BT6000 PROTOCOL FOR BASKETBALL VERSION 9

For keyboard EPROM version V5.2A020 and above.

1 - WIRING

24s keyboard   Main keyboard   Secondary keyboard
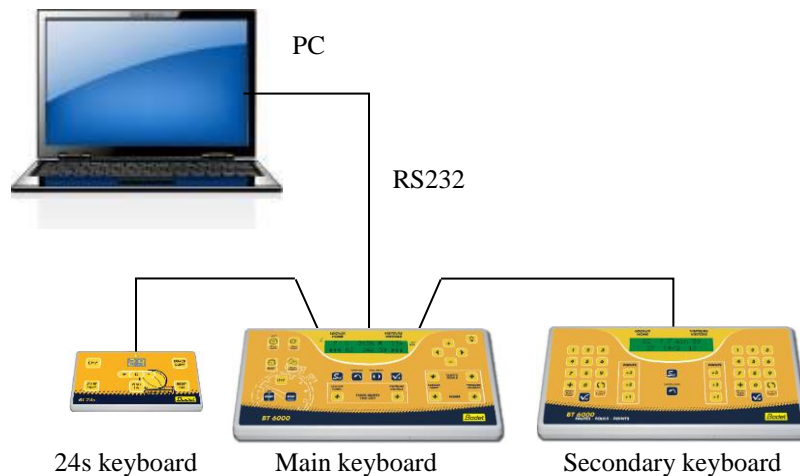
2 - PROTOCOL

This protocol sends only ASCII messages (8 bits).
The format of the message is:

- 8 bits + 1 start bit + 1 stop bit + no parity.

The baudrate is 9600 Baud.

The keyboard sends messages of that type: « SOH Address STX CTRL Message ETX LRC ».
Some of those messages are necessary to extract the data required.

> **SOH** = 01 hexadecimal
> **Address** = 1 byte, to be ignored (*caution* : useful for LRC calculation)
> **STX** = 02 hexadecimal
> **CTRL** = 1 byte, to be ignored (*caution* : useful for LRC calculation)
> **Message** = several bytes (see details)
> **ETX** = 03 hexadecimal
> **LRC** = 1 byte $\Rightarrow$ Exclusive OR of the bytes between SOH (not included) and
> ETX (included).
> LRC is then calculated as follows:
>> LRC = LRC and 0x7f
>> IF (LRC < 32)
>> THEN LRC = LRC + 32   (32 decimal = 0x20)

Useful messages

Message 18 : Main timer, period number and number of time-out.
Message 20 : Local time
Message 36 : Tenth of second (main timer)
    NB : During the last minute of the game period, the message 18 is different and sent every second ; the message 36 is sent every tenth of second.

Message 50 : Shot timer
Message 30 : Scores
Message 31 : Personal and team fouls
Message 19 : Timeouts
Message 32 : Player foul control
Message 33 : Player fouls of every player of the Home team
Message 34 : Player fouls of every player of the Visitor team.
Message 37 : player number for local team
Message 38 : player number for visitor team
Message 56 : Score per player

Message 18 before the last minute
Ex :   Timer   = 16Min. 54Sec.
         Home time-out   = 1.
         Visitor time-out = 3.
         Period number   = 2.

Byte	Content		
1	« 1 » (31H)		
2	« 8 » (38H)		
3	Status *1		See details
4	« 5 » = Basketball		
5	Minutes * 10 « 1 » (31H)	*timer*	
6	Minutes * 1 « 6 » (36H)	**16:54**	
7	Seconds * 10 « 5 » (35H)		
8	Seconds * 1 « 4 » (34H)		
9	Number of Home timeout	« **1** » 31H	
10	Number of Visitor timeout	« **3** » 33H	
11			
12			
13	Period number *2	« **2** » 32H	
14			

Message 18 during the last minute (ex : 56"4)

Ex : Timer   = 56Sec 4.
      Home time-out   = 1.
      Visitor time-out = 3.
      Period number   = 2.

