ACTION CENTER
TO END WORLD HUNGER

100% Final Design
Equipment List &
Cutsheets Appendix
November 21, 2007

DESIGN

ESI Design
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ACTION CENTER TO END WORLD HUNGER
100% Final Design
Project No. 05500-0G
11/21/2007

ACTION CENTER
TO END WORLD HUNGER

MercyCorps

	Total Qty	Description	Suggested Equipment Specification	
			Make	Model #
CONT1	1	PC USB Trackball	Clearly Superior Tech	Pc-Trac
AVCS1	1	AV Control System - Netlinx	AMX	NI-4100
PS1	1	AV Control 12V Power Supply	AMX	PSN 6.5
TP1	1	Touch Panel - 12"	AMX	NXT-CV12
CBOX1	3	Cable TV Receiver	Scientific Atlanta	Cable Provider
LMONB	8	LCD Monitor Mounting Bracket	Peerless	ST650P
VPM	2	Video Projector - Mount	NEC	WT60CM
NSW1	2	Network Switch - 48 Port	Cisco	Catalyst WS-C3550-48-SMI
COMP1	15	Computer - General Display	Lenovo	M57p vPro Ultra Small Desktop
COMP2	4	Computer - Office	Lenovo	M57p vPro Ultra Small Desktop
LCOMP1	20	Laptop Computer	Panasonic	Toughbook 30
DSER1	1	Server - Database	IBM/Lenovo	System x3550
RACK2	1	Lectern/Equipment Rack	DWI	D32 Series
RACK3	4	Equipment Rack (Info Hub)	Middle Atlantic	PSDR-20
TMON1	6	18" Touch Screen	Focus	Focus MTK1800VWT
TMON2	4	32" Touch Screen	Touchscreens.com	LCDNC32-CAP-USB-B
AE1	2	Audio Extender - CAT5	Gefen	EXT-AUD-1000
DVIX2	7	DVI Audio USB Extender	Gefen	CAT5 9500HD
AVS1	1	DVI Switcher w/ Audio	Gefen	4x4 DVI KVM Matrix
USBW1	1	Wireless USB Extender - USB 2.0	Gefen	Wireless USB Extender
SPKR1	14	Audio Speaker	JBL	Control 25T
SPKR1B	6	Speaker Mounting Bracket	JBL	Control 25T
SPKR2	6	Audio Speaker	JBL	Control 25
SPKR2B	6	Speaker Mounting Bracket	JBL	Control 25
SPKR3	7	Audio Speaker - Self Powered Pair	Yamaha	MSP3
KYBD1	2	Wireless Keyboard & Mouse	Logitech	LX 710 Laser
RACK1	2	Equipment Rack - 44U (Control Room)	Middle Atlantic	MRK-4426
CABLE1	26	Cabling	NA	NA
VP1A	5	Video Projector - Spare Lamp	NEC	WT61LP
VP1	2	Video Projector - Ultra Short Throw LCD	NEC	WT615
AMP1	7	Audio Amplifier - Stereo	QSC	RMX850
AMP2	2	Audio Amplifier 70V	TOA	A-912 MK2
MIC1	2	Microphone - Lecturn	AudioTechnica	AT808G
MIX2	1	Matrix Switcher - 4x4 - Component/Stereo	AutoPatch	Precis FGP37-0404-345
MIX3	1	Matrix Switcher - 4x4 - RGBHV/Stereo	AutoPatch	Precis FGP37-0404-844
MIX1	3	Audio Mixer	Rane	SM-26S
FBS1	1	Feedback Suppressor	Sabine	FBX-SOLO SM820
LMON1	4	LCD Monitor - 42" (16:9)	Samsung	SAMSUNG 42" 400PXN
KVM1	2	KVM Switch - 12-port	Servswitch	Servswitch (SW724A-R4)
WIFIC1	4	WiFi Desktop Card	Belkin	Wireless G Desktop Card
WIFIR1	5	WiFi Router w/Enclosure	SMC	7004AWBR
CD1	1	CD Player - 5 Disk Changer	DENON	DCM-390/290
VCAM1	1	Video Camera	Sony	HDR-FX1
VCAM1A	1	Video Camera - Tripod	TBD	TBD
CAM1	7	Webcam	Logitech	QuickCam® Communicate Deluxe
UPS1	2	Uninterruptable Power Supply	Tripplite	SmartPro3000RM2U
LMON6	2	LCD Monitor - 21" (16:9)	Viewsonic	VX2025WM
FWALL1	1	Firewall	Watch Guard	Firebox 1000

ESI Design

FT100 95 90 85 80 75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0

Junction box beneath window for power distribution to lightbox - switched at adj. NW wall

Junction box @ wall for distribution to Global Status Wall

Junction box @ wall for distribution to Global Status Wall

Terminate at local equipment rack Ⓒ

Terminates at local equipment closet Ⓑ

AC01.S01

AC06.S01

AC05.S01

AC04.S01

Ⓒ

Ⓑ

AC03.S01

AC01.S08-S11

AC01.S08-S10

AC07.S03

AC07.S01

AC07.S02

AC07.S04

AC02.S01

AC08.S03

AC08.S03-S06

AC08.S07-S08

AC08.S01-SO2

AC01.S08-S09

AC01.S06-SO7

AC01.S04-SO5

AC01.S02-SO3

Ⓐ

AC10.S01

DESIGN

ACTION CENTER
TO END WORLD HUNGER

No.	Issue	Date

Date	Drawn By
11/21/07	JA

Scale	Phase
1/8"	100% F.D.

Title

GENERAL PLAN
POWER AND DATA

Job Number
05500-0G

Drawing Number
AC11.S01

1 GENERAL PLAN VIEW
Scale: 1/8" = 1'-0"

DRAWING KEY:

STANDARD 110V AC POWER	Ⓙ	JUNCTION BOX- CEILING
	Ⓙ	JUNCTION BOX- FLOOR
	Ⓙ	JUNCTION BOX- WALL
CLEAN 110V AC POWER FOR A/V EQUIPMENT	Ⓙc	JUNCTION BOX- CEILING
	Ⓙc	JUNCTION BOX- FLOOR
	Ⓙc	JUNCTION BOX- WALL
	⊕c	QUADRUPLEX RECEPTACLE OUTLET

QUADRUPLEX RECEPTACLE OUTLET IN CASEWORK

QUADRUPLEX RECEPTACLE OUTLET FLUSH MOUNTED IN THE FLOOR

DUPLEX OUTLET IN CASEWORK

DUPLEX OUTLET IN THE FLOOR

POWER & DATA - CEILING

EMPTY (W/ PULL) CONDUIT FOR DATA

EMPTY (W/ PULL) CONDUIT FOR DATA - FLOOR

SPEAKER JUNCTION BOX

LIGHT BOX - 3AMP/ea (Hard wire connection - location TBD on site.)

Ⓐ TERMINATION POINT

All data points terminate at Ⓐ unless otherwise indicated

Plan highlights power and data requirements for exhibit elements only.

PRECIS LT Component + Stereo
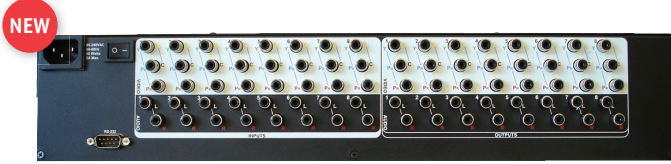
The most compact of the Precis line, the PrecisLT is designed to provide AutoPatch's superior performance in a compact, space efficient unit.

These component + stereo models feature a choice of BNC/5T connectors or RCA/RCA connectors.

I/O RANGE

4x4, 4x8
8x4, 8x8

SIGNAL TYPES

3 component + stereo

FEATURES

- •Ultra-Flat Response
- •Choice of front panel control or blank front panel
- •RS-232 control port
- •Breakaway
- •Simple AutoPatch BCS Serial Control Protocol
- •Ships with free APControl software
- •Front panel security lockout
- •Rack mounting ears included
- •Audio connections support balanced or unbalanced (V1, V2 models)
- •Lifetime Warranty
- •AutoAssist 24-hour technical support

We stand behind every unit we sell with our exclusive AutoPatch Lifetime Warranty.

24hrs / 800.622.0246
International 509.235.2636

Our trained technical staff is available 24 hours a day, every day of the year, to answer installation and technical questions.

GENERAL

AC Power:	100-240 VAC single phase, 50-60 Hz
Power Consumption (max):	60 Watts per enclosure
Operational Temperature:	32° to 110° F (0° to 43° C)
Humidity:	0 to 90% non-condensing
Enclosure Dimensions:	10.4" (26.40 cm) depth
	17.4" (44.2 cm) width without rack ears
	19.0" (48.26 cm) width with rack ears
Height:	3.5" (8.89 cm) height 2 RU
Weight:	Appx. 10.5 lb (4.76 kg) per enclosure
Approvals:	UL, CUL, CE

COMPONENT & STEREO

STANDARD AUDIO

Input Level (max):	+14 dBu, unbalanced (RCA)
	+14 dBu, balanced (5T)
Input Impedance:	18 kΩ
Output Level (max):	+14 dBu, unbalanced (RCA)
	+14 dBu, balanced (5T)
Output Impedance:	50 Ω
Frequency Response:	<+/-0.1 dB (20 Hz to 20 kHz)
THD + Noise:	<0.025% (20 Hz to 20 kHz, Vin = -10 to +14 dBu)
Signal to Noise Ratio:	>105 dB (20 Hz to 20 kHz, Vin = +14 dBu)
Crosstalk:	<-105 dB (1 kHz, Vin = +2 dBu)
Connectors:	5T or RCA

WIDEBAND VIDEO

Input Level (max):	+/-1.5 Volts
Input Impedance:	75 Ω
Output Level (max):	+/-1.5 Volts
Output Impedance:	75 Ω
Frequency Response:	300 MHz or better (+/-3 dB)
	100 MHz or better (+/-1.5 dB)
Crosstalk:	<-70 dB (f = 5 MHz)
	<-35 dB (f = 150 MHz)
Signal to Noise Ratio:	>65 dB (Vin = 0.7 V, 100% IRE)
Differential Gain:	< 0.2% or better (f = 3.58 MHz)
Differential Phase:	< 0.2° or better (f = 3.58 MHz)
Connectors:	BNC or RCA

AutoPatch™
High Performance Signal Routing

2416 Cheney-Spokane Rd.
P.O. Box 350 Cheney, WA 99004-0350
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fax: +44 (0) 1347 812322

PRECIS LT Composite / S-video / RGBHV

NEW

The most compact of the Precis line, the PrecisLT is designed to provide AutoPatch's superior performance in a compact, space efficient unit.

I/O RANGE

4x4, 4x8
8x4, 8x8

SIGNAL TYPES

Composite
S-video
RGBHV

GENERAL

General Specs apply to Composite, S-video, and RGBHV models

AC Power:	100-240 VAC single phase, 50-60 Hz
Power Consumption (max):	35 Watts per enclosure Composite/S-video
	60 Watts per enclosure RGBHV
Operational Temperature:	32° to 110° F (0° to 43° C)
Humidity:	0 to 90% non-condensing
Enclosure Dimensions:	10.4" (26.4 cm) depth
	17.4" (44.2 cm) width without rack ears
	19.0" (48.26 cm) width with rack ears
Height:	1.7" (4.32 cm) 1 RU
Weight:	Appx. 7 lbs (3.18 kg) per enclosure
Approvals:	UL, cUL, CE

COMPOSITE AND S-VIDEO MODELS

STANDARD AUDIO

Input Level (max):	+14 dBu, balanced
Input Impedance:	18 kΩ
Output Level (max):	+14 dBu, balanced
Output Impedance:	50 Ω
Frequency Response:	<+/-0.1 dB (20 Hz to 20 kHz)
THD + Noise:	<0.025% (20 Hz to 20 kHz, Vin = -10 to +14 dBu)
Signal to Noise Ratio:	>105 dB (20 Hz to 20 kHz, Vin = +14 dBu)
Crosstalk:	<-105 dB (1 kHz, Vin = +2 dBu)
Connectors:	5T

STANDARD VIDEO

Input Level (max):	+/-1.9 V
Input Impedance:	75 Ω
Output Level (max):	+/-1.9 V
Output Impedance:	75 Ω
Frequency Response:	50 MHz or better (+/-3 dB)
	15 MHz or better (+/-1 dB)
Crosstalk:	<-65 dB (f = 5 MHz)
Differential Gain:	<0.2% or better (f = 3.58 MHz)
Differential Phase:	<0.2° or better (f = 3.58 MHz)
Signal to Noise Ratio:	> 65 dB (Vin = 0.7 V, 100% IRE)
Connectors:	BNC or S-video

RGBHV MODELS

STANDARD AUDIO

Input Level (max):	+14 dBu, unbalanced
Input Impedance:	18 kΩ
Output Level (max):	+14 dBu, unbalanced
Output Impedance:	50 Ω
Frequency Response:	<+/-0.1 dB (20 Hz to 20 kHz)
THD + Noise:	<0.025% (20 Hz to 20 kHz, Vin = -10 to +14 dBu)
Signal to Noise Ratio:	>105 dB (20 Hz to 20 kHz, Vin = +14 dBu)
Crosstalk:	<-105 dB (1 kHz, Vin = +2 dBu)
Connectors:	3T

WIDEBAND VIDEO

Input Level (max):	+/-1.5 V
Input Impedance:	75 Ω
Output Level (max):	+/-1.5 V
Output Impedance:	75 Ω
Frequency Response:	300 MHz or better (+/-3 dB)
	100 MHz or better (+/-1.5 dB)
Crosstalk:	<-65 dB (f = 5 MHz)
	<-40 dB (f = 150 MHz)
Signal to Noise Ratio:	>65 dB (Vin = 0.7 V, 100% IRE)
HV Sync Input Level (max):	+/-5 V
HV Sync Output Level (max):	+/-5 V (follows input)
HV Input Impedance:	22 kΩ
Connectors:	HD-15

FEATURES

- Ultra-Flat Response
- Choice of front panel control or blank front panel
- RS-232 control port
- Breakaway
- Simple AutoPatch BCS Serial Control Protocol
- Ships with free APControl software
- Front panel security lockout
- Rack mounting ears included
- Audio connections support balanced or unbalanced (V1, V2 models)
- Lifetime Warranty
- AutoAssist 24-hour technical support

8x8 RGBHV(HD-15) + stereo

The Snowball™

Congratulations.

You have just purchased the world's most unique and innovative USB professional condenser microphone — the Snowball™! Here at Blue, we are known for designing and building the finest microphones available for studio, stage, film, broadcast — and *now* — you guessed it — computer use. Our microphones unite the heritage of the world's most respected classics with leading-edge technology, innovative engineering and inimitable styling. The Snowball is the product of our unrestrained imagination and our years of microphone and capsule manufacturing experience. There is simply nothing else like it. But don't just take our word for it . . .

"This thing will make me immortal!"

— Frosty (lead singer of *The Snowmen*)

"The next best thing to plugging a USB connector into your neck"

— Rodney Petersburg, President, *North Platte Star Trek Fan Club*

"Thanks to the Snowball, I can now actually record ON the Matterhorn!'"

— Lars Jürgenssbourger, Winner, *1981 World Yodeling Competition*

"Finally, something to plug into my laptop on those long, winter nights!"

— The Abominable Snowman

We know you hate to read manuals. So do we! But because the Snowball is such a unique recording tool, we really hope you take the time to familiarize yourself with its features and try the suggested application tips that are designed to help you get the most out of the Snowball. You might just learn something too! With proper care and feeding, the Snowball will reward you with many years of recording and performance enjoyment and it won't end up as a pool of water on your desktop! Now on with the show. (No refrigeration necessary.)

What's that on the back?

Well, we're glad you asked. You will find the USB output port and a three-position switch on the rear of the Snowball. You can probably figure out what the USB port is for, but in case you can't, this is the place where you connect the boxy end of the USB cable — with the other end going into, you guessed it, your computer. Now for the fun part. Just above the USB output port, you will find a three-position switch. Viewed from left to right, the positions are as follows:

① **First position:** Activates the cardioid capsule.

② **Second position:** Activates the cardioid capsule with a -10dB PAD (more geek talk for a device that reduces the output of the mic for use with loud sound sources that could cause distortion of the signal).

③ **Third position:** Activates the omni capsule.

Snowball suggested applications

The Snowball was designed for convenient studio use without the necessity for a lot of signal processing — or even a mic pre! Because you just connect it to your USB port, it offers a wide range

Frequency Response

+10
+5
dB
-5
-10

20 30 40 50   100   500   1kHz   5kHz 10kHz 20kHz

- - - 1 setting   ⋯⋯ 2 setting   —— 3 setting

Polar Response

0°
315°   45°
270°   90°
225°   135°
180°

5 10 15 20 25 dB

100Hz
250Hz

500Hz
1kHz

2.5kHz
4kHz

8kHz
16kHz
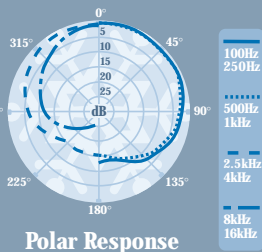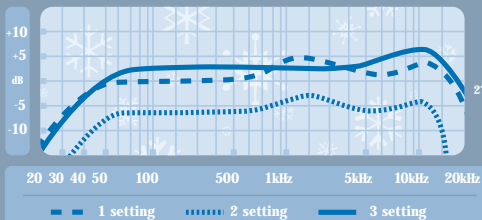
This frequency chart is only a start. It gives the recordist a basis of the sound provided. How the microphone reacts in a particular application will differ greatly because of many variables. Room acoustics, distance from sound source (proximity), tuning of the instrument and mic cabling are only a few of the interacting issues. For an artist or an engineer, how the microphones are used creates the basis of the sound.

of applications coupled with an ease of use never before offered in a studio microphone. Because of its rugged construction, dual-capsule design and high-spl specification, you can use the Snowball virtually anywhere — including the Arctic Circle!

Why TWO capsules? *(well, of course, two capsules are better than one!)*

The Snowball uses two separate capsules to offer you a wide variety of applications. The first capsule generally "hears" what's right in front of it in a fixed cardioid pattern with a neutral sonic signature (engineering geeks call this *unidirectional*). The second capsule generally "hears" everything around it with a brighter overall sound (engineering geeks call this *omnidirectional*).

Where do you put it?

The Snowball features a unique swivel mount located on the bottom center of the mic body. Be sure to mount the Snowball on the Blue Snowball desktop tripod or on a standard-thread counter-weighted tripod mic stand. And for reduction of low-frequency rumble and additional positioning options, mount the Snowball in the Blue Ringer, available from your authorized Blue dealer. Though the Snowball is extremely durable, we would hate to see it fall due to an inadequate stand. Also, be sure to position the Snowball over the center leg of the tripod to further prevent tipping. Once mounted, you can gently pivot the Snowball back and forth for optimum positioning in front of the sound source.

HEADS UP!: Forceful positioning of the swivel mount can result in damage not covered by the warranty, so there.

Snowball mounted on The Ringer

What do you connect it to?

Once safely mounted, connect the Snowball to the USB port on your Macintosh or Windows computer (the Snowball is USB 2.0 compatible — see the right sidebar for full system requirements). Make sure that the active, on-axis side of the diaphragm (the side with the BLUE logo) is facing the desired source. When connected, the LED just above the Blue logo will glow red, indicating power has reached the Snowball and it is ready to roll. For additional set-up information and FAQs about the Snowball, visit the Blue Microphones website at *www.bluemic.com*, then click on the Snowball link at the top of the home page.

System Requirements*

Macintosh	Windows
Mac OSX	XP Home Edition or
USB 1.0 or 2.0	XP Professional
64 MB RAM (minimum)	USB 1.0 or 2.0
	64 MB RAM (minimum)

*While the Snowball has been designed to work effectively with a wide range of recording applications, we cannot guarantee full compatibility with all software on the market. If you are experiencing difficulties using the Snowball with a particular application, please contact the software manufacturer for assistance and technical support.

1. In system OSX: in the Apple menu, open SYSTEM PREFERENCES.
2. Double-click the SOUND preference file.
3. Click on the INPUT tab.
4. Double click BLUE USB BALL MIC under CHOOSE A DEVICE FOR SOUND INPUT dialog box.
5. Set input volume to the appropriate level. The mic is sensitive and may require a very low volume setting.
6. Exit SYSTEM PREFERENCES.

1. In Windows XP Home Edition or XP Professional: Under START MENU open SOUNDS AND AUDIO DEVICES control panel.
2. Select AUDIO tab; insure BLUE BALL USB MIC is selected as DEFAULT DEVICE.
3. Click on VOLUME; select appropriate volume level. The mic is sensitive and may require a very low volume setting.
4. Exit control panel.

Great, so now I'm ready to go! How do I get the most out of my Snowball?

The following application hints are intended to give you a good starting point to get the most out of this unique audio tool. As with all applications however, there are no rules, only guidelines. Trust your gear and trust your ears. If it *sounds* good, it *is* good!

Experiment with each capsule once you have the Snowball set up. You'll find that the omni capsule captures more of the room sound, while the cardioid capsule is more focused on what's right in front of it.

Vocals

Here's a little-known secret: vocalists love singing into unique and impressive mics like the Snowball. Put it in front of any singer and you're sure to get an inspired performance. For a "big" vocal sound, position the vocalist within one to four inches of the diaphragm. With the input volume properly adjusted in your computer's settings, there is no need to worry about overloading the microphone, but be sure to use a high-quality sonically neutral pop filter, such as the Blue Pop, to control plosives and protect the diaphragm.

Tilt the microphone slightly upward (toward the forehead) for more projection and head tone, straight on at the mouth for maximum brightness and intelligibility, or down toward the chest for more robust full lows and smoother highs. We recommend starting out in position one — or position two, which activates the -10dB PAD for real screamers.

Electric Guitar

Because of its neutral response and solid bottom end, the Snowball is an excellent mic for any clean or distorted guitar amp. Position the diaphragm toward the center of the speaker or dust cap to capture more highs, or toward the edge of the speaker cone for a fuller sound with more low end. For overdriven or distorted tones, move the mic towards the outer edge of the speaker cone, or back it away from the amp a foot or more to blend room tone with direct pickup and soften high frequencies. Give the Snowball a try on electric bass, blues harmonica, and organ too!

Acoustic Guitar

Microphones require careful placement when used on acoustic guitar, but the Snowball's neutral tone is well-suited to this task. For a balanced sound with plenty of sparkling high end, position the diaphragm facing the neck where it joins the body (usually between the 12th and 14th frets.)

Initially, keep the mic as close to the instrument as possible, tilting the diaphragm toward the soundhole to capture a blend of low frequencies and pick sound. If you need more low frequencies, move the Snowball closer to the soundhole. For more high frequency detail, move the Snowball farther away from the guitar, either at the same neck position, or above the instrument near the guitarist's head.

Strings

The Snowball is an excellent choice for miking all members of the bowed string family. In general, the diaphragm should be angled toward the instrument's bridge to pick up a blend of body resonance and bow sound. On bass and cello, placement from 3 to 6 inches in front of the bridge is usually ideal. For violin and viola, it is preferable to position the microphone 1 to 2 feet above the instrument. Angle the diaphragm toward the bridge for more bow sound and low tones, or toward the tuning pegs to capture a more diffuse, brighter sound.

Drums

The Snowball's excellent transient response offers numerous advantages when miking drums. For kit and hand drums, begin by placing the microphone two to four inches above the rim or hoop (where the head is secured to the shell). Angle the mic toward the player's stick or hand to pick up more attack and definition. Orienting the diaphragm toward the shell will soften the sharp attack of a hand drum, or pick up more of the bright, crackling buzz from a snare drum. Moving the microphone closer to a drum generally increases the low end, shell resonance, and separation from other sound sources, while more distant placement emphasizes the interaction of the drum and the environment, producing a blended, airier sound. If you have multiple USB inputs available, try a pair of Snowballs as drum overheads!

Saxophones, Flutes, and Reeds

For soprano sax, clarinet, oboe and related instruments, position the Snowball directly above and in front of the keys between the middle of the horn and the lowest pads. Try moving the Snowball up or down along the length of the body to adjust the balance of airy highs (toward the mouthpiece) and cutting midrange (toward the bell). On flute, start by placing the Snowball above the middle of the instrument, and move the diaphragm closer to the mouthpiece if more high frequencies and breath sounds are desired. For other members of the saxophone family, start by placing the Snowball two to six inches in front of the lip of the bell. Angle the Snowball upward toward the mouthpiece to capture more air, brightness, and high notes. For a mellower sound, orienting the diaphragm toward the floor will emphasize the low range of the sax, and will tame the biting upper midrange that projects straight out of the bell.

Additional Applications

The Snowball is an ideal desktop microphone for applications such as dictation, voice recording and internet telephony, and of course, PODCASTING! You'll also love it for looping dialog over your professional or home movies.

Now, go get the Snowball connected and see how cool it really is.

Technical Specifications	Position 1	Position 2	Position 3
Acoustical Operating Principal	Pressure Gradient	Pressure Gradient	Pressure Gradient
Polar Pattern	Cardioid	Cardioid	Omnidirectional
Frequency Response	40-18000Hz	40-18000Hz	40-18000Hz

Optional Accessories

1 *The Ringer* — Universal shockmount   **2** *The Pop* — Custom-designed pop filter

For more information on Blue Microphones and our complete line of award-winning mics, visit us on the web at *www.bluemic.com*

S N O W B A L L ™

CE

Microphones

Step up to the mic.™

Clearly Superior Technologies
Manufacturer of High Quality Specialty and OEM Trackballs

Made in the USA
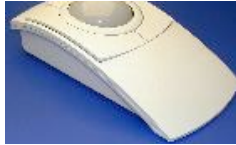
Who Buys From Us
and WHY

1044 Pioneer Way
Suite F
El Cajon, CA. 92020
Phone: 619-579-1762
Fax: 619-579-1764

KidTrac / Pc-Trac

The large, high-density ball and shape of the Pc-Trac / Kidtrac case act as a natural hand rest that mirrors the contour of the hand. Combined with the special "Ambidextrous" feature, the Pc-Trac trackball accommodates both right and left-handed users and hands of all sizes. No need to move your arm or rotate your wrist from side to side. You will enjoy this trackball's ability to dynamically accelerate across the screen as you turn the ball faster!

Made in America with only the highest quality components and materials, Clearly Superior trackballs (formerly produced by Microspeed Inc.) have a reputation for reliability and performance. The large precision-ground ball and mirror-finished rollers deliver "smooth-as-silk" feel and effortless control.

Custom Trackball configurations and branding available by request.

Mechanical

Case Dimensions:
Width 3.75" (9.5cm)
Length 6.75" (17.1cm)
Height 1.75" (5cm)

Ball Size: 2.25"
Ball Type: high-density phenolic

Bearings: Duponttm Delrintm with Teflon
Shafts: Nickel plated alloy

Construction: High Impact ABS

Compatibility

USB Models
Windows XPtm, Windows 2000tm, Windows 98SEtm and ME, most versions of Linux, MAC OS9 and later and any other USB 1.1/HID 1.0 compatible operating system such as Sun Solaristm.

5-Disc CD Auto Changer

DCM-390/290

DENON

High Performance CD Auto Changer with HDCD*, MP3 and WMA (Windows Media® Audio) Decoders.

The DCM-390/290, a 5-disc carousel CD changers equipped with HDCD*, MP3 and WMA decoders, let you not only enjoy regular audio CDs, but also HDCD* discs, MP3 and WMA encoded CD-R/RW discs.

COMPACT disc DIGITAL VIDEO **WMA** **MP3** **HDCD**

*'HDCD': DCM-390 only

■ **CD-R/RW Playback**

■ **MP3 and WMA Decoders**
The DCM-390/290 play finalized CD-R/RW discs containing MP3 or WMA audio files. When they are in MP3 or WMA format, a single CD-R/RW disc can contain up to 10 times more tracks than an ordinary audio CD. CD-R/RW discs containing a large number of MP3/WMA files are ideal for use in long-play applications such as background music.

■ **HDCD Decoding (DCM-390 only)**

■ **Advanced Multilevel Noise Shaping DAC**
The DCM-390/290 features a Multilevel Noise Shaping DAC. This multi-level modulation powerfully removes the adverse effects of jitter, and because it is built into the output amp, a clean analog output with suppressed high-frequency interference can be directly obtained.

■ **8-Times Oversampling Digital Filter**
Increasing the oversampling frequency by a factor of eight makes possible an extraordinary degree of attenuation and reduces frequency irregularities in the audio range to an absolute minimum.

■ **Remote Control IN/OUT**
When the DCM-390/290 is cable connected to an amplifier or receiver that supports the Remote Control IN/OUT feature, you can operate the DCM-390/290 via the remote sensor on the amplifier or receiver. This feature is very handy when the DCM-390/290 is placed in another room.

■ **Full Selection of Program Playback**
The DCM-390/290 lets you combine up to 32 tracks from the five or fewer CDs which are loaded.

■ **3-Mode Random Playback**
Full Random/Program Random/Disc Sequential Random
■ **Intelligent Disc Scan**
The Disc Skip button can rotate the carousel tray clockwise or counter-clockwise when searching for a disc. (Counter-clockwise rotation is operable only by remote controller.)

■ **20-Selection Music Calendar Display**

■ **Optical/Coaxial Digital Outputs**

■ **Headphone Jack**

■ **RS-232C terminal (DCM-390 only)**

Specifications

Audio Section	DCM-290	DCM-390
Frequency response	2 Hz - 20 kHz	2 Hz - 20 kHz
Dynamic range	98 dB	100 dB
Signal-to-noise ratio	108 dB	112 dB
Total harmonic distortion	0.003%	0.0027%
Channel separation	98 dB	98 dB
Line out level (Fix)	2.0 V rms	2.0 V rms
Digital Output	Optical/Coaxial	Optical/Coaxial

General		
Power supply	AC 120 V, 60 Hz	AC 120 V, 60 Hz
Power consumption	15 W	15 W
Dimensions	17.1(W) x 4.7(H) x 15.8(D) inch	17.1(W) x 4.7(H) x 15.8 (D) inch
	434(W) x 120(H) x 400(D) mm	434(W) x 120(H) x 400(D) mm
Weight	13.9 lbs, 6.3 kg	13.9 lbs, 6.3 kg

* Design and specifications are subject to change without notice.
* "WMA" (Windows Media® Audio) is a new audio codec developed by Microsoft in the United States of America.

DCM-290

DWI ENTERPRISES

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Products
Standards

D32 Series

Mitered corners with hardwood cap and step base. Includes Clock/Timer with battery backup, Light and Tilt-N-Roll wheels. Available with optional surface-mounted molding.

Unit also available in a Table-Top configuration.

Specifications:

Width	Depth	Height
25"	23½"	46½"
32"	23½"	46½"
40"	23½"	46½"

▶ Call for Additional Options & Accessories
▶ Standard Finishes (Finish Options)

▶ More Images

Standards

▶ D10 Series
▶ D20 Series
▶ D22 Series
▶ D30 Series
▶ **D32 Series**
▶ D40 Series
▶ D42 Series
▶ D50 Series
▶ D60 Series
▶ D70 Series
▶ Table-Top Lecterns
▶ Standard & Optional Features

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Focus MTK1800VWT LCD Monitor
With Touch Screen, Panel Mount
18" TFT Active Matrix Panel
1280 x 1024 UXGA Resolution
230:1 Contrast Ratio
200 Nits Brightness

Home > Products > Monitors > Focus

Focus MTK1800VWT 18" Panel Mount LCD monitor with Touch Screen integrates easily into interactive kiosks. Its metal Chassis is ideal for industrial environments and reduce the redesigned Kiosk around monitor changes. The Focus MTK1800VWT 18" Panel Mount LCD monitor with Touch Screen has composite video signal input NTSC/PAL or SECAM and Video signal output. The Focus MTK1800VWT 18" Panel Mount LCD monitor with Touch Screen consumes only 40 watts and the metal EMI cover make electromagnetic wave emissions are far lower than CRT displays. It's easy to install the Focus MTK1800VWT 18" Panel Mount LCD monitor with Touch Screen in security, presentation and other systems.

Features:

- **1280 x 1024 m (UXGA) Resolution**
- **200 Nit Brightness**
- **Analog Input & Composite input**
- **Panel Mount**

Specifications:

- **LCD**
  - **RESOLUTION 1280 x 1024 (UXGA)**
  - **SCREEN SIZE 18.0" (46 cm) Diagonal**
  - **PANEL TYPE TFT Active Matrix**
  - **COLOR 16 Millions**
  - **BRIGHTNESS 200 Nits**
  - **CONTRAST RATIO 230:1**
  - **PIXEL PITCH 0.2805mm x 0.2805mm**
  - **ACTIVE AREA W(359.0 mm) * H(287.2 mm)**
- **INPUT SIGNAL**
  - **RESPONSE TIME 10ms (Max)**
  - **VIDEO SIGNAL RGB Analog, 0.714 Vp-p, 75 Ohm**
  - **SYNCHRONIZATION VGA-XUGA, NTSC/PAL/SECAM**
  - **HORIZONTAL FREQUENCY 24 ~ 61 KHz**
  - **VERTICAL FREQUENCY 56.0 ~ 75.0 Hz**
- **CONNECTOR**
  - **VIDEO SIGNAL 15-Pin D-SUB**
  - **NTSC/PAL Video-in RCA Connector x2; S-Video Connector x 1**
  - **NTSC/PAL Video-out RCA Connector x1**
  - **USB N/A**

- **AUDIO**
    - **LINE IN N/A**
    - **LINE OUT N/A**
    - **SPEAKER N/A**
- **TOUCH SCREEN Resistive / Capacitive**
- **POWER SUPPLY Input AC100-240V 50/60 Hz, Output: DC 12V**
- **POWER CONSUMPTION 45W(Max.) Stand by: 4W(Max.)**
- **POWER MANAGEMENT VESA DPMS**
- **PLUG & PLAY DDC2B (VESA Standard)**
- **PHYSICAL**
    - **DIMENSIONS (WXHXD) 18.9" x 13.39" x 2.36" / 480 x 340 x 60mm**
    - **WEIGHT 17.6 Lbs. (8 Kgs.)**

Availability: Usually ships the next business day.

**Focus MTK1800VWT LCD Monitor
With Touch Screen, Panel Mount
18" TFT Active Matrix Panel
1280 x 1024 UXGA Resolution
230:1 Contrast Ratio
200 Nits Brightness**
MTK1800VWT Regular Price: $2,499.00 Sale Price: **$1,999.00**

Warranty: | 3 Year Next Day On–Site Support (+399) ▾ |

Expedite: | Same Day Order Processing and Shipping (+20) ▾ | Order Now |

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  - **BRIGHTNESS 200 Nits**
  - **CONTRAST RATIO 230:1**
  - **PIXEL PITCH 0.2805mm x 0.2805mm**
  - **ACTIVE AREA W(359.0 mm) * H(287.2 mm)**
- **INPUT SIGNAL**
  - **RESPONSE TIME 10ms (Max)**
  - **VIDEO SIGNAL RGB Analog, 0.714 Vp-p, 75 Ohm**
  - **SYNCHRONIZATION VGA-XUGA, NTSC/PAL/SECAM**
  - **HORIZONTAL FREQUENCY 24 ~ 61 KHz**
  - **VERTICAL FREQUENCY 56.0 ~ 75.0 Hz**
- **CONNECTOR**
  - **VIDEO SIGNAL 15-Pin D-SUB**
  - **NTSC/PAL Video-in RCA Connector x2; S-Video Connector x 1**

- - NTSC/PAL Video-out RCA Connector x1
  - USB N/A
- **AUDIO**
  - **LINE IN N/A**
  - **LINE OUT N/A**
  - **SPEAKER N/A**
- **TOUCH SCREEN Resistive / Capacitive**
- **POWER SUPPLY Input AC100-240V 50/60 Hz, Output: DC 12V**
- **POWER CONSUMPTION 45W(Max.) Stand by: 4W(Max.)**
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- **PLUG & PLAY DDC2B (VESA Standard)**
- **PHYSICAL**
  - **DIMENSIONS (WXHXD) 18.9" x 13.39" x 2.36" / 480 x 340 x 60mm**
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With Touch Screen, Panel Mount
18" TFT Active Matrix Panel
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230:1 Contrast Ratio
200 Nits Brightness
MTK1800VWT Regular price: $2,499.00 Sale price: **$1,999.00**

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Gefen

Audio Extender
USER MANUAL

www.gefen.com

ASKING FOR ASSISTANCE

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Technical Support Hours:
9:00 AM to 5:00 PM Monday thru Friday.

Write To:

Gefen Inc.
C/O Customer Service
6265 Variel Ave.
Woodland Hills, CA 91367-9897

Notice
Gefen Inc. reserves the right to make changes in the hardware, packaging and any accompanying documentation without prior written notice.

The Audio Extender is a trademark of Gefen Inc.

TABLE OF CONTENTS

INTRODUCTION

Thank you for purchasing the Audio Extender series.

Gefen's line of KVM (Keyboard Video & Mouse), ADC, DVI, USB, switches, extenders, converters and splitters is designed to make computer use more comfortable, more productive and less expensive.

KVM switches allow access to multiple computers from a single keyboard, while the extenders give the user control over a computer up to 330 feet away from the work area.

Gefen products offer solutions for noise, space and security concerns, data center control, information distribution, conference room presentation, and school and corporate training environments.

How it works

The Audio Extender allows audio devices to be extended up to 1000 feet using CAT-5 cables. The Audio Extender send unit is connected directly to the source with the supplied audio cable. A CAT-5 cable is used to connect the Audio Extender send unit to the Audio Extender receive unit.

OPERATION NOTES

READ THESE NOTES BEFORE INSTALLING
OR OPERATING THE AUDIO EXTENDER SYSTEM

* Industry standard Category-5 (CAT-5) cables are used to link the Audio Extender sender and receiver boxes together.

* The Audio Extender units are housed in a metal box for better RF shielding.

FEATURES

Features:

• Extends any unbalanced analog audio device up to 1000 feet (300 meters) from the source

• One CAT-5e cable used for extension

• Bidirectional transmission for speaker and mic

Includes:

Audio Extender Sender Unit
Audio Extender Receiver Unit
5V DC power supply
6ft Audio Cable
User Manual

HOW TO CONNECT THE Audio EXTENDER

How to Connect the Audio Extender

1- Connect the supplied Audio cables from the source Audio port into the Audio extender send unit.

2- Connect the CAT5 cable from the send unit to the receive unit.

3- Connect your Audio devices into the Audio extender receiver unit.

4- Plug the 5 volt power supply into the Audio extender send unit.

RJ-45 Jack

1 2 3 4 5 6 7 8

White/Orange
Orange
White/Green
Blue
White/Blue
Green
White/Brown
Brown

RJ-45 Jack

1 2 3 4 5 6 7 8

SPECIFICATIONS

Sample Rate .... 5 kHz (min) - 48 kHz (max)

Frequency Response .... 20Hz - 20kHz

Input/Output .... mini-phone stereo 3.5mm

Link Connector .... RJ-45 Shielded

Power Consumption .... 5 Watts (max)

Power Supply .... 5 VDC (External)

Dimensions .... 1 1/4"H x 1 1/2"W x 2.75"D

Weight .... 3 lbs

WARRANTY

Gefen Inc. warrants the equipment it manufactures to be free from defects in material and workmanship.

If equipment fails because of such defects and Gefen Inc. is notified within one (1) year from the date of shipment, Gefen Inc. will, at its option, repair or replace the equipment, provided that the equipment has not been subjected to mechanical, electrical, or other abuse or modifications.

Equipment that fails under conditions other than those covered will be repaired at the current price of parts and labor in effect at the of repair. Such repairs are warranted for ninety (90) days from the day of reshipment to the Buyer.

This warranty is in lieu of all other warranties expressed or implied, including without limitation, any implied warranty or merchantability or fitness for any particular purpose, all of which are expressly disclaimed.

The information in this manual has been carefully checked and is believed to be accurate. However, Gefen Inc. assumes no responsibility for any inaccuracies that may be contained in this manual. In no event will Gefen Inc., be liable for direct, indirect, special, incidental, or consequential damages resulting from any defect or omission in this manual, even if advised of the possibility of such damages. The technical information contained herein regarding Audio Extender features and specifications is subject to change without notice.

ma‑aud‑1000

Gefen

CAT5 • 9500HD
USER MANUAL

www.gefen.com

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                   (800) 545-6900

Fax   (818) 884-3108

Technical Support Hours:
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TABLE OF CONTENTS

INTRODUCTION

Thank you for purchasing the new CAT5•9500HD series by Gefen, Inc.

The CAT5•9500HD by Gefen allows users the benefits of extending DVI, USB 1.1, PS/2, RS232, and audio signals beyond the desktop. In a growing number of applications, broadcast stations and production facilities there is a need to locate a computer remotely from the keyboard, mouse, and video monitor. A CPU may need to be shared between several users, for example, or moved to another room because of annoying fan noise.

The CAT5•9500HD series can be used to extend computers with noisy fans, printers, and hard drives. With the potential to cover the distance of 200 feet, industry standard Category 5e (CAT-5e) cables are used for the extension of all the devices. One can connect additional CAT5•9500HD series to the same computer, allowing access to the same computer from other locations up to 200 feet apart.

Lengths and Distances Supported:
Up to 200 Feet..1280x1024 @ 60Hz
Up to 150 Feet..1920x1200 @ 60Hz

CONTENTS
The CAT5•9500HD system consists of:

(1) CAT5•9500HDS sender unit
(1) CAT5•9500HDR receiver unit
(2) 5VDC power supply
(1) DVI cable (6FT)
(2) PS/2 cable (6FT)
(1) Audio cables (6FT)
(1) USB cable (6FT)
(1) Rack ears
(1) User Manual

HOW IT WORKS
In its most basic application, the CAT5•9500HDS sender unit resides next to the computer. Supplied with the system, DVI, USB 1.1, PS/2, and audio cables connect the computer to the CAT5•9500HDS sender unit.

The CAT5•9500HDR receiver unit are placed next to the monitors and keyboard, mouse, speakers, and RS232 devices, at the remote location. The monitor, keyboard, mouse, and other devices are connected to the CAT5•9500HDR similar to the way they are connected to the back of the computer (PC or Macintosh).

READ THESE NOTES BEFORE INSTALLING
OR OPERATING THE CAT5•9500HD SYSTEM

• Use industry standard Category 5e (CAT-5e) cable to operate the CAT5•9500HD system.

• Please connect all the cables between the computer and the CAT5•9500HDS before power up the CAT5•9500HDS unit.

• The CAT5•9500HD units are housed in a metal box for better RF shielding.

How to Connect the CAT5•9500HD Extender to your devices

1 Connect the supplied cables from the computer outputs into the CAT5•9500HD Sender unit inputs. Only the peripherals being extended need to be connected.

2 Connect the cable from your display (monitor or projector) into the DVI out of the CAT5•9500HD Receiver unit.

3 Connect the cables from your peripherals into their respective outputs on the CAT5•9500HD Receiver unit.

4 Connect two CAT-5e cables for video and USB extension on the CAT-5 Video and CAT-5 DDC channel. Two CAT-5e cables are required for video extension.

5 Connect one CAT-5e cable for audio extension and another CAT-5e for PS/2 and RS-232 extension.

6 Plug the 5VDC power supplies into the CAT5•9500HD Sender and Receiver unit.

Front Panel Function Description

1   POWER ON INDICATOR - Indicates that the unit is plugged in and powered on

CAT5•9500HDR FRONT PANEL DESCRIPTIONS

Front Panel Function Description

1   POWER ON INDICATOR - Indicates that the unit is plugged in and powered on

CAT5•9500HDS BACK PANEL LAYOUT

+5 Vdc	VIDEO	USB/ DDC	DVI In	USB In	Keyboard	Mouse	AUDIO	PS2 RS-232	RS-232	Mic Out	Audio In
1	2	3	4	5	6	7	8	9	10	11	12

CAT-5

CAT-5

EKT-CAT5-9500HDS
Made In U.S.A.
Gefen Inc.

CAT5•9500HDS BACK PANEL DESCRIPTIONS
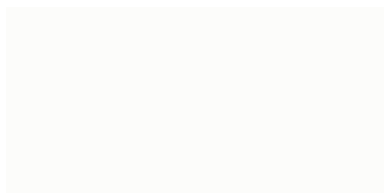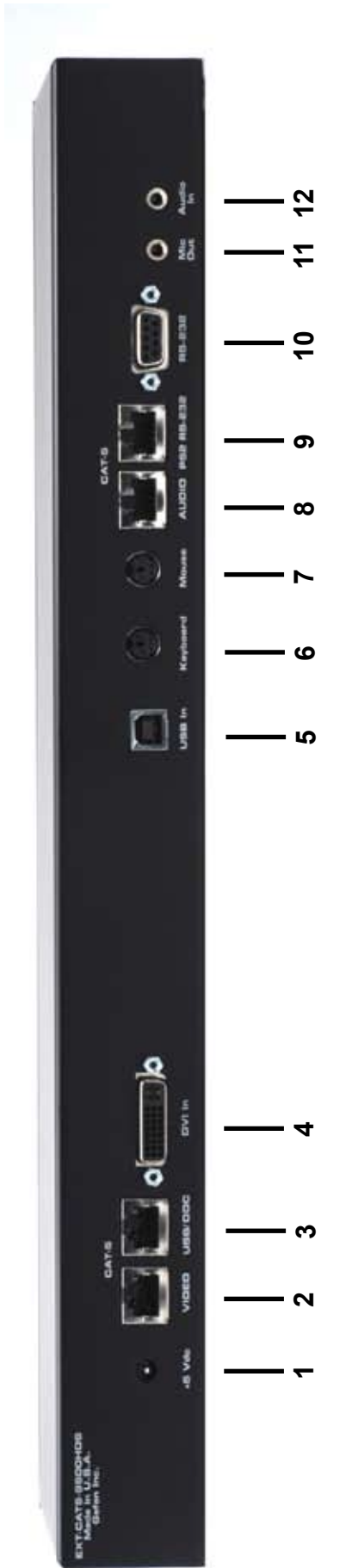
1   **POWER -** 5 VDC external power supply

2   **CAT5 Video -** RJ-45 input extends DVI input with CAT-5 cable

3   **CAT5 USB/DDC -** RJ-45 input extends USB and DDC signals with CAT-5 cable

4   **DVI IN -** DVI Input connects to your computer with the supplied DVI cable

5   **USB IN -** USB input from computer

6   **KEYBOARD -** Mini din PS/2 connector connects to PC for keyboard controls

7   **MOUSE -** Mini din PS/2 connector connects to PC for mouse controls

8   **CAT-5 AUDIO -** RJ-45 input extends audio out and audio in with CAT-5 cable

9   **CAT-5 SERIAL PS/2-** RJ-45 input extends RS232, and PS/2 keyboard and mouse with CAT-5 cable

10   **RS232 -** DB-9 input from computer

11   **AUDIO OUT -** Audio Mini Jack input from computer

12   **AUDIO IN -** Audio Mini Jack input from computer

CAT5•9500HDR BACK PANEL LAYOUT

EXT-CAT5-9500HDR
Made in U.S.A.
Gefen Inc.

