

MULTI-PURPOSE HALL SCOREBOARD SYSTEM TECHNICAL SPECIFICATION (WITH EXCLUSION TIME INDICATOR)

1. Scope and Purpose

This specification defines the minimum technical and functional requirements for a professional scoreboard system to be used in indoor sports halls for basketball (including FIBA, 3x3, EuroLeague, NBA modes), volleyball, handball, futsal, water polo, and various hockey branches. The system shall be positioned in accordance with the venue architecture and shall ensure the complete and rules-compliant display of player/team/time information.

2. Standards, Compliance, and Usage References

2.1. FIBA approval: The scoreboard system shall have **FIBA Level 2** approval. The 24/14 second **Shot Clock**, **Backboard Lights**, and audible signal functions shall comply with the relevant FIBA provisions.

2.2. Other rules compliance: The system shall operate in compliance with **IHF** (handball) and **FIVB** (volleyball) rules.

2.3. Basketball modes: The main console shall support **FIBA, EuroLeague, 3x3, and NBA** competition modes.

2.4. International usage requirement: The proposed brand's timing, videoboard, or scoreboard systems shall have been used in **at least five** major international events such as **EuroLeague, EuroCup, AfroBasket, BAL (Basketball Africa League), and the FIBA World Championship**.

2.5. Data and referee systems: The system shall be compatible with the **FIBA Whistle System** and shall provide suitable data output for live broadcasters via the **FIBA Data Protocol**.

3. System Architecture and Communication

3.1. Control console architecture: The control console shall operate on an **embedded architecture without an operating system**; independent of Android / iOS / Windows, etc. This design shall ensure **high responsiveness and low latency**.

3.2. Communication: The system shall operate via **RF 868 MHz** wireless communication and, when required, via **RS485** wired infrastructure (**RS485 Half Duplex**, single line, up to **1 km**).

3.3. Keyboard and keypad: The console shall include a membrane keypad; by connecting an external keyboard, team and player data (number, foul, score) shall be entered directly.

3.4. Language and character support: The interface shall include **Turkish, English, French, Spanish**. In addition to the Latin alphabet, the following special characters shall be fully supported (in menus and team/player names—**no abbreviation**):

Uppercase: Ç, Ğ, İ, Ö, Ş, Ü, À, Á, Â, Ä, Æ, È, É, Ê, Ë, Ì, Í, Î, Ï, Ñ, Ò, Ó, Ô, Õ, Ù, Ú, Ý, Ž, Æ, ß

Lowercase: ç, ğ, ı, ö, ş, ü, à, á, â, ä, æ, è, é, ê, ë, ì, í, î, ï, ñ, ò, ó, ô, ò, ù, ú, û, ý, ž, æ, ß

4. System Content (Components)

- **Team Name, Score, Game Time, and Timeout Panel**
- **Period, Team Foul, and Exclusion Time Panel**
- **Player Foul and Player Score Panels**
- **24–14 Second Shot Clock Devices** (including backboard mounting brackets)
- **Control Units** (main console, **Game Time** console, **Shot Clock** console)
- **Ball Possession Arrow Indicator**
- **Coach Timeout Buttons**
- **Scoreboard Mounting Brackets**

5. Panels and Indicators

5.1. Team Name, Score, Game Clock, and Timeout Panel

- **Team name:** Editable via external keyboard or the membrane keypad on the console; **character height ≥ 16 cm**; supports up to **12 characters**. LED module structure. Special characters shall be supported as in 3.4.
- **Score:** **3 digits per team**, range **0–199**; **digit height ≥ 30 cm**; **the same color** shall be used for both teams.
- **Game time:** **MM:SS (4 digits)**; count up/down; adjustable **00:00–99:59**; **1/10 second** display in the **last 60 s**; tolerance **± 0.1 s / 100 min**; audible signal at expiry. **Digit height ≥ 30 cm**.
- **Timeout indicators:** **3 square dots per team** (side **≥ 5 cm**). Audible signal at the start/end of **Timeout**; during the **Timeout** countdown, the dot indicators shall **flash**.
- **Timeout duration:** **2 digits, 0–99**; **digit height ≥ 20 cm**; countdown; **pre-warning** time adjustable. If desired, **Timeout** duration can be displayed on the **24 s** devices.

5.2. Period, Team Foul, and Exclusion Time Panel

- **Period/Set:** **1 digit, 0–9**; **digit height ≥ 20 cm**; in basketball, overtime is indicated by the letter **“O”**. On increase/decrease, the clock and **Timeout** are automatically adapted.
- **Team Foul:** **1 digit per team, 0–9**; **digit height ≥ 23 cm**; **color: Red (mandatory)**; after the **4th foul**, a **square mark** is shown; when a player foul is entered, the team foul count increases automatically; automatic reset/adjustment at period changes.

- **Shot/Service arrows: 1 arrow indicator per team** (the attacking team in basketball / the serving team in volleyball).
- **Exclusion Time** (handball, hockey types, futsal, water polo): Up to **2 players simultaneously per team; jersey no. (2 digits, 0–99) + Exclusion Time (3 digits, 0:00–9:59); digit height ≥ 16 cm**; operates **synchronized with game time**. In basketball, **last foul** info is flashed for **10 s**.

5.3. Player Foul and Player Score Panels

- **Layout:** Two team panels in an asymmetric arrangement; **12 player rows per team**: from outside to inside **jersey no. (2 digits), player foul (1 digit), player score (2 digits)**.
- **Jersey no.:** **0–99 (including 00); digit height ≥ 12 cm**; if the team roster is smaller, unused rows can be set **blank**.
- **Player foul:** **0–9; digit height ≥ 12 cm; color: Red (mandatory)**; max. 5 in Basketball/EuroLeague, max. 3 in Handball; **at least 3 flashes** on change.
- **Player score:** **0–99; digit height ≥ 12 cm**; entering a player score **automatically increases** the team score; **at least 3 flashes** on change.

