

ICL

Card and paper tape punching codes and keyboards

OXFORD UNIVERSITY COMPUTING LABORATORY

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Introduction

This publication sets out in detail I.C.T. card and paper tape punching codes and gives a full description of the keyboards used to produce the current codes on card and tape punch off-line preparation equipment.

THE I.C.T. CARD PUNCHING CODES detailed in this publication are 1004, 1500, 1900 and the following:

<i>Group A</i>	<i>Tabulator/Computer Types</i>	<i>Code Description</i>
Code A1	40 and 160-column 900 series Tabulators.	I.C.T. 4-zone
Code A2	915 Tabulators and 1300 series Computers.	I.C.T. 5-zone
Code A3	700 and 800 series Tabulators.	Revised 3-zone
<i>Group B</i>	<i>Tabulators</i>	<i>Code Description</i>
Code B1	900 series	New B.T.M. 4-zone
Code B2	900 series	Old B.T.M. 4-zone
Code B3	915	5-zone for New B.T.M. 4-zone users.
Code B4	915	5-zone for Old B.T.M. 4-zone users.
Code B5	800 series	B.T.M. 3-zone
<i>Group C</i>	<i>Tabulators</i>	<i>Code Description</i>
Code C1	40-column, 65/130-column (restyled), 80/160-column	40-character
Code C2	65/130-column (standard)	32-character
Code C3	36-column	29-character

THE I.C.T. TAPE PUNCHING CODES detailed in this publication are 1300, 1500, 1900 and B.S. 7-track code (B.S. 3480: 1962).

The keyboards are numeric or alphabetic and with the exception of the I.C.T. 62 and 63 Card Punches, are electrically linked to the machine by a flexible cable. The 62 and 63 Punches have integral numeric keyboards (not alphabetic), which operate mechanically.

Keyboards are used for data preparation in conjunction with the following I.C.T. machines:

Card Preparation

62 to 69 (inclusive) Punches
166 and 169 Verifiers

Tape Preparation

1027 Punch
1028 Punch/Verifier

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Keyboard Specifications

Numeric Keyboard - I.C.T. 81 and 181 (see Figure 1)

- Weight: 9 pounds (4.1 kg)
- Height: 4 inches (9.2 cm)
- Length: 7 inches (17.8 cm)
- Depth: 10 inches (25.4 cm)
- Ball Locking: I.C.T. 81 (not fitted to I.C.T. 181)
- Key pressure: 2 to 3 ounces (56.7 to 85 g)
- Key stroke: $\frac{1}{4}$ inch (0.63 cm) approximately
- Keyboard connecting cable:
(I.C.T. 66 to 69, 166 and 169) 3 feet (91.5 cm).

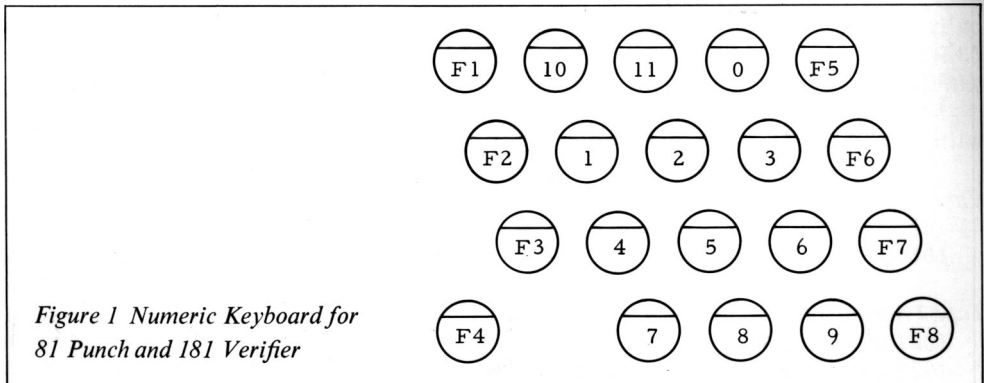
Numeric Keyboard - I.C.T. 62 and 63 only

Weight and dimensions are not given for this keyboard because it is an integral part of the machine and not linked by a flexible cable.

- Ball locking: According to code, I.C.T. 62/1, 2, 3 and 63/1, 2 and 3 only.
- Key stroke: I.C.T. 62/0 and 63/0, $\frac{1}{2}$ inch (1.27 cm)
I.C.T. 62/1, 2, 3 and 63/1, 2, 3, $\frac{15}{32}$ inch (1.19 cm)

Alphabetic Keyboards - I.C.T. 82 and 182 (see Figure 2)

- Weight: 17 pounds (7.8 kg)
 - Height: 4 inches (9.2 cm)
 - Length: 14 inches (35.6 cm)
 - Depth: 10 inches (25.4 cm)
 - Ball locking: I.C.T. 82 (not fitted to I.C.T. 182)
 - Key pressure: 2 to 3 ounces (56.7 to 85 g)
 - Key stroke: $\frac{1}{4}$ inch (0.63 cm) approximately
 - Keyboard connecting cable:
(I.C.T. 66 to 69, 166 and 169) 3 feet (91.5 cm).
(I.C.T. 64 and 65) 4 feet 6 inches (137.2 cm).
- N.B. The alphabetic keyboard used in conjunction with the I.C.T. 1027/1028 machines (see pages 20 to 27) has no type number but is similar to the I.C.T. 82 Keyboard.



Keyboards for Punched Card Preparation

Punched cards may be prepared using the following I.C.T. equipment:

Punches

- 62 Automatic Key Punch
- 63 Automatic Key Punch with Verification
- 64 Electric Automatic Key Punch
- 65 Electric Automatic Key Punch with Verification
- 66 Programme Board Punch
- 67 Programme Board Printing Punch
- 68 Programme Board Printing Punch
- 69 Programme Board Punch

Verifiers

- 166 Programme Board Verifier
- 169 Programme Board Verifier.

With the exception of the 62 and 63 Punches, all the above punches and verifiers may be equipped with a numeric and/or alphabetic keyboard (see Figures 1 and 2). The keyboard, which is linked to the punch or verifier by a flexible cable plugged into a socket at the right-hand end of the machine, may be placed on the table top in a position most convenient to the operator. The type numbers allocated to each type of keyboard, irrespective of the punching code that they produce are

- 81 - Numeric Keyboard for Card Punches
- 82 - Alphabetic Keyboard for Card Punches
- 181 - Numeric Keyboard for Card Verifiers
- 182 - Alphabetic Keyboard for Card Verifiers

The 62 and 63 Punches are equipped with integral numeric keyboards, which are not the same as the 81 or 181 Keyboards. Alphabetic keyboards are not available on the 62 and 63 Punches.

