

Sony Memory Stick Walkman¹

November 14, 1999 was the second day of COMDEX Fall, which was being held in Las Vegas, Nevada. It was the last COMDEX show before the millennium. Every participating company in this year's show demonstrated its own vision and capabilities for coming millennium. Nobuyuki Idei, the CEO of Sony Corporation, and Howard Stringer, Chairman and CEO of Sony Corporation of America, delivered Sony's vision on power of hardware in a networked society. During the speech, Nobuyuki demonstrated the recording capabilities of the new Memory Stick™ and its digital Walkman. He announced that Sony Memory Stick Walkman will be launched in the US in January, 2000 starting with its 64MB Memory Stick™ at a suggested retail price of \$399. For him, this announcement was more meaningful because the year 1999 was also the 20th anniversary of Sony Walkman®, the portable personal cassette player which changed forever the way people listen to the music.

Behind the excitement and expectation of new product announcement, he was still deeply concerned about the success of the Walkman in the next millennium. Sony expects a decrease in sales of audio equipment for the fiscal years 1999 and 2000. Also, the digital Mini Disc Walkman, which was Sony's previous attempt to revolutionize the way people listen to music, had not been successful in the market in spite of persistent marketing efforts.

Sony Corporation

Sony Corporation was established on May 7, 1946 as Tokyo Tsushin Kogyo (Tokyo Telecommunications Engineering Corporation) but later changed its name to Sony in 1958. The

firm started with about 20 dedicated engineers, including the founder, Mr. Masaru Ibuka. Ibuka's original motive for setting up the firm was to create a stable work environment where engineers with a deep and profound appreciation for technology could realize their societal mission and work to their heart's content. Its first business was to develop and produce communication equipment. Later, it expanded into other areas such as electronic products, and audio equipment.

In 1999, Sony Corporation had 3 business groups: Electronics, Entertainment, and Insurance & Finance. Sony Group's organizational chart is shown in **Exhibit A**. From a total of \$57 billion in revenues, electronics contributed 64%. Game console and software business accounted for 11%, music business 11%, motion picture and television business 8%, insurance business 5%, and others 1%. Sony employed about 177,000 employees worldwide in 1999; not counting those employed through its 1,041 subsidiaries and 65 affiliates all over the world. **Exhibit B** presents a summary of corporate data. **Exhibit C** shows Sony's financial statements for the fiscal years 1996-1999 and forecasted financial statements for the fiscal years 2000-2004 respectively.

Sony Electronics and Audio Businesses

Sony has been known as a leading manufacturer of audio, video, communications and information technology products for the consumer and professional markets. Since its foundation, Sony has developed many innovative products and is now one of the world's foremost companies in the consumer and industrial electronics and entertainment business areas. **Exhibit D** summarizes Sony's electronics product innovations. Its electronics products are categorized into five groups: Audio, Video, Televisions, Information and Communications, and Electronics components and others. See **Exhibit E and F** for details on sales and income for each group. Since the fiscal year 1980, Sony's electronics business has posted an average of 11% annual growth, mostly led by major technology-driven changes in the electronics industry².

Audio equipment accounted for about 15% of Sony's total revenues and about 25% of its electronics business revenues. Annualized growth for audio equipment has been 10% over the past 20 years. **Exhibit G** shows Sony's revenues for audio sales for the last 20 years.

Although Sony has recorded substantial growth in electronics business in the past, it posted decreased revenues and operating profits in FY 1999 and expects its revenues and operating profits to continue to fall in FY 2000³. The large decline in revenues primarily came from audio equipment, color TVs as well as electronics devices and others. Strong yen, price declines, and reduced competitiveness have impacted these businesses.

Sony Walkman Products⁴

Sony introduced the first Walkman, 'TPS-L2', on July 1st, 1979. Before that, music could only be enjoyed through a stereo system at home or in a car. Masaru Ibuka and Akio Morita, Sony founders, created the concept of Walkman portable stereo as a means of personal music entertainment. Walkman became extremely popular particularly with young users.

Sony Memory Stick Walkman

The first Walkman model was introduced with the lightweight headphones and as a compact cassette tape player. With the emergence of new music media, the Walkman has expanded its product lineup. It includes the Sony Discman portable CD player 'D-50' in 1984, DAT (Digital Audio Tape) Walkman 'TCD-D3' in 1990, and MiniDisc Walkman 'MZ-1', 'MZ-2P' in 1992. **Exhibit H** presents the details of Sony Walkman Timeline.

The audio CD format, developed in 1982 by Sony and Philips, was the first mass-market digital audio format. Because of its superior sound quality and greater convenience, the audio CD has virtually replaced analog music. Continuing the development of the compact disc, Sony introduced the Enhanced CD, CD Extra, which combines the music CD with the CD-ROM. CD Extra discs contain music that can be played on a standard CD player and data that can be read by a suitably equipped CD-ROM drive connected to a personal computer. The latest development is "Super CD" that offers better sound quality than any other CD formats. Sony recently launched its first Super Audio CD players (SACD) in the U.S. in order to expand the high-end audio market.

Minidisc (MD) is a digital audio format designed by Sony to replace the audio compact cassette. Due to digital compression technology, Minidisc can store up to 74 minutes of near CD-quality sound on a 64mm disc. Minidisc uses the ATRAC coding method to produce efficient sound. Sony's Minidisc and Minidisc players have not completely caught on with other music and electronics companies. As a result, the MD system currently has a small customer base in the audio market and generates much lower revenues for Sony than the CD Walkman. Sales breakdown of the Walkman is shown in **Exhibit I**.

For the past 20 years, the Walkman has created a new global culture of "enjoying music any where and any time" and has changed the way people listen to music. According to Sony's FY 1998 figures, cumulative worldwide shipments of the cassette tape Walkman are 186 million units, 46 million units for the CD Walkman, and 4.6 million units for MD Walkman.

Distribution

Sony audio and video products are distributed through power retailers, mass merchandisers, factory outlets, and online direct.

Power retailers: These include Best Buy, Circuit City, Radio Shack, etc. Since they have nationwide distribution channels and buy products in bulk, they enjoy great buying power. They are dedicated to electronic goods and value-added resellers. They have educated sales people. Most new products are introduced through these retailers.

Mass merchandisers: These include Wal-Mart, K-mart, Sears, etc. Like power retailers, they have nationwide distribution channels but they are not dedicated to electronic goods. They tend to sell mostly commodity electronic goods, such as Walkman, small and mid size color TV, VCR, etc. Not many premium products are sold through these channels.

Factory outlets: These are stores that are owned and operated by Sony. Factory outlets only sell products that have been returned to Sony. These products are inspected and if necessary

reconditioned to meet original product specifications. They may have minor cosmetic blemishes but are backed by Sony's warranty. There are only 12 outlets currently running in the US.

