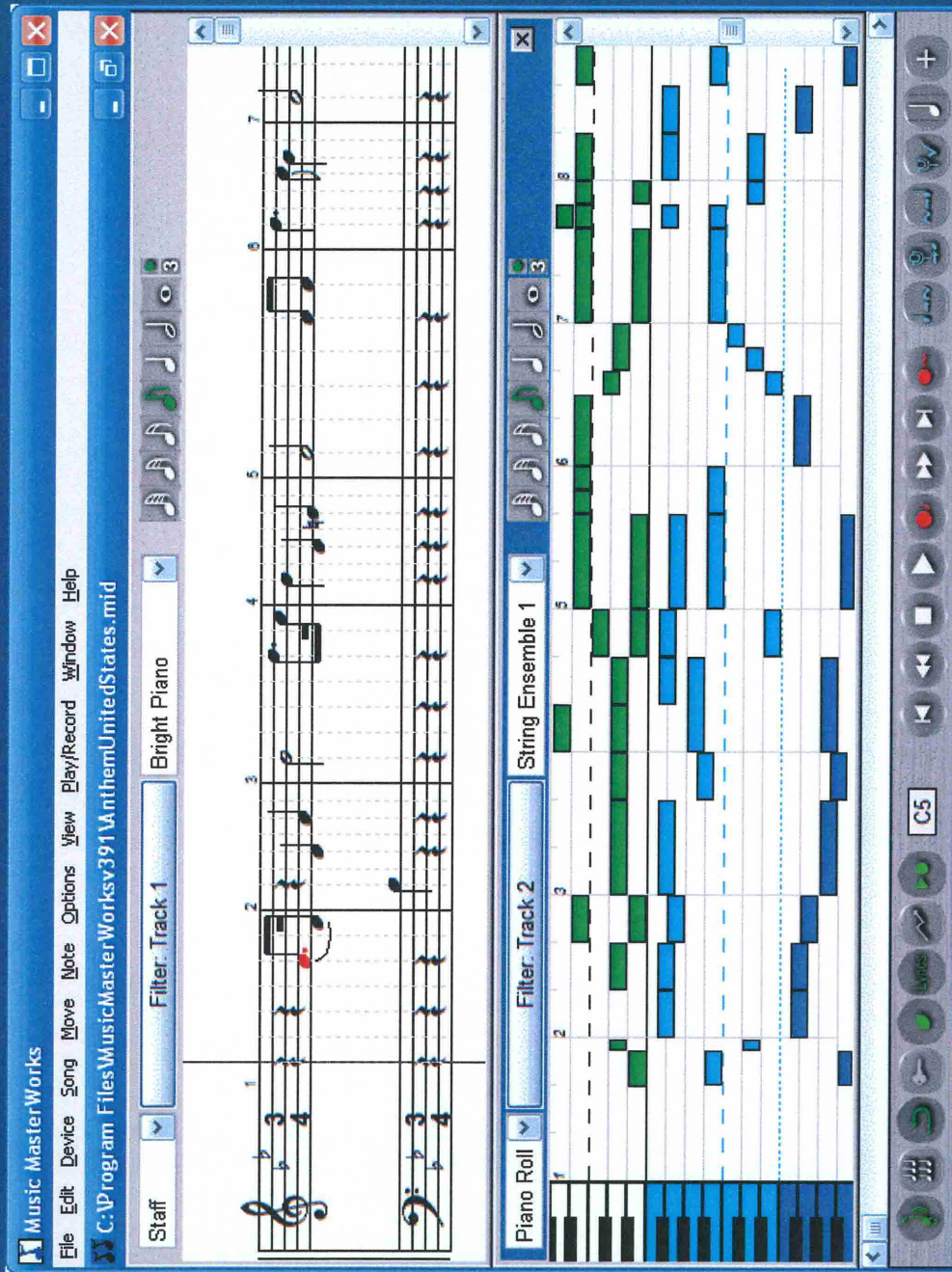


## DIGITAL AUDIO VS. SHEET MUSIC

- Sheet music provides a set of instructions to an artist to read and perform
- MIDI (Musical Instrument Digital Interface)
  - *Electronic sheet music*
  - *Stores instructions, as opposed to raw audio data*
    - Reflected in file size differences (KB vs. MB)
  - *Reliance on tones stored on playback computer*
    - i.e., playback computer is the artist
  - *Cannot accurately capture artist vocals*
  - *MIDI is not created by converting analog sound waves, it is an all digital creation of notes to play.*

