AXIOME FORM

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FORMs3 programming manual

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CHAPTER 1 : GENERAL DESCRIPTION

General

This programme is developed in order to enable any user to connect their AXIOME OMR reader to (almost) any computer. After power-on, before the feed command, it is possible to send the reader a list of commands to suit your computer interface.
The commands are described in this document.

How to use it ?

The reader is entirely under the computer's control and doesn't proceed by itself to a logical control of the read data.

The computer sends to the reader the configuration, reading and ejection commands. These parameters are not registered in the reader.

The reader sends the read marks to the computer according to two ways to be chosen from:

- hexadecimal mode: each document line has a 12 character code,
- co-ordinates mode: each mark is sent in a 4 character form showing the line and track numbers.

The user can define if the reader must wait for a command from the computer (acceptance or rejection of document) after each document, or if the reading and transmission of data must be sent for each document without waiting for any command.

A reader working with **FORMs3** sends error messages (no document to be read, no clock-marks on document...) to the computer, which has to take the decision on the processing follow up.

A reader working with **FORMs3** is entirely guided by the computer.

The communication protocol is fixed but the transmission speed can be modified by switches on the models axm 952 and axm 985 or by modifying a firmware address on the models axm 930 and axm 99x.

FORMs3 is compatible with STANDA from KAISER (versions 6.08 and 7.01).

CHAPTER 2 : The feeding commands

L command

'L' Hex value : 4C H
Read a document and send the data in hex format (12 characters per line). The reader is in auto feed mode : as soon as a document is laid onto the reader, it will be transported and read by pressing the start key of the reader. No error messages will be sent.

A line (status) is not sent if at least one track is marked.

'I' Hex value : 6C H
Same format as 'L' command, but the reader will wait the 'I' command to feed the next document. The error messages will be sent.

A line is sent if at least one track is marked.

Hex format reader output string (Hex format see appendix B)

ccddddddddddd

cc	=	Clock number in DECIMAL code
d	=	Read data in HEX code
<CR>	=	Carriage return
<LF>	=	Line feed

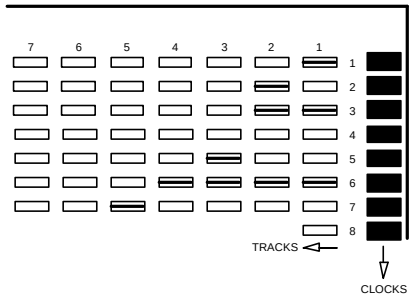
The last string is ever followed by <CR><LF>

Example :

ccddddddddddd

010000000001
020000000002
030000000003
050000000004
06000000000F
070000000010<CR><LF>

12 characters per line



K command

'K' Hex value : 4B H
Same as 'L' command, but the data are sent as co-ordinates.

A line (status) is not sent if at least one track is marked.

'k' Hex value : 6B H
Same as 'l' command, but the data are sent as co-ordinates.

A line (status) is sent if at least one track is marked.

Co-ordinates reader output string

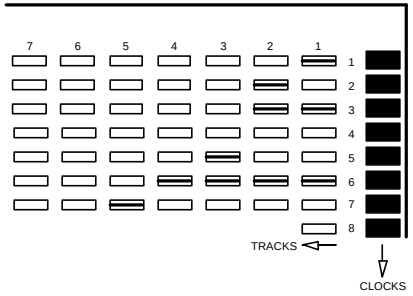
cctt

cc	=	Clock number in DECIMAL code
tt	=	Track number in DECIMAL code (01 to 40)
<CR>	=	Carriage return
<LF>	=	Line feed

The last string is ever followed by <CR><LF>

Example :

cctt 2 characters clk and 2 characters track



0101
0202
0301
0302
0503
0601
0602
0603
0604
0705<CR><LF>

CHAPTER 3 : The ejection commands

G command

'G' Hex value : 47 H
Eject the sheet to the good "**Gut**" output tray

'g' Hex value : 67 H
Same as 'G' command.

S command

'S' Hex value : 53 H
Eject the sheet back to the input tray for all the manual AXIOME readers. For the readers with two output trays, the document is sent to the bad "**Schlecht**" output tray. For the AXM952, the document is sent to the good tray, give an error message on the display and returned an error message "M08" to the host.

's' Hex value : 6B H
Same as 'S' command.

W command

'W' Hex value : 57 H
Resend to the host the data of the last reading document (this command can be used many time, while the sheet remain not ejected).

'w' Hex value : 77 H
Same as 'W' command.