#	Label
1	+5 Vdc
2	USB/DDC (CAT-5)
3	VIDEO
4	DVI Out
5	USB Out
6	Keyboard
7	Mouse
8	AUDIO PS2 (CAT-5)
9	RS-232
10	RS-232
11	Mic In
12	Audio Out

CAT5•9500HDR BACK PANEL DESCRIPTIONS

1 **POWER -** 5 VDC external power supply

2 **CAT5 USB/DDC -** RJ-45 input extends USB and DDC signals with CAT-5 cable

3 **CAT5 Video -** RJ-45 input extends video input with CAT-5 cable

4 **DVI OUT -** DVI output connects to the monitor for local video

5 **USB Out -** USB Output to devices

6 **KEYBOARD -** PS/2 output connects to the keyboard

7 **MOUSE -** PS/2 output connects to the mouse

8 **CAT-5 AUDIO -** RJ-45 input connects CAT-5 cable to receive extended audio in and audio 2 signals

9 **CAT-5 SERIAL PS/2 -** RJ-45 input connects CAT-5 cable to receive extended RS-232 and PS/2 signals

10 **RS232 -** DB-9 connector connects to RS-232 devices

11 **AUDIO IN -** Audio mini jack connects to microphone

12 **AUDIO OUT -** Audio mini jack connects to speakers
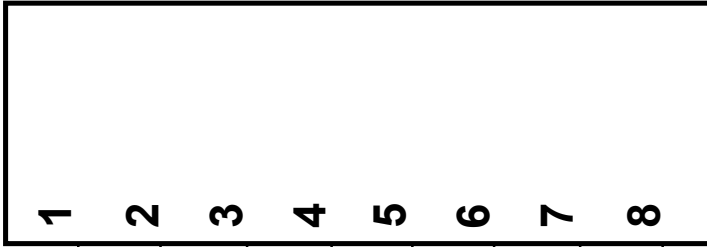
CAT5 WIRING DIAGRAM

RJ-45 Jack

1 2 3 4 5 6 7 8

White/Orange
Orange
White/Green
Blue
White/Blue
Green
White/Brown
Brown

RJ-45 Jack

1 2 3 4 5 6 7 8

SERVICE SWITCH USAGE GUIDE
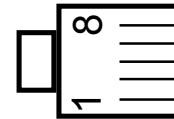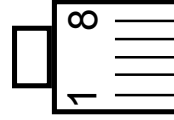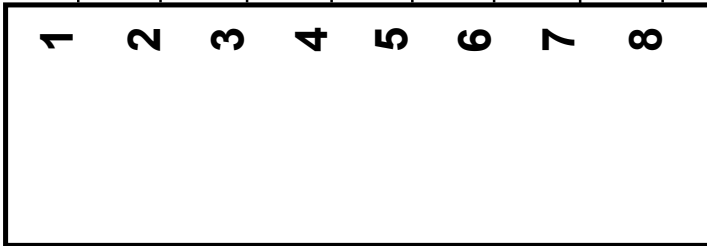
Gefen CAT5 HD products (sender and receiver) both contain a pair of service switches (also called dip switches) located underneath the unit. These service switches are used to select from sets of configurations that will equalize the signal to best match the conditions in your setup. For the CAT5•9500HD, there is 1 set of switches for the monitor under both the sender and receiver units. The switches are hidden beneath black stickers. Each bank of dip switches have 4 switches. Switches 3 and 4 are not used. (*Note: Adjustments should be done with sources and display on.)

Sender Dip Swich Settings		
Setting	Switch 1	Switch 2
No Boost	OFF	ON
Normal Boost (Default)	OFF	OFF
Strong Boost	ON	OFF
Undefined	ON	ON

Receiver Dip Swich Settings		
Setting	Switch 1	Switch 2
No EQ (Default)	OFF	OFF
EQ Setting 2	ON	OFF
EQ Setting 3	OFF	ON
Maximum EQ	ON	ON

Adjustment Guidelines:

1)   Strong boost should not be used on stranded cables. Strong boosting will cause pixels or no picture on these cables.

2)   Using the wrong settings will not damage the units; it will either produce no image or a noisy image.

3)   To elminate the possibility of cross talk and interference, cables must be terminated with 568B scheduling. (See page 8 for details)

DVI Out

USB Devices

PS/2 Devices

RS232 Out

Audio In

Audio Out

CAT5●9500HDR

CAT5 Video

CAT5 DDC

Audio

CAT5 Serial

PS/2

CAT5●9500HDS

DVI

RS232

USB

Audio In

Audio Out

PS/2

Computer

TROUBLESHOOTING
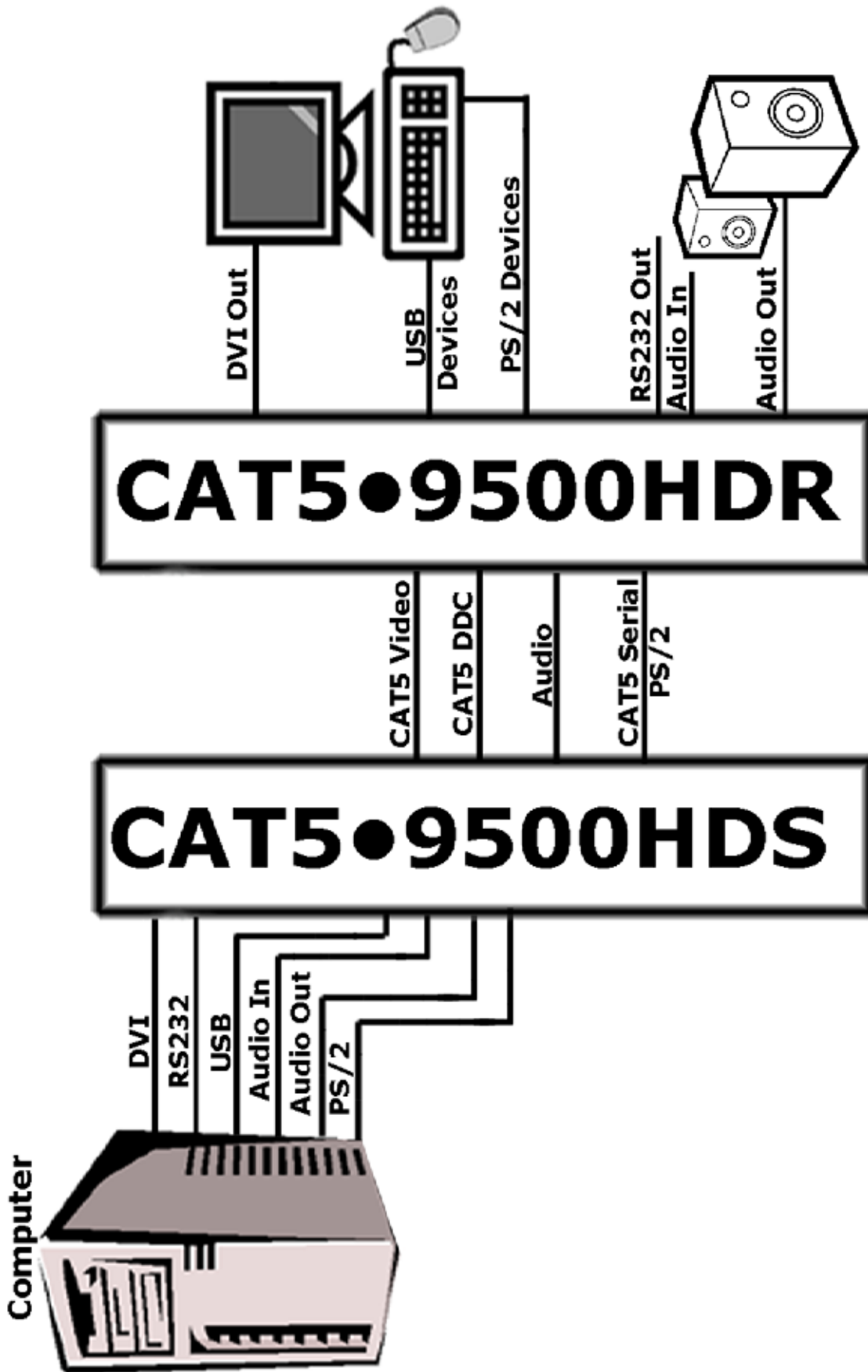
Frequently Asked Questions

What kind of CAT-5e cable should I be using?
Solid core CAT-5e cable rated at 350 Mhz 568a or 568b is the minimum requirement. CAT-6 cables are also a viable cable to use.

I'm getting no video on the screens, what can I check?
First thing to check is make sure that the video CAT5 is linked to the other video CAT5 port and the same with the DDC ports. Test to make sure the units are working with short CAT-5e cables 15-20 feet. Please refer to the Service Switch Usage Guide on page 9.

I'm getting no video on the screens using ADC to DVI adapters, what is wrong?
ADC to DVI adapters remove the necesary 5V line that the extenders require on the input to operate. To enable the 5V you will need to open up the sender unit. Next to each DVI/HDMI input connector will be a jumper that needs to be shorted to enable 5V to the input. This should only be enabled when using a ADC to DVI Adapter otherwise damage to your video card may result.

How can I fix an occasionally flickering or flashing picture?
A flickering or a flashing image is the result of Electromagnetic Interference (EMI). Try a shielded CAT-5e or CAT-6 cable on the DDC to reduce interference.

Why is there a green or pink tint to my picture?
A tint of green or pink in the picture is a result of incorrect colorspace being transmitted. This can be resolved by recycling power on your devices including the extender. If this does not help, the DDC data containing the colorspace is not being transmitted correctly due to loss in the CAT5 cable, try replacing the DDC cable.

Why is the USB dropping out every so often?
The USB bus is inheirently not a very reliable system. Drop outs occur on occasion but if it is happeing quite often, then interference along the DDC line that is also transmitting USB is causing the problem. Try using a shielded CAT-5e cable on this line instead.

I can't seem to get my RS-232 devices to detect and connet, what's wrong?
The CAT5-9500HD system only extends the Tx and Rx lines of RS232. If you need full RS232 extension of every line, you will need the standalone RS232 Extender units.

Can I run the CAT-5 cable through a patch bay?
No, the signal will not transmit reliably

TERMINOLOGY

CAT-5

Category 5 cable, commonly known as Cat 5, is an unshielded twisted pair type cable designed for high signal integrity. The actual standard defines specific electrical properties of the wire, but it is most commonly known as being rated for its Ethernet capability of 100 Mbit/s. Its specific standard designation is EIA/TIA-568. Cat 5 cable typically has three twists per inch of each twisted pair of 24 gauge copper wires within the cable.

CAT-5e

Similar to Cat 5 cable, but is enhanced to support speeds of up to 1000 megabits per second

DDC

Short form for Display Data Channel. It is a VESA standard for communication between a monitor and a video adapter. Using DDC, a monitor can inform the video card about its properties, such as maximum resolution and color depth. The video card can then use this information to ensure that the user is presented with valid options for configuring the display

DDWG

Digital Display Working Group DDWG are the creators of the DVI specification.

DVI

Digital Visual Interface. Connection standard developed by Intel for connecting computers to digital monitors such as flat panels and DLP projectors. A consumer electronics version, not necessarily compatible with the PC version, is used as a connection standard for HDTV tuners and displays. Transmits an uncompressed digital signal to the display. The latter version uses HDCP copy protection to prevent unauthorized copying

USB

Universal Serial Bus. An external peripheral interface standard for communication between a computer and external peripherals over a cable using bi-serial transmission.

VESA

Video Electronic Standards Association, a consortium of manufacturers formed to establish and maintain industry wide standards for video cards and monitors. VESA was instrumental in the introduction of the Super VGA and Extended VGA video graphics standards with a refresh rate of 70 Hz, minimizing flicker and helping to reduce user eyestrain and fatigue.

PS/2

A port type developed by IBM for the purpose of connecting a keyboard or mouse to a PC. The PS/2 port has a mini DIN plug containing 6 pins. PS/2 ports are used so that the serial port can be used by another device. The PS/2 port is often called the mouse port.

RS-232

Recommended Standard 232. This is the de facto standard for communication through PC serial ports. It can refer to cables and ports that support the RS232 standard.

SPECIFICATIONS

Video Amplifier Bandwidth .... 1.65 Gbps

Input Video Signal .... 1.2 volts p-p

Input DDC Signal .... 5 volts p-p (TTL)

Single Link Range ....1080p / 1920 x 1200

Video Connector Type .... DVI-I 29 pin female (digital only)

Link Connector .... RJ-45 Shielded

USB Input .... USB type "B" connector

USB Output .... USB type "A" connectors

PS/2 Keyboard Connector .... 6 Pin MiniDin

PS/2 Mouse Connector .... 6 Pin MiniDin

RS232 Connector DB-9

Power Consumption .... 20 watts (max)

Power Supply .... 5V DC

Dimensions .... 17" W x 1.75" H x 4.375" D

Shipping Weight .... 10 lbs.

WARRANTY

Gefen Inc. warrants the equipment it manufactures to be free from defects in material and workmanship.

If equipment fails because of such defects and Gefen Inc. is notified within two (2) year from the date of shipment, Gefen Inc. will, at its option repair or replace the equipment, provided that the equipment has not been subjected to mechanical, electrical, or other abuse or modifications.

Equipment that fails under conditions other than those covered will be repaired at the current price of parts and labor in effect at the time of repair. Such repairs are warranted for ninety (90) days from the day of reshipment to the Buyer.

This warranty is in lieu of all other warranties expressed or implied, including without limitation, any implied warranty or merchantability or fitness for any particular purpose, all of which are expressly disclaimed.

1. Proof of sale may be required in order to claim warranty.

2. Customers outside the US are responsible for shipping charges to   and from Gefen.

3. Copper cables are limited to a 30 day warranty and cable must be free from any scratches, markings, and neatly coiled.

The information in this manual has been carefully checked and is believed to be accurate. However, Gefen Inc. assumes no responsibility for any inaccuracies that may be contained in this manual. In no event will Gefen Inc., be liable for direct, indirect, special, incidental, or consequential damages resulting from any defect or omission in this manual, even if advised of the possibility of such damages. The technical information contained herein regarding CAT5•9500HD features and specifications is subject to change without notice.

ma- cat 5- 9500hd

Gefen

Wireless USB 2.0 Extender
USER MANUAL

www.gefen.com

ASKING FOR ASSISTANCE

Technical Support:

Telephone	(818) 772-9100
	(800) 545-6900
Fax	(818) 772-9120

Technical Support Hours:
8:00am to 5:00pm
Monday thru Friday

Write To:

Gefen, Inc.
c/o Customer Service
20600 Nordhoff St.
Chatsworth, CA 91331

support@gefen.com
www.gefen.com

Notice
Gefen Inc. reserves the right to make changes in the hardware, packaging and any
accompanying documentation without prior written notice.

Wireless USB 2.0 Extender is a trademark of Gefen Inc.

TABLE OF CONTENTS

INTRODUCTION

This manual explains the installation and operation of the Wireless USB 2.0 Extender. The instructions in this guide assume a general knowledge of computer installation procedures, wireless network installation requirements, and some understanding of USB devices.

NOTE: Notes give additional information that could make installation easier.

To complete the installation, you will also require the following items that are not included with the product:
• USB 1.1 or 2.0 compatible computer
• USB device(s)

NOTE: The Wireless USB 2.0 Extender uses an IEEE 802.11g radio platform to wirelessly communicate between the Wireless USB 2.0 Sender unit and the Wireless USB 2.0 Receiver unit using the 2.4GHz radio frequency range. Other products, such as wireless routers and 2.4GHz cordless telephones, also broadcast in this same 2.4GHz range. Please be aware of potential interference issues with such products before you begin installation of the Wireless USB 2.0 Extender.

NOTE: The Wireless USB 2.0 Sender unit and the Wireless USB 2.0 Receiver unit of your new Wireless USB 2.0 Extender have been "Paired" during manufacturing. This means that they will only communicate with each other, even if other Wireless USB 2.0 Extender units are installed near by.

NOTE: Use only the AC adapters supplied with the Wireless USB 2.0 Extender. Use of substitute adapters may cause permanent damage to the system and will void the warranty.

The Wireless USB 2.0 Extender provides the freedom to connect high performance and high speed USB peripherals anywhere up to 100 feet from the CPU. Instant access to data (up to 54 Mbps) with zero wires. Work with your USB 2.0 peripherals as if they were all connected locally.

Wireless Hi-speed USB 2.0 transmits data up to 54 Mbps allowing for little or no downtime. Compatible with original USB and uses the same cables and connectors.

**READ THESE NOTES BEFORE INSTALLING OR
OPERATING THE USB 2.0 EXTENDER SYSTEM.**

* The wireless USB extender does not support isochronous USB.

* In order to operate properly, the Wireless USB 2.0 Extender sender and receiver units must not exceed 100 feet.

* To prevent interference, keep sender and receiver in plain sight of each other.

The Wireless USB 2.0 Sender unit is connected to the computer or USB source.

The USB 2.0 peripherals are connected to the Wireless USB 2.0 receiver unit is connected to the extended USB 2.0 peripherals. A wireless 802.11 type connection is used to link the sender to the receiver.

The Wireless USB package includes are:

(1) USB Sender
(1) USB Receiver
(2) Power Supply
(1) USB Cable
(1) User Manual

IR Eye

Power, Link, Host, and Activity LED Indicators

Pair/CH Button

5v Power Supply

USB IN

WIRELESS USB 2.0 EXTENDER RECEIVER PANEL LAYOUT

USB Out

LED
Indicators

IR Eye
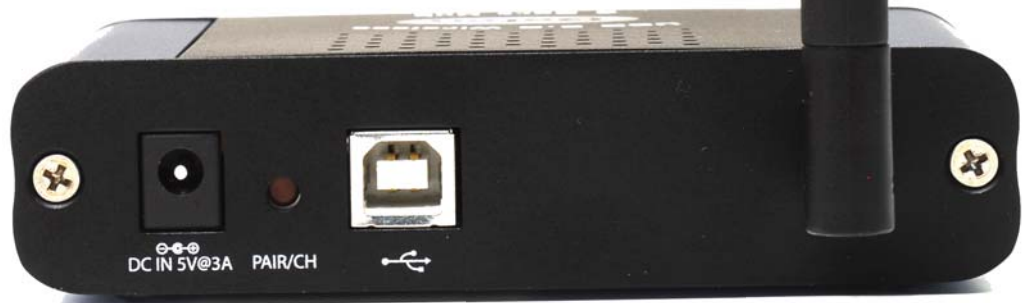
BEFORE YOU BEGIN

1. Set up the host computer in an appropriate location.

2. Determine where you want to locate the USB device(s).

3. Determine suitable locations for the Wireless USB 2.0 Sender unit and the Wireless USB 2.0 Receiver unit such that they will be able to maintain wireless communication. Physical obstacles and other radio wave emitting devices can cause interference that will reduce the maximum distance and data rate between the Wireless USB 2.0 Sender unit and the Wireless USB 2.0 Receiver unit.

4. If other 802.11g based products will be in operation in the same area, determine the optimal Radio Channel selection for all wireless products. See the Wireless Operation section on Page 5 for more information on channel selection.
Plug the power adapter into a suitable AC outlet.

CONNECTING THE WIRELESS HUB

1. Place the sender unit near the host computer.

2. Plug the Type-B connector on the USB cable (included) into the Host port on the sender unit.

3. Plug the Type-A connector on the USB cable into the USB port on the computer.

4. Plug the power adapter into a suitable AC outlet.

5. Connect the power adapter to the sender unit.

6. Place the receiver unit near the USB device(s), no more than 30m from the sender unit.

7. Plug the power adapter into a suitable AC outlet.

8. Connect the power adapter to the receiver unit.

ESTABLISHING WIRELESS COMMUNICATION

The Wireless USB 2.0 Extender will automatically establish a wireless connection between the Wireless USB 2.0 Sender unit and the Wireless USB 2.0 Receiver unit once power is applied to both units and they are located within their operating range. The Link LED on both units will turn on once the wireless connection has been made.

NOTE: It may take up to 30 seconds for the Wireless USB 2.0 Extender to establish wireless communication. The Activity LED will flash during this time to indicate that the radios are powering up.

CHECKING THE INSTALLATION

Once the Activity LED's on the Wireless USB 2.0 Sender unit and Wireless USB 2.0

1. Check that the Power LED's on the Wireless USB 2.0 Sender unit and Wireless USB
    2.0 Receiver unit are both on.

2. Check that the Link LED's on the Wireless USB 2.0 Sender unit and Wireless USB
    2.0 Receiver unit are both on.

3. Check that the Host LED's on the Wireless USB 2.0 Sender unit and Wireless USB
    2.0 Receiver unit are both on.

4. For Windows users (2000, XP, or Vista) open Device Manager to confirm that the
    Wireless USB 2.0 Extender has installed correctly. Expand the entry for Universal
    Serial Bus controllers by clicking the + sign. If the Wireless USB 2.0 Extender has
    been installed correctly you should find it listed as a Generic USB Hub.

NOTE: To open Device Manager in Windows 2000 or XP: Right-click My Computer
then select Properties, select the Hardware tab and click the Device Manager button

NOTE: To open Device Manager in Windows Vista: Open the Start menu, right-click on
Computer, select Manage and finally click on "Device Manager" in the left-hand tree.

5. For Mac OS X users open the System Profiler to confirm that the Wireless USB 2.0
    Extender has installed correctly. In the left hand column under Hardware, select
    "USB" and inspect the right hand panel. If the Wireless USB 2.0 Extender has been
    installed correctly you should find it listed as a Hub under the USB High-Speed Bus.

    NOTE: To open System Profiler in OS X: Open the Finder, select Applications, then
    open the Utilities folder and double click on the System Profiler icon.

CONNECTING A USB DEVICE

1. Install any software required to operate the USB device(s). Refer to the
    documentation for the device(s), as required.

2. Connect the USB device(s) to the Device port(s) on the Wireless USB 2.0 Receiver
    unit.

3. Check that the Device LED on the Wireless USB 2.0 Receiver unit is on.

4. Confirm on the host PC that the each connected device operates as expected.

VIEWING AND CHANGING THE 802.11g RADIO CHANNEL

The following instructions are for advanced users only.

These instructions should only be executed if specifically required and if you are comfortable with the operations. Under normal operating conditions, you should not need to view or change the 802.11g Radio Channel.
Viewing the Current 802.11g Radio Channel

NOTE: Radio Channel viewing can be done on either the Wireless USB 2.0 Sender unit or the Wireless USB 2.0 Receiver unit. The procedure is the same.
NOTE: Viewing the current 802.11g Radio Channel will not disrupt normal USB communication between the Wireless USB 2.0 Sender unit and the Wireless USB 2.0 Receiver unit.

1. Power on either the Wireless USB 2.0 Sender unit or the Wireless USB 2.0 Receiver unit and wait for approximately 20 seconds before proceeding to step 2. If the unit is already on, proceed to step 2.

2. On the selected Wireless USB 2.0 Sender unit or Wireless USB 2.0 Receiver unit, press and hold (do not release) the Pair/CH button for a minimum of 10 seconds. The button can be released when the Host, Link and Activity LED's start to blink rapidly.

3. Upon release of the Pair/CH button the current 802.11g Radio Channel will be displayed as a pattern on the Host, Link, and Activity LED's. Please see the figure below for the description of the LED Radio Channel patterns.

Radio Channel	LED Pattern		
	Link	Host	Activity
1	🟢	⚪	⚪
6	🟢	🟢	⚪
11	🟢	🟢	🔵

4. DO NOT press the Pair/CH button again. After 60 seconds the selected Wireless USB 2.0 Sender unit or Wireless USB 2.0 Receiver unit LED's will return to their normal operation.

    NOTE: If the button is pressed again and a Channel Change is not desired, DO NOT press the button again. After 60 seconds from last button press the selected Wireless USB 2.0 Sender unit or Wireless USB 2.0 Receiver unit LED's will return to their normal operation and no change in the unit's channel selection will be made.

    NOTE: If power is removed from the unit while the Channel LED Pattern is still active, no change in the units channel selection will be made.

VIEWING CHANGING THE 802.11g RADIO CHANNEL (CONT...)

The Wireless USB 2.0 Extender can operate on one of three 802.11g radio channels. Each radio channel broadcasts data in a different frequency band within the 2.4GHz range. The Wireless USB 2.0 Extender can be configured to operate on channels: 1, 6, and 11.

By selecting a different Radio Channel, you can try to find a channel with minimal radio interference. This can improve signal quality and data rates.

NOTE: When changing the Radio Channel for a "Paired" system, the channel change MUST BE completed on BOTH the Wireless USB 2.0 Sender unit and the Wireless USB 2.0 Receiver unit. The order is non-specific.

NOTE: Stop all devices connected to the Wireless USB 2.0 Receiver unit prior to changing the channel on either unit. Changing the Radio Channel will disrupt USB traffic.

1. Power on either the Wireless USB 2.0 Sender unit or the Wireless USB 2.0 Receiver unit and wait for approximately 20 seconds before proceeding to step 2. If the unit is already on, proceed to step 2.

2. On the selected Wireless USB 2.0 Sender unit or Wireless USB 2.0 Receiver unit, press and hold (do not release) the Pair/CH button for a minimum of 10 seconds. The button can be released when the Host, Link and Activity LED's start to blink

3. rapidly.

    Upon release of the Pair/CH button the current 802.11g Radio Channel will be displayed by as a pattern on the Host, Link, and Activity LED's. Please see the figure below for the description of the LED Radio Channel patterns.

Radio Channel	LED Pattern		
	Link	Host	Activity
1	🟢	⚪	⚪
6	🟢	🟢	⚪
11	🟢	🟢	🔵

4. To change the channel press and release the Pair/CH button until the desired channel pattern as seen in the above figure is visible on the LED's. Upon reaching channel 11 the pattern will return to channel 1.

    NOTE: If the Pair/CH button is not pressed for 60 seconds the LED's will return to their normal operation and no changes will be made to the current channel selection.

    NOTE: If wireless communication is present it will continue until a channel change is confirmed.

5. Once the desired 802.11g Radio Channel is displayed, press and hold the Pair/CH button for 10 seconds. The button can be released when the Host, Link and Activity LED's start to blink rapidly.

    NOTE: If the LED's do not start blinking rapidly within 20 seconds release the button and confirm that the LED pattern still shows your desired channel pattern. If it does, repeat step 5. If it does not, return to step 4.

6. Upon release of the Pair/CH button the LED's will continue to blink for approximately 20 seconds while the Channel Change is stored and the 802.11g radio reboots. Once the blinking stops the Channel Change is complete.

    NOTE: DO NOT remove power while LED's are blinking.

    NOTE: If the channel selection on the Wireless USB 2.0 Sender unit and the Wireless USB 2.0 Receiver unit are no longer the same the USB traffic will now stop. If the channel selection on the Wireless USB 2.0 Sender and Wireless USB 2.0 Receiver are made the same the USB traffic will begin.

7. If only one side of the system has been changed repeat steps 1 to 6 for the other side of the system. If channel selection is complete on both sides of the system go to step 8.

8. Connect a USB cable between the Wireless USB 2.0 Extender and the host PC, and confirm its operation by checking if it is listed in Device Manager (for Windows installations), or System Profiler (for Mac OS X installations) under Universal Serial Bus controllers as a "Generic USB Hub".

PAIRING A WIRELESS USB 2.0 SENDER AND RECEIVER

The following instructions are for advanced users only.

These instructions should only be executed if specifically required and if you are comfortable with the operations. Under normal operating conditions, you should never need to pair a Wireless USB 2.0 Sender unit and a Wireless USB 2.0 Receiver unit.

Paired units are defined as a Wireless USB 2.0 Sender unit and a Wireless USB 2.0 Receiver unit that are aware of each other's unique address and communicate exclusively.

Pairing is accomplished by infrared (IR) communication through the IR windows on the Wireless USB 2.0 Sender unit and the Wireless USB 2.0 Receiver unit; pairing information is not sent over the 802.11g radios. The IR communication distance is limited to an approximate distance of 20 cm.

NOTE: The Wireless USB 2.0 Extender's Wireless USB 2.0 Sender unit and Wireless USB 2.0 Receiver unit are shipped paired from the factory.

NOTE: If the Pair/CH button is pressed whether accidentally or purposefully and the Wireless USB 2.0 Sender unit and the Wireless USB 2.0 Receiver unit are not able to communicate via the IR interface no effect in operation will be detected and pairing will not occur.

1. Place the Wireless USB 2.0 Sender unit and the Wireless USB 2.0 Receiver unit 5 cm apart from each other with their IR windows pointed directly at each other. The IR windows must have a clear and unobstructed view of each other.

2. Power on both the Wireless USB 2.0 Sender unit and the Wireless USB 2.0 Receiver unit and wait for approximately 20 seconds before proceeding to step 3. If the units are already on, proceed to step 3.

3. Press the Pair/CH button on either unit for approximately 1 second. Upon release of the button the Host, Link and Activity LED's on both the Wireless USB 2.0 Sender unit and the Wireless USB 2.0 Receiver unit should begin to blink rapidly.

    NOTE: DO NOT remove power while LED's are blinking.

    NOTE: If step 3 is attempted too early after power up, the pairing procedure will not occur. Wait a few seconds longer and retry step 3.

    NOTE: If the rapid blinking of the LED's does not occur, confirm that the IR windows on the Wireless USB 2.0 Sender unit and the Wireless USB 2.0 Receiver unit are unobstructed, pointed at each other, and are 5 cm apart. Retry pressing the PAIR button. If the LED's still do not blink upon release of the button unplug both units for at least 10 seconds and return to step 1.

4. Wait for the LED's on the Wireless USB 2.0 Sender unit and the Wireless USB 2.0 Receiver unit to stop blinking and for the Link LED to turn on.

   NOTE: If the Link LED does not turn on within 30 seconds return to step 1.

5. The Wireless USB 2.0 Sender unit and the Wireless USB 2.0 Receiver unit are now Paired and are free to be unplugged and moved to their desired locations.

6. Once the units are installed in their specific locations, connect a USB cable between the Wireless USB 2.0 Extender and the host PC to confirm the Wireless USB 2.0 Extender's operation. If the system has been installed and paired correctly it should be listed in Device Manager (for Windows installations), or System Profiler (for Mac OS X installations) under Universal Serial Bus controllers as a "Generic USB Hub".

MAINTENANCE & TROUBLESHOOTING

The following table provides troubleshooting help. The topics are arranged in the order in which they should be executed in most situations. If you are unable to resolve the problem after following these instructions, please contact technical support for further assistance (see page 20).

Symptoms/Cause	Remedy
All LEDs on Wireless USB 2.0 Sender unit and Wireless USB 2.0 Receiver unit are off. Cause: The Wireless USB 2.0 Extender is not receiving power from the adapter.	1. Ensure that the power adapters are connected to both the Wireless USB 2.0 Sender unit and the Wireless USB 2.0 Receiver unit. 2. Check that the adapters are connected to a live source of electrical power.

MAINTENANCE & TROUBLESHOOTING

Appendix Page 68

Symptoms/Cause	Remedy
Link LEDs on Wireless USB 2.0 Sender unit and Wireless USB 2.0 Receiver unit are off. Cause: There is no wireless connection between the Wireless USB 2.0 Sender unit and the Wireless USB 2.0 Receiver unit because: a) The units are too far apart or there are too many obstructions between them. b) There is too much Radio Interference. c) The Wireless USB 2.0 Extender is not configured correctly. d) The Wireless USB 2.0 Extender is malfunctioning.	Move the Wireless USB 2.0 Sender unit and Wireless USB 2.0 Receiver unit together so that they are about 1 meter apart (3') and power both units. Confirm that they can establish a radio link. If the Wireless USB 2.0 Extender can establish wireless communications at short range: 1. The original Wireless USB 2.0 Sender unit and Wireless USB 2.0 Receiver unit placement is too far apart. Move the units to physically closer positions that have fewer obstacles in the way (walls, ceilings, etc). 2. And/or, there is excessive Radio Interference on the 802.11g Radio Channel. 3. Using standard Wireless Networking software, confirm if there are any other 802.11g radio networks operating on or near the same channel as the Wireless USB 2.0 Extender. (Note you can determine the current Wireless USB 2.0 Extender Radio Channel using the procedure on Page 9.) 4. Configure all conflicting 802.11g products so that they use evenly separated Radio Channels. Optimal separation is five channels, so channels 1, 6, and 11 will provide the least interference between themselves. If the Wireless USB 2.0 Extender cannot establish wireless communications at short range: 1. Confirm that the Radio Antennas are properly secured to the antenna connectors of the Wireless USB 2.0 Extender. 2. Confirm the Radio Channels of the Wireless USB 2.0 Sender unit and the Wireless USB 2.0 Receiver unit as described on Page 9. 3. If the Wireless USB 2.0 Sender unit and the Wireless USB 2.0 Receiver unit are not configured with the same Radio Channels, then set both units to the same channel as described on Page 10. 4. If both units are already configured to the same Radio Channel, then attempt the Pairing Procedure described on Page 12.

MAINTENANCE & TROUBLESHOOTING (CONT...)

Symptoms/Cause	Remedy
Link LED on Wireless USB 2.0 Sender unit is on; Host LED on Wireless USB 2.0 Sender unit is off. Cause: a) The computer is not functioning. b) The Wireless USB 2.0 Sender unit is not connected to the computer. c) There is too much Radio Interference for USB communication to succeed. d) The Wireless USB 2.0 Extender is	1. Disconnect all USB devices from the Wireless USB 2.0 Receiver unit. 2. Disconnect the Wireless USB 2.0 Sender unit from the computer. 3. Disconnect and then reconnect the power adapters to the Wireless USB 2.0 Extender. 4. Reconnect the Wireless USB 2.0 Sender unit to the computer. 5. In the Universal Serial Bus controllers section of Device Manager, check that the Wireless USB 2.0 Extender is recognized as a "Generic USB Hub". 6. If the problem persists, move the Wireless USB 2.0 Sender unit and Wireless USB 2.0 Receiver unit together so that they are about 1 meter apart (3') and power both units and connect the Wireless USB 2.0 Sender unit to the host PC. 7. Confirm that the Wireless USB 2.0 Extender can establish a radio link and that the Host LED's turn on. 8. If the Wireless USB 2.0 Extender is still not recognized, contact Technical Support for assistance (see page 20).

MAINTENANCE & TROUBLESHOOTING (CONT...)

Symptoms/Cause	Remedy
A device is connected to Wireless USB 2.0 Receiver unit and the corresponding Device LED is off Cause: a) The USB device is malfunctioning. b) The computer does not recognise the USB device. c) The application software for the device is not operating. d) The Wireless USB 2.0 Extender is	1. Disconnect the Wireless USB 2.0 Extender from the computer. 2. Connect the USB device directly to the USB port on the computer. 3. If the device does not operate properly, consult the user documentation for the device. 4. If the device operates properly when directly connected to the computer, connect another device (of a different type) to the Wireless USB 2.0 Extender. Connect the Wireless USB 2.0 Extender to the computer. 5. If the second device does not operate, the Wireless USB 2.0 Extender may be malfunctioning. Contact Technical Support for assistance (see page 20). 6. If the second device does operate properly, the first device may not be compatible with the Wireless USB 2.0 Extender. Contact Technical Support for assistance (see page 20).

MAINTENANCE & TROUBLESHOOTING (CONT...)

Symptoms/Cause	Remedy
All LEDs on both the Wireless USB 2.0 Sender unit and Wireless USB 2.0 Receiver unit are on but the device does not operate correctly Cause: a) The USB device is malfunctioning. b) The computer does not recognise the USB device. c) The application software for the device is not operating. d) The Wireless USB 2.0 Extender is	1. Disconnect the Wireless USB 2.0 Extender from the computer. 2. Connect the USB device directly to the USB port on the computer. 3. If the device does not operate properly, consult the user documentation for the device. 4. If the device operates properly when directly connected to the computer, connect another device (of a different type) to the Wireless USB 2.0 Extender. Connect the Wireless USB 2.0 Extender to the computer. 5. If the second device does not operate, the Wireless USB 2.0 Extender may be malfunctioning. Contact Technical Support for assistance (see page 20). 6. If the second device does operate properly, the first device may not be compatible with the Wireless USB 2.0 Extender. Contact Technical Support for assistance (see page 20).

TECHNICAL SPECIFICATIONS

Radio Max Data Rate	54Mbps (802.11g)
USB device support	High-speed devices (480 Mb/s) Full speed devices (12 Mb/s) Low speed devices (1.5 Mb/s)
USB host support	USB 1.1: UHCI & OHCI USB 2.0: EHCI
Upstream USB hub support	Yes
Downstream USB hub support	Yes
Maximum Devices Connected	14 including USB hubs
Security	Standard 64 bit WEP security enabled by Radio
AC adapter(s) NOTE: Use only the AC adapters provided with the Wireless USB 2.0 Extender.	Input: 110/240 V AC, 50 – 60 Hz Output: 5 V DC, 3 A
Power available to USB device at Wireless USB 2.0 Receiver unit	4 x 500 mA
USB cable	2 meters (6.6 ft)
Wireless USB 2.0 Sender unit connector (upstream)	1 x USB Type B
Wireless USB 2.0 Receiver unit connector (downstream)	4 x USB Type A
Wireless USB 2.0 Sender unit dimensions	110mm x 69mm x 28mm (4.33" x 2.72" x 1.10")
Wireless USB 2.0 Sender unit weight	0.18 kg (0.40 lbs.)
Wireless USB 2.0 Receiver unit dimensions	110mm x 69mm x 28mm (4.33" x 2.72" x 1.10")

WARRANTY

Gefen Inc. warrants the equipment it manufactures to be free from defects in material and workmanship.

If equipment fails because of such defects and Gefen Inc. is notified within two (2) year from the date of shipment, Gefen Inc. will, at its option, repair or replace the equipment, provided that the equipment has not been subjected to mechanical, electrical, or other abuse or modifications.

Equipment that fails under conditions other than those covered will be repaired at the current price of parts and labor in effect at the time of repair. Such repairs are warranted for ninety (90) days from the day of reshipment to the Buyer.

This warranty is in lieu of all other warranties expressed or implied, including without limitation, any implied warranty or merchantability or fitness for any particular purpose, all of which are expressly disclaimed.

1. Proof of sale may be required in order to claim warranty.

2. Customers outside the US are responsible for shipping charges to and from Gefen.

3. Copper cables are limited to a 30 day warranty and cable must be free from any scratches, markings, and neatly coiled.

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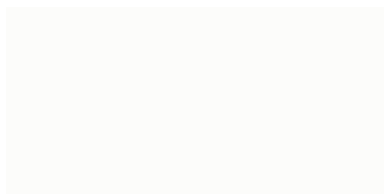
 Free shipping on all purchases. Ends Thursday.

HDR-FX1 HDV Handycam® Camcorder

Relive life's most precious moments.
Your memories will be brought to life
when you record in stunningly
life-like high definition with the
Handycam® HDR-FX1.

Product Specifications

Imaging Device
Three - 1/3" 16:9 Advanced HAD™ CCD

Pixel Gross
1120K

Recording Media
MiniDV Cassette

Video Actual
1070K Pixels

Still Actual
N/A

Recording Time
HDV: 60 min. (with DVM60 cassette), DV: SP: 60 min., LP: 90 min.

35mm Equivalent
32.5-390mm (Camera Mode), 40-480mm (4:3 TV Mode)

Aperture
f1.6-f2.8

Exposure
N/A

Filter Diameter
72mm

Focal Distance
4.5-54.0mm

Focus
Full Range Auto, Manual (Ring), One Touch

Progressive Shutter Mode
N/A

Shutter Speed
1/4-1/10,000 (AE Mode)

Optical Zoom
12X

Digital Zoom
N/A

Resolution
N/A

Video Recording System
Real-Time HD Codec Engine, HDV/DV Recording

Video Signal System
NTSC color, EIA standards

Analog-to-Digital Converter
Yes (Signal Convert with DV only)

Dolby® Digital Output
MPEG1 Audio Layer 2-Stereo (HDV), PCM (DV)

Recording Format
Stereo

LCD
3.5" (250K Pixels Wide Precision Hybrid SwivelScreen™ LCD Display)[3]

Headphone Jack
Yes (Stereo Mini)

Microphone Input
Yes (Stereo Mini)

Remote Jack
N/A

S-Video Input(s)
Yes

S-Video Output(s)
Yes

HDMI™ Connection Output(s)
N/A

USB Streaming
N/A

SteadyShot® Image Stabilization
Yes (Super; Optical)

Accessory Shoe
Yes, Cold

White Balance
Auto, A/B Preset, One-Push

Memory Stick PRO™ Media Compatibility
N/A

Still Image Mode(s)
N/A

Minimum Illumination
3 Lux

Low Light Capability
N/A

Easy Operation
Assignable Buttons, End Search

Fader Effects
Black, White

Multiple Language Display
Yes

Remote Control
Yes

Slide Show Mode
N/A

Titling
N/A

Light/Flash
N/A

Movie Mode(s)
MPEG2

Scene Mode(s)
Picture Profile (upto 6 pre-set conditions)

Picture Effect(s)
CineFrame™ Recording and Shot Transition

Digital Picture Effect(s)
N/A

Lens Type
Carl Zeiss® Vario-Sonnar® T

Viewfinder
Wide (16:9), Color (252K Pixels)

Docking Station
N/A

Microphone
Yes (Built-in)

LANC Terminal
Yes (Stereo Mini)

Analog Audio/Video Input(s)
Yes (Mini Plug)

Analog Audio/Video Output(s)
Yes (Mini Plug)

Digital Audio/Video Input(s)
Yes (via i.LINK®)[2]

Digital Audio/Video Output(s)
Yes (via i.LINK®)[1]

USB Port(s)
N/A

i.LINK® Interface
Yes[1]

Component Video (Y/Pb/Pr) Output(s)
Yes

AA Battery
Lens Hood
Lens Cap
A/V Cable
Component Video Cable
Cleaning Cassette
Shoe Adapter
Large Eye Cup
Shoulder Strap

PictBridge Compatible
N/A

Power Consumption
7.4W/8.0W/8.4W (VF/LCD/VF LCD)

Battery Type
InfoLITHIUM® with AccuPower™ Meter System
(NP-F570)

Power Requirements
7.2V (battery pack); 8.4V (AC Adaptor)

Limited Warranty
1 Year Parts; 90 Days Labor

Operating System Compatibility
N/A

Supplied Software
N/A

Weight (Approx.)
4 lbs, 6.5 oz (2000g) main unit only; 4 lbs,10 1/8
oz (2.1 kg) including the NP-F570 rechargeable
battery pack, DVM60 cassette and lens hood

Dimensions (Approx.)
5 15/16" x 7 1/8" x 14 3/8" (151 x 181 x 365mm)

Accessories Supplied

Power Adaptor/ In Camera Charger (AC-L15)

InfoLITHIUM® Rechargeable Battery (NP-F570)

Wireless Remote Commander® Remote Control
(RMT-840)

$3,699.99

Add to Wishlist

As low as $104.80/month

Select Your Service Plan:

⊙ None

○ 2 Year Service Plan with   **$149.99**
Accidental Damage from
Handling

○ 3 Year Service Plan with   **$239.99**
Accidental Damage from
Handling

○ 4 Year Service Plan with   **$359.99**
Accidental Damage from
Handling

See more Service Plans

Find out more about Service Plans

Add Accessories

|			
☐ Select	**$149.99**	Make sure your Handycam® camcorder is always ready to roll with the NP-F970 InfoLITHIUM® L Series rechargeable battery pack.	NP-F970 InfoLithium® L Series Battery
☐ Select	**$199.99**	Leave nothing behind with the LCS-VCB Handycam® carrying case. It has multiple compartments and soft padding to fit and protect all of your gear. Includes rain jacket for protection in wet climates.	LCS-VCB Soft Handycam® Carrying Case
☐ Select	**$159.99**	Put the power back into your Mavica® camera or Handycam® camcorder with the BC-V500 InfoLITHIUM® L Series portable battery charger.	BC-V500 InfoLithium® L Series Portable Battery Charger

View more Accessories

QuickSpecs

Overview
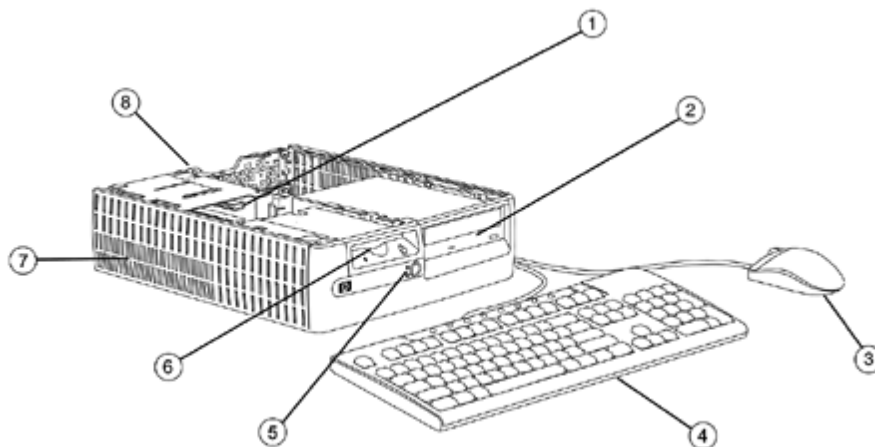
1. Expansion: 2 full-height PCI slots
2. 1 3.5" internal bay and 1 5.25" external bay for optical drive
3. 2-Button Scroll Mouse
4. Keyboard
5. LEDs
6. Optional diskette drive or 3.5" bay
7. 185W Internal Power Supply
8. Rear I/O:
   6 USB (2 standard, 4 powered - 3 @ 12V, 1 @ 24V),
   4 Standard RS232 Serial Port (supports powered 5V & 12V),
   1 parallel port, 2 PS/2, 1 RJ-45, 1 VGA, Line out

At A Glance

- Intel® Pentium® 4 and Celeron™ processors (Socket N)
- One of the following Operating Systems:
  Genuine Windows XP Professional
  Genuine Windows XP Embedded
  Genuine Windows Embedded for Point of Service (WEPOS)
  FreeDOS
- Intel 845GV chipset with Intel Extreme integrated graphics
- Integrated Intel Pro 100/VE ethernet
- 400 and 533 MHz with front side bus support
- SMART III Ultra ATA/100 Hard Drives
- SoundMax Digital AC97 integrated audio with internal speaker (supports speaker beeps only, support for other file formats i.e. WAV/AVI requires an external speaker)
- Pre-loaded Manageability tools
- Energy Star compliance with energy-saving features
- Protected by HP Services, including a 3-3-3, standard warranty. Terms and conditions vary by country. Certain restrictions and exclusions apply.