# DIGITAL AUDIO VS. SHEET MUSIC



# DIGITAL AUDIO VS. SHEET MUSIC

**SALES AND DISTRIBUTION: Prior to final purchase, hardware units need to be physically transferred from the manufacturing facility to the wholesale warehouse to & the retail warehouse to the retail outlet, resulting in lengthy, lag time between music creation and music marketing, as well as incurring unnecessary and inefficient transfer and handling costs. Additionally,**

**Accordingly, it is an objective of this invention is to provide a new and improved methodology/system to electronically sell and distribute Digital Audio Music.**

**METHOD FOR TRANSFER OF DIGITAL AUDIO MUSIC TO A USER.**  
 This is a continuation of U.S. Pat. No. 6,720,471 filed on the same date as the present application.  
**FIELD OF THE INVENTION**  
 The present invention is directed to a method for transferring digital audio music to a user. The method includes the steps of: (a) creating a digital audio music file; (b) transferring the digital audio music file to a user; and (c) receiving the digital audio music file at the user's location.  
**BACKGROUND OF THE INVENTION**  
 The three basic methods of transferring music are: (1) physical transfer, (2) electronic transfer, and (3) digital transfer. Physical transfer involves the transfer of a physical medium, such as a CD or cassette, from a manufacturer to a retailer, and then to a consumer. Electronic transfer involves the transfer of a digital file from a manufacturer to a retailer, and then to a consumer. Digital transfer involves the transfer of a digital file from a manufacturer to a consumer, without the need for a retailer.  
 Physical transfer is the most common method of transferring music. It involves the transfer of a physical medium, such as a CD or cassette, from a manufacturer to a retailer, and then to a consumer. This method is slow and expensive, and it is difficult to transfer large amounts of music.  
 Electronic transfer is a more efficient method of transferring music. It involves the transfer of a digital file from a manufacturer to a retailer, and then to a consumer. This method is faster and cheaper than physical transfer, but it still requires the use of a retailer.  
 Digital transfer is a new method of transferring music. It involves the transfer of a digital file from a manufacturer to a consumer, without the need for a retailer. This method is the most efficient and cheapest method of transferring music, and it allows for the transfer of large amounts of music.

'573 patent at col. 1:39-43, 2:10-12

# DIGITAL AUDIO VS. SHEET MUSIC

MIDI



Elvis Presley, "Can't Help Falling In Love" (1961)

# DIGITAL AUDIO VS. SHEET MUSIC

## DIGITAL AUDIO



Elvis Presley, “Can’t Help Falling In Love” (1961)

