AccessionIndex: TCD-SCSS-T.20190917.001
Accession Date: 17-Sep-2019
Accession By: Pat O'Byrne
Object name: Comart Communicator Computer and peripherals
Vintage: c.1979
Synopsis: Computer with Lear Siegler ADM-3A terminal and acoustic coupler used by Roads Design Office, Co.Cork, to interact with design software in TCD.

Description:
This item includes a Comart Communicator Computer with a Lear Siegler ADM-3A terminal and an acoustic coupler modem. It was used by the road design engineers in Co.Cork to interact with design software in Trinity College Dublin. These items were the basis of an interesting early example of remote usage of computing in TCD, as described below by Pat O'Byrne of the Roads Design Office of Cork County Council.

Comart was a large company distributing systems (such as NorthStar, Apple II, Sharp MZ80K, VIC20, Cromemco, etc) that took over the ByteShop/Computerland chain when it ran into financial difficulties in the late 1970s. The Communicator was a system made in Cambridgeshire, UK, with a simple chassis with three variations of hard disk drives and floppy disk drives, printer port, two or more RS232 serial ports, and a motherboard that had a Zilog Z80-A CPU, 64kB of RAM, and ten S-100 bus slots. Several S-100 boards were available for Viewdata/Prestel, 18.7MB hard disk, and 13.4MB cartridge backup. The system ran Gary Kildall's CP/M operating system.

The Lear Siegler ADM-3A terminal was a very widely used "dumb" (i.e. it was not "intelligent") video display unit (VDU) introduced in 1976. It had a 12-inch CRT screen that could display 12 or 24 lines of 80 of 5x7 dot matrix characters, and a standard RS232 interface supporting from 75-19200 baud. It was the primary user interface to the computer.

The acoustic coupler modem is typical of the era, with an acoustically insulated wooden box into which a standard telephone was inserted, so that the standard RS232 communication protocol could be converted to/from audio frequency-shift key encoded signalling tones, typically at 110/300/1200/2400 baud. At TCD there was specialised equipment for interfacing modem lines to computing. For further details of the remote access facilities see the history of the Computer Laboratory in TCD and the history of networking in TCD elsewhere in this catalog.

Trivia: The 80 characters derives from the number of characters on a punched card

The Evolution of Engineering Computers in Cork County Council

Pat O'Byrne

In the early 1970s calculations were performed mainly with sliderules, as it had been done for many decades. Then around the middle of the decade we acquired our first "computer". This came in the form of a Texas Instruments Programmable Calculator. Simple programmes could be written on this calculator and stored on magnetic strips for reloading at some future time. This little machine very much simplified repetitive calculations such as reducing the readings from topographic surveys.

Following this, the Roads Design Office acquired the assistance of An Foras Forbartha in Dublin and under the expertise of Mr.David Borland we were able to avail of the processing power of a computer in Trinity College Dublin. The aim was to design road alignments using TCD software and hardware. For our part in Cork we had to write by hand the x, y & z coordinates of thousands of survey points on numerous sheets of A4 paper. These were then posted to TCD where staff typed them onto punched cards, which were then fed into the computer in order to generate a digital ground model of the site of the proposed new road. This ground model would be printed out and returned to us in Cork by the postal service. We would then superimpose on this a suggested horizontal alignment of the road. The parameters of this alignment would be returned (by post) to Dublin where it would be coded and processed in the computer. We received the results in Cork about a week after preparing them. On inspecting the alignment on paper it invariably needed to be adjusted and fine-tuned. Each alteration would take approximately one week.

We then acquired our own card-punching machine so that we, in Cork, could prepare the cards and post bundles of them to Trinity, where the computer would read them in order to generate the digital ground model. This process was exceedingly slow and labour-consuming.