Byte	Content			
1	« 1 » (31H)			
2	« 8 » (38H)			
3	Status*[1]			See details
4	« 5 » = Basketball			To be ignored
5	Seconds * 10 « 5 » (35H)	*timer*		
6	Seconds * 1 « 6 » (36H)	**56.4**		
7	« D » (44H)			
8	Seconds * 0.1 « 4 »(34H)			
9	Number of Home timeout	« **1** » 31H		
10	Number of Visitor timeout.	« **3** » 33H		
11				
12				
13	Period number *[2]	« **2** » 32H		
14				

*[1] : details

bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0

b0   :   To be ignored.
b1   :   Game clock (timer) status (ON / OFF)
  - *= 1 ⇨ Game clock OFF.*
  - *= 0 ⇨ Game clock ON.*
b2   :   Status of the horn (ON / OFF)
  - *= 1 ⇨ Horn ON.*
  - *= 0 ⇨ Horn OFF.*
b3   :   To be ignored
b4   :   timer if is on 1/10 sec display
  - *= 0 ⇨ timer displayed in minutes and seconds*
  - *= 1 ⇨ timer displayed in seconds and 1/10 seconds (last minute of each period)*

b5   :   To be ignored
b6   :   Game status
  - *= 1 ⇨ New game*
  - *= 0 ⇨ Game running*
b7   :   = 1.

[2] : period number
The character sent is « E » for extra time, otherwise period number is sent.

Message 36 during the last minute of timer (ex : 56"4)

Byte	Content		
1	« 3 » (33H)		
2	« 6 » (36H)		
3	Seconds * 10 « 5 » (35H)	*timer*	
4	Seconds * 1 « 6 » (36H)	**56:4**	
5	Seconds * 0,1 « 4 »(34H)		

Message 50 (ex : 24")

Byte B4 at status = 0

Byte	Content		
1	« 5 » (35H)		
2	« 0 » (30H)		
3	Status *1		See details
4	Seconds * 10 « 2 » (32H)		
5	Seconds * 1 « 8 » (34H)	**28 seconds**	

Byte B4 at status = 1

Byte	Content		
1	« 5 » (35H)		
2	« 0 » (30H)		
3	Status *1		See details
4	Seconds * 1 « 4 » (32H)		
5	Seconds * 0.1 « 3 » (34H)	**4 seconds and 0.3 sec**	

*1 : details:

bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0

b0   :   To be ignored.
b1   :   Status of the shot timer (ON / OFF)
- = 1 ⇨ Timer OFF.
- = 0 ⇨ Timer ON.

b2   :   Status of the shot horn (ON / OFF)
- = 1 ⇨ horn ON.
- = 0 ⇨ Horn OFF.

b3   :   Display of shot timer
- = 1 ⇨ Blank display
- = 0 ⇨ display the shot timer.

b4 : shot timer if shot timer is on 1/10 sec display
- = 0 ⇨ *shot timer displayed in seconds*
- = 1 ⇨ *shot timer displayed in 1/10 seconds (last five 5 seconds of shot clock)*

b5 : To be ignored
b6 : To be ignored
b7 : = 1.

Message 30 :

Byte	Content				
1	« 3 » (33H)				
2	« 0 » (30H)				
3	« 5 » = Basketball				
		Score < 10	10 <= Score < 100	Score >= 100	
4	Score Home	« » 20H ▌	« » 20H ▌	« 1 »31H **1**	
5	Score Home	« 5 »35H **5**	« 1 »31H **1**	« 0 »30H **0**	
6	Score Home	« » 20H ▌	« 2 »32H **2**	« 4 »34H **4**	
		Score < 10	10 <= Score < 100	Score >= 100	
7	Score Visitor	« »20H ▌	« 1 »35H **1**	« 1 »31H **1**	
8	Score Visitor	« 7 »37H **7**	« 8 »35H **8**	« 1 »31H **1**	
9	Score Visitor	« »20H ▌	« » 20H ▌	« 8 »38H **8**	

Message 31 (ex : 3rd foul to player 10)

Byte	Content		
1	« 3 » (33H)		
2	« 1 » (31H)		
3	« 5 » = Basketball		
4			To be ignored
5	Home team fouls	« 3 » 33H	
6			To be ignored
7	Visitor team fouls	« 5 » 35H	
8	Player number * 10	« 1 » 31H	*1
9	Player number * 1	« 0 » 30H	
10	Number of fouls of the player	« 3 » 33H	
11	Team of the player = (31H) Home = (32H) Visitor	« 1 » 31H	

NB : the number of team fouls is limited by the value entered in the keyboard.