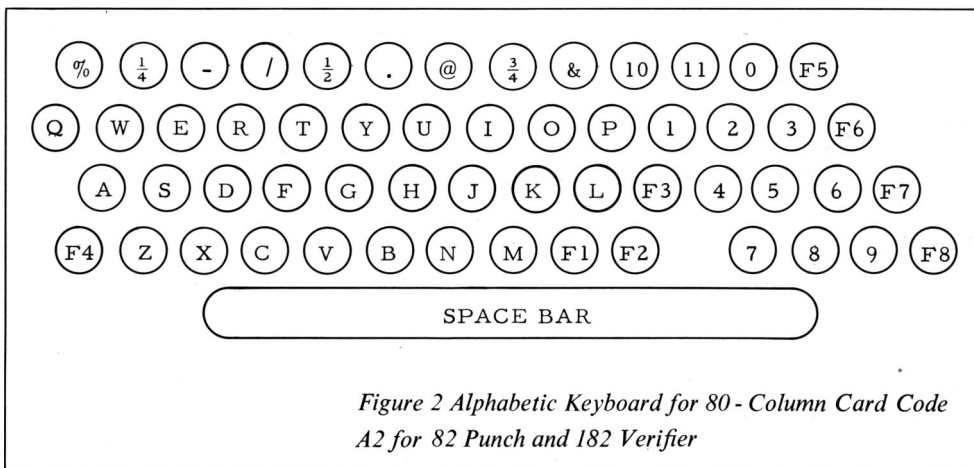


Figure 2 Alphabetic Keyboard for 80-Column Card Code A2 for 82 Punch and 182 Verifier

NUMERIC KEYBOARDS

Numeric Keyboard - I.C.T. 62 and 63 Punches only

The I.C.T. 62 and 63 Punches are equipped with identical numeric keyboards. The arrangement of keys is the same for all codes. Alphabetic information may be punched by depressing the appropriate numeric and zone keys (10, 11, 0). These keyboards are built into the machine. Depression of the keys mechanically operates the machine via flexible cables. The keyboards may have Powers Pitch (see Figure 3) or B.T.M. Pitch (see Figure 4) keys as follows:

<i>Machine Type</i>	<i>Pitch</i>	<i>Ball Locking</i>	<i>Zone</i>	<i>Corresponding Punch Codes</i>
62/0 63/0	Powers	Not Fitted	Multi	All
62/1 63/1	B.T.M.	Fitted	3	A3, B5
62/2 63/2	B.T.M.	Fitted	4	A1, B1, B2.
62/3 63/3	B.T.M.	Fitted	5	A2, B3, B4.

From the above table, it will be seen that ball locking is fitted on all keyboards except Powers Pitch. Ball locking ensures that the data keys can only be depressed in accordance with the punching code.

Keys

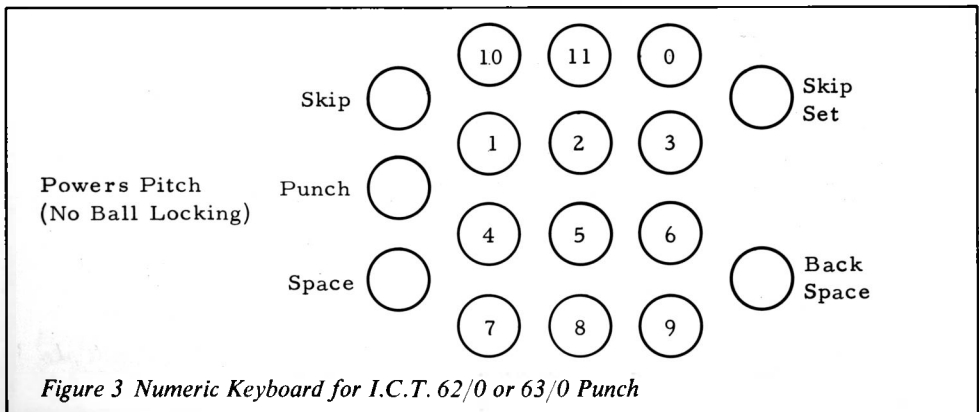
Both Powers and B.T.M. Pitch numeric keyboards have twelve data keys (one for each of the digits 0 to 9, one for 10, and one for 11) and five function keys, described below.

Space Key

Depression of this key permits spacing over one column of the card.

Back Space Key

Single depression of this key causes a carriage to move back one column at a time to permit correction of conscious errors.



Skip Key

This key must be depressed and released immediately, not held down. This action causes the carriage to skip over fields of the card that are not to be manually punched or verified.

Skip Set Key

Depression of this key sets a skip stop on the column on which the carriage is positioned. The skip stop arrests the carriage when skipping has been initiated by depression of the skip key.

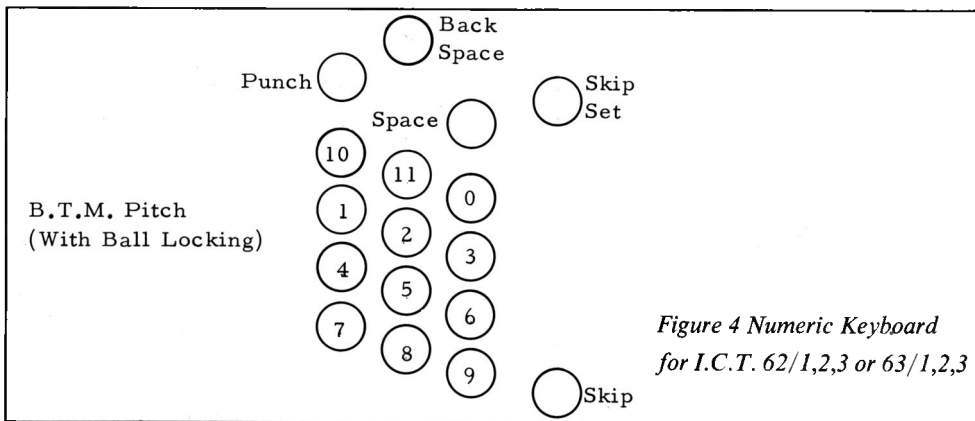
Punch Key

When power is supplied to the I.C.T. 62 or 63, a single depression of this key initiates punching and feeding.

Notes on Selection of Numeric Keyboard for 62 and 63 Punches

The following notes are intended to aid selection of the appropriate keyboard, viz. Powers Pitch (I.C.T. 62/0 and 63/0) or B.T.M. Pitch (I.C.T. 62/1, 2 or 3).

- 1 A multipunch key is *not fitted* to any of the I.C.T. 62 or 63 Card Punches, therefore, whenever three-hole computer codes are required, the 62/0 or 63/0 should be used. Although ball locking is not fitted to the keyboard on these machines, the spacing of the keys is sufficient to overcome the danger of inadvertent double punching.
- 2 Wherever the I.C.T. 62 is required to be used in association with the I.C.T. 166 or 169 Verifiers, the 62/0 should be used in conjunction with a 181 Numeric Keyboard on the verifier. This will give the greatest similarity between the two keyboards. Since the I.C.T. 63 is in itself a punch/verifier this problem does not arise.
- 3 When three-hole computer codes are not involved and verification is achieved by using the I.C.T. 103 Hand Verifier, the I.C.T. 62/1, 2 or 3 will provide the greatest similarity between keyboards.



I.C.T. 81 Numeric Keyboard

The I.C.T. 81 Numeric Keyboard (see Figure 1), used in conjunction with the 64 to 68 Card Punches inclusive, has twelve data keys (one for each of the digits 0 to 9, one for 10, and one for 11) and eight function keys, e.g. skip, duplicate, multipunch, etc. The arrangement of keys is the same for all codes, and although key tops are not coded with alphabetic information this may be punched on the numeric keyboard by depressing the appropriate numeric and zone key (10, 11, 0). A code A1 keyboard may also be used to punch cards in accordance with computer codes by using the Multi-punch Key.