# System to Transmit Digital Signals

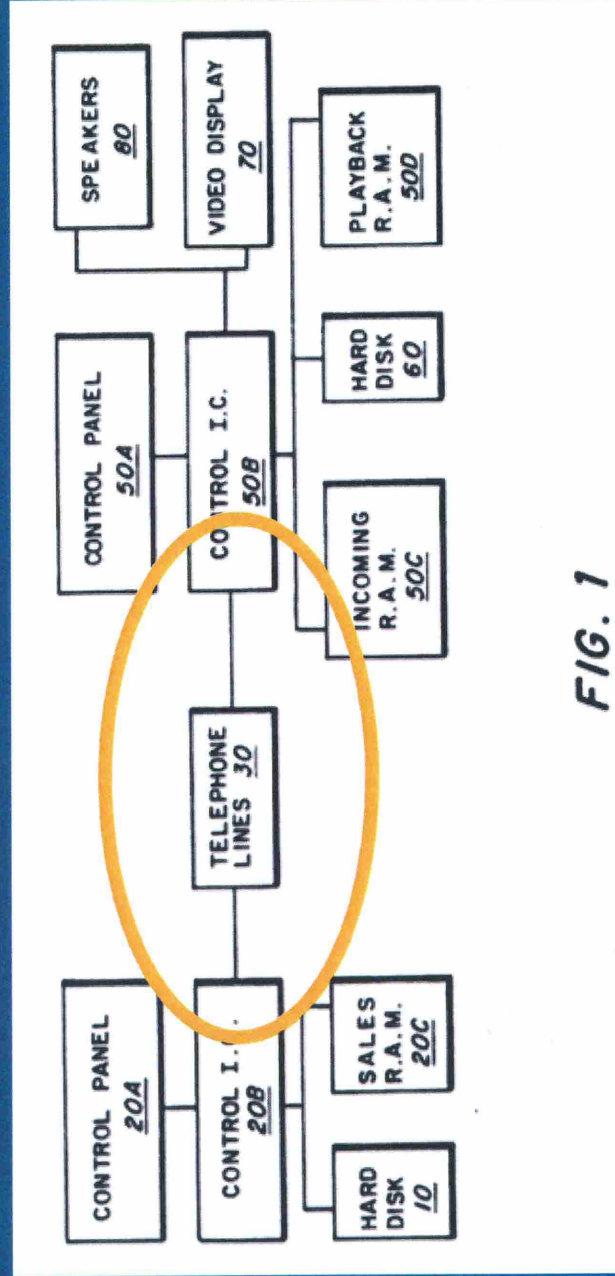
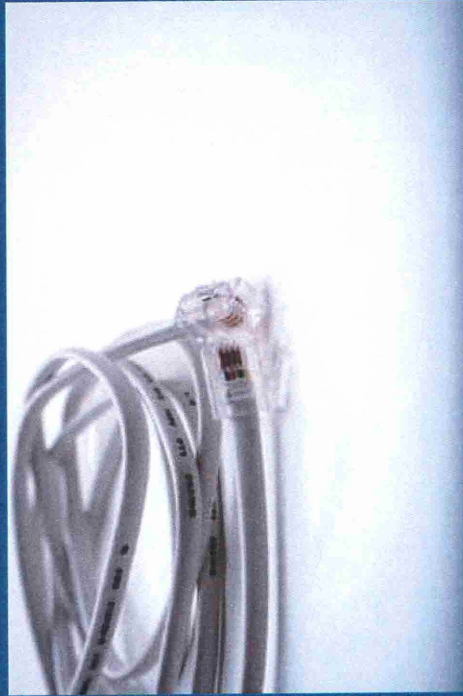


FIG. 1

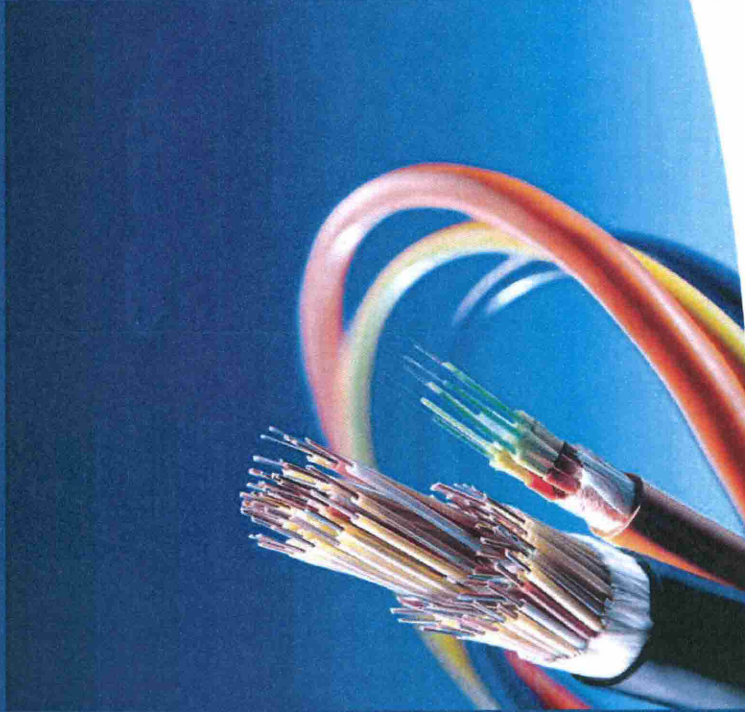
# Copper Wire

- Metal-based
- By 1988, was part of the backbone of telephone networks, e.g., “last mile”
- Provides for an electrical conduction path



# Fiber Optics

- Composed of Fibers
- Data communication utilizing light/photons
- By 1988, utilized in phone networks, e.g., long-distance calls.





