

AccessionIndex: TCD-SCSS-T.20160425.001

Accession Date: 25-Apr-2016

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Object name: ICT Manual Card Punch

Vintage: c.1967

Synopsis: 'Portable' appliance to punch cards by hand, manufactured by ICT (predecessor of ICL). S/N: 1/8/41763.

Description:

A punched card is made of stiff paper, on which the presence or absence of holes in predefined positions represents digital information. Perforated paper was first used to represent digital information (even if not yet known as such) to control weaving looms invented by Bouchon in 1725, Falcon in 1728, and Vaucanson in 1740, but most effectively by Jacquard in 1801, after which such looms became pervasive.

Knowing of Jacquard's looms, Charles Babbage started in 1823 to design his Difference Engines and Analytical Engine (see elsewhere in this catalog) to use punched cards for input of programs and for data input and output. In 1832 Semen Korsakov also proposed machines to search for information on punched cards. However, only Babbage's Difference Engines were realised, and then only partially.

The first concrete use for information processing was by Herman Hollerith in the tabulating machines that he designed for the 1890 U.S. Census. Punch-card tabulating machines subsequently became the basis for a substantial data processing industry. Hollerith's company eventually became IBM. It was natural that they would persevere into computing, where they were used to write programs and represent data in the era before interactive computing, lasting into the mid-1980s.

Generally punched cards were generated using desk-sized card punch machines, for example see the IBM Card Punch Model 29C elsewhere in this catalog. When unable to access such a machine, cards could be punched by hand using a simple appliance.

The keypunch appliance in this collection came from Baric Computing Services, a computer service bureau and a subsidiary of Barclays Bank and ICL. This item dates from about 1967 and is in good working order. Baric (Ireland), i.e. its Dublin and Cork offices, was taken over by ICS Computing in 1974, with Tom Winter as Managing Director. The paper sticker on the keypunch reads *International Computers Limited*, but it seems to be covering a metal plate which, one may presume, reads *International Computers & Tabulators*, indicating the keypunch was manufactured before ICL was set up in July 1968.

Punched Cards Punch cards were divided into 80 columns and 12 rows, see Fig.12 below. Only 10 rows, numbered '0' to '9', were labelled, with the top two rows above the '0' row being blank. The blank top row was known as the '10' row, corresponding to the '10' key on the keyboard, while the blank second row was the '11' row. Each card could hold a single line of text or code. Individual characters, one per column, were represented by combinations of up to three keys.

The keyboard will be unfamiliar to modern eyes. The top three keys are (left to right): *carriage-return*, *tab* and *space*. Below them are three more keys: '10', '11', '0'. Below those is a complex of nine multi-function keys redolent of those on an analog telephone dial or a mobile phone keypad but ordered differently.

Numeric characters 0 to 9 required just a single press of their respective keys, for example, pressing the '5' key punched a hole in the 5th row of the current column of the card. Alphabetic characters required a simultaneous double press, always including one of rows '10', '11' or '0'. For example, the '10' and '1' keys denoted 'A', and '11' and '1' denoted 'J', whereas '0' and '1' denoted '/' (non-alphabetic, indicated by a blank segment on the '1' key). Other non-alphanumeric characters might require a simultaneous triple press, as for an asterisk ('10', '4', '8'). Four asterisks were used, as an ICL standard, to indicate end-of-file, without which the computer would prompt the operator to place more cards in the card reader hopper. There was no provision for Shift, or lower-case letters. The ICL 64-character card code, from [6], is shown below:

64-Character Card Code							
Symbol	Card Punching	Symbol	Card Punching	Symbol	Card Punching	Symbol	Card Punching
		&	10	-	11		
0	0	&	10/0	"	11/0		
1	1	A	10/1	J	11/1	/	0/1
2	2	B	10/2	K	11/2	S	0/2
3	3	C	10/3	L	11/3	T	0/3
4	4	D	10/4	M	11/4	U	0/4
5	5	E	10/5	N	11/5	V	0/5
6	6	F	10/6	O	11/6	W	0/6
7	7	G	10/7	P	11/7	X	0/7
8	8	H	10/8	Q	11/8	Y	0/8
9	9	I	10/9	R	11/9	Z	0/9
		+	10/2/8	[11/2/8	£	0/2/8
#	3/8	.	10/3/8	\$	11/3/8	,	0/3/8
@	4/8	;	10/4/8	*	11/4/8	%	0/4/8
(5/8	:	10/5/8	>	11/5/8	?	0/5/8
)	6/8	'	10/6/8	<	11/6/8	=	0/6/8
]	7/8	!	10/7/8	↑	11/7/8	←	0/7/8

Lines of code or text were written in capital letters on ruled code sheets (like graph paper), and punched exactly (column by column) as written. With a bit of practice, it was easy (if not quick) to punch your own lines of code, using the segmented key covers as prompts when necessary.

