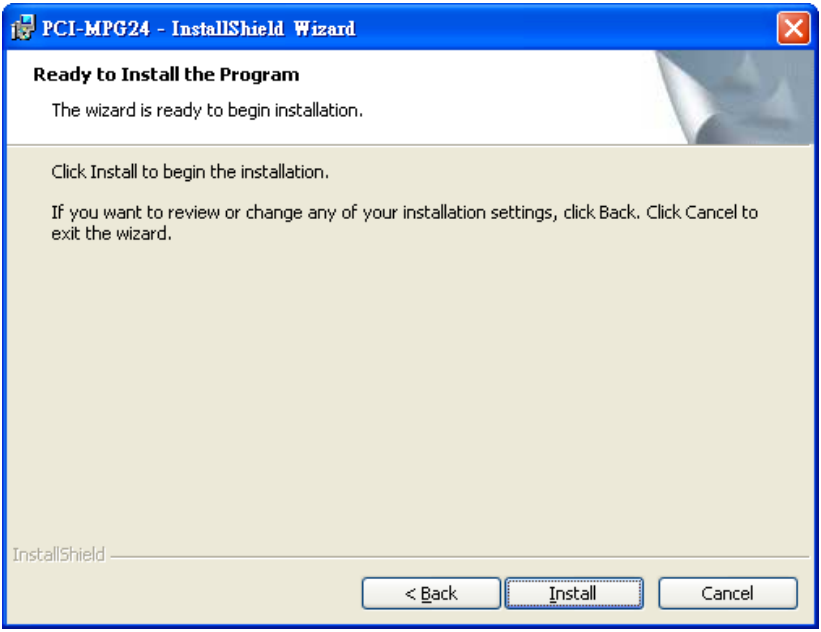
4. Click **Next**.

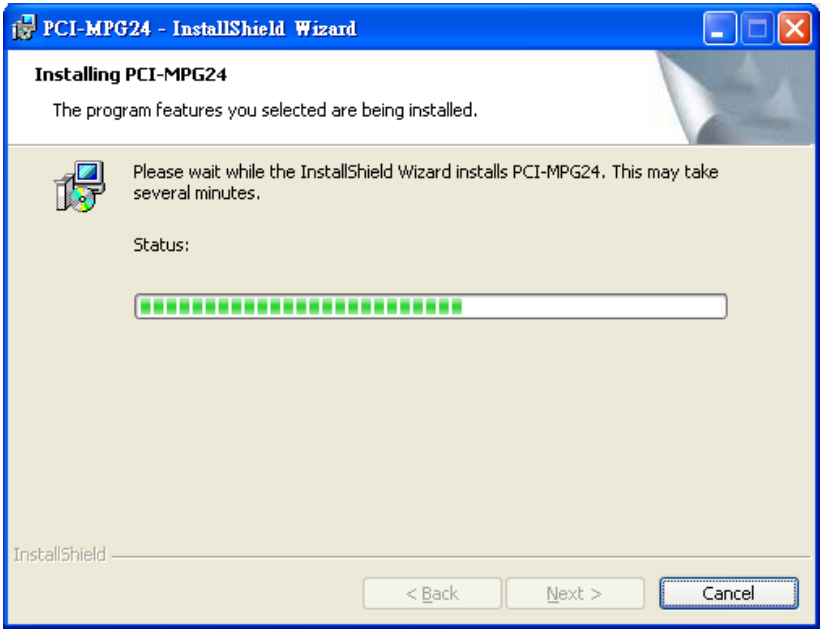

PCI-MPG24 - InstallShield Wizard
Welcome to the InstallShield Wizard for PCI-MPG24
The InstallShield(R) Wizard will allow you to modify, repair, or remove PCI-MPG24. To continue, click Next.
< Back
Next >
Cancel