In order to speed up the process we purchased a Lear Siegler “dumb” Terminal and dot matrix printer. The purpose of this was to enable us to omit the punched card stage and to input the digital ground model directly into the TCD computer in Dublin via the national telephone network. To enable us to connect the terminal and printer remotely to the computer, which was about 160 miles away, we had to interlink them over the normal telephone lines by means of a modem. This modem, more commonly known as an “Acoustic Coupler” was really cutting edge technology at the time. It consisted of a timber box with a hinged soundproof lid and into which one could insert an ordinary telephone handset. In order to make the remote connection one had to dial a given telephone number in Dublin. Then when the number answered with a sound like a FAX machine the telephone handset was inserted into the box and the lid closed in order to keep out extraneous noise interference. With a bit of luck we could then input data directly to the remote computer and also get printed output back. We had now reached the stage where we could input data for digital ground models, horizontal road alignments and vertical alignments. We could also request outputs such as cross sections at any intervals, longitudinal profiles and mass haul diagrams. This was a huge step up because we could now operate a computer without the assistance of a third party. The turn around time was also greatly improved. Instead of having to wait for a week to get feedback we were able to submit an overnight batch job and get results next morning.

While the above shows that we were making good progress in computerising Roads Design we could work only when we were on a telephone line to Dublin. This had many obvious disadvantages, not the least of which was that the telephone bill in the County Hall must have gone through the roof – but we received no complaints.

Our next advance was to make the dumb terminal into an intelligent terminal with the addition of a Comart Communicator Computer. This was a computer with a 10MB hard disk and a 5.25” 720kB floppy disk drive. It had a CP/M operating system, 64kB of RAM and ran MSDOS software. It had basic graphics capabilities also.

This combination of terminal and computer enabled us to prepare data when not online, store it on disk and transmit it quickly to the remote computer, thus greatly enhancing our efficiency. The computer could also be used to run other programs that had been written in-house.

Our next major step forward was the acquisition of Sord Computers. These were much more powerful than the Comart Communicator Computer and two terminals could be connected to each computer so that two operators could (in theory) use the same processor. They also had very basic graphics software, called “Dragon”. There was no mouse, instead the cursor was moved using the four arrow keys, so in practice it had practically no use in the engineering graphics field, but was very useful for text documents. The Sord computers had two 1MB floppy double-sided disk drives, and were suitable for running the DOER Roads Design program written by Mr.John Devlin of the Department of Local Government.

The Sord Computers had a relatively short lifespan, when along came desktop PCs in the form of the Tulip i286-based computers. These were a huge improvement over the Sord machines. They ran Microsoft software such as Word and Excel, and their great advantage was that they could run “Autocad”, a graphics-orients engineering design program which was just becoming prominent. The i286-based model was quickly followed by the more powerful i386-based model, then the i486-based model, and progressively faster processors.

As desktop PCs dropped in price they became more widely used in every office. Networking had not yet become common-place. To enable many computers to have access to central printers and plotters we used a system whereby the computers were connected to the printers/plotters over the mains AC electrical wiring in the office. To achieve this, each computer was connected to a “black box” which, in turn, was connected to a mains socket. A similar box then interfaced each printer or plotter to the mains AC and connected the computers to the printer/plotter on a “first-come-first-served” basis. The actual printer/plotter to be used was chosen by selecting it manually on a multi-port switch. Later, an Ethernet network was installed in the office, which made the above system obsolete.

In order to change the font on the daisy wheel printer it was necessary to physically change the daisy wheel in the printer.

Many thanks to Pat O’Byrne for donating these items, and for permission to preserve the description above and to publish it online, and also to Pat and his wife for transporting these items from Cork to this collection.

The homepage for this catalog is at: https://www.scss.tcd.ie/SCSSTreasuresCatalog/
Click *'Accession Index'* (1st column listed) for related folder, or *'About'* for further guidance.
Some of the items below are more properly part of the other categories of this catalog,
but are listed here for convenience.