Many thanks to Paul O'Kane, a TCD Engineering School graduate who was in Prof.J.G.Byrne's first undergraduate Computer Science classes from 1967-1970 (see the class photograph in the Literature category of this catalog), and who donated this item and some of the photographs. Paul used similar keypunches at Irish Biscuits (Jacobs), in Aungier Street, Dublin, from 1970 to 1973.

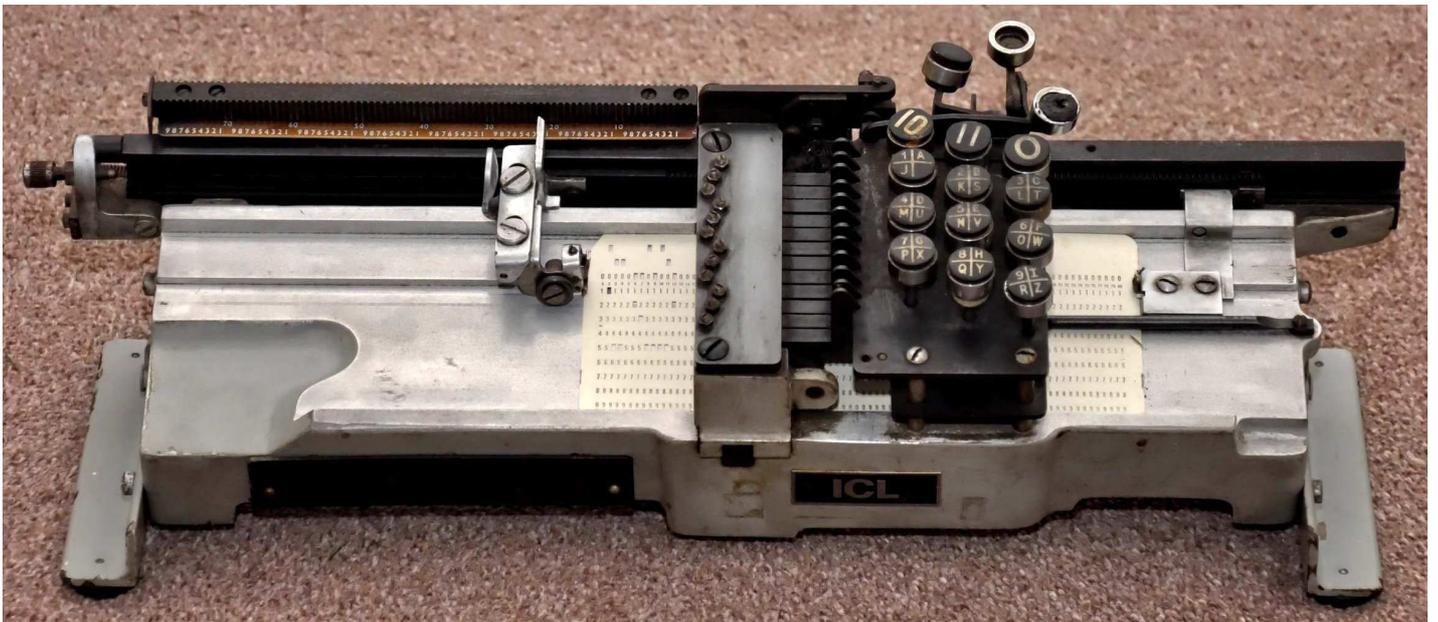
Accession Index	Object with Identification
ICD-SCSS-T.20160425.001	ICT Manual Card Punch. S/N: 1/8/41763

References:

1. Wikipedia, *Punched card*, see:
https://en.wikipedia.org/wiki/Punched_card
 Last browsed to on 17-Jun-2016.
2. Wikipedia, *Keypunch*, see:
<https://en.wikipedia.org/wiki/Keypunch>
 Last browsed to on 17-Jun-2016.
3. Wikipedia, *Punched card input/output*, see:
https://en.wikipedia.org/wiki/Punched_card_input/output
 Last browsed to on 17-Jun-2016.
4. Wikipedia, *International Computers and Tabulators*, see:
https://en.wikipedia.org/wiki/International_Computers_and_Tabulators
 Last browsed to on 17-Jun-2016.
5. Wikipedia, *International Computers Limited*, see:
https://en.wikipedia.org/wiki/International_Computers_Limited
 Last browsed to on 17-Jun-2016.
6. Brian Spoor, *ICL 1900 Series Computers*, see:
<http://www.icl1900.co.uk/icl1900/charset.html>
 Last browsed to on 19-Jun-2016.



