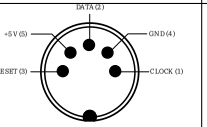
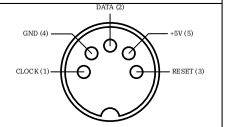
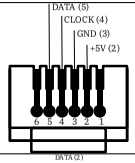
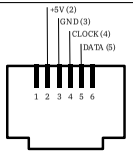
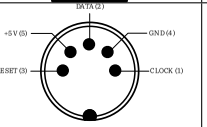
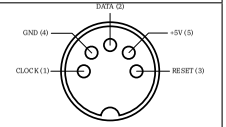
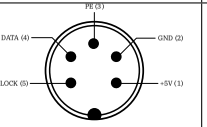
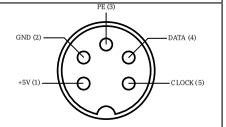
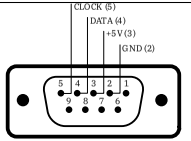
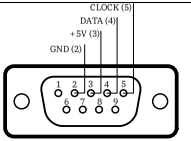
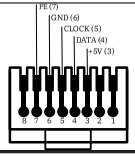
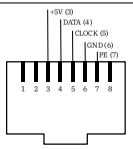
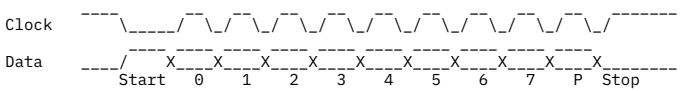
System	Connector	Language	Protocol	Image Plug	Image Socket
IBM PC Keyboard IBM System 9000	5-Pin DIN (DIN 41524)	Set-1	2 start bits, 8 data bits, make/break bit, 1 stop bit		
XT Portable Keyboard	RJ25 - 6P4C	Set-1	2 start bits, 8 data bits, make/break bit, 1 stop bit		
IBM AT Keyboard	5-Pin DIN (DIN 41524)	Set-2 / Subset of Set-3	1 start bit, 8 data bits, 1 parity bit (odd), 1 stop bit		
IBM Display Station	5-Pin DIN (DIN 45322)	Set-3	1 start bit, 8 data bits, 1 parity bit (odd), 1 stop bit		
IBM 4704 Family	DE-9	IBM proprietary with host to keyboard communications	1 start bit, host request and release bits, 1 stop bit*		
IBM Terminal Family	RJ45 - 8P5C	Set-3 / IBM proprietary with host to keyboard communications	IBM proprietary with host to keyboard communication		

The IBM 4704 Keyboard protocol was analyzed and described in depth by the GeekHack user hasu[1]. The outcome has been a fully working converter that allowed the usage of the original controller on a modern computer[2].
The following is a direct quote of the text - file linked above:

4704 Keyboard Protocol
On powering up keyboard sends keyboard ID; A3h for 6019284 (62-key), for example. After that the keyboard enters FC command mode and waits for parameter data from host so that it doesn't send any scancode until you send 'FF'(End of FC command mode).

Keyboard	ID
Model 100 50-key	A2h
Model 200 62-key	A3h
Model 300 77-key	A4h
Model 400 107-key	A5h
Japanese/Chinese 102-key	A6h

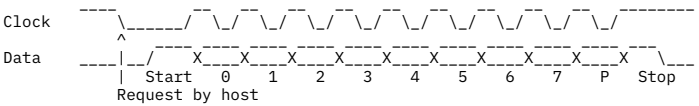
Keyboard to Host
Data bits are LSB first and Parity is odd. Clock has around 60us high and 30us low part.



Start bit: can be long as 300-350us.
Inhibit: Pull Data line down to inhibit keyboard to send.
Timing: Host reads bit while Clock is hi.(rising edge)
Stop bit: Keyboard pulls down Data line to lo after 9th clock.

[1] https://github.com/tmk/tmk_keyboard/blob/master/converter/ibm4704_usb/ibm4704.txt
[2] https://geekhack.org/index.php?topic=54706.0

Host to Keyboard
Data bits are LSB first and Pairty is odd. Clock has around 60us high and 30us low part.