A locking device, incorporated within the keyboard, ensures that the operator can depress keys only in accordance with the specified code. It is also possible to prevent the depression of data keys during machine functions.

I.C.T. 181 Numeric Keyboard

The I.C.T. 181 Numeric Keyboard (see Figure 1), used in conjunction with the 166 and 169 Card Verifiers is identical to the I.C.T. 81 Keyboard described above, except that there are no key locking arrangements.

ALPHABETIC KEYBOARDS

I.C.T. 82 Alphabetic Keyboard

The I.C.T. 82 Alphabetic Keyboard (see Figure 2), used in conjunction with the 64 to 68 Card Punches inclusive, contains individual keys for each of the 26 letters of the alphabet and incorporates the twelve data keys and the eight function keys comprising the numeric keyboard. In addition, nine keys are available on the top row from the left for the most frequently used symbols. The arrangement of the data keys will vary in accordance with the code.

The twelve data keys comprising the numeric section cannot be used for punching alpha. A locking device, incorporated within the keyboard, ensures the operator cannot depress two data keys simultaneously. It is possible to prevent the depression of data keys during machine functions.

I.C.T. 182 Alphabetic Keyboard

The I.C.T. 182 Alphabetic Keyboard, used in conjunction with the 166 and 169 Card Verifiers is identical to the 82 Keyboard described above, except that there are no key locking arrangements.

Function Keys on 81, 82, 181 and 182 Keyboards

The following table shows the function keys and positions on I.C.T. card punch and verifier keyboards:

Function Key	Punches						Verifiers	
	64	65	66	67	68	69	166	169
F1	Skip Set	Skip Set	Dup	Dup	Dup	-	Cancel	Error Cancel
F2	Skip Set	Skip Set	Sel	Sel	Sel	-	Sel	Manual Eject
F3	Skip	Skip	Skip	Skip	Skip	Skip	Skip	Skip
F4	Multi Punch	Multi Punch	Multi Punch	Multi Punch	Multi Punch	Multi Punch	Multi Verify	Multi Verify
	Shift	Shift	Shift	Shift	Shift	Shift	Shift	Shift
F5	Space	Space	Space	Space	Space	Space	Space	Space
F6	Release	Release	S.C. Sel*	S.C. Sel*	S.C. Sel*	-	S.C. Sel*	-
F7	Back Space	Back Space	-	-	-	-	-	Cont Space
F8	Punch	Punch	-	Int	Int	Release	-	Release

Notes

- 1 * Single Column Selector, caption S.C. Sel, is an A.&A.U.
- 2 F4 key is used as 'Shift' instead of Multipunch/Multi-verify on 82 and 182 Alphabetic Keyboards only when codes involving shift facilities are required.

I.C.T. Standard Keyboard Layouts for Preparation of Codes

The I.C.T. standard alphabetic keyboard layouts and codes are depicted in the following pages:

- Page 12 I.C.T. A1 or A2 Codes
- Page 14 I.C.T. 1004 Code.
- Page 16 I.C.T. 1500 Code.
- Page 18 I.C.T. 1900 Code.

Keyboard Layouts for non-I.C.T. Codes

Non-standard keyboard layouts and card codes, e.g. Honeywell, Leo, Burroughs, EELM etc., can be provided by special arrangement with Field Support Dept., Technical Services. Non-standard codes are identified by an I.C.T. special number, which must be used in all correspondence and orders.

Basic Principles of Keyboard Layout Design

- 1 The numeric and alphabetic characters should be disposed as for standard I.C.T. keyboards.
- 2 The most frequently used symbols should be disposed on the nine keys from the left on the top row. For the convenience of the operator, symbols most frequently used in numeric work may be positioned at the right-hand end of the top row.
- 3 The punch codes for the remaining symbols can be produced only by using a shift key in conjunction with any of the data keys. The symbols should be arranged over the data keys if possible in a way that gives the same significance to the shift key. For most card punch codes, depression of the shift key will cause the digit 8 to be punched together with the punch code of the data key. For example, in the I.C.T. 1900 code, semicolon (;) is code 10, 4, 8 and would be produced by depressing the shift key in conjunction with the D key, since D is code 10,4.

Paper tape may be prepared off-line using the following I.C.T. equipment:

- 1027 Paper Tape Punch
- 1028 Paper Tape Punch/Verifier

These machines use an alphabetic keyboard similar to the card punch keyboard (see Figure 2).

The arrangement of the 55 keys comprising the 1027/1028 Keyboard is in accordance with the paper tape code for which the keyboard is specified, as follows:

I.C.T. 1300, 1500 or B.S. 3480 (7-track)

- 53 data keys
- 2 case keys
- Locking lever
- Space bar

I.C.T. 1900 series

- 52 data keys
- 2 shift keys
- 1 control key
- Locking lever
- Space bar

Function Keys

The function keys that may be incorporated in a keyboard operate as follows:

Shift (or Case) Key

This key is used in conjunction with selected data keys to produce shift or case tape codes.

The shift key (on some keyboards captioned 'case') is held depressed, before the selected data key is depressed and released. On most keyboards, depression of the shift key will always have the same effect with any data key. In other words, the shift key will modify the normal tape code corresponding to any selected key by the addition or deletion (by specification) of the same combination of tracks, usually tracks 5, 6 or 7.

Control Key

The control key is operated in the same way as the shift key and is engraved 'Control' because it is used in conjunction with selected data keys to produce 'Control' tape codes.

Locking Lever

The shift key locking lever, when moved toward the operator, causes the shift key to be depressed and locked in the depressed position, thus relieving the operator of the necessity of holding the key down.

Space Bar

This bar is mechanically linked with the space key and depression of either will cause the space code to be punched.

Keyboard Locking

The keyboard is interlocked to prevent the simultaneous operation of any two data keys. The continuous holding down of a key to cause repetitive punching into the tape of the selected code is also prevented except when the data key is operated in conjunction with a special switch (Punch Feed) which permits this mode.

I.C.T. Standard Keyboard Layouts for Preparation of Paper Tape

The I.C.T. standard keyboard layouts and codes are depicted in the following pages:

- Page 22 I.C.T. 1300 series Paper Tape Code
- Page 24 I.C.T. 1500 Paper Tape Code
- Page 26 I.C.T. 1900 series Paper Tape Code
- Page 28 B.S. 7-track Paper Tape Code.

Keyboard Layouts for Other Codes

Non-standard keyboard layouts and tapes codes, e.g. Honeywell, Leo, Burroughs, NCR etc., can be provided by special arrangement with Field Support Dept., Technical Services.

Basic Principles of Keyboard Layout Design

- 1 The numeric and alphabetic characters should be disposed as for standard I.C.T. keyboards.
- 2 The most frequently used tape codes, other than those corresponding to the numerals and alphabet, should be disposed on the nine keys from the left on the top row. For the convenience of the operator the tape codes used for symbols for those most frequently used with numeric work may be placed at the right-hand end of the top row.
- 3 The remaining tape codes can be produced by using only the shift keys, which may be used in conjunction with any of the data keys. The tape codes to be produced using a shift key should be arranged over the data keys in a way that gives the same significance to the shift, e.g. standard 1900 code keyboard.