Standard Features - Select Models (localized by Regions)

HP Point of Sale System rp5000
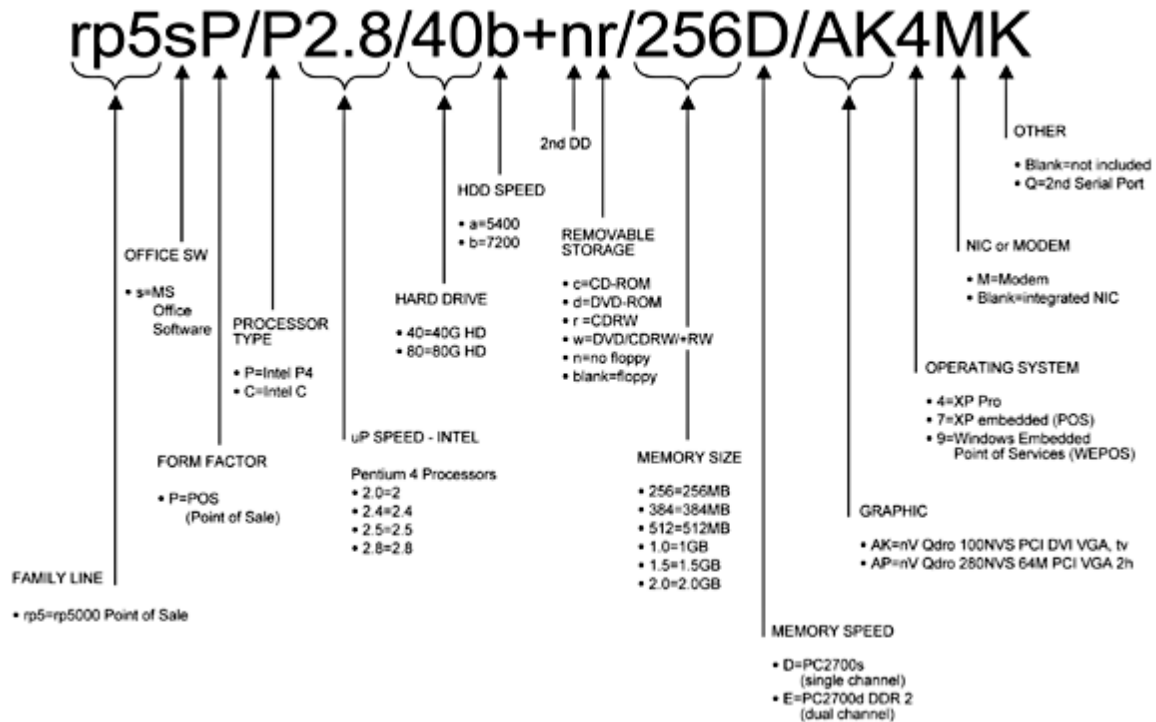
rp5000 Models

DM329A#ABA	rp5P/P2.0/40anc/256D/4 US
DM330A#ABA	rp5P/P2.0/40an/256D/4 US
DM331A#ABA	rp5P/P2.0/40an/256D/7 US
DM332A#ABA	rp5P/C2.0/40anc/256D/4 US
DN847A#ABA	rp5P/C2.0/40an/256D/4 US
DN848A#ABA	rp5P/C2.0/40an/256D/7 US

NOTE: All rp5000's contain Intel 845GV chipsets with Intel Extreme Integrated graphics, Integrated Intel Pro 100/VM Ethernet, 400 MHz Processor front side bus support, SoundMax Digital AC97 Integrated audio with internal speaker, and 3-3-3 Warranty.

QuickSpecs

Standard Features - Custom Components

		rp5000
Processor and Speed – One of the following	**Intel Celeron Processors** with 400-MHz Front Side Bus, 128-KB L2 cache 2.0-GHz, 2.5-GHz	X
	Intel Pentium 4 Processors with 400-MHz or 533-MHz Front Side Bus, 512-KB L2 cache 2.0-GHz, 2.4-GHz, 2.8-GHz	X
Operating System – One of the following	Genuine Windows XP Professional SP2	X
	Genuine Windows XP Embedded SP1	X
	Genuine Windows Embedded for Point of Service (WEPOS)	X
	FreeDOS	X
Hard Disk Drive – One of the following	40-GB 5400 rpm SMART III Ultra ATA/100; 40-GB 7200 rpm, 80-GB 7200 rpm	X
	2nd hard drive, 40-GB 5400 rpm SMART III Ultra ATA/100, 40-GB 7200 rpm, 80-GB 7200 rpm (optional in lieu of floppy)	X
Memory – One of the following	256-MB DDR Synch Dram PC2700 (333-MHz) Non ECC (1 x 256)	X
	256-MB DDR Synch Dram PC2700 (333-MHz) Non ECC (2 x 128)	X
	384-MB DDR Synch Dram PC2700 (333-MHz) Non ECC (1 x 128, 1 x 256)	X
	512-MB DDR Synch Dram PC2700 (333-MHz) Non ECC (1 x 512)	X
	512-MB DDR Synch Dram PC2700 (333-MHz) Non ECC (2 x 256)	X
	1-GB DDR Synch Dram PC2700 (333-MHz) Non ECC (1 x 1GB)	X
	1-GB DDR Synch Dram PC2700 (333-MHz) Non ECC (2 x 512)	X
	1.5-GB DDR Synch Dram PC2700 (333-MHz) Non ECC (1 x 1GB, 1 x 512)	X
	2-GB DDR Synch Dram PC2700 (333-MHz) Non ECC (2 x 1GB)	X
Removable Storage	1.44-MB Diskette Drive (optional)	X
	48X CD-ROM Drive	X
	48X/32X/48X CDRW Drive (XP Professional only)	X
	16X/40X DVD-ROM	X
	16X DVD+/-RW LightScribe Drive (Double Layer/Dual Format)	X
	48X/32X Combo Drive (XP Professional only)	X
Keyboard	2004 standard keyboard PS/2 (no hotkeys)	X
	No keyboard optional	X
Mouse	PS/2 2-Button Scroll Mouse	X
	No mouse optional	X

Standard Features - Custom Components

Audio	SoundMax Digital AC97 integrated audio with internal speaker (supports speaker beeps only, support for other file formats i.e. WAV/AVI requires an external speaker)	X
NIC	Intel Pro 100/VE NIC	X
Miscellaneous	Wall/under desk mounting bracket	X
	Tower stand	X
Serial Port Configurations	**Standard Mode:** All four serial ports configured in standard mode (no power)	X
	Powered Mode: All four serial ports configured for power (pin 1 = +12V & pin 9 = +5V on each serial port).	X
	Standard/Powered Mode: Two serial ports are configured in standard mode (no power) and two serial ports are configured for power (pin 1 = +12V & pin 9 = +5V).	X
Graphics	Intel Extreme Graphics (integrated with Intel 845GV chipset)	X
	NVIDIA Quadro 280NVS PCI (64 MB, dual VGA)	X

Standard Features

Processor	Intel Pentium 4, Intel Celeron (Socket N)
Preinstalled Software	
Genuine Microsoft Windows XP Professional SP2	X
Genuine Microsoft Windows XP Embedded SP1	X
Genuine Microsoft Windows Embedded for Point of Service (WEPOS)	X
FreeDOS	X
Computer Setup Utility	X
Diagnostics for Windows	X
Microsoft Internet Explorer	X
Norton Antivirus 2005 with 60-day Live Update Subscription	X
CPU Bus Speed Supported	400 and 533 MHz with FSB support
Standard L2 Cache - Pentium 4, Celeron	512-KB ECC, 128-KB ECC depending on processor speed
Chipset	Intel 845GV
Memory Expansion Slots	2 DIMMs
Memory Type Supported	DDR (ECC not supported by Chipset)
Memory Speed Supported	PC2700 (333-MHz) Non-ECC – ships standard
	DDR Synch DRAM PC2100 (operates at 266MHz) Non-ECC
	DDR Synch DRAM PC3200 (operates at 266MHz or 333MHz) Non-ECC
Maximum Memory	2-GB
Network controller	Integrated Intel PRO/100VE
Graphics	Integrated Intel Extreme Graphics
Audio	SoundMax Digital AC97 integrated audio with internal speaker
NOTE: supports speaker beeps only, support for other file formats i.e. WAV/AVI requires an external speaker	
PCI	2 full-height half-length PCI cards (6.87 in/17.45 cm)
AGP	None
Bays	Total Bays = 3
Internal Bays	(1) 3.5 inch ATA Hard Drive
External Bays	(2) 1– 3.5 floppy drive bay or 2nd HD and 1– 5.25 inch optical drive bay
NOTE: Usability is dependent on configuration. If a configuration contains a 2nd HDD, then no optical device or floppy can be chosen.	
Parallel Port	1
Serial Port	4 standard RS232 – individually configurable to powered 5V & 12V
USB Port	6 USB 2.0 (2 standard, 4 powered - 3 @ 12V, 1 @ 24V),
Front I/O	None
Rear I/O	6 USB 2.0, 4 Serial, 1 Parallel, 1 VGA, Line Out, 1 RJ-45, 2PS/2
PS/2 Keyboard	1
PS/2 Mouse	1
VGA Adapter	1
Chassis Dimensions (HxWxD)	3.95 x 13.3 x 15.1 in (10 x 33.8 x 38.3 cm)
System Weight	22.2 lbs (10.07 kg)
System Volume	13 liters (13.74 quarts)
Shipping weight	29 lbs (13.15 kg)

Standard Features

Power Supply	185W Power Supply – PFC (115v/230v line switch)
Hard Drive Interfaces Supported	2 ULTRA ATA/100 interfaces
Hard Drive Controller (PCI) Supported	ULTRA ATA 100/66/33
Serial-ATA	0

After-Market Options

Graphics	*2D Multi-Display Graphics*	
	NVIDIA Quadro 280NVS PCI (64MB, Dual VGA)	DY599A

Hard Disk Drive – One of the following	40-GB 7200 rpm SMART III Ultra ATA/100	DC180A
	80-GB 7200 rpm SMART III Ultra ATA/100	DC181A

Memory (DIMMs)	*266-MHz (PC2100) DDR DIMMs Non-ECC*	
	1-GB DDR Synch Dram PC2100 (266-MHz) Non-ECC	DC166A
	512-MB DDR Synch Dram PC2100 (266-MHz) Non-ECC	DC165A
	256-MB DDR Synch Dram PC2100 (266-MHz) Non-ECC	DC164A
	333-MHz (PC2700) DDR DIMMs Non-ECC	
	1-GB DDR Synch Dram PC2700 (333-MHz) Non-ECC	DC341A
	512-MB DDR Synch Dram PC2700 (333-MHz) Non-ECC	DC340A
	256-MB DDR Synch Dram PC2700 (333-MHz) Non-ECC	DC339A
	400-MHz (PC3200) DDR DIMMs Non-ECC	
	1-GB DDR Synch Dram PC3200 (400-MHz) Non-ECC	DE468A
	512-MB DDR Synch Dram PC3200 (400-MHz) Non-ECC	DE467A
	256-MB DDR Synch Dram PC3200 (400-MHz) Non-ECC	DE466A

Monitors	CRTs	
	HP s7540 17" (16.0" vis) CRT Monitor	PF997AA#ABA
	HP v7650 17" (16.0" vis) Flat-face CRT Monitor	PF996AA#ABA
	TFTs	
	HP L1506 15" TFT Flat Panel Monitor - Analog only	PX848AA#ABA
	HP L1706 17" TFT Flat Panel Monitor - Analog only	PX849AA#ABA
	HP L1740 17" TFT Flat Panel Display - Analog/Digital	PL766AA#ABA
	HP L1755 17" TFT Flat Panel Display - Analog/Digital	PL777AA#ABA
	HP L1906 19" TFT Flat Panel Display - Analog only	PX850AA#ABA
	HP L1940T 19" TFT Flat Panel Display - Analog/Digital	EM869AA#ABA
	HP L1955 19" TFT Flat Panel Display - Analog/Digital	PD974AA#ABA
	HP L2065 20" TFT Flat Panel Display - Analog/Digital	EF227A4#ABA
	HP LP2465 24" TFT Widescreen Flat Panel Display - Analog/Digital	EF224A4#ABA
	GSA Monitors	
	HP L717g 17" GSA Flat Panel Monitor	EE191AA#ABA
	HP L919g 19" GSA Flat Panel Monitor	EE192AA#ABA
	Options	
	HP Flat Panel Speaker Bar	EE418AA
	HP CRT Monitor Multimedia Base	PM552AA

After-Market Options

Optical Drives	*DVD-ROM Drive*	
	16X/40X DVD-ROM	DC151B
	16X DVD+/-RW LightScribe Drive (Double Layer/Dual Format)	PR595A
	CD-ROM Drive	
	48X Max CD-ROM Drive	DC143B
	Combo Drive	
	48X/32X (XP Professional only)	DL976B
	CD-RW Drive	
	48X/32X/48X CD-RW Drive (XP Professional only)	DL975B
Communications	HP WL500 PCI (802.11 a/g) WiFi Wireless LAN	DV649A
	HP Wireless A+G PCI Adapter – Americas only	EA118AA
	HP Wireless A+G PCI Adapter – WW except Americas	PZ928AA
	2006 Agere PCI 56K International SoftModem	EK694AA
Input Devices	HP USB 04 Standard Keyboard	DT528A
	HP USB 04 Standard Keyboard BG1650 Compliant	DT529A
	HP PS/2 2-Button Scroll Mouse (Carbonite)	DD440B
	HP USB 2-Button Scroll Mouse (Carbonite)	DD441B
	HP USB 2- Button Optical Scroll Mouse (Carbonite/Silver)	DC172B
Removable Storage	256-MB HP USB Drive Key II	PH657A
	1-GB HP USB Drive Key II	AG382AA
	1.44MB Internal Floppy Drive	DS710B
Security	Kensington Security Lock Kit	PC766A
	HP Business PC Security Lock Kit	EV265AA
Brackets/Stands	Wall Mounting Bracket	DK412A

Memory

845GV chipset
DDR SYNCH DRAM Non-ECC Memory
It is not necessary to add memory in pairs. Memory upgrades are accomplished by adding single or multiple DIMMs of the same or varied sizes. This chart does not represent all possible memory configurations. The Intel 845GV chipset supports non-ECC 266-MHz (PC2100), 333-MHz (PC2700) and 400-MHz (PC3200)* DDR memory. Minimum memory configuration is 256 MB for any Microsoft OS.

*System will support PC3200 memory but will default to PC2700 or PC2100 performance depending on any other memory modules installed and the FSB speed of the processor.

Maximum Memory (RP5000 Point of Sale System)
Supports up to 2-GB of DDR SYNCH DRAM.

Possible Memory Configurations

DIMM Size	Slot	
	1	2
256-MB	256-MB	
256-MB	128-MB	128-MB
384-MB	256-MB	128-MB
512-MB	512-MB	
512-MB	256-MB	256-MB
768-MB	512-MB	256-MB
1-GB	1-GB	
1-GB	512-MB	512-MB
1.5-GB	1-GB	512-MB
2-GB maximum	1-GB	1-GB

Storage
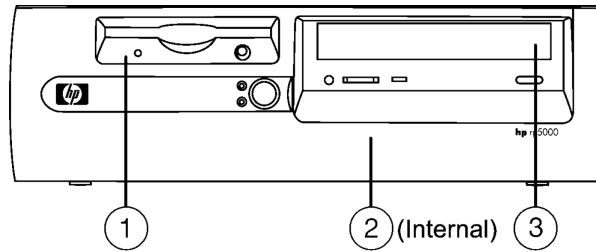
Front View	Quantity Supported	Position Supported	Controller
Diskette Drives	1	1	Diskette
Optional second internal 3.5" SMART III Ultra ATA Hard Drive	1 in lieu of floppy	1	IDE
Optical Drive Bay	1	3	IDE
Internal 3.5" SMART III Ultra ATA Hard Drive	1	2	IDE

NOTE: Usability is dependent on configuration. If a configuration contains a 2nd HDD, then no optical device or floppy can be chosen.
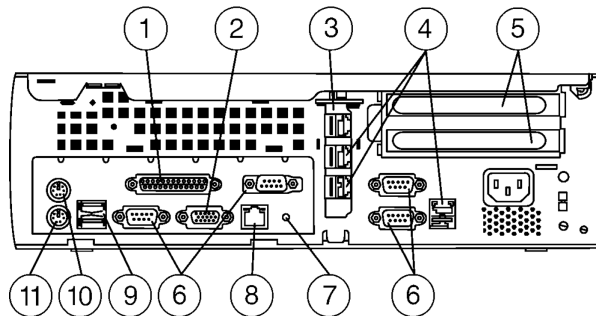
Rear View	Position
Parallel	1
VGA	2
1 USB 2.0: +24V powered port	3
3 USB 2.0: +12V powered ports	4
2 full-height PCI slots	5
4 standard RS232 serial – individually configurable to powered 5V & 12V	6
Line out	7
RJ-45	8
2 standard USB 2.0 ports	9
Mouse: PS/2	10
Keyboard: PS/2	11

Technical Specifications

Base Unit Contents	
Processor	Intel Pentium 4 & Celeron Socket N - 478
CPU Bus Speed Supported	400 and 533-MHz FSB
Coprocessor	Integrated
CPU Package	FC-PGA2
Standard L2 Cache – Pentium 4, Celeron	512-KB ECC, 128-KB ECC depending on processor speed
L2 Cache Architecture/Speed – Pentium 4 and Celeron	Full core clock speed
Cache Upgradeable – Pentium 4 and Celeron	Not upgradeable – Integrated into Processor
System board with Intel 845GV Chipset with Integrated graphics	X
Cables	ATA Cable
Quick Setup Poster	X
Product Documentation on CD	X
Operating System CD	X
Restore CD	X
Power Cord	X
Keyboard	X (PS/2)
Mouse	X (PS/2)
Memory Expansion Slots	2 DIMMs
Memory Type Supported	DDR (ECC not supported by Chipset)
Memory Speed Supported	PC2700 (333-MHz) Non-ECC – ships standard
	DDR Synch DRAM PC2100 (operates at 266MHz) Non-ECC
	DDR Synch DRAM PC3200 (operates at 266MHz or 333MHz) Non-ECC
Maximum Memory	2-GB
Memory Parity	Not Needed for non-ECC
ECC Memory	Not Supported by chipset
Serial Presence Detect Support	Supported
PCI	2 full-height half- length PCI card (6.87 in/17.45 cm)
AGP	None
Bays	Total Bays = 3
Internal	(1) 3.5 inch ATA Hard Drive
External	(2) 1- 3.5 floppy drive bay or 2nd HD and 1- 5.25 inch optical drive bay
NOTE: Usability is dependent on configuration. If a configuration contains a 2nd HDD, then no optical device or floppy can be chosen.	
Wireless Support	PCI card or external USB
Parallel Port	1
Serial Port	4 standard RS232 – individually configurable to powered 5V & 12V
USB Port	6 USB 2.0 (2 standard, 4 powered – 3 @ 12V, 1 @ 24V)
PS/2 Keyboard	1
PS/2 Mouse	1
VGA Adapter	1
Chassis Dimensions (H x W x D) Centimeters	10 x 33.8 x 38.3
Chassis Dimensions (H x W x D) Inches	3.95 x 13.3 x 15.1

Technical Specifications

System Weight	22.2 lb (10.07 kg)
System Volume	13 liters
Shipping Weight	29 lb (13.15 kg)
Monitor weight supported (maximum)	77 lb (35 kg)
Hard Drive Interfaces Supported	2 ULTRA ATA/100 interfaces
Hard Drive Controller (PCI) Supported	ULTRA ATA 100/66/33
Parallel-ATA	2 ports
Serial-ATA	0 port

System Board	
Architecture	P4 / PCI
Chipset	Intel 845GV Chipset
I/O Controller	SMSC LPC47B387 & LPC47M107 (for 3rd and 4th serial ports)
System Board Form Factor	ATX like (not true ATX due to rear I/O layout and motherboard PCI slot configuration)
Processor Socket – 478 Pin ZIF	X
DIMM Connectors (2.5V)	2
AGP Connector (1.5V)	—
Integrated AGP Graphics	Intel
PCI Connectors (5.0V)	1
Flash ROM	X
AC97 integrated audio	X (AC97 audio routes to line-out jack only)
CD ROM IN (Audio)	X
AUX IN (Audio)	X
Clear CMOS Jumper	X
CPU Fan Header	X
Chassis Fan Header	X
Chassis Speaker Header	X
CMOS Battery Holder – Lithium	X
Integrated Intel PRO/100VE NIC	X
Wake-On-Lan®	X
Power Supply Header	X
Power Switch, Power LED & Hard Drive LED Header	X
Password Clear Header	X
Riser Connector	X
SCSI LED Header	X
PCI extender that connects to System Board	—

Technical Specifications

Chassis	
Color	Carbonite
System Board Form Factors Supported	Custom point of sale
Cooling Solutions Supported	X
Power Supply Fan (Variable Speed)	X
Processor Fan-Heatsink (Variable Speed)	X
Chassis Fan	X
Slots Supported	2 full-height half- length PCI card (6.87 in/17.45 cm)
AGP Slot	—
Front I/O	none
Rear I/O	6 USB, 4 Serial, 1 VGA, 1 RJ-45, Line Out, parallel, PS/2 keyboard, PS/2 mouse
Internal Speaker	X
Power Supply	185W Power Supply - PFC (115v/230v line switch)
Security Locks Supported	Kensington Cable Lock Provision (Lock not included) Hood Cover Security Loop (Lock not included)
Security Loop Hole Diameter	0.212 in (0.538 cm)

Interfaces	
I/O Chip	SMSC LPC47B387 & LPC47M107 (for 3rd and 4th serial ports)
Serial Port	4 standard RS232 – configurable for powered 5V & 12V
Parallel Port	1
PS/2	2
USB (2.0)	6 USB 2.0 (2 standard, 4 powered – 3 @ 12V, 1 @ 24V)
RJ-45 10/100/1000 Network	X
Keyboard	X (PS/2 standard)
Mouse	X (PS/2 standard)
Multibay	—
Video (VGA)	X
Audio	X (line-out only)

Technical Specifications

Power Supply	
Power Supply	Custom Power Supply - PFC With in 230V (115v/230V line switch)
Full Ranging Input (No Line Select Switch)	—
Active Power Factor Correction (APFC) (Input Current is nearly 1/2 a non-APFC PS)	—
Passive Power Factor Correction (PFC)	X
Operating Voltage Range	90 – 132/180 – 264 VAC
Rated Voltage Range	100 – 127/200-240 VAC
Rated Line Frequency	50/60 Hz
Operating Line Frequency Range	47 – 63 Hz
Rated Input Current	5A/2.5A
Heat Dissipation	Typical 256 btu/hr (65 kg-cal/hr) Maximum 971 btu/hr (245 kg-cal/hr)
Power Supply Fan	60 mm variable speed
Energy Star Compliant	X
Blue Angel Compliant (<5w in S5-- Power Off)	X
FEMP Standby Power Compliant (<2W in S5 – Power Off)	X
Power Consumption in ES Mode - Suspend to RAM (S3) (Instantly Available PC)	2.5W to 3W
Processor/Cache Memory Power - Down (S3)	< 3W
CD-ROM Spins Down when not in use	
Environmental and Mechanical Engineering Support Center	http://env-webserver.ccm.cpqcorp.net/EMESC/default.htm

ROM Features	Description	
Instantly Available PC (Suspend to RAM - S3)	Allows for very low power consumption with quick resume time	X
ROM Based F10 Setup	Review and customize BIOS settings	X
Remote System Installation via F12 (PXE) (Remote Boot from Server)	Allows a new or existing system to boot over the network and download software, including the operating system	X
System/Emergency ROM Flash Recovery with Video	Recovers corrupted system BIOS	X
CMOS Archive and CMOS Restore	Holding down the power button restores the last known good BIOS settings (from previous restart) if the system gets into a locked state after configuration changes are made	X
Auto Setup when New Hardware Installed	System automatically detects addition of new hardware	X

Technical Specifications

Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control	Enable or disables serial, parallel, USB, audio, and network ports	X
Removable Media Write / Boot Control	Prevents ability to boot from removable media on supported devices (and can disable writes to media)	X
Network Server Mode	Allows for secured keyboard-less operation	X
Power-On Password	Prevents an unauthorized person from booting up the computer	X
Setup Password	Prevents an unauthorized person from changing the system configuration	X
Replicated Setup	Saves BIOS settings to diskette or USB disk-on-key in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering ROM-based F10 setup	X
Memory Change Alert (Requires Insight Management Agent)	Alerts management console if memory is removed or changed	X
Thermal Alert (Requires Insight Management Agent)	Monitors the temperature state within the chassis. Three modes: • NORMAL – normal temperature ranges • ALERTED – excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown • SHUTDOWN – excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs	X
Cover Removal Alert (Requires Insight Management Agent for network alerts)	Notifies the Network Administrator and end user when the cover has been removed without authorization through an electronic switch residing inside the computer. Can be set to one-of-three modes: • DISABLED – user/network administrator does not want to be made aware of the computer hood removal • NOTIFY USER – notifies user/network administrator that the hood has been removed, but no action required before re-booting the computer • UP PASSWORD – notifies user/network administrator that the hood has been removed and administrator password is required before the computer will continue to boot	—
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console	X
Remote Wakeup	• System administrators can power on, restart, and power off a client computer from a remote location. • Enables cost-effective power consumption when the administrator needs to distribute software, perform security management, or update the ROM.	X
ACPI (Advanced Configuration and Power Management Interface)	• Allows the system to wake from a low power mode • Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system	X
Keyboard-less Operation	The system can be operated without a keyboard	X
SMBIOS	System Management BIOS, previously known as DMI BIOS, for system management information	X
Environmental and Mechanical Engineering Support Center (EMESC) Intranet Web Site only	http://env-webserver.ccm.cpqcorp.net/EMESC/default.htm	

Technical Specifications

Software	Description	
Preinstalled Software		
Windows 3.1		—
Windows 95		—
Windows 98		—
Windows NT 4.X (drivers available on web – Softpaqs only)		—
Microsoft Windows XP Professional with service pack 2		X
Microsoft Windows for Point of Service (WEPOS)		X
Microsoft Windows XP Embedded with service pack 1		X
Microsoft Windows 2000 with service pack 4		—
Windows XP Home SP1		—
MS FreeDOS		X
Computer Setup Utility		X
Diagnostics for Windows		X
Microsoft Internet Explorer		X
Norton Antivirus 2005 with 60 day Live Update Subscription		X
Pre-loaded Software		
Altiris Agents (Aclient, Nsclient)		X
Insight Management Agent		X
Local Diskette Boot		X
Network Boot		X
Disk-on-Key Boot		X

QuickSpecs

Technical Specifications

Initial Configuration and Deployment	Description	
HP/Compaq Client Manager (free)	A FREE solution that provides asset tracking, alerting, diagnostics, and SoftPaq distribution for Compaq business desktops, notebooks, and workstations. Compaq Client Manager "plugs" into the Altiris eXpress infrastructure to provide value-add Compaq specific information that can be leveraged by all Altiris eXpress solutions	X
Altiris eXpress Solutions (30-day trial version)	A suite of solutions that focus on business needs in four areas, saving time and freeing resources to address other crucial issues: • Deployment & Migration • Software & Operations Management • Inventory & Asset Management • Help Desk & Problem Resolution	X
System Software Manager (free)	Detects and updates BIOS, device drivers, and management agent versions on your networked PCs	X
Replicated Setup	Saves BIOS settings to diskette or USB disk-on-key in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering ROM-based F10 setup	X
Insight Manager	-----	X
Support Software CD	-----	X
Software Restore CD	Restores computer to its original factory shipping image	X
Asset Tag	• Repository for storing company-specific property asset numbers for easy tracking • Initially set equal to the system serial number • Stored in a protected section of non-volatile memory that can be accessed and modified with the F10 Setup program	X
DIMM Serial Presence Detect	Detects whether or not memory DIMMs are present and their type	X
Hard drive serial number, model, and manufacturer	Hard drive manufacturer, model, and serial number is stored in the hard drive firmware and reported in ROM-based F10 setup	X
Monitor serial number, model & manufacturer	-----	X
System serial number, model, & manufacturer	System serial number, model, & manufacturer stored in a non-volatile memory and can be retrieved with management SW or viewed in ROM-based F10 setup	X
ROM revision levels	• Identifies system ROM revision levels and reports in ROM-based F10 setup • Version is stored in an industry standard memory location (SMBIOS) so that management SW applications can use and report this information	X
System board revision level	• Allows management SW to read the revision level of the system board • Revision level is digitally encoded into the hardware and cannot be modified	X
Memory Change Alert	Alerts management console if memory is removed or changed	X
Ownership Tag	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen	X

Technical Specifications

Security Features	Description	
Smart Cover Lock	Remote operated system lock	—
Smart Cover Sensor (Requires Insight Management Agent for network alerts)	Notifies the Network Administrator and end user when the cover has been removed without authorization through an electronic switch residing inside the computer. Can be set to one-of-three modes: • DISABLED – user/network administrator does not want to be made aware of the computer hood removal • NOTIFY USER – notifies user/network administrator that the hood has been removed, but no action required before re-booting the computer • UP PASSWORD – notifies user/network administrator that the hood has been removed and administrator password is required before the computer will continue to boot	—
Mechanical Hood Security Provision	Security Loop	X
Kensington Lock Support	Kensington lock slot on the chassis	X
Cable Lock Provision	Physically secure computer hardware from theft	X
Serial, Parallel, USB Enable/Disable	Enable or disable serial, parallel or USB ports and hide them form the operating system	X
Port Control	Attaches to back of chassis covering external ports and thereby preventing unauthorized access; also aids in cable management	X
Removable Media Write/ Boot Control	Prevents the computer from being booted from removable media on supported devices (and can disable writes to media)	X
Power-On Password	Prevents an unauthorized person from booting up the computer	X
Setup Password	Prevents an unauthorized person from changing the system configuration	X
Smartcard Reader	Prevents system access to the operating system unless the user has the appropriate Smartcard	X
Fingerprint Reader	Restricts system access to the operating system based on fingerprint	X

Fault Notification and Recovery	Description	
SMART Hard Drives, Fault Notification, & Prefailure Warranty	• Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted • Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count • By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure	X
Altiris Local Recovery	• Provides data and system file protection for HP business PCs to enable fast recovery of information that is accidentally deleted or if the system becomes corrupted. Designed for disconnected or seldom-connected users, Local Recovery protects your HP computer's data and system state by taking scheduled snapshots, which are then stored in a protected area on the local hard disk. System backup and disaster recovery is now simple and fast for all users, regardless of connectivity.	X
Surge Tolerant Full Ranging Power Supply	Withstands power surges up to 2000V	X

Technical Specifications

Thermal Alert	Monitors the temperature within the chassis • NORMAL – normal temperature ranges • ALERTED – excessive temperatures are detected. Raises a flag so that appropriate action can be taken to avoid shutdown or provide for a smoother system shutdown • SHUTDOWN – excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs	X
Ultra ATA Integrity Monitoring (CRC Checking)	Provides data transfer verification and proactive notification of hard drive data transmission problems with recommendations for enhancing system performance. It detects all the following errors types: • single bit errors • double bit errors • an odd number of errors • error bursts up to 32-bits long	X

System Software Updating	Description	
Product Change Notification	• Program to proactively communicate Product Change Notifications (PCNs) and Customer Advisories by email to customers, based on a user-defined profile. • PCNs provide advance notification of hardware and software changes to be implemented in the factory providing time to plan for transition. • Customer Advisories provide concise, effective problem resolution, greatly reducing the need to call technical support	X
Active Update	• Advanced web-based application that provides proactive notification and automatic download of software updates for most Compaq commercial products • Updates may be deployed using Compaq or third-party deployment tools • Software subscription filters automatically identify and download only relevant content based on the user-defined subscription information	X
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console	X
Remote Wakeup/ Remote Shutdown	• System administrators can power on, restart, and power off a client computer from a remote location. • Enables cost-effective power consumption when the administrator needs to distribute software, perform security management, or update the ROM.	X
ROM Based Setup (F10) and Start-up Diagnostics	-----	X
Support Software CD & WWW	-----	X

QuickSpecs

Technical Specifications

Other Features	Description	
ACPI-Ready Hardware	Advanced Configuration and Power Management Interface (ACPI). • Allows the system to wake from a low power mode. • Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system	X
SMBIOS	System Management BIOS, previously known as DMI BIOS, for system management information	X
Wired for Management Support	Intel-driven, industry-wide initiative to make Intel architecture-based PCs, servers and mobile computers more inherently manageable right out of the box and over the network	X
Dual-State Power Button	Power button acts as either an on/off button and suspend-to-sleep button	X
Serial Ports	In addition to the three HP defined serial port configurations, all serial ports on rp5000 can be custom configured in either standard mode or powered mode. By using a combination of jumpers and/or jumper wires, each serial port can achieve seven different variations of power configurability as depicted in the diagram below.	

Pin	Standard Mode	Powered Mode
1	CD# (Carrier Detect)	+5V or +12V
9	RI# (Ring Indicate)	+5V or +12V

Serviceability Features of System	Description	
Dual Color Power LED on Front of Computer (Indicates Normal Operations and Fault Conditions)	-----	X
Diagnostic LED Explanation Table	Number of 1-second red LED blinks followed by 2-second pause, then repeats: 2-processor thermal protection activated 3-processor not installed 4-power supply failure 5-memory error 6-video error 7-PCA failure (ROM detected failure prior to video) 8-invalid ROM, bootblock recover mode	X
System/Emergency ROM Flash Recovery with Video	Recovers corrupted system BIOS.	X
Compaq Diagnostic for Windows Software	XP Pro only	X
Compaq Configuration Record SW	-----	X
Over-Temp Warning on Screen (Requires IM Agents)	-----	X

Technical Specifications

HP OS CD (Restore OS CD)	Restores computer to its original factory shipping image (XP Pro only)	X
HP Restore CD	Restores the computer to its original factory shipping image	X
Flash ROM	-----	X
3.3V Aux Power LED on System PCA	-----	X
Dual Function 5V Aux Power LED (ON)/PS_ON LED (OFF) on System PCA	-----	X
Diagnostic Power Switch LED on board	-----	X
Clear Password Jumper	-----	X
Clear CMOS Jumper	-----	X
CMOS Battery Holder for easy Replacement	-----	X
Processor ZIP Socket for easy Upgrade	-----	X
DIMM Connectors for easy Upgrade	-----	X
NIC LEDs (integrated) (Green & Amber)	Used to determine NIC status	X

Serviceability Features of Chassis	Description	
Dual Color Power and HD LED – To Indicate Normal Operations and Fault Conditions	-----	X
Smart Cover Sensor (Requires Insight Management Agent for network alerts)	Notifies the Network Administrator and end user when the cover has been removed without authorization through an electronic switch residing inside the compute. Can be set to one-of-three modes: • DISABLED – user/network administrator does not want to be made aware of the computer hood removal • NOTIFY USER – notifies user/network administrator that the hood has been removed, but no action required before re-booting the computer • UP PASSWORD – notifies user/network administrator that the hood has been removed and administrator password is required before the computer will continue to boot	—
Smart Cover Lock	Remote operated system lock	— cover can be locked with security loop or kensington
Front power switch	-----	X
Green Pull Tabs, and Quick Release Latches for easy Identification	-----	X
Color coordinated cables and connectors	-----	X

Technical Specifications

System memory can be upgraded without removing the system board or any internal components	Eases memory upgrading	X
Tool-less Hood Removal	Eases entry to the chassis without use of special tools	— (with captive thumbscrews)
Tool-less Hard Drive, CD & Diskette Removal	-----	Hard Drive is tool-less. Multibay Drives are hot-swappable and ejectable.
Tool-less System Board Removal	No special tools required for system board removal or maintenance	—
Towerable	Product can be oriented as a tower (in addition to desktop orientation)	X
Universal Tower Stand	Necessary to safely orient as a tower	X (Standard)
Drive Self Tests (DPS)	• Drive Protection System • A diagnostic hard drive self test. It scans critical physical components and every sector of the hard drive for physical faults and then reports any faults to the user.	X
DPS Access through F10 Setup during Boot	• Running independently of the operating system, it can be accessed through a Windows-based diagnostics utility or through the computer's setup procedure. It produces an evaluation on whether the hard drive is the source of the problem and needs to be replaced.	X
DPS Access through Diagnostics for Windows (XP Pro only)	• The system expands on the Self-Monitoring, Analysis, and Reporting Technology (SMART), a continuously running systems diagnostic that alerts the user to certain types of failures	X
SMART Technology (Self-Monitoring, Analysis and Reporting Technology)	• Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted • Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count	X
SMART I – Drive Failure Prediction		X
SMART II – Off-Line Data Collection	• By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure	X
SMART III – Off-Line Read Scanning with Defect Reallocation		X

Service and Support	On-site Warranty and Service[NOTE 1] This three-year, limited warranty and service offering delivers three years of on-site, next business-day[NOTE 2] service for parts and labor and includes free telephone support[NOTE 3] 24 x 7. Global coverage[NOTE 2] ensures that any product purchased in one country and transferred to another non-restricted country will remain fully covered under the original warranty and service offering. The rp5000 is available for sale in the Americas and EMEA only
	NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply.
	NOTE 2: On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.
	NOTE 3: Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.

QuickSpecs

Technical Specifications - Environmental Data

Eco-Label Certifications & declarations	This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks: • US Energy Star • US Federal Energy Management Program (FEMP) • IT ECO declaration
System Configuration	The rp5000 configuration used for the Energy Consumption and Declared Noise Emissions data included: • Processor: Intel Pentium 4 • 2.8-GHz, 533-MHz FSB, 512-KB L2 cache) • System memory: 256 MB DDR PC2700 • Hard disk drive: 80 GB 7200 rpm SMART III Ultra ATA/100 • Optical drive: 48x/32x CDRW/DVD-ROM Combo • Graphics: Intel Extreme Graphics (integrated with Intel 845GV chipset)

Energy Consumption (in accordance with US Energy Star test method)		115VAC, 60Hz	230VAC, 50Hz	100VAC, 60Hz
	Normal Operation	51.6 W	50.5 W	48.69 W
	Sleep	3.27 W	3.4 W	3.15 W
	Off	2.35 W	2.5 W	2.26 W

Heat Dissipation*		115VAC, 60Hz	230VAC, 50Hz	100VAC, 60Hz
	Normal Operation	176 BTU/hr	172 BTU/hr	166 BTU/hr
	Sleep	11 BTU/hr	11.6 BTU/hr	10.7 BTU/hr
	Off	8 BTU/hr	8.5 BTU/hr	7.7 BTU/hr

*NOTE: Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		Sound Power (LWad, bels)	Sound Pressure (LpAm, decibels)	
	Idle	3.79	27.9	
	Fixed Disk (random writes)	3.86	28.9	
	Optical Drive (sequential reads)	5.22	45.0	

Longevity and Upgrading	This product is designed to be upgraded, possibly extending its useful life by several years. Spare parts are available throughout the warranty period and for up to 5 years after the end of production. Upgradeability features contained in the product include: • 6 USB ports • 2 empty PCI slots (standard profile) • 1 internal drive slot • 2 memory slots • 4 serial ports

Technical Specifications - Environmental Data

Batteries	This product complies with ISO standards: • EU Directive 91/ 157/ EEC • EU Directive 93/ 86/ EEC • EU Directive 98/ 101/ EEC Batteries used in the product do not contain: • Mercury greater the 5ppm by weight • Cadmium greater than 10ppm by weight • Lead greater than 4000 ppm by weight. Battery size: CR2032 (coin cell) Battery type: Lithium/Manganese Dioxide

Additional Information	This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.
	
	Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.
	
	This product contains 0% recycled materials (by wt.)
	
	This product is 74.7% recycle-able when properly disposed of at end of life.
	
	Packaging Materials
	
	• External:
	  ○ Corrugated Paper 1623 g
	• Internal:
	  ○ EPS Molded Foam (front cushion) 85 g
	  ○ EPS Molded Foam (rear cushion) 99 g
	  ○ Corrugated Paper Insert 227g

Material Usage	This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html): • Asbestos • Certain Azo Colorants • Certain Brominated Flame Retardants - may not be used as flame retardants in plastics • Cadmium • Chlorinated Hydrocarbons • Chlorinated Paraffins • Formaldehyde • Halogenated Diphenyl Methanes • Lead carbonates and sulfates • Lead and Lead compounds • Mercuric Oxide Batteries • Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user. • Ozone Depleting Substances • Polybrominated Biphenyls (PBBs) • Polybrominated Biphenyl Ethers (PBBEs) • Polybrominated Biphenyl Oxides (PBBOs) • Polychlorinated Biphenyl (PCB)

Technical Specifications - Environmental Data

	• Polychlorinated Terphenyls (PCT) • Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications. • Radioactive Substances • Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)
Packaging	HP follows these guidelines to decrease the environmental impact of product packaging: • Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials. • Eliminate the use of ozone-depleting substances (ODS) in packaging materials. • Design packaging materials for ease of disassembly. • Maximize the use of post-consumer recycled content materials in packaging materials. • Use readily recyclable packaging materials such as paper and corrugated materials. • Reduce size and weight of packages to improve transportation fuel efficiency. • Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.
End-of-life Management and Recycling	Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.
Hewlett-Packard Corporate Environmental Information	For more information about HP's commitment to the environment: Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Eco-label certifications http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html ISO 14001 certificates: http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html

High-speed performance and application density for power-managed data centers

IBM

IBM System x3550

Innovation comes standard

Standard integrated data protection with hardware RAID and 2.5" SAS hard disk drives keeps your data safe and readily available. Super-efficient network communication and hot-swap redundant power help keep your business humming at lower support costs.

Protect investments, lower heat output

Fault protection comes integrated in the x3550. IBM PowerExecutive™ delivers advanced control to help monitor power usage and achieve decreased infrastructure, power and cooling costs. Hot-swap, redundant fans keep components cool without taking the server offline.

Select configurations of the x3550 are part of the IBM Express Portfolio™, designed and priced to meet the needs of mid-sized businesses. Reliable and easy to manage, Express models/configurations vary by country.

Highlights

■ *High-performance design to maximize your IT investment*

■ *Improved business availability with IBM Xtended Design Architecture™ features*

■ *New design and tools for optimized power management*

Optimized for speed

Designed for applications ranging from Web serving to workload consolidation and virtualization, the IBM System x3550 offers high-speed, dual-core and quad-core processors with blazing front-side bus speed. Optimized for exceptional application computing, the x3550 features a highly functional infrastructure that addresses more memory, lowers power consumption and provides dramatic systems performance increases.