Accession Index	Object with Identification
TCD-SCSS-T.20190917.001.001	Comart Communicator Computer. Computer used with Lear Siegler ADM-3A terminal and acoustic coupler to interact with design software in TCD. c.1979.
TCD-SCSS-T.20190917.001.002	Lear Siegler ADM-3A terminal. Dumb terminal used with Comart Communicator Computer and acoustic coupler to interact with design software in TCD. c.1979.
TCD-SCSS-T.20190917.001.003	Acoustic Coupler modem. Modem used with Comart Communicator Computer and Lear Siegler ADM-3A terminal to interact with design software in TCD. c.1979.
TCD-SCSS-T.20190917.002	SORD M343SX Multi-user Computer. Computer used with Lear Siegler ADM-3A terminal and acoustic coupler to interact with design software in TCD. c.1984.
TCD-SCSS-T.20190917.003	Tulip AT 386/25 PC with powerline printer/plotter sharing system. Desktop i386-based PC used with powerline printer/plotter sharing adapters and multi-port printer/plotter switches by Roads Design Office, Co.Cork. c.1985.
TCD-SCSS-T.20190917.004	Lear Siegler LSI-310 printer. Tractor-feed dot-matrix printer used by Roads Design Office, Co.Cork. c.1980.
TCD-SCSS-T.20190917.005	Brother HR-15 Lear Siegler LSI-310 printer. Daisy-wheel printer used by Roads Design Office, Co.Cork. c.198x.
TCD-SCSS-X.20121208.005	History of the Computer Laboratory, Trinity College Dublin. The evolution of Trinity College Dublin computing services as reflected in the long line of machines used by the Computer Lab since its inception. c.1968.
TCD-SCSS-T.20160323.001	Networking and the Internet. Networking hardware and the arrival of the Internet in Ireland. 1991.

References:

1. Computer History Wiki, *Comart*, see:
   http://gunkies.org/wiki/Comart
   Last browsed to on 1-Nov-2019.

2. old-computers.com, *Comart Communicator*, see:
   https://www.old-computers.com/museum/computer.asp?st=1&c=759
   Last browsed to on 1-Nov-2019.

3. nosher.net, *Comart Advert - October 1983*, see:
   https://nosher.net/archives/computers/pcw_1983-10-00_016_comart
   Last browsed to on 1-Nov-2019.