CHAPTER 4 : The configuration commands

The following commands have to be configured before started reading the first document.

C command

'C' Hex value : 43 H
Set the reader to place the number of clocks read, on each document, at the beginning of the data record (see example).

Hex format reader output string

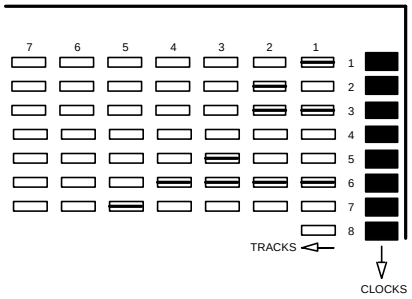
```
nnnccddddddddd...
```

nnn	=	Number of clock marks read on the document
cc	=	Clock number in DECIMAL code
d	=	Read data in HEX code
<CR>	=	Carriage return
<LF>	=	Line feed

Example : "with 'L' command"

nnnccddddddddd...

007010000000001
020000000002
030000000003
050000000004
06000000000F
070000000010<CR><LF>



'c' * Hex value : 63 H
With lowercase c, this option is reseted and the number of clock marks will be no more transmitted

O command

'O' Hex value : 4F H
Set the reader to place CR and LF characters after each elementary data in the record (every line is followed by CR and LF).

Example :"with 'L' command"

`ccddddddddddd`<CR><LF>`ccdddd...`

`cc`	=	Clock number in DECIMAL code
`d`	=	Read data in HEX code
<CR>	=	Carriage return
<LF>	=	Line feed

Example :

010000000001**<CR><LF>**
02000000000B**<CR><LF>**
03000000000F<CR><LF>

Example :"with 'K' command"

`cctt`<CR><LF>`cctt`<CR>...

`cc`	=	Clock number in DECIMAL code
`tt`	=	Track number in DECIMAL code
<CR>	=	Carriage return
<LF>	=	Line feed

Example :

0101**<CR><LF>**
0201**<CR><LF>**
0202**<CR><LF>**
0204**<CR><LF>**
0301**<CR><LF>**
0302**<CR><LF>**
0303**<CR><LF>**
0304<CR><LF>

'o' * Hex value : 6F H
Reset the option, CR and LF will no more sent.

X command

'X' Hex value : 58 H
Set the reader to place data between STX and ETX instead of CR and LF at the end.

Example : "with 'L' command"

<STX>ccddddddddddccdddd...<ETX>

cc	=	Clock number in DECIMAL code
d	=	Read data in HEX code
<STX>	=	Start of text
<ETX>	=	End of text

Example :

<STX>010000000001
02000000000B
03000000000F**<ETX>**

Example :"with 'K' command"

<STX>ccttcct...<ETX>

cc	=	Clock number in DECIMAL code
tt	=	Track number in DECIMAL code
<STX>	=	Start of text
<ETX>	=	End of text

Example :

<STX>0101
0201
0202
0204
0301
0302
0303
0304**<ETX>**

'x' * Hex value : 78 H
Reset the option, return in CR / LF mode.

The both mode ('O' and 'X') can be selected.

D command

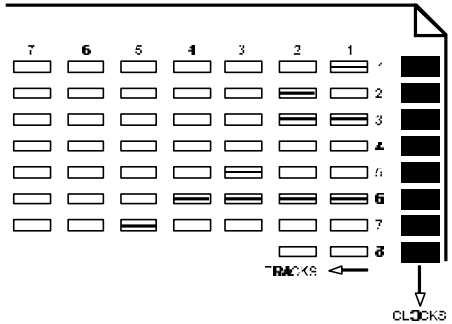
'D' Hex value : 44 H
In case of, your reader can read 2 side sheets, the read will sent first the data of side 1, than send R and after the data of side 2.

Example : "with 'L' and 'O' command"

ccddddddddddd

Side 1 / 12 characters per line

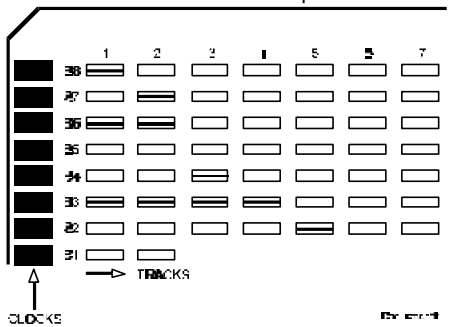
010000000001<CR><LF>
020000000002<CR><LF>
030000000003<CR><LF>
050000000004<CR><LF>
06000000000F<CR><LF>
070000000010<CR><LF>



Turn the document like a book page.

