Typewriters, Teletypes, and Keyboards

T V Atkinson, Ph D
Senior Academic Specialist
Department of Chemistry
Michigan State University
East Lansing, MI 48824

1. History

The keyboard has traditionally provided an essential interface between the human and digital machines such as the computer. Over the life of modern computing, 1940's to present, a great number of keyboard designs have been used. These designs have varied in many ways: physical construction, nature of the mechanism, i.e. mechanical, electrical, or electronic, keyboard layout, character sets. The roots of the modern keyboard are firmly connected to the history of the typewriter.

The first patents for typewriters were granted in 1713. The first workable model is ascribed to Pellegrino Turri in 1808[1]. The first commercial model is attributed to a Danish pastor Malling Hansen in 1870.[1] Nietzsche was given one of these as a Christmas present from his mother and sister and hated it.

A significant development in the typewriter industry was achieved by Christopher Latham Sholes[2,3,4]. He demonstrated a mechanical mechanism in 1868. Production of the "Sholes and Glidden Type Writer" was begun in 1874 by E. Remington & Sons, arms manufacturer. 5000 units were sold. In 1878, a new model, "Remington No. 2" was introduced. The new model had upper and lower case, selected by the familiar "Shift" key that mechanically shifted the carriage up and down to align one or the other of the two sets of type. Figure 1 and Figure 2 are drawings from the patent issued in 1878.

One significant impact this machine has had on the computer industry is illustrated by Figure 1 and Figure 8. Notice that the layout of the alphabetic, numeric, and some of the punctuation mark keys are the same. This is true for the majority of the keyboards used for Latin based and other western language speakers for the last 124 years. This keyboard layout is called QWERTY after the left six keys of the upper row of the alphabetic section of the keyboard. This layout was a compromise between the mechanical realities of the early designs, ergonometric factors, and the distribution of pairs of letters in the words of the English language. At that time, the probablility of the type bars of two characters struck in succession jamming was related to how far apart they were in the row of type mechanisms. The QWERTY layout was chosen to optimize the separation of key pairs such as "TH" that are most common and hence minimize jams.

---

[1] "A Brief History of Typewriters," http://xavier.xu.edu:8000/~polt/tw-history.html, observed 12-Jan-1997.

[2] "The First Typewriter," Darryl Rehr, http://home.earthlink.net/~dcrehr/firsttw.html, observed 12-JAN-1997.

[3] "Consider Qwerty...," Darryl Rehr, http://home.earthlink.net/~dcrehr/whyqwert.html, observed 11-JAN-1997.

[4] "The Typewriter," Darryl Rehr, Popular Mechanics, August 1996, http://popularmechnics.com:80/popmech/spec/9608SFACM.html, observed 11-JAN-1997.
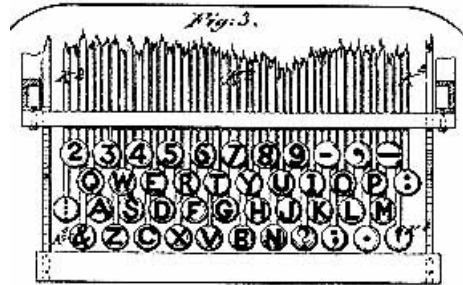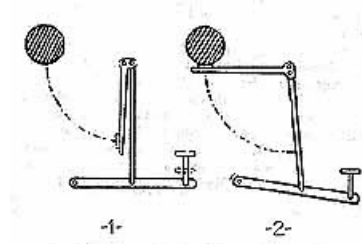
Figure 1 1878 Patent Drawing 3

Figure 2 1878 Patent Drawing 1,2

Many other keyboard layouts have been proposed over the last century. The most famous is that developed by Professor August Dvorak[4,5,6,7] of Washington University with funds from the Carnegie Foundation. In 1932 he published the keyboard layout shown in Figure 9.

Many individuals have promoted the use of the DVORAK keyboard over the years, but QWERTY remains the dominant layout by far. In the early years, you would have to have a drastically different typewriter. In these days of electronic keyboards and computer based word processing, there is a greater opportunity for the DVORAK or other optimized keyboards to take hold. You may select to use the DVORAK keyboard layout with Microsoft Windows 95 and Windows NT 4.0. Go into the Keyboard Control Panel and select the Language Tab, click on English (United States), click on Properties, then select United States - Dvorak. Other layouts are provided.