5. Click **Next**, or click **Change** to install in a different folder.

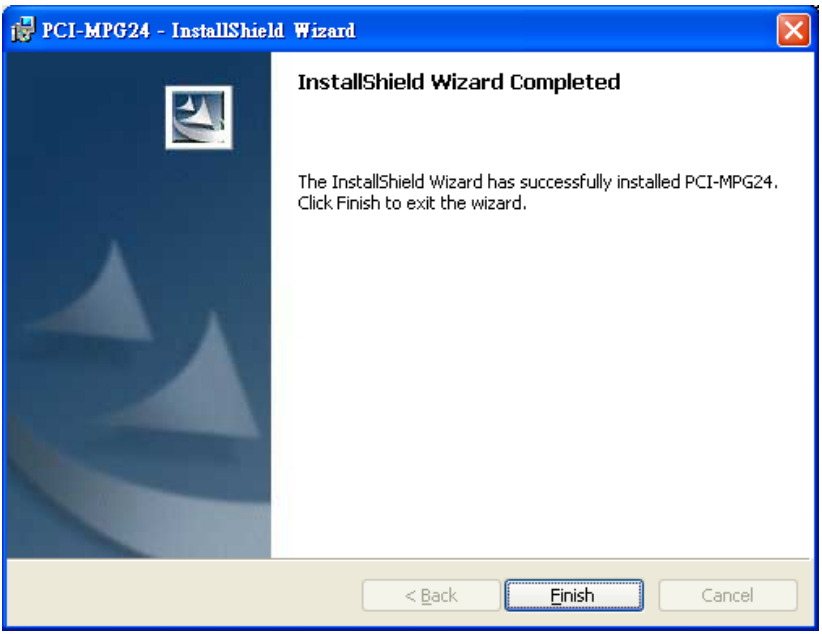


6. Click **Install** to begin installation.

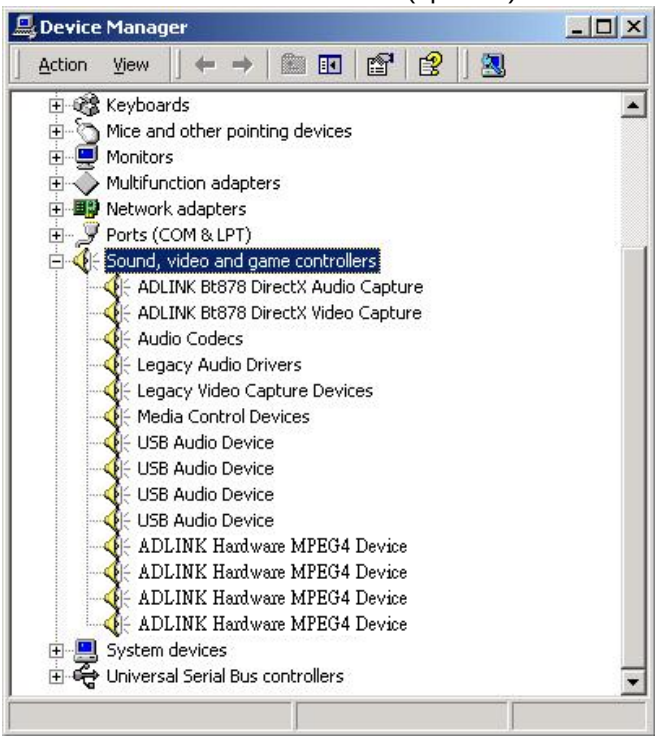



PCI-MPG24 - InstallShield Wizard
Installing PCI-MPG24
The program features you selected are being installed.
Please wait while the InstallShield Wizard installs PCI-MPG24. This may take several minutes.
Status:
InstallShield
< Back
Next >
Cancel

7. Click **Finish**.



8. Go to system control panel and select multimedia devices. There should be:
   - ▷ One **ADLINK Bt878 DirectX Audio Capture**
   - ▷ One **ADLINK Bt878 DirectX Video Capture**
   - ▷ Four **USB Audio Devices**
   - ▷ Four **ADLINK Hardware MPEG4 Devices**
   - ▷ One **NetMos PCI Serial Port** (optional)



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Linux Driver Installation

Prepare Operating System - Install RedHat 9

This section describes how to install RadHat 9 if your system does not have Linux operation system on the computer.