Side 2 / 12 characters per line

R880000000001<CR><LF>
870000000002<CR><LF>
860000000003<CR><LF>
850000000004<CR><LF>
84000000000F<CR><LF>
830000000010<CR><LF>

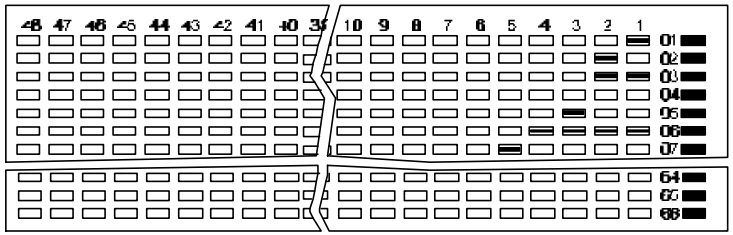


'd' * Hex value : 64 H
The read will sent **only** the data of side 1.

R command

'R' Hex value : 52 H
This command will make a rotation of 180° of the sheet. The reader will sent the first clock as the last and the first colon as the last.

Example :



The output format after a "I" :

```
010000000001
020000000002
030000000003
050000000004
06000000000F
070000000010
```

The output format after a "R" and a "I" :

```
600800000000
61F000000000
622000000000
64C000000000
654000000000
668000000000
```

'r' * Hex value : 72 H
This command will make **no** rotation of 180° of the sheet

B command

'B' Hex value : 42 H
In case of, you reader is equipped with bar-code reading option and you want only to read the bar-code data, this command instructs the reader to process only the bar-code.
The bar-code data are preceded and followed by " (Hex value : 22 H).

"yyy...yy"

'b' * Hex value : 62 H
The bar-code data follows the OMR data.

ccddddddddd "yyy...yy"

cc	=	Clock number in DECIMAL code
d	=	Read data in HEX code
<CR>	=	Carriage return
<LF>	=	Line feed

P command

'P' Hex value : 50 H
The bar-code data are sent with the indication of the type and the position of the bar-code.

"[Cxxxxx]yyy...yy"

'p' * Hex value : 70 H
The bar-code data are sent without type and position of the bar-code.

"yyy...yy"

cc = Clock number in DECIMAL code
d = Read data in HEX code
yyy..y = Bar-code value
C = Bar-code type:
- I = interleaved 2/5 forward
- J = interleaved 2/5 backward
- A = codabar forward
- B = codabar backward
- C = code 128 forward and backward
- E = code 39 forward
- F = code 39 backward
- G = code AXIOME forward
- H = code AXIOME backward
- T = EAN 8 or 13 forward
- S = EAN 8 or 13 backward

xxxxx = # Distance up to the end of the document
<CR> = Carriage return
<LF> = Line feed

Presently this value can't be converted in mm, because the reliability is not guaranteed.

T command

'T' Hex value : 54 H

Set the reader to **wait for the key** pushed after a rejection backwards.

't' * Hex value : 74 H

No wait for the key. The reader is ready to accept the next command without acknowledgement on the reader button.

CHAPTER 5 : Error messages

Error messages after a lowercase command

If the host command was 'l' or 'k' (lowercase) and a function goes wrong, the reader responds with one of the following error message.
The error messages are preceded and followed from STX and ETX if this mode is selected.

M00 No document present to read (on manual reader).

M02 The input tray is empty (on automatic reader).

M08 Bad feeding.

M10 Too long, too short, too thin, too thick.

M20 Path not free.

M99 No clock mark on the document.

Example : After a lowercase command

In ETX mode <STX>M99<STX><ETX>

* In LF mode M99<CR><LF>

Error messages after a uppercase command

With uppercase command **no error message will be sent**, and the " no clock mark on the document error " is processed as follow.

Example : After a uppercase command

In ETX mode <STX><ETX>

* In LF mode <CR><LF>

a * indicates the default values after power-on

CHAPTER 6 : Information's

V command

'V' Hex value : 56 H
Ask the reader to send the software version number to the host.