TRACKS	P	7	6	5	4	3	2	1
Normal A	- 0	1	0	0	0	0	0	1
Shift a	- 1	1	1	0	0	0	0	1
Normal B	- 0	1	0	0	0	0	1	0
Shift b	- 1	1	1	0	0	0	1	0

In this example, the tape code for a is produced by using the shift key in conjunction with the A key and for b with

the B key. In both cases, this shift key adds a bit in tracks 6 and 8 (parity). From inspection, it will be seen that the significance of the shift key in conjunction with the A to Z keys is the same for producing all the tape codes for a to z.

- 4 The tape code for space may be produced by the space key or bar. The space key and bar are mechanically linked so that it is not possible to use the space key for any other tape code.

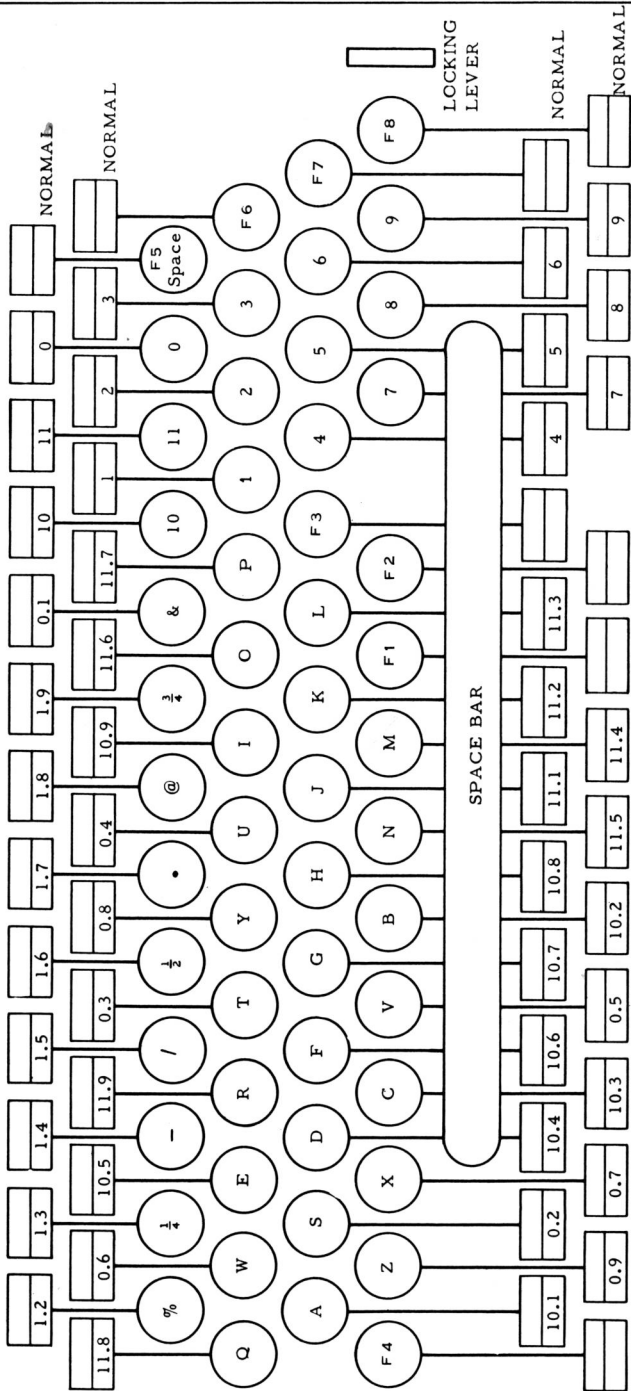
I.C.T. A1 and A2 Card Codes

GROUP A

<i>Code A.1</i>			
Zone	10	11	0
10	10		
11		11	
0			0
1	A	J	&
2	B	K	S
3	C	L	T
4	D	M	U
5	E	N	V
6	F	O	W
7	G	P	X
8	H	Q	Y
9	I	R	Z

<i>Code A.2</i>				
Zone	10	11	0	1
10	10			
11		11		
0			0	
1	A	J	&	1
2	B	K	S	%
3	C	L	T	$\frac{1}{4}$
4	D	M	U	-
5	E	N	V	$\frac{1}{2}$
6	F	O	W	.
7	G	P	X	@
8	H	Q	Y	.
9	I	R	Z	$\frac{3}{4}$

and I.C.T. 82 or 182 Alphabetic Keyboard



THE KEY ANNOTATED "SPACE" IS MECHANICALLY LINKED TO THE "SPACE BAR"

Note: See page 7 for distribution of Function Keys.