1. Partition a free section about 10G size from hard disk before install RH9.
2. Insert the RH9 CD into your CD driver and reboot with CD supported.
3. System will install automatically after computer reboots.
4. Follow Linux installation step by step.

Note: It is preferred to install all packages for upgrading Linux kernel.

Upgrade Linux Kernel to 2.6.9

This section describes how to upgrade Linux kernel to 2.6.9 using the following steps:

1. If you do not have Linux kernel 2.6.9 source code, please download it from http://www.kernel.org. The compressed Linux kernel package is named as linux-2.6.9.tar.bz2.
2. Uncompress the source code to the target directory /usr/src with the root account.
3. Uncompress the source code.

```
# cd /usr/src
# tar jxvf linux-2.6.9.tar.bz2
```

4. Make a link from /usr/src/linux-2.6.9 to /usr/src/linux.

```
# cd /usr/src
# rm -Rf linux
# ln -s /usr/src/linux-2.6.9 linux
```

5. Remove the object files and the dep files from the source code.

```
# cd /usr/src/linux
# make clean; make mrproper
```

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6. Upgrade the gcc compiler to version 3.4 if you have an old one. Enter the following command to check the version of gcc:

```
# gcc --version
```

Configure the kernel.

1. Start the kernel configuration program.

```
# cd /usr/src/linux
# make menuconfig
```

2. Make sure the following items to be chosen when configuring the kernel.

```
Loadable module support --->
[*] Enable loadable module support
[*] Module unloading
[*] Forced module unloading
[*] Module versioning support (EXPERIMENTAL)
[*] Automatic kernel module loading


Device drivers --->
USB support --->
[*] USB verbose debug messages
[*] USB device filesystem
[*] Enforce USB bandwidth allocation (EXPERIMENTAL)
[*] USB suspend/resume (EXPERIMENTAL)
<M> EHCI HCD (USB 2.0) support
<M> OHCI HCD support
<M> UHCI HCD (most Intel and VIA) support
I2C Support --->
<M> I2C support
File systems --->
Pseudo filesystems --->
 [*] /dev file system support (OBSOLETE)
 [*] Debug devfs

<M> Video For Linux
Video For Linux --->
<M> BT848 Video For Linux
```

Note: DO NOT select devfs automatically mount at boot. Please make sure you select the device driver for your Ethernet.

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Build the kernel.

1. Build the kernel to generate a new image file bzImage.

```
# make bzImage
```

2. Build the configured loadable modules in order to load them when needed.

```
# make modules
# make modules_install
```

Run the kernel

1. Copy the new image file and the System.map to /boot directory.

```
# cp /usr/src/linux/arch/i386/boot/bzImage /boot/
     vmlinuz-2.6.9
# cp /usr/src/linux/System.map /boot/System.map-
     2.6.9
# cd /boot
# rm -f System.map
# ln -s System.map-2.6.9 System.map
# mkinitrd /boot/initrd-2.6.9.img 2.6.9
```

2. Append the following lines to /boot/grub/grub.conf file:

```
title Red Hat Linux (2.6.9)
root (hd0,0)
kernel /vmlinuz-2.6.9 ro devfs=mount root=/dev/
     hda2
initrd /initrd-2.6.9.img
```

Note: /dev/hda2 is where your Linux root directory locates.

3. Install module initialization tool:

- This tool is used for install drivers under 2.6.9;
- Download module-init-tools-3.0.tar.gz from web site
- #tar zxvf module-init-tools-3.0.tar.gz
- Install this tool step by step according to README for this tool;
- Be sure to execute the command "make moveold";

4. Install devfsd:

- Download devfsd-v1.3.25.tar.gz

```
#tar zxvf devfsd-v1.3.25.tar.gz
```

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```
#cd devfsd
#make & make install
```

5. Make USB mouse/keyboard work:

If you are using USB mouse for Kernel 2.6.9, please modify /etc/rc.sysinit, replace "mousedev" with "usbmouse". If you are using USB keyboard for Kernel 2.6.9, please modify /etc/rc.sysinit, replace "keybdev" with "usbkbd".

6. Reboot the Linux operation system