'v' Hex value : 76 H
Same as 'V'

Example :

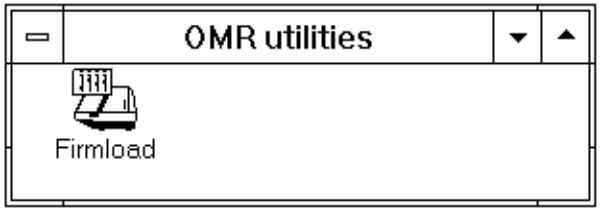
```
FORS3  06/08/96<CR><LF>
```

CHAPTER 7 : Possibility to fix commands

The AXIOME Fload Windows® program gives the possibility to fix, many Forms3 commands in the firmware of the axm930 and 99x readers,. On the axm926,952,985 readers, you must read the Firmware Prom on a Prom programmer, modify the value on the addresses describes further and than burn a new Prom.

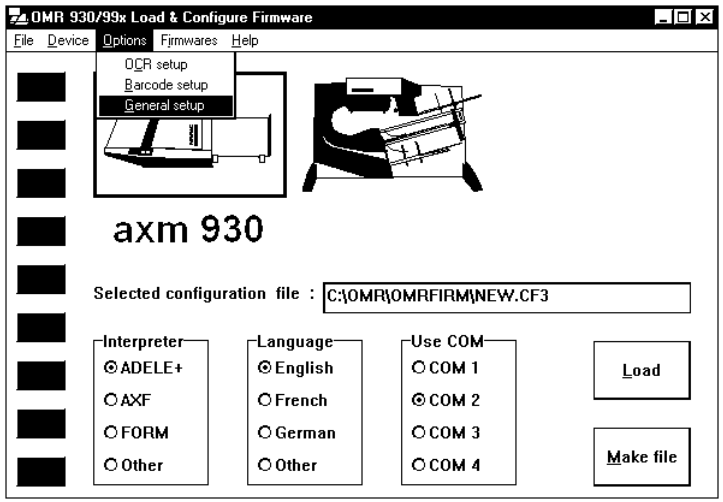
If you use an axm 930 or a axm99x (reader), proceed like follows :

- Execute the FLOAD.EXE program or click with the mouse on the FIRMLOAD icon.



- Select the reader type and the configuration type (Software, Language, Com) by clicking with the mouse on the box you want to select.

- Open the General setup menu by clicking on the "Option" and then "General setup".



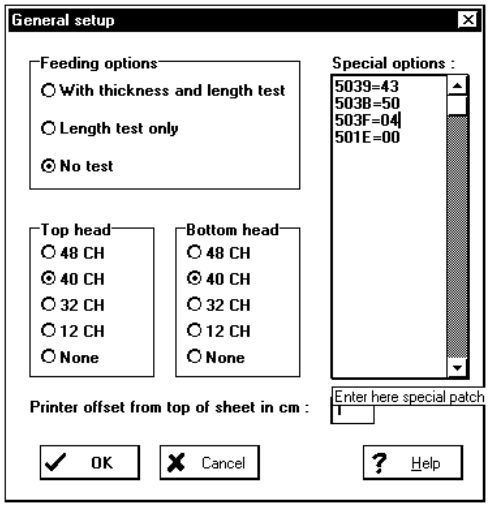
- Type the address number of the command, then an equal sign and the Hex value to be fixed (see below) in the "Special options" column. Only a byte by line is allowed.

  The syntax is : addr=val

  - addr : 4 hexadecimal digits from 0001 to FFFF

  - val : 2 hexadecimal digits from 00 to FF

To be careful with this facility some values at some memory address can produce unpredictable behaviour and damages at the machine.



- Click on OK to confirm your choice.
- Press the selector key before switching the reader on (switch ON).
- Click "LOAD" to start the transmission to the reader. On the reader display, a cross turns during the whole transport.

Addresses

- For the axm 926,952,985 readers, the programming address begin at 3000H
- For the axm 930,99x,995 readers, the programming address begin at 5000H

B command

(for more information see page 13)

B: 5038H=42H
b: 5038H<>42H default FFH

C command

(for more information see page 7)

C: 5039H=43H
c: 5039H<>43H default FFH

O command

(for more information see page 8)

O: 503AH=4FH
o: 503AH<>4FH default FFH

P command

(for more information see page 14)

P: 503BH=50H
p: 503BH<>50H default FFH

R command

(for more information see page 12)

R: 503CH=52H
r: 503CH<>52H default FFH

X command

(for more information see page 9)

X: 503DH=58H
x: 503DH<>58H default FFH

D command

(for more information see page 10)

D: 503EH=44H
D: 503EH<>44H default FFH

Number of column read

column 503FH=FFH head same default FFH
503FH=1/ 2/ 3/ 4/ 5/ 6/ 7/ 8/ 9/ :/ ;/ > quarter of column

Baud-rate adjusting

baudr 501DH=00 default unchanged (9600)
501DH=01(1200) 02(2400) 03(4800) 04(9600) 05(19200) 06(38400)

uart 501EH=00 default unchanged (e,7,1)
501EH=7AH (e,7,1) 6EH (n,8,1)

C command

side 5020H=00 default if D command also output : SIDE1-**R**-SIDE2
5020H<>0 if D command also output SIDE1-SIDE2 without reset from line counter.