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to buy direct or to locate an IBM reseller

x3550 at a glance

Form factor/height	Rack/1U
Processor (max)	Dual-Core Intel® Xeon® Processor 5160 up to 3.0 GHz and up to 1333 MHz front-side bus or Quad-Core Intel Xeon Processor X5365 up to 3.0 GHz and up to 1333 MHz front-side bus
Number of processors (std/max)	1/2
L2 cache	2x2 MB (dual-core) and 2x4 MB (quad-core)
Memory[1] (std/max)	1 GB or 32 GB Fully Buffered DIMM 667 MHz
Expansion slots	2 PCI-Express (x8) half-length, full-height or optional riser card for 1 PCI-X (64-bit 133 MHz)
Disk bays (total/hot-swap)	2/2 (3.5" form factor) or 4/4 (2.5" form factor)
Maximum internal storage[1,2]	500 GB 3.5" hot-swap SAS or up to 1.5 TB simple-swap SATA or 293.6 GB 2.5" hot-swap SAS
Network interface	Integrated dual Gigabit Ethernet
Power supply (std/max)	670W 1/2
Hot-swap components	Power supply, fans, hard disk drives (select models)
RAID support	Integrated RAID-0, -1, -10, optional RAID-5, -6
Systems management	IBM PowerExecutive (included with IBM Director), Integrated Service Processor, Diagnostic LEDs, drop-down light path diagnostics panel, Automatic Server Restart, optional Remote Supervisor Adapter II SlimLine, IBM Director, IBM ServerGuide™ and optional Remote Deployment Manager
Operating systems supported	Microsoft® Windows Server® 2003, Red Hat Enterprise Linux®, SUSE Linux Enterprise Server, TurboLinux Enterprise Server, Novell NetWare and VMware ESX Server
Limited warranty[3]	3-year customer replaceable unit and onsite limited warranty

For more information

World Wide Web

U.S.	**ibm.com**/systems/x
Canada	**ibm.com**/ca/en/systems/x
Xtended Design Architecture	**ibm.com**/servers/eserver/xda/index.html

[1] Maximum internal hard disk and memory capacities may require the replacement of any standard hard drives and/or memory and the population of all hard disk bays and memory slots with the largest capacity supported drives available. When referring to variable speed CD-ROMs, CD-Rs, CD-RWs and DVDs, actual playback speed will vary and is often less than the maximum possible.

[2] GB and TB = 1,000,000,000 and 1,000,000,000,000 bytes, respectively, when referring to storage capacity. Accessible capacity is less.

[3] IBM hardware products are made from new parts, or new and serviceable used parts. Regardless, our warranty terms apply. For a copy of applicable product warranties, write to: Warranty Information, P.O. Box 12195, RTP, NC 27709, Attn: Dept. JDJA/B203. IBM makes no representation or warranty regarding third-party products or services, including those designated as ServerProven® or ClusterProven®.

JBL PROFESSIONAL

Control® 25T

Compact Indoor/Outdoor Background/Foreground Speaker

Professional Series

Key Features:

▶ Isolation transformer for 70.7V/100V distributed-line sound systems

▶ Components: 5¼" Polypropylene coated woofer, ¾" Titanium coated horn loaded tweeter.

▶ Built-in *InvisiBall*® mounting hardware*

▶ Weather resistant enclosure and transducers

▶ Readily paintable

▶ 90° x 90° high frequency horn

▶ Overload Protection Circuitry

Patents pending worldwide

The Control® 25T is perhaps the most versatile of JBL Professional's Control Contractor Series indoor/outdoor loudspeakers. Its robust nature makes the Control® 25T a perfect choice for restaurants, health clubs, outdoor theme and water parks or other applications where foreground/background music and paging are required. The Control 25T can be used in either 70.7V or 100V distributed-line sound systems. Taps are provided at 30W, 15W and 7.5W (plus a 3.7W tap for use on 70.7V systems only).

The unique and global patent pending *InvisiBall*® mounting hardware is included in each system and makes short work of permanent installation. The *InvisiBall* mounting method adds the benefit of vertical rotation of up to 37° off-axis and horizontal rotation of up to 44° off-axis. Because *InvisiBall* adjustments are made through a hidden access behind the logo badge, the grill never needs to be removed and there exists a high degree of theft deterrence as well.

The Control® 25T readily accepts a variety of paints and finishes to match any decor.

Weather resistance is maximized by coating the woofer cone in polypropylene and terminating its circumference in JBL's *WeatherEdge*™, a seamless, rubberized extension of the woofer surround that provides added protection to critical transducer elements. The polycarbonate tweeter diaphragm is reinforced with a thin film of titanium for added rigidity and endurance against sun, salt and moisture. Zinc plated grilles resist rusting in the harshest conditions.

Available in black (Control 25T) and white (Control 25T-WH).
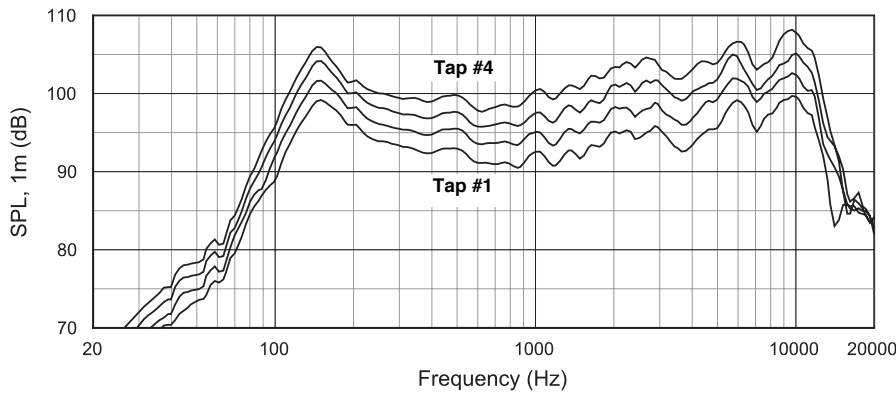
Specifications:

Frequency Range (-10 dB)[1]:	80 Hz to 15 kHz
Power Capacity:	Components and Network: 150 Watts Continuous Program[2] Transformer: Per each listed tap rating (IEC pink noise, 100 hrs)
Tap Settings:	100V Line: Tap 1 = 7.5W, Tap 2 = 15W Tap 3 = 30W, Tap 4 is not used 70V Line: Tap 1 = 3.7W, Tap 2 =7.5W Tap 3 = 15W, Tap 4 = 30W

Nominal Max. Output by Tap: (dB-SPL @ 1m)	Tap Number	70.7V Input	100V Input
	Tap #1:	94 dB	97 dB
	Tap #2:	97 dB	100 dB
	Tap #3:	100 dB	102 dB
	Tap #4:	102 dB	(do not use)

|	
Directivity Factor (Q):	5.3
Directivity Index (DI):	7.2
Crossover Frequency:	3.0 kHz
LF Driver:	135 mm (5.25 in) Polypropylene coated paper w/WeatherEdge
HF Driver:	19 mm (.75 in) Titanium coated polycarbonate
Enclosure Material:	HIPS (High Impact Polystyrene)
Overload Protection:	Full-Range power limiting to protect network and transducers
Termination:	Spring terminals, accepts banana plug
Environmental:	Conforms to Mil Spec 810 for humidity, salt spray, temperature & UV. IEC 529 IP-X4 splashproof rating.
Dimensions (H x W x D):	236 x 188 x 149 mm (9.3 x 7.4 x 5.8 in)
Net Weight (ea):	3.6 kg (8 lbs)
Shipping Weight (pr):	7.7 kg (17 lbs)
Included Accessories:	Invisiball Assembly 6 mm x 100 mm hex key
Optional Accessories:	
MTC-25V:	For vertical columnar orientation of up to 3 loudspeakers
MTC-25/23H:	For horizontal splaying of two speakers. Three brackets array up to six loudspeakers in a 360° array.
MTC-28/25CM:	Ceiling-mount adapter.
MTC-25SSG:	Stainless Steel Grille for harsh environments. Available in silver, black (-BK) or white (-WH)
MTC-25WMG:	WeatherMax™ Stainless Steel Grille protects against driving precipitation. Available in black or white (-WH)
MTC-PC2:	Input panel cover protects input terminals in outdoor environments

[1]Half-space (on-wall).
[2]Continuous program power is a conservative expression of the system's ability to handle normal speech and music program material and is defined as 3 dB above the Continuous Pink Noise Rating (IEC-shaped pink noise with a 6 dB crest factor, for 100 hours continuously).
[3]Half-space (on-wall), ave 100 Hz to 10 kHz.

JBL continually engages in research related to product improvement. Changes introduced into existing products without notice are an expression of that philosophy.
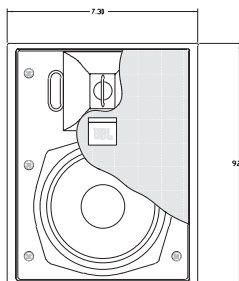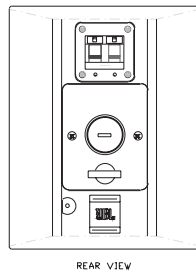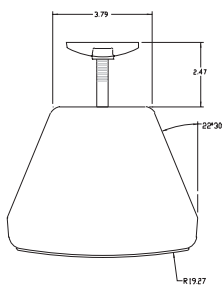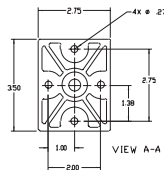
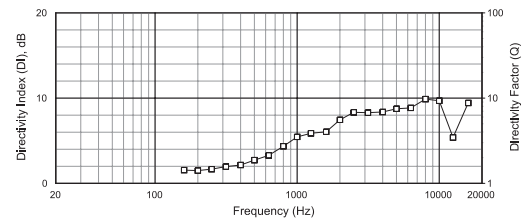# ► Control® 25T Compact Indoor/Outdoor Background/Foreground Speaker

Frequency Response in half-space with 70.7V input, taps #1 through #4. For 100V input, raise each curve +3dB.
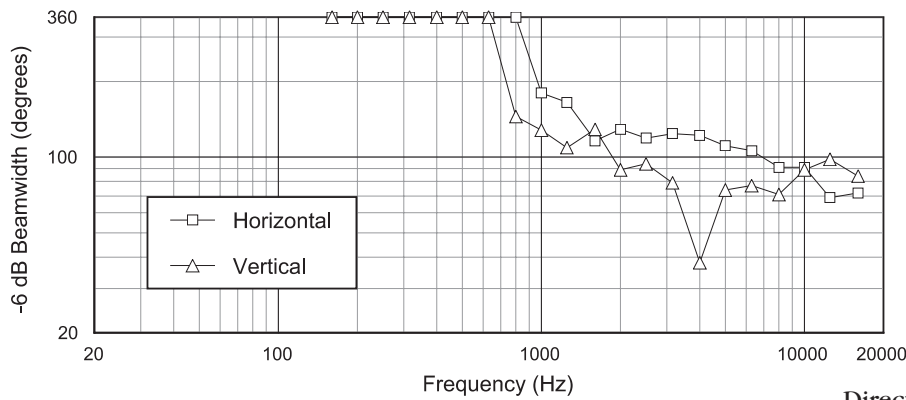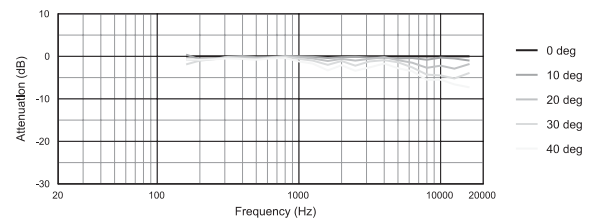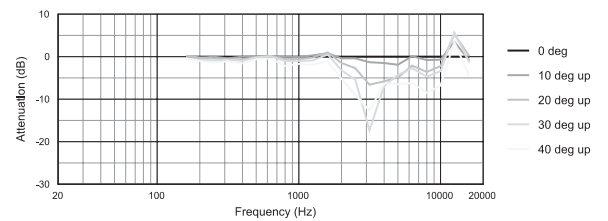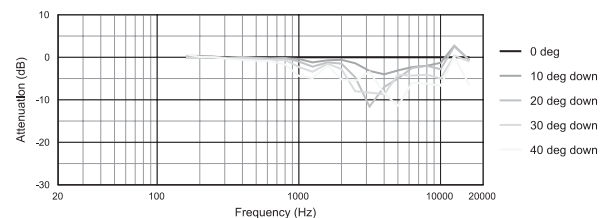
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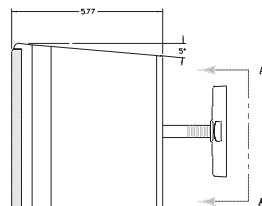
Directivity Index, Q
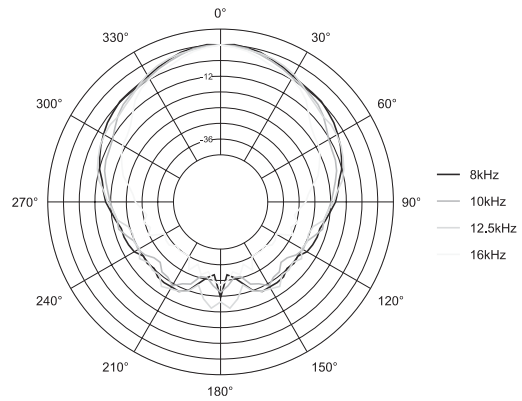
Horizontal Off Axis Frequency Response

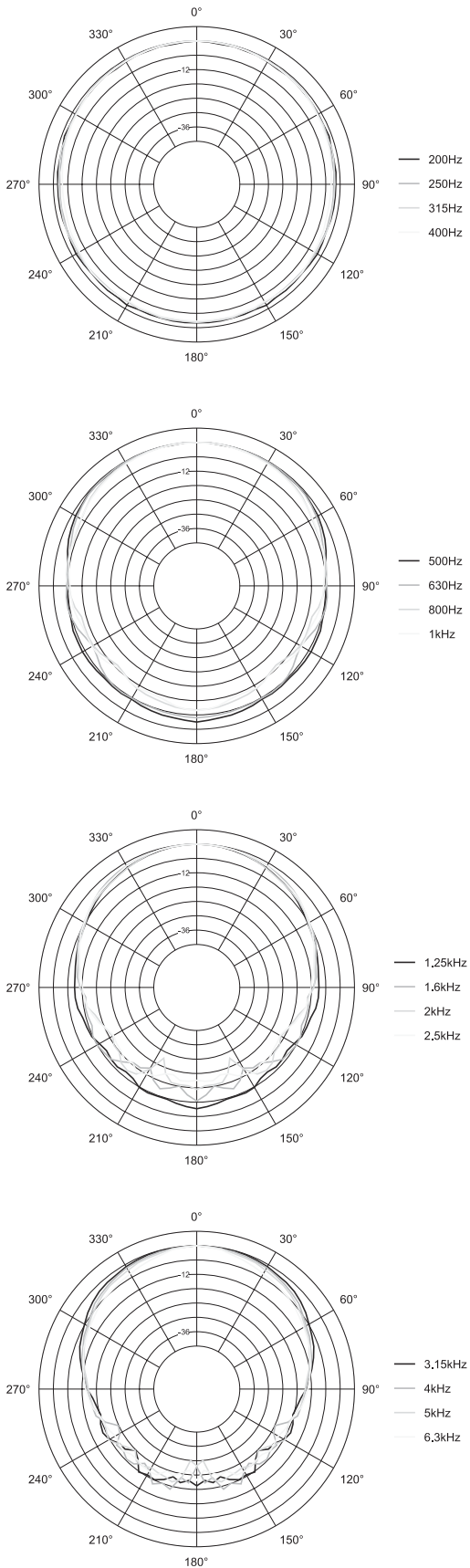Vertical Off Axis Frequency Response (up)

Vertical Off Axis Frequency Response (down)

Horizontal 1/3 Octave Polars

200Hz
250Hz
315Hz
400Hz

500Hz
630Hz
800Hz
1kHz

1.25kHz
1.6kHz
2kHz
2.5kHz

3.15kHz
4kHz
5kHz
6.3kHz

8kHz
10kHz
12.5kHz
16kHz

Architectural Specifications:

The loudspeaker shall consist of a 135mm (5-1/4 in) low frequency transducer, 19mm (3/4 in) high frequency transducer, and frequency dividing network installed in a ported enclosure. The low frequency voice coil shall be 25 mm (1 in) in diameter.

Performance specifications of a typical production unit shall be as follows: Usable frequency response shall extend from 80 Hz to 15 kHz (10 dB below rated sensitivity, in half-space, with no external equalization). The loudspeaker shall be equipped with a transformer for use in either 70.7V or 100V distributed-line sound systems with taps selectable by rotary switch. Taps shall be nominally 3.7W @ 70V (7.5W @ 100V), 7.5W @ 70V (15W @ 100V), 15W @ 70V (30W @ 100V), and 30W @ 70V (not used @ 100V). The frequency dividing network shall have a crossover frequency of 3.0 kHz. Rated power capacity of the components and network shall be at least 150 watts continuous program power, defined as 3dB above a test signal of filtered random noise conforming to international standard IEC268-5 (shaped pink noise with a peak-to-average ratio of 6dB), for 100 continuous hours duration.

The system shall be protected against damage from occassional overpowering via full range series lamps that limits the power to the network and transducers. The high frequency transducer shall be horn-loaded to more evenly cover a nominal 90° horizontal by 90° vertical area.

The enclosure shall be constructed of high-impact polystyrene for protection against the elements in outdoor applications, and for paintability. The grille shall be completely zinc-coated for resistance against rusting, shall be bake-painted black, and shall be secured via screws to keep it in place when facing downward.

The low frequency transducer shall have a polypropelene-coated cone and a butyl rubber surround which shall extend seamlessly over the edge of the speaker frame for protection against the elements. The high frequency transducer shall be constructed of polycarbonate, reinforced with a titanium film for additional weather resistance. The system shall withstand Mil Spec 810 testing with specified time durations for exposure to the following environments with no effect on its acoustical performance or structural integrity: salt spray (method 509.3), temperature -19°C to 49°C (method 501.3 and 502.3), 95% humidity (method 507.3) and ultra-violet (method 505.3). The system shall have a IEC 529 splashproof rating of IP-X4.

For theft deterrence, the installation access area shall be hidden behind a snap-out cover, and the access area shall be on the front of the loudspeaker for ease of installation and adjustment. The loudspeaker shall be rotatable over a minimum of ±35° in all directions via a ball-type mounting system. The ball mechanism shall be internal to the cabinet to allow low-profile mounting and better stability via a short moment arm. The logo shall be rotatable for proper orientation when the loudspeaker is mounted horizontally or vertically.

The external wiring connectors shall be spring loaded and gold plated, and shall accept bare wire, single or dual banana-type connectors with 19 mm (3/4 in) spacing. Overall cabinet dimensions shall be no greater than 236 mm (9.3 in) high by 188 mm (7.4 in) wide by 148mm (5.8 in) deep and shall weigh no more than 3.6 kg (8 lbs). The finish shall be a paintable lighly textured black.
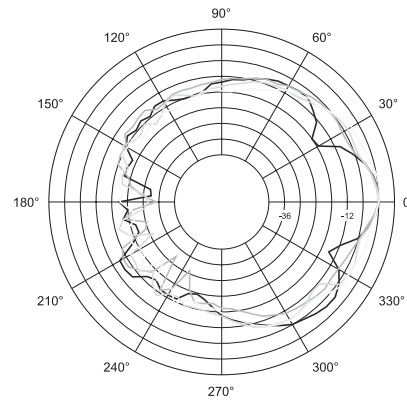
The system shall be the JBL Model Control 25T with included Invisiball® mounting system.

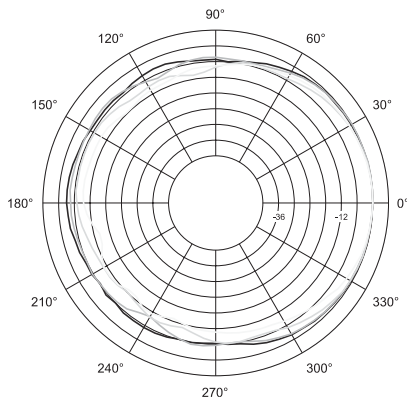# ► Control® 25T Compact Indoor/Outdoor Background/Foreground Speaker
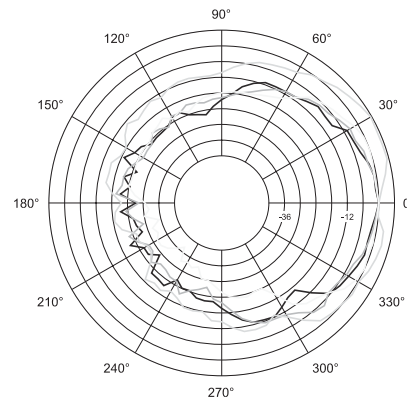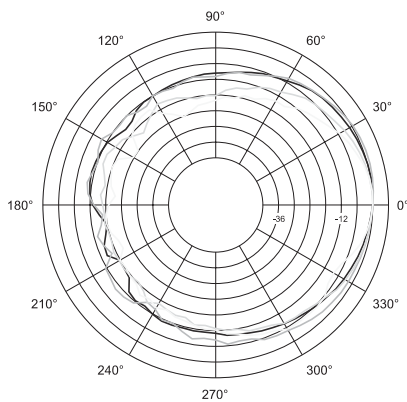
Vertical 1/3 Octave Polars
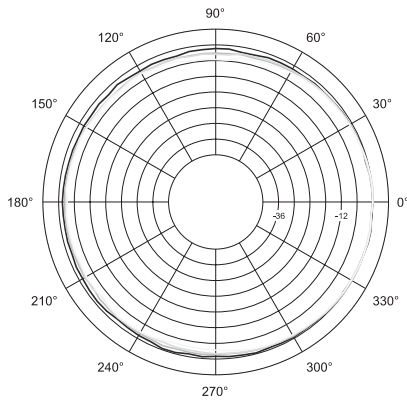
200Hz
250Hz
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400Hz

3.15kHz
4kHz
5kHz
6.3kHz

500Hz
630Hz
800Hz
1kHz

8kHz
10kHz
12.5kHz
16kHz

1.25kHz
1.6kHz
2kHz
2.5kHz

TouchScreens.com
Touch Input Systems from Mass Multimedia, Inc.

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Now at: Home > Products > PC Touchscreen Monitors > Desktop LCD/TFT Monitors > LCDNC32-CAP-USB-B

32-inch (16:9) TFT Monitor, Black, with Capacitive Touchscreen, USB Interface

Information:

‣ Description

‣ Technical Specifications

‣ Ordering Information

‣ Accessories

More Information:

‣ Download Software Drivers

The LCDNC32-CAP-USB-B monitor is a 32" widescreen (16:9) flat panel TFT monitor with an integrated touch responsive screen. Flat panel monitors such as this are a stylish and space saving alternative to conventional CRT type monitors.

The LCDNC32-CAP-USB-B monitor has a Capacitive type touchscreen. Durable Capacitive touchscreen technology is widely used in demanding applications ranging from Point-of-Sale systems and operator controls to information kiosk systems and gaming applications. It is a durable, scratch-resistant screen that has a higher clarity than most resistive type touchscreens. It is not affected by dirt, moisture, or grease that may come in contact with the screen.

- Touchscreen responds to finger contact only
- Durable touchscreen has been tested to over 100 million touches at one point
- Works with all mouse-driven software using software driver mouse emulation
- Works alone or with keyboard and mouse
- Allows you to perform the following mouse functions: Left-Click, Double-Click, Drag-and-Drop, and Right-Click* (*Windows)

The touchscreen works with standard Windows software, including multimedia presentations, operator controls, and Web pages. Touching the screen is the same as clicking your mouse at that point on the screen. This means that no additional programming is required for the touchscreen to work with standard Windows programs. And custom programs can be developed in the same way as mouse-driven programs.

The LCDNC32-CAP-USB-B touch monitor comes with everything you need to add touch-screen interaction to your PC system:

- Widescreen 32" TFT monitor with integrated Capacitive touchscreen
- Internal touchscreen controller with USB port interface
- Cables to connect to your PC: video, touchscreen, and AC power
- Software driver
- VESA Mount Compatible
- 1-Year Parts and Labor Warranty

System Requirements:

- Windows 98 / ME / 2000 / XP / Server 2003 / Vista, Mac OS 8.5 / 8.5.1 / 8.6 / 9.0, or Linux 2.4 and 2.6 kernels running XFree86 4.0.3, 4.1.0, 4.2.0, or 4.3.0
- USB port for Touchscreen
- VGA, DV-I, RCA, or S-Video video port for Monitor

Multiple Monitor Configurations:

- Run up to 12 monitors on one PC with Windows 2000 / XP / 2003 Server / Vista
- Run either 2 or 4 monitors on one PC with Windows 95 / 98 / ME
- Requires 1 video port per Monitor
  (Multi-port video card or multiple video cards)
- Requires 1 USB port per Touchscreen
- Works with standard Windows multiple monitor configuration
- Supports any combination of touchscreen and non-touchscreen monitors
- Click Here for More Info on Multiple Monitor Configurations

Technical Specifications

Monitor Specifications

Monitor:	NEC LCD3210-BK
Size:	32"
Aspect Ratio:	16:9 Wide-screen
Dot Pitch:	0.511mm
Max. Resolution:	1360 x 768
Brightness:	500 cd/m^2
Contrast:	600:1
Colors:	Over 16 Million
Viewing Angle:	L/R=88° / 88° U/D=88° / 88°
Input Connector:	RGB1: DVI-D x 1 RGB2: Analog D-sub RGB3: Analog BNC Video 1*: Composite RCA or S-Video Component Video 1 (DVD/HD): Component BNC
Input Signal:	Video: ANALOG RGB Vp-p / 75 Ohms Sync: Separate sync: TTL Level (Positive/Negative) Composite sync: TTL Level (Positive/Negative) Composite sync on green: (0.3Vp-p negative 0.7Vp-p positive)
Horizontal Frequency:	31.5-91.1 KHz (15.625,15.734 kHz) (Analog) 31.5-91.1 KHz (Digital)
Vertical Frequency:	Vertical: 58-85 Hz Analog / 50-85 Hz Digital
AC Adapter:	AC 100-120V / AC 220-240V @ 50/60 Hz
Power Consumption:	(typical) On: 140W Power Savings Mode: <5W
Regulations:	UL 1950/CSA C22.2 No. 950/TUV-GS/EN60950/FCC-B/ DOC-B/EN55022-B/EN55024/EN61000-3-2/EN1000-3-3/CE
Operating Temperature:	5° to 40° C / 41° to 104° F
Storage Temperature:	--20° to 60° C / -4° to 140° F

Touchscreen Specifications

Touch Type:	3M ClearTek Capacitive
Cable Interface:	USB Port
Touch Resolution:	1024 x 1024
Activation Force:	less than 3 ounces
Light Transmission:	88% at 550 nm wavelength (visible light spectrum)
Durability Test:	100,000,000 plus touches at one point
Temperature:	Operating: -15°C to 50°C Storage: -50°C to 85°C
Humidity:	Operating: 90% RH at max 40°C, non-condensing
Chemical Resistance:	The active area of the touchscreen is resistant to all chemicals that do not affect glass, such as: Acetone, Toluene, Methyl ethyl ketone, Isopropyl alcohol, Methyl alcohol, Ethyl acetate, Ammonia-based glass cleaners, Gasoline, Kerosene, Vinegar

Measurements:	(WxHxD) Net (with stand) - 31.1 x 20.1 x 7.9 in./789 x 510.3 x 200mm Net (without stand) - 31.1 x 18.9 x 5.5 in./789 x 479 x 140mm
Weight:	(with stand) 37.5 lbs./17 kg (without stand) 35.3 lbs./16 kg
VESA Mount Compatability:	200 x 200mm (8 hole) / 200 x 100mm (6 hole)

Regulations: UL, CE, TUV, FCC-B

Software Drivers: Windows 98 / ME / 2000 / XP and Macintosh OS 8.5 / 8.5.1 / 8.6 / 9.0

* Specifications subject to change.

* Specifications subject to change.

Ordering Information

Click [Add to Order] to add items to your shopping cart for on-line ordering, or call us at 1-800-348-8610 to order by phone.

Image	**Item**	**Price**	**Order**
	32-inch (16:9) TFT Monitor, Black, with Capacitive Touchscreen, USB Interface Part Number: LCDNC32-CAP-USB-B Availability: Typically ships in within 1-2 weeks	$2999.00	[Add to Order]

Options and Accessories

	My-T-Soft On-Screen Keyboard Software Part Number: MY-T-SOFT Description: Provides a customizeable keyboard and macro button panel that can be used with a touchscreen to replace a physical keyboard. (Windows 95 / 98 / ME / NT / 2000 / XP)	$89.00	[Add to Order] [More Info]

[Click Here to Review, Change, or Place Your Order]

TouchScreens.com is owned and operated by Mass Multimedia, Inc.

Call: 1-800-348-8610   E-mail: info@touchscreens.com

Cart details

Print

Quantity	Part number	Description	Availability	Item price	Line total
1	6073CTO	**ThinkCentre M57p Series Small Form Factor - Limited On-site Warranty 3 Year Parts / 3 Year Labor**	Ships within 1-2 weeks**	$2,306.00	**$2,306.00**
		Processor	Intel® Core™ 2 Duo processor E6850 (3.00GHz 1333/3000MHz 4MB L2)		
		Operating system[12]	Genuine Windows XP Professional		
		Operating system language	Genuine Windows XP Pro English		
		Form factor	Mechanical Package Small Form Factor 2x3 Auto Sensing 280W AMT / WW		
		Total memory[8]	8GB PC2-5300 SDRAM (4 DIMMs)		
		Video adapter	ATI Radeon HD 2400 XT 256MB LP with DMS59+TV-Out		
		Display support	DMS-59 to VGA-DVI Dongle		
		Audio adapter	Integrated Audio AD1882HD		
		First hard drive bay [4]	80GB Hard Disk Drive, 7200RPM Serial ATA		
		First optical device bay[23]	DVD Recordable SATA		
		Networking	Integrated Intel Pro 1000T Gigabit		
		Keyboard	Lenovo Preferred Pro USB Fingerprint Keyboard - US English		
		Pointing Device	No Mouse Selected		
		Power cord	Line Cord - US		
		Chassis intrusion switch	No Chassis Intrusion Switch		
		Publications pack	Pub English		

Subtotal: **$ 2,306.00**

[]   -$ 0.00

Estimated total: **$ 2,306.00***

Take advantage of IBM Financing Advantage*** and lease for as little as $ 72.00 a month for 36 months!

Print

Cordless Desktop® LX 710 Laser

Home > Keyboards > Keyboard + Mice Combos > **Cordless Desktop® LX 710 Laser**

Focus on the fun. Edit photos precisely, access music quickly and set it all up easily. Enjoy it all with superior comfort and without wires.

Overview

Comfort
Take it easy.

- **Soft-Touch Surfaces**: Reduce fatigue with support that's smooth to the touch.
- **3-Way Adjustable Tilt Legs**: Customize your keyboard angle.

Convenience
Simplify life.

- **Reliable Wireless**: Enjoy fast 27 MHz wireless performance.
- **One-Touch Controls**: Access music, video, volume, email, IM and more.
- **Programmable F-Keys**: Easily set them to open favorite apps, sites or files.
- **Windows Vista™ Ready**: Make the most of the Start key and handy DocFlip controls—also great with Windows® XP.

Mouse Precision
Go exactly where you want to go.

- **Laser Engine**: Get accuracy in all applications on virtually any surface.
- **Tilt Wheel plus Zoom™**: Go side to side or in and out on photos and spreadsheets alike.

Elevate the Power of Windows Vista™

See more products certified for Windows Vista >>

How To

Getting Started
Our keyboard designs place a premium on comfort, style, and ergonomics. Learn how you can improve your computing experience.
Keyboard & Mouse User Guide >>
Comfort Guidelines >>

Product Maintenance
Get simple online help with Logitech hardware and software.
Get Support >>

Tips & Tricks
In order to help you to improve your productivity, we have provided a list of the most commonly used keyboard shortcuts.
Keyboard Shortcuts >>

Specifications

System Requirements

- Windows® XP or Windows Vista™
- 1 available USB port
- CD-ROM drive

Package Contents

- Logitech® LX 710 Cordless Keyboard
- Logitech® LX 7 Cordless Laser Mouse
- USB mini-receiver
- 4 AA alkaline batteries
- CD with software, comfort guidelines, and help center
- Quick-start guide
- Full product support
- 5-year warranty

QuickCam® Communicate Deluxe

Enjoy sharp, vibrant images in any light with RightLight™2 Technology. A glass lens provides more lifelike images, and the high-performance sensor captures detailed photos—up to five megapixels* (software-enhanced).

Overview

Performance

- **Glass lens**: Enjoy more lifelike images with a glass lens.
- **High-performance sensor**: Capture finer, more accurate photos—up to five megapixels* (software-enhanced).
- **RightLight™2 Technology**: Adjusts intelligently to produce the best possible images in dim light or backlighting.
- **Integrated microphone with RightSound™ Technology**: Enjoy crystal-clear conversations, free from echo** and annoying background noise.
- **Ultra-wide field of view and intelligent face tracking**: Keeps you right in the middle of the action.

Convenience and Style

- **Logitech® Video Effects™**: Personalize your conversations with hundreds of avatars and face accessories that mirror expressions and motion.
- **Downloadable Fun Filters**: Add video effects like fisheye, '50s movie, neon, and more.
- **Privacy shade**: Launch and mute video sessions with confidence.
- **Bonus software**: Use bundled HP Photosmart Essential software to capture, edit, customize, and print images.
- **Snapshot button**: Click to snap candid, high-resolution photos.
- **Flexible camera base/monitor clip**: Use it on a flat surface, a monitor, or a flat-panel display.
- **Activity light**: Lets you know when you're "live."

Elevate the Power of Windows Vista™

See more products certified for Windows Vista >>

* Interpolated from native 2-megapixel sensor
** RightSound™ echo cancellation not compatible with S/PDIF or 7.1-channel output.

How To

Getting Started
See how easy it is to use your webcam and keep in touch with friends and family for free from your PC.
Video & Software Services >>
Video Technologies >>

Product Maintenance
Get simple online help with Logitech hardware and software.
Get Support >>

Tips & Tricks
Learn how to personalize your on-screen appearance with Video Effects.
Learn More >>

Gadgets for Windows® Vista™
Elevate the Power of Windows Vista with Gadgets designed exclusively for use with Logitech products.
Learn More >>

Specifications

System Requirements

Windows® XP

- Pentium® P4 (or compatible) processor, 1.4 GHz (2.4 GHz recommended)
- 128 MB RAM (256 MB recommended)
- 200 MB available hard disk space
- 16-bit color display adapter
- Windows®-compatible sound card and speakers (full-duplex sound card recommended)
- USB port
- CD-ROM drive

Windows Vista™

- Pentium® P4 (or compatible) processor, 2.4 GHz (2.8 GHz recommended)
- 512 MB RAM (1 GB recommended)
- WEI score of 3
- 200 MB available hard disk space
- 16-bit color display adapter
- Windows®-compatible sound card and speakers (full-duplex sound card recommended)
- USB port
- CD-ROM drive

Technical Specifications

- 1.3-megapixel sensor with RightLight™2 Technology
- Built-in microphone with RightSound™ Technology
- Video capture: Up to 1280 x 1024 pixels (HD quality) (HD Video 960 x 720 pixels)
- Frame rate: Up to 30 frames per second
- Still image capture: 5 megapixels (with software enhancement)
- USB 2.0 certified
- Optics: Manual focus

Note: System recommendations apply to use of Logitech® RightLight™2, RightSound™, Video Effects™, or Fun Filters.

Package Contents

- Logitech® QuickCam® Communicate Deluxe
- Flexible clip
- USB cable (6 feet)
- QuickCam® Software CD, including:
  Logitech® QuickCam® applications—Logitech® Video Effects™, one-click video e-mail, QuickCapture for photos, webcamming software
  Applications for Windows®—Windows Live™ Messenger, Skype™ with free full-screen video calling, video-enabled AIM®, Yahoo!® Messenger with free video calling
  Bonus software—HP Photosmart Essential application for capturing, editing, customizing, and printing images (Web download required)
- Quick Start guide
- 2-year limited warranty

lenovo

ThinkCentre
User Guide
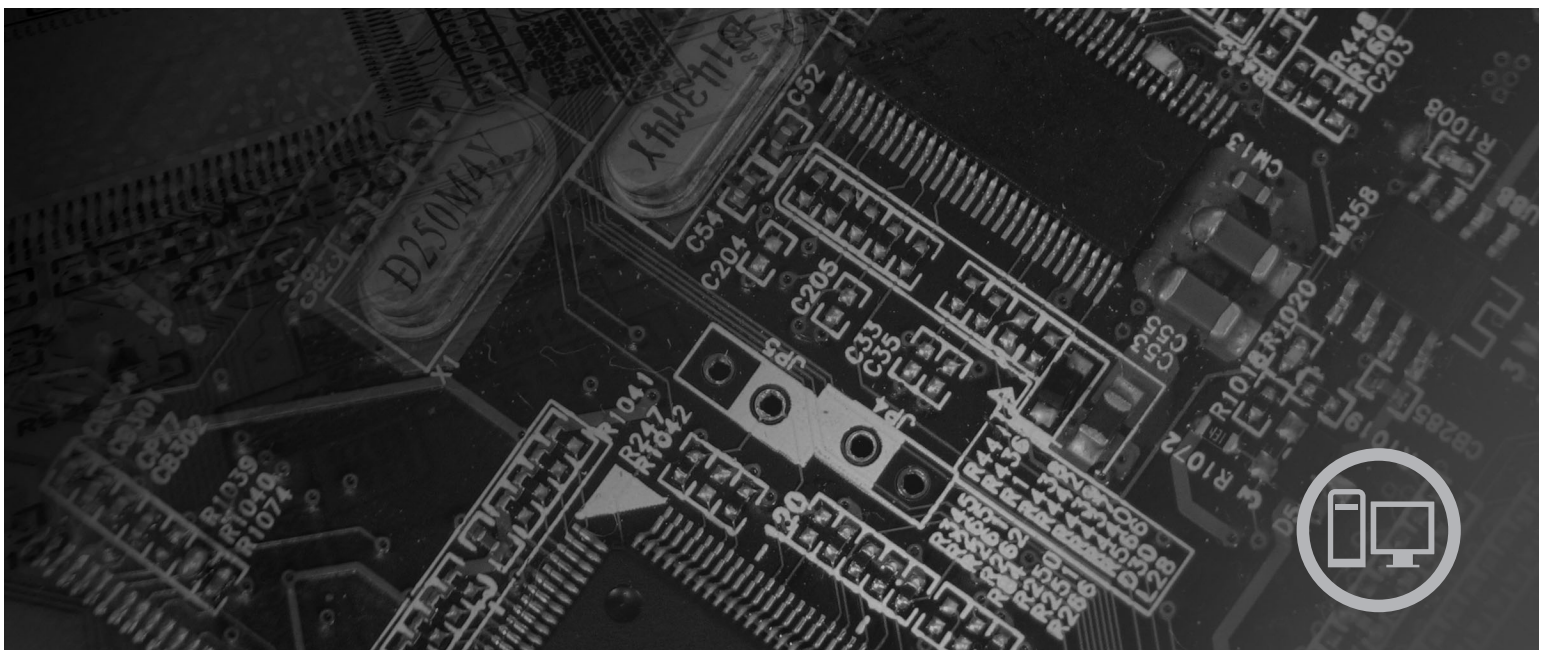
Machine Types 6008, 6010, 6019, 6062, 6064, 6065, 6066, 6067, 6068, 6069, 6071, 6072, 6073, 6074, 6075, 6076, 6077, 6078, 6079, 6081, 6082, 6086, 6087, 6088, 6089, 9011, 9012, 9013, 9014, 9018, 9019, 9071, 9087, 9088, 9089, 9096, 9160, 9162, 9163, 9164, 9172, 9174, 9181, 9182, 9193, 9194, 9196, 9303, 9304

lenovo

ThinkCentre
User Guide

> **Note**
>
> Before using this information and the product it supports, be sure to read the *Safety and Warranty Guide* that came with this product and Appendix B, "Notices," on page 65.

Contents

Introduction

This *User Guide* contains the following information:

- Chapter 1, "Important safety information," on page 1 provides information about where to find safety information for this product.
- Chapter 2, "Arranging your workspace," on page 3 provides information about setting up your computer for comfort and the impact of light sources, air circulation, and electrical outlets.
- Chapter 3, "Setting up your computer," on page 5 provides information about setting up your computer and software and operating system installation.
- Chapter 4, "Software overview," on page 29 contains an overview of the factory installed software installed on your computer.
- Chapter 5, "Using the Setup Utility," on page 31 provides instructions on how to view and change the configuration settings of your computer.
- Chapter 6, "Updating system programs," on page 35 provides information about updating POST/BIOS and how to recover from a POST/BIOS update failure.
- Chapter 7, "Troubleshooting and diagnostics," on page 37 provides information about basic troubleshooting and diagnostic tools for your computer.
- Chapter 8, "Recovering software," on page 45 provides instructions on how to use the ThinkVantage® Rescue and Recovery™ program to create product recovery disks, back up data, recover software, and restore the entire contents of your hard disk to a previously saved state.
- Chapter 9, "Getting information, help, and service," on page 53 provides information about the wide variety of helpful resources available from Lenovo.
- Appendix A, "Manual modem commands," on page 57 provides commands for manually programming your modem.
- Appendix B, "Notices," on page 65 provides notices and trademark information.

Chapter 1. Important safety information

CAUTION:
Before using this manual, it is important that you read and understand all the related safety information for this product. Refer to the *Safety and Warranty Guide* **that you received with this product for the latest safety information. Reading and understanding this safety information reduces the risk of personal injury and or damage to your product.**

Chapter 2. Arranging your workspace

To get the most from your computer, arrange both the equipment you use and your work area to suit your needs and the kind of work you do. Your comfort is of foremost importance, but light sources, air circulation, and the location of electrical outlets can also affect the way you arrange your workspace.

Comfort

Although no single working position is ideal for everyone, here are a few guidelines to help you find a position that suits you best.

Sitting in the same position for a long time can cause fatigue. The backrest and seat of your chair should adjust independently and provide good support. The seat should have a curved front to relieve pressure on the thighs. Adjust the seat so that your thighs are parallel to the floor and your feet are either flat on the floor or on a footrest.

When using the keyboard, keep your forearms parallel to the floor and your wrists in a comfortable position. Use a light touch on the keyboard and your hands and fingers relaxed. Change the angle of the keyboard for maximum comfort by adjusting the position of the keyboard feet.
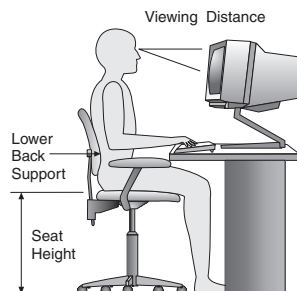
Adjust the monitor so the top of the screen is at, or slightly below, eye level. Place the monitor at a comfortable viewing distance, usually 51 to 61 cm (20 to 24 in.), and position it so you can view it without having to twist your body. Also, position other equipment you use regularly, such as the telephone or a mouse, within easy reach.

Glare and lighting

Position the monitor to minimize glare and reflections from overhead lights, windows, and other light sources. Reflected light from shiny surfaces can cause annoying reflections on your monitor screen. Place the monitor at right angles to windows and other light sources, when possible. Reduce overhead lighting, if necessary, by turning off lights or using lower wattage bulbs. If you install the monitor near a window, use curtains or blinds to block the sunlight. You can adjust the brightness and contrast controls on the monitor as the room lighting changes throughout the day.

Where it is impossible to avoid reflections or to adjust the lighting, an antiglare filter placed over the screen might be helpful. However, these filters might affect the clarity of the image on the screen; try them only after you have exhausted other methods of reducing glare.

Dust buildup compounds problems associated with glare. Remember to clean your monitor screen periodically using a soft cloth moistened with a nonabrasive liquid glass cleaner.

Air circulation

Your computer and monitor produce heat. The computer has a fan that pulls in fresh air and forces out hot air. The monitor lets hot air escape through vents. Blocking the air vents can cause overheating, which might result in a malfunction or damage. Place the computer and monitor so that nothing blocks the air vents; usually, 51 mm (2 in.) of air space is sufficient. Also, make sure the vented air is not blowing on someone else.

Electrical outlets and cable lengths

The location of electrical outlets, the length of power cords and cables that connect to the monitor, printer, and other devices might determine the final placement of your computer.

When arranging your workspace:
- Avoid the use of extension cords. When possible, plug the computer power cord directly into an electrical outlet.
- Keep power cords and cables neatly routed away from walkways and other areas where they might get kicked accidentally.

For more information about power cords, refer to the *Safety and Warranty Guide* that was provided with your computer.

Chapter 3. Setting up your computer

Read and understand the *Safety and Warranty Guide* before you set up your computer. Reading and understanding the safety information reduces the risk of personal injury and or damage to your product.

Set up your computer in the best possible work area that suits your needs and habits. For more information, see Chapter 2, "Arranging your workspace," on page 3.

Connecting your computer

Use the following information when connecting your computer.

* Look for the small connector icons on the back of your computer. Match the connectors to the icons.
* If your computer cables and connector panel have color-coded connectors, match the color of the cable end with the color of the connector. For example, match a blue cable end with a blue connector or a red cable end with a red connector.

Note: Depending on your model type, your computer might not have all of the connectors that are described in this section.

1. Check the position of the voltage-selection switch on the rear of the computer. Use a ballpoint pen to slide the switch, if necessary.

   Note: Some computers do not have a voltage switch. These computers automatically control the voltage.

   * If the voltage supply range is 100–127 V ac, set the switch to 115 V.
   * If the voltage supply range is 200–240 V ac, set the switch to 230 V.
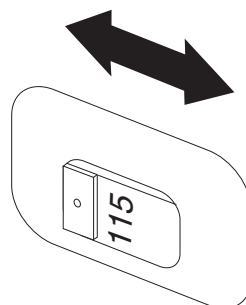
2. Connect the keyboard cable to the appropriate keyboard connector, either the standard keyboard connector **1** or the Universal Serial Bus (USB) connector **2**.
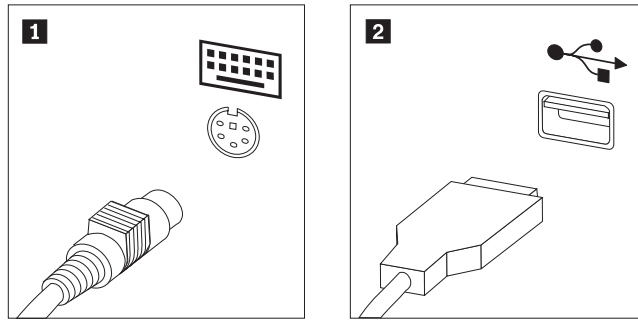
> **Note:** Some models will have keyboards with a fingerprint reader. After you setup and turn on your computer, refer to the Access Help online help system for information about your fingerprint reader. See "Access Help" on page 54 for instructions on how to open the online help system.