On-line direct: Sony has a web site that sells virtually all Sony products. It can also direct consumer to the nearest location where they can buy Sony products.

The Music Industry Revolution

Major recording labels -- Sony Music Entertainment, Warner Music Group, BMG Entertainment, EMI Recorded Music and the Universal Music Group -- control most of the popular music in the U.S. The traditional music industry value chain consists of four main steps. First, talent search involves visiting various bars and clubs where various bands play and listening to demo tapes sent by artists. Second, production of album involves funding the recording of songs by the band. The recording labels do not typically own recording studios. Third, promotion of bands, albums, and songs involves developing and maintaining relationships with various radio and television stations. Last, distribution of music involves mass production of CDs and tapes and manages of retail channels.

Since the advent of Internet, it has been a force of change in the music industry⁵. While all businesses compete on the Internet as a trading outlet, the additional complication for the music industry is that the Internet itself has become a source of music. The forces driving this change are: (1) Various audio compression formats allow conversion of large music files into small music files. (2) Various security mechanisms prevent piracy of these files and provide copyright protection. (3) Internet allows these small files to be posted and downloaded quickly using a standard 56K modem. (4) Free software that plays these files on PCs. (5) Portable Walkman-like devices that let consumers enjoy these music files anywhere anytime. (6) Various storage media for portable devices that will soon allow consumers to store hundreds of songs in a single removable card.

MP3: An Audio Compress Format⁶

Much of the public and media attention in 1999 has focused on MP3. MP3 has gained rapid acceptance with the consumers. In a survey conducted by DMN for Webnoize Insider⁷, nearly 60 percent of respondents in April 1999 claimed awareness of the term MP3, compared to less than 8 percent in December 1998. By August 1999, "MP3" surpassed "sex" as the most searched word on the Internet.

MP3 stands for Motion Picture Experts Group Audio Layer 3. It is an audio compression format which creates near-CD-quality files that are 10 to 20 times smaller than those on CDs. A typical song when stored in MP3 format yields a 3MB file. A file of this size can be downloaded from a web site in 4-5 minutes via a 56K dial-up modem. Thus MP3 enables sale and distribution of music through the Internet.

Music bought through the Internet offers several advantages over CDs and tapes. A CD costs \$10-15 and often has only one or two good songs. Over the Internet, a fan has the option to buy only the songs that he likes, normally at \$2-3 each, from sites such as eMusic.com⁸. He can also convert songs from his existing CD collection to MP3 format using free software called rippers. He can remix songs from various artists and add songs or remove songs as he wishes. He can also download free MP3 files from hundreds of sites, such as MP3.com, StreamlineMusic.com, and Wired Planet. However, most of the MP3 songs on the web are from relatively unknown artists. Record Labels, who own most of the popular music, have not embraced MP3, mainly because it does not have any copy protection and hence can be easily pirated⁹.

MP3 has been a revolution for artists¹⁰. Artists like Beastie Boys, Tom Petty, and Chuck D support MP3. It lets them connect directly to their fans³¹. Also, there are monetary benefits. Artists usually make between \$0.60 and \$0.80 for each CD sold. This does not bring a lot of money to the artist even if the album sells a million CDs. Artists make lot more money by going on tours and by selling concert tickets and merchandise.

Competing Formats

Record companies -- Sony Music Entertainment, Warner Music Group, BMG Entertainment, EMI Recorded Music and the Universal Music Group -- control most of the popular music today and are nervous about MP3. MP3 has no inherent copy protection and hence it allows pirates to post an artist's music online for free downloads. There is no copy protection on CDs either, so they can be easily converted to MP3 and pirated. MP3 also allows artist to directly deal with their fans, bypassing the recording firms.

Lack of copyright protection in MP3 format has prompted firms to develop competing compression formats with built-in security features. Firms hope to license these formats for digital content distribution. **Exhibit J** summarizes various firms and organizations, their formats, security technologies, and file size relative to MP3 file size.

Security Systems

Various firms have developed security technologies and frameworks that can be used with any audio format including MP3 format. The most eagerly awaited framework is still being developed by Secure Digital Music Initiative¹¹ (SDMI). SDMI is a forum launched by Recording Industry Association of America (RIAA) that brings together over 110 worldwide recording, consumer electronics and information technology industries to develop open interoperable architecture and specification for digital music security. SDMI is a framework for secure digital music distribution. It is not meant to provide an alternative format to, or compete with, MP3 or any other compression technique or audio technology. In fact, SDMI-compliant systems (hardware and software) will be able to play MP3 content or any other format that the manufacturer chooses to support. SDMI is building on various security technologies that have been developed by various firms as discussed in **Exhibit K**. SDMI completed the first specification on July 13, 1999. The long-term specification, which will address the entire delivery chain, is targeted for initial release in the second quarter of 2000.

Applications

Any audio application can benefit from digital audio compression formats such as MP3; however, MP3 has been most popular in the music arena. At present MP3 music is for someone, who has access to a PC, has a high-bandwidth connection and is comfortable with the MP3 format. Thus, college students with high-speed connections at school have been the early adopters of MP3 format.

Music: By 2003, digitally distributed music is expected be a \$1.1 billion¹² market (10 to 15 percent of the U.S. music industry volume).

There are several software that play MP3 files on a computers. RealNetworks' RealJukebox, Wired Planet's Wired Planet13, Nullsoft's WinAmp, MusicMatch's MusicMatch, Microsoft's Windows Media Player14, etc. play MP3 files on PC.

There are MP3 applications in portable devices and in home and automobile music systems¹⁵. ReQuest released a component for a standard stereo that will store up to 150 hours of MP3 music. Empeg launched a removable MP3 player for cars. It stores 35 hours of music. Samsung plans a similar model. Micronas Intermetall announced MP3-compatible CD player that allows 10 hours of MP3 music per CD. NAIAM has a similar model.

Books: In 1999, books-on-tape was a \$2 billion market. MP3 can be used for digital distribution of books-on-tape. However, Audible's format is fast becoming the standard for selling digital books. Audible¹⁶ uses a proprietary non-copy format. There are more than 7,000 mainstream books from prime publishers and prominent authors available in audible format.

PDA: Palm-size MP3 players with a built-in microphone can be used for note taking in meetings, during lectures, and for personal reminders.

Competition: Portable Digital Audio Players

The hottest product in 1999 using digital audio compression format was Diamond Technology's Rio PMP 300¹⁷, the first commercially available portable MP3 player. By the end of 1999, it sold about 1 million units. Rio PMP 300 allowed music lovers to enjoy their MP3 music anywhere anytime. They were no longer tied to their PCs. Since then many small and large firms have jumped on the portable player bandwagon.