5.4. 24–14 Second Shot Clock Devices and Backboard Lights

- **Mounting:** Single-sided device for each backboard; mounted above the backboard according to FIBA standards / from the ceiling to the backboard top when required.
- **Timing relation:** While the **Shot Clock** is stopped, **game time continues**; when game time falls below **24**, the **Shot Clock** either **turns off** or **synchronizes** with the game clock. **0–99 s** display; start from **24 s** and **14 s**; **start/stop/resume** from the same value. Audible signal at expiry.
- **Digit heights:** game time ≥ 13 cm; **Shot Clock ≥ 25 cm**. **Game time color: Yellow, Shot Clock color: Red (mandatory)**.
- **Backboard Lights:** **Red** around the backboard frame and **Yellow** on the upper backboard section; at the relevant time expiries they remain **on for at least 2 s**; **Shot Clock/game-end tones** have different sound signatures; **sound pressure ≥ 120 dBA (1 m)**.
- **Compatibility:** Software and hardware shall comply with **EuroLeague** and **EuroCup** competition rules.

5.5. Control Units

General: Button labels shall comply with international norms; connectors shall be easy to plug/unplug. The main console, **Shot Clock** console, and **Game Time** console shall operate together and in sync.

Main console: Supports at least **13 branches** including basketball, volleyball, handball, futsal, **3x3 basketball**, and hockey types (field, indoor, hockey 5S, ice, underwater, rink, roller inline), and water polo.

— Modes for basketball: **FIBA, EuroLeague, 3x3, NBA**. **≥ 7" color TFT display (≥ 800×480)**. Aluminum front protection; waterproof printed buttons; membrane keypad; name entry via external keyboard. RF connection can be disabled by software. **100-step** brightness control; **switch-off/test** for all indicators; customization of durations and rules; automatic period transitions/adjustments. **Time sync difference < 0.05 s**. Data transmission via **RS485 Half Duplex**. Remote update without opening the enclosure. **IP54**. — **Data/broadcast:** Data output for broadcasters; integration with **FIBA Whistle** and **FIBA Data Protocol**.

Shot Clock console: 24s/14s/Start/Stop; pressing **24s + 14s** simultaneously turns the **Shot Clock** display off; when game time stops, it stops in sync; **< 0.5 kg, ABS, IP54**.

Game Time console: Start/Stop and manual audible signal control; **< 0.5 kg, ABS, IP54**.

5.6. Ball Possession Arrow Indicator

Arrow-shaped right/left display; **FIBA-approved; width and height ≥ 11 cm; 12 V; color: Red (mandatory);** direction selection via a switch; LED on the rear shows the arrow direction.

5.7. Coach Timeout Button

When pressed, **game time stops** and **Timeout** time starts; mounted **≥ 1 m** above the floor; no sharp edges; **connection cable ≥ 5 m**.

6. General Technical Considerations

- **Panel body:** aluminum; **height ≥ 190 cm, width ≥ 330 cm, thickness ≤ 8.5 cm**.
- **Indicators:** SMD LED, **7-segment;** a single LED failure shall **not** extinguish the whole segment; **static driving technology** for camera suitability.
- **Installation:** on a safe base with proper viewing angles; connectors easy to plug/unplug and moisture-resistant; **anti-reflective plexiglass** (reflect/lexan) front protection.
- **Internal wiring:** grouped data cables, orderly and with sockets; driver boards **short-circuit protected**. Power supplies **CE-certified; LED lifetime ≥ 50,000 hours**.
- **Integrated circuits/processors:** **ST, Toshiba, Texas, NXP, Green Micro**.

- **Operating temperature:** –40 °C ... +55 °C.
- **External power and data cables** shall meet manufacturer-approved sizes/standards; wiring diagrams and fuse values shall be manufacturer-approved; data and power cables shall be **protected** and **not visible**.
- A **data output for broadcasters** shall be available on the console.
- For suspension/maintenance safety, the scoreboard shall be **hung from at least one point** with a **hoist/motor of ≥ 500 kg capacity**.
- The manufacturer shall have **ISO 9001**; products shall have **RoHS** and **CE** certificates.
- A **user manual** and **warranty certificate** shall be delivered; **warranty period: 2 years**.

SUMMARY TABLE – System Overview (Highlighted Mandatory Features)

Component / Indicator	Digit/Field Structure	Min. Height	Color (Mandatory)	Other Mandatory Attributes
Team Name	Characters	16 cm	—	Up to 12 characters; LED module; full special-character support
Score	3 digits (0–199)	30 cm	Same color	Same color for both teams
Game Time (MM:SS)	4 digits	30 cm	—	Last 60 s with 1/10; ±0.1 s/100 min; audible signal
Timeout Indicator (dots)	3 per team	5 cm (side)	—	Flash during Timeout ; warning at start/end
Timeout Duration	2 digits (0–99)	20 cm	—	Countdown; adjustable pre-warning
Period/Set	1 digit (0–9/“0”)	20 cm	—	Automatic adaptation on increase/decrease
Team Foul	1 digit (0–9)	23 cm	Red	Square after 4th foul; automatic increment
Shot/Service	Arrow indicator	—	—	Ball Possession Arrow /

Component / Indicator	Digit/Field Structure	Min. Height	Color (Mandatory)	Other Mandatory Attributes
Arrows				service direction
Exclusion Time – Jersey No.	2 digits (0–99)	16 cm	—	Synchronized with game clock
Exclusion