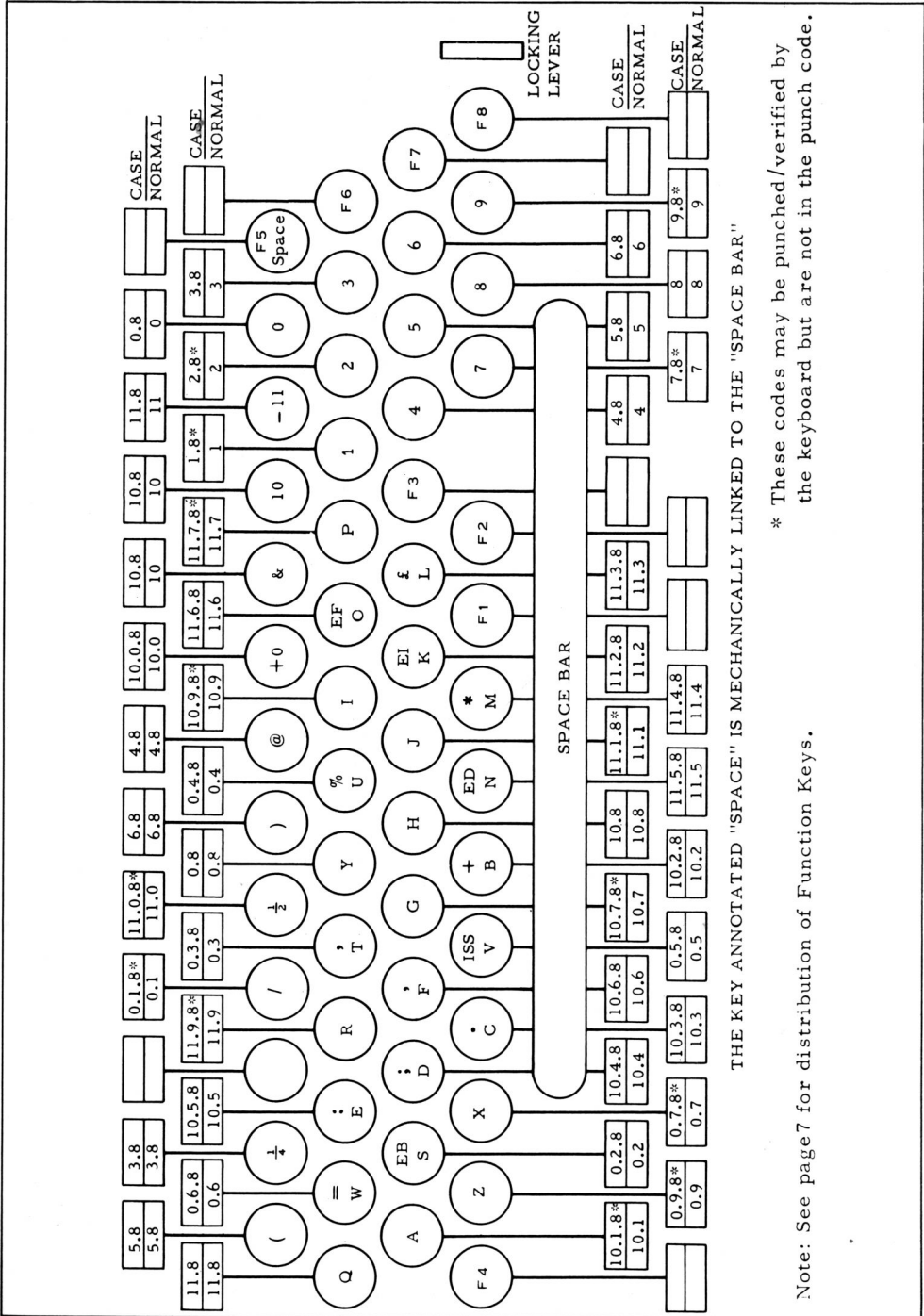
I.C.T. 1004 80-column Card Code

Punching Code	Character or Symbol	Punching Code	Character or Symbol
0	0	0/3	T
1	1	0/4	U
2	2	0/5	V
3	3	0/6	W
4	4	0/7	X
5	5	0/8	Y
6	6	0/9	Z
7	7	2/8	+
8	8	3/8	$\frac{1}{4}$
9	9	4/8	@
10	10	5/8	$\frac{1}{2}$
10/1	A	6/8	>
10/2	B	7/8	$\frac{3}{4}$
10/3	C	10/0	?
10/4	D	10/2/8	NOT USED
10/5	E	10/3/8	.
10/6	F	10/4/8	£
10/7	G	10/5/8	[
10/8	H	10/6/8	<
10/9	I	10/7/8	=
11	11	11/2/8	NOT USED
11/0	/	11/3/8	-
11/1	J	11/4/8	*
11/2	K	11/5/8]
11/3	L	11/6/8	;
11/4	M	11/7/8	§
11/5	N	0/2/8	≠
11/6	O	0/3/8	,
11/7	P	0/4/8	%
11/8	Q	0/5/8	(
11/9	R	0/6/8	\
0/1	&	0/7/8)
0/2	S	BLANK	SPACE

I.C.T. 1500 80-column Card Code

<i>Punching Code</i>	<i>Character or Symbol</i>	<i>Punching Code</i>	<i>Character or Symbol</i>
0	0	0/1	/
1	1	0/2	S
2	2	0/3	T
3	3	0/4	U
4	4	0/5	V
5	5	0/6	W
6	6	0/7	X
7	7	0/8	Y
8	8	0/9	Z
9	9	3/8	$\frac{1}{4}$
10	& (or 10)	4/8	@
10/0	+0	5/8	(
10/1	A	6/8)
10/2	B	10/2/8	+
10/3	C	10/3/8	.
10/4	D	10/4/8	;
10/5	E	10/5/8	:
10/6	F	10/6/8	'
10/7	G	11/2/8	EI
10/8	H	11/3/8	£
10/9	I	11/4/8	*
11	- (or 11)	11/5/8	ED
11/0	$\frac{1}{2}$	11/6/8	EF
11/1	J	0/2/8	EB
11/2	K	0/3/8	,
11/3	L	0/4/8	%
11/4	M	0/5/8	ISS
11/5	N	0/6/8	=
11/6	O		
11/7	P		
11/8	Q		
11/9	R		

and I.C.T. 82 or 182 Alphabetic Keyboard



* These codes may be punched/verified by the keyboard but are not in the punch code.

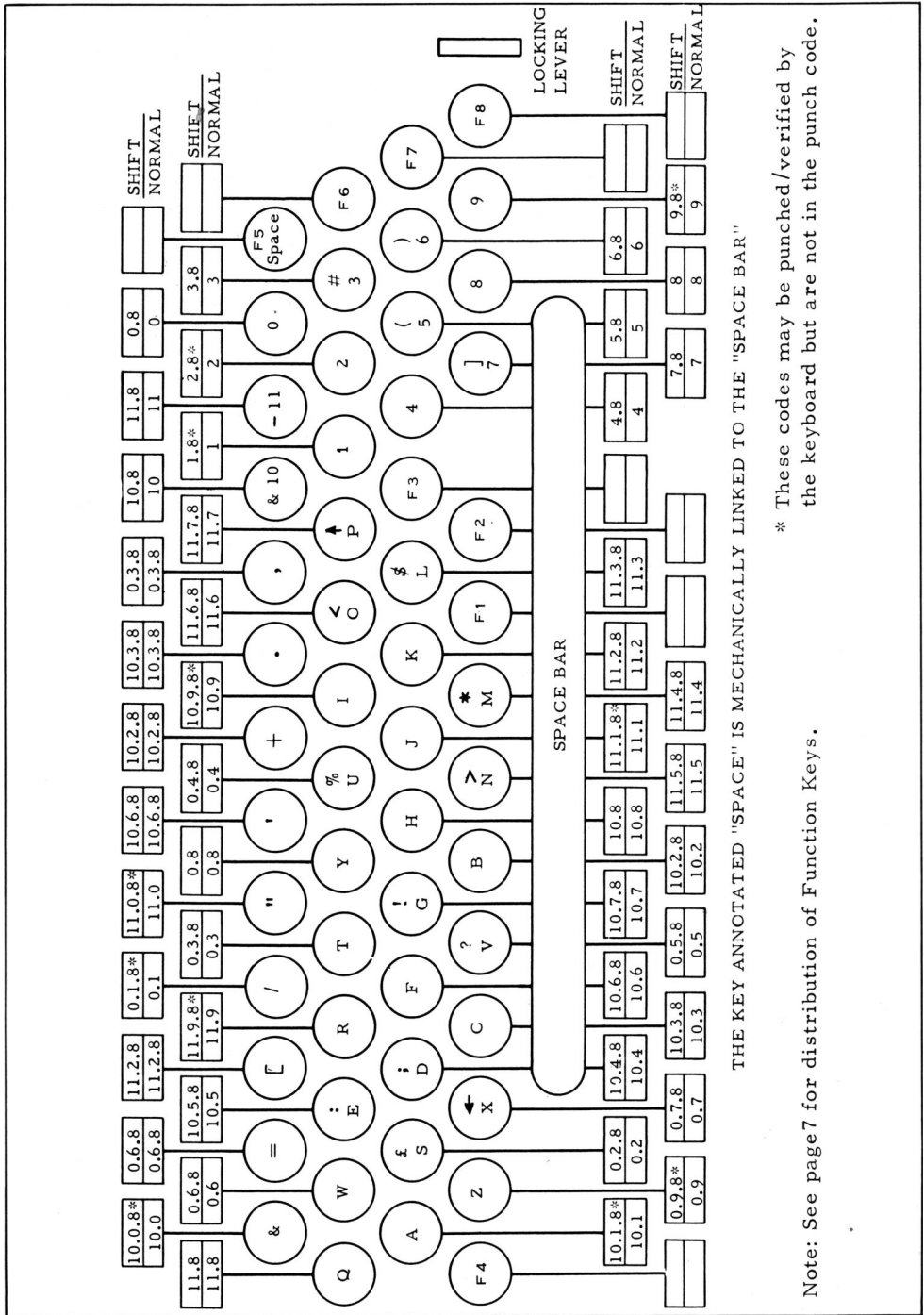
Note: See page 7 for distribution of Function Keys.