Portable digital music players compete along a variety of dimensions¹⁵ such as ease of use, industrial design, and features such as FM tuner, built-in microphone, PDA features, graphics screen, etc. Earlier players supported only MP3 format and had no security features. Newer players support at least one more format besides MP3 and offer some form of copyright protection¹⁸. With the standard for digital music distribution still not established, supporting the winning format is critical.

One of the other distinguishing features is the on-board memory, which determines the amount of music that can be stored in the player. 1MB memory can hold roughly 1 minute of music. The first

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portable MP3 players had only 32MB on-board memory. One year later, the 64MB on-board memory became the norm. However, the 64MB on-board memory may become obsolete by next year.

Most of the models come with one or two slots for 32MB add-on memory. Some firms offer no on-board memory. Instead they provide slightly cheaper product and let the consumer buy the latest add-on memory for their players.

Rio PMP 300/500¹⁹

Diamond Technology's Rio PMP 300 was the first commercially available portable MP3 player. It weighs 2.4 ounces, measures 2.5"x3.5"x0.625", and is sold at a retail price of \$170. Its success, selling over 10,000 units per week, has encouraged lot of firms to enter the portable MP3 player market. Rio PMP 300 is a basic model with only 32MB on-board memory. Rio PMP 500, which is SDMI compliant, overcomes the limited on-board memory with 64MB on-board memory. Retail price for Rio PMP 500 is \$250. Both the models support SmartMedia Card format from Toshiba for add-on memory.

Diamond enjoyed tremendous brand recognition and publicity from the suit²⁰ filed by Recording Industry Association of America (RIAA), which claimed that Diamond's product encouraged piracy of music. Diamond has since endorsed various secure formats, launched a content and service portal, and partnered with content and security technology providers. They plan to leverage their brand towards providing an integrated digital audio solution. The firm has a variety of multimedia networking products and worldwide distribution channels. Diamond had sales of 608 million and a net loss of 39.5 million in 1998.

Nomad²¹

Nomad is a feature rich MP3 player from Creative Labs but suffers from limited on-board memory, only 32MB. It weighs 2.2 ounces, measures 2.5"x3.6"x0.68", and is sold at a retail price of \$170. It comes with an FM Tuner and built-in microphone for note-taking during classes or during meetings. Nomad supports SmartMedia Card from Toshiba for add-on memory.

Creative Labs has its worldwide headquarters in Singapore and offers a variety of multimedia products, including several audio and visual PC and networking products. Its Sound Blaster technology is the standard for PC audio worldwide. Creative had 4000 employees and \$1.23 billion revenue in 1998. It has 40,000 retail outlets in North America alone and over 230 key distributors in 80 nations. Nomad supports SmartMedia Card format from Toshiba for add-on memory.

Lyra²²

Lyra from RCA is unique in several aspects. It has a big graphics display. It can play both MP3 and RealNetworks RealAudio G2 formats and can be upgraded to future formats. Lyra weighs 3.3 ounces, measures 2.5"x4.25"x0.75". Lyra is sold at a retail price of \$199, which includes cost of one

32MB CompactFlash Memory Card. It is the first MP3 player that will support both IBM's 340MB microdrive. Lyra will also support Sandisk's CompactFlash format for add-on memory. It has RealJukebox software loaded on the player. RealJukebox allows storage of songs in different folders that can be used to organize songs by artist, genre, etc.

RCA brand is well known for consumer electronic products such as TVs, VCRs, camcorders, and home theatre. This brand naturally transfers to their MP3 products. Besides, they have distribution strength, technical know how and other resources.

Yepp²³

Samsung has released its two MP3 products under the Yepp brand. Yepp models are basic with only 32MB on-board memory. They weigh 2.5 ounces, measure 2.3"x3.4"x0.68", and support SmartMedia Card from Toshiba for add-on memory. One of the models has an FM tuner and the other has a built-in microphone. Both models have some PDA functions such as memory for storing telephone numbers.

Samsung brand is well known for its semiconductor, computer, and communication products. Samsung has been looking for distributors in North America. Samsung employed 267,000 employees and had revenues of \$96 billion in 1997.

MP-F10/20/30/40²⁴

Saehan is in a variety of industries including textile/fashion, films, information/media, battery, telecom, information systems, and raw materials. In 1998, its revenue was \$995 million and net income \$6.8 million. Saehan's MPman division has released 4 portable MP3 players so far. MP-F10 and MP-F20 are basic models and are likely to be discontinued soon. MP-F30 has been licensed out as raveMP to Sensory Science. These models weigh 2.2 ounces and measure 2.8"x3.6"x 0.67". Its latest model MP-F40 was release in late August of 1999. Eiger does most of the distribution for Saehan's MPman series.

RaveMP²⁵

Sensory Science was founded in 1984 as Go-Video. In 1998, Sensory Science employed 92 employees and had turnover of \$49 million. Sensory Science's main product is dual deck VCRs, which sell about 1m units per year. They do their own distribution in North America and in Canada through 7000 stores.

Their player raveMP is not their design. They bought the MP-F30 design of Saehan (Korea), who is also manufacturing raveMP. The industrial design of raveMP is very attractive.

Competition: Digital Music Storage Media

On-board memory represents about 70% of material costs in a digital audio player. However, there is a growing trend towards removable flash memory. Removable flash memory is to portable digital audio players what cassette or CD is to Walkman. Flash memory devices are non-volatile storage devices i.e. they do not need battery to retain data indefinitely²⁶. Thus, floppy disk is a type of flash memory.

There are two types of flash memories – flash cards and traditional disk drives. Flash cards can be viewed as very small floppy disk with very high storage capacity. However, unlike floppy disks, flash cards are solid state, i.e. they have no moving parts, making them more rugged and reliable. Also, flash cards are shock-resistance, noiseless, and have extended operating temperature range (-40°C to +85°C vs. +5°C to +55°C for rotating drives). They consume less power (5% of 1.8" and 2.5" disk drives) and can be operated on just 2 AA batteries (unlike rotating disk drives), making them ideal for use in digital cameras, MP3 players, audio recorders, and smart phones. Flash card storage capacity is likely to double every year from the current 64M to 1G by 2003. Historically, price per MB for various types of flash memory has halved each year. However, in 1999, the increased demand for flash memory slowed the rate of price decline.

Removable flash memory comes in various formats and these formats are not compatible with each other. Consumers will be very sensitive to the type of removable flash memory in their player, as they will not want to be stuck with a format that loses this race to become the standard. It is very important for each memory device to gain credibility and market presence for long term sales.

CompactFlash Cards²⁶

Sandisk's CompactFlash Cards have been used in more than 200 new mobile products and have sold 2.4 million units (60% market share) in 1998. Average CompactFlash card offers a sustained write throughput of about 500 Kbytes/s, weighs ½ ounce, costs about \$1/MB today, and has greater storage capacity than its competition. CompactCards come in two sizes. 3.3 mm x 43 mm x 3.6 mm & 5 mm x 43 mm x 3.6 mm. They operate at both 3.3 & 5 volts. CompactFlash Cards available in 32, 64, and 96MB capacities and cost about \$2.5/MB. CompactFlash Cards are forward compatible with higher compatibility with higher capacity models to be developed in the future.