3. Connect the USB mouse cable to the USB connector.
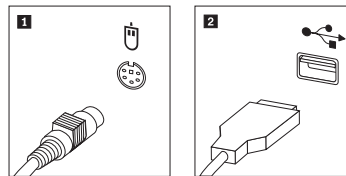
4. Connect the monitor cable to the monitor connector on the computer.
   - If you have a Video Graphics Array (VGA) Standard monitor, connect the cable to the connector as shown.

     > **Note:** If your model has two monitor connectors, be sure to use the connector on the graphics adapter.
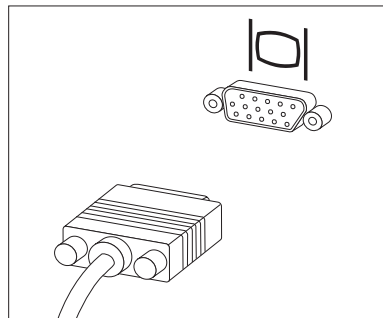
   - If you have a digital video interface (DVI) monitor, your computer must have an adapter installed that supports the DVI monitor. Connect the cable to the connector as shown.
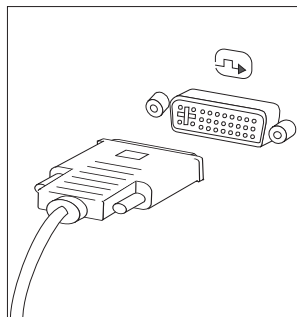
5. If you have a modem, connect the modem using the following information.
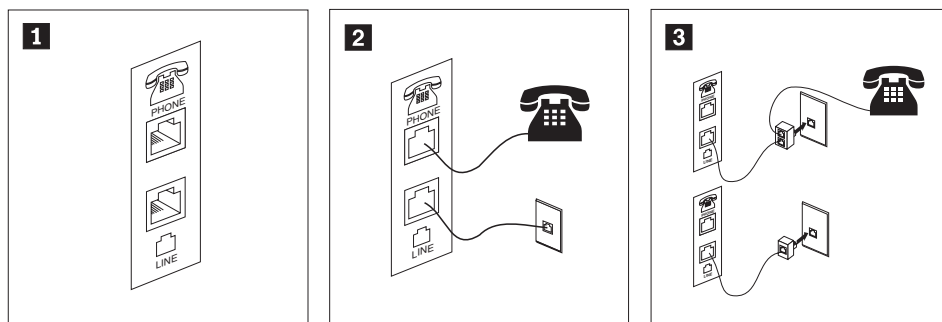
1   This illustration shows the two connections on the back of the computer that are
     needed to set up your modem.

2   In the United States and other countries or regions that use the RJ-11 telephone
     outlet, attach one end of the telephone cable to the telephone and the other end to
     the telephone connector on the back of the computer. Attach one end of the modem
     cable to the modem connector on the back of the computer and the other end to the
     telephone outlet.

3   In countries or regions that do not use RJ-11 telephone outlets, a splitter or converter
     is required to attach the cables to the telephone outlet, as shown at the top of the
     illustration. You also can use the splitter or converter without the telephone, as
     shown at the bottom of the illustration.

6. If you have audio devices, attach them using the following instructions. For
    more information about speakers, see steps 7 and 8 on page 8.
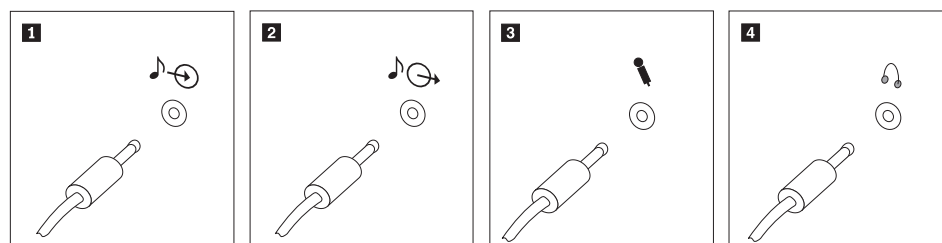
1   Audio line-in   This connector receives audio signals from an external audio device,
                       such as a stereo system.

2   Audio line-out   This connector sends audio signals from the computer to external
                       devices, such as powered stereo speakers.

3   Microphone   Use this connector to attach a microphone to your computer when
                       you want to record sound or if you use speech-recognition software.

4   Headphone   Use this connector to attach headphones to your computer when you
                       want to listen to music or other sounds without disturbing anyone.
                       This connector might be located on the front of the computer.

Chapter 3. Setting up your computer

7. If you have *powered* speakers with an ac adapter:
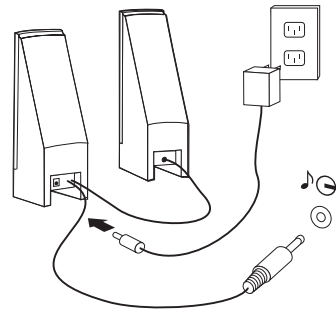
   a. Connect the cable that runs between the speakers, if necessary. On some speakers, this cable is permanently attached.
   b. Connect the ac adapter cable to the speaker.
   c. Connect the speakers to the computer.
   d. Connect the ac adapter to the ac power source.

8. If you have *unpowered* speakers with no ac adapter:
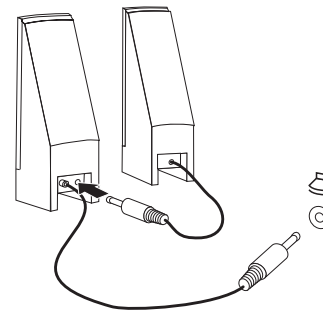
   a. Connect the cable that runs between the speakers, if necessary. On some speakers, this cable is permanently attached.
   b. Connect the speakers to the computer.

9. Connect any additional devices that you have. Your computer might not have all connectors that are shown.
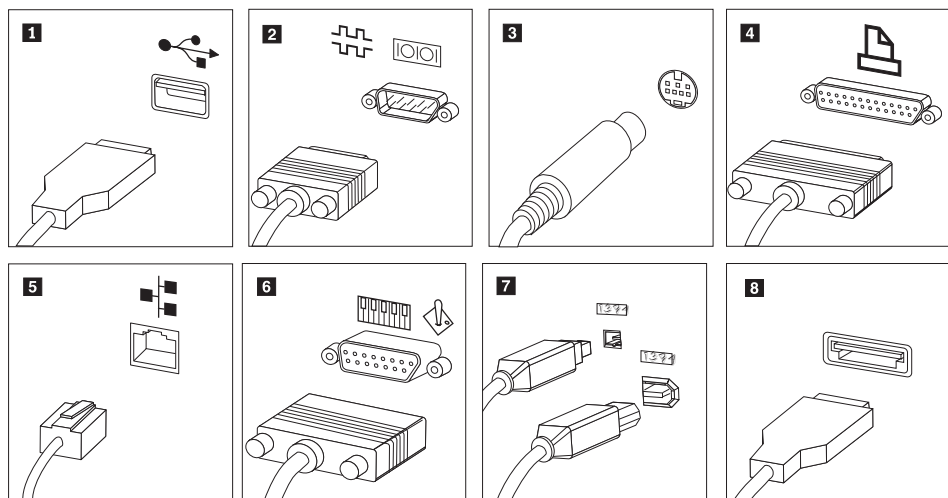
1	USB	Use this connector to attach a device that requires a USB connection, such as a keyboard, mouse, scanner, printer, or personal digital assistant (PDA).
2	Serial	Use this connector to attach an external modem, serial printer, or other device that uses a 9-pin serial connector.
3	S-video	Use this connector to attach a television set that has an S-Video connector. This connector is present on some high-performance video adapters.
4	Parallel	Use this connector to attach a parallel printer or any other device that requires a 25-pin parallel connection.
5	Ethernet	Use this connector to attach the computer to an Ethernet-type local area network or to a cable modem.
		Important: To operate the computer within FCC limits when it is connected to an Ethernet network, use a Category 5 Ethernet cable.
6	MIDI/joystick	Use this connector to attach a joystick, gamepad, or a musical instrument digital interface (MIDI) device such as a MIDI keyboard.
7	IEEE 1394	This connector is sometimes called Firewire because it transmits data rapidly. There are two types of IEEE 1394 connectors: the 4-pin and the 6-pin. IEEE 1394 offers connection to several types of consumer electronics, including digital audio devices and scanners.
8	eSATA	Use this connector to attach an external hard disk drive

10. Connect the power cords to properly grounded electrical outlets.
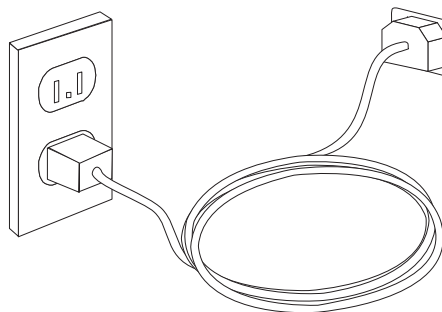
Note: For more information about connectors, refer to the Access Help online help system. See "Access Help" on page 54 for instructions on how to open the online help system.

Turning on computer power

Turn on the monitor and other external devices first, and then turn on the computer. When the power-on self-test (POST) is finished, the logo window closes. If your computer has preinstalled software, the software installation program starts.

If you experience any problems during startup, see Chapter 7, "Troubleshooting and diagnostics," on page 37. For additional help, refer to Chapter 9, "Getting information, help, and service," on page 53. You can get help and information by telephone through the Customer Support Center. Refer to the safety and warranty information that is provided with your computer for the Service and Support worldwide telephone list.

Finishing the software installation

> **Important**
>
> Read the license agreements carefully before using the programs on this computer. These agreements detail your rights, obligations, and warranties for the software on this computer. By using these programs, you accept the terms of the agreements. If you do not accept the agreements, do not use the programs. Instead, promptly return the entire computer for a full refund.

The first time you start your computer, follow the instructions on the screen to complete the software installation. If you do not complete the software installation the first time the computer is turned on, unpredictable results might occur. When the installation is complete, refer to the Access Help online help system to learn more about your computer. See "Access Help" on page 54 for instructions on how to open the online help system.

Note: Some models might have a multilingual version of Microsoft® Windows® operating system preinstalled. If your computer has the multilingual version, you will be prompted to choose a language during the installation process. After installation, the language version can be changed through the Windows Control Panel.

Completing important tasks

After you have set up your computer, perform the following tasks, which will save you time and trouble later:

• Create a diagnostic CD image, diagnostic diskettes, or rescue media. Diagnostic programs are used to test hardware components of your computer and report operating-system-controlled settings that can cause hardware failures. Making a diagnostic CD image, diagnostic diskettes, or rescue media ahead of time assures that you will be able to run diagnostics if the Rescue and Recovery workspace becomes inaccessible. For more information, see "PC-Doctor for DOS" on page 39 or "PC-Doctor for Windows PE" on page 41.

• Record your computer machine type, model, and serial number. If you need service or technical support, you will probably be asked for this information. For further information, refer to the safety and warranty information that is provided with your computer.

Updating your operating system

Microsoft makes updates available for various operating systems through the Microsoft Windows Update Web site. The Web site automatically determines what Windows updates are available for your specific computer and lists those updates only. Updates could include security fixes, new versions of Windows components (such as media player), fixes to other portions of the Windows operating system, or enhancements.

For more information about updating your operating system, refer to the Access Help online help system . See "Access Help" on page 54 for instructions on how to open the online help system.

Installing other operating systems

If you install your own operating system, follow the instructions that come with your operating system CDs or diskettes. Remember to install all device drivers after you install your operating system. Installation instructions are usually provided with the device drivers.

Updating your antivirus software

Your computer comes with antivirus software you can use to detect and eliminate viruses. Lenovo provides a full version of antivirus software on your hard disk with a free 90-day subscription. After 90 days, you must get a new virus definition.

For more information about updating your antivirus software, refer to the Access Help online help system . See "Access Help" on page 54 for instructions on how to open the online help system.

Shutting down the computer

When you turn off your computer, always follow the shutdown procedure for your operating system. This prevents the loss of unsaved data or damage to your software programs. To shut down the Microsoft Windows operating system, open the Start menu from the Windows desktop, click **Shut Down**. Select **Shut Down** from the drop down menu and click **OK**.

Installing external options

For information about installing external options for your computer, Refer to " Installing external options" in the *Hardware Installation and Replacement Guide*.

Features for machine types: 6008, 6068, 6074, 6079, 6082, 9012, 9018, 9087, 9096, 9163, 9172, 9193

This section provides an overview of the computer features and preinstalled software.

> **System information**
> The following information covers a variety of models. For information for your specific model, use the Setup Utility. See Chapter 5, "Using the Setup Utility," on page 31.

Microprocessor
- Intel® Pentium® dual-core processor
- Intel Celeron® processor
- Intel Core™ 2 Duo processor
- Intel Core™ 2 Quad processor
- Internal cache (size varies by model type)

Memory
- Support for four double data rate 2 dual inline memory modules (DDR2 DIMMs)
- Flash memory for system programs (varies by model type)

Internal drives
- Diskette drive (some models)
- Serial Advanced Technology Attachment (SATA II) internal hard disk drive
- Optical drive (some models)

Video subsystem
- An integrated graphics controller for a Video Graphics Array (VGA) monitor
- Intel Graphics Media Accelerator with dual display support (ADD2 card is needed for dual display)
- PCI Express (x16) graphics adapter connector on the system board

Audio subsystem
- HD with ADI 1882 Audio Codec
- Microphone and headphone connectors on the front panel
- Line in, line out, and microphone connectors on the rear panel
- Mono internal speaker

Connectivity
- 10/100/1000 Mbps integrated Ethernet controller
- Peripheral Component Interconnect (PCI) V.90 Data/Fax modem (some models)

System management features
- Preboot Execution Environment (PXE) and Dynamic Host Configuration Protocol (DHCP)
- Wake on LAN®

- Wake on Ring (in the Setup Utility program, this feature is called Serial Port Ring Detect for an external modem)
- Remote Administration
- Automatic power-on startup
- System Management (SM) BIOS and SM software
- Ability to store power-on self-test (POST) hardware test results

Input/output features
- 25-pin Extended Capabilities Port (ECP)/Extended Parallel Port (EPP)
- 9-pin serial connector
- Eight USB connectors (two on front panel and six on rear panel)
- Standard mouse connector
- Standard keyboard connector
- Ethernet connector
- VGA monitor connector
- Three audio connectors (line in, line out, and microphone) on rear panel
- Two audio connectors (microphone and headphone) on front panel
- One eSATA connector through PCI bracket (some models)

Expansion
- Three drive bays
- Two 32-bit PCI adapter connector
- One PCI Express x1 adapter connector

Power
- 280 Watt power supply with autosensing voltage switching
- Automatic 50/60 Hz input frequency switching
- Advanced Configuration and Power Interface (ACPI) support

Security features
- User and administrator passwords for BIOS access
- Support for the addition of an integrated cable lock (Kensington lock)
- Keyboard with fingerprint reader (some models, see the ThinkVantage Productivity Center program for more information)
- Cover presence switch (some models)
- Startup sequence control
- Startup without diskette drive, keyboard, or mouse
- Unattended start mode
- Diskette and hard disk I/O control
- Serial and parallel port I/O control
- Security profile by device

Preinstalled software
Your computer might come with preinstalled software. If it does, an operating system, device drivers to support built-in features, and other support programs are included.

Operating systems, preinstalled (varies by model)

Note: Not all countries or regions have these operating systems.
- Microsoft Windows XP Home
- Microsoft Windows XP Professional
- Microsoft Windows Vista™

Operating systems, certified or tested for compatibility[1] (varies by model)
Linux®

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1. The operating systems listed here are being certified or tested for compatibility at the time this publication goes to press. Additional operating systems might be identified by Lenovo as compatible with your computer following the publication of this booklet. Corrections and additions to this list are subject to change. To determine if an operating system has been certified or tested for compatibility, check the Web site of the operating system vendor.

Features for machine types: 6010, 6069, 6075, 6081, 6086, 9013, 9019, 9088, 9160, 9164, 9174, 9194, 9304

This section provides an overview of the computer features and preinstalled software.

> **System information**
>
> The following information covers a variety of models. For information for your specific model, use the Setup Utility. See Chapter 5, "Using the Setup Utility," on page 31.

Microprocessor
- Intel® Pentium® dual core processor
- Intel Celeron® processor
- Intel Core™ 2 Duo processor
- Intel Core™ 2 Quad processor
- Internal cache (size varies by model type)

Memory
- Support for four double data rate 2 dual inline memory modules (DDR2 DIMMs)
- Flash memory for system programs (varies by model type)

Internal drives
- Diskette drive (some models)
- Serial Advanced Technology Attachment (SATAII) internal hard disk drive
- Optical drive (some models)

Video subsystem
- An integrated graphics controller for a Video Graphics Array (VGA) monitor
- Intel Graphics Media Accelerator with dual display support (ADD2 card is needed for dual display)
- PCI Express (x16) graphics adapter connector on the system board

Audio subsystem
- HD with ADI 1882 Audio Codec
- Microphone and headphone connectors on the front panel
- Line in, line out, and microphone connectors on the rear panel
- Mono internal speaker

Connectivity
- 10/100/1000 Mbps integrated Ethernet controller
- Peripheral Component Interconnect (PCI) V.90 Data/Fax modem (some models)

System management features
- Preboot Execution Environment (PXE) and Dynamic Host Configuration Protocol (DHCP)
- Wake on LAN®

- Wake on Ring (in the Setup Utility program, this feature is called Serial Port Ring Detect for an external modem)
- Remote Administration
- Automatic power-on startup
- System Management (SM) BIOS and SM software
- Ability to store power-on self-test (POST) hardware test results

Input/output features
- 25-pin Extended Capabilities Port (ECP)/Extended Parallel Port (EPP)
- 9-pin serial connector
- Eight USB connectors (two on front panel and six on rear panel)
- Stasndard mouse connector
- Standard keyboard connector
- Ethernet connector
- VGA monitor connector
- Three audio connectors (line in, line out, and microphone) on rear panel
- Two audio connectors (microphone and headphone) on front panel
- One eSATA connector through PCI bracket (some models)

Expansion
- Five drive bays
- Two 32-bit PCI adapter connector
- One PCI Express x1 adapter connector

Power
- 280 Watt power supply with manual voltage selection switch
- Automatic 50/60 Hz input frequency switching
- Advanced Configuration and Power Interface (ACPI) support

Security features
- User and administrator passwords for BIOS access
- Support for the addition of an integrated cable lock (Kensington lock)
- Keyboard with fingerprint reader (some models, see the ThinkVantage Productivity Center program for more information)
- Cover presence switch (some models)
- Startup sequence control
- Startup without diskette drive, keyboard, or mouse
- Unattended start mode
- Diskette and hard disk I/O control
- Serial and parallel port I/O control
- Security profile by device

Preinstalled software
Your computer might come with preinstalled software. If it does, an operating system, device drivers to support built-in features, and other support programs are included.

Operating systems, preinstalled (varies by model)

Note: Not all countries or regions have these operating systems.
- Microsoft Windows XP Home
- Microsoft Windows XP Professional
- Microsoft Windows Vista™

Operating systems, certified or tested for compatibility[2] (varies by model)
Linux®

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2. The operating systems listed here are being certified or tested for compatibility at the time this publication goes to press. Additional operating systems might be identified by Lenovo as compatible with your computer following the publication of this booklet. Corrections and additions to this list are subject to change. To determine if an operating system has been certified or tested for compatibility, check the Web site of the operating system vendor.

Features for machine types: 6019, 6064, 6066, 6067, 6072, 6073, 6077, 6078, 6087, 6088, 9181, 9196

This section provides an overview of the computer features and preinstalled software.

> **System information**
> The following information covers a variety of models. For information for your specific model, use the Setup Utility. See Chapter 5, "Using the Setup Utility," on page 31.

Microprocessor
- Intel® Pentium® dual core processor
- Intel Celeron® processor
- Intel Core™ 2 Duo processor
- Intel Core™ 2 Quad processor
- Internal cache (size varies by model type)

Memory
- Support for four double data rate 2 dual inline memory modules (DDR2 DIMMs)
- Flash memory for system programs (varies by model type)

Internal drives
- 3.5-inch, half-inch (slim) diskette drive (some models)
- Serial Advanced Technology Attachment (SATAII) internal hard disk drive
- Optical drive (some models)

Video subsystem
- An integrated graphics controller for a Video Graphics Array (VGA) monitor
- Intel Graphics Media Accelerator with dual display support (ADD2 card is needed for dual display)
- PCI Express (x16) graphics adapter connector on the system board

Audio subsystem
- HD with ADI 1882 Audio Codec
- Microphone and headphone connectors on the front panel
- Line in, line out, and microphone connectors on the rear panel
- Mono internal speaker

Connectivity
- 10/100/1000 Mbps integrated Ethernet controller
- Peripheral Component Interconnect (PCI) V.90 Data/Fax modem (some models)

System management features
- Preboot Execution Environment (PXE) and Dynamic Host Configuration Protocol (DHCP)
- Wake on LAN®

- Wake on Ring (in the Setup Utility program, this feature is called Serial Port Ring Detect for an external modem)
- Remote Administration
- Automatic power-on startup
- System Management (SM) BIOS and SM software
- Ability to store power-on self-test (POST) hardware test results

Input/output features
- 25-pin Extended Capabilities Port (ECP)/Extended Parallel Port (EPP)
- 9-pin serial connector
- Eight USB connectors (two on front panel and six on rear panel)
- Ethernet connector
- VGA monitor connector
- Three audio connectors (line in, line out, nad microphone) on rear panel
- Two audio connectors (microphone and headphone) on front panel
- One eSATA connector on the rear panel

Expansion
- Three drive bays
- One 32-bit PCI adapter connector

Power
- 280 Watt power supply with autosensing voltage switching
- Automatic 50/60 Hz input frequency switching
- Advanced Configuration and Power Interface (ACPI) support

Security features
- User and administrator passwords for BIOS access
- Support for the addition of an integrated cable lock (Kensington lock)
- Keyboard with fingerprint reader (some models, see the ThinkVantage Productivity Center program for more information)
- Cover presence switch (some models)
- Startup sequence control
- Startup without diskette drive, keyboard, or mouse
- Unattended start mode
- Diskette and hard disk I/O control
- Serial and parallel port I/O control
- Security profile by device

Preinstalled software
Your computer might come with preinstalled software. If it does, an operating system, device drivers to support built-in features, and other support programs are included.

Operating systems, preinstalled (varies by model)

Note: Not all countries or regions have these operating systems.
- Microsoft Windows XP Home
- Microsoft Windows XP Professional
- Microsoft Windows Vista™

Operating systems, certified or tested for compatibility[3] (varies by model)
Linux®

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3. The operating systems listed here are being certified or tested for compatibility at the time this publication goes to press. Additional operating systems might be identified by Lenovo as compatible with your computer following the publication of this booklet. Corrections and additions to this list are subject to change. To determine if an operating system has been certified or tested for compatibility, check the Web site of the operating system vendor.

Features for machine types: 6062, 6065, 6071, 6076, 6089, 9011, 9014, 9071, 9089, 9162, 9182, 9303

This section provides an overview of the computer features and preinstalled software.

> **System information**
>
> The following information covers a variety of models. For information for your specific model, use the Setup Utility. See Chapter 5, "Using the Setup Utility," on page 31.

Microprocessor
- Intel® Pentium® dual core processor
- Intel Celeron® processor
- Intel Core™ 2 Duo processor
- Intel Core™ 2 Quad processor
- Internal cache (size varies by model type)

Memory
- Support for two double data rate 2 dual inline memory modules (DDR2 DIMMs)
- Flash memory for system programs (varies by model type)

Internal drives
- Serial Advanced Technology Attachment (SATAII) internal hard disk drive
- Optical drive (some models)

Video subsystem
- An integrated graphics controller for a Video Graphics Array (VGA) monitor
- Intel Graphics Media Accelerator with dual display support (ADD2 card is needed for dual display)

Audio subsystem
- HD with ADI 1882 Audio Codec
- Microphone and headphone connectors on the front panel
- Line in, and line out connectors on the rear panel
- Mono internal speaker

Connectivity
- 10/100/1000 Mbps integrated Ethernet controller
- Peripheral Component Interconnect (PCI) V.90 Data/Fax modem (some models)

System management features
- Preboot Execution Environment (PXE) and Dynamic Host Configuration Protocol (DHCP)
- Wake on LAN®
- Wake on Ring (in the Setup Utility program, this feature is called Serial Port Ring Detect for an external modem)
- Remote Administration

- Automatic power-on startup
- System Management (SM) BIOS and SM software
- Ability to store power-on self-test (POST) hardware test results

Input/output features
- 25-pin Extended Capabilities Port (ECP)/Extended Parallel Port (EPP)
- 9-pin serial connector
- Eight USB connectors (two on front panel and six on rear panel)
- Ethernet connector
- VGA monitor connector
- Two audio connectors (line in, line out, nad microphone) on rear panel
- Two audio connectors (microphone and headphone) on front panel
- One eSATA connector on the rear panel

Expansion
- Two drive bays
- One 32-bit PCI adapter connector

Power
- 225 Watt power supply with autosensing voltage switching
- Automatic 50/60 Hz input frequency switching
- Advanced Configuration and Power Interface (ACPI) support

Security features
- User and administrator passwords for BIOS access
- Support for the addition of an integrated cable lock (Kensington lock)
- Keyboard with fingerprint reader (some models, see the ThinkVantage Productivity Center program for more information)
- Cover presence switch (some models)
- Startup sequence control
- Startup without diskette drive, keyboard, or mouse
- Unattended start mode
- Diskette and hard disk I/O control
- Serial and parallel port I/O control
- Security profile by device

Preinstalled software
Your computer might come with preinstalled software. If it does, an operating system, device drivers to support built-in features, and other support programs are included.

Operating systems, preinstalled (varies by model)

Note: Not all countries or regions have these operating systems.
- Microsoft Windows XP Home
- Microsoft Windows XP Professional
- Microsoft Windows Vista™

Operating systems, certified or tested for compatibility[4] (varies by model)
Linux®

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4. The operating systems listed here are being certified or tested for compatibility at the time this publication goes to press.
   Additional operating systems might be identified by Lenovo as compatible with your computer following the publication of this
   booklet. Corrections and additions to this list are subject to change. To determine if an operating system has been certified or
   tested for compatibility, check the Web site of the operating system vendor.

Specifications for machine types: 6008, 6068, 6074, 6079, 6082, 9012, 9018, 9087, 9096, 9163, 9172, 9193

This section lists the physical specifications for your computer.

Note: The operating systems listed here are being certified or tested at the time this publication is going to press. Additional operating systems might be identified by Lenovo as compatible with your computer following the publication of this booklet. Corrections and additions to this list are subject to change. To determine if an operating system has been certified or tested for compatibility, check the Web site of the operating system vendor.

Dimensions

    Width: 325 mm (12.8 in.)

    Height: 107 mm (4.21in.)

    Depth: 410 mm (16.14 in.)

Weight

    Minimum configuration as shipped: 8.2 kg (18 lbs)

    Maximum configuration: 10.4 kg (23 lbs)

Environment

    Air temperature:

        Operating at 0 - 3000 ft (914.4 m): 10° to 35°C (50° to 95°F)

        Non-operating: -40° to 60°C (-40° to 140°F)

    Humidity:

        Operating: 10% to 80% (10% per hour, non condensing)

        Non-operating: 10% to 90% (10% per hour)

    Maximum altitude:

        Operating: -50 to 10,000 ft (-15.2 to 3048 m)

        Non-operating: -50 to 35,000 ft (-15.2 to 10.668)

Electrical input

    Input voltage:

        Low range:

            Minimum: 100 V ac

            Maximum: 127 V ac

            Input frequency range: 50/60 Hz

            Voltage switch setting: 115 V ac

        High range:

            Minimum: 200 V ac

            Maximum: 240 V ac

            Input frequency range: 50/60 Hz

            Voltage switch setting: 230 V ac

Specifications for machine types: 6010, 6069, 6075, 6081, 6086, 9013, 9019, 9088, 9160, 9164, 9174, 9194, 9304

This section lists the physical specifications for your computer.

Note: The operating systems listed here are being certified or tested at the time this publication is going to press. Additional operating systems might be identified by Lenovo as compatible with your computer following the publication of this booklet. Corrections and additions to this list are subject to change. To determine if an operating system has been certified or tested for compatibility, check the Web site of the operating system vendor.

Dimensions

Width: 400 mm (15.7 in.)

Height: 175 mm (6.9 in.)

Depth: 432 mm (17.0in.)

Weight

Minimum configuration as shipped: 8.17 kg (18 lbs)

Maximum configuration: 10.21 kg (22.5lbs)

Environment

Air temperature:

Operating at 0 - 3000 ft (914.4 m): 10° to 35°C (50° to 95°F)

Non-operating: -40° to 60°C (-40° to 140F)

Humidity:

Operating: 10% to 80% (10% per hour non-condensing)

Non-operating: 10% to 90% (10% per hour)

Maximum altitude:

Operating: -50 to 10,000 ft (-15.2 to 3048 m)

Non-operating: -50 to 35,000 ft (-15.2 to 10,668 m)

Electrical input

Input voltage:

Low range:

Minimum: 100 V ac

Maximum: 127 V ac

Input frequency range: 50/60 Hz

Voltage switch setting: 115 V ac

High range:

Minimum: 200 V ac

Maximum: 240 V ac

Input frequency range: 50/60 Hz

Voltage switch setting: 230 V ac

Specifications for machine types: 6019, 6064, 6066, 6067, 6072, 6073, 6077, 6078, 6087, 6088, 9181, 9196

This section lists the physical specifications for your computer.

Note: The operating systems listed here are being certified or tested at the time this publication is going to press. Additional operating systems might be identified by Lenovo as compatible with your computer following the publication of this booklet. Corrections and additions to this list are subject to change. To determine if an operating system has been certified or tested for compatibility, check the Web site of the operating system vendor.

Dimensions

Width: 317 mm (12.48 in.)

Height: 99 mm (3.9 in.)

Depth: 341 mm (13.4in.)

Weight

Minimum configuration as shipped: 6.32 kg (13.9 lbs)

Maximum configuration: 7.42 kg (16.4 lbs)

Environment

Air temperature:

Operating at 0 - 3000 ft (914.4 m): 10° to 35°C (50° to 95°F)

Non-operating: -40° to 60°C (-40° to 140°F)

Humidity:

Operating: 10% to 80% (10% per hour, non-condensing)

Non-operating: 10% to 90%(10% per hour)

Maximum altitude:

Operating: -50 to 10,000 ft (-15.2 to 3048 m)

Non-operating: -50 to 35,000 ft (-15.2 to 10,668 m)

Electrical input

Input voltage:

Low range:

Minimum: 100 V ac

Maximum: 127 V ac

Input frequency range: 50/60 Hz

Voltage switch setting: 115 V ac

High range:

Minimum: 200 V ac

Maximum: 240 V ac

Input frequency range: 50/60 Hz

Voltage switch setting: 230 V ac

Specifications for machine types: 6062, 6065, 6071, 6076, 6089, 9011, 9014, 9071, 9089, 9162, 9182, 9303

This section lists the physical specifications for your computer.

Dimensions

Width: 89 mm (3.5in.)

Height: 276 mm (10.9 in.)

Depth: 273 mm (10.7 in.)

Weight

Minimum configuration as shipped: 6.3 kg (13.4 lbs)

Maximum configuration: 6.4 kg (14.1 lbs)

Environment

Air temperature:

Operating at 0 - 3000 ft (914.4 m): 10° to 35°C (50° to 95°F)

Non-operating: -40° to 60°C (-40° to 140°F)

Humidity:

Operating: 10% to 80% (10% per hour, non-condensing)

Non-operating: 10% to 90% (10% per hour)

Maximum altitude:

Operating: -50 to 10,000 ft (-15.2 to 3048)

Non-operating: -50 to 35,000 ft (-15.2 to 10,668 m)

Electrical input

Input voltage:

Low range:

Minimum: 100 V ac

Maximum: 127 V ac

Input frequency range: 50/60 Hz

Voltage switch setting: 115 V ac

High range:

Minimum: 200 V ac

Maximum: 240 V ac

Input frequency range: 50/60 Hz

Voltage switch setting: 230 V ac

Chapter 4. Software overview

The computer is manufactured with a preloaded operating system and several preloaded applications.

The operating systems available are:
- Windows Vista
- Windows XP

Software provided with your Windows operating system

This section describes the Windows applications included with this product.

Software provided by Lenovo

The following software applications are provided by Lenovo to help you improve productivity and reduce the cost associated with maintaining your computer. Software provided with your computer may vary depending on your model.

ThinkVantage Productivity Center

The ThinkVantage Productivity Center program guides you to a host of information and tools to help you set up, understand, maintain and enhance your computer.

ThinkVantage Rescue and Recovery

The ThinkVantage Rescue and Recovery program is a one button recovery and restore solution that includes a set of self recovery tools to help users diagnose, get help, and recover from system crashes quickly, even if the primary operating system will not boot.

ThinkVantage Client Security Solution

This unique hardware-software combination is available on select Lenovo computers. It helps protect your information, including vital security information like passwords, encryption keys and electronic credentials, while guarding against unauthorized user access to data.

ThinkVantage System Update

ThinkVantage System Update is a software program that helps you keep the software on your system current, by downloading and installing software packages (applications, device drivers, BIOS flashes and other updates). Some examples of software that you would like to keep updated are programs provided by Lenovo, such as the Rescue and Recovery program and the Productivity Center program.

System Migration Assistant

System Migration Assistant (SMA) is a software tool that enables system administrators and individual users to migrate a work environment from one computer to another.

Fingerprint Software

With a fingerprint reader, you can enroll your fingerprint and associate it with a power-on password, hard disk password, and administrator (supervisor) password. As a result, your fingerprint can replace passwords enabling simple and secure

access to your computer system. A fingerprint reader keyboard is only available with select computers or can be purchased for computers that support this option.

PC Doctor for WINPE, PC Doctor for Windows

This diagnostic program is preinstalled from the factory on your hard disk. PC-Doctor for Windows works through the Windows operating system to diagnose hardware problems and report operating-system-controlled settings that can cause hardware failures.

Adobe Acrobat Reader

Adobe Acrobat Reader is a tool used to view, print, and search, PDF documents.

See "Online Books folder" on page 53 for more information about accessing the online books and the Lenovo Web site.

Chapter 5. Using the Setup Utility

The Setup Utility program is used to view and change the configuration settings of your computer, regardless of which operating system you are using. However, the operating-system settings might override any similar settings in the Setup Utility program.

Starting the Setup Utility program

To start the Setup Utility program, do the following:

1. If your computer is already on when you start this procedure, shut down the operating system and turn off the computer.
2. Press and hold the F1 key then turn on the computer. When you hear multiple beeps, release the F1 key.

   Notes:

   a. If you are using a USB keyboard and the Setup Utility program does not display using this method, repeatedly press and release the F1 key rather than leaving it pressed when turning on the computer.

   b. If a user password or an administrator password has been set, the Setup Utility program menu is not displayed until you type your password. For more information, see "Using passwords."

The Setup Utility might start automatically when POST detects that hardware has been removed or new hardware has been installed in your computer.

Viewing and changing settings

The Setup Utility program menu lists items that identify system configuration topics. To view or change settings, see "Starting the Setup Utility program."

When working with the Setup Utility program menu, you must use the keyboard. The keys used to perform various tasks are displayed at the bottom of each screen.

Using passwords

By using the Setup Utility program, you can set passwords to prevent unauthorized persons from gaining access to your computer and data. See "Starting the Setup Utility program." The following types of passwords are available:

- User Password
- Administrator Password

You do not have to set any passwords to use your computer. However, if you decide to set any passwords, read the following sections.

Password considerations

A password can be any combination of up to twelve characters (a-z and 0-9) and symbols. For security reasons, it is a good idea to use a strong password that cannot be easily compromised. Passwords should adhere to the following rules:

- Have at least eight characters in length

- Contain at least one alphabetic character, one numeric character, and one symbol
- Contain at least one of the following symbols: , . / ` ; ' []
- You can also use the space bar
- Setup Utility program and hard disk drive passwords are not case sensitive
- Not be your name or your user name
- Not be a common word or a common name
- Be significantly different from your previous password

User Password

When a User Password is set, the computer cannot be used until a valid password is typed from the keyboard.

Administrator Password

When an Administrator Password is set, it deters unauthorized persons from changing configuration settings. If you are responsible for maintaining the settings of several computers, you might want to set an Administrator Password.

After you set an Administrator Password, a password prompt is displayed each time you try to access the Setup Utility program.

If both the user and administrator passwords are set, you can type either password. However, to change any configuration settings, you must use your administrator password.

Setting, changing, and deleting a password

To set, change, or delete a password, do the following:

Note: A password can be any combination of up to twelve characters (A- Z, a-z, and 0-9). For more information, see "Password considerations" on page 31.

1. Start the Setup Utility program (see Chapter 5, "Using the Setup Utility," on page 31).
2. From the Setup Utility program menu, select **Security**.
3. Select **Set Passwords**. Read the information displayed on the right side of the screen.

Using Security Profile by Device

Security Profile by Device is used to enable or disable user access to the following devices:

IDE controller	When this feature is set to **Disable**, all devices connected to the IDE controller (such as hard disk drives or the CD-ROM drive) are disabled and will not be displayed in the system configuration.
Diskette Drive Access	When this feature is set to **Disable**, the diskette drive cannot be accessed.

To set Security Profile by Device, do the following:

1. Start the Setup Utility program (see "Starting the Setup Utility program" on page 31).
2. From the Setup Utility program menu, select **Security**.

3. Select **Security Profile by Device**.
4. Select the desired devices and settings and press Enter.
5. Return to the Setup Utility program menu and select **Exit** and then **Save Settings** or **Save and exit the Setup Utility**.

   Note: If you do not want to save the settings, select **Exit the Setup Utility without saving**.

Selecting a startup device

If your computer does not start up (boot) from a device such as the CD-ROM, diskette, or hard disk as expected, use one of the following procedures to select a startup device.

Selecting a temporary startup device

Use this procedure to startup from any boot device.

Note: Not all CDs, hard disks, and diskettes are bootable.

1. Turn off your computer.
2. Press and hold the F12 key then turn on the computer. When the Startup Device Menu appears, release the F12 key.

   Note: If you are using a USB keyboard and the Startup Device Menu does not display using this method, repeatedly press and release the F12 key rather than leaving it pressed when turning on the computer.

3. Select the desired startup device from the Startup Device Menu and press Enter to begin.

Note: Selecting a startup device from the Startup Device menu does not permanently change the startup sequence.

Selecting or changing the startup device sequence

To view or permanently change the configured startup device sequence, do the following:

1. Start the Setup Utility program (see "Starting the Setup Utility program" on page 31).
2. Select **Startup**.
3. Select **Startup Sequence**. See the information displayed on the right side of the screen.
4. Select the devices for the Primary Startup Sequence, the Automatic Startup Sequence, and the Error Startup Sequence.
5. Select **Exit** from the Setup Utility menu and then **Save Settings** or **Save and exit the Setup Utility**.

If you have changed these settings and want to return to the default settings, select **Load Default Settings** on the Exit menu.

Advanced settings

On some computer models the Advanced settings menu includes a setting to Enable/Disable HyperThreading. This feature works only with HyperThreading-aware operating systems, such as Microsoft Windows XP. The default setting for HyperThreading is Enabled. However, if you select **Set Defaults** and are using an operating system other than Windows XP, your computer performance might be degraded. Therefore, you should always set HyperThreading to Disabled unless you are sure your operating system supports HyperThreading.

Exiting from the Setup Utility program

After you finish viewing or changing settings, press Esc to return to the Setup Utility program menu (you might have to press Esc several times). If you want to save the new settings, select **Save Settings** or **Save and exit the Setup Utility**. Otherwise, your changes will not be saved.

Chapter 6. Updating system programs

This chapter contains information about updating POST/BIOS and how to recover from a POST/BIOS update failure.

Using system programs

System programs are the basic layer of software built into your computer. They include the power-on self-test (POST), the basic input/output system (BIOS) code, and the Setup Utility program. POST is a set of tests and procedures that is performed each time you turn on your computer. BIOS is a layer of software that translates instructions from other layers of software into electrical signals that the computer hardware can execute. You can use the Setup Utility program to view and change the configuration and setup of your computer.

Your computer system board has a module called electrically erasable programmable read-only memory (EEPROM, also referred to as flash memory). You can easily update POST, BIOS, and the Setup Utility program by starting your computer using a flash update diskette or by running a special update program from your operating system.

Lenovo might make changes and enhancements to the POST/BIOS. When updates are released, they are available as downloadable files on the Lenovo Web site at http://www.lenovo.com. Instructions for using the POST/BIOS updates are available in a .txt file that is included with the update files. For most models, you can download either an update program to create a system-program-update (flash) diskette or an update program that can be run from the operating system.

Note: You can download a self starting bootable CD image (known as an .iso image) of the diagnostics program from http://www.lenovo.com to support systems without a diskette drive.

Updating (flashing) BIOS from a diskette or CD-ROM

This section describes how to update (flash) the BIOS using a diskette or CD_ROM. System program updates are available at http://www.lenovo.com/support on the World Wide Web.

1. To update (flash) the BIOS:
   - From a diskette, make sure the computer is turned off and insert a system program update (flash diskette). Then turn the computer on. The update begins.
   - From a CD-ROM, make sure the computer is turned on. Insert the CD-ROM into the optical drive.
2. Turn on the computer. If it is on already, you must turn it off and back on again. The update begins.
3. When you are prompted to select a language, press the number on your keyboard that corresponds to the language and then press Enter.
4. When prompted to change the serial number, press Y.
5. Type in the seven character serial number of your computer and then press Enter.
6. When prompted to change the machine type/model, press Y.

7. Type in the seven character machine type/model of your computer and then press Enter.

8. Follow the instructions on the screen to complete the update.

Updating (flashing) BIOS from your operating system

Note: Due to the constant improvements made to the Web site, Web page content (including the links referenced in the following procedure) is subject to change.

1. From your browser, type http://www.lenovo.com/support in the address field and press Enter.

2. Locate the Downloadable files for your machine type as follows:

    a. In the **Enter a product** field, type your machine type and click **Go**.

    b. Click **Continue**.

    c. Click **Downloads and drivers**.

    d. Under the BIOS category, click the Flash BIOS update.

    e. Click the .txt file that contains the installation instructions for the flash BIOS update (flash from the operating system version).

3. Print these instructions. This is very important since they are not on the screen after the download begins.

4. From your browser, click **Back** to return to the list of files. Carefully follow the printed instructions to download, extract, and install the update.

Chapter 7. Troubleshooting and diagnostics

This chapter describes some basic troubleshooting and diagnostic programs. If your computer problem is not described here, see Chapter 9, "Getting information, help, and service," on page 53 for additional troubleshooting resources.

Basic troubleshooting

The following table provides information to help you troubleshoot your computer problem.

Symptom	Action
The computer does not start when you press the power button.	Verify that: • The power cord is plugged into the rear of the computer and into a working electrical outlet. • If your computer has a secondary power switch on the back of the computer, make sure that it is switched on. • The power indicator on the front of the computer is on. • The voltage is set to the correct setting for your country. If you cannot correct the problem, have the computer serviced. Refer to the safety and warranty information that is provided with your computer for a list of service and support telephone numbers.
The monitor screen is blank.	Verify that: • The monitor cable is securely attached to the rear of the monitor and to the rear of the computer. • The monitor power cord is plugged into the monitor and into a working electrical outlet. • The monitor is turned on and the brightness and contrast controls are set correctly. • The voltage is set to the correct setting for your country. • The monitor signal cable is securely connected to the monitor and to the monitor connector on the computer. **Note:** If your computer has two monitor connectors, verify that your monitor is connected to the option connector rather than the one in the rear of the system board. For more information, see "Connecting your computer" on page 5. If you cannot correct the problem, have the computer serviced. Refer to the safety and warranty information that is provided with your computer for a list of service and support telephone numbers.
The keyboard does not work. The computer does not respond to the keyboard.	Verify that: • The computer is turned on. • The monitor is turned on and the brightness and contrast controls are set correctly. • The keyboard is securely connected to the keyboard connector on the computer. • No keys are stuck. If you cannot correct the problem, have the computer serviced. Refer to the safety and warranty information that is provided with your computer for a list of service and support telephone numbers.

Symptom	Action
The USB Keyboard does not work.	Verify that: • The computer is turned on. • The keyboard is securely connected to a USB connector on the front or rear of the computer. • No keys are stuck. If you cannot correct the problem, have the computer serviced. Refer to the safety and warranty information that is provided with your computer for a list of service and support telephone numbers.
The mouse does not work. The computer does not respond to the mouse.	Verify that: • The computer is turned on. • The mouse is securely connected to the mouse connector on the computer. • The mouse is clean. Refer to "Cleaning the mouse" on page 41 for further information. If you cannot correct the problem, have the computer serviced. Refer to the safety and warranty information that is provided with your computer for a list of service and support telephone numbers.
The operating system will not start.	Verify that: • There is no diskette in the diskette drive. • The startup sequence includes the device where the operating system resides. Usually, the operating system is on the hard disk. For more information, see "Selecting a startup device" on page 33. If you cannot correct the problem, have the computer serviced. Refer to the safety and warranty information that is provided with your computer for a list of service and support telephone numbers.
The computer beeps multiple times before the operating system starts.	Verify that no keys are stuck down. If you cannot correct the problem, have the computer serviced. Refer to the safety and warranty information that is provided with your computer for a list of service and support telephone numbers.