# Fiber Optics

- 1977 – AT&T utilized fiber optics in their telephone networks
- 1987 – AT&T, British Telecom laid down TAT-8 fiber optic cables to facilitate long-distance telephone communications



**AT&T Labs**  
About AT&T Labs  
In Development  
In Research  
Products & Services  
Tech Showcase  
Technology Timeline

1900's  
1910's  
1920's  
1930's  
1940's  
1950's  
1960's  
1970's

**1977: Fiber Optic Communication**

AT&T Bell Labs scientists became interested in lightwave communication in the mid-1960s, when it became apparent that lightwaves had an enormous capacity for carrying information and were immune from electrical interference. Advances in lasers, light-emitting diodes, repeaters, connectors, photoreceptors and glass fibers in the following decades - and the realization that they could be fabricated and integrated on a single chip - paved the way for the development of the first lightwave system in an operating telephone company in 1977.

The installation was the world's first lightwave system to provide a full range of telecommunications service - voice, data, and video - over a public switched network. The system, extending about 1.5 miles under downtown Chicago, used glass fibers that each carried the equivalent of 672 voice channels.

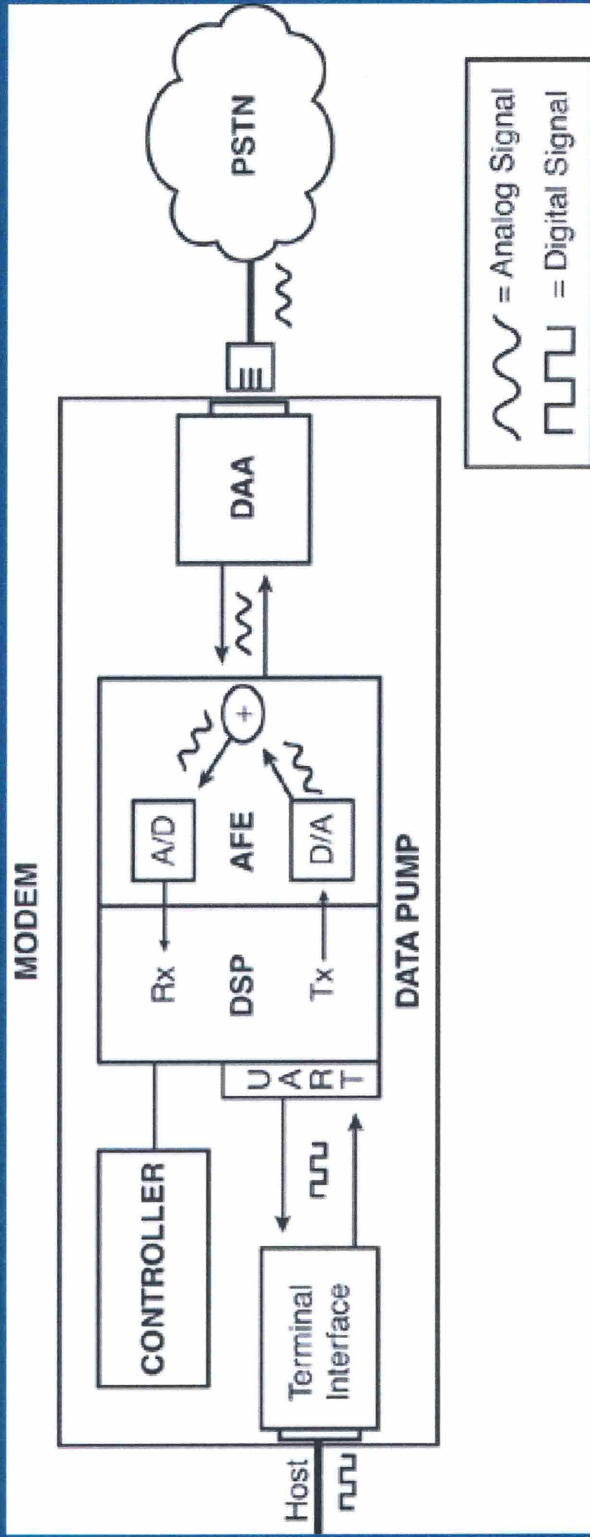


# Wireless / Cellular

- Radiowaves / microwaves
- Antenna transmission from devices utilizes electricity