I.C.T. 1900 series 64-character Card Code

<i>Punching Code</i>	<i>Character or Symbol</i>	<i>Punching Code</i>	<i>Character or Symbol</i>
0	0	11/7	P
1	1	11/8	Q
2	2	11/9	R
3	3	0/2	S
4	4	0/3	T
5	5	0/4	U
6	6	0/5	V
7	7	0/6	W
8	8	0/7	X
9	9	0/8	Y
NONE	space	0/9	Z
10 or 10/0	&	11	-
3/8	#	11/0	"
4/8	@	0/1	/
5/8	(	10/2/8	+
6/8	)	10/3/8	.
7/8	]	10/4/8	;
10/1	A	10/5/8	:
10/2	B	10/6/8	'
10/3	C	10/7/8	!
10/4	D	11/2/8	[
10/5	E	11/3/8	§
10/6	F	11/4/8	*
10/7	G	11/5/8	>
10/8	H	11/6/8	<
10/9	I	11/7/8	↑
11/1	J	0/2/8	£
11/2	K	0/3/8	,
11/3	L	0/4/8	%
11/4	M	0/5/8	?
11/5	N	0/6/8	=
11/6	O	0/7/8	←

The I.C.T. 64-character card code has been designed to incorporate the figures 0 to 9, the letters A to Z and all the usual punctuation marks as well as the more common scientific and mathematical symbols. In addition further useful symbols (e.g. §, £ etc.) have been included. Provision may be made for special symbols to be included to suit a customer's requirements but it will be obvious that if these special provisions are made, some of the existing symbols will have to be sacrificed.

and I.C.T. 82 or 182 Alphabetic Keyboard



THE KEY ANNOTATED "SPACE" IS MECHANICALLY LINKED TO THE "SPACE BAR"

* These codes may be punched/verified by the keyboard but are not in the punch code.

Note: See page 7 for distribution of Function Keys.

I.C.T. Card Codes Groups A, B

GROUP A

Code A.1			
Zone	10	11	0
10	10		
11		11	
0			0
1	A	J	&
2	B	K	S
3	C	L	T
4	D	M	U
5	E	N	V
6	F	O	W
7	G	P	X
8	H	Q	Y
9	I	R	Z

Code A.2				
Zone	10	11	0	1
10	10			
11		11		
0			0	
1	A	J	&	1
2	B	K	S	%
3	C	L	T	$\frac{1}{4}$
4	D	M	U	-
5	E	N	V	$\frac{1}{2}$
6	F	O	W	.
7	G	P	X	@
8	H	Q	Y	$\frac{3}{4}$
9	I	R	Z	

Code A.3		
Zone	10	11
10	Z	
11		A
0 (O)	N	B
1 (I)	P	C
2	Q	D
3	R	E
4	T	F
5	U	H
6 (G)	V	J
7	W	K
8 (S)	X	L
9	Y	M

GROUP B

Code B.1			
Zone	Y	X	0
Y	11		
X		10	
0			0
1	A	J	&
2	B	K	S
3	C	L	T
4	D	M	U
5	E	N	V
6	F	O	W
7	G	P	X
8	H	Q	Y
9	I	R	Z

Code B.2			
Zone	Y	X	0
Y	11		
X		10	
0			0
1	A	B	C
2	D	E	F
3	G	H	I
4	J	K	L
5	M	N	O
6	P	Q	R
7	S	T	U
8	V	W	X
9	Y	Z	&

Code B.3				
Zone	Y	X	0	1
Y	11			
X		10		
0			0	
1	A	J	&	1
2	B	K	S	%
3	C	L	T	$\frac{1}{4}$
4	D	M	U	-
5	E	N	V	$\frac{1}{2}$
6	F	O	W	.
7	G	P	X	@
8	H	Q	Y	$\frac{3}{4}$
9	I	R	Z	

Code B.4				
Zone	Y	X	0	1
Y	11			
X		10		
0			0	
1	A	B	C	1
2	D	E	F	%
3	G	H	I	$\frac{1}{4}$
4	J	K	L	-
5	M	N	O	$\frac{1}{2}$
6	P	Q	R	.
7	S	T	U	@
8	V	W	X	$\frac{3}{4}$
9	Y	Z	&	

Code B.5		
Zone	Y	X
Y	11/Z	
X		10/A
0 (O)	N	B
1 (I)	P	C
2	Q	D
3	R	E
4	T	F
5	U	H
6 (G)	V	J
7	W	K
8 (S)	X	L
9	Y	M

and C

GROUP C

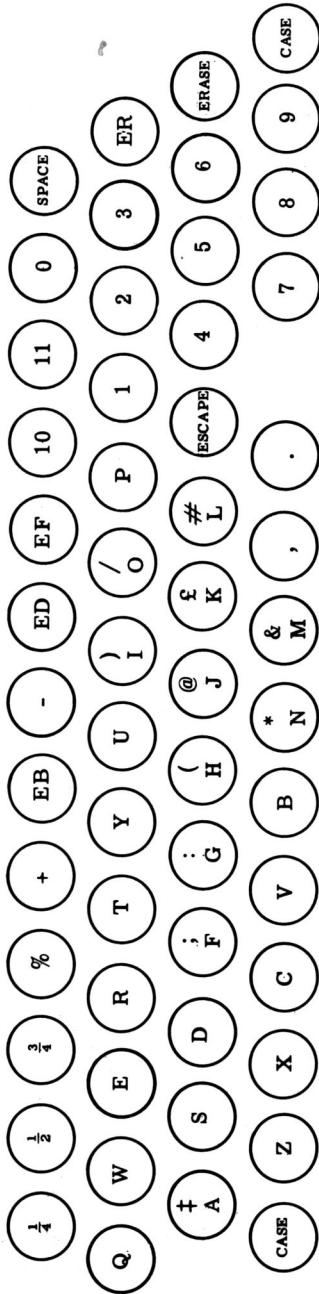
Card Positions	Code C.1				Code C.2			Code C.3		
	A	B	C	-	A	B	-	A	B	-
A	10			10	A		(10)	A		(11)
B		11		11		B	(11)		O(0)	(10)
C			0	0	C	P	0 (O)	B	M	1 (I)
D	A	J	S	1	D	Q	1 (I)	C	N	2 (Z)
E	B	K	T	2	E	R	2	D	P	3
F	C	L	U	3	F	T	3	E	Q	4
G	D	M	V	4	H	U	4	F	R	5
H	E	N	W	5	J	V	5	H	T	6 (G)
I	F	O	X	6	K	W	6 (G)	J	U&V	7
J	G	P	Y	7	L	X	7	K&X	W	8 (S)
K	H	Q	Z	8	M	Y	8 (S)	L	Y	9
Z	I	R	&	9	N	Z	9	(11 pos'ns.per col.)		