```
# reboot
```

Install the Driver

Install driver under Linux terminal following these steps:

1. Uncompress MPG24 package:

```
# cd /home
# tar zxvf MPG24-kernel2.6.9.tar.gz
```

2. Copy supporting files:

```
# mkdir /etc/wis
# cp /home/MPG24/SupportFiles/* /etc/wis
```

3. Create device node for Wisgo7007SB

```
# mknod /dev/wisgo7007_0 c 240 0
# mknod /dev/wisgo7007_1 c 240 1
# mknod /dev/wisgo7007_2 c 240 2
 # mknod /dev/wisgo7007_3 c 240 3
```

4. Install modules

```
# cd /home/MPG24
# ./mpg24.sh reload
```

Ignore the errors: Module xxxxx doesn't exist in /proc/modules.

Note: Remember to set the pin 4 of s1 on MPG24 board for NTSC(off) or PAL(on) video format. The pin 1~3 of s1 on MPG24 board are used for Card ID. Normally, you need to install the driver, shutdown the computer, plug the MPG24, restart the computer, and then the OS will detect a new hardware.

Upgrade Linux Kernel to RedHat Fedora 3

The new version can support RedHat Fedora 3. The only thing that should be paid special attention is that you should copy

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SupportFiles/*.bin and SupportFiles/fix_setting.txt to /lib/firmware before doing step 4 of Install Driver.

Sample Programs

The sample programs are located on "Src/App" folder

1. Encode:

```
#./go-server
```

A 4 channels full D1 MPEG4 sample.This sample program initialize MPG24, and compress the video into MPEG4 avi files, Video_0.avi, Video_1.avi, Video_2.avi, Video_3.avi.

2. Preview:

```
#./v4lsample
```

This is a live preview sample program. The program is based on Video4Linux 2 API. Please refer to Video for Linux Two API Specification.

Before you compile this sample, please make sure you had installed imlib:

```
# tar zxvf imlib-1.9.15.tar.gz
#  ./configure  --prefix=/usr  --sysconfdir=/etc/
     imlib
# make
# make install
```

Install MPlayer

MPlayer is a Media Player for Linux, follow the steps to build and install the player, then you can play the MPEG4 avi file.

1. Configuring MPlayer

MPlayer can be adapted to all kinds of needs and hardware environments. Run

```
# ./configure
```

To configure MPlayer with the default options. The codecs you installed above should be auto-detected. GUI support has to be enabled separately. Execute the following if you want to use the GUI.

```
# ./configure --enable-gui
```

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If something does not work as expected, try the following to see the available options:

```
# ./configure --help
```

The configure script prints a summary of enabled and disabled options. If you have something installed that configure fails to detect, check the file configure.log for errors and reasons for the failure. Repeat this step until you are satisfied with the enabled feature set.

2. Compiling and Install MPlayer

Now you can start the compilation by typing:

```
# make
```

You can install MPlayer with (provided that you have write permission in the installation directory):