Diagnostic programs

Diagnostic programs are used to test hardware components of your computer and report operating-system-controlled settings that can cause hardware failures. There are two diagnostic programs preinstalled on your computer to help you diagnose problems:

• PC-Doctor for Windows (used when diagnosing problems while running the Windows operating system)
• PC-Doctor for DOS or PC-Doctor for Windows PE, depending upon your machine type and model (used when your Windows operating system will not start)

Notes:

1. You can download the latest version of the PC-Doctor for Windows or PC-Doctor for DOS diagnostic programs from http://www.lenovo.com/support/. Type your machine type into the **Use Quick Path** field and click **Go** to find the downloadable files that are specific to your computer.
2. If you are unable to isolate and repair the problem yourself after you run PC-Doctor for Windows and depending upon your machine type and model, PC-Doctor for DOS or PC-Doctor for Windows PE, save and print the log files

created by both diagnostic programs. You will need the log files when you speak to a Lenovo technical support representative. (The log file created by PC-Doctor for Windows is automatically saved in C:\PCDR\DETAILED.TXT.)

PC-Doctor for Windows

PC-Doctor for Windows is a diagnostic program that works through the Windows operating system. This diagnostic program enables you to view symptoms and solutions for computer problems, access the Lenovo troubleshooting center, update system drivers, and review system information.

To run PC-Doctor for Windows, open the Start menu from the Windows desktop, select **All Programs**, select **PC-Doctor for Windows**, and click **PC-Doctor for Windows**. Follow the instructions on the screen. For additional information about running the diagnostic program, refer to the PC-Doctor for Windows help system.

If you still suspect a problem after PC-Doctor for Windows runs successfully, run PC-Doctor for DOS or PC- Doctor for Windows PE to help you diagnose your computer problem.

PC-Doctor for DOS

Depending upon your machine type and model, you have either PC- Doctor for DOS or PC-Doctor for Windows PE on your Lenovo computer. The PC-Doctor for DOS diagnostic program is part of the Rescue and Recovery workspace and runs independently of the Windows operating system. Use PC-Doctor for DOS, if you are unable to start the Windows operating system or if PC-Doctor for Windows has not been successful in isolating a possible problem. You can run PC-Doctor for DOS from a diagnostic CD image or diagnostic diskettes that you create. You can also run PC-Doctor for DOS from the Rescue and Recovery workspace.

Note: Be sure to create a diagnostic CD image or diagnostic diskettes in case you are unable to run PC-Doctor for DOS from the Rescue and Recovery workspace.

Creating a diagnostic CD image
To create a diagnostic CD image, download a self-starting bootable CD image (known as an .iso image) of the diagnostic program from http://www.lenovo.com/support/. After you download the image, you can create the CD using any CD burning software.

If your computer does not have a CD burner or you do not have Internet access, see "Creating diagnostic diskettes."

Creating diagnostic diskettes
To create diagnostic diskettes, download the PC-Doctor for DOS diagnostic program from http://www.lenovo.com/support/ onto two blank, formatted diskettes.

If you do not have Internet access, create the diagnostic diskettes using the following procedure:

Note: You will need a diskette drive on your computer or a USB diskette drive to complete this procedure.
1. Shut down the operating system and turn off the computer.
2. If you are using a USB diskette drive, plug it into the computer.

3. Repeatedly press and release the F11 key as you turn on the computer.
4. When you hear beeps or see a logo screen, stop pressing the F11 key. The Rescue and Recovery workspace opens.

   Note: For some models, press the Esc key to enter Rescue and Recovery.
5. From the Rescue and Recovery workspace, select **Create diagnostic disks**.
6. Follow the instructions on the screen.
7. When prompted, insert a blank, formatted diskette into the diskette drive and continue to follow the instructions on the screen.
8. When the operation is complete, remove the diskette and click **Quit**.
9. Insert another blank, formatted diskette into the diskette drive and continue to follow the instructions on the screen.
10. When the operation is complete, remove the diskette and click **Quit**.

Running diagnostics from the CD or diskettes

To run diagnostics from the diagnostic CD image or diagnostic diskettes that you created, use the following procedure:
1. Make sure your computer is turned off.
2. If you are running diagnostics from diskettes using a USB diskette drive, plug in the USB device.
3. Insert the CD into the optical drive or the first diagnostic diskette into the diskette drive.
4. Restart the computer.

   Note: If the diagnostic program does not start, the optical drive or diskette drive has not been set as a bootable device. See "Selecting a startup device" on page 33 for instructions on how to select or change the startup device.
5. When the diagnostics program opens, follow the instructions on the screen.

   Note: If you are running diagnostics from a diskette, when prompted, remove the first diskette and insert the second diskette.
6. When the program finishes, remove the CD or diskette from the drive.
7. Select the diagnostic test you want to run. Press the F1 key for additional help.

Running diagnostics from the Rescue and Recovery workspace

To run diagnostics from the Rescue and Recovery workspace, use the following procedure:

Note: If you did not create a diagnostic CD image or diagnostic diskettes, you can run the PC-Doctor for DOS diagnostic program from the Rescue and Recovery workspace.
1. Shut down the operating system and turn off the computer.
2. Repeatedly press and release the F11 key as you turn on the computer.
3. When you hear beeps or see a logo screen, stop pressing the F11 key. The Rescue and Recovery workspace opens.

   Note: For some models, press the Esc key to enter Rescue and Recovery.
4. From the Rescue and Recovery workspace, select **Diagnose hardware**.
5. Follow the prompts on the screen. The computer will reboot.

6. When the computer restarts, the diagnostic program opens automatically. Select the diagnostic test you want to run. Press the F1 key for additional help.

PC-Doctor for Windows PE

Depending upon your machine type and model, you either have PC-Doctor for DOS or PC-Doctor for Windows PE on your Lenovo computer. The PC-Doctor for Windows PE diagnostic program is part of the Rescue and Recovery workspace. Use PC-Doctor for Windows PE, if you are unable to start the Windows operating system or if PC-Doctor for Windows has not been successful in isolating a possible problem.

Running diagnostics from the Rescue and Recovery workspace

You can run the PC-Doctor for Windows PE diagnostic program from the Rescue and Recovery workspace. To run diagnostics from the Rescue and Recovery workspace, use the following procedure:

1. Shut down the operating system and turn off the computer.
2. Repeatedly press and release the F11 key as you turn on the computer.
3. When you hear beeps or see a logo screen, stop pressing the F11 key. The Rescue and Recovery workspace opens.
4. From the Rescue and Recovery workspace, select **Diagnose hardware**.
5. The diagnostic program opens automatically. Select the diagnostic test you want to run. Press the F1 key for additional help.
6. Follow the instructions on the screen.

   Note: Rescue media includes PC-Doctor for Windows PE. For more information about rescue media, see "Creating and using rescue media" on page 48.

Cleaning the mouse

This section provides instructions on how to clean an optical or non-optical mouse.

Optical mouse

An optical mouse uses a light-emitting diode (LED) and an optical sensor to navigate the pointer. If the pointer on the screen does not move smoothly with the optical mouse, you might need to clean the mouse. To clean the optical mouse:

1. Turn off your computer.
2. Disconnect the mouse cable from the computer.
3. Turn the mouse upside down to look at the lens.
   a. If there is a smudge on the lens, gently clean the area with a plain cotton-tipped swab.
   b. If there is debris in the lens, gently blow the debris away from the area.
4. Check the surface on which you are using the mouse. If you have a very intricate picture or pattern beneath the mouse it may be difficult for the digital signal processor (DSP) to determine changes in the mouse position.
5. Reconnect the mouse cable to the computer.
6. Turn your computer back on.

Non-optical mouse

The non-optical mouse uses a ball to navigate the pointer. If the pointer on the screen does not move smoothly with the mouse, you might need to clean the mouse. To clean the non-optical mouse:

Note: The following illustration might be slightly different from your mouse.
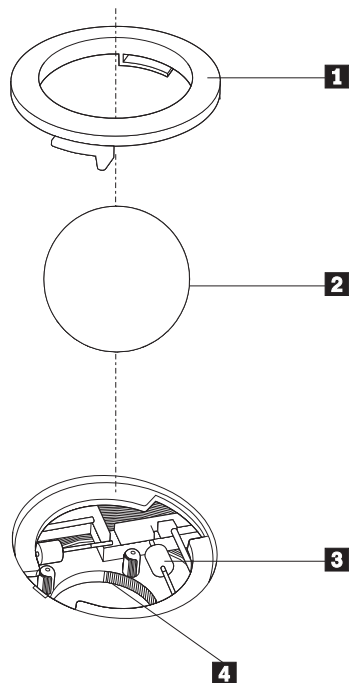
1 Retainer ring
2 Ball
3 Plastic rollers
4 Ball cage

To clean a mouse with a ball, follow the instructions below:

1. Turn off your computer.
2. Disconnect the mouse cable from the computer.
3. Turn the mouse upside down. Twist the retainer ring 1 to the unlocked position to remove the ball.
4. Place your hand over the retainer ring and ball 2 , and then turn the mouse right-side up, so that the retainer ring and ball fall out into your hand.
5. Wash the ball in warm, soapy water then dry it with a clean cloth.
6. Blow air carefully into the ball cage 4 to dislodge dust and lint.
7. Look for a build up of dirt on the plastic rollers 3 inside the ball cage. This build up usually appears as a stripe running across the middle of the rollers.
8. If the rollers are dirty, clean them by using a cotton swab soaked in isopropyl (rubbing) alcohol. Turn the rollers with your finger and continue swabbing them until all the dirt is removed. Be sure the rollers are still centered in their channels after you clean them.
9. Remove any fibers from the swab that might be remaining on the rollers.
10. Replace the ball and the retainer ring. Twist the retainer ring to the locked position.

11. Reconnect the mouse cable to the computer.
12. Turn your computer back on.

Chapter 8. Recovering software

This chapter will help you become familiar with recovery solutions provided by Lenovo. This chapter explains how and when to use the following recovery methods:

- Creating and using Product Recovery discs
- Performing backup and recovery operations
- Using the Rescue and Recovery workspace
- Creating and using rescue media
- Creating and using a Recovery Repair diskette
- Recovering or installing device drivers
- Setting a rescue device in the startup sequence
- Solving recovery problems

Refer to the Access Help online help system for additional information about the Rescue and Recovery program provided by Lenovo. For information on how to access the online help system, see "Access Help" on page 54.

Note: There are a variety of methods to choose from when considering how to recover software in the event of a software or hardware-related problem. Some methods vary depending on the type of operating system you have.

Creating and using the Product Recovery disc

If your computer is equipped with a recordable CD or DVD drive, you can create a set of Product Recovery discs that enables you to restore the contents of the hard disk to the same state as when the computer was originally shipped from the factory. Product Recovery discs are useful if you transfer the computer to another area, sell the computer, recycle the computer, or as a last resort put the computer in an operational state after all other methods of recovery have failed. As a precautionary measure, it is important to create a set of Product Recovery discs as soon as possible.

Note: The recovery operations you can perform using Product Recovery discs vary depending on the operating system from which they were created. Your Microsoft Windows license permits you to create only one set of Product Recovery discs, so it is important that you store the discs in a safe place after you make them.

To create Product Recovery discs, do the following:

1. From the Windows desktop, open the Start menu, select **All Programs**, select **ThinkVantage**, click **Create Recovery Media**.
2. Follow the instructions on the screen.

The following list explains how Product Recovery discs are used on different operating systems:

- Windows XP: Use Product Recovery discs to restore your computer to the original factory contents, perform a custom factory recovery, or to perform other rescue and recovery operations such as rescuing individual files.

- Windows Vista: Use Product Recovery discs to restore your computer to the original factory contents only.

When using Product Recovery discs on Windows XP, you are given the option to enter the Rescue and Recovery workspace and choose from a variety of recovery operations. When using Product Recovery discs on Windows Vista, you are prompted to insert your Product Recovery discs and are guided through the process of restoring from original factory contents only.

To use Product Recovery discs on Windows XP, do the following:

Attention: When you restore the factory contents from the Product Recovery discs, all files currently on the hard disk will be deleted and replaced by the original factory contents. During the restore process, you will be given the opportunity to save one or more files currently on your hard disk drive to other media before any data is removed.

1. Insert Product Recovery disc 1 into your CD or DVD drive.
2. Restart your computer.
3. After a short delay, the Rescue and Recovery workspace opens.

   Note: If the Rescue and Recovery workspace fails to open, you might not have your startup device (CD drive or DVD drive) set correctly in your BIOS startup sequence. For more information, see "Setting a rescue device in the startup sequence" on page 51.

4. In the Rescue and Recovery menu, click **Restore your system.**
5. Follow the instructions on the screen. Insert the appropriate Product Recovery disc when prompted.

Note: After restoring your hard disk to the original factory content, you might have to reinstall some software or drivers. See "Using the Rescue and Recovery workspace" on page 47 for details.

To use Product Recovery discs on Windows Vista, do the following:

Attention: When you restore the factory contents from the Product Recovery discs, all files currently on the hard disk will be deleted and replaced by the original factory contents.

1. Insert Product Recovery disc 1 into your CD or DVD drive.
2. Restart your computer.
3. Follow the instructions on the screen. Insert the appropriate Product Recovery disc when prompted.

Note: After restoring your hard disk to the original factory content, you might have to reinstall some software or drivers. See "Using the Rescue and Recovery workspace" on page 47 for details.

Performing backup and recovery operations

The Rescue and Recovery program enables you to back up your complete hard disk contents including the operating system, data files, application programs, and personal settings. You can designate where the Rescue and Recovery program stores the backup:

- On a protected area of your hard disk

- On a second hard disk installed in your computer
- On an externally attached USB hard disk
- On a network drive
- On recordable CDs or DVDs (a recordable CD or DVD drive is required for this option)

After you have backed up your hard disk, you can restore the complete contents of the hard disk, restore selected files only, or restore only the Windows operating system and applications.

To perform a backup operation using the Rescue and Recovery program, do the following:

1. From the Windows desktop, open the Start menu, select **All Programs**, click **ThinkVantage**, then click **Rescue and Recovery**. The Rescue and Recovery program opens.
2. From the Rescue and Recovery main window, click **Back up your hard drive** select backup operation options.
3. Follow the instructions on the screen.

To perform a restore operation using the Rescue and Recovery program, do the following:

1. From the Windows desktop, open the Start menu, select **All Programs**, click **ThinkVantage**, then click **Rescue and Recovery**. The Rescue and Recovery program opens.
2. From the Rescue and Recovery main window, click **Restore your system from a backup** icon.
3. Follow the instructions on the screen.

For information about performing a restore operation from the Rescue and Recovery workspace, see "Using the Rescue and Recovery workspace."

Using the Rescue and Recovery workspace

The Rescue and Recovery workspace resides in a protected, hidden area of your hard disk that operates independently from the Windows operating system. This enables you to perform recovery operations even if the Windows operating system cannot be started. You can perform the following recovery operations from the Rescue and Recovery workspace:

- **Rescue files from your hard disk or from a backup:** The Rescue and Recovery workspace enables you to locate files on your hard disk and transfer them to a network drive or other recordable media, such as a USB hard disk drive or a diskette. This solution is available, even if you did not back up your files or if changes were made to the files since your last backup operation. You also can rescue individual files from a Rescue and Recovery backup located on your local hard disk, a USB device, or a network drive.
- **Restore your hard disk from a Rescue and Recovery backup:** When you perform a backup operation using the Rescue and Recovery program, you can perform restore operations from the Rescue and Recovery workspace, even if you cannot start the Windows operating system.
- **Restore your hard disk to the factory contents:** The Rescue and Recovery workspace enables you to restore the complete contents of your hard disk to the same state as it was when originally shipped from the factory. If you have multiple partitions on your hard disk, you have the option to restore the factory

contents to the C: partition and leave the other partitions intact. Because the Rescue and Recovery workspace operates independently from the Windows operating system, you can restore the factory contents even if you cannot start the Windows operating system.

Attention: If you restore the hard disk from a Rescue and Recovery backup or restore the hard disk to the factory contents, all files on the primary hard disk partition (usually drive C) will be deleted in the recovery process. If possible, make copies of important files. If you are unable to start the Windows operating system, you can use the Rescue files feature in the Rescue and Recovery workspace to copy files from your hard disk to other media.

To start the Rescue and Recovery workspace, do the following:
1. Turn off your computer.
2. Restart your computer.
3. Repeatedly press and release the F11 key.
4. When you hear beeps or see a logo screen, release the F11 key.
5. If you set a Rescue and Recovery password, type your password when prompted. The Rescue and Recovery workspace opens after a short delay.

   Note: If the Rescue and Recovery workspace fails to open, see "Solving recovery problems" on page 51.
6. Do one of the of the following:
   - To rescue files from your hard disk or from a backup, click **Rescue** files; then, follow the instructions on the screen.
   - To restore your hard disk from a Rescue and Recovery backup or to restore your hard drive to the factory contents, click **Restore your system**; then, follow the instructions on the screen.
   - For information about other features of the Rescue and Recovery workspace, click **Help**.

Notes:
1. After restoring a hard disk to the original factory contents you might have to reinstall device drivers for some devices. See "Recovering or installing device drivers" on page 50.
2. Some computers come with Microsoft Office or Microsoft Works preinstalled. If you need to recover or reinstall your Microsoft Office or Microsoft Works applications, you must use the *Microsoft Office CD* or *Microsoft Works CD*. These CDs are provided only with computers that come with Microsoft Office or Microsoft Works preinstalled.

Creating and using rescue media

Rescue media such as a CD or USB hard disk drive enables you to recover from failures that prevent you from gaining access to the Rescue and Recovery workspace on your hard disk.

Note: The recovery operations you can perform using rescue media vary depending on the operating system. The rescue disc can be started in any type of CD or DVD. Rescue media also contains a PC-Doctor diagnostics program, which enables you to run diagnostics from the rescue media.

To create rescue media, do the following:

1. Open the Start menu from the Windows desktop, select **All Programs**, click **ThinkVantage**, then click **Create Recovery Media**.
2. In the **Rescue Media** area, select the type of rescue media you want to create. You can create rescue media using a CD, USB hard drive, or a second internal hard disk drive.
3. Click **OK**.
4. Follow the instructions on the screen.

The following list explains how Product Recovery discs are used on different operating systems:

- Windows XP: Use Product Recovery discs to restore your computer to the original factory contents, perform a custom factory recovery, or to perform other rescue and recovery operations such as rescuing individual files.
- Windows Vista: Use rescue media to perform all recovery operations except the ability to restore to the original factory contents and custom factory recovery.

To use rescue media, do one of the following:

- If your rescue media is on CDs or DVDs, insert the rescue disc and restart your computer.
- If your rescue media is on a USB hard disk, attach your USB hard disk drive to one of the USB connectors on your computer, then restart on your computer.
- If you are using a second internal hard disk drive, set the startup sequence to start from that drive.

When the rescue media starts, the Rescue and Recovery workspace opens. Help for each feature is available from the Rescue and Recovery workspace. If your rescue media fails to start, you might not have your rescue device (CD drive, DVD drive, or USB device) set correctly in your BIOS startup sequence. For more information, see "Setting a rescue device in the startup sequence" on page 51.

Creating and using a Recovery Repair diskette

If you are unable to access the Rescue and Recovery workspace or the Windows environment, use a Recovery Repair diskette to repair the Rescue and Recovery workspace or repair a file needed to enter the Windows environment. It is important to create a Recovery Repair diskette as soon as possible and store it in a safe place as a precautionary measure.

To create a Recovery Repair diskette, do the following:

1. Start your computer and operating system.
2. Using an Internet browser, go to the following Web address:

http://www.lenovo.com/think/support/site.wss/document.do?lndocid=MIGR-54483

3. Insert a diskette into diskette drive A. Information on the diskette will be erased and the diskette will be formatted appropriately.
4. Double-click on the appropriate file name. The diskette is created.
5. Take out the diskette and label it Recovery Repair diskette.

To use the Recovery Repair diskette, do the following:

1. Shut down the operating system and turn off the computer.

2. Insert the Recovery Repair diskette into diskette drive A.
3. Turn on the computer and follow the instructions on the screen.

Note: If the repair operation finishes without error, you will be able to access the Rescue and Recovery workspace by repeatedly pressing the F11 key while you restart your computer. When you hear beeps or see a logo screen, release the F11 key. You will also be able to access the Windows environment after the repair operation finishes.

If an error message appears during the repair operation and the repair operation cannot be completed, you might have a problem with the partition that contains the Rescue and Recovery workspace. Use your rescue media to access the Rescue and Recovery workspace. For information about creating and using rescue media, see "Creating and using rescue media" on page 48.

Recovering or installing device drivers

Before you can recover or install device drivers, your operating system must be installed on your computer. Make sure that you have the documentation and software media for the device.

Device drivers for factory-installed devices are located on the computer hard disk (usually drive C) in the SWTOOLS\drivers folder. Other device drivers are on the software media that come with individual devices.

The latest device drivers for factory-installed devices also are available on the World Wide Web at http://www.lenovo.com/think/support/.

To reinstall a device driver for a factory-installed device, do the following:
1. Start your computer and operating system.
2. Use Windows Explorer or My Computer to display the directory structure of your hard disk.
3. Open the C:\SWTOOLS folder.
4. Open the DRIVERS folder. Within the DRIVERS folder are several subfolders that are named for various devices that are installed in your computer (for example, AUDIO or VIDEO).
5. Open the appropriate device subfolder.
6. Use one of the following methods to reinstall the device driver:
   - In the device subfolder, look for a README.TXT or other file with the .TXT extension. This file might be named after the operating system, such as WIN98.TXT. The text file has information on how to reinstall that device driver.
   - If the device subfolder contains a file with an .INF extension, you can use the Add New Hardware program (located in the Windows Control Panel) to reinstall the device driver. Not all device drivers can be reinstalled using this program. In the Add New Hardware program, when prompted for the device driver that you want to install, click **Have Disk** and **Browse**. Then select the appropriate device driver file from the device subfolder.
   - In the device subfolder, look for a SETUP.EXE file. Double-click **SETUP.EXE** and follow the instructions on the screen.

Setting a rescue device in the startup sequence

Before you start the Rescue and Recovery program from a CD, DVD, USB hard disk drive, or any external device, you must first change the startup sequence in the Setup Utility.

To view or change the startup sequence, do the following:

1. With the computer turned off, repeatedly press and release the F1 key while you turn on the computer.
2. When the logo screen appears, or you hear a series of beeps, release the F1 key.
3. If you are prompted for a password, type your current password.
4. From the Setup Utility main menu, use the right-arrow key to select **Startup**.
5. Arrange the startup sequence to meet your needs.
6. Press the Esc key twice to go to the Setup Utility exit menu.
7. Use the down-arrow key to select Save and exit the Setup Utility, then press Enter.
8. When the Setup Confirmation window appears, press Enter.
9. The computer restarts.

Note: If you are using an external device, you first must turn off your computer before connecting the external device.

For more information on Setup Utility, see Chapter 5, "Using the Setup Utility," on page 31.

Solving recovery problems

If you are unable to access the Rescue and Recovery workspace or the Windows environment, you can:

- Use your rescue media (CD, DVD, or USB hard disk) to start the Rescue and Recovery workspace. See "Creating and using rescue media" on page 48 for details.
- Use a Recovery Repair diskette to repair the Rescue and Recovery workspace or repair a file needed to enter the Windows environment. See "Creating and using a Recovery Repair diskette" on page 49 for details.
- Use a set of Product Recovery discs if your intent is to restore the hard disk to its original factory contents. See "Creating and using the Product Recovery disc" on page 45.

It is important to create a Recovery Repair diskette, rescue media, and a set of Product Recovery discs as soon as possible and store them in a safe place.

If you are unable to access the Rescue and Recovery workspace or the Windows environment from rescue media, a Recovery Repair diskette, or a set of Product Recovery CDs, you might not have the rescue device, CD drive, DVD drive, or USB hard disk drive defined as a startup device in the BIOS startup sequence. For more information, see "Setting a rescue device in the startup sequence."

Chapter 9. Getting information, help, and service

This chapter contains information about help, service, and technical assistance for products manufactured by Lenovo.

Information resources

This section describes how to access useful resources relating to your computing needs.

Online Books folder

The Online Books folder provides publications to help you set up and use your computer. The Online Books folder is preinstalled on your computer and requires no Internet access to view the publications. In addition to this *User Guide*, the *Hardware Installation and Replacement Guide* is also available in the Online Books folder.

The *Hardware Installation and Replacement Guide* provides step-by-step instructions for replacing Customer Replacement Units (CRUs) in your computer. CRUs are computer parts that can be upgraded or replaced by the customer.

To view a publication, open the Start menu from the Windows desktop, select **All Programs**, select **Online Books**, and click **Online Books**. Double-click on the appropriate publication for your computer. The publications also are available on the Lenovo Web site at http://www.lenovo.com.

Notes:

1. These publications are in Portable Document Format (PDF) format, which requires Adobe Acrobat Reader to be installed. If Adobe Acrobat Reader has not yet been installed on your computer, a message will appear when you attempt to view the PDF file and you will be guided through the Adobe Acrobat Reader installation.

2. The publications that are preinstalled on your computer are available in other languages on the Lenovo Support Web site at http://www.lenovo.com/support/.

3. If you want to install a different language version of Adobe Acrobat Reader than the version provided on your computer, go to the Adobe Web site at http://www.adobe.com and download the version you want to use.

ThinkVantage Productivity Center

The ThinkVantage Productivity Center program contains information sources and tools designed to make computing easier and secure.

The ThinkVantage Productivity Center program provides information about your computer and easy access to various technologies, such as:

- The Rescue and Recovery program
- Productivity Center
- Client Security Solutions
- Factory Recovery
- System Updates

- Service and support

Note: ThinkVantage Technologies are only available on select Lenovo computers.

To access the ThinkVantage Productivity Center program, open the Start menu from the Windows desktop, select **All Programs**, select **ThinkVantage**, and click **Productivity Center**.

Access Help

The Access Help online help system provides information about getting started, doing basic tasks, customizing settings for your personal preference, protecting data, expanding and upgrading, and troubleshooting.

To open Access Help, open the Start menu from the Windows desktop, select **All Programs**, select **ThinkVantage**, and click **Access Help**. After you have opened Access Help, use the left panel to make a selection from the Contents or Index tab, or use the Search tab to find a particular word or phrase.

Safety and Warranty

The safety and warranty information that is provided with your computer contains information on safety, and warranty, notices. Read and understand all safety information before using this product.

www.lenovo.com

The Lenovo Web site (www.lenovo.com) provides information and services to help you buy, upgrade, and maintain your computer. You can access up-to-date information for your computer on the Lenovo Web site. From the www.lenovo.com Web site, you can also:
- Shop for:
  - Desktop and notebook computers,
  - Monitors
  - Projectors
  - Upgrades and accessories
  - Special offers.
- Purchase additional services, such as support for hardware, operating systems, application programs, network setup and configuration, and custom installations.
- Purchase upgrades and extended hardware repair services.
- Download the latest device drivers and software updates for your computer model.
- Access the online manuals.
- Access the Lenovo Statement of Limited Warranty.
- Access troubleshooting and support information for your computer model and other supported products.
- Find the service and support phone number for your country or region.
- Find a service provider located near you.

Help and service

This section contains information about obtaining help and service.

Using the documentation and diagnostic programs

If you experience a problem with your computer, see Chapter 7, "Troubleshooting and diagnostics," on page 37. For information on additional resources to help you troubleshoot your computer problem, see "Information resources" on page 53.

If you suspect a software problem, see the documentation, including README files and online help, that comes with the operating system or application program.

Most computers come with a set of diagnostic programs that you can use to help you identify hardware problems. For instructions on using the diagnostic programs, see "Diagnostic programs" on page 38.

Lenovo maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to http://www.lenovo.com/support/ and follow the instructions.

Calling for service

During the warranty period you can get help and information by telephone through the Customer Support Center.

These services are available during the warranty period:
- **Problem determination** - Trained personnel are available to assist you with determining a hardware problem and deciding what action is necessary to fix the problem.
- **Hardware repair** - If the problem is caused by hardware under warranty, trained service personnel are available to provide the applicable level of service.
- **Engineering Change management** - There might be changes that are required after a product has been sold. Lenovo or your reseller will make selected Engineering Changes (ECs) available that apply to your hardware.

These items are not covered by the warranty.
- Replacement or use of parts not manufactured for or by Lenovo or non-warranted Lenovo parts
- Identification of software problem sources
- Configuration of BIOS as part of an installation or upgrade
- Changes, modifications, or upgrades to device drivers
- Installation and maintenance of network operating systems (NOS)
- Installation and maintenance of application programs

Refer to the safety and warranty information that is provided with your computer for a complete explanation of warranty terms. You must retain your proof of purchase to obtain warranty service.

For a list of service and support phone numbers for your country or region, go to http://www.lenovo.com/support/ and click **Support phone list** or refer to the safety and warranty information provided with your computer.

Note: Phone numbers are subject to change without notice. If the number for your country or region is not provided, contact your Lenovo reseller or Lenovo marketing representative.

If possible, be at your computer when you call. Have the following information available:
- Machine type and model

- Serial numbers of your hardware products
- Description of the problem
- Exact wording of any error messages
- Hardware and software configuration information

Using other services

If you travel with your computer or relocate it to a country where your desktop or notebook computer machine type is sold, your computer might be eligible for International Warranty Service, which automatically entitles you to obtain warranty service throughout the warranty period. Service will be performed by service providers authorized to perform warranty service.

Service methods and procedures vary by country, and some services might not be available in all countries. International Warranty Service is delivered through the method of service (such as depot, carry-in, or on-site service) that is provided in the servicing country. Service centers in certain countries might not be able to service all models of a particular machine type. In some countries, fees and restrictions might apply at the time of service.

To determine whether your computer is eligible for International Warranty Service and to view a list of the countries where service is available, go to http://www.lenovo.com/support/, click **Warranty**, and follow the instructions on the screen.

For technical assistance with the installation of or questions related to Service Packs for your preinstalled Microsoft Windows product, refer to the Microsoft Product Support Services Web site at http://support.microsoft.com/directory/, or you can contact the Customer Support Center. Some fees might apply.

Purchasing additional services

During and after the warranty period, you can purchase additional services, such as support for hardware, operating systems, and application programs; network setup and configuration; upgraded or extended hardware repair services; and custom installations. Service availability and service name might vary by country or region. For more information about these services, go to the Lenovo Web site at http://www.lenovo.com.

Appendix A. Manual modem commands

The following section lists commands for manually programming your modem.

Commands are accepted by the modem while it is in Command Mode. Your modem is automatically in Command Mode until you dial a number and establish a connection. Commands can be sent to your modem from a PC running communication software or any other terminal devices.

All commands sent to the modem must begin with **AT** and end with **ENTER**. All commands can be typed in either upper or lower case, but not mixed. To make the command line more readable, spaces can be inserted between commands. If you omit a parameter from a command that requires one, it is just like specifying a parameter of **0**.

Example:

ATH [ENTER]

Basic AT commands

In the following listings, all default settings are printed in **bold text**.

Command		Function
A		Manually answer incoming call.
A/		Repeat last command executed. **Do not** precede **A/** with AT or follow with ENTER.
D_		**0 - 9, A-D, # and ***
	L	last number redial
	P	pulse dialing
		Note: Pulse dialing is not supported for Australia, New Zealand, Norway, and South Africa.
	T	**touch-tone dialing**
	W	wait for second dial tone
	,	pause
	@	wait for five seconds of silence
	!	flash
	;	return to Command Mode after dialing
DS=n		Dial one of the four telephone numbers (n=0-3) stored in the modem non-volatile memory.
E_	E0	Commands are not echoed
	E1	**Commands are echoed**
+++		Escape Characters - Switch from Data Mode to Command Mode (T.I.E.S. Command)
H_	H0	Force modem on-hook (hang up)

Command		Function
	H1	Force modem off-hook (make busy) **Note: H1 command is not supported for Italy**
I_	I0	Display product-identification code
	I1	Factory ROM checksum test
	I2	Internal memory test
	I3	Firmware ID
	I4	Reserved ID
L_	L0	Low speaker volume
	L1	**Low speaker volume**
	L2	Medium speaker volume
	L3	High speaker volume
M_	M0	Internal speaker off
	M1	**Internal speaker on until carrier detected**
	M2	Internal speaker always on
	M3	Internal speaker on until carrier detected and off while dialing
N_		Included for compatibility only, provides no effect
O_	O0	Return to Data Mode
	O1	Return to Data Mode and initiate an equalizer retrain
P		**Set Pulse dial as default**
Q_	Q0	Modem sends responses
Sr?		Read and display value in register r.
Sr=n		Set register r to value n (n = 0-255).
T		**Set Tone Dial as default**
V_	**V0**	**Numeric responses**
	V1	**Word responses**
W_	**W0**	**Report DTE speed only**
	W1	Report line speed, error correction protocol, and DTE speed.
	W2	Report DCE speed only
X_	X0	Hayes Smartmodem 300 compatible responses/blind dialing.
	X1	Same as X0 plus all CONNECT responses/blind dialing
	X2	Same as X1 plus dial tone detection
	X3	Same as X1 plus busy detection/blind dialing
	X4	All responses and dial tone and busy **signal detection**
Z_	Z0	Reset and retrieve active profile 0
	Z1	Reset and retrieve active profile 1

Extended AT commands

Command		Function
&C_	&C0	Force Carrier Detect Signal High (ON)
	&C1	**Turn on CD when remote carrier is present**
&D_	&D0	**Modem ignores the DTR signal**
	&D1	Modem returns to Command Mode after DTR toggle
	&D2	**Modem hangs up, returns to the Command Mode after DTR toggle**
	&D3	Resets modem after DTR toggle
&F_	&F	Recall factory default configuration
&G_	**&G0**	**Guard tone disabled**
	&G1	Guard tone disabled
	&G2	1800 Hz guard tone
&K_	&K0	Disable flow control
	&K3	**Enable RTS/CTS hardware flow control**
	&K4	Enable XON/XOFF software flow control
	&K5	Enable transparent XON/XOFF flow control
	&K6	Enable both RTS/CTS and XON/XOFF flow control
&M_	**&M0**	Asynchronous operation
&P_	**&P0**	**US setting for off-hook-to-on-hook ratio**
	&P1	UK and Hong Kong off-hook-to-on-hook ratio
	&P2	Same as &P0 setting but at 20 pulses per minute
	&P3	Same as &P1 setting but at 20 pulses per minute
&R_	&R0	Reserved
	&R1	**CTS operates per flow control requirements**
&S_	**&S0**	**Force DSR Signal High (ON)**
	&S1	DSR off in command mode, on in on-line mode
&T_	&T0	Ends test in progress
	&T1	Perform Local Analog Loopback Test
	&T3	Perform Local Digital Loopback Test
	&T4	**Grant Remote Digital Loopback Test request by remote modem**
	&T5	Deny Remote Digital Loopback Test request
	&T6	Perform a Remote Digital Loopback Test
	&T7	Perform a Remote Digital Loopback Test and Self-Test
	&T8	Perform Local Analog Loopback Test and Self-Test
&V	**&V0**	Displays Active and Stored Profiles

Appendix A. Manual modem commands

Command		Function
	&V1	Display Last Connection Statistics
&W_	&W0	Stores the active profile as Profile 0
	&W1	Stores the active profile as Profile 1
%E_	**%E0**	**Disable auto-retrain**
	%E1	Enable auto-retrain
+MS?		Displays the current Select Modulation settings
+MS=?		Displays a list of supported Select Modulation options
+MS=a,b,c,e,f		Select modulation where: **a**=0, 1, 2, 3, 9, 10, 11, 12, 56, 64, 69; **b**=0-1; **c**=300-56000; **d**=300-56000; **e**=0-1; and **f**=0-1. **A, b, c, d, e, f** default=**12, 1, 300, 56000, 0, 0.** Parameter **"a"** specifies the modulation protocol desired where: 0=V.21, 1=V.22, 2=V.22bis, 3=V.23, 9=V.32, 10=V.32bis, 11=V.34, 12=V.90,K56Flex,V.34......,56=K 56Flex, V.90,V.34......, 64=Bell 103, and 69=Bell 212. Parameter "b" specifies automode operations where: 0=automode disabled, 1= automode enabled with V.8/V.32 Annex A. Parameter **"c"** specifies the minimum connection data rate (300- 56000). Parameter **"d"** specifies the maximum connection rate (300-56000); Parameter **"e"** specifies the codec type (0= Law, and 1=A-Law). Parameter **"f"** specifies "robbed bit" signaling detection (0=detection disabled 1=detection enabled)

MNP/V.42/V.42bis/V.44 commands

Command		Function
%C_	%C0	Disable MNP Class 5 and V.42bis data compression
	%C1	Enable MNP Class 5 data compression only
	%C2	Enable V.42bis data compression only
	%C3	**Enable MNP Class 5 and V.42bis data compression**
&Q_	&Q0	Direct data link only (same as \N1)
	&Q5	**V.42 data link with fallback options**
	&Q6	Normal data link only (same as \N0)
+DS44=0, 0		Disable V.44
+DS44=3, 0		Enable V.44
+DS44?		Current values
+DS44=?		List of support values

Fax Class 1 commands

+FAE=n	Data/Fax Auto Answer
+FCLASS=n	Service Class
+FRH=n	Receive data with HDLC framing
+FRM=n	Receive data
+FRS=n	Receive silence
+FTH=n	Transmit data with HDLC framing
+FTM=n	Transmit data
+FTS=n	Stop transmission and wait

Fax Class 2 commands

+FCLASS=n	Services class.
+FAA=n	Adaptive answer.
+FAXERR	Fax error value.
+FBOR	Phase C data bit order.
+FBUF?	Buffer size (read only).
+FCFR	Indicate confirmation to receive.
+FCLASS=	Service class.
+FCON	Facsimile connection response.
+FCIG	Set the polled station identification.
+FCIG:	Report the polled station identification.
+FCR	Capability to receive.
+FCR=	Capability to receive.
+FCSI:	Report the called station ID.
+FDCC=	DCE capabilities parameters.
+FDCS:	Report current session.
+FDCS=	Current session results.
+FDIS:	Report remote capabilities.
+FDIS=	Current sessions parameters.
+FDR	Begin or continue phase C receive data.
+FDT=	Data transmission.
+FDTC:	Report the polled station capabilities.
+FET:	Post page message response.
+FET=N	Transmit page punctuation.
+FHNG	Call termination with status.
+FK	Session termination.
+FLID=	Local ID string.
+FLPL	Document for polling.
+FMDL?	Identify model.
+FMFR?	Identify manufacturer.

+FPHCTO	Phase C time out.
+FPOLL	Indicates polling request.
+FPTS:	Page transfer status.
+FPTS=	Page transfer status.
+FREV?	Identify revision.
+FSPT	Enable polling.
+FTSI:	Report the transmit station ID.

Voice commands

#BDR	Select Baud Rate
#CID	Enable Caller ID detection and reporting format
#CLS	Select Data, Fax or Voice/Audio
#MDL?	Identify Model
#MFR?	Identify Manufacturer
#REV?	Identify Revision Level
#TL	Audio output transmit level
#VBQ?	Query Buffer Size
#VBS	Bits per sample (ADPCM or PCM)
#VBT	Beep Tone Timer
#VCI?	Identify Compression Method
#VLS	Voice line select
#VRA	Ringback goes away timer
#VRN	Ringback never came timer
#VRX	Voice Receive Mode
#VSDB	Silence deletion tuner
#VSK	Buffer skid setting
#VSP	Silence detection period
#VSR	Sampling rate selection
#VSS	Silence deletion tuner
#VTD	DTMF tone reporting capability
#VTM	Enable timing mark placement
#VTS	Generate tone signals
#VTX	Voice transmit mode

> **Attention Switzerland User:**
>
> If your Swisscom phone line does not have Taxsignal switched OFF, modem function may be impaired. The impairment may be resolved by a filter with the following specifications:
>
> Telekom PTT SCR-BE
> Taximpulssperrfilter-12kHz
> PTT Art. 444.112.7
> Bakom 93.0291.Z.N

Appendix B. Notices

Lenovo may not offer the products, services, or features discussed in this document in all countries. Consult your local Lenovo representative for information on the products and services currently available in your area. Any reference to a Lenovo product, program, or service is not intended to state or imply that only that Lenovo product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any Lenovo intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any other product, program, or service.

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Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may

vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Television output notice

The following notice applies to models that have the factory-installed television-output feature.

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    ThinkCentre
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lenovo™

Part Number: 43C6566

Printed in USA

`(1P) P/N: 43C6566`

RK/BRK/OBRK/SRK
Wooden Studio Racks

EIA/TIA Compliant

The RK/BRK/OBRK/SRK Series 19" Equipment Racks

Features

- High quality black woodgrain laminate finish (OBRK features high quality oak laminate finish)

- 5/8" furniture grade MDF board construction

- 11-gauge threaded rackrails, pre-installed

- Assembles easily with included hex key

- Decorative screw caps and feet provided

- Caster kit available (Standard on SRK)

- All assembly hardware included

SRK

RK/BRK

OBRK

Architects' and Engineers' Specifications

RK/BRK/OBRK

EIA compliant Wooden Studio Rack shall be Middle Atlantic Products model # (B)RKX (X = total # of rackspaces, refer to chart). RKX shall have a 16" depth. BRKX shall have an 18" depth. Studio rack shall be constructed of 5/8" furniture grade MDF board and shall feature a high quality black wood grain laminate finish. Model # OBRKX shall include all specifications of BRKX with a high quality oak laminate finish. Pre-installed rackrail shall be 11-gauge steel with tapped 10-32 holes in universal EIA spacing. Assembly hardware shall be 2-1/4" joint connector screws. A hex key shall be included for assembly. Black plastic screw caps shall snap into place to cover the included hardware. Studio rack shall be rated to 200 lb. weight capacity. Studio rack shall be warrantied to be free from defects in material or workmanship under normal use and conditions for a period of 7 years.

SRK

EIA compliant Sloped Rolling Equipment Rack shall be Middle Atlantic Products model # SRK. Equipment rack shall provide a 16 rackspace lower bay and an upper 12 rackspace bay sloped back at a 25° angle. SRK shall be constructed of 5/8" furniture grade MDF board and shall feature a high quality black wood grain laminate finish. Pre-installed rackrail shall be 11-gauge steel with tapped 10-32 holes in universal EIA spacing. Assembly hardware shall be 2-1/4" joint connector screws. A hex key shall be included for assembly. Black plastic screw caps shall snap into place to cover the included hardware. Studio rack shall be rated to 200 lb. weight capacity. Studio rack includes four pre-installed casters. Studio rack shall be rated to 200 lb. weight capacity. Studio rack shall be warrantied to be free from defects in material or workmanship under normal use and conditions for a period of 7 years.