2.Teletypes

Teletypes were mechanical implementations of typewriter that allowed for transmission of and receipt of messages transmitted over twisted pairs or telephone lines[8]. These devices were in use in the 1950's through the 1970's.

---

[5] "The Dvorak Keyboard," http://www.mit.edu:8001/people/jcb/Dvorak/index.html, observed on 11-Jan-1997.

[6] "The Dvorak Keyboard," //http://www.cs.washington.edu/homes/dylan/dvorak.html, observed on 11-Jan-1997.

[7] "The DVORAK Keyboard Layout," Joe Strout, http://www-acs.ucsd.edu/~jstrout/dvorak/dvorak.html, observed on 11-Jan-1997.

[8] "Technical Manual, 33 Teletypewriter Sets, Bulletin 310B Vol 1", Teletype Corporation, 1974.
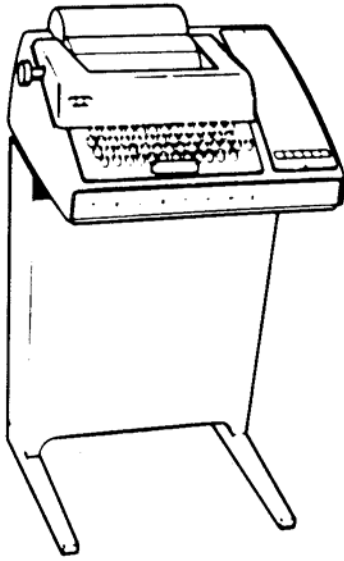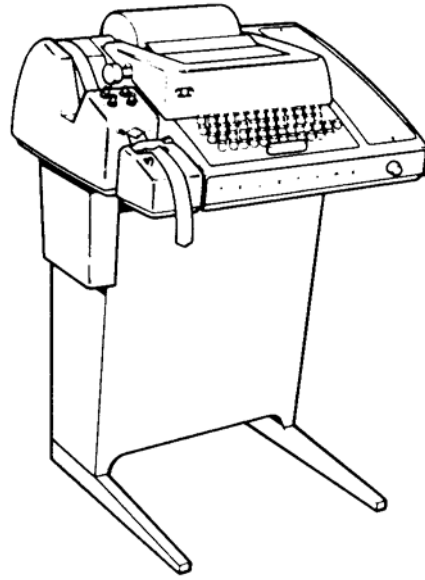
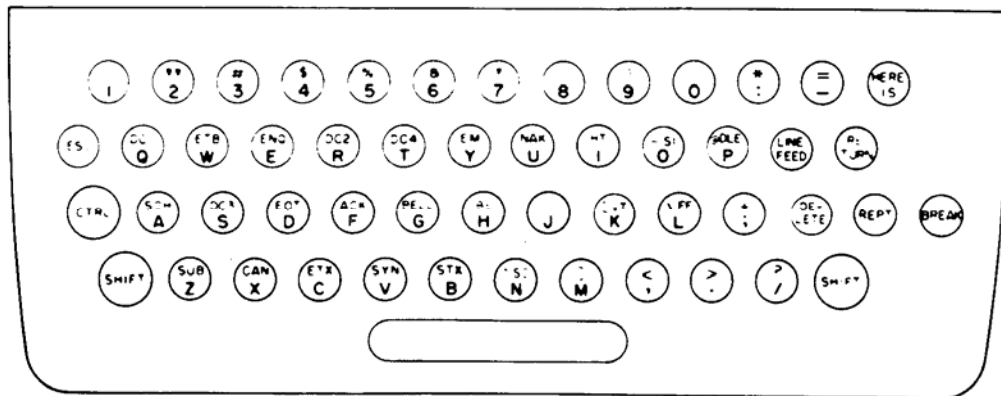**Figure 3 - KSR 33 Teletype**