```
# make install
```

3. View Content

To start playing movies, open a command line and run:

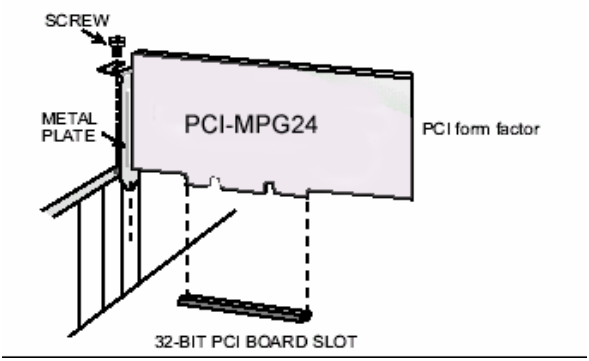
```
# mplayer <moviefile>
```

3.2 Hardware Installation

To install the PCI-MPG24 board onto the PCI bus:

1. Remove the computer cover using instructions from the computer manual.
2. Check that there is an empty PCI (32-bit) slot to accommodate the board. If there are no empty slots, remove a PCI board from the computer to make room for the PCI-MPG24 board and note down the chosen slot number.
3. Remove the blank metal plate located at the back of the selected slot (if any). Keep the removed screw to fasten the PCI-MPG24 board after installation.
4. Carefully position the PCI-MPG24 in the selected PCI slot as illustrated below. If using a tower computer, orient the board to accomodate the board slots.

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5. Once aligned with an empty slot, press the board firmly but carefully into the connector.
6. Anchor the board by replacing the screw.
7. Connect your video sources for image acquisition tests. For details, refer to the ‘ViewCreator” utility.

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4 ViewCreator Utility

Once hardware installation is complete, ensure that they are configured correctly before running the ViewCreator utility. This chapter outlines how to establish a vision system and how to manually control PCI_MPG24 cards to verify correct operation. ViewCreator provides a simple yet powerful means to setup, configure, test, and debug the vision system.

Note:	ViewCreator is only available for Windows 2000/XP with a recommended screen resolution higher than 800x600 and 24-bit above color format. It also needs Microsoft Direct X runtime.

4.1 Overview

ViewCreator offers the following features:

1. 32-bit operation under Windows 2000/XP
2. PCI-MPG24 cards access
3. Video format adjustments
4. Video recording
5. Video file playback
6. Still image file saving (BMP)
7. Direct access to general purpose I/Os
8. Direct access to EEPROM
9. FULL, CIF, or QCIF Image size, 2x2 or 4x4 display

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4.2 Component Description

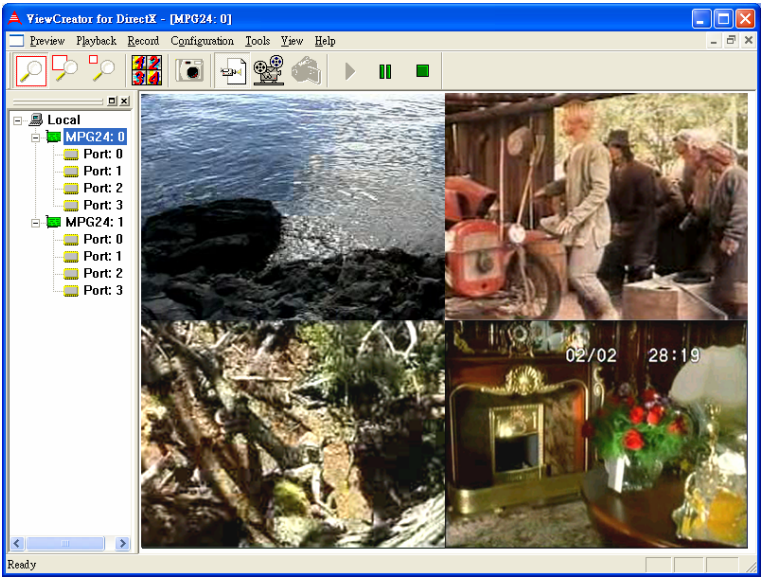


Figure 4-1: Component Description

Tree Browser

The Tree Browser window lists the PCI-MPG24 cards and video ports available at the local computer.

Image View

The Image View window displays Full, CIF, and QCIF size images and image effects. Playback is displayed in an individual window.

Toolbar

The toolbar simplify user's operation. Full functions can be found on the menu.

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4.3 Operation Theory

ViewCreator provides many functions for the PCI-MPG24 card as described below:

Preview

Single channel display

Click on the **video Port** icon in the Tree Browser window. A video frame will appear in the Image View window.

2x2 channels (Quad mode)

Click on the **card icon** in the Tree Browser window. All video ports in that card will appear in the Image View window.

You also can click **Single/Quad Image** on the toolbar to toggle between single channel display and 2x2 channels display.

All channels

Click on the **Local** icon in the Tree Browser window. All video ports in the system will appear in the Image View window.

Save still image

Click on **Capture Still Image** on the toolbar. This command saves the image into a bitmap format file. The path of the file can be set in the Set Still Image command of menu Preview.

This command can only be used in single channel display mode or 2x2 channels mode (select a video Port icon in the Tree Browser window).

Playback

Click **Play file** in the menu Playback. This command will open an **Open file** dialog. Select a media file to play.

This command can only be used in single channel display mode or 2x2 channels mode (select a video Port icon in the Tree Browser window).

Record

Select a video Port icon in the Tree Browser window. Click **Record Mode** on the toolbar then **Play** on the toolbar to capture video

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stream to a file. The path of the file can be set in the Set Recording command of menu Record.

Configurations

Record

Execute the Record Filter command of menu Configuration to open a setting menu. Click **OK** or **Apply** to apply these settings.

This command can only be used in the single channel display mode (select a video Port icon in the Tree Browser window).

Preview

Execute the Preview Filter command of menu Configuration to open a setting menu. There are two tabs allowing the user to select video standard and adjust the video amplifier. The changes will apply to the Image View window immediately.