Figure 2: ICT Manual Card Punch front right three-quarter view



*Figure 3: ICT Manual Card Punch front view
Photograph courtesy Paul O'Kane*



Figure 4: ICT Manual Card Punch keyboard closeup

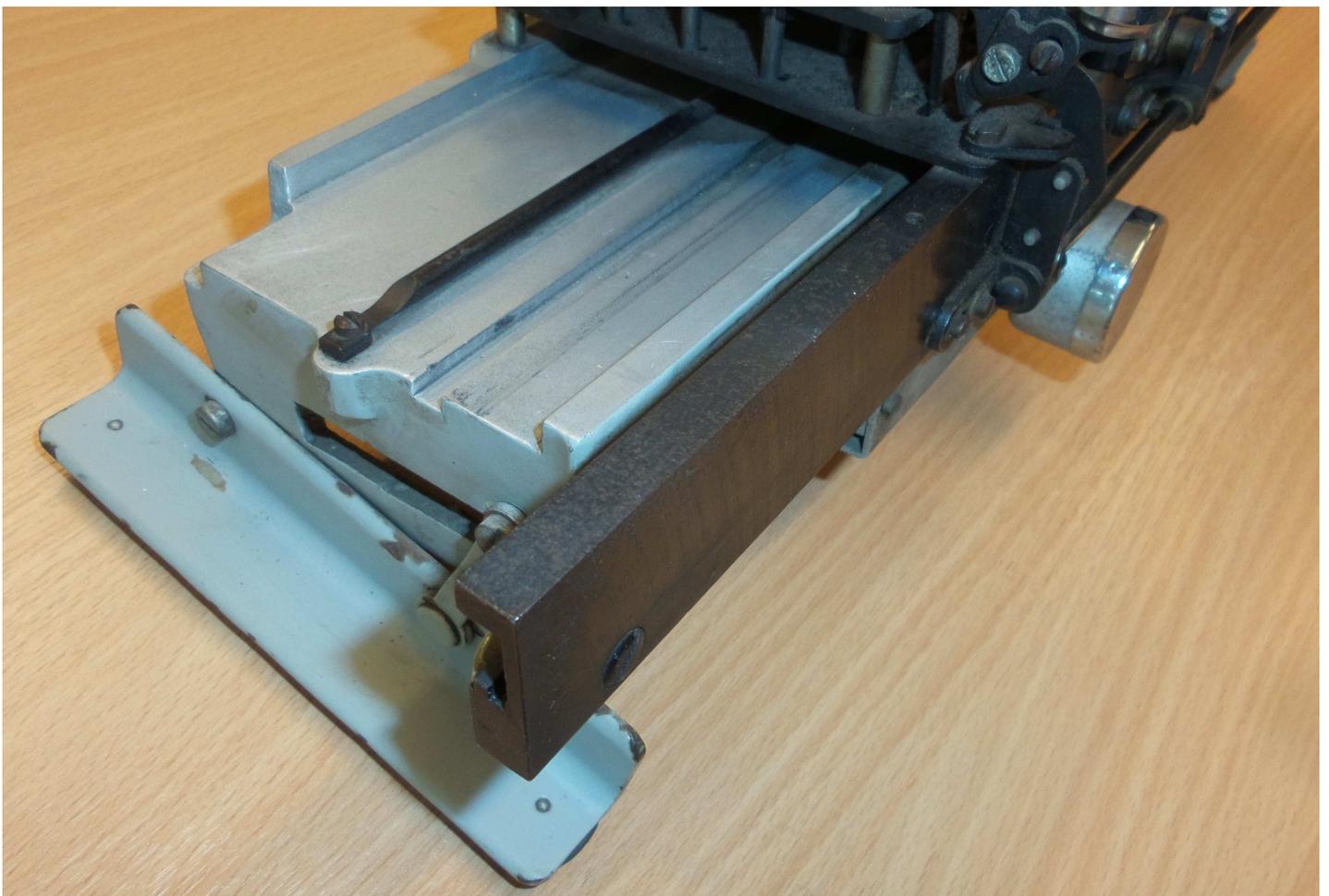