Figure 4 - ASR 33 Teletype

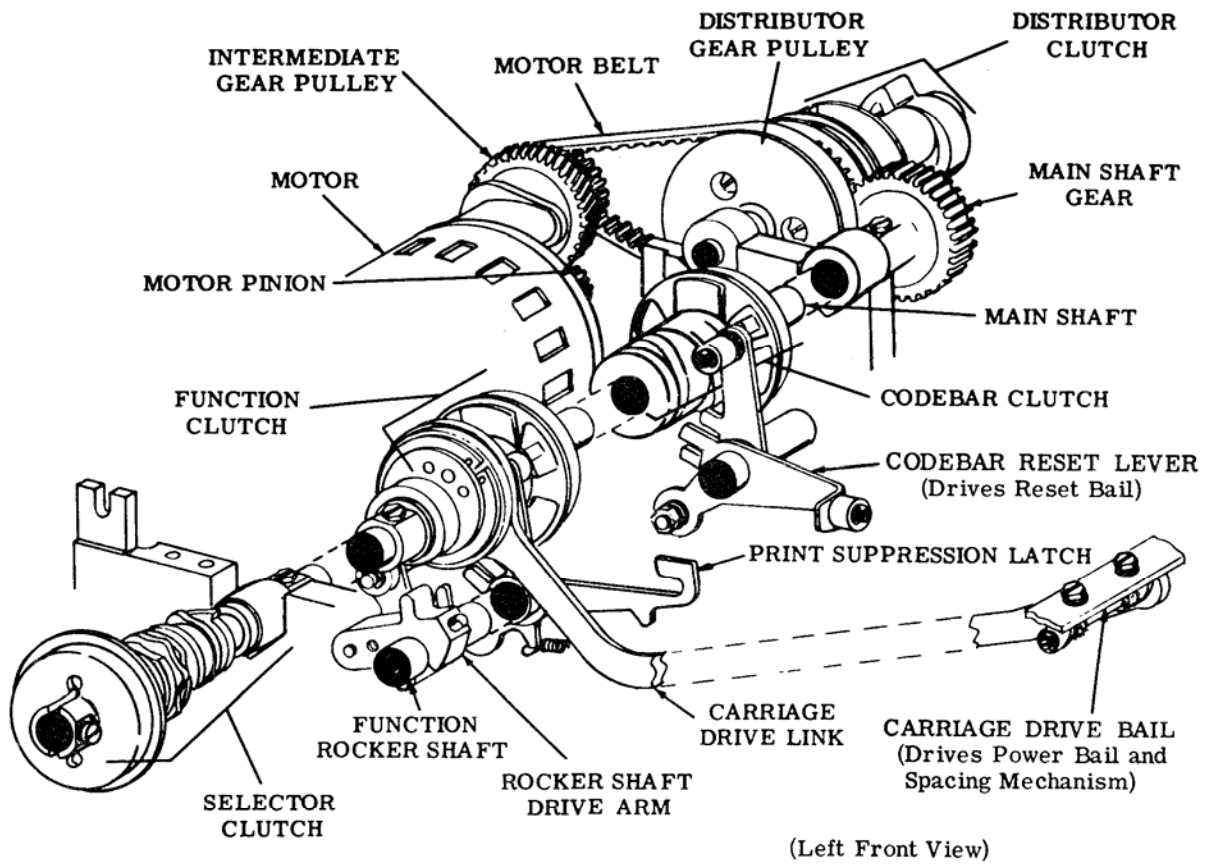**Figure 5 - ASR/KSR 33 Teletype Keyboard**

ISS 3, SECTION 574-122-100TC

INTERMEDIATE
GEAR PULLEY

MOTOR BELT

DISTRIBUTOR
GEAR PULLEY

DISTRIBUTOR
CLUTCH

MOTOR

MAIN SHAFT
GEAR

MOTOR PINION

MAIN SHAFT

FUNCTION
CLUTCH

CODEBAR CLUTCH

CODEBAR RESET LEVER
(Drives Reset Bail)

PRINT SUPPRESSION LATCH

FUNCTION
ROCKER SHAFT

CARRIAGE
DRIVE LINK

CARRIAGE DRIVE BAIL
(Drives Power Bail and
Spacing Mechanism)

ROCKER SHAFT
DRIVE ARM

SELECTOR
CLUTCH

(Left Front View)

Figure 5 - Motor and Drive Mechanism

Figure 6 ASR/KSR 33 Teletype Mechanism (Small Fraction of Complete Mechanical)

Note: Reader feed contact assembly
and certain contact wiring removed.