Supported video standards are NTSC and PAL. Supported adjust video amplifiers are: brightness, contrast, hue, saturation, sharpness, gamma, white balance, black light compensation, and color enable.

This command can only be used in a single channel display mode or 2x2 channels mode (select a video Port icon in the Tree Browser window).

Tools

GPIO

Execute the GPIO command in the menu Tools to bring up the GPIO dialog box. Select the port to access and select the digital output value. Click the write or read button to write/read to/from the digital I/O ports.

This command can only be used in the single channel display mode or in 2x2 channels mode (select a video Port icon in the Tree Browser window).

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EEPROM

Execute EEPROM command in the menu Tools to bring up the EEPROM dialog box. Enter the offset and output values, and then click the Write button to write the value into the EEPROM. Enter the offset value and click the Read button to read the value from the EEPROM.

Valid offset values are between 0-127. Valid output values are in the range of 0 and 255. The value in the EEPROM will not be erased when the system is powered off.

This command can only be used in the single channel display mode or 2x2 channels mode (select a video Port icon in the Tree Browser window).

OSD

On Screen Display is supported by the ADLINK Hardware MPEG4 Device. It is used to overlay and OSD string with video, which will generate a corresponding OSD effect.

Execute an OSD command in the menu Tools to bring up the OSD dialog box. Enter the values of X and Y as the macro-block coordinate (X,Y) for the first font of display text, and enter display text in the Text textbox.

The maximum display text is limited to 94 characters. The size of a character is 16x16.

This command can only be used in single channel display mode and the duration of file recoding.

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Appendix

Appendix A: Glossary

Brightness:

Attribute of a visual sensation according to which an area appears to exhibit more or less light

CCIR:

Committee Consulat International Radiotelegraphique. This is a standards committee of the International Telecommunications Union, which made the technical recommendation for European 625 line standard for video signals.

Composite Video:

Composite video (CVS/CVBS) signal carries video picture information for color, brightness, and synchronizing signals for both horizontal and vertical scans.

CIF:

CIF has 352(H) x 288(V) luminance pixels, and 176(H) x 144(V) chrominance pixels. QCIF is a similar picture format with one-quarter the size of CIF.

EIA:

Electronic Industry Association. An industry lobbying group; it collects statistics and establishes testing standards for many types of home electronics.

Field:

For interlaced video the total picture is divided into two fields, one even and one odd, each containing one half of the total vertical information. Each field takes one sixtieth of a second (one fiftieth for PAL) to complete. Two fields make a complete frame of video.

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Frame:

One frame (two fields) of video contains the full vertical interlaced information content of the picture. For NTSC this consists of 525 lines and PAL a frame is consisted of 625 lines.

Gamma:

Cathode ray tubes (CRTs) do not have a linear relationship between brightness and the input voltage applied. To compensate for this non-linearity, a pre distortion or gamma correction is applied, generally at the camera source. A value of gamma equal to 2.2 is typical, but can vary for different CRT phosphors.

Hue:

Attribution of visual sensation according to which area appears to be similar to one, or proportions of two, of the perceived colors red, yellow, green, and blue.

NTSC:

Color TV standard developed in the U.S. in 1953 by National Television System Committee. NTSC is used in United States, Canada, Japan, in most of the American continent countries and in various Asian countries. The rest of the world uses either some variety of PAL or SECAM standards.

NTSC runs on 525 lines/frame and it's vertical frequency is 60Hz. NTSC's framerate is 29, 97 frames/sec.

PAL:

PAL (Phase Alternating Line) TV standard was introduced in the early 1960's in Europe. It has better resolution than in NTSC, having 625 lines/frame, but the frame rate is slightly lower - 25 frames/sec. PAL is used in most of the western European countries (except France, where SECAM is used instead), Australia, various countries in Africa and in South America and in some Asian countries. There are various versions of PAL, the most commonly used method is PAL B/G, but others include PAL I (used in the UK and in