SmartMedia Card²⁷

Toshiba's SmartMedia card sold 1.5 million units (37% market share) in 1998. Less than 1 mm thick, SmartMedia cards measure 45 mm x 37 mm, operate at 3.3 or 5 volts, and are currently available in 16MB and 32MB capacity and cost about \$2/MB. SmartMedia Cards are not forward compatible.

MultiMediaCards²⁶

MultiMediaCards from Sandisk and Siemens weigh two-gram, measure 35 mm x 24 mm x 1.4 mm, and are available in 4, 8, 16 and 32MB capacities costing \$ 40, \$ 50, \$ 80 and \$130. They are

designed for insertion in cell phones and other small portable devices. MultiMediaCards are forward compatible.

Clik²⁸

Clik from Iomega has 40MB memory. It has 700-Kbps sustained throughput, is a little smaller than CompactFlash, and cost \$0.25/MB. However, there are moving parts that are subject to wear and tear. It is not forward compatible.

Microdrive²⁹

IBM's new 170MB and 340MB microdrive measures the same as CompactFlash but is likely to cost only \$0.50/MB. However, it may not be forward compatible. Also, it has moving parts raising concerns about its ruggedness and reliability.

Sony Digital Music Strategy

Sony Memory Stick Walkman³⁰

Continuing the legacy that launched the Walkman personal stereo and allowing people to listen to music anytime, anywhere, Sony, on September 24, 1999, introduced the future of the Walkman personal stereo, the NW-MS7, a 2.5-ounce Memory Stick Walkman model.

The Memory Stick Walkman recording system is Secure Digital Music Initiative (SDMI)-compliant. The Memory Stick Walkman model NW-MS7 comes with a 64MB MagicGate Memory Stick media that can store up to 80 minutes of digital audio. The unit connects to a universal serial bus (USB) port for high-speed music file transfer, downloading an hour of music in just over three minutes. PC-based music recording and editing software is included. It also has a built-in rechargeable Lithium Ion battery offering four hours of continuous playback.

The Memory Stick Walkman model NW-MS7 measures 1-7/16" (w) x 3-3/4" (h) x 3/4" (d), has a manufacturer's suggested retail price of \$399.95 and will be available in January 2000.

MagicGate/OpenMG: Security Systems

On February 25, 1999, Sony Corporation announced the development of new copyright management technologies that could revolutionize the way in which digital music content is delivered and used. Two new content protection technologies are "MagicGate" and "OpenMG". They will provide an urgently needed solution for protecting digital music on personal computers and portable digital audio players.

"MagicGate" technology will be used for portable digital audio players. It employs a microchip embedded in both the portable player and the storage media to ensure that protected content is transmitted only between SDMI compliant devices and media. All content is transmitted and

stored in an encrypted format to prevent unauthorized copying, playback and transmission of protected content.

"OpenMG" technology will be used for PCs and related devices. It employs a hardware module and special software to encrypt digital music content stored on a hard disk drive or similar storage device. This technology allows content to be enjoyed on PCs, but prevents unauthorized copying, playback, or transmission.

"MagicGate" and "OpenMG" support the interchange of data between PCs and SDMI compliant digital audio players, allowing digital music content to be "moved" rather than copied while preventing unauthorized copying, playback, and transmission. Sony will broadly license "MagicGate" and "OpenMG" to the relevant industries. At the same time, it plans to implement them into Memory Stick (Sony's digital music storage media) and Sony's PC products.

However, Memory Stick player will be interoperable with music encoded and distributed in other formats. They include Intertrust, Liquid Audio, RealNetworks, Windows Media Audio from Microsoft, and Electronic Music Management System (EMMS) from IBM.

Memory Stick: Digital Audio Storage Media³¹

Sony created a new universal media based on flash-memory technology. Smaller than a stick of chewing gum (2 x 5cm), the 32MB and 64MB Memory Stick costs \$130 and \$212 respectively in Japan. It provides the ability to interface with and between a potentially endless array of audio and video and computer products. Sony has already developed and introduced a number of compliant products that use memory stick, including Handycam® Camcorders (DCR-TRV900, DCR-TRV10), Cyber-shot digital still cameras, VAIO notebook and desktop computers, digital photo printers, and voice recorders.

Memory Stick comes with an Erasure Prevention Switch, which helps prevent stored data from accidentally being erased. Original Serial Protocol ensures forward compatibility with higher compatibility with higher capacity models to be developed in the future.

Since there are several competing memory devices in the market, Sony has put much effort to gain alliance with other companies who are willing to use its Memory Stick™ devices in their hardware platform. So far, Sony has been supported and has granted license to twenty-four companies, including not only consumer electronic product manufacturers and computer manufactures, but also car manufacturers and telecommunication service operators. **Exhibit L** shows companies who support Sony Memory Stick™.

Sony Digital Music Web Site

Embracing the Internet, Sony will begin selling digital music online by the end of the 1999. It will offer new releases and catalog at prices from \$1.70 to \$4.40 per song, which will make the online music significantly cheaper than a CD single. With the compression protocol technology offered by the web site, the downloadable music will deliver compact disc-quality sound. The

company plans to launch the service at around the same time as the launch of Memory Stick Walkman, which will complement it to be global standard devices.

Turbulence

COMDEX show was over and Nobuyuki Idei was returning to Japan. As the aircraft reached cruising altitude he wondered how to change his music entertainment business model for the new digital economy. He was puzzled by the recent slump in CD sales among 15-24 year olds, once the mainstay of the market, from 32.2% in 1996 to 28%. He reviewed the steps taken by his company in 1999, wondering if they were enough to reverse the downward trend in audio equipment sales and in CD sales and to make Memory Stick Walkman the next hit product in the Walkman series? Will the Memory Stick Walkman become a mass product? He was also worried that consumers may not accept the inconvenience of a security system such as MagicGate or OpenMG. Memory stick too had received only lukewarm reception so far. Could it become the standard for digital content media? As he pondered over these questions, the seat beat sign turned on. Nobuyuki Idei knew there was turbulence ahead.