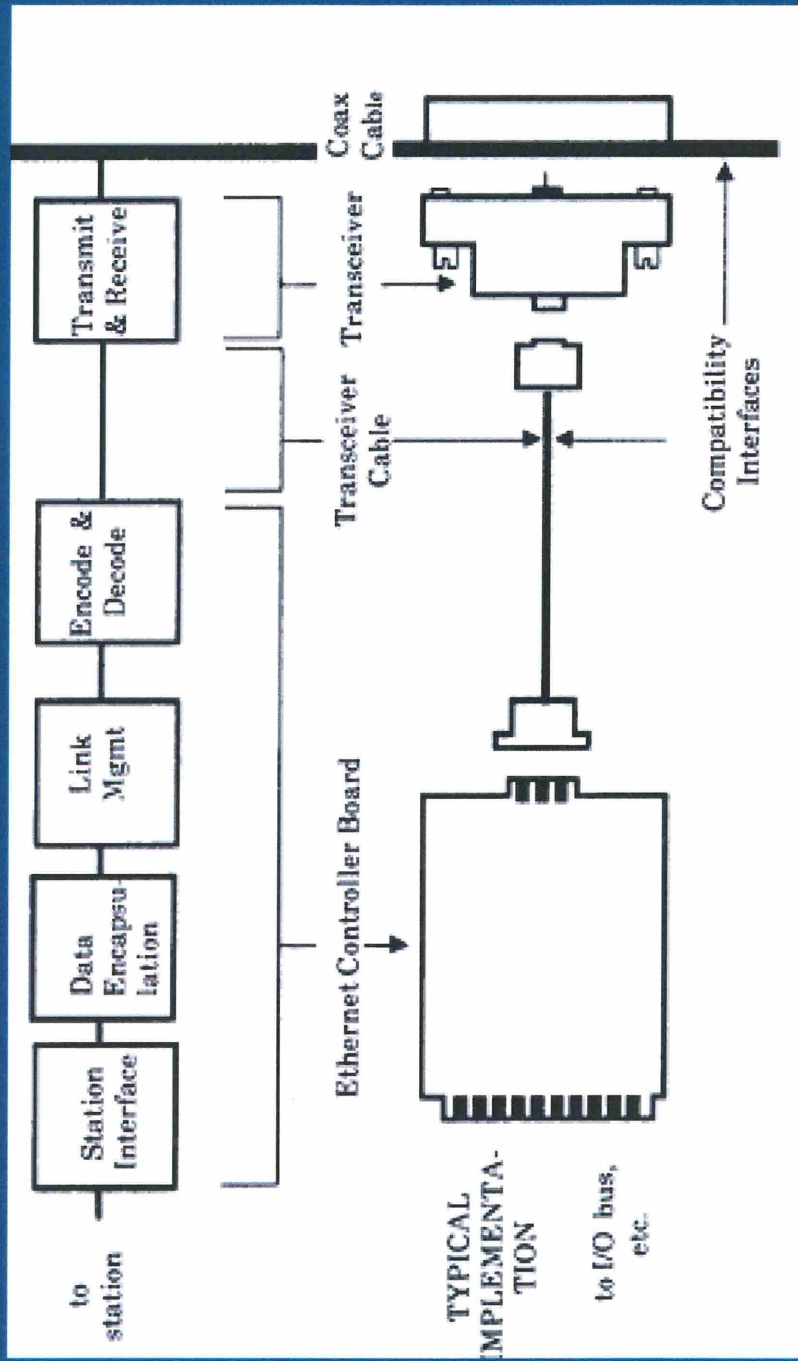


# Connecting / Transmitting



- Modem converts digital signals from a computer to an analog signal s to be sent across copper wires as used in phone systems
- Computer bytes are converted to bits by a (transmitter/receiver)
  - “A” = 97 (decimal) = 01100001 (binary)
- Bits are represented in tones (Hz)