I.C.T. 1300 series Paper Tape Code

Track Numbers →				7	6	7	6	7	6	7	6
4	3	2	1	0	0	0	1	1	0	1	1
0	0	0	0	SPACE	0			,			P
0	0	0	1	‡	1			A			Q
0	0	1	0	ER	2			B			R
0	0	1	1	EB	3			C			S
0	1	0	0	EF	4			D			T
0	1	0	1	ED	5			E			U
0	1	1	0	;	6			F			V
0	1	1	1	:	7			G			W
1	0	0	0	(	8			H			X
1	0	0	1	)	9			I			Y
1	0	1	0	@	10			J			Z
1	0	1	1	£	11			K			$\frac{1}{4}$
1	1	0	0	#	%			L			$\frac{1}{2}$
1	1	0	1	&	+			M			$\frac{3}{4}$
1	1	1	0	*	-			N			(Escape) →
1	1	1	1	/	.			O			Erase

Track 5 = Odd Parity Bit

and I.C.T. 1027/1028 Keyboard



SEPARATE LEVER TO
PROVIDE LOCK AND
RELEASE FOR CASE KEY

SWITCHES ON PANEL ABOVE KEYBOARD

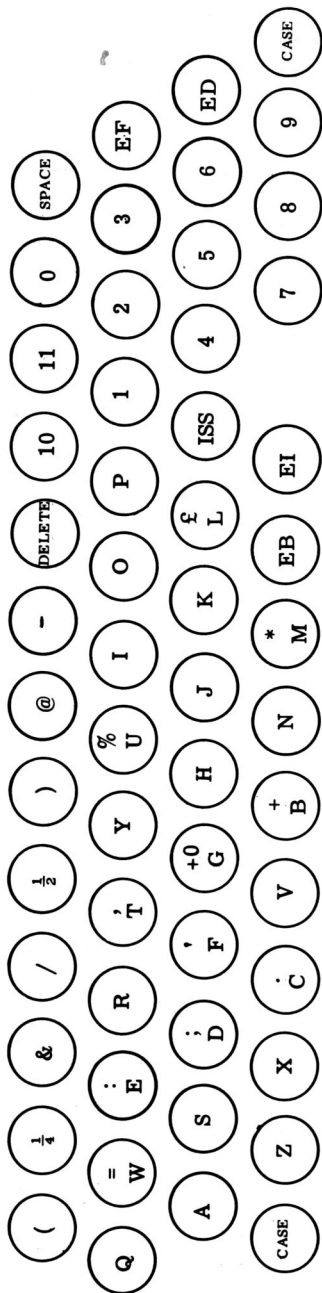
1020	1021
<ul style="list-style-type: none"> Punch Feed Parity Check Back Space Error Cancel Mains 	<ul style="list-style-type: none"> Reproduce On/Off Single Rep. Verify Reader Feed Error Amend Single Insert
	<ul style="list-style-type: none"> Multi Insert Punch Feed Parity Check Back Space Error Cancel Mains

I.C.T. 1500 Paper Tape Code

Track Number →				6	5	6	5	6	5	6	5
4	3	2	1	1	1	1	0	0	1	0	0
1	1	1	1	0		&		-		$\frac{1}{2}$	
1	1	1	0	1		A		J		/	
1	1	0	1	2		B		K		S	
1	1	0	0	3		C		L		T	
1	0	1	1	4		D		M		U	
1	0	1	0	5		E		N		V	
1	0	0	1	6		F		O		W	
1	0	0	0	7		G		P		X	
0	1	1	1	8		H		Q		Y	
0	1	1	0	9		I		R		Z	
0	1	0	1	Space or Underline		+		EI		EB	
0	1	0	0	$\frac{1}{4}$		· (Dec)		£		, (Comma)	
0	0	1	1	@		;		*		%	
0	0	1	0	(		:		ED		· (ISS)	
0	0	0	1	)		' (Apost)		EF		=	
0	0	0	0	Not Used		10 or +0		11		Not Used	

Track 7 = Even Parity

and I.C.T. 1027/1028 Keyboard



SEPARATE LEVER TO
PROVIDE LOCK AND
RELEASE FOR CASE KEY

SWITCHES ON PANEL ABOVE KEYBOARD

1020	1021
<ul style="list-style-type: none"> Punch Feed Parity Check Back Space Error Cancel Mains 	<ul style="list-style-type: none"> Reproduce On/Off Single Rep. Verify Reader Feed Error Amend Single Insert
	<ul style="list-style-type: none"> Multi Insert Punch Check Parity Check Back Space Error Cancel Mains

I.C.T. 1900 series Paper Tape Code

Characters, Symbols and Functions obtained from Normal, Shift and Control Operation

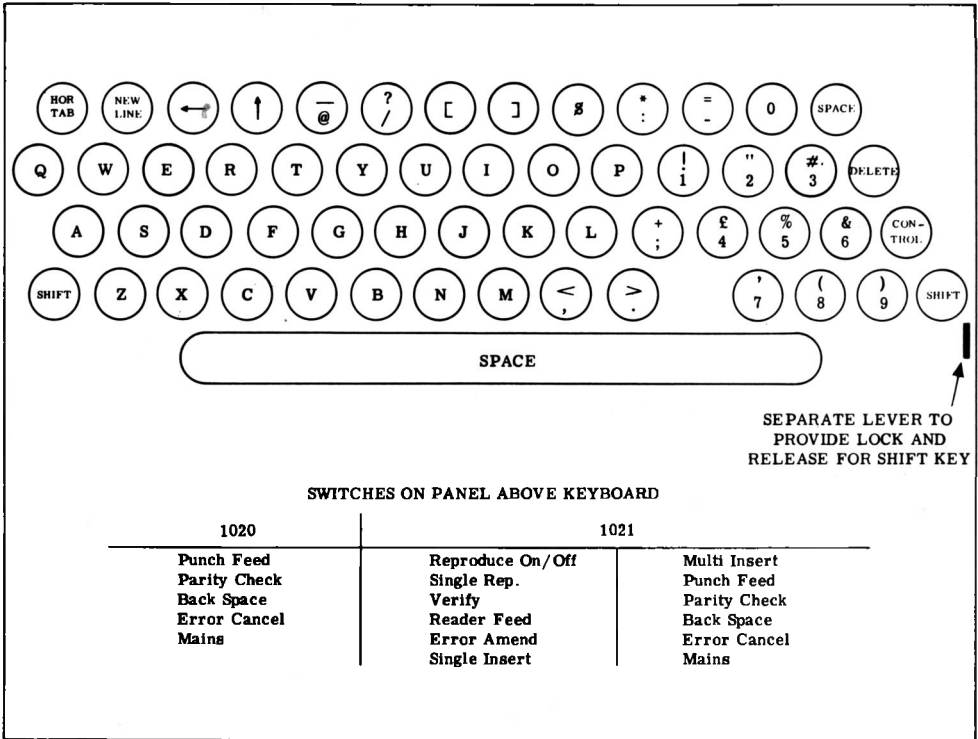
Key Top	Normal	Shift	Control	Key Top	Normal	Shift	Control	Key Top	Normal	Shift	Control
0	0		↑	⌘	@	—	TC0 (Null)	P	P	p	TC7 (DLE)
!	1	!	CONTROL SHIFT DOES NOT APPLY TO THESE KEYS	A	A	a	TC1 (SOH)	Q	Q	q	DC1
"	2	"		B	B	b	TC2 (STX)	R	R	r	DC2
#	3	#		C	C	c	TC3 (ETX)	S	S	s	DC3
£	4	£		D	D	d	TC4 (Eot)	T	T	t	DC4 (STOP)
%	5	%		E	E	e	TC5 (ENQ)	U	U	u	TC8 (NACK)
&	6	&		F	F	f	TC6 (Ack)	V	V	v	TC9 (SYNC)
'	7	'		G	G	g	Bell	W	W	w	TC10 (ETB)
(	8	(		H	H	h	FE0 (BS)	X	X	x	CNCL
)	9	)		I	I	i		Y	Y	y	EM
*	:	*		J	J	j		Z	Z	z	SS
+ ;	;	+	K	K	k	FE3 (VT)	[	[	CHARACTERS AS SPECIFIED	ESC	
< ,	,	<	L	L	l	FE4 (FF)	§	§		IS4 (FS)	
= -	-	=	M	M	m	FE5 (CR)	]	]		IS3 (GS)	
> .	.	>	N	N	n	SO	↑	↑		IS2 (RS)	
? /	/	?	↓	O	O	o	SI	←	←		IS1 (US)
HOR TAB	FE1 (HT)	FE1 (HT)	FE1 (HT)	Delete	Delete	Delete	Delete	SPACE	SPACE	SPACE	SPACE
NEW LINE	FE2 (LF)	FE2 (LF)	FE2 (LF)								