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Exhibit A: Sony Group's Organizational Chart (as of October 1, 1999)

Sony Corporation Board of Directors	
<u>Norio Ohga</u>	Chairman and Representative Director
<u>Nobuyuki Idei</u>	President and Representative Director, CEO
<u>Minoru Morio</u>	Executive Deputy President and Representative Director
	Executive Representative, Technology
<u>Tamotsu Iha</u>	Executive Deputy President and Representative Director
	Oversees Financial business, Broadcasting business and Computer Entertainment business
<u>Teruhisa Tokunaka</u>	Senior Managing Director and CFO
<u>Teruo Masaki</u>	Senior Managing Director
	Oversees Legal matters and Telecommunications business
<u>Howard Stringer</u>	Director (Chairman and CEO, Sony Corporation of America)
<u>Peter G. Peterson</u>	Director (Chairman of The Blackstone Group)
<u>Kennichi Suematsu</u>	Director (Counsellor of The Sakura Bank , Limited)
<u>Iwao Nakatani</u>	Director (Professor, School of Management and Information Sciences, Tama University)

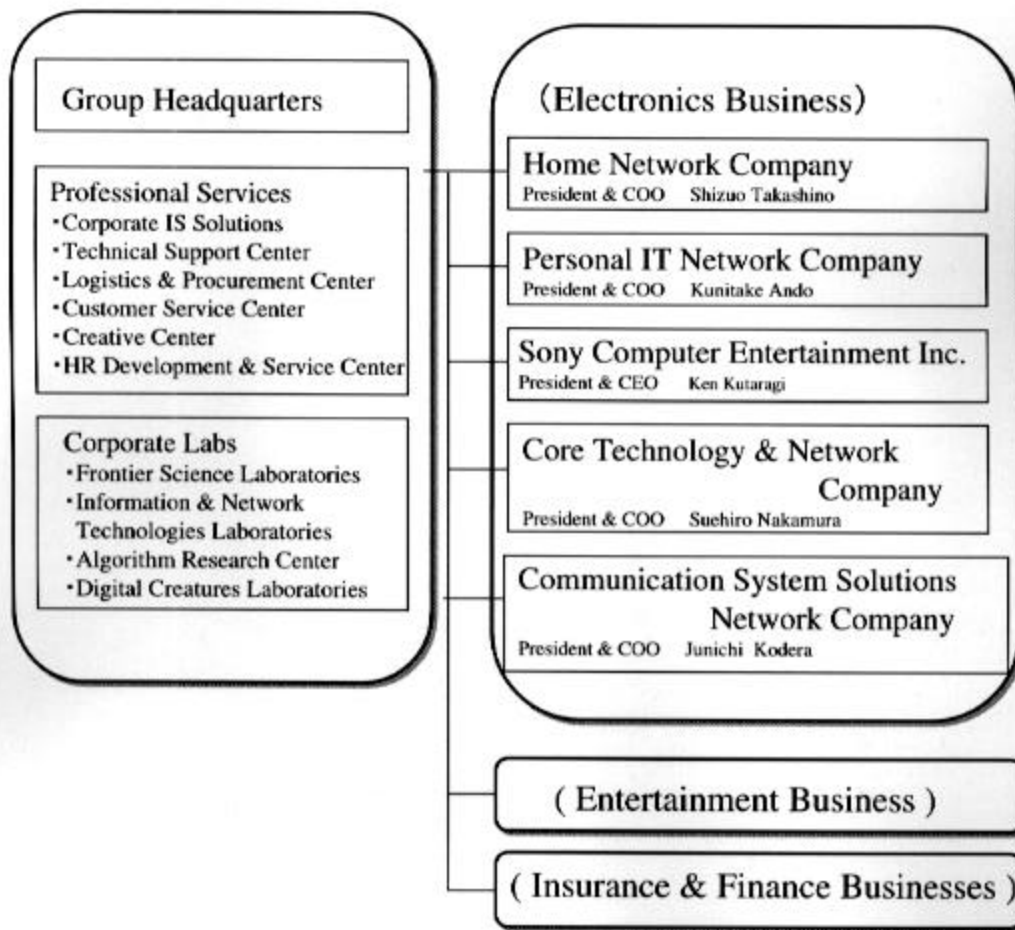


Exhibit B: Summary of Corporate Data

❑ **Company Name**

❑ Sony Corporation

❑ **Founded**

❑ May 7, 1946

❑ **Headquarters**

❑ 7-35 Kitashinagawa 6-chome, Shinagawa-ku, Tokyo 141-0001, Japan

❑ **Representatives**

❑ Norio Ohga, Chairman and Representative Director

❑ Nobuyuki Idei, President and Representative Director, Chief Executive Officer

❑ **Capital**

❑ 416,373,017,984 yen (As of March 31, 1999)

❑ **Major Products**

❑ **Audio**

MD systems, CD players, headphone stereos, personal component stereos, hi-fi components, radio-cassette tape recorders, tape recorders, digital audio tape (DAT) recorders/players, IC recorders, radios, headphones, car audio, professional-use audio equipment, audiotapes, and recordable MDs

❑ **Video**

8mm/Digital8, DV-, VHS- and Beta-format VTRs, DVD-Video players, video CD players, digital still cameras, broadcast-and professional-use video equipment, and videotapes

❑ **Televisions**

Color TVs, Hi-Vision TVs, projection TVs, flat display panels, personal LCD monitors, professional-use monitors/projectors, and large color video display systems

❑ **Information and communications**

Computer displays, personal computers, computer peripherals, satellite broadcasting reception systems, internet terminals, cellular phones, telephones, and car navigation systems

❑ **Electronic components and other**

Semiconductors, LCDs, electronic components, CRTs, optical pickups, batteries, and FA systems)

❑ **Number of Employees**

❑ 21,308 (As of March 31, 1999)

❑ **Locations of Major Offices and Research Centers (in Japan)**

❑ Tokyo, Kanagawa, Chiba, Miyagi

Source: <http://www.world.sony.com>

Exhibit C: Sony's Consolidated Financial Statements

□ Consolidated Income Statement and Ratios (¥ billion)