# Connecting / Transmitting



The Ethernet, 1982

# System to Transmit Digital Signals

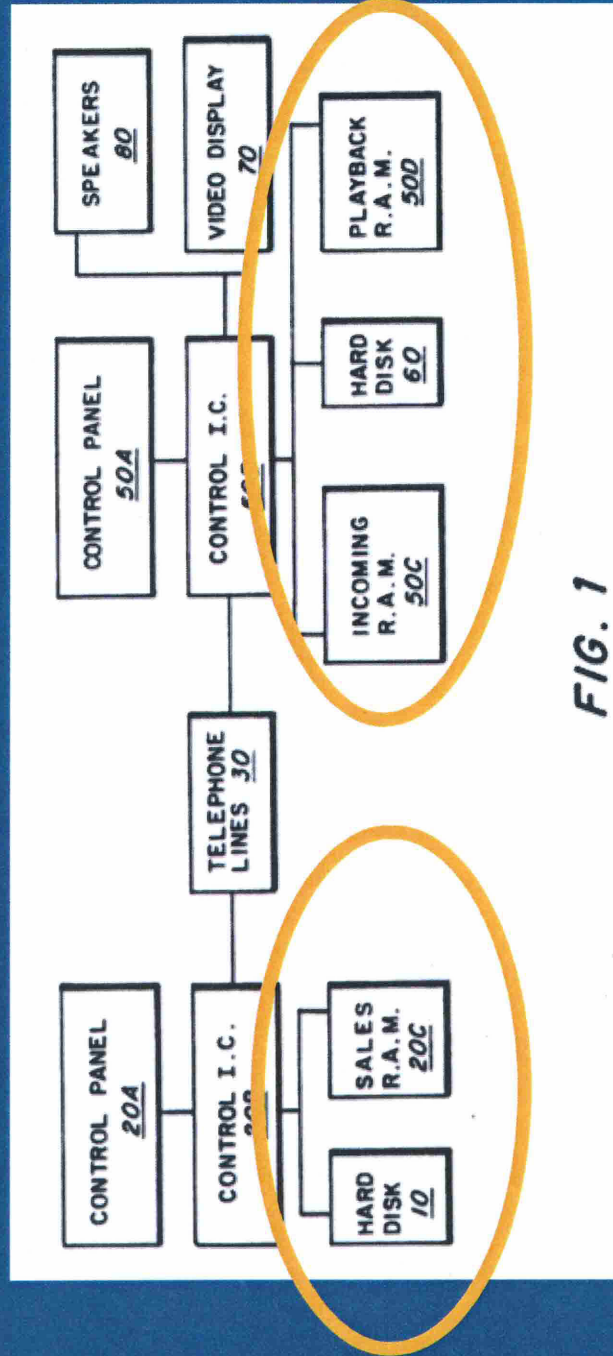


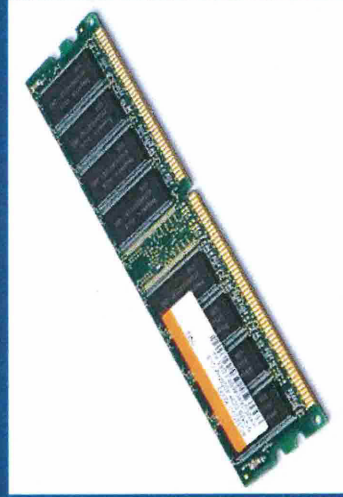
FIG. 1

# STORAGE

- Volatile Memory
- Non-volatile memory

# Volatile Memory: RAM

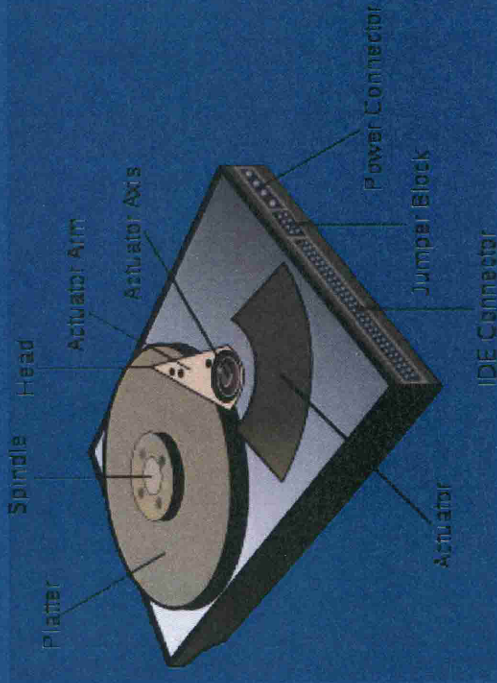
- Random Access Memory



- Composed of integrated circuits (transistors)
- Loss of contents or state when power is removed
- Consistent access time for different locations