*1
the player number and the number of fouls is displayed during 10 seconds, = 20H (blank display)

Message 19 (ex : 28")

Byte	Content		
1	« 1 » (31H)		
2	« 9 » (39H)		
3	« 5 » = Basketball		
4	Home timeout indicator *1		
5	Visitor timeout indicator *1		
6	Seconds * 10 « 2 » (32H)		
7	Seconds * 1 « 8 » (38H)	**28 secondes**	

*1 : description of the timeout indicators :

Example with 1 timeout :
- When the timeout is running, the value is alternating between 0x30 and 0x31. (0x2F + number of timeouts and 0x30 + number of timeouts).
- When the timeout is stopped, the value = 0x31 (Ox30 + 1 timeout)

Message 32

| Byte	Content		
1	« 3 » (33H)		
2	« 2 » (32H)		
3	« 5 » = Basketball		

4	Team of the player = (31H) Home
	                  = (32H) Visitor
	                  = (20H) Initialisation of the fouls		

5	Player number * 10	« 1 » 31H	*1
6	Player number * 1	« 0 » 30H	
7	Value of the indicator		*2

When a foul is issued, the message is sent every 500 ms and the value of the byte 7 is alternating.

1 :
If the bytes 4, 5 and 6 are set to 20H then the player fouls are erased.

2

Block of player foul indicators:
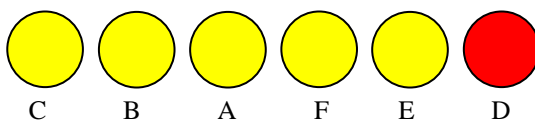
Game with 0 player foul :

Foul s	1	0	F	E	D	C	B	A		Code
0	1	0	0	0	0	0	0	0		0x80

Game with 1 player foul :

Foul s	1	0	F	E	D	C	B	A		Code
0	1	0	0	0	0	0	0	0		0x80
1	1	0	0	0	1	0	0	0		0x88

Game with 2 player fouls :

Foul s	1	0	F	E	D	C	B	A		Code
0	1	0	0	0	0	0	0	0		0x80
1	1	0	0	0	0	1	0	0		0x84
2	1	0	0	0	1	1	0	0		0x8c

Game with 3 player fouls :

Foul s	1	0	F	E	D	C	B	A		Code
0	1	0	0	0	0	0	0	0		0x80
1	1	0	0	0	0	1	0	0		0x84
2	1	0	0	0	0	1	1	0		0x86
3	1	0	0	0	1	1	1	0		0x8e

Game with 4 player fouls :

Fouls	1	0	F	E	D	C	B	A		Code
0	1	0	0	0	0	0	0	0		0x80
1	1	0	0	0	0	1	0	0		0x84
2	1	0	0	0	0	1	1	0		0x86
3	1	0	0	0	0	1	1	1		0x87
4	1	0	0	0	1	1	1	1		0x8f

Game with 5 player fouls :

Fouls	1	0	F	E	D	C	B	A		Code
0	1	0	0	0	0	0	0	0		0x80
1	1	0	0	0	0	1	0	0		0x84
2	1	0	0	0	0	1	1	0		0x86
3	1	0	0	0	0	1	1	1		0x87
4	1	0	1	0	0	1	1	1		0xa7
5	1	0	1	0	1	1	1	1		0xaf

Game with 6 player fouls :

Fouls	1	0	F	E	D	C	B	A		Code
0	1	0	0	0	0	0	0	0		0x80
1	1	0	0	0	0	1	0	0		0x84
2	1	0	0	0	0	1	1	0		0x86
3	1	0	0	0	0	1	1	1		0x87
4	1	0	1	0	0	1	1	1		0xa7
5	1	0	1	1	0	1	1	1		0xb7
6	1	0	1	1	1	1	1	1		0xbf

Nb : Value of the indicator = Code

Message 33 :

Byte	Content	
1	« 3 » (33H)	
2	« 3 » (33H)	
3	« 5 » = Basketball	
4	Value of the foul indicator for the Home player no 4	
5	Value of the foul indicator for the Home player no 5	
6	Value of the foul indicator for the Home player no 6	
7	Value of the foul indicator for the Home player no 7	
8	Value of the foul indicator for the Home player no 8	
9	Value of the foul indicator for the Home player no 9	
10	Value of the foul indicator for the Home player no 10	
11	Value of the foul indicator for the Home player no 11	
12	Value of the foul indicator for the Home player no 12	
13	Value of the foul indicator for the Home player no 13	
14	Value of the foul indicator for the Home player no 14	
15	Value of the foul indicator for the Home player no 15	

NB : to get the values of the foul indicators use the same method than for message 32.

Message 34 :

Byte	Content	
1	« 3 » (33H)	
2	« 4 » (34H)	
3	« 5 » = Basketball	
4	Value of the foul indicator for the Visitor player no 4	
5	Value of the foul indicator for the Visitor player no 5	
6	Value of the foul indicator for the Visitor player no 6	
7	Value of the foul indicator for the Visitor player no 7	
8	Value of the foul indicator for the Visitor player no 8	
9	Value of the foul indicator for the Visitor player no 9	
10	Value of the foul indicator for the Visitor player no 10	
11	Value of the foul indicator for the Visitor player no 11	
12	Value of the foul indicator for the Visitor player no 12	
13	Value of the foul indicator for the Visitor player no 13	
14	Value of the foul indicator for the Visitor player no 14	
15	Value of the foul indicator for the Visitor player no 15	

NB : to get the values of the foul indicators use the same method than for message 32.