	FY3/97	FY3/98	FY3/99	FY3/00E	FY3/01E	FY3/02E
Sales	5,663.13	6,755.49	6,794.62	6,647.25	7,335.00	7,750.00
CoGS	3,930.11	4,618.96	4,633.79	4,517.40	4,980.00	5,200.00
Gross profit	1,733.03	2,136.53	2,160.83	2,129.85	2,355.00	2,550.00
SG&A	1,132.24	1,345.58	1,500.86	1,534.36	1,690.00	1,780.00
Insurance and financing expense	230.46	270.74	321.32	308.26	315.00	390.00
Operating profit	370.33	520.21	338.65	287.24	350.00	380.00
Non-operating income	92.64	83.96	152.91	45.67	20.00	20.00
Non-operating expenses	150.54	150.42	123.43	70.09	100.00	100.00
Recurring profit	312.43	453.75	368.13	262.82	270.00	300.00
Extraordinary gains	0.00	0.00	0.00	0.00	0.00	0.00
Extraordinary losses	0.00	0.00	0.00	0.00	0.00	0.00
Pretax profit	312.43	453.75	368.13	262.82	270.00	300.00
Tax	163.57	214.87	176.97	113.36	121.50	135.00
Minority and affiliate income	9.40	16.81	12.15	9.44	4.00	5.00
Net profit	139.46	222.07	179.00	116.53	144.50	160.00
Dividend per share (¥)	55.0	60.0	60.0	60.0	60.0	60.0
Consolidated						
EPS (¥)	371.52	546.37	435.85	283.73	316.00	349.90
Fully diluted EPS (¥)	300.62	478.31	385.48	250.93	290.53	321.69
Gross margin (%)	30.60	31.63	31.80	32.04	32.11	32.90
Operating margin (%)	6.54	7.70	4.98	4.32	4.77	4.90
Recurring margin (%)	5.52	6.72	5.42	3.95	3.68	3.87
Net margin (%)	2.46	3.29	2.63	1.75	1.97	2.06
CoGS-to-sales (%)	69.40	68.37	68.20	67.96	67.89	67.10
SG&A-to-sales (%)	19.99	19.92	22.09	23.08	23.04	22.97
Equity ratio (%)	25.69	28.35	28.95	30.27	30.99	32.24
Current ratio (x)	1.43	1.54	1.58	1.61	1.61	1.65
Return on assets (%)	2.60	3.68	2.82	1.85	2.24	2.41
Return on equity (%)	10.61	13.56	9.84	6.23	7.32	7.62
BPS (¥)	3,887.93	4,466.90	4,440.40	4,664.13	4,445.07	4,734.97
EBITDA (¥bn)	578.96	755.41	675.30	622.82	630.00	660.00

□ Consolidated Balance Sheet Summary (¥ billion)

	FY3/97	FY3/98	FY3/99	FY3/00E	FY3/01E	FY3/02E	FY3/03E	FY3/04E
Current assets	2,795.46	3,267.48	3,069.39	3,028.37	3,219.82	3,335.35	3,435.57	3,523.26
Cash and deposits	481.04	530.43	616.51	616.51	616.51	616.51	616.51	616.51
Accounts and notes receivable	972.58	1,115.89	1,013.58	991.60	1,094.19	1,156.10	1,209.80	1,256.79
Marketable securities	120.09	169.21	117.86	117.86	117.86	117.86	117.86	117.86
Inventories	869.80	993.93	877.90	858.86	947.72	1,001.34	1,047.85	1,088.55
Other current assets	351.95	458.03	443.54	443.54	443.54	443.54	443.54	443.54
Fixed assets	2,884.88	3,135.57	3,229.66	3,299.66	3,339.66	3,379.66	3,419.66	3,459.66
Tangible	1,238.91	1,347.13	1,249.75	1,319.75	1,359.75	1,399.75	1,439.75	1,479.75
Intangible	112.08	124.82	123.27	123.27	123.27	123.27	123.27	123.27
Investments and other assets	1,533.89	1,663.62	1,856.64	1,856.64	1,856.64	1,856.64	1,856.64	1,856.64
Total assets	5,680.34	6,403.04	6,299.05	6,328.03	6,559.48	6,715.01	6,855.23	6,982.92
Current liabilities	1,951.87	2,116.33	1,942.55	1,879.64	1,994.03	2,016.99	2,013.64	1,984.02
Accounts and notes payable	1,191.55	1,444.70	1,393.32	1,363.10	1,504.13	1,589.23	1,663.06	1,727.65
Short-term borrowings	328.12	199.41	128.70	96.01	69.37	7.24	-69.93	-164.15
Other current liabilities	432.20	472.22	420.52	420.52	420.52	420.52	420.52	420.52
Fixed liabilities	2,154.18	2,345.38	2,396.72	2,396.72	2,396.72	2,396.72	2,396.72	2,396.72
Bonds and long-term debt	1,099.77	1,104.42	1,037.46	1,037.46	1,037.46	1,037.46	1,037.46	1,037.46
Other long-term liabilities	1,054.42	1,240.96	1,359.26	1,359.26	1,359.26	1,359.26	1,359.26	1,359.26
Consolidated adjusted account and minority interest	114.87	125.79	136.13	136.13	136.13	136.13	136.13	136.13
Total liabilities	4,220.91	4,587.49	4,475.39	4,412.48	4,526.87	4,549.83	4,546.49	4,516.86
Shareholders' equity	1,459.43	1,815.56	1,823.67	1,915.55	2,032.61	2,165.18	2,308.74	2,466.05
Total liabilities and shareholders' equity	5,680.34	6,403.04	6,299.05	6,328.03	6,559.48	6,715.01	6,855.23	6,982.92

Exhibit D: Summary of Sony's Electronics Product Development

YEAR	PRODUCTS
1950	"G-Type", Japan's first tape recorder
1955	"TR-55", Japan's first transistor radio
1960	World's first transistor television
1963	World's first transistor, compact size, VCR
1968	"Trinitron" color TV
1971	3/4 inch, U-matic VCR
1975	"Betamax" VCR for home use
1979	"Walkman", the headphone stereo
1982	CD player "Betacam", a single-unit, 1/2 inch, broadcast use camera
1985	Single-unit, 8mm video camera
1987	Digital Audio Tape (DAT) deck
1988	"Mavica", electronic, still-image camera
1989	High-resolution, High-Band system, 8mm video series, "CCD-TR55", lightweight, compact-size, single-unit 8mm video
1990	"HD Trinitron", 36-inch, color HDTV for home-use
1991	"Kirara Basso" Series with "Super Trinitron" picture tube
1992	MiniDisc(MD) system
1993	"Digital Betacam" system, broadcast-use, component digital VCR