Figure 5: ICT Manual Card Punch right rear three-quarter view

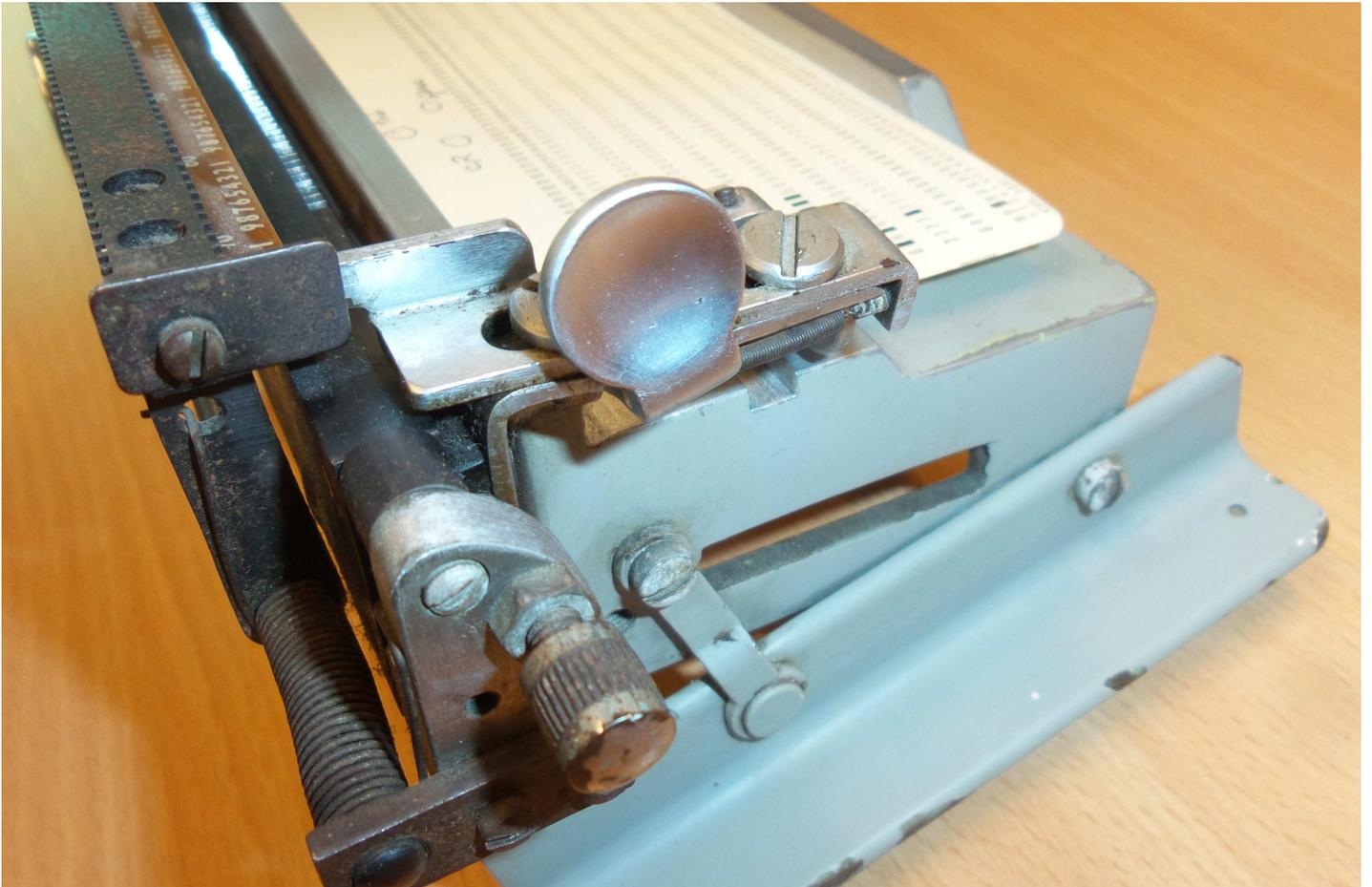


Figure 6: ICT Manual Card Punch left rear three-quarter view



Figure 7: ICT Manual Card Punch rear view

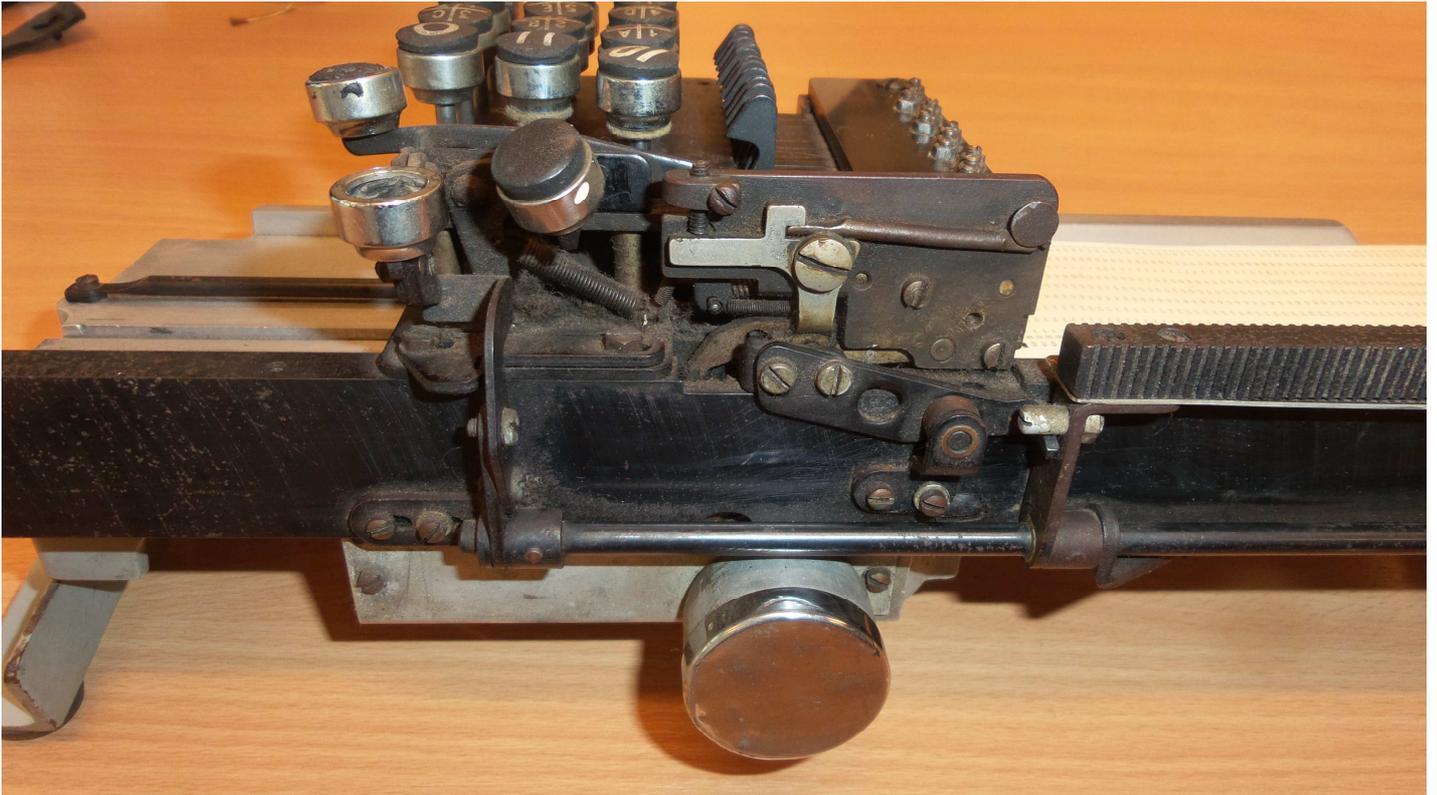


Figure 8: ICT Manual Card Punch rear closeup