Message 56 (ex : Home player no 10 scored 23 points)

Byte	Content		
1	« 5 » (35H)		
2	« 6 » (36H)		
3	« 5 » = Basketball		

4	Team of the player = (31H) Home
	             = (32H) Visitor
	             = (20H) Initialisation
		« 1 » 31H	

5	Player number * 10	« 1 » 31H	
6	Player number * 1	« 0 » 30H	
7	Score * 10	« 2 » 32H	
8	Score * 1	« 3 » 33H	

Message 37 : player number for home team

Byte	Content	
1	« 3 » (33H)	
2	« 7 » (37H)	
3	Player number * 10 for home team n°4	« »
4	Player number * 1 for home team n°4	« 4 »
5	Player number * 10 for home team n°5	« »
6	Player number * 1 for home team n°5	« 5 »
7	Player number * 10 for home team n°6	« »
8	Player number * 1 for home team n°6	« 6 »
9	Player number * 10 for home team n°7	« »
10	Player number * 1 for home team n°7	« 7 »
11	Player number * 10 for home team n°8	« »
12	Player number * 1 for home team n°8	« 8 »
13	Player number * 10 for home team n°9	« »
14	Player number * 1 for home team n°9	« 9 »
15	Player number * 10 for home team n°10	« 1 »
16	Player number * 1 for home team n°10	« 0 »
17	Player number * 10 for home team n°11	« 1 »
18	Player number * 1 for home team n°11	« 1 »
19	Player number * 10 for home team n°12	« 1 »
20	Player number * 1 for home team n°12	« 2 »
21	Player number * 10 for home team n°13	« 1 »
22	Player number * 1 for home team n°13	« 3 »
23	Player number * 10 for home team n°14	« 1 »
24	Player number * 1 for home team n°14	« 4 »
25	Player number * 10 for home team n°15	« 1 »
26	Player number * 1 for home team n°15	« 5 »
27	Player number * 10 for home team n°16	« 1 »

28	Player number * 1 for home team n°16	« 6 »
29	Player number * 10 for home team n°17	« 1 »
30	Player number * 1 for home team n°17	« 7 »
31	Player number * 10 for home team n°18	« 1 »
32	Player number * 1 for home team n°18	« 8 »

Message 38 : player number for visitor team

Byte	Content	
1	« 3 » (33H)	
2	« 8 » (38H)	
3	Player number * 10 for visitor team n°4	
4	Player number * 1 for visitor team n°4	
5	Player number * 10 for visitor team n°5	
6	Player number * 1 for visitor team n°5	
7	Player number * 10 for visitor team n°6	
8	Player number * 1 for visitor team n°6	
9	Player number * 10 for visitor team n°7	
10	Player number * 1 for visitor team n°7	
11	Player number * 10 for visitor team n°8	
12	Player number * 1 for visitor team n°8	
13	Player number * 10 for visitor team n°9	
14	Player number * 1 for visitor team n°9	
15	Player number * 10 for visitor team n°10	
16	Player number * 1 for visitor team n°10	
17	Player number * 10 for visitor team n°11	
18	Player number * 1 for visitor team n°11	
19	Player number * 10 for visitor team n°12	
20	Player number * 1 for visitor team n°12	
21	Player number * 10 for visitor team n°13	
22	Player number * 1 for visitor team n°13	
23	Player number * 10 for visitor team n°14	
24	Player number * 1 for visitor team n°14	
25	Player number * 10 for visitor team n°15	
26	Player number * 1 for visitor team n°15	
27	Player number * 10 for visitor team n°16	
28	Player number * 1 for visitor team n°16	
29	Player number * 10 for visitor team n°17	
30	Player number * 1 for visitor team n°17	
31	Player number * 10 for visitor team n°18	
32	Player number * 1 for visitor team n°18	

Message 20 : time (ex : 14h38)

Byte	Content		
1	« 2 » (32H)		
2	« 0 » (30H)		
3	Hours *10 « 1 » (31H)	*time*	
4	Hours *1 « 4 » (34H)		
5	Minutes * 10 « 3 » (33H)	**14h38**	
6	Minutes * 1 « 8 »(38H)		