OPTIONS (OBRK, BRK and RK)

- Set of four casters shall be model # RKW

- Additional set of rear rackrail, shall be model # RK-RRX (X = total # of rackspaces)

OPTIONS (OBRK, BRK only)

- Smoked glass front door shall be model # RK-GD___ (6, 8, 10, 12, 14, 16, 20) for ___ rackspace (O)BRK rack

- Quick-Position™ shelf with built-in cable management slots shall be model # SH-BRK . Shelf mounts without rackrail for OBRK/BRK and accepts horizontal mounting of PD-815SC or PD-815SC-NS power strip

electronic version available at middleatlantic.com

Engineered Mounting Solutions

US: New Jersey • California • Illinois • Voice: 973-839-1011 Fax: 973-839-1976 • middleatlantic.com
Canada: Ontario • British Columbia • Voice: 613-836-2501 Fax: 613-836-2690 • middleatlantic.ca

SRK basic dimensions

6.50 [165]

0.50 [13] RAIL SETBACK

20.38 [518]

21.00 [533] (12 SPACES)

19.13 [486]

6.75 [171]

25°

54.60 [1387]

51.90 [1318]

3.00 [76]

28.00 [711] (16 SPACES)

31.75 [806]

16.00 [406]

NOTE: 10-32 THREADED RAILS

RK/BRK/OBRK basic dimensions

0.500 [13]

0.625 [16]

B

A

CUTAWAY TO SHOW LOCATION OF RACK RAIL

17.78 [452]

19.125 [486]

20.40 [518] (RK/BRK) / 20.70 [526] (OBRK)

C

All dimensions in inches [Bracketed dimensions in millimeteres]
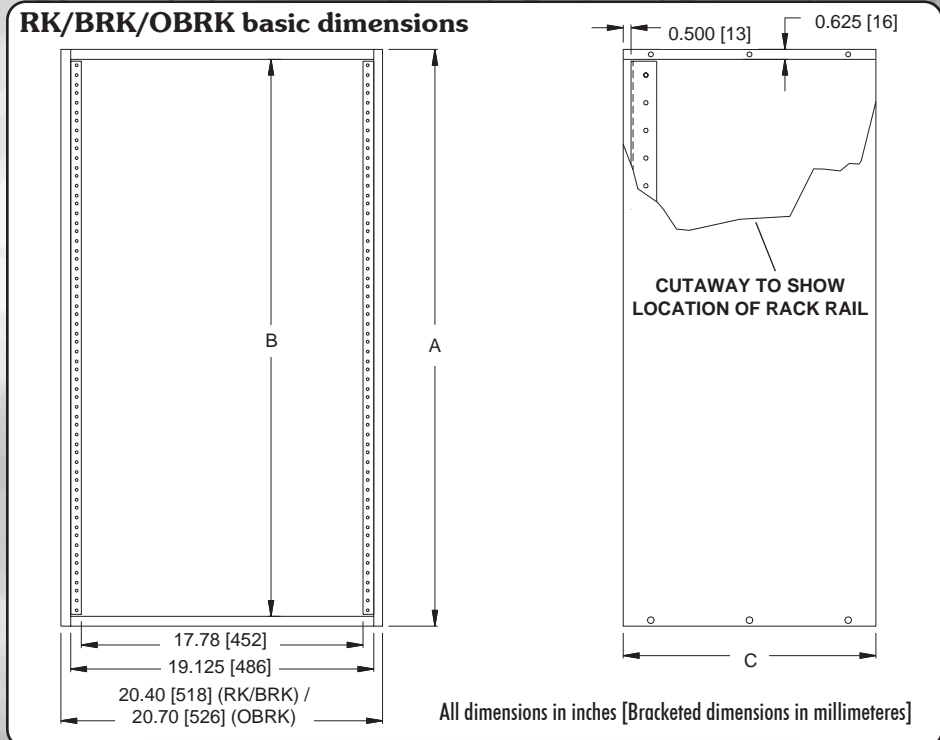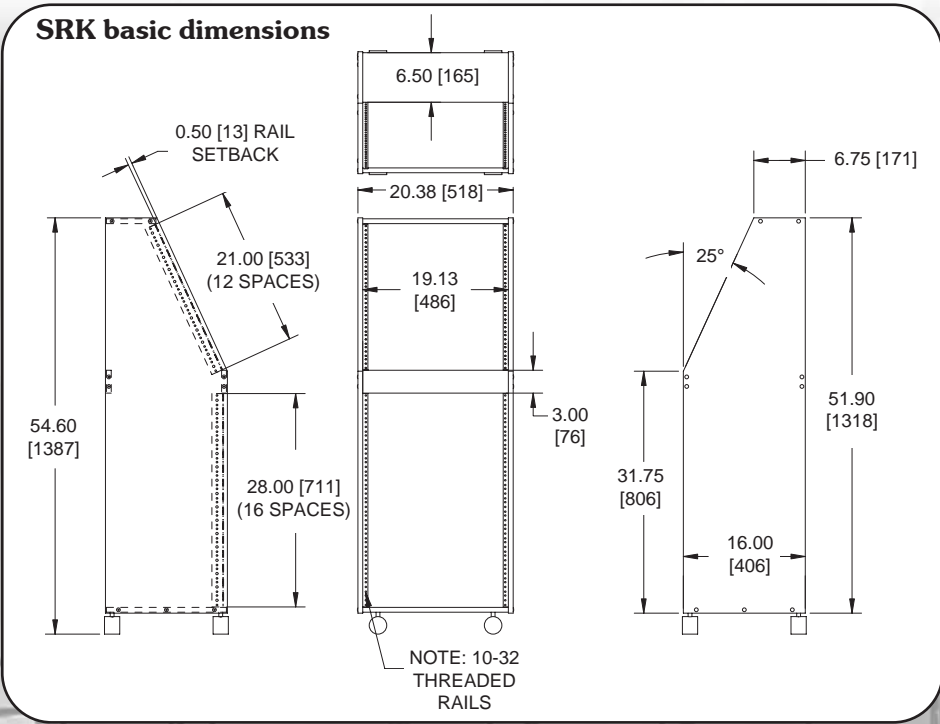
PART #	A OVERALL HEIGHT	B RACKING HEIGHT	C OVERALL DEPTH
RK2	5.00 [127]	3.50 [89]	16.00 [406]
RK4	8.50 [216]	7.00 [178]	16.00 [406]
RK6	12.00 [305]	10.50 [267]	16.00 [406]
RK8	15.50 [394]	14.00 [356]	16.00 [406]
RK10	19.00 [483]	17.50 [445]	16.00 [406]
RK12	22.50 [572]	21.00 [533]	16.00 [406]
RK14	26.00 [660]	24.50 [622]	16.00 [406]
RK16	29.50 [749]	28.00 [711]	16.00 [406]
RK20	36.50 [927]	35.00 [889]	16.00 [406]
BRK6	12.00 [305]	10.50 [267]	18.00 [457]
(0)BRK8	15.50 [394]	14.00 [356]	18.00 [457]
BRK10	19.00 [483]	17.50 [445]	18.00 [457]
(0)BRK12	22.50 [572]	21.00 [533]	18.00 [457]
BRK14	26.00 [660]	24.50 [622]	18.00 [457]
(0)BRK16	29.50 [749]	28.00 [711]	18.00 [457]
(0)BRK20	36.50 [927]	35.00 [889]	18.00 [457]

Look at things differently
WT610E digital projector.

Goes where no projector has gone before.

SMART DESIGNS ENABLE VERSATILE ACTIONS.

- **Space saving design.** Achieve up to a 100" diagonal image from 25.95" away from the screen.
- **Designed to fit** into the smallest of rooms.
- **Network connectivity.** Communicate with the projector with or without wires through an existing infrastructure or an on-the-fly peer-to-peer connection (802.11b/g).
- **USB flexibility.** Play back presentations or display images stored as .jpgs from standard USB keys.
- **Project on almost any color wall.** Preset selections provide for adaptive color tone correction when projecting onto non-white screen material or walls.
- **Extensive connections** to virtually any source through HDTV, S-Video, Component, Composite video.
- **Adapts for special needs.** ADA508 compliant for hearing-impaired and colorblind users supporting closed caption display and black & white menu options.
- **Pincushion adjustment.** Maximize image display with fine tune pincushion adjustments that reduce barrel distortion.
- **Autosense™** intuitively syncs the projector with most computer signals and features one-touch image optimization.

AMAZING IMAGES ENABLE STUNNING PRESENTATIONS.

- **High resolution display.** XGA (1024 x 768) native resolution, compatible with computer signals up to UXGA (1600 x 1200).
- **High contrast.** 3500:1 enables varying levels of black to be displayed by the projector for improved video quality.
- **Bright.** 2,000 ANSI lumens.
- **Real life colors.** VORTEX Technology Plus™ breakthrough image processing technology improves white balance, color accuracy, dynamic range and varying levels of black in an image.
- **HDTV capable.** HD Signal compatibility for the best video quality.
- **Advanced AccuBlend™.** Ensures detailed images even when non-native resolution sources are connected to the projector.
- **Color management.** Automatically adjusts for input type (presentation, movie, video, graphic and sRGB).
- **Variable audio out.** Control external amplified audio through the projector.
- **Enhanced video.** DLP™ technology enables real life video.

NEC IS A LEADER IN DEVELOPING TECHNOLOGIES TO EXTEND PROJECTOR LIFE.

- **Extended lamp life.** Eco-mode™ technology increases lamp life by up to 100% for up to 4,000 hours.
- **Security features.** Enhanced multi-level security features protect your investment.
  - **Integrated lock slot.** Attach a security cable to physically lock down the projector
  - **Cabinet control lock.** Lock cabinet control keys to prevent unauthorized access.
  - **Logo lock.** Restricts changes to logo saved in projector memory
  - **Password protection.** Restricts unauthorized use of projector
- **E-mail notification** when maintenance is due
- **Quiet operation.** Low operating noise at <32dB in Eco-Mode.
- **Sleep timer** setting enables projector to automatically shut down.

REVOLUTIONARY LENSLESS TECHNOLOGY

UP TO 4000 HOUR LAMP LIFE

EYE CATCHING DESIGN

INSTALLATION FLEXIBILITY

100" IMAGE SIZE AT LESS THAN 26" THROW DISTANCE

FITS IN INCREDIBLY SMALL SPACES

EXTENSIVE CONNECTIONS

Because It's your Image

NEC

12.32"
(313 mm)

14.96"
(380 mm)

12.32"
(313 mm)

Look at things differently
WT610E digital projector.

OPTICAL

Display Technology	Single chip 12 degree DMD
Resolution	Native: XGA 1024 x 768
	Maximum: UXGA 1600x1200
Light Output (lumens)	2000 normal, 1500 eco
Contrast Ratio	3500:1
Lamp Type	275W DC
Lamp Life (up to)	2000 hours normal, 4000 hours eco
Screen Size (diagonal)	40-100 inches diagonal
Projection Distance	2.5 – 25.9 inches, 64 – 659 mm
Projection Angle	55°
Keystone Correction	±5° Horizontal and –5° Vertical

SIGNAL COMPATIBILITY/CONNECTIVITY

Scan Rate	Horizontal	15 to 100 kHz (non-interlaced)
	Vertical	50 to 120Hz
Supported Video Standards	NTSC, NTSC4.43, PAL, PAL-60, PAL-M, PAL-N, SECAM	
SD/HD Video Signal Compatibility	1080i, 720p, 576p,576i, 480p, 480i	
PC Signal Compatibility	VGA, SVGA, XGA, SXGA, SXGA+, UXGA	
Macintosh Compatibility	Yes	
Input/Output Terminals	RGB 1 (analog)	15 pin
	RGB 2 (analog)	DVI-I with HDCP
	Video 1	Composite
	Video 2	S-Video
	Audio	1 set RCA, 2 stereo mini
	Audio Out	Variable audio out
	Monitor Out	Yes
Audio	1Wx2	
External Control	RS232, LAN (AMX/Crestron compatibility), remote in	
Sync Compatibility	Separate Sync/Composite Sync/Sync on G	
Networking	Wired LAN using integrated RJ45, 802.11b/g wireless with optional card	

ELECTRICAL

Power Req.	100-120VAC/200-240VAC, 50/60Hz
Input Current	3.9A (100V), 1.7A (240V)
Power Consumption	Eco-Mode 300W, Normal 370W, 0.6W Standby, 8.0W Idle Mode

MECHANICAL

Installation Orientation	Floor/Front, Floor/Rear, Ceiling/Front, Ceiling/Rear
Dimensions (WxDxH)	14.96" x 12.32" x 12.32", 380x313x313mm, mirror open (not including protrusions)
Net Weight	14.1 lb., 6.4 kg)
Fan Noise	<37 dB normal/<32 dB eco
Regulations	USA UL 1950 FCC Class B, Canada CSA950 (C-UL), NOM

ENVIRONMENTAL

Operational Temp	41° to 95°F / 5° to 35°C
Humidity	20-80% non-condensing
Storage	14° to 122°F / -10° to 50°C

WARRANTY

Owners receive a 2-year limited parts and labor warranty. RepairCare™ is provided during the first year of coverage for registered owners. RepairCare provides the original owner with 3-business day repair and return of the projector. When used under normal operating conditions, the lamp is covered for 90 days or 500 hours, whichever comes first.

IN THE BOX

Users manual, wired/wireless remote control, D-sub signal cable, DVI-D signal cable, DVI-A – D-sub signal cable, audio cable, USB A-B cable, power cable, set up guide, registration card

ACCESSORIES

Order Code	Description
WT610E	WT610E 2000 ANSI lumen mirror projector
WT61LP	Replacement lamp
WT60CM	Ceiling mount kit
WT60ATA	ATA shipping case
NWL-100A	802.11b/g wireless LAN PC card
WTPL-01	Extends term of limited parts and labor warranty to three years

UNIQUE FEATURES

Advanced AccuBlend	Ensures detailed images when non-native resolution sources are connected to the projector.
Autosense	Automatically syncs with any computer signal and features one touch image optimization.
VORTEX™ Technology Plus	Breakthrough image processing technology improves white level, color accuracy, dynamic range and varying levels of black in an image.
3D Reform™	Provides the ability to square the image by adjusting 3D Reform horizontally, vertically or diagonally when the projector can not be placed parallel or perpendicular to the screen.
Eco-Mode™ Technology	Extends lamp life, lowers audible noise and reduces total cost of ownership.
Built-in Wall Color Correction	Presets provide for adaptive color tone correction to display properly on non-white surfaces.
Kensington Lock Slot	Enables security cable to be attached to projector.
Image Magnification	64-step image magnification with location control.
Sleep Timer	Count down timer can be set to automatically turn off the projector.

RepairCare℠

Because It's your Image

NEC

From: Jamie Allen <jallen@esidesign.com>
Subject: **WHAC Specs for Sizing**
Date: September 27, 2007 1:26:14 PM EDT
To: Curt Meissner <cmeissner@esidesign.com>, Chris Muller <cmuller@esidesign.com>
Cc: Kris Haberman <khaberman@esidesign.com>, Isabella Bruno <ibruno@esidesign.com>, Mark Corral <mcorral@esidesign.com>, Trip Kyle <tkyle@esidesign.com>

DESIGN.

Hi guys,

If you need references for the drawings - here's some relevant specs on the gear we're using, as I'm figuring them out:

HP Point of Sale Computer - Entry
http://h10010.www1.hp.com/wwpc/us/en/sm/WF05a/12454-359465-359467-338958-f39-339692.html

Video Field Dispatches - 18" Touch Panels
Focus MTK1800VWT
http://www.shopmiracle.com/mtk1800vwt.html

Projector - Briefing Area & Global Status
http://www.aboutprojectors.com/NEC-WT615-projector.html

Wifi Routers
http://www.smc.com/index.cfm?event=viewProduct&cid=1&scid=3&localeCode=EN%5FUSA&pid=881

Laptops - Action Stations
Panasonic Toughbook® CF-30CTQAZBM
https://www.toughonline.com/features.asp?item=1014
https://www.toughonline.com/pdf/TB-30_ss.pdf

Training Towers - 32" TFT Touch Screen
LCDNC32-CAP-USB-B
http://www.touchscreens.com/lcdnc32-cap-usb-b.html

Dry-erase/Projection Wall Covering - Briefing Area & Global Status (THIS IS NOT IN SYSTEMS BUDGET)
http://www.whiteboardsetc.com/optirite5.htm

I am collecting cut-sheets for all this gear in the Mercycorps Systems Folder, under "Equipment Datasheets"
All for now...

Cheers,
Jamie

TECHNICAL DATA SHEET - *SmartMount*™
Universal Tilt Wall Mount for 32" - 50" Screens

Peerless®
Solid Solutions - Solid Support™

MODELS: ST 650, ST 650P, ST 650-S, ST 650P-S

c(UL)us

The **SmartMount™** for 32" to 50" flat panel screens provides a versatile and secure solution for professional environments such as boardrooms, hotels and stadiums. This mount offers smooth, continuous one touch tilt and IncreLok™ locking tilt, allowing for easy adjustment to achieve the perfect viewing angle without tools. The mount includes simple to align universal brackets and a unique wall plate that can be mounted to wood studs or concrete. For easy installation the mount is preassembled and includes a Sorted-For-You™ baffle pack with all screen hardware and security fasteners.

Features:

- For virtually all 32" to 50" flat panel screens
- Adjustable 15° of forward tilt, 15° backward tilt
- Integrated security features provide effective theft deterrence
- Self-balancing, one-touch tilt for effortless adjustment
- Easy access knob for fine tension adjustment
- Tilt can be locked in place with the IncreLok™ locking tilt mechanism at -5, 0, +5, +10, & +15 degree increments
- Up to 6" of horizontal adjustment after the screen is mounted
- Mounts to wood studs, concrete, or to metal studs (with accessory metal stud fastener kit)
- Universal tilt brackets easily hook onto the wall plate for fast installation
- Includes hardware for wood studs, concrete and cinder block
- Comes with Peerless' complete Sorted-For-You™ baffle pack with all screen hardware included

Accessories:

- Metal Stud Fastener Kit (ACC 215)
- Video Conferencing Shelf (ACC 309)
- Accessory Shelf (PM 600, PM 610)
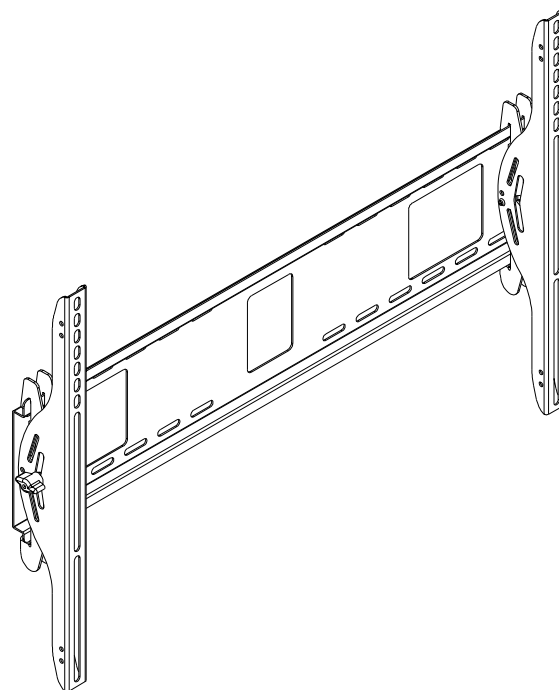
Dimensions:

Weight:
8 lb (3.6 kg)

Shipping weight:
10.5 lb (4.8 kg)

Maximum Load Capacity:
175 lb (79 kg)

Shipping Carton dimensions:
L = 8.63 in (219 mm)
W = 31.8 in (808 mm)
H = 3.88 in (99 mm)

ARCHITECTS SPECIFICATIONS

The Smartmount shall be Peerless models _____ and shall be located where indicated on the plans. It shall feature adjustable 15° of forward tilt and 15° backward tilt. It shall feature Self-balancing, one-touch tilt for effortless adjustability. Assembly and installation shall be done according to instructions provided by the manufacturer.

ISSUED: 01-16-06   SHEET NO: 202-9511-2 03-01-06

TECHNICAL DATA SHEET

MODELS: ST 650, ST 650P, ST 650-S, ST 650P-S

All dimensions = inch (mm)

30.75
(781)

29.06
(738)

17.67
(449)

18.5
(470)

Front View

2.5
(64)

Side View

30.75
(781)

30
(762)

1.35
(34)

7.45
(189)

7.2
(183)

5
(127)

2 TYP.
(51)

1.1
(28)

Wall Plate Detail

15° BACKWARD

15° FORWARD

Side View

Peerless Industries, Inc.
3215 W. North Ave. Melrose Park, IL 60160
708-865-8870   800-865-2112 Fax 708-865-2941
www.peerlessmounts.com

RMX Series
Professional Power Amplifiers

RMX850 | RMX1450 | RMX1850HD | RMX2450 | RMX4050HD | RMX5050
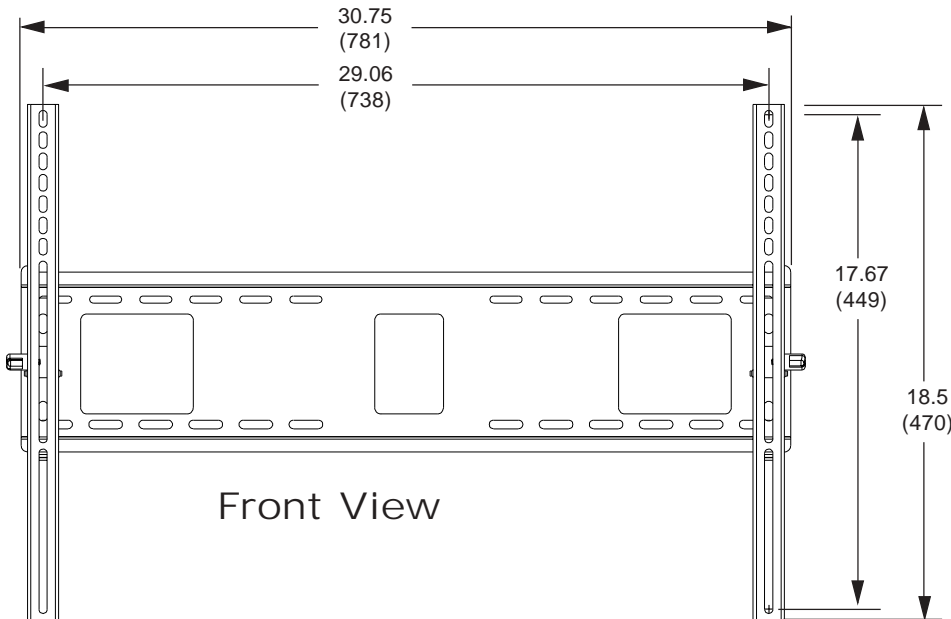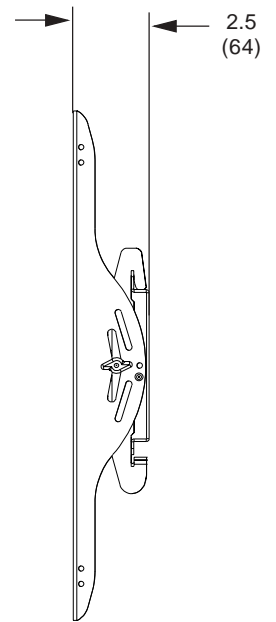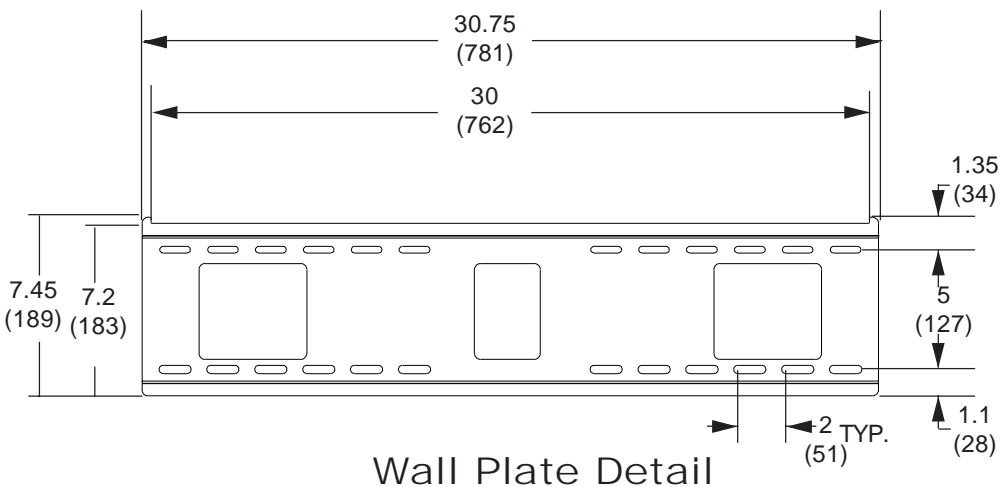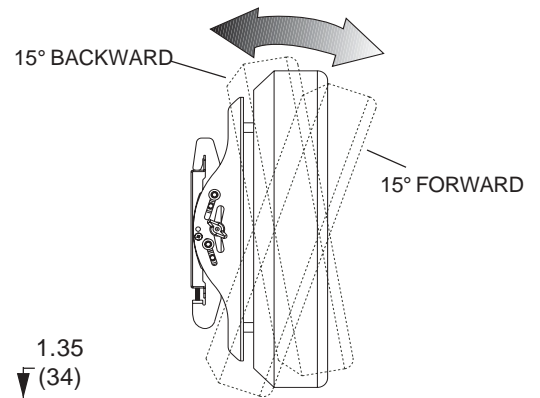
The RMX Series amplifiers from QSC offer true professional-quality performance at an affordable price. Four 2-rackspace models range in power from 430 to 1200 watts per channel at 2 ohms. Two 3-rackspace models provide 2000 to 2500 watts per channel at 2 ohms. All six models feature a compact chassis less than 16" deep. RMX amplifiers include a comprehensive set of features including XLR and 1/4" balanced inputs, Speakon® and binding post outposts for convenient connectivity. User-defeatable clip limiters and selectable low frequency filters optimize sonic performance.

RMX5050

QSC's RMX5050 power amplifier represents state-of-the-art in professional quality performance at an affordable price. Perfectly suited for a wide range of sound reinforcement applications including professional touring, performing musicians, and mobile entertainers, the RMX5050 is optimized to deliver high levels of sustained power, extraordinary audio performance and road-proven reliability.

RMX4050HD

Like its smaller sibling (the RMX1850HD), the RMX4050HD is one of two RMX "heavy duty" models designed to work as hard into 2 ohm loads as most competing amplifiers will at 4 ohms.

Both the RMX5050 and RMX4050HD feature a three-tier, Class H design that is extremely efficient at real world power levels. Less AC current is wasted and more available current goes into producing useful audio power. 120 volt versions of the RMX4050HD accomplish all this with a standard 15 amp plug.

RMX Power Amplifiers

Model	8Ω	4Ω	2Ω*	Bridged 4Ω*
		Watts per channel		
RMX850	200	300	430	830
RMX1450	280	450	700	1400
RMX1850HD	360	600	900	1800
RMX2450	500	750	1200	2400
RMX4050HD	850	1400	2000	4000
RMX5050	1100	1800	2500	5000

*1 kHz, 0.1% THD   *1 kHz, 1% THD*

Speakon is a trademark of Neutrik

Features

- Professional quality performance—incorporates road-proven QSC designs

- The 4000 watt RMX4050HD operates on a standard 15 amp plug (120V)

- Both the RMX4050HD and RMX5050 feature a dual mono, high current power supply for increased reliability and performance

- The RMX1850HD and RMX4050HD provide improved thermal performance yielding higher continuous power in 2 ohm stereo or 4 ohm bridged applications (a RMX HD exclusive!)

- Compact size—up to 2400 watts in 2 rack spaces or 5000 watts in 3 rack spaces

- High-current toroidal transformers for greater 2 ohm power and low noise

- Independent user-defeatable clip limiters reduce distortion

- Selectable low frequency filters (30 Hz or 50 Hz) protect speakers and increase headroom

- Balanced 1/4" (6.3 mm) TRS, XLR, and barrier strip inputs

- Touch-proof binding post and Neutrik Speakon® outputs

- Front mounted gain controls for easy access

- Signal and Clip LED indicators to monitor performance

- Independent DC and thermal overload protection on each channel automatically protects amplifier and speakers

- 3 year warranty plus optional 3 year extended service contract

RMX Series

	RMX850	RMX1450	RMX1850HD	RMX2450	RMX4050HD	RMX5050
Stereo Mode (both channels driven)			Continuous average output power per channel			
8Ω / FTC 20 Hz - 20 kHz / 0.1% THD	185 W	260 W	350 W	450 W	800 (650**) W	1050 W
8Ω / EIA 1 kHz / 0.1% THD	200 W	280 W	360 W	500 W	850 W	1100 W
4Ω / FTC 20 Hz - 20 kHz / 0.1% THD	280 W	400 W	550 W	650 W	1300 W	1600 W
4Ω / EIA 1 kHz / 0.1% THD	300 W	450 W	600 W	750 W	1400 W	1800 W
2Ω / FTC 20 Hz - 20 kHz / 1% THD	–	–	–	–	1600 W	2000 W
2Ω / EIA 1 kHz / 1% THD	430 W	700 W	900 W	1200 W	2000 W	2500 W
Bridge Mono Mode			Continuous average output power			
8Ω / FTC 20 Hz - 20 kHz / 0.1% THD	530 W	800 W	1100 W	1300 W	2600 W	3200 W
8Ω / EIA 1 kHz / 0.1% THD	600 W	900 W	1200 W	1500 W	2800 W	3600 W
4Ω / EIA 1 kHz / 1% THD	830 W	1400 W	1800 W	2400 W	4000 W	5000 W
Signal to Noise (20 Hz - 20 kHz) 8Ω	> -100 dB	> -100 dB	> -100 dB	> -100 dB	> -100 dB	> -100 dB
Distortion (SMPTE-IM)	< 0.01%	< 0.01%	< 0.02%	< 0.02%	< 0.02%	< 0.02%
Input Sensitivity at 8Ω	1.15V (+3.4 dBu)	1.15V (+3.4 dBu)	1.16V (+3.5 dBu)	1.23V (+4.0 dBu)	1.25V (+4.1 dBu)	1.42V (+5.3 dBu)
Voltage Gain	31.6x (30 dB)	40x (32 dB)	46x (33 dB)	50x (34 dB)	64x (36 dB)	64x (36 dB)
Output Circuitry	AB	AB	Class H, 2-tier	Class H, 2-tier	Class H, 3-tier	Class H, 3-tier
Power Requirements						
Typical, 1/8 power pink noise at 4Ω*	4.5 A	6.0 A	6.1 A	6.3 A	10.0 A	13.9 A
Severe, 1/3 power pink noise at 4Ω*	6.6 A	9.6 A	11.2 A	15.6 A	20.1 A	26.9 A
Supplied Plug Type, 100/120V	NEMA 5-15	NEMA 5-15	NEMA 5-15	NEMA 5-15	NEMA 5-15	NEMA 5-20
Supplied Plug Type, 230V	CEE7/7	CEE7/7	CEE7/7	CEE7/7	CEE7/7	CEE7/7
Weight						
Net	35 lbs (15.9 kg)	40 lbs (18.2 kg)	44.5 lbs (20.2 kg)	44.5 lbs (20.2 kg)	68 lbs (30.8 kg)	75 lbs (33.1 kg)
Shipping	41 lbs (18.6 kg)	46 lbs (20.9 kg)	50.5 lbs (23 kg)	50.5 lbs (23 kg)	77 lbs (34.9 kg)	87 lbs (37.2 kg)
Distortion (typical)						
20 Hz - 20 kHz: 10 dB below rated power	< 0.03% THD / 4Ω and 8Ω				< 0.02% THD / 4Ω and 8Ω	
1.0 kHz and below: full rated power	< 0.03% THD / 4Ω and 8Ω				< 0.02% THD / 4Ω and 8Ω	
Frequency Response	20 Hz - 20 kHz: +0/-1 dB -3 dB points: 5 Hz and 50 kHz (LF filter bybassed / 8Ω)					
Damping Factor (1 kHz and below)	> 300 at 8Ω				> 250 at 8Ω	
Input Impedance	10k ohms unbalanced / 20k ohms balanced					
Input Clipping	10 Vrms (+22 dBu)				6.4 Vrms (+18 dBu)	
Cooling	Continuously variable speed fan, back-to-front air flow					
Connectors (each channel)	Input: Active balanced / 3-pin Euro-style detachable terminal block and XLR (pin 2+)					
	Output: Touch-proof binding posts / Neutrik Speakon®					
Controls	Front: AC switch / Ch. 1 & 2 gain knobs					
	Rear: 10-position DIP switch					
Indicators	Power-on: Green LED / Signal: Yellow LED (1 per channel) / Clip: Red LED (1 per channel) Protect: Red LED					
Amplifier Protection	Full short circuit, open circuit, thermal, ultrasonic, RF protection. Stable into reactive or mismatched loads					
Load Protection	Turn-on/off muting / AC coupling (850, 1450) / Triac crowbar (1850HD, 2450, 4050HD, 5050) on each channel					
Dimensions	3.5" (8.9 cm) tall / 2 rack spaces				5.25" (13.3 cm) tall / 3 rack spaces	
Power Requirements	100, 120, 230 VAC, 50 - 60 Hz (factory configured)					

* at 120VAC, both channels driven; multiply current by .5 for 230V units   ** CE Rating

Specifications subject to change without notice.

RANE

General Description

The Rane Model SM 26S Splitter Mixer is one of the most useful, yet unusual audio products available. In its most basic configuration, it is a six-to-two line level mixer. It will accept six balanced or unbalanced line level inputs which are applied to six Level and Pan controls. An additional stereo Master Input allows a total of eight inputs. The result of the mix is sent to an overall Master Output Level control and appears at the Left and Right Outputs on the rear. In its splitter mode, the SM 26S can take one or two line level inputs and split these to any of the six Mono Outputs on the rear. The Mix/Pan controls in this mode control the level from each of the two input buses to be applied to each Output. Internal header blocks allow the Mix Outputs to become an independent stereo out, allowing a total of eight outputs. The SM 26S may also be used as a six input, six output buffer amplifier in which case signal applied to Input 1 is delivered to Output 1, and so on.

The SM 26S may also be used in a combination of modes at once. For instance, Inputs 1 through 3 may be mixed to the left and/or right output buses while at the same time Outputs 4 and 5 are delivering signal originally applied to the Left and Right Master Inputs while at the same time Output 6 is being driven from Input 6 in the straight through mode.

The front of the SM 26S comprises a Master Input Level control, six Channel Level controls, six Mix/Pan controls and a Master Output Level control. The rear of the SM 26S provides two Master Left and Right Inputs, six Mono Inputs, six Mono Outputs and two Master Left and Right Mix Outputs. All Inputs and Outputs on the SM 26S are ¼" TRS active balanced.

See the RaneNote, *"The SM 26S Swiss Army Mixer"* for additional application information, available from our website.

Features

- −10 dBV to +4 dBu Shifter
- +4 dBu to −10 dBV Shifter
- 6 Balanced Mono Inputs, 6 Balanced Mono Outputs
- 2 Main Balanced Inputs, 2 Main Balanced Outputs
- 6 Input Level Controls and 6 Mix/Pan Controls
- Master Input and Output Level Controls
- NEW! Internal Universal Power Supply (100-230 VAC)

Applications

- 6 Mono Inputs, Stereo Output Line Mixer
- 4 Stereo Inputs, Stereo Output Line Mixer
- Stereo Input, 6 Mono Output Line Splitter
- 1 Stereo Input, 4 Stereo Output Splitter
- 6-In, 6-Out Booster Amplifier
- Configurable to 8 Outputs

RANE

Features and Specifications

Parameter	Specification	Limit	Units	Conditions/Comments
Inputs: Type	Active Balanced			
..........Connectors	¼" TRS			Tip=(+), Ring=(–), Sleeve=GND
..........Impedance	20k	1%	Ω	
..........Maximum Level	22	1	dBu	
Outputs: Type	Active Balanced			
..........Connectors	¼" TRS			
..........Impedance	125	typ	Ω	1 kHz
..........Maximum Level	26	1	dBu	10 kΩ or greater
Overall Gain Range	Off to +12	-0/+6	dB	Any Input to any Output
RFI Filters	Yes	5%		
Frequency Response	10-40 kHz	+0/-3	dB	
THD+Noise	0.008	.002	%	+4 dBu, 20-20 kHz unity gain
IM Distortion (SMPTE)	0.009	.002	%	60 Hz /7 kHz, 4:1, +4 dBu unity gain
Signal-to-Noise Ratio				re +4 dBu, 20 kHz noise bandwidth
	120	2	dB	Mono Outputs, unity gain
	98	2	dB	Mix Outputs, unity gain
Crosstalk				
..........L-R Panning	60 (1 kHz)	2	dB	Any Input to Mix Outs
..........Channel-Channel	75 (1 kHz)	2	dB	Any Input to Mix Outs
Mean Time Between Failure	35,500 hours		h	Mil-Hdbk-217D, Section V
Unit: Maximum Power	7		W	
..........Universal Line Voltage	100 to 240	10%	VAC	50/60 Hz
..........Agency Listing	UL/cUL/CE			
Unit: Construction	All Steel			19" 1U Rackmount
..........Size	1.75" H x 19" W x 5.3" D			(4.4 cm x 48.3 cm x 13.5 cm)
..........Weight	5 lb (w/o power supply)			(2.3 kg)
Shipping: Size	4.25" x 20.3" x 13.75"			(11 cm x 52 cm x 35 cm)
..........Weight	9 lb			(4.1 kg)
Note: 0 dBu=0.775 Vrms	*Unity Gain = Master Levels Set to ~ "7" Position*			

Block Diagram
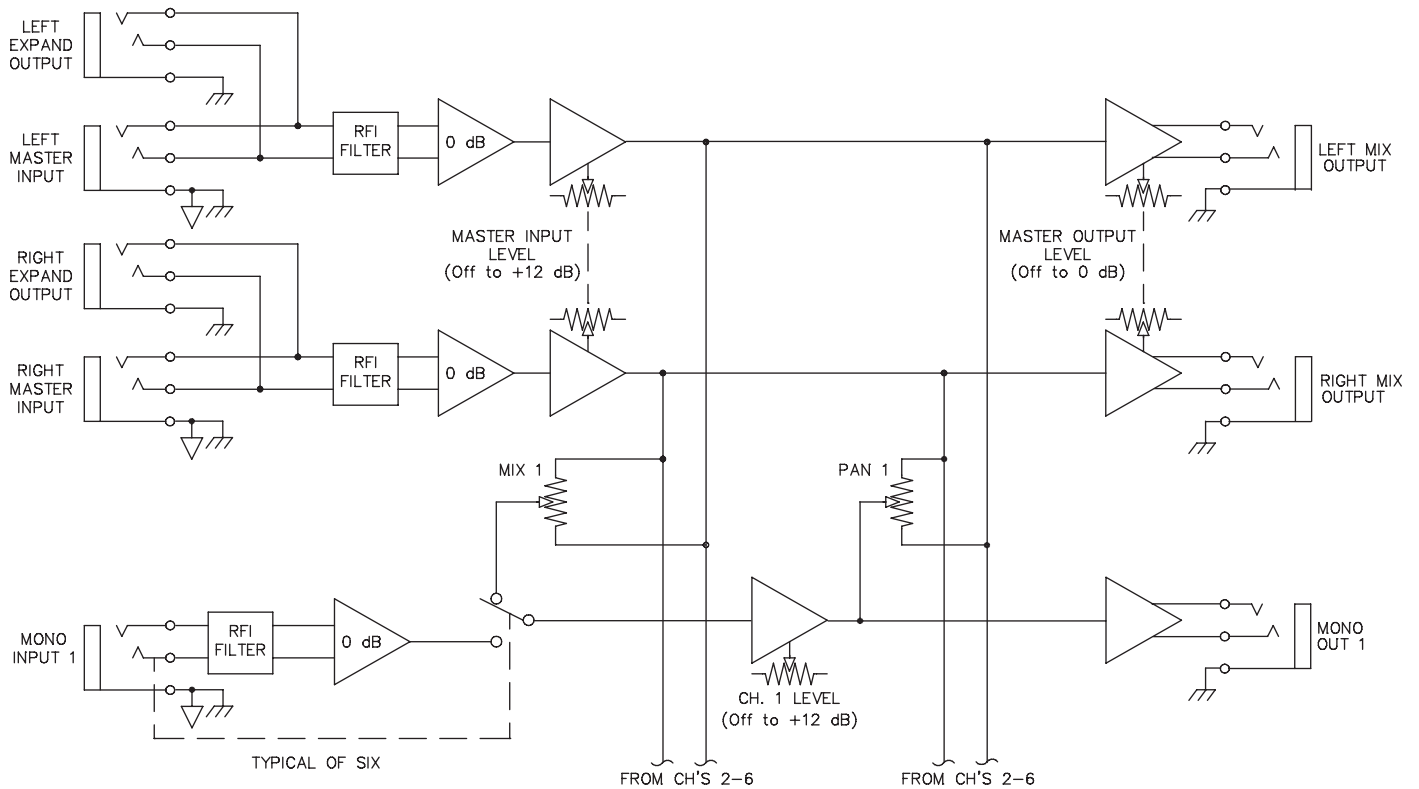
Application Information

Aptly nicknamed the "Swiss Army Mixer", the SM 26S is an extremely versatile single rack-space tool providing a number of different functions to solve a broad spectrum of line-level signal routing problems. Whether the need is for line mixing, line distribution or line matching/amplification, the SM 26S easily performs these tasks, along with additional features for even more flexibility.

One of the most popular uses is line-level mixing for keyboards, drum machines, and effects. Expanding existing console limitations is simple. Whenever a mono or stereo sub-mix is desired, the SM 26S comes to the rescue. Up to three stereo, or six mono sources easily mix together, with panning ability on every input. Many musical instrument performers find the SM 26S indispensable for combining various effects and expanding the available loops on their signal processors.

The SM 26S capabilities also include a wide variety of functions such as live recording splitting, -10 dBV to +4 dBm level matching, intercom splitting, line boosting, hotel and club zone management, restaurant paging systems, adding additional monitor buses for studio or stage use, and many more custom applications. Please consult the RaneNote *"The SM 26S Swiss Army Mixer"* for in-depth applications.

The SM 26S provides full expansion capabilities for all applications. Simple ¼" TRS connectors allow expansion using patch cords. Using these provisions, an unlimited number of lines may be mixed or split upon demand. For example, three units create either an 18 input mixer or an 18 output splitter, or a combination of both.

The question arises regarding mic levels. Since the SM 26S operates only at line levels, microphone applications require separate boosting before connection. Rane offers a mic stage model MS 1b ideally suited to this application. The MS 1b is a single channel mic preamplifier with a true differential input and balanced output. This provides the ability to locate the mic preamp close to the mic's location.

Rear Panel

Architectural Specifications

The splitter mixer unit shall have six (6) mono inputs, six (6) mono outputs, two (2) master inputs, and two (2) master outputs. The unit shall be capable of mixing or splitting any inputs to any outputs simultaneously. Each mono input shall have a level control with a range of off to +12 dB gain. Separate +12 dB gain Master Input and Output Level controls shall be provided.

Complete expansion capabilities shall be provided to allow any number of similar units to be coupled together.

A combination Mix or Pan control shall be provided on each of the six (6) mono channels to allow any output to be a mix of the two master inputs, or to allow any mono input to be panned between the two master outputs.

The inputs and outputs shall be active balanced designs terminated with ¼" TRS (tip-ring-sleeve) connectors. RFI filters shall be provided. Ultrasonic filters shall be built-in.

The unit shall be capable of operation by means of its own built-in universal power supply operating at 100-240 VAC and meet CE requirements (pending). The unit shall be UL and cUL listed (pending). The unit shall be entirely constructed from cold-rolled steel.

The unit shall be a Rane Corporation SM 26S.

Available Accessories

- SC 1.7 Security Cover
- MS 1B Microphone Preamplifier

400PX

400PXn

40" Analog/Digital Network LCD Display

SAMSUNG

- MagicNet™ X Ethernet LAN connectivity (400PXn)
- 500 cd/m² brightness
- 1366 x 768 native resolution
- 1200:1 contrast ratio
- Fast 8 ms response time
- 178° horizontal/vertical viewing angles
- Anti-image retention technologies

imagine communicating clearly without saying a word. The Samsung 400PX and 400PXn 40" LCD monitors deliver your information and your messages in big, bold, bright fashion. In lobbies or in lunchrooms, these leading-edge monitors feature 1200:1 contrast ratios, 500 nits brightness, 178° viewing angles and fast 8 ms response times. And the 400PXn can be networked through an existing LAN, allowing you to send content from a single source to many monitors and eliminating the need for any remote PCs. With the Samsung 400PX and 400PXn, it's not hard to imagine.

400PX
400PXn

40" Analog/Digital Network LCD Display

Features

DNIe™

Samsung's proprietary DNIe™ technology provides optimized motion display, natural color, increased contrast, increased brightness and stunning detail.

MagicNet™ X

The server can send files to the clients after registering to the schedule. Or the client can search for files registered in the server library, select files to be received, and play them after receiving them via the network.

Multi Display Control (MDC)

Control up to 10 units from your PC. Just open supplied MDC software, list the units to be controlled, and click on the functions to display.

Video Wall

Built-in Image Enlarging Processor supports 2 x 2, 3 x 3, 4 x 4, 5 x 1 and 1 x 5 video walls. You don't need any Video Controller Device. And to use Video and PC Interface, an additional Input Signal Distributor is not necessary.

2-Way Video Wall Display

Full mode displays the picture regardless of cabinet bezel. Natural mode considers bezel's depth and adjusts for a properly proportioned picture.

Vertical Image Capability

90˚ rotation allows vertical images or text.

Dimensions
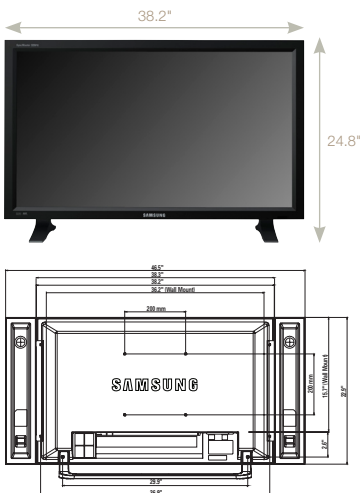
Specifications	400PX/400PXn
Viewable Size	40"
Panel Type	a-si TFT/PVA
Aspect Ratio	16:9
Pixel Pitch (H x V)	0.648 x 0.648 mm
Brightness (typical)	500 cd/m²
Contrast Ratio (typical)	1200:1
Viewing Angle (H/V)	178°/178°
Response Time (G to G)	8 ms
Scanning Frequency	Horizontal: 30~70 kHz, Vertical: 50~85 Hz
Maximum Resolution (H x V)	1366 x 768
Bandwidth	100 MHz
Colors Supported	16.7M
Sync Type	Separate H/V, Composite, SOG
Input Video Signal	Analog RGB (15-pin D-sub)
	DVI-D
	S-Video
	BNC Component Video/PC
	RS-232C 9-pin D-sub
	USB
	Audio (2 x RCA L/R, 1 x Stereo PC)
	Video Composite
Input Connectors	Analog RGB (15-pin D-sub)
	S-Video
	BNC Component Video/PC
	RS-232C 9-pin D-sub
	Speaker (10W x 2)
	Video Composite
Power Consumption	230 watts
Color	Black/Black
Included Accessories	MDC software
	User manual
	RCA adapter (4 pcs)
	Power cable
	Remote controller
	Table-top stand
Optional Accessories	Speaker: SP-L400PB/S (10 watts x 2), Wall Mount Bracket: WMB-4050PS (VESA compatible)
Dimensions (W x H x D)	38.2" x 24.8" x 8.8" (without stand: 38.2" x 22.9" x 4.7")
Net Weight	51.8 lbs.
Plug and Play	DDC 2B
Compatibility	Windows, Mac, Sun
Special Features	Anti-image retention function (DNIe), PIP/PDP/POP, HDCP (HD copy protection), Safety lock, Video wall (2 x 2, 3 x 3, 1 x 5, 5 x 1, 4 x 4)
Magic Technologies	XP-based MagicNet™ (400PXn)
Safety/Regulation	FCC Class A, UL, CSA, TUV, NEMCO, CE, NUTEK

900 SERIES

MIXER/ AMPLIFIERS:

A-903MK2
A-906MK2
A-912MK2

THE TOA 900 SERIES are widely recognized as the industry standard in installed sound system amplification. When reliability and performance are critical – such as in paging and music distribution for airport, hospital, and industrial sound systems – you can count on the TOA 900 Series to perform consistently, day-in and day-out.