4. Wikipedia, *ADM-3A*, see:
https://en.wikipedia.org/wiki/ADM-3A
Last browsed to on 1-Nov-2019.

5. Wikipedia, *Acoustic Coupler*, see:
https://en.wikipedia.org/wiki/Acoustic_coupler
Last browsed to on 1-Nov-2019.

Figure 1: Comart Communicator Computer advertisement, PC World Oct-1983

Figure 2: Comart Communicator Computer, three-quarter view

Figure 3: Comart Communicator Computer, top view
Photograph courtesy Pat O'Byrne

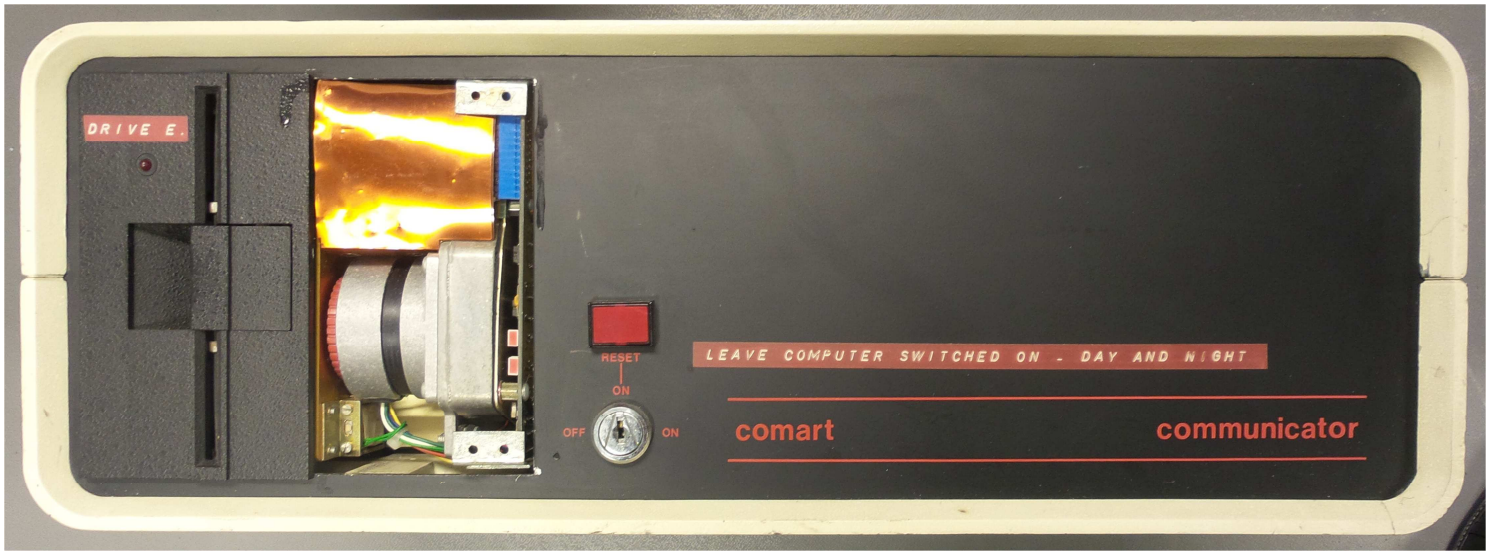

Figure 4: Comart Communicator Computer, front view

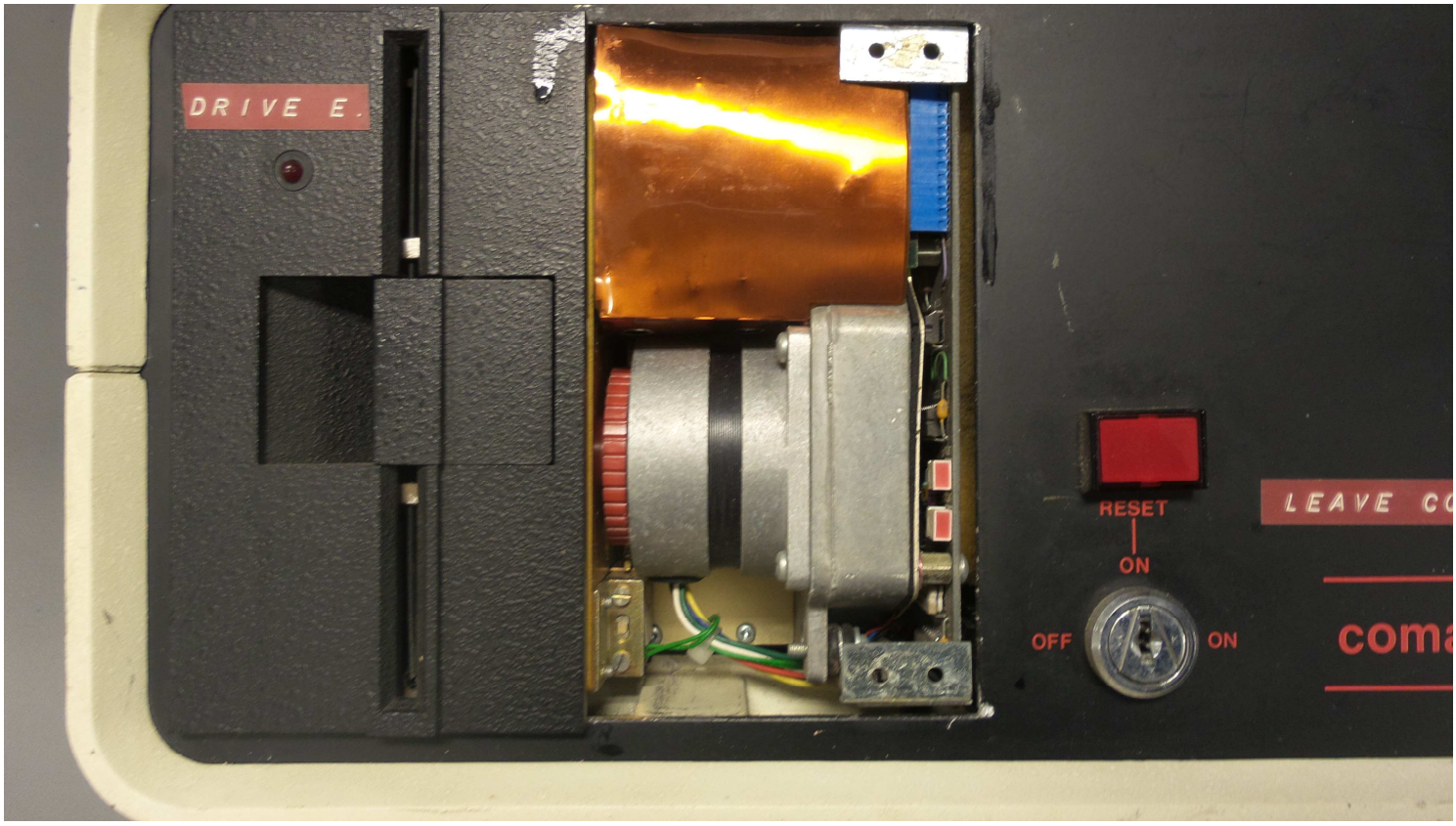

Figure 5: Comart Communicator Computer floppy disk and hard disk drives
The hard disk drive appears to use a stepper-motor