CHAPTER 8 : ASCII characters

OCTAL	DEC	HEX	CHRS	CTRL KEY	DESCRIPTION
000	0	0	<NUL>	@	Null, tape feed.
001	1	1	<SOH>	A	Start of heading.
002	2	2	<STX>	B	Start of text.
003	3	3	<ETX>	C	End of text.
004	4	4	<EOT>	D	End of transmission.
005	5	5	<ENQ>	E	Enquiry, also WRU.
006	6	6	<ACK>	F	Acknowledge, also RU.
007	7	7	<BEL>	G	Rings the bell.
010	8	8	<BS>	H	Backspace, also FEB.
011	9	9	<HT>	I	Horizontal tab.
012	10	A	<LF>	J	Line feed, adv. cursor to next line.
013	11	B	<VT>	K	Vertical tab (VTAB).
014	12	C	<FF>	L	Form feed to top of next page.
015	13	D	<CR>	M	Carriage return to beginning of line.
016	14	E	<SO>	N	Shift out.
017	15	F	<SI>	O	Shift in.
020	16	10	<DLE>	P	Data line escape.
021	17	11	<DC1>	Q	Device ctrl 1,turns transm. on ,XON.
022	18	12	<DC2>	R	Device ctrl 2.
023	19	13	<DC3>	S	Device ctrl 3,turns transm. off ,XOFF
024	20	14	<DC4>	T	Device ctrl 4.
025	21	15	<NAK>	U	Negative acknowledge, also ERR .
026	22	16	<SYN>	V	Synchronous idle (SYNC).
027	23	17	<ETB>	W	End of transmission block.
030	24	18	<CAN>	X	Cancel (CANCL), escape sequence.
031	25	19	<EM>	Y	End of medium.
032	26	1A	<SUB>	Z	Substitute.
033	27	1B	<ESC>	[	Escape.
034	28	1C	<FS>	\	File separator.
035	29	1D	<GS>	]	Group separator.
036	30	1E	<RS>	^	Record separator.
037	31	1F	<US>	_	Unit separator.
040	32	20	<SP>		Space.
041	33	21	<!>		Exclamation point.
042	34	22	<">		Quotation mark
043	35	23	<#>		Number sign.
044	36	24	<$>		Dollar sign.
045	37	25	<%>		Percent sign.
046	38	26	<&>		Ampersand.
047	39	27	<'>		Acute accent or apostrophe.
050	40	28	<(>		Open parenthesis.
051	41	29	<)>		Close parenthesis.
052	42	2A	<*>		Asterisk.
053	43	2B	<+>		Plus sign.

054	44	2C	<,>		Comma.