The **A-903MK2** (30 W), **A-906MK2** (60 W) and **A-912MK2** (120 W) **Modular Mixer/Amplifiers** are engineered for high performance with wide frequency response, very low noise and distortion, and excellent output regulation. Eight module slots allow you to easily configure custom configurations using TOA plug-in modules with an extensive array of features and connector types. You can increase the input capacity by connecting a second mixer or mixer/amplifier to the rear-panel Bridge In/Out jack. Outputs include transformer-isolated 25 V, 70 V and 8 ohm (A-903MK2: 4 ohm) plus a direct low-impedance mode if non-transformer operation is required.

Multiple paging priorities are easily configured using optional mute-type modules activated by external switch-closure or mute-send modules. Pre-Out/Power-In jacks allow connection of external signal processing between the mixer and amplifier sections. Other features include protection circuitry, auxiliary output, bass/treble controls and remote master volume terminals.

The 900 Series Mixer/Amplifiers are UL and cUL Listed and carry a five year warranty.

HIGHLIGHTS

- **Modular Eight Channel Mixer/ Amplifiers** for paging, background/ foreground music distribution and music/messaging-on-hold.

- **Proven TOA Quality and Reliability**

- **Engineered for High Performance** with wide frequency response, very low noise and distortion, and excellent output regulation.

- **Three Models:** **A-903MK2** (30 W), **A-906MK2** (60 W), **A-912MK2** (120 W)

- **Eight Module Slots** accept any combination of TOA plug-in modules for custom system configurations.

- **25 V, 70 V and 8 Ohm Transformer-Isolated Speaker Outputs** with screw terminal connector and protective cover plate (A-903MK2: 4 ohm).

- **Direct Low-Impedance Output Mode** bypasses output transformer.

- **Dual Mute Bus** permits multiple levels of paging priority using optional mute-type modules.

- **External Mute Terminals** for activating mute function with external switch-closure.

- **Remote Master Volume Terminals** for control with an external 10k ohm linear-taper potentiometer.

- **Individual Channel and Master Volume Controls.**

- **Bass/Treble Tone Controls** with tone defeat switch.

- **Low Cut Switch** to limit low frequency response.

- **Auxiliary Output** for connecting an external mixer or recording device.

- **Insert Jacks** for connecting external signal processing.

- **Bridging Input/Output** for input expansion or recording device.

- **Normal, Clip, Power, Protect, and Signal Indicators** provide unit status.

- **Rear Panel AC Convenience Outlet** for powering external equipment

- **Turn-On Delay** disconnects output during power-up.

- **Over-current and Thermal Protection Circuitry** prevents potential damage from overload, short-circuit and overheating.

- **Volume Control Security Knobs Included (4)**

- **Optional Rack-Mount Kits**

- **UL / cUL Listed**

- **Five Year Warranty**

OPTIONAL ACCESSORIES

Plug-in Modules (see individual module specifications)

MB-25B	Rack-mount Kit (2 RU)
PF-511	Perforated Rack Panel (2 RU)
YA-920	Volume Control Security Knob

900 Series Module Guide available from http://www.toaelectronics.com

SPECIFICATIONS

900 SERIES
MIXER/AMPLIFIERS

Tel: 800-733-7088
Fax: 800-733-9766
www.toaelectronics.com

TOA

Type	8-channel modular mixer/amplifier
Output Power	**A-903MK2**: 30 W RMS; **A-906MK2**: 60 W RMS **A-912MK2**: 120 W RMS
Power Bandwidth	(D) 20 - 20k Hz, 0.5% THD; (T) 50 - 20k Hz, 0.5% THD
Frequency Response	(D) 20 - 20k Hz, ±1 dB; (T) 20 - 15k Hz, ±1 dB (T) 20 - 20k Hz, +1 dB / -3 dB
Total Harmonic Distortion	0.02% at 1k Hz, rated output
Inputs	8 input ports: every port accepts any input module 1 Bridging Input/Output
Input Sensitivity & Impedance	Please refer to 900 Series module specifications. Bridging Input/Output: 100 mV / 3.3k Ω
Pre-amp. Out/ Power Amp. In	1 V, 600 Ω / 1 V, 10k Ω
Outputs (T)=Transformer (D)=Direct	Main (T): 8 Ω, 25 V & 70 V, balanced Main (D): 4 Ω, unbalanced Aux: 1 V, 10k Ω
Output Regulation (1k Hz)	(D): Less than 0.5 dB, no load to full load (T): Less than 1.0 dB, no load to full load
Dynamic Range (Band Pass: 20 - 20k Hz, with Tone Controls centered)	Master volume set to min.: 90 dB Master volume set to max.: 77 dB Power amplifier only: 105 dB
Tone Controls	Bass: ±10 dB at 100 Hz; Treble: ±10 dB at 10k Hz
Indicators	Normal, Peak, Power, Protect, and Signal LEDs
Protection	Self-protection, with internal AC fuse
Power Consumption	**A-903MK2**: 60 W; **A-906MK2**: 100 W; **A-912MK2**: 180 W
Temperature Range	12° F to 140° F (-10° C to +60° C)
Color	Black
Dimensions (W x H x D)	**A-903MK2**: 16.5" x 3.9" x 12.5" (420 x 99.1 x 318 mm) **A-906/912MK2**: 16.5" x 3.9" x 14.1" (420 x 99.1 x 358 mm)
Weight (without modules)	**A-903MK2**: 17.2 lbs (7.8 kg); **A-906MK2**: 21.2 lbs (9.6 kg) **A-912MK2**: 25.1 lbs (11.4 kg)
Other Features	Output connects approx. 5 seconds after switching power on.

Visit www.toaelectronics.com to download:

900 Series Architect and Engineering Specifications
900 Series Installation Manual
900 Series CAD Files
900 Series Module Guide

APPLICATIONS

A/V Rentals
Airports
Audio/Visual
Auditoriums / Theatres
Banks
Bars / Lounges / Nightclubs
Boardrooms
Business Music
Conference Facilities
Convenience Stores
Educational Facilities
Fitness Clubs / Gymnasiums
Hotels / Hospitality
Houses of Worship
Industrial / Warehouses
Museums
Music Distribution
Offices
Public Address
Restaurants
Retail Stores
Theme Parks
Training Rooms

900 SERIES
MIXER/AMPLIFIERS

Tel: 800-733-7088
Fax: 800-733-9766
www.toaelectronics.com

TOA

Model	Type	Description
M-01F	MIC	Microphone Input Module, Balanced, 200 Ω, Lo/Hi-Cut Filters, Female XLR
M-01M	MIC	Same as M-01F with Male XLR
M-01P	MIC	Same as M-01F with Phone Jack
M-01S	MIC	Same as M-01F with Screw Terminals
M-03P	MIC	Microphone Input Module, HiZ, Unbalanced, 50k Ω, Lo/Hi-Cut Filters, Phone Jack
M-11S	MIC	Microphone Input Module, Balanced, 200 Ω, Lo/Hi-Cut Filters, Mute-Receive, Screw Terminals
M-21S	MIC	Microphone Input Module, Balanced, 200 Ω, Lo/Hi-Cut Filters, Remote Vol. Control, Screw Terminals
M-41S	MIC	Microphone Input Module, Balanced, 200 Ω, Lo/Hi-Cut Filters, Mute-Send, Removable Terminal Block
M-51F	MIC	Microphone Input Module, Balanced, 200 Ω, Lo-Cut Filter, Voice Gate, Female XLR
M-51S	MIC	Same as M-51F with Screw Terminals
M-61F	MIC	Microphone Input Module, Balanced, 200 Ω, Lo/Hi-Cut Filters, Compressor, Female XLR
M-61S	MIC	Same as M-61F with Screw Terminals
B-01F	LINE	Balanced Line Input Module, 10k Ω Transformer, Female XLR
B-01S	LINE	Balanced Line Input Module, 10k Ω Transformer, Screw Terminals
B-11S	LINE	Balanced Line Input Module, 10k Ω Transformer, Mute-Receive, Screw Terminals
B-21S	LINE	Balanced Line Input Module, 10k Ω Transformer, Remote Volume Control, Screw Terminals
B-41S	LINE	Balanced Line Input Module, 10k Ω Transformer, Mute-Send, Removable Terminal Block
L-01F	LINE	Line Matching Input Module, 600 Ω Transformer, Balanced, Female XLR
L-01S	LINE	Same as L-01F with Screw Terminals
L-11S	LINE	Line Matching Input Module, 600 Ω Transformer, Balanced, Mute-Receive, Screw Terminals
L-41S	LINE	Line Matching Input Module, 600 Ω Transformer, Balanced, Mute-Send, Scew Terminals
U-01F	LINE	Line Input Module, Unbalanced, 220k Ω, Female XLR
U-01P	LINE	Same as U-01F with Phone Jack
U-01R	LINE	Same as U-01F with RCA Jack
U-01S	LINE	Same as U-01F with Screw Terminals
U-03R	LINE	Stereo Line Input Module, Lo/Hi-Cut Filters, Stereo Summing Dual RCA Jacks
U-03S	LINE	Line Input Module, Lo/Hi-Cut Filters, Screw Terminals
U-11R	LINE	Line Input Module, Unbalanced, 220k Ω, Mute-Receive, RCA Jack
U-11S	LINE	Line Input Module, Unbalanced, 220k Ω, Mute-Receive, Screw Terminals
U-12S	LINE	Line Input Module, Unbalanced, 220k Ω, Variable Mute-Receive Depth, Screw Terminals
U-13R	LINE	Same as U-03R with Mute-Receive
U-13S	LINE	Same as U-03S with Mute-Receive
U-21S	LINE	Line Input Module, Unbalanced, 220k Ω, Remote Volume Control, Screw Terminals
U-43R	LINE	Same as U-03R with Mute-Send
U-43S	LINE	Same as U-03S with Mute-Send
U-61S	LINE	Line Input Module, Unbalanced, 220k Ω, Compressor, Screw Terminals
E-03R	SPECIAL FUNCTION	900 Series Processor Module for F-121C/CM Speakers, Dual RCA Jacks
E-04R	SPECIAL FUNCTION	900 Series Processor Module for H-1 Speakers, Dual RCA Jacks
E-05R	SPECIAL FUNCTION	900 Series Processor Module for H-2/H-2WP Speakers, Dual RCA Jacks
E-06R	SPECIAL FUNCTION	900 Series Processor Module for H-3/H-3WP Speakers, Dual RCA Jacks
E-07S	SPECIAL FUNCTION	900 Series Low Pass Filter Output Module for FB-100 and HB-1, Removable Terminal Block
S-01S	SPECIAL FUNCTION	Signal Generator Module, 1 kHz Sine Wave, Screw Terminals
S-02S	SPECIAL FUNCTION	Signal Generator Module, Buzzer/Yelp, Screw Terminals
S-04S	SPECIAL FUNCTION	Signal Generator Module, 8 Selectable Tones, Screw Terminals
T-01S	SPECIAL FUNCTION	Line Output Module, Balanced, 600 Ω, Screw Terminals
T-02S	SPECIAL FUNCTION	Line Input Module for Music-on-Hold, Unbalanced, 220k Ω Input, 600 Ω Balanced Output, Screw Terminals
T-12S	SPECIAL FUNCTION	Same as T-02S with Input Mute-Receive

900 Series
Mixer/
Amplifiers

900 Series Module Chart
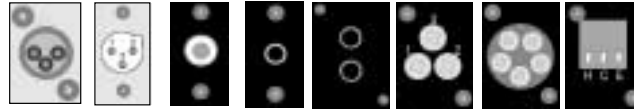
		Female XLR	Male XLR	1/4" Phone Jack	RCA Jack	Dual RCA Jacks	3 Screw Terminals	5 Screw Terminals	Removable Terminal Block
Microphone Input Modules	Standard with high/low cut filters	M-01F	M-01M	M-01P			M-01S		
	Mute-Receive with high/low cut filters						M-11S		
	Mute-Send with high/low cut filters								M-41S
	Voice Gate with low cut filters	M-51F					M-51S		
	Compressor with high/low cut filters	M-61F					M-61S		
	Remote Volume Control with high/low filters							M-21S	
	For high-Z mic. only w/ high/low cut filters			M-03P					
Line Input Modules*	Standard, no special features	L-01F B-01F U-01F		U-01P	U-01R		L-01S B-01S U-01S		
	Standard with high/low cut filters					U-03R			U-03S
	Mute-Receive				U-11R		L-11S B-11S U-11S		
	Mute-Receive with high/low cut filters					U-13R			U-13S
	Mute-Receive with variable mute depth						U-12S		
	Mute-Send						L-41S		B-41S
	Mute-Send with high/low cut filters					U-43R			U-43S
	Remote Volume Control							B-21S U-21S	
	Compressor						U-61S		
Special Function Modules	Line output						T-01S		
	Line input with Music-On-Hold (MOH) output								T-02S
	Line input w/ MOH & input Mute-Receive								T-12S
	1 kHz Sine Wave test tone						S-01S		
	Buzzer/Yelp signal tone						S-02S		
	Switch-selectable tone						S-04S		
	Equalizer for F-121C/CM Speakers					E-03R			
	Equalizer for H-1 Speakers					E-04R			
	Equalizer for H-2/H-2WP Speakers					E-05R			
	Equalizer for H-3/H-3WP Speakers					E-06R			
	Low Pass Filter for FB-100/HB-1 Speakers								E-07S

*For Line Input Modules: Use "B" modules w/ transformer isolation for balanced/unbalanced sources. Use "L" modules only for 600 ohm impedance matching. Use "U" for unbalanced sources w/ short cables (≤ 15 feet).

Muting Modules

The two types of muting modules, MUTE-RECEIVE and MUTE-SEND, have mute function circuitry that connects to two common "MUTE" buses, and one common "GROUND" bus when installed in an A-900MK2 mixer/amplifier or M-900MK2 mixer/pre-amplifier. A "BUS" is simply an internal wire that connects from module-slot to module-slot. You can access these buses via rear-panel screw terminals, labeled, "MUTE 1", "MUTE 2" and "GND". Mute-type modules connect to both mute buses "out-of-the-box". You can disconnect the module's mute function circuitry from each mute bus by cutting jumper wires on the modules. This allows you to configure systems with multiple levels of priority.

MUTE-RECEIVE modules respond to mute bus activation in either of two ways: 1) Switch Activation: Connecting a switch closure between the "MUTE" (1 or 2)" and "GND" screw terminals on the rear of the mixer/amplifier activates the mute function circuitry of MUTE-RECEIVE modules connected to the same bus. This is also referred to as "manual muting". 2) Auto-Mute: When input signal level to a MUTE-SEND module exceeds a user-adjustable threshold, the module's mute function circuitry activates the mute function circuitry of all MUTE-RECEIVE modules connected to the same bus. This is also referred to as "signal-activated muting".

TOUGHBOOK®

toughbook 30

Powerful, Rugged and Wireless

- *Full Magnesium Alloy Case with Handle*
- *Moisture- and Dust-resistant Design*
- *Shock-mounted, Removable HDD*
- *Wide Area Wireless and GPS Capable*
- *Intel® Centrino® Duo Mobile Technology*

INDEPENDENT · AGENCY TESTED ·
MIL-STD-810F COMPLIANT

Panasonic
ideas for life

TOUGHBOOK®

toughbook 30
Powerful, Rugged and Wireless

Panasonic recommends Windows® XP Professional for Business

DURABILITY FEATURES
- Designed using MIL-STD-810F test procedures
- Full magnesium alloy case with handle
- Moisture- and dust-resistant LCD, keyboard and touchpad
- Sealed port and connector covers
- Shock-mounted, removable HDD in stainless steel case
- Rugged, dust-resistant hinges
- Vibration and drop-shock resistant
- Pre-installed replaceable screen film for touchscreen protection

CPU
- Intel® Core™ Duo Processor L2400
  – 2MB L2 cache
  – Processor speed 1.66GHz
  – 667MHz FSB

STORAGE & MEMORY
- 80GB or 60GB HDD
- 512MB SDRAM (DDR2) standard, expandable to 4096MB

DISPLAY
- With 80GB HDD: 13.3" 1024 x 768 (XGA) transmissive, daylight-readable TFT Active Matrix Color LCD with Touchscreen
- With 60GB HDD: 13.3" 1024 x 768 (XGA) transmissive, daylight-readable TFT Active Matrix Color LCD without Touchscreen
- External video support up to 1280 x 1024 at 16 million colors (24 bit color depth)
- Intel® Mobile 945GM graphic controller DVMT up to 128MB
- 1000 Nit (touchscreen models), 500 Nit LCD brightness (non-touchscreen models)

AUDIO
- Sigmatel™ STAC9751T AC-97 v2.1 Compliant Audio Codec
- Integrated front-facing speaker
- Convenient keyboard volume and mute controls

EXPANSION SLOTS
- PC Card Type II x 1
- Secure Digital (SD) Card
- Express Card/54 x 1

MULTIMEDIA POCKET
- Will accept optional Combo or Multi Drive, or 2nd Battery

KEYBOARD & INPUT
- 87-key with dedicated Windows® key
- Pressure sensitive touchpad with vertical scrolling support
- Touchscreen LCD (only with Touchscreen version)

INTERFACE
- External Video — MiniD-sub 15 pin
- Headphones/Speaker — Mini-jack Stereo
- Microphone/Line In — Mini-jack
- Port Replicator — 80 pin (Reinforced)
- Serial — D-sub 9 pin
- Ext. Antenna Conn. — 50 Ohm Coaxial
- USB 2.0 (x 3) — 4 pin
- IEEE 1394a (Firewire) — 4 pin
- 10/100/1000 Ethernet — RJ-45
- 56K Modem — RJ-11

WIRELESS
- Bluetooth® v2.0
- Intel® PRO/Wireless 3945ABG LAN connection 802.11a/b/g
- Security
  – Authentication: LEAP, WPA, 802.1x, EAP-TLS, EAP-FAST, PEAP
  – Encryption: CKIP, TKIP, 128-bit and 64-bit WEP, Hardware AES
- Slide on/off switch

POWER SUPPLY
- Lithium Ion battery pack (10.65V, 8.55Ah) with overcharge protection
- Battery operation: TBD***
- Battery charging time: TBD***
- AC Adapter: AC 100V-240V 50/60Hz, Auto Sensing/Switching worldwide power supply
- Pop-up on-screen battery status reporting

POWER MANAGEMENT
- Hibernation, Standby, ACPI Bios

SOFTWARE
- Genuine Windows® XP Professional SP2
- Setup, Diagnostics, DMI Viewer, On-line Reference Manual, Adobe® Acrobat® Reader

SECURITY FEATURES
- Password Security: Supervisor, User, Hard-Disk Lock
- Cable lock slot
- Trusted Platform Module (TPM) Security Chip v.1.2

WARRANTY
- 3-year limited warranty, parts & labor

DIMENSIONS & WEIGHT
- 2.8"(H) x 11.9"(W) x 11.3"(D)
- 8.2 lbs.

■ *Full Magnesium Alloy Case with Handle*
■ *Moisture- and Dust-resistant Design*
■ *Shock-mounted, Removable HDD*
■ *Wide Area Wireless and GPS Capable*
■ *Intel® Centrino® Duo Mobile Technology*

INTEGRATED OPTIONS**
- Wide Area Wireless Solutions
  – EVDO
  – HSDPA
- Global Positioning System (GPS) Receiver
- Backlit Keyboard – sealed rubber or plastic emissive
- SmartCard Reader
- Fingerprint Scanner

ACCESSORIES**
AC Adapter (3 pin)	CF-AA1653AM
MIL-461 Compliant AC Adapter	CF-AA1653ASM
Battery Charger	CF-VCBTB1U
Combo Drive (DVD-ROM*/CD-RW**)	CF-VDR301U
DVD Multi Drive (DVD-RAM/DVD-RW/CD-RW**)	CF-VDM301U
ComFolio Universal Carrying Case (large capacity)	CF-COMUNIV
ComFolio Universal Jr. Carrying Case	CF-COMUNIVJR
Desktop Port Replicator	CF-VEB272A2W
External USB Floppy Drive	CF-VFDU03W
Lithium Ion Battery Pack	CF-VZSU46U
Lithium Ion Battery Pack for Multimedia Pocket	CF-VZSU1430U
Memory Cards	
– 512MB	CF-WMBA5512
– 1GB	CF-WMBA501G
ToughMate Nylon Sling Carrying Case	CF-TM29
Touchscreen Large Stylus with Tether Hole	CF-VNP004U
Vehicle Mount Port Replicator (USB 2.0)	
Vehicle Mount Port Replicator with Integrated Dual High-gain Antenna Pass-throughs (USB 2.0)	
Vehicle Mount Port Replicator with Integrated High-gain Antenna Pass-through (USB 2.0)	
13.3" LCD Protector Film	CF-VPF03U

*Decoder software is required for DVD movie play. (Included)
**CD authoring software is required to write CD-RW. (Included)
***Battery performance features such as charge time and life span can vary according to the conditions under which the computer and battery are used. Battery operation and recharge times will vary based on many factors including screen brightness, applications, features, power management, battery conditioning and other customer preferences. Battery testing results from MobileMark 2002.
****Accessories and Integrated Options may vary depending on your notebook configuration.
Please consult your reseller or Panasonic representative before purchasing.

For more information call 1-800-662-3537 or visit us on the Web at panasonic.com/toughbook.

intel Centrino Duo

Panasonic
ideas for life

Tripp Lite

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SmartPro Tower UPS System
Intelligent line-interactive network power management system

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SmartPro Tower UPS System
Intelligent line-interactive network power management system

Model #: SMART3000SLT

▶ 3000VA / 3kVA line interactive tower UPS

▶ Maintains sine-wave 120V nominal output over an input range of 83 to 145V

▶ Network communications supported via HID enabled USB port, RS-232 enabled DB9 port, SNMP/Web card slot and EPO interface

▶ Current monitoring via front panel meter

▶ Input: NEMA L5-30P (120V 30A) / Output: 6 x NEMA 5-15/20R, 1 x L5-30R (120V)

▶ 2 year product warranty / $250,000 Ultimate Lifetime Insurance (USA, Puerto Rico & Canada only)

CISCO Compatible

CISCO PARTNER Technology Developer

Enterprise Assistance

E-mail us your critical extended run application requirements for large kVA and extended run UPS Systems and we will research the ideal solution and provide a custom configuration.

Contact a Tripp Lite Product Specialist

DESCRIPTION

3000VA line-interactive tower UPS system for server, networking and telecommunications equipment. Upright tower form factor. Offers sine wave 120V nominal output in both AC and battery modes. Switches to battery-derived AC output during power failures and extreme voltage variations. Line-interactive automatic voltage regulation (AVR) provides voltage boost/cut during brownouts/overvoltages to maintain regulated 120V nominal output over an input voltage range of 83-145V. Includes NEMA L5-30P input plug and 7 UPS-supported output receptacles (6 x 5-15/20R, 1 x L5-30R). Network-grade AC surge and noise suppression. Network management interfaces support simultaneous communications via USB port, DB9 serial port and SNMPWEBCARD slot. HID-compliant USB interface enables integration with built-in power management and auto shutdown features of Windows and Mac OS X. Supports simultaneous detailed monitoring of equipment load levels, self-test data and utility power conditions via all three network interfaces. Includes PowerAlert power management software and complete cabling. Three-stage metered current monitoring and battery charge status LEDs. Utility power and voltage regulation, and battery warning LEDs. Audible alarm. Self-test. Field-replaceable, hot-swappable internal batteries. Attractive all-black color scheme. 2-year warranty and $250,000 connected equipment insurance; extended warranty and service contracts available.

KEY BUYING POINTS

- SmartPro line-interactive UPS system is ideal for voice, data, medical and industrial networking applications
- Line-interactive voltage regulation maintains selectable 120V nominal output during brownouts as low as 83V and overvoltages to 145V
- Enables continuous operation through blackouts, voltage fluctuations and surges
- Line-interactive automatic voltage regulation (AVR) provides 12% and 24% voltage boost during brownouts and a 12% voltage cut during overvoltages
- Standard internal battery set offers 9 min. runtime at half load (1125W) and 3 min. at full load (2250W)
- Space-saving upright tower format
- Network interfaces support simultaneous communications via built-in USB port, DB9 serial port and SNMPWEBCARD slot
- HID-compliant USB interface enables integration with built-in power management and auto shutdown features of Windows and Mac OS X
- Included PowerAlert power management software supports safe unattended shutdown, monitoring and control via local connected servers, plus any number of additional servers over IP
- UPS interface supports on-battery, low-battery, power-restored, AC-voltage, DC-voltage, output current monitoring, battery charge current, battery

- capacity, timed inverter shutoff, activate self-test and output power control
- NEMA L5-30P input plug / 6 x NEMA 5-15/20R and 1 x NEMA L5-30R output receptacles
- Front panel LEDs provide current monitoring, voltage regulation, battery charge level and battery warning information
- UPS ships fully assembled in full compliance with DOT regulations; no time-consuming connection of internal batteries by user required
- 2-year product warranty; $250,000 Ultimate Lifetime Insurance

TYPICAL APPLICATIONS

- Ideal for protection of network fileservers, internetworking gear, switches, hubs, POS terminals, VoIP telephony and traditional PBX switching systems, back office computer systems, ATM machines, informational/Internet/commerce kiosks, remote unattended servers, web servers, database servers, security systems, card readers, security cameras and other sensitive electronic devices requiring clean, continuously regulated output power.

OPTIONS & ACCESSORIES

- SNMP accessories: SNMPWEBCARD, ENVIROSENSE
- Watchdog Software: WATCHDOGSW
- Dataline protectors: DNET1, DTEL2, DCATV
- Circuit tester: CT120
- Power distribution: PDU1215, PDUNV
- USB hubs/accessories: U202-004-R, U205-004-R, U022-010
- Extended warranties: 3-year WEXT3-2200-3000, 5-year WEXT5-2200-3000

PACKAGE INCLUDES

- SMART3000SLT UPS System
- PowerAlert Software and cabling
- Owner's manual with warranty information

COMPLETE SPECIFICATIONS

SYSTEM OVERVIEW

System overview:	3000VA line-interactive UPS system
Voltage compatibility:	120V
Frequency compatibility:	50 / 60Hz

OUTPUT

Output volt amp capacity (VA):	3000
Output watt capacity (watts):	2250
Output nominal voltage:	120
Output voltage regulation:	LINE MODE: Sine wave line voltage 120V (-18% / +8%)
Output frequency regulation:	LINE MODE: Passes line frequency of 60Hz +/-10%
Outlet quantity / type:	6 x NEMA 5-15/20R, 1 x NEMA L5-30R
Overload protection:	Two-branch 20A output breakers

INPUT

Maximum input amps:	20A
Input connection type:	NEMA L5-30P
Input cord length:	10 ft.
Recommended electrical service:	30A 120V

BATTERY

Full load runtime:	3 min.
Half load runtime:	9 min.
DC system voltage:	48 VDC
Typical battery lifespan:	4-6 years typical
Replacement Battery Cartridge:	RBC48-SLT

VOLTAGE REGULATION

Voltage regulation description:	Automatic Voltage Regulation (AVR) circuits maintain clean, regulated computer-grade output, without using battery power, during brownouts to 83V and overvoltages to 145V
Overvoltage correction:	Input voltages from 127-145V are reduced by 12%
Brownout correction:	Input voltages from 96-108V are boosted by 12%
Severe brownout correction:	Input voltages from 83-95V are boosted by 24%

LEDS ALARMS & SWITCHES

Front panel LEDs:	9 front panel LEDs: Green POWER LED, Green VOLTAGE CORRECTION LED, 3-stage BATTERY CHARGE LED's, 3 stage OUTPUT LOAD LEVEL LED's, red BATTERY WARNING LED
Alarms:	Tri-functional audible alarm indicates power failure conditions (4 short beeps every 10 seconds), overload (continuous short beeps) and low battery (continuous tone)
Switches:	2 front panel-mounted push-button switches for system enable, self-test and alarm cancel functions

SURGE / NOISE SUPPRESSION

AC surge suppression:	570 joules
AC suppression response time:	instantaneous
EMI / RFI AC noise suppression:	Yes

PHYSICAL

Unit weight (lbs):	57
Unit weight (kg):	25.9
Unit Dimensions (HWD/in):	10.5 x 8.875 x 12.5
Unit Dimensions (HWD/cm):	26.7 x 22.5 x 31.75
Shipping Dimensions (HWD/in):	14.5 x 13.75 x 18
Shipping Dimensions (HWD/cm):	36.8 x 34.9 x 45.7
Material of construction:	Steel
Form factors supported:	Tower
Cooling method:	Fan
Battery Access:	Battery access panel allows hot-swap replacement without powering connected equipment off

ENVIRONMENTAL

Operating Temperature:	+32 to +104 degrees Fahrenheit
Storage Temperature:	+5 to +122 degrees Fahrenheit
Relative Humidity:	0 to 95%, non-condensing
Line mode BTU/hr. (Max.):	Less than 319 BTU/hr. (line power mode)
Battery mode BTU/hr. (Max.):	Less than 1245 BTU/hr. (battery power mode)
Audible Noise:	Less than 50 dBA @ 1m

COMMUNICATIONS

Network monitoring port:	1 x HID-complaint USB port, 1 x DB9 serial port
Software and cabling included:	PowerAlert power management software and cabling included

SNMP compatibility:	Built-in accessory slot accommodates internal SNMPWEBCARD and other network accessories
WatchDog compatibility:	Compatible with Tripp Lite's WatchDog system service software to restore operation to locked equipment through soft reboot of application / OS or hard power off/on reboot of connected equipment - ideal for unattended kiosk applications

LINE / BATTERY TRANSFER

Transfer time from line power to battery mode:	2-4 milliseconds
Low voltage transfer to battery power:	Switches to battery when voltages drop below 83V. Resets back to line power when voltages are back above 75V
High voltage transfer to battery power:	Switches to battery when voltage reach 145V. Resets back to line power when voltages reduce below 141V

CERTIFICATIONS

Certifications:	Tested to UL1778 (USA), CSA C22.2 No. 107.3 (Canada), RoHS compliant, Class A (Emissions), NOM (Mexico)

WARRANTY

Product warranty:	2 years
Connected equipment insurance (USA and Canada Only):	$250,000 connected equipment insurance (USA & Canada only)
Optional coverage:	3-year, 5-year, next-day, and on-site warranty coverage available for select opportunities

SPECIAL FEATURES

EPO port:	Includes RJ11 EPO (emergency power off) port and interconnection cable
Cold Start:	Inverter can be cold started to enable temporary AC output during a power failure
Appearance:	Attractive all-black color scheme

The policy of Tripp Lite is one of continuous improvement.
Specifications are subject to change without notice.
Therefore, your product may vary slightly from what is currently listed.

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TRIPP·LITE

Tripp Lite World Headquarters
1111 W. 35th Street
Chicago, IL 60609 USA

Customer Support
(773) 869-1234

wireless

Barricade™
4-Port 11 Mbps Wireless Broadband Router

Model Number: | **SMC7004AWBR**

PC MAGAZINE EDITORS' CHOICE™

February 12, 2002
SMC Barricade 7004AWBR
SMC Networks

PRACTICALLY NETWORKED RECOMMENDED

cablemodeminfo.com
FIVE STAR RATING

The Barricade wireless broadband router is the ideal networking solution for home and small business users alike, providing the ultimate in mobility with its wireless operation. This platform independent multi-functional router is combined with a 3-port 10/100 Mbps dualspeed switch and incorporates a built-in print server, an RS-232 COM port, and firewall security for protection against hackers and other intruders.

The Barricade wireless broadband router provides a WAN port and Network Address Translation (NAT), which extends simultaneous internet access to up to 253 PCs on the LAN.

The wireless broadband router with a built-in access point provides wireless data rates of 11,5.5,2,and 1 Mbps, with 64-bit/128-bit encryption for wireless LAN security. The Barricade wireless router has an operating range of up to 1000 feet.

The wireless router also allows the connection of multi -ple users to the internet using a single purchased IP address. LAN and IP addresses are auto-assigned and easily managed, and the IP routing supports a range of popular applications.

The Barricade wireless broadband router is a comprehensive networking solution for PC or MAC users, and is backed by SMC's limited lifetime warranty and 24/7 technical support.

Benefits

Features
- Built-in NAT firewall security
- Simultaneous Internet access for up to 253 PCs on the LAN using only one IP address
- Wireless operation at 11, 5.5, 2, or 1 Mbps
- Wireless operating range of up to 1,000 ft
- LAN and WAN addresses auto-assigned and easily managed
- Connects to a cable/xDSL modem, dial-up modem, or Ethernet backbone
- 3-port 10/100 Mbps switch versatility plus 1 port for WAN connection
- Advanced security through 64-bit/128-bit WEP encryption and MAC address filtering

Benefits
- All-in-one solution provides switching, IP sharing, print server, and firewall security
- Print server access from any PC on the LAN. No need to keep one dedicated as a print server, thus additional memory is available
- IP routing supports wide range of popular applications
- Dramatic enhancement of mul timedia and gaming connections
- Web-based utilities allow configuration through any networked PC's Web browser.
- Hacker attack monitoring allows the detection of a list of hacker patterns

Compatibility
- Platform independent – works with PC or Mac
- State-of-the-art software enables instant, installation
- IEEE 802.11b compliant

SMC® Networks
38 Tesla
Irvine, CA 92618
1-800-SMC-4YOU
www.smc.com

Barricade™
4-Port 11 Mbps Wireless Broadband Router

SMC7004AWBR

Ports
- Three 10Base-T/100Base-TX RJ-45 LAN Ports with Automatic-MDI/MDIX feature
- One 10Base-T Broadband WAN Port
- One DB-9 Port for PSTN/ISDN Connection
- One DB-25 Printer Port

Internet Sharing Methods
- Static IP
- Dynamic IP
- PPPoE
- Dial-up Networking

Protocols
- TCP/IP, PPTP/L2TP/IPSec Passthrough (VPN)
- DNS
- SNTP
- NAT
- DHCP
- HTTP
- HTML
- LPD
- PPP Internet Control Protocol
- PPP Authentication Protocol
- Point-to-Point Protocol

Cabling Type
- 10Base-T: UTP/STP Category 3 or 5
- 100Base-TX: UTP/STP Category 5 or better

Speed
- WAN Router: 10Mbps (10Base-T)
- LAN: 10Mbps (10Base-T) or 100Mbps (100Base-TX)

LEDs
- Power
- WAN
- WLAN
- Link
- Activity

Print Server
- Windows 95/98/Me/NT/2000/XP

NAT Router – Ethernet Interface
- IP, PPPoE

NAT Router – Asynchronous Interface
- Auto-Disconnect

Wireless
- IEEE802.11b for Wireless LAN
- 11, 5.5, 2,1 Mbps data rate per channel, Auto Fallback
- 2.4-2.4835 GHz, Direct Sequence Spread Spectrum
- Operating Range: up to 1000 feet
- 2 External Antennas

Frequency
- 2.4-2.4835 GHz for US, Canada and ETSI
- 2.471-2.497GHz for Japan

Modulation Type
- CCK,BPSK,QPSK

Operating Channels:
- 11 Channels (US, Canada)
- 13 Channels (ETSI)
- 14 Channels (Japan)

Output Power
- >+13dBm

Receive sensitivity
- Min. -76dBm for 11Mbps;
- Min. -80dBm for 5.5/2/1 Mbps ; (@BER 10E-5)

Configuration and Management
- Web-based

Maximum Users
- NAT: 253 PCs

Features
- DHCP Client/Server, Print Server, NAT firewall, Hacker Attack Logging

Upgrade Method
- Web

Security
- 64-bit/128-bit WEP Encryption

Standards
- 802.11b
- 802.3
- 802.3u
- RFC

Certification
- FCC Class B
- VCCI Class B
- Industry Canada Class B
- EN55022(CISPR22) Class B
- C-Tick-AS/NZS 3548 (1995) Class B
- CE Mark
- ETSI 300.328
- MPT RCR STD 33
- IEC 1000-4-2/3/4/6
- CSA
- UL
- EN60950(TUV)

Size
- 8.625" x 5.25" x 1"

Weight
- 1.5 lbs

Power
- 5V, 2A

Temperature
- 0℃ ~ 40℃ in operating
- -40℃ ~ 70℃ in storage

Humidity
- 5%~95% (non-condensing)

Warranty
- Limited Lifetime

Product	Description
SMC7004AWBR	Barricade 4-Port 11 Mbps Wireless Broadband Router

NEC WT615

Article No.:	50025161
Display:	1 x 1.75 cm (0.7") DMD ±12° Chip (DDR)–DLP™ Technology
Lamp:	275 W DC
Lamp Life:	4,000 hrs*
Brightness:	3,500 Lumens (2,000 ANSI Lumens)
Contrast Ratio:	3,500:1
Optical System:	Ultra short focus system with aspherical mirror, f=14,9 mm, F=3,5
Minimum Image Diagonal:	102 cm (40")
Maximum Image Diagonal:	254 cm (100")
Throwing Distance:	64 mm–659 mm
Projection Size:	1,016 mm (40")/64 mm, 1,270 mm (50")/164 mm,
(Diagonal/Distance)	1,524 mm (60")/263 mm, 2,032 mm (80")/461 mm, 2,540 mm (100")/659 mm
Projection Angle:	55°
Frequency:	Horizontal: 15–100 kHz (RGB: 24 kHz–100 kHz), vertical: 48–85 Hz
Native Resolution:	1,024 x 768 (XGA)
Supported Resolutions:	1,600 x 1,200 (UXGA), 1,400 x 1,050 (SXGA+), 1,280 x 1,024 (SXGA), 1,152 x 900 (SGI, SUN), 1,152 x 870 (Mac), 1,920 x 1,080 (HDTV 1,080i 60/50 Hz), 1,280 x 720 (HDTV 720p) compressed format, 1,024 x 768 (XGA), 800 x 600 (SVGA), 832 x 624 (Mac), 640 x 480 (VGA/Mac), 720 x 480 (SDTV 480p), 720x480 (DVD 15.7 kHz + 31.4 kHz), 720 x 576 (DVD 15.6 kHz + 31.3 kHz)
In/Output Terminal:	
Computer	1 input: Mini D-SUB, 15-pin shared with component signal (YPbPr) and SCART-RGB
	1 digital input: DVI-I, analog shared with component signal (YPbPr)
	1 output: Mini D-SUB, 15-pin, computer or DVI-I (analog)
Video	1 input: cinch
S-Video	1 input: Mini DIN 4-pin (Hoseiden Connection)
Audio	1 input: 3.5 mm stereo mini jack (RGB or component/SCART RGB)
	1 input: 3.5 mm stereo mini jack (DVI-I or component)
	1 input: cinch stereo (video or S-video)
	1 output variable for selected input: 3.5 mm stereo mini jack (RGB, DVI-I, video or S-video)
PC Card Slot	1 input: PCMCIA Type II, CardBus
LAN	W-LAN (IEEE 802.11b/g) and LAN by PC card
PC-Control	1 USB: Type A, mouse control for PJ/USB HUB-Out from PC
	1 USB: Type B, remote mouse out/PC control
	1 PC control (RS-232): Mini DIN 8-pin (female)
	1 Remote input: 3.5 mm stereo mini jack
Video Signals:	PAL/PAL60/NTSC/SECAM/NTSC 4.43/PAL-N/PAL-M
Audio Functions:	1 W with integrated stereo speaker
Zoom Adjustment:	Digital Zoom
Focus Adjustment:	Power Focus
Benefits:	Ultra short focus system with aspherical mirror, electric whiteboard function, HDCP compatible, LAN and W-LAN, digital 3D Reform™ picture correction, wall color correction, PC card slot, USB interface for mouse, USB storage, PC control function, help function, Plug&Play
Remote Control (RD407E):	Laser pointer, 3D Reform™ control, source select, auto picture adjustment, digital zoom, magnify, freeze, mute, aspect ratio, volume, pointer function, viewer control, mouse control with R- and L-click, page slide up and down, help, menu and power control
Dimensions (W x H x D):	380 x 313 x 313 mm (at projection)
Weight:	6.4 kg
Power Supply:	100–240 V AC/50–60 Hz
Power Consumption:	370 W max./standby mode 0.6 W
Fan Noise:	32 dB (A)*
Safety / Ergonomics:	CE, TÜV GS
Warranty:	Projector: 3 years pan-European premium service Lamp: 6 months**
Shipping Contents:	Projector, remote control RD-407E, electric-pen, Mini D-SUB signal cable (1.8 m), power cord, USB cable A-B, remote controller cable, users manual on CD Rom, setup guide, application guide, e-beam CD Rom, CD Rom utility software,
Optional Accessories:	WT61LP (lamp), ADP-CV1 adapter (YUV cable), ADP-SC1 (SCART adapter), W-LAN card NWL-100 E, WT60CM (ceiling mount kit), WT40SN (mobile 40"screen), WT60ST (mobile presentation table)
Available from:	March 2005

*Eco Mode   **Please refer to our warranty conditions under: www.de.nec.de
All specifications are subject to change without notice. Status: January 2005

- Worldwide shortest throwing distance projector
- Native resolution: 1,024 x 768 (XGA)
- Max. resolution: 1,600 x 1,200 (UXGA) with compressed format
- Brightness: 3,500 Lumens
- Contrast ratio: 3,500:1
- Whisper quiet: 32 dB (A)*
- Electric whiteboard function
- IR remote control with laser pointer and mouse control
- Digital 3D Reform™ picture correction
- LAN and W-LAN (IEEE802.11b/g) function
- USB and CF card storage connection
- Wall color correction
- 4,000 hours lamp life*
- 3 years warranty, 6 months on the lamp**

Peripherals

Plasma-Monitors

Empowered by Innovation

NEC

WT615-E-01/05

YAMAHA
MSP5A & MSP3
Powered Monitor Speakers

MSP3

MSP5A
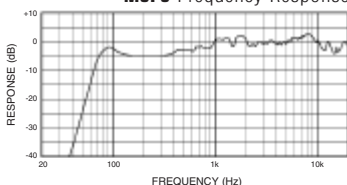
High Quality Performance With Built-In Amplification

Yamaha is no newcomer when it comes to creating top-performance monitor systems. From the classic NS1000 through the ever-popular NS10M series, professionals world-wide have chosen Yamaha speakers systems for critical monitoring applications because of their exceptionally accurate, natural reproduction and reliability. The MSP Series powered monitor speakers take Yamaha performance to new levels with state-of-the-art materials and design. The MSP5A uses built-in biamplification for the utmost in sound quality, while the MSP3 is a compact 2-way system with an on-board amp for use in personal music production systems.

Why built-in power? It's simple: quality. These speakers and amplifiers have been designed together to achieve an uncompromising audio quality and efficiency that's impossible to match with separate components.

Speaking of components, MSP speakers take advantage of the latest advances in materials and technology. The 5" woofer and dome tweeter in the MSP5A feature sophisticated magnetic structures that achieve exceptionally low distortion. The tweeter on the MSP3 operates in conjunction with a unique waveguide horn that achieves broad, uniform high-frequency dispersion for optimum balance regardless of listening position. The MSP5A also includes four low frequency and three high frequency trim switches to optimize the system's response to the room's acoustic environment. And both models sport balanced XLR type inputs for direct compatibility with professional equipment.

MSP3 Frequency Response

MSP5A Frequency Response

	MSP3	MSP5A
Type	Amplified 2-way bass-reflex powered speaker	Bi-amp 2-way bass-reflex powered speaker
Crossover Frequency	4kHz	2.5 kHz
Frequency Response	65Hz-22 kHz (-10dB)	650Hz-40kHz (-10dB)
Maximum SPL	98dB (1m)	98dB (1m on axis)
Dimensions w/h/d	5$\frac{11}{16}$" x 9$\frac{5}{16}$" x 6$\frac{9}{16}$"	6$\frac{5}{8}$" x 11" x 8$\frac{3}{4}$"
Weight	9.70 lbs.	16.5 Lbs.
SPEAKER SECTION		
Components	LF: 4" cone, HF: 7/8" dome	LF: 5" cone, HF: 1" titanium done
Enclosure	Magnetically shielded for safe positioning near computers	
AMPLIFIER SECTION		
Output Power	200W at 1kHz, RL=4Ω	Biamped System LF: 40W at 400Hz, RL=4Ω HF: 60W at 10kHz, RL=8Ω
Input Sensitivity	Line 1: -10db, Line 2: +4dB	Input 1: +4dB, Input 2: -10dB
Input Impedance	Line 1: 10kΩ/RCA pin (unbalanced) Line 2: 10kΩ/XLR & phone (balanced, parallel)	Input 1: 10kΩ/XLR (balanced) Input 2: 10kΩ/phone
S/N	≥95dB (IEC-A weighting)	≥100dB (IEC-A weighting)
Controls	Level control: line 1, line 2 Tone control: low, high Power switch: on/off	Master volume control Tone control (7 position): Low: +1.5db, 0.0dB, -1.5dB, -3.0dB at 60Hz High: +1.5dB, 0dB, -1.5dB at 15kHz Power switch: on/off
Power Indicator	Green LED	Green LED
Power Requirement	AC 120V 60Hz	AC 120V 60Hz
Power Consumption	30W	60W
Optional Accessories	BMS10A (Mic stand adapter) SM SPKR BRKT (Wall/ceiling mount)	BMS10A (Mic stand adapter) SM SPKR BRKT

YAMAHA proAudio