Source: <http://www.world.sony.com>

Exhibit E: Sony's Consolidated Sales Breakdown by Product Segment

(¥ Billions, %)	1997	1998	1999E	2000E	2001E
Sales by Division					
Electronics	4,380.1	4,356.3	4,354.0	4,554.5	4,930.8
Audio	1,127.8	1,072.6	1,004.3	1,002.5	1,042.5
Video	870.9	969.1	973.0	1,039.0	1,138.5
Televisions	709.0	702.6	629.5	660.3	729.8
Information and Communications	894.8	914.1	997.3	1,050.0	1,144.0
Electronic Components and Other	777.6	697.7	750.0	802.8	876.0
Game	699.6	760.1	577.6	704.9	879.1
Music	658.4	717.3	703.5	722.1	758.2
Motion Pictures	644.2	545.7	488.4	512.9	538.5
Insurance	291.1	339.4	359.1	395.1	434.6
Other	87.3	85.5	110.3	115.8	121.6
Total	6,761.0	6,804.2	6,592.9	7,005.2	7,662.6
% of Sales					
Electronics	64.8%	64.0%	66.0%	65.0%	64.3%
Audio	16.7%	15.8%	15.2%	14.3%	13.6%
Video	12.9%	14.2%	14.8%	14.8%	14.9%
Televisions	10.5%	10.3%	9.5%	9.4%	9.5%
Information and Communications	13.2%	13.4%	15.1%	15.0%	14.9%
Electronic Components and Other	11.5%	10.3%	11.4%	11.5%	11.4%
Game	10.3%	11.2%	8.8%	10.1%	11.5%
Music	9.7%	10.5%	10.7%	10.3%	9.9%
Motion Pictures	9.5%	8.0%	7.4%	7.3%	7.0%
Insurance	4.3%	5.0%	5.4%	5.6%	5.7%
Other	1.3%	1.3%	1.7%	1.7%	1.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Yr/Yr % Change					
Electronics	(11.4%)	-0.5%	-0.1%	4.6%	8.3%
Audio	(9.5%)	-4.9%	-6.4%	-0.2%	4.0%
Video	(6.6%)	11.3%	0.4%	6.8%	9.6%
Televisions	(0.7%)	-0.9%	-10.4%	4.9%	10.5%
Information and Communications	(17.0%)	2.2%	9.1%	5.3%	9.0%
Electronic Components and Other	(26.4%)	-10.3%	7.5%	7.0%	9.1%
Game	(71.3%)	8.6%	-24.0%	22.0%	24.7%
Music	(15.5%)	8.9%	-1.9%	2.6%	5.0%
Motion Pictures	(46.9%)	-15.3%	-10.5%	5.0%	5.0%
Insurance	(27.7%)	16.6%	5.8%	10.0%	10.0%
Other	(-0.7%)	-2.0%	29.0%	5.0%	5.0%
Total	(19.4%)	0.6%	-3.1%	6.3%	9.4%

Note: Fiscal Year ended on March 31

E = Morgan Stanley Dean Witter Research Estimates

Source: Morgan Stanley Dean Witter

Exhibit F: Sony's Consolidated Segment Information

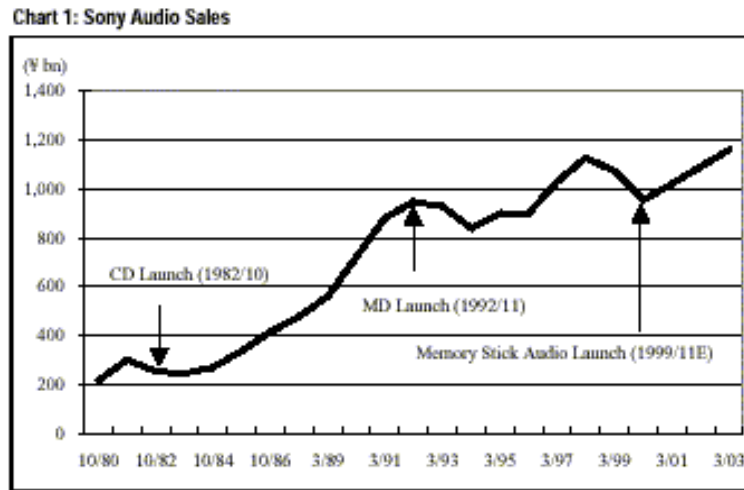
(\$ Billions, %)	Full Year				
	1997	1998	1999E	2000E	2001E
Operating Income by Segment					
Electronics	314.5	131.1	107.6	164.6	209.5
Yr/Yr % Chg	31.4%	-58.3%	-17.9%	53.0%	27.3%
Audio	67.7	41.6	10.8	23.1	28.7
Video	104.5	87.9	66.2	69.7	81.0
Televisions	67.4	50.0	37.8	38.7	46.1
Infor. and Commun.	44.7	-23.9	3.9	28.9	36.1
Elec. Compo. and Others	30.3	-24.5	-11.0	4.2	17.6
Game	116.9	136.5	87.2	108.7	138.8
Music	52.1	36.6	39.9	45.2	50.2
Motion Pictures	37.0	43.0	29.2	30.6	33.5
Insurance	20.3	18.0	26.2	28.8	31.7
Other	-7.0	-4.5	9.9	10.4	10.9
Inter-company	-10.9	-12.4	-13.0	-14.2	-14.8
Total	525.7	348.2	287.0	374.2	459.8
Yr/Yr % Chg	42.0%	-33.8%	-17.6%	30.4%	22.9%
Operating Margin by Segment					
Electronics	6.7%	2.8%	2.3%	3.4%	4.0%
Audio	6.0%	3.9%	1.1%	2.3%	2.8%
Video	12.0%	9.1%	6.8%	6.7%	7.1%
Televisions	9.5%	7.1%	6.0%	5.9%	6.3%
Infor. and Commun.	5.0%	-2.6%	0.4%	2.8%	3.2%
Elec. Compo. and Others	3.9%	-3.5%	-1.5%	0.5%	2.0%
Game	16.7%	18.0%	15.1%	15.4%	15.8%
Music	7.5%	4.8%	5.4%	5.9%	6.2%
Motion Pictures	5.7%	8.0%	6.0%	6.0%	6.2%
Insurance	7.0%	5.3%	7.3%	7.3%	7.3%
Other	-2.8%	-1.6%	3.0%	3.0%	3.0%
Total	7.8%	5.1%	4.4%	5.3%	6.0%
% of Operating Income					
Electronics	58.6%	36.4%	35.9%	42.4%	44.1%
Audio	12.6%	11.5%	3.6%	6.0%	6.0%
Video	19.5%	24.4%	22.1%	17.9%	17.1%
Televisions	12.6%	13.9%	12.6%	10.0%	9.7%
Infor. and Commun.	8.3%	-6.6%	1.3%	7.4%	7.6%
Elec. Compo. and Others	5.6%	-6.8%	-3.7%	1.1%	3.7%
Game	21.8%	37.8%	29.1%	28.0%	29.2%
Music	9.7%	10.1%	13.3%	11.6%	10.6%
Motion Pictures	6.9%	11.9%	9.7%	7.9%	7.1%
Insurance	3.8%	5.0%	8.7%	7.4%	6.7%
Other	-1.3%	-1.3%	3.3%	2.7%	2.3%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Note: Fiscal Year ended on March 31