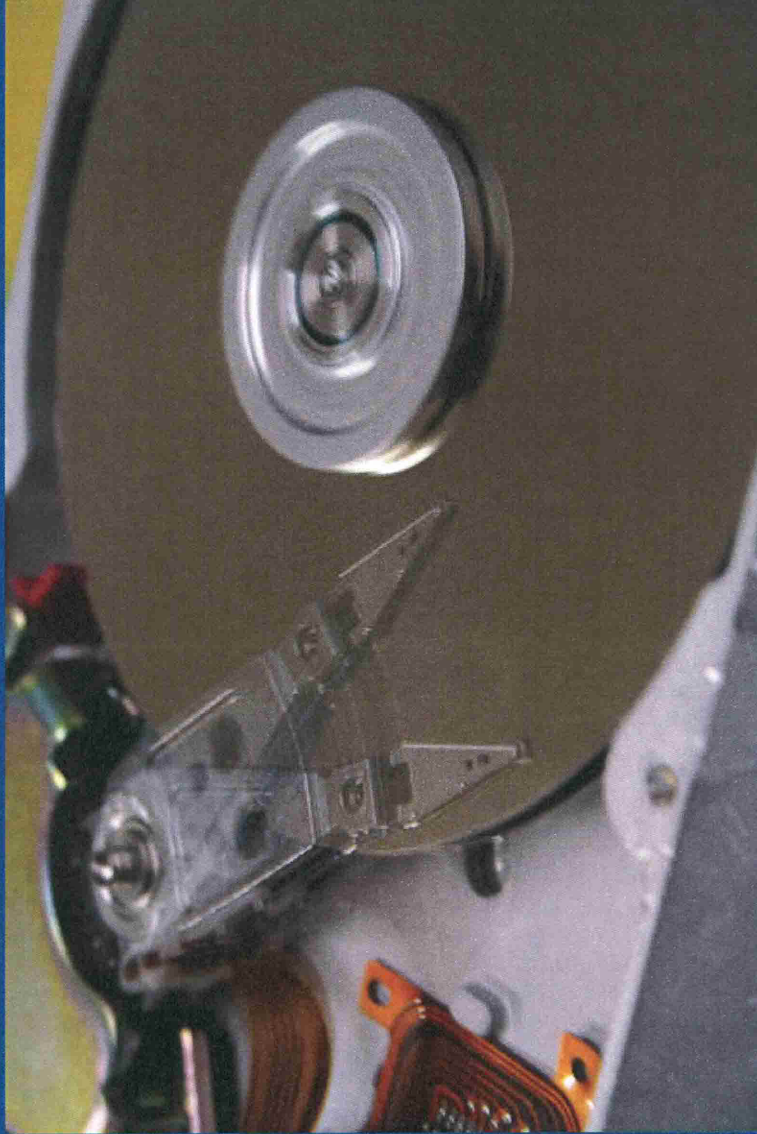
# Non-volatile Memory

- Retain information even when power is removed
- Long-term persistent secondary storage
- Hard Disks
  - Rotating disk
  - Movable actuator arm
  - Read/write head
- Solid State Drives
  - Integrated circuits
  - Less susceptible to physical shock
  - Faster access
  - Quieter





# Non-volatile Memory: Hard Drives



# Non-volatile Memory: Hard Drives

- Solid State Drives are non-volatile and use NAND-based flash memory



NEW ULTRA HIGH DENSITY EPROM AND FLASH EPROM WITH NAND STRUCTURE CELL

KEIICHI NISHIMURA, HAJIME NISHIMOTO, TOSIYUKI TAKEDA AND RICHIEO HIRANO  
VLSI Research Center, Toshiba Corporation  
1, Esakami-cho, Sakuragaoka, Kanagawa, 210 JAPAN

**ABSTRACT**

The new NAND structure cell is a new type of non-volatile memory cell. It is based on the NAND structure cell technology, which has been widely used in NAND flash memory. The new NAND structure cell is a high density non-volatile memory cell. It is suitable for high density non-volatile memory applications. The new NAND structure cell is a high density non-volatile memory cell. It is suitable for high density non-volatile memory applications.