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Ireland) and PAL M (hybrid standard, having the same resolution as NTSC, but uses PAL transmission and color coding technology).

Saturation:

A characteristic describing color amplitude or intensity. A color of a given hue may consist of low or high saturation value, which relates to the vividness of color.

AGC

Abbreviation for automatic gain control. On a TV or VCR, AGC is a circuit that automatically adjusts the incoming signal to the proper levels for display or recording. On a video camera, AGC is a circuit that automatically adjusts the sensitivity of the pickup tube to render the most pleasing image.

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Appendix B: Standard Compliance

Notice for USA



Compliance Information Statement (Declaration of Conformity Procedure) DoC FCC Part 15

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation or when the equipment is operated in a commercial environment.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

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Notice for Europe



This product is in conformity with the Council Directive 89/336/EEC amended by 92/31/EEC and 93/68/EEC

This equipment has been tested and found to comply with EN55022/CISPR22 and EN55024/CISPR24. To meet EC requirements, shielded cables must be used to connect a peripheral to the card. This product has been tested in a typical class B compliant host system. It is assumed that this product will also achieve compliance in any class A compliant unit.

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Warranty Policy

Thank you for choosing ADLINK. To understand your rights and enjoy all the after-sales services we offer, please read the following carefully.

1. Before using ADLINK's products please read the user manual and follow the instructions exactly. When sending in damaged products for repair, please attach an RMA application form which can be downloaded from: http://rma.adlinktech.com/policy/.
2. All ADLINK products come with a limited two-year warranty, one year for products bought in China:
   - The warranty period starts on the day the product is shipped from ADLINK's factory.
   - Peripherals and third-party products not manufactured by ADLINK will be covered by the original manufacturers' warranty.
   - For products containing storage devices (hard drives, flash cards, etc.), please back up your data before sending them for repair. ADLINK is not responsible for any loss of data.
   - Please ensure the use of properly licensed software with our systems. ADLINK does not condone the use of pirated software and will not service systems using such software. ADLINK will not be held legally responsible for products shipped with unlicensed software installed by the user.
   - For general repairs, please do not include peripheral accessories. If peripherals need to be included, be certain to specify which items you sent on the RMA Request & Confirmation Form. ADLINK is not responsible for items not listed on the RMA Request & Confirmation Form.

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3. Our repair service is not covered by ADLINK's guarantee in the following situations:
   - Damage caused by not following instructions in the User's Manual.
   - Damage caused by carelessness on the user's part during product transportation.
   - Damage caused by fire, earthquakes, floods, lightening, pollution, other acts of God, and/or incorrect usage of voltage transformers.
   - Damage caused by unsuitable storage environments (i.e. high temperatures, high humidity, or volatile chemicals).
   - Damage caused by leakage of battery fluid during or after change of batteries by customer/user.
   - Damage from improper repair by unauthorized ADLINK technicians.
   - Products with altered and/or damaged serial numbers are not entitled to our service.
   - This warranty is not transferable or extendible.
   - Other categories not protected under our warranty.
4. Customers are responsible for shipping costs to transport damaged products to our company or sales office.
5. To ensure the speed and quality of product repair, please download an RMA application form from our company website: http://rma.adlinktech.com/policy. Damaged products with attached RMA forms receive priority.

If you have any further questions, please email our FAE staff: service@adlinktech.com.

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