E = Morgan Stanley Dean Witter Research Estimates

Source: Morgan Stanley Dean Witter

Exhibit G: Chart of Sony's Estimated Sales from Audio Equipment



Source: Merrill Lynch

Exhibit H: Details of Sony Walkman Timeline

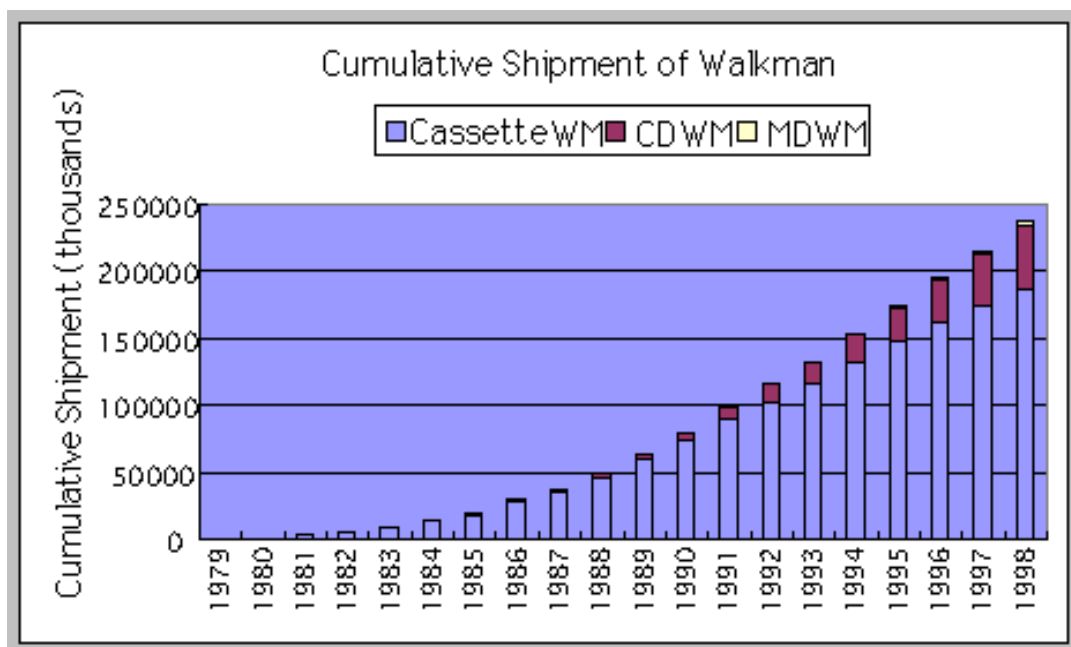
Year	Representative Models	Notes
1979	First model "TPS-L2" for 33,000 yen	- 6/22: The press announcement at Yoyogi Park - It became extremely popular from autumn to the year-end, which kept it out of stock for a while.
1980		- The Walkman, roller skate, digital watch became "the three new sacred treasures". - The late Maestro von Karajan used the Walkman habitually, which became quite topical. - Other companies began to commercialize the Walkman.
1981	"WM-2" (greatly boosted up the popularity of the Walkman)	- The word, "Walkman" was added in the French dictionary "Petit Larousse".
1983	"WM-20" (the 1st cassette tape size)	
1984	"Discman" "D-50" (greatly boosted up the popularity of the Discman)	- Cumulative shipment: 10 million units in June
1985	"WM-101" (the 1st model compatible with chewing gum-size batteries)	
1986	"WM-109" (the 1st model equipped with a remote control)	- Cumulative shipment: 20 million units in June - The word "Walkman" was added in the "Oxford English Dictionary".
1987	"WM-501"	- Cumulative shipment: 30 million units in June - Permanently displayed in the Smithsonian Institution
1988	"WM-505" (the 1st model with wireless headphones)	- Cumulative shipment: 40 million units in July

Exhibit H: Details of Sony Walkman Timeline (Continued)

Year	Representative Models	Notes
1989		- Cumulative shipment: 50 million units in June
1990	"WM-805" (the 1st model with wireless remote control) DAT Walkman "TCD-D3"	
1992	MD Walkman "MZ-1" "MZ-2P"	
1993		- Cumulative shipment: 100 million units in January
1994	The 15th anniversary model "WM-EX1", "WM-EX1HG" (No.1 sales units ever for domestic model)	- The bagasse paper (non-wood pulp and made of sugarcane) was used for the package (WM-EX511) for environmental protection
1996	"WM-EX5" (mirror faced "beautiful Walkman")	- Cumulative shipment: 150 million units in April - Introduction of "Beans Walkman" brought public attention to the "casual" models.
1997		- The name "Discman" was officially changed to "CD Walkman" (for the Japanese lineups launched between 97/10_98/3 only).
1998	"WM-EX9" (constant playback for 100 hours)	
1999	20th anniversary models (4): "WM-WE01" (cassette tape), "D-E01" (CD), "MZ-E80" (MD), "MDR-EX70SL"(headphones)	- Cumulative shipment: 186 million units as of the end of the fiscal year ended March 31, 1999.

Source: <http://www.world.sony.com>

Exhibit I: Cumulative shipment of Walkman



Source of data: <http://www.world.sony.com>

Exhibit J: Competing Formats

Organization	Format	File size	Supporters
MICROSOFT	Windows Audio 4.0 ¹	0.5 MP3	Microsoft, Casio, etc.
RealNetworks	G2 ²	MP3	EMI, Sony, RealNetworks, etc.
AT&T	a2b ³	<MP3	AT&T
Sony	ATRAC3 ⁴	>MP3	Sony, IBM, Microsoft
Lucent	Enhanced Perceptual Audio Coder (EPAC ⁵)		Lucent
Liquid Audio	Liquid Audio ⁶		EMI

1. PR Newswire, November 10, 1999, Microsoft Announces New Windows Media Developer Resources for Next Generation Of Digital Audio
2. www.real.com
3. www.a2bmusic.com
4. www.sony.com
5. www.lucent.com
6. www.liquidaudio.com

Exhibit K: Competing Security Systems

Organization	Security Technology
MICROSOFT	Digital Rights Management (DRM ¹)
IBM	Electronic Music Management System (EMMS ²)
AT&T	Playback mode only
Secure Digital Music Initiative (SDMI)	<i>Under Development</i>
Cognicity	Digital Watermarking, etc.
InterTrust	Digital Rights Management (DRM)
Sony	MagicGate/OpenGate ²
Samsung	Secumax ³

1. Consumer multimedia report, November 29, 1999, Monday, Multi-format internet portables readied.

2. AUDIO WEEK, April 19, 1999, Monday, IBM, SONY IN SDMI LINK

3. Audio Week, February 8, 1999, Monday, Consensus Emerging On Internet Music Delivery

Exhibit L: Memory Stick™ licensed companies

Adobe Systems Inc.

Aiwa Co., Ltd

Alpine Electronics, Inc.

Alps Electric Co., Ltd

Casio Computer Co., Ltd

Clarion Co., Ltd

DataFab System Inc.

Fujitsu Ltd

I-O Data Device, Inc.

Kenwood Corporation

Koninklijke Philips Electronics N.V

LG Electronics Inc

Mitsumi Electric Co., Ltd

Oki Electric Industry Co., Ltd

Olympus Optical Co., Ltd

Pioneer Corporation

Ricoh Co., Ltd

Sanyo Electric Co., Ltd

Seiko Epson Corporation

Sharp Corporation

Teac Corporation

Western Digital Corporation

France Telecom

Audi AG

Volkswagen AG

Source: <http://www.world.sony.com>