TRACK 8 = EVEN PARITY



Indicates NO CODE Required on Tape

and I.C.T. 1027/1028 Keyboard



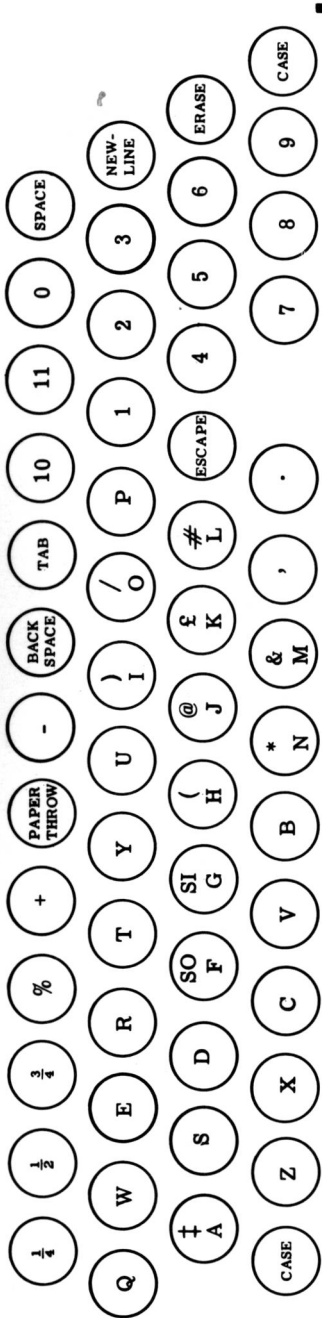
Track Numbers →				0			1			2			3			4			5			6			7		
				7	6	5	7	6	5	7	6	5	7	6	5	7	6	5	7	6	5	7	6	5	7	6	5
4	3	2	1	0	0	0	0	0	1	0	1	0	0	1	1	1	0	0	1	0	1	1	1	0	1	1	1
0	0	0	0	TC0(Null)	TC7(DLE)	SPACE	0	@	P	—	p																
0	0	0	1	TC1 (SOH)	DC1	!	1	A	Q	a	q																
0	0	1	0	TC2 (STX)	DC2	"	2	B	R	b	r																
0	0	1	1	TC3 (ETX)	DC3	#	3	C	S	c	s																
0	1	0	0	TC4 (EOT)	DC4(STOP)	£	4	D	T	d	t																
0	1	0	1	TC5 (ENQ)	TC8(NACK)	%	5	E	U	e	u																
0	1	1	0	TC6 (ACK)	TC9 (SYNC)	&	6	F	V	f	v																
0	1	1	1	BELL	TC10(ETB)	'	7	G	W	g	w																
1	0	0	0	FE0 (Back space)	CNCL	(	8	H	X	h	x															
1	0	0	1	FE1 (HOR.TAB)	EM	)	9	I	Y	i	y															
1	0	1	0	FE2 (NEW LINE)	SS	*	:	J	Z	j	z																
1	0	1	1	FE3(V Tab)	ESCAPE	+	;	K	[	k	Characters or Symbols by Customer Specification															
1	1	0	0	FE4 (FF)	IS4 (FS)	,	<	L	£	l																	
1	1	0	1	FE5 (CR)	IS3 (GS)	-	=	M	]	m																
1	1	1	0	SO	IS2 (RS)	.	>	N	↑	n																	
1	1	1	1	SI	IS1 (US)	/	?	O	←	o		DELETE															

I.C.T. B.S. 7-Track Paper Tape Code

Track Numbers →	7	6	7	6	7	6	7	6
↓								
4 3 2 1	0	0	0	1	1	0	1	1
0 0 0 0	Space		0		,		P	
0 0 0 1	†		1		A		Q	
0 0 1 0	New Line		2		B		R	
0 0 1 1	Paper Throw		3		C		S	
0 1 0 0	Tabulate		4		D		T	
0 1 0 1	Backspace		5		E		U	
0 1 1 0	Shift Out		6		F		V	
0 1 1 1	Shift In		7		G		W	
1 0 0 0	and Run Out							
1 0 0 1	(		8		H		X	
1 0 1 0	)		9		I		Y	
1 0 1 1	@		10		J		Z	
1 1 0 0	£		11		K		¼	
1 1 0 1	#		%		L		½	
1 1 1 0	&		+		M		¾	
1 1 1 1	*		-		N		(Escape) →	
1 1 1 1	/		.		O		Erase	

Track 5 = Odd Parity Bit

and I.C.T. 1027/1028 Keyboard



SEPARATE LEVER TO PROVIDE LOCK AND RELEASE FOR CASE KEY

SWITCHES ON PANEL ABOVE KEYBOARD

1020	1021
<ul style="list-style-type: none"> Punch Feed Parity Check Back Space Error Cancel Mains 	<ul style="list-style-type: none"> Reproduce On/Off Single Rep. Verify Reader Feed Error Amend Single Insert
	<ul style="list-style-type: none"> Multi Insert Punch Feed Parity Check Back Space Error Cancel Mains

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With effect from 9th July 1968 the name of International Computers and Tabulators Limited has been changed to International Computers Limited.

Technical Publication 4012

© International Computers Limited 1967

First Edition February 1967

Reprinted January 1968
(incorporating Amendment List 1)

Issued by Technical Publications Service
International Computers Limited
Head Office: ICL House, Putney, London SW15
and printed in Great Britain by
ICL Printing Services, Letchworth, Hertfordshire