INT 9 - Hardware Keyboard Make/Break Codes

Key	Make	Break		Key	Make	Break
Backspace	0E	8E		F1	3B	BB
Caps Lock	3A	BA		F2	3C	BC
Enter	1C	9C		F3	3D	BD
Esc	01	81		F4	3E	BE
Left Alt	38	B8		F7	41	C1
Left Ctrl	1D	9D		F5	3F	BF
Left Shift	2A	AA		F6	40	C0
Num Lock	45	C5		F8	42	C2
Right Shift	36	B6		F9	43	C3
Scroll Lock	46	C6		F10	44	C4
Space	39	B9		F11	57	D7
Sys Req (AT)	54	D4		F12	58	D8
Tab	0F	8F				

Keypad Keys		Make	Break
Keypad 0	(Ins)	52	D2
Keypad 1	(End)	4F	CF
Keypad 2	(Down arrow)	50	D0
Keypad 3	(PgDn)	51	D1
Keypad 4	(Left arrow)	4B	CB
Keypad 5		4C	CC
Keypad 6	(Right arrow)	4D	CD
Keypad 7	(Home)	47	C7
Keypad 8	(Up arrow)	48	C8
Keypad 9	(PgUp)	49	C9
Keypad .	(Del)	53	D3
Keypad *	(PrtSc)	37	B7
Keypad -		4A	CA
Keypad +		4E	CE

Key	Make	Break		Key	Make	Break
A	1E	9E		N	31	B1
B	30	B0		O	18	98
C	2E	AE		P	19	99
D	20	A0		Q	10	90
E	12	92		R	13	93
F	21	A1		S	1F	9F
G	22	A2		T	14	94
H	23	A3		U	16	96
I	17	97		V	2F	AF
J	24	A4		W	11	91
K	25	A5		X	2D	AD
L	26	A6		Y	15	95
M	32	B2		Z	2C	AC

Key	Make	Break		Key	Make	Break
1	02	82		-	0C	8C
2	03	83		=	0D	8D
3	04	84		[	1A	9A
4	05	85		]	1B	9B
5	06	86		;	27	A7
6	07	87		'	28	A8
7	08	88		`	29	A9
8	09	89		\	2B	AB
9	0A	8A		,	33	B3

```
        0      0B    8B                    .      34    B4
                                           /      35    B5
```

Enhanced Keyboard Keys (101/102 keys)

```
Control Keys            Make                Break

Alt-PrtSc (SysReq)      54                  D4
Ctrl-PrtSc              E0 37               E0 B7
Enter                   E0 1C               E0 9C
PrtSc                   E0 2A E0 37         E0 B7 E0 AA
Right Alt               E0 38               E0 B8
Right Ctrl              E0 1D               E0 9D
Shift-PrtSc             E0 37               E0 B7
/                       E0 35               E0 B5
Pause                   E1 1D 45 E1 9D C5   (not typematic)
Ctrl-Pause (Ctrl-Break) E0 46 E0 C6         (not typematic)
```

- Keys marked as "not typematic" generate one stream of bytes
  without corresponding break scan code bytes (actually the
  break codes are part of the make code).

```
                Normal Mode or
                Shift w/Numlock
Key             Make    Break    |----- Numlock on ------.
                                   Make             Break
Del             E0 53   E0 D3    E0 2A E0 53    E0 D3 E0 AA
Down arrow      E0 50   E0 D0    E0 2A E0 50    E0 D0 E0 AA
End             E0 4F   E0 CF    E0 2A E0 4F    E0 CF E0 AA
Home            E0 47   E0 C7    E0 2A E0 47    E0 C7 E0 AA
Ins             E0 52   E0 D2    E0 2A E0 52    E0 D2 E0 AA
Left arrow      E0 4B   E0 CB    E0 2A E0 4B    E0 CB E0 AA
PgDn            E0 51   E0 D1    E0 2A E0 51    E0 D1 E0 AA
PgUp            E0 49   E0 C9    E0 2A E0 49    E0 C9 E0 AA
Right arrow     E0 4D   E0 CD    E0 2A E0 4D    E0 CD E0 AA
Up arrow        E0 48   E0 C8    E0 2A E0 48    E0 C8 E0 AA

Key          |--Left Shift Pressed--.  |--Right Shift Pressed--.
                Make         Break          Make         Break
Del          E0 AA E0 53  E0 D3 E0 2A   E0 B6 E0 53  E0 D3 E0 36
Down arrow   E0 AA E0 50  E0 D0 E0 2A   E0 B6 E0 50  E0 D0 E0 36
End          E0 AA E0 4F  E0 CF E0 2A   E0 B6 E0 4F  E0 CF E0 36
Home         E0 AA E0 47  E0 C7 E0 2A   E0 B6 E0 47  E0 C7 E0 36
Ins          E0 AA E0 52  E0 D2 E0 2A   E0 B6 E0 52  E0 D2 E0 36
Left arrow   E0 AA E0 4B  E0 CB E0 2A   E0 B6 E0 4B  E0 CB E0 36
PgDn         E0 AA E0 51  E0 D1 E0 2A   E0 B6 E0 51  E0 D1 E0 36
PgUp         E0 AA E0 49  E0 C9 E0 2A   E0 B6 E0 49  E0 C9 E0 36
Right arrow  E0 AA E0 4D  E0 CD E0 2A   E0 B6 E0 4D  E0 CD E0 36
Up arrow     E0 AA E0 48  E0 C8 E0 2A   E0 B6 E0 48  E0 C8 E0 36
/            E0 AA E0 35  E0 B5 E0 2A   E0 B6 E0 35  E0 B5 E0 36
```

- The PS/2 models have three make/break scan code sets. The first
  set matches the PC & XT make/break scan code set and is the one
  listed here. Scan code sets are selected by writing the value F0
  to the keyboard via the 8042 (port 60h). The following is a brief
  description of the scan code sets (see the PS/2 Technical Reference
  manuals for more information on scan code sets 2 and 3):

/ set 1, each key has a base scan code. Some keys generate

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      extra scan codes to generate artificial shift states.  This
      is similar to the standard scan code set used on the PC and XT.
/   set 2, each key sends one make scan code and two break scan
      codes bytes (F0 followed by the make code).  This scan code
      set is available on the IBM AT also.
/   set 3, each key sends one make scan code and two break scan
      codes bytes (F0 followed by the make code) and no keys are
      altered by Shift/Alt/Ctrl keys.
/   typematic scan codes are the same as the make scan code
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- Some Tandy 1000's do not handle Alt key combinations when multiple
  shift keys are pressed. The Alt-Shift-H combination loses the Alt.
- extended keys like (F11, F12) can only be read with systems that
  have extended keyboard BIOS support (or INT 9 extensions); to
  read these special keys on these systems INT 16,10 must be used

  - see   SCAN CODES   KB FLAGS   KEYBOARD COMMANDS