Start bit: can be long as 300-350us during start up and upto 2500us while key scanning
Request: Host pulls Clock line down to request to send a command.
Timing: After Request keyboard pull up Data and down Clock line to low for start bit. After request host release Clock line once Data line becomes hi. Host writes a bit while Clock is hi and Keyboard reads while low.
Stop bit: Host releases or pulls up Data line to hi after 9th clock and waits for keyboard pull down the line to lo.

Scancodes
Keyboard doesn't send Break code for all keys except for Alt by default.

```
6019284 62-key:
,-------------------------------------------------------------.
|  `|  1|  2|  3|  4|  5|  6|  7|  8|  9|  0|  -|  =|**1|BS |
|-------------------------------------------------------------|
|Tab  |  Q|  W|  E|  R|  T|  Y|  U|  I|  O|  P|  ¢|  \|  PD2|
|-------------------------------------------------------------|
|Ctrl  |  A|  S|  D|  F|  G|  H|  J|  K|  L|  ;|  '| {}| PD3|
|-------------------------------------------------------------|
|Shif| <>|  Z|  X|  C|  V|  B|  N|  M|  ,|  ,|  /|**2|Shift |
|-------------------------------------------------------------|
|Reset|blk|Alt  |         Space             |Alt  |blk|Enter|
`-------------------------------------------------------------'
+----------+--------------------+----------+----------+
|`       00|PD1     04|Caps     20|LShift   30|Reset    31|
|1       18|q       05|a        21|<>       3E|Rblank   41|
|2       19|w       06|s        22|z        32|Alt      3F|
|3       1A|e       13|d        23|x        33|Space    40|
|4       10|r       14|f        24|c        34|Alt      3F|
|5       11|t       15|g        25|v        35|Lblank   42|
|6       12|y       16|h        26|b        36|Enter    2F|
|7       08|u       17|j        27|n        37|           |
|8       09|i       01|k        28|m        38|           |
|9       0A|o       02|l        29|,        39|           |
|0       0F|p       03|;        2A|.        3A|           |
|-       1F|¢       1B|'        2B|/        3B|           |
|=       0D|\       1C|{}       2C|**2      3C|           |
|**1     0C|PD2     1D|PD3      2D|RShift   3D|           |
|BS      0E|          |          |           |           |
+----------+--------------------+----------+----------+
Bit7 is 'press flag' which set 1 on press and 0 on release when
break code is enabled.
```

NOTE: When break code is enabled the key sends scancode with setting 7th bit on press and without it on release. That is, '`' sends 80h on press and 00h on release.

Keyboard command

Keyboard accepts these commands from host.

Description	Entry point
FF Soft Reset	0008h
FE Resend	00e8h
FD Buzzer(emits a short beep)	00edh
FC Set Key Flag	00f6h
FB Soft Reset	0008h
FA Reset	0000h

Keyboard response

Keyboard sends these bytes to host.

Description	Entry point
FE Overflow(key event/receive data)	00c5h, 0346h
Memory test error	0224h
FD Command out of bound	00d8h
Key out of bound	
7E Read/Parity error in receive from host	00bch

80-FB? scan code(make)
00-7B? scan code(break)
note: Alps model spits scan code 7B(FB) at least.

Set Key Flag command(FC)
After 'Power on Reset' firmware enters this command mode and waits for data from host, so that you don't need to send 'FC' and it doesn't send any scancode until you send 'FF' to exit this mode. With Alps models you need to send 'FC' command to enter this mode.

Data sent from host:

```
bit: 7   6 ... 0
en  |     |
|   '-----'--- scan code
'------------- enable bit(0: enable repeat, 1: enable break)
```

```
00-7B   Enable repeat
80-FB   Enable break
FE      Resend(011ah) no need to use
FF      End(0114h) exits FC command mode.

Response from keyboard:
FD      Out of bound - Invalid scancode
--      OK - No response means that command is accepted.

Examples:
To enable break code of all keys you have to send
following commands.

FC 80 81 ... FB FF
```