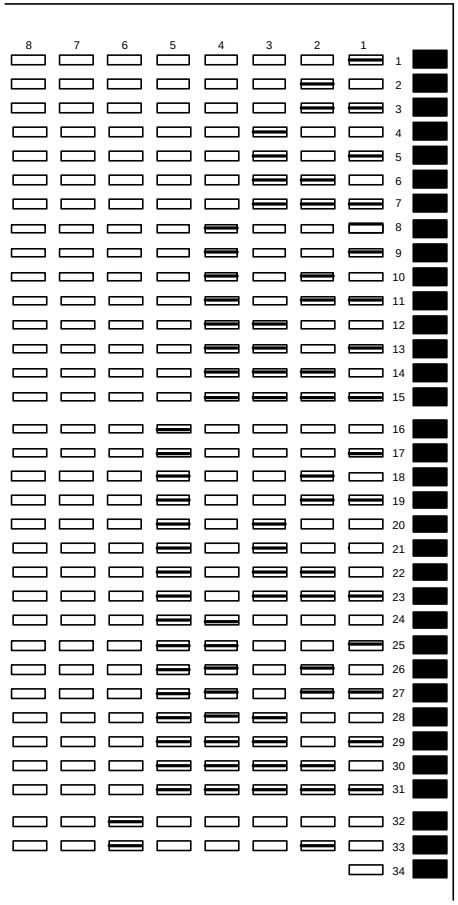
OCTAL	DEC	HEX	CHRS	CTRL KEY	DESCRIPTION
055	45	2D	<->		Hyphen or minus sign.
056	46	2E	<.>		Period.
057	47	2F	</>		Slash.
060	48	30	<0>		Number 0.
061	49	31	<1>		Number 1.
062	50	32	<2>		Number 2.
063	51	33	<3>		Number 3.
064	52	34	<4>		Number 4.
065	53	35	<5>		Number 5.
066	54	36	<6>		Number 6.
067	55	37	<7>		Number 7.
070	56	38	<8>		Number 8.
071	57	39	<9>		Number 9.
072	58	3A	<:>		Colon.
073	59	3B	<;>		Semicolon.
074	60	3C	<<>		Less than.
075	61	3D	<=>		Equal sign.
076	62	3E	<>>		Greater than.
077	63	3F	<?>		Question mark.
100	64	40	<@>		At sign.
101	65	41	<A>		Letter A.
102	66	42	<B>		Letter B.
103	67	43	<C>		Letter C.
104	68	44	<D>		Letter D.
105	69	45	<E>		Letter E.
106	70	46	<F>		Letter F.
107	71	47	<G>		Letter G.
110	72	48	<H>		Letter H.
111	73	49	<I>		Letter I.
112	74	4A	<J>		Letter J.
113	75	4B	<K>		Letter K.
114	76	4C	<L>		Letter L.
115	77	4D	<M>		Letter M.
116	78	4E	<N>		Letter N.
117	79	4F	<O>		Letter O.
120	80	50	<P>		Letter P.
121	81	51	<Q>		Letter Q.
122	82	52	<R>		Letter R.
123	83	53	<S>		Letter S.
124	84	54	<T>		Letter T.
125	85	55	<U>		Letter U.
126	86	56	<V>		Letter V.
127	87	57	<W>		Letter W.
130	88	58	<X>		Letter X.

131	89	59	<Y>		Letter Y.
132	90	5A	<Z>		Letter Z.

OCTAL	DEC	HEX	CHRS	CTRL KEY	DESCRIPTION
133	91	5B	<[>		Open brackets.
134	92	5C	<\>		Reverse slash.
135	93	5D	<]>		Close Brackets.
136	94	5E	<^>		Up arrow / caret.
137	95	5F	<_>		Underscore.
140	96	60	<`>		Grave accent.
141	97	61	<a>		Letter a.
142	98	62	<b>		Letter b.
143	99	63	<c>		Letter c.
144	100	64	<d>		Letter d.
145	101	65	<e>		Letter e.
146	102	66	<f>		Letter f.
147	103	67	<g>		Letter g.
150	104	68	<h>		Letter h.
151	105	69	<i>		Letter i.
152	106	6A	<j>		Letter j.
153	107	6B	<k>		Letter k.
154	108	6C	<l>		Letter l
155	109	6D	<m>		Letter m.
156	110	6E	<n>		Letter n.
157	111	6F	<o>		Letter o.
160	112	70	<p>		Letter p.
161	113	71	<q>		Letter q.
162	114	72	<r>		Letter r.
163	115	73	<s>		Letter s.
164	116	74	<t>		Letter t.
165	117	75	<u>		Letter u.
166	118	76	<v>		Letter v.
167	119	77	<w>		Letter w.
170	120	78	<x>		Letter x.
171	121	79	<y>		Letter y.
172	122	7A	<z>		Letter z.
173	123	7B	<{>		Left brace.
174	124	7C	<¦>		Vertical bar (broken).
175	125	7D	<}>		Right brace.
176	126	7E	<~>		Tilde.
177	127	7F	<DEL>		Delete (reboot)

CHAPTER 9 : Hex code description

Hex	Binary	
01	0000	0001
02	0000	0010
03	0000	0011
04	0000	0100
05	0000	0101
06	0000	0110
07	0000	0111
08	0000	1000
09	0000	1001
0A	0000	1010
0B	0000	1011
0C	0000	1100
0D	0000	1101
0E	0000	1110
0F	0000	1111
10	0001	0000
11	0001	0001
12	0001	0010
13	0001	0011
14	0001	0100
15	0001	0101
16	0001	0110
17	0001	0111
18	0001	1000
19	0001	1001
1A	0001	1010
1B	0001	1011
1C	0001	1100
1D	0001	1101
1E	0001	1110
1F	0001	1111
20	0010	0000
21	0010	0001
…		



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Printed in Switzerland by AXIOME SA