Figure 9: ICT Manual Card Punch keyboard underside closeup

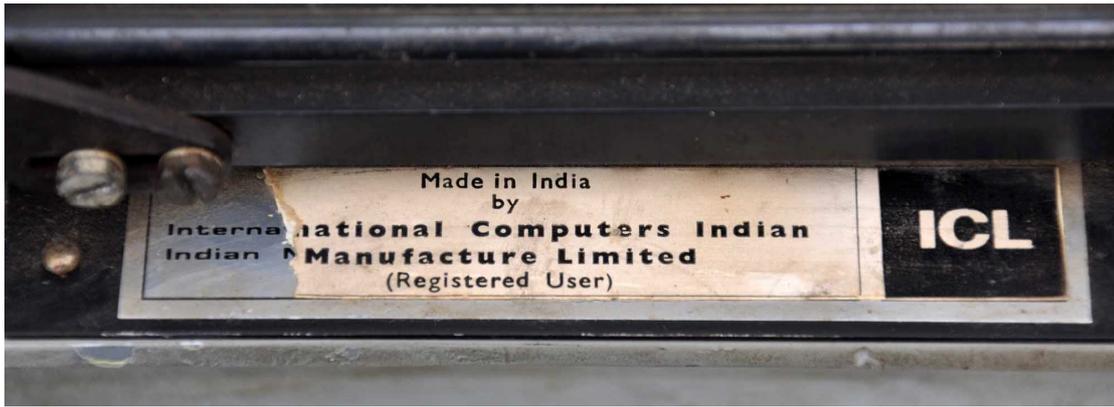


Figure 10: ICT Manual Card Punch manufacturing label
 Top paper label probably covers original "International Computers & Tabulators" label
 Photograph courtesy Paul O'Kane

