

# 數位分身的前世：傳真機

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最近我到高雄市的國立科學工藝博物館演講，順便參觀其珍貴館藏，無意間看到中華電信的骨董傳真機 TYPE LDI-3 FACSIMILE，頗有親切感。科工館的解說：「傳真機為結合光學、電子、精密機械及通訊等多項技術的事務機器。由於國際網路通訊盛行，傳真機市場逐步衰退，且單一功能傳真機已不符需求，故廠商推出結合傳真、掃描、影印及列印等多功能傳真機來因應市場變化。」今日傳真機被當成不符需求的事務機器，其實它可是 1940 年代的劃時代創新。

數位分身是今日的熱門話題，而傳真機應該是最早期的遠距數位分身產生器。傳真機的前世可歸功於倫傑 (Richard Ranger) 發明的無線傳真 (wireless photoradiogram 或 transoceanic radio facsimile)。這部無線傳真機由紐約傳送第一張照片到倫敦，照片是時任美國總統柯立芝 (John Coolidge) 的玉照。

倫傑於 1930 年成立 Rangertone 公司，位於紐澤西州的紐瓦克 (Newark)，這家公司在三號公路附近，我曾拜訪過。倫傑一生多采多姿，有許多發明，還得過奧斯卡金像獎。直到今日，無線傳真仍然用於傳送氣象圖及資訊。1924 年，AT&T 的艾維斯 (Herbert Ives) 完成第一張彩色傳真。艾維斯是個特異獨行俠，多次公開表示反對愛因斯坦的相對論。

1925 年貝爾實驗室採用真空管技術和光電管技術研製出了實用型的傳真機。1947 年慕維廉 (Alexander Muirhead) 發明現代的傳真機；1960 年代，美國陸軍首次以衛星傳送照片到波多黎各 (Puerto Rico)。早期的傳真機採用阿摩尼亞水來作顯影液，到後期才出現用特別熱感紙的傳真機。

中華電信總公司陳列一部早期的傳真機，這部日本 Toho Denki 製造的傳真機於 1968 年出品，將客戶手寫之電報稿，原樣地發送或接收。1970 年代中期，因傳真機成本大幅下降，遂普遍被採用，尤其是數位傳真機在日本率先流行，很快取代電傳打字機 (teletypewriter)。其主因是，在那個年代，以打字機敲打日文很不方便，遠不如傳真機的掃描快速。傳真電報稿不必先譯成電碼再傳送，而可直接送真跡到對方客戶端。

1980 年後，傳真機已遍佈全世界。1985 年，麥格努斯基 (Hank Magnuski) 製作第一張電腦傳真擴充卡 GammaFax，完成第一部電腦傳真機。現在的傳真機大多數都依此原理，採用噴墨或雷射列印。今日傳真的服務已漸漸被網路上的服務取代，不過傳真仍有優點，例如它不像網路產品那樣容易被入侵或中毒。因此一些機密文件，仍然依賴傳真機的傳送。



早期傳真機。林一平攝



林一平手繪之柯立芝 (John Coolidge)。



早期電傳打字機。林一平攝

# The Forerunner of Digital Cloning: Fax Machine

Recently I gave a speech at the National Science and Technology Museum in Kaohsiung City, and stopped by to enjoy the precious collection. It was quite familiar to me when I saw Chunghwa Telecom's antique fax machine, TYPE LDI-3 FACSIMILE, by accident. The National Science and Technology Museum explanatory text described, "Fax machines are business machines that integrate optics, electronic, precision machinery, and communications. The fax machine market declines gradually due to the prevalence of internet use. At the same time, single-function fax machines cannot meet the end users' expectation so that vendors promote multi-function fax machines, which offer faxing, scanning, photocopying and printing in one box, in response to market changes." Although fax machine today is regarded as a business machine that does not meet the requirements, it was in fact an epoch-making innovation in the 1940s.

While digital clones are a hot topic today, fax machines should be the earliest remote digital clone generator. The forerunner of current fax machines was wireless photoradiogram or transoceanic radio facsimile invented by Richard Ranger. The wireless fax machine sent the first photo, which was a photograph of President John Calvin Coolidge, from New York to London.

Ranger formed a company, Rangertone, Inc., in Newark, New Jersey in 1930. I have visited that company near Highway 3. Ranger lives a colorful life. He has many inventions, and won an Academy Award. Until today, wireless faxing is still used to transmit weather maps and information. In 1924, Herbert Ives of AT&T developed the first color facsimile. Ives is a loner and he has publicly spoken out against Einstein's theory of relativity on several occasions.

In 1925, Bell Labs developed a practical fax machine using vacuum tubes and photocells. In 1947, Alexander Muirhead invented the modern fax machine; in the 1960s, the US Army first sent images to Puerto Rico by satellite. The early fax machines utilized ammonia solution as a developer, and in the later period, fax machines using special thermal paper became available.

Chunghwa Telecom Corporation exhibits an early fax machine. This facsimile machine Toho Denki, manufactured in Japan in 1968, sends or receives the customer's handwritten telegram as it is. In the mid-1970s, the cost of fax machines reduced sharply, so they were widely accepted. In particular, digital fax machines became popular in Japan and soon replaced teletypewriters. In those days, typing Japanese with a typewriter was inconvenient, which was far less efficient than scanning hand-written documents with a fax machine. Fax telegram drafts did not need to be translated into codes before transmission, but were directly sent to the peer.

After 1980, fax machines were used around the world. In 1985, Hank Magnuski produced the first computer fax add-on card, called GammaFax, and invented the first computer fax machine. Most of today's fax machines follow Magnuski's design concept, either using inkjet or laser printing. Today's fax service has been gradually substituted by the service on the Internet; however, fax still possesses some advantages since it is not as easy to be hacked or poisoned as Internet products. Therefore, some confidential documents still rely on the transmission of fax machines.