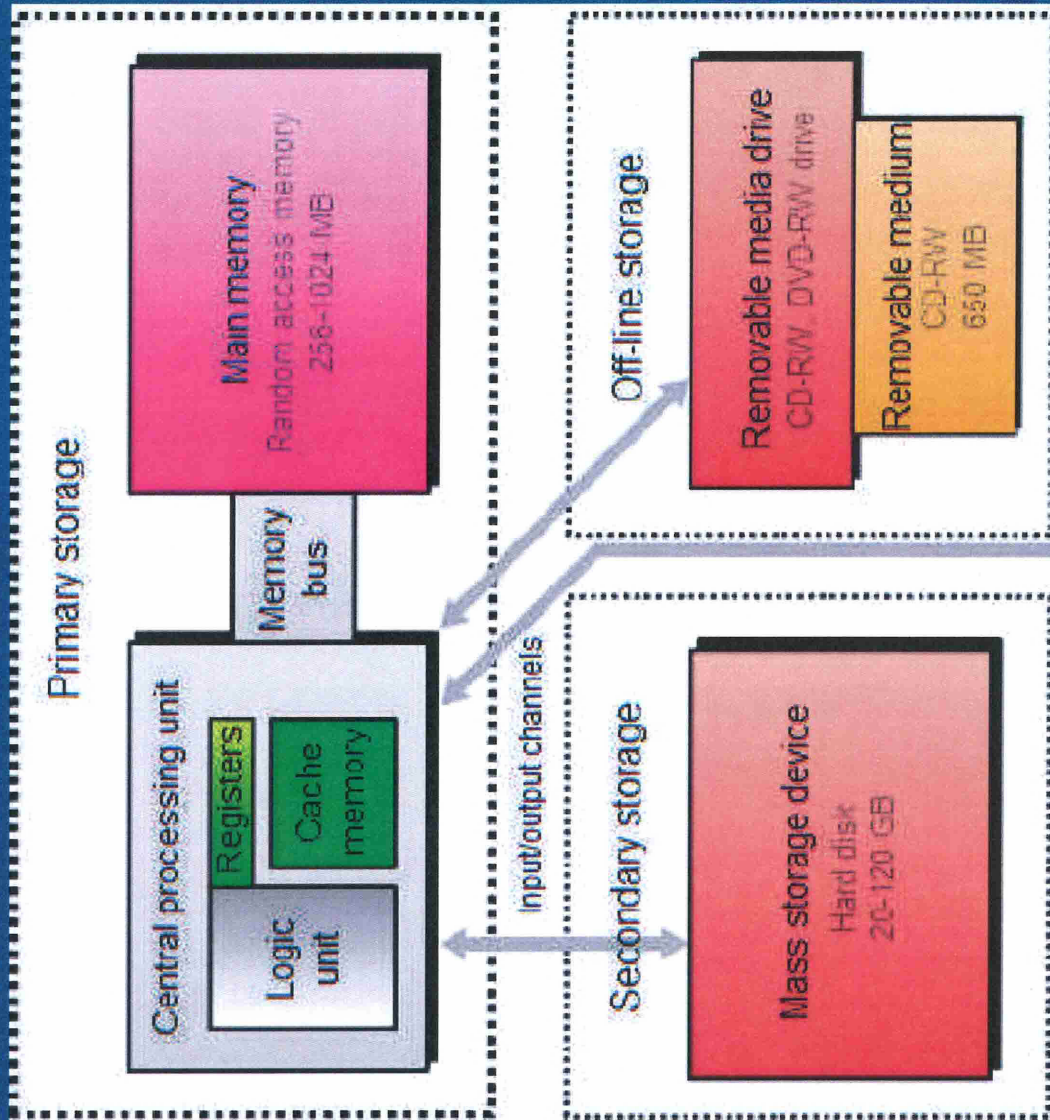
**INDEXING TERMS**

Non-volatile memory, NAND structure cell, high density, non-volatile memory, NAND flash memory, high density non-volatile memory, NAND structure cell, high density non-volatile memory, NAND structure cell, high density non-volatile memory.

VLSI Research Center, Toshiba Corporation

programmed selectively. This high performance NAND structure cell is applicable to high density nonvolatile memories as large as 8M bit EPROM and Flash-EEPROM or beyond.

# Storing in Memory



END