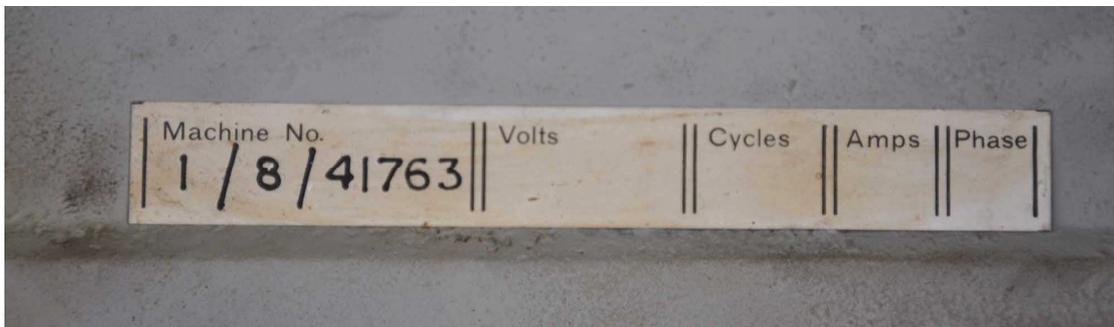


Figure 11: ICT Manual Card Punch serial number
 S/N: 1/8/41763
 Photograph courtesy Paul O'Kane

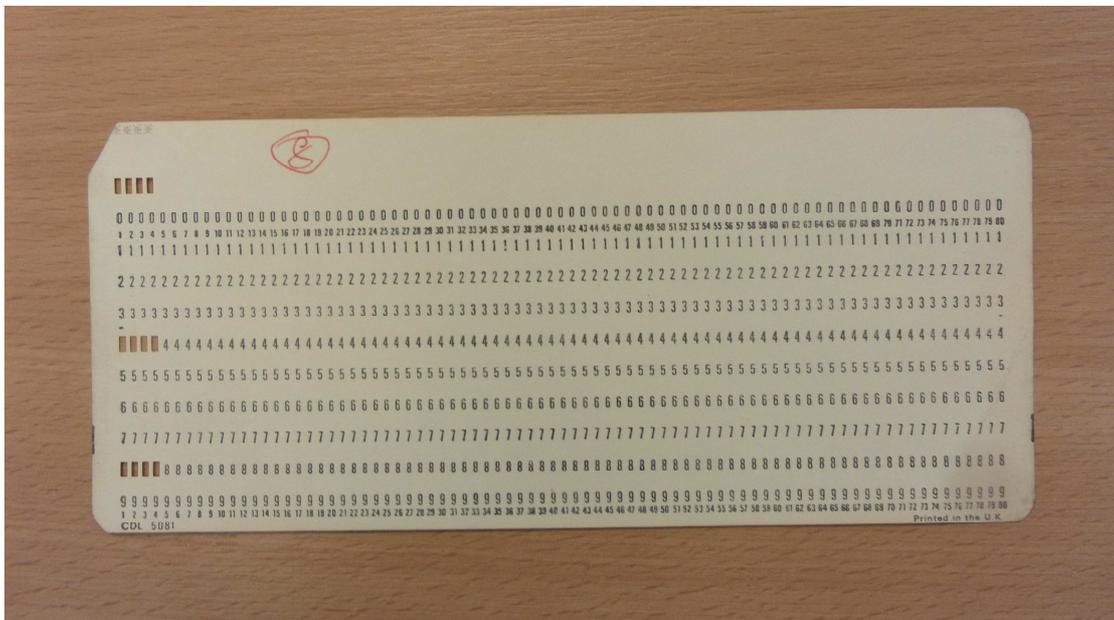


Figure 12: Example punched card
 Punched characters represent "End-of-File"