PLATEN
MECHANISM

TP183379
BELTS

IDLERS

IDLER
POST

FORM-OUT
MECHANISM
MOUNTING
SCREWS

FORM-OUT
MECHANISM

BRUSH
HOLDER

TP183378
BELT

DISTRIBUTOR
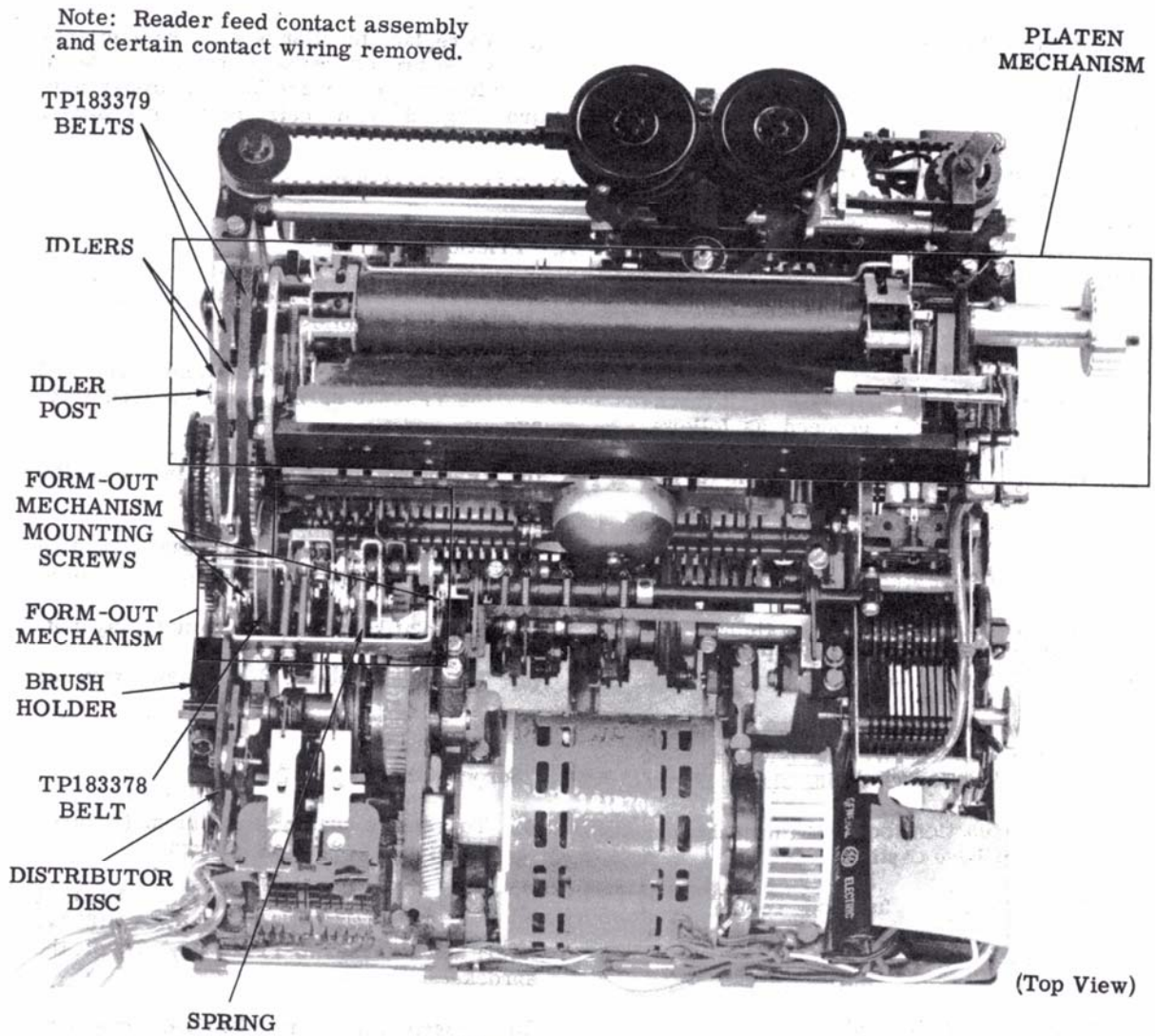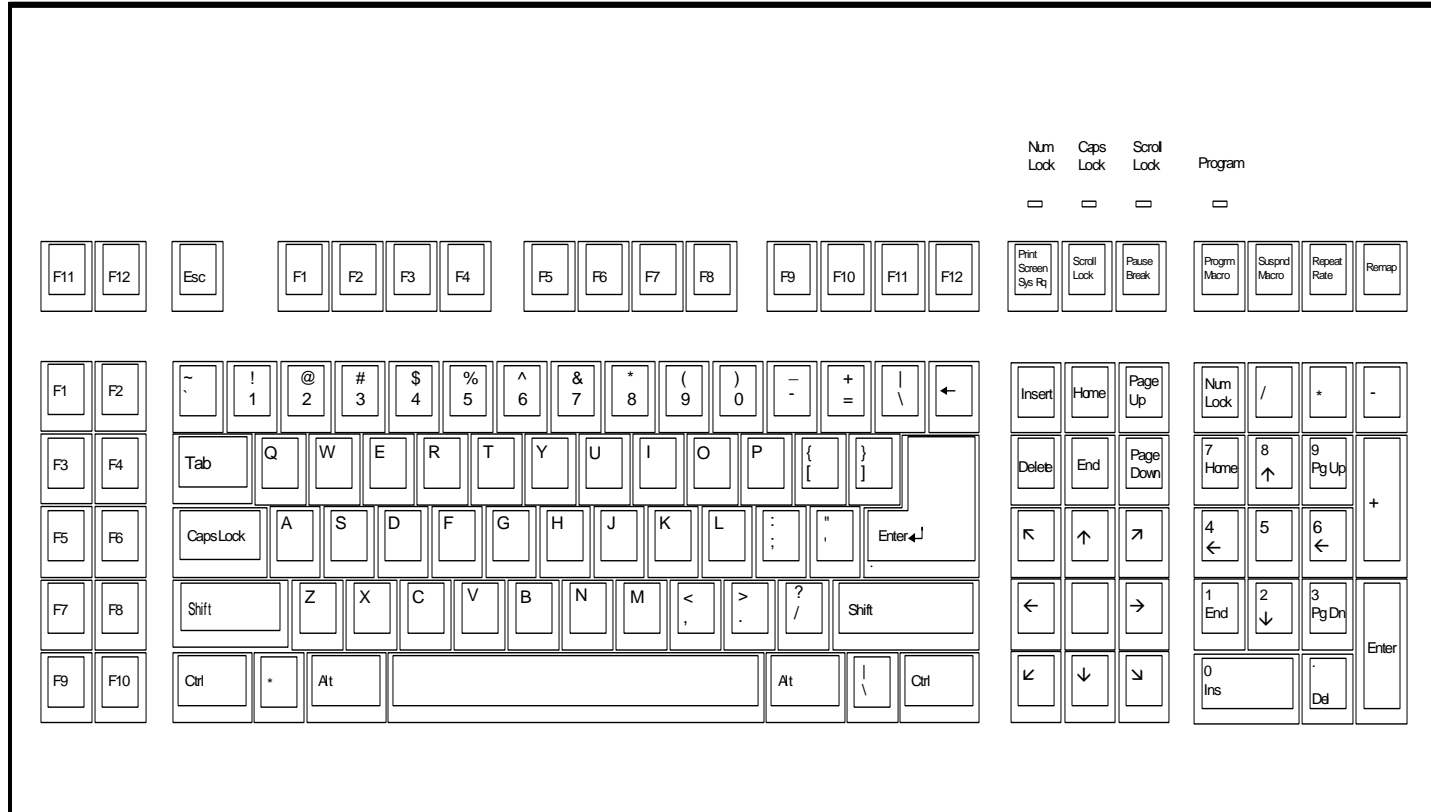DISC

(Top View)

SPRING

Figure 5 - Typing Unit

Figure 7 ASR/KSR 33 Teletype Mechanism

3. Typical Modern Computer Keyboard

Gateway 2000 Keyboard (124 Keys)

Figure 8 - A Modern Keyboard

4. Dvorak Keyboard

Figure 9 - The Dvorak Keyboard