Figure 6: Comart Communicator Computer rear view

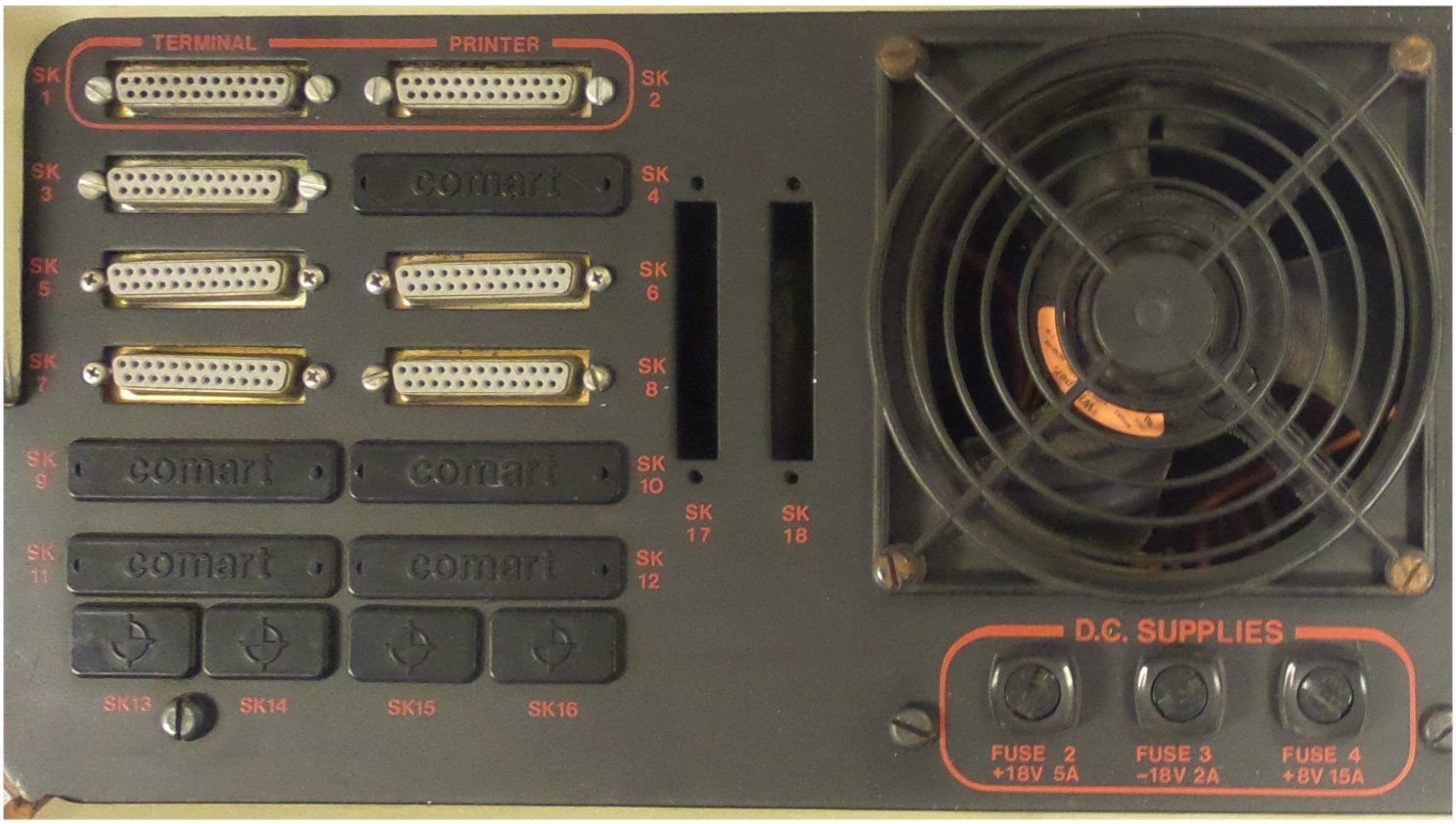

Figure 7: Comart Communicator Computer input/output panel, fan and fuses, showing printer interface plus 6 x RS232C serial interfaces

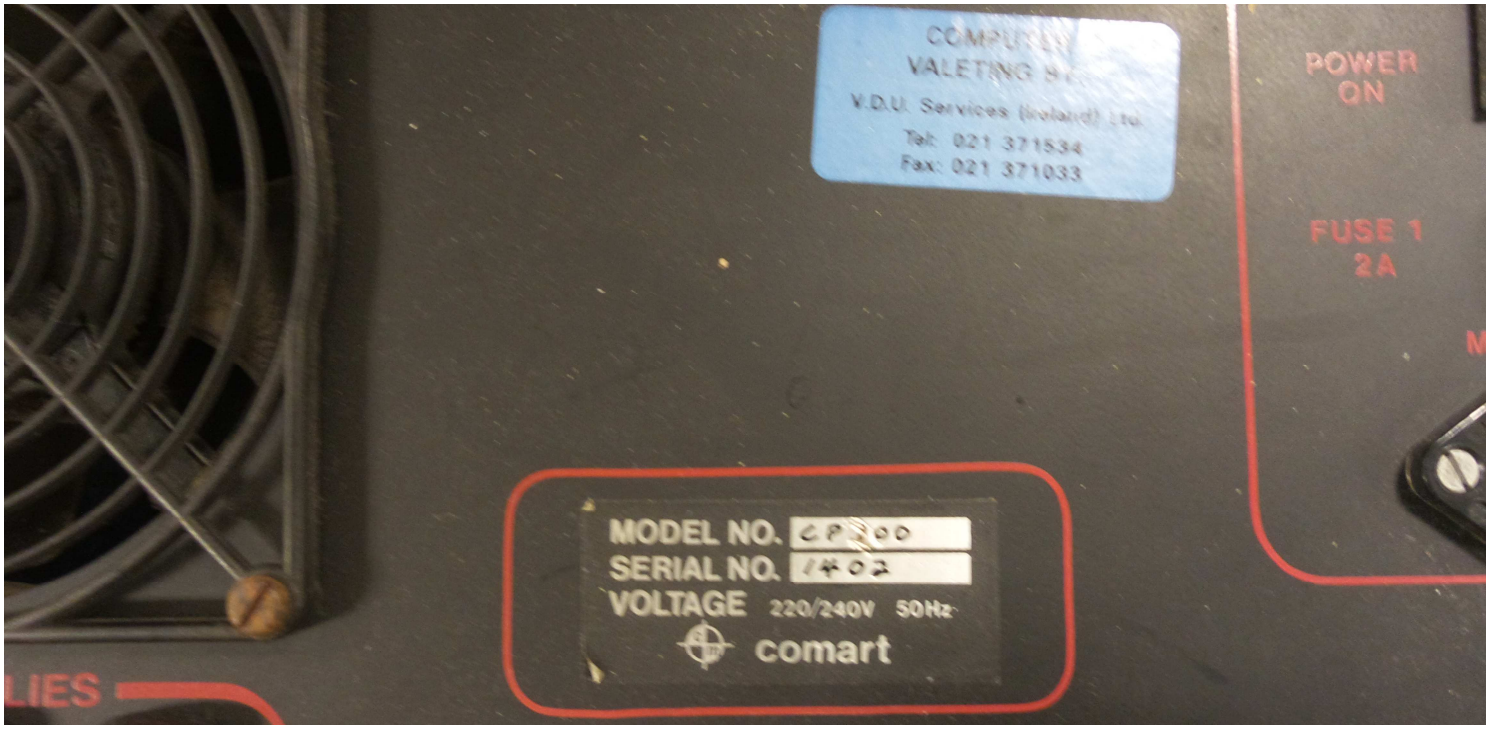

Figure 8: Comart Communicator Computer manufacturing labels
"Model No. CP200
Serial No. 1402"

Figure 9: Comart Communicator Computer in operation
Photograph courtesy Pat O'Byrne

Figure 10: Lear Siegler ADM-3A, front view
Photograph courtesy Pat O'Byrne

Figure 11: Lear Siegler ADM-3A keyboard

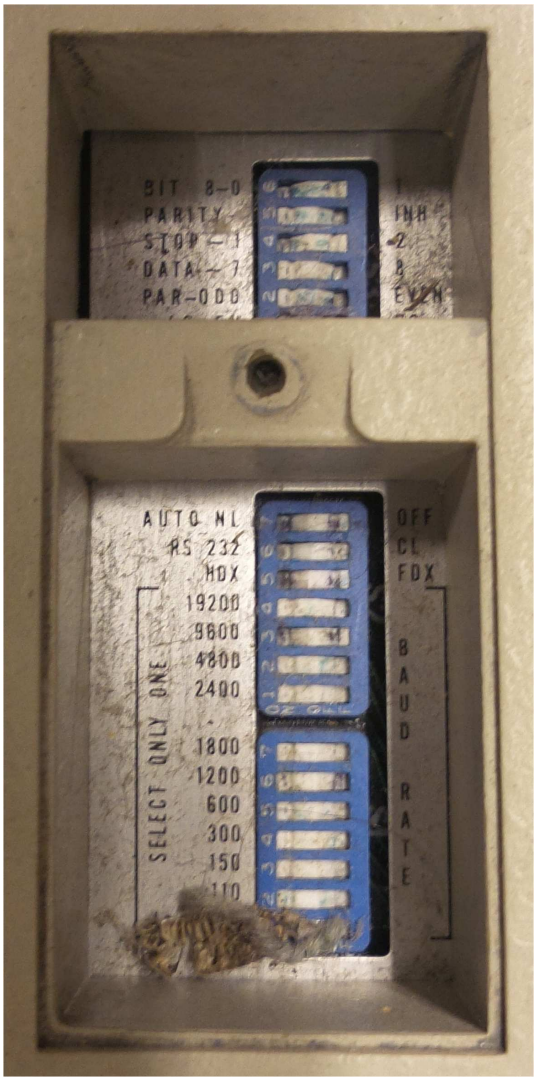

Figure 12: Lear Siegler ADM-3A (a) configuration switches, (b) manufacturing labels

Figure 13(a): Acoustic Coupler modem opened beside telephone
Photograph courtesy Pat O'Byrne

Figure 13(b): Acoustic Coupler modem with telephone handset inserted
Photograph courtesy Pat O'Byrne

Figure 13(c): Acoustic Coupler modem closed and in operation
Photograph courtesy Pat O'Byrne

Figure 14: Acoustic Coupler modem, right side view

Figure 15: Acoustic Coupler modem, right side closeup

Figure 16: Acoustic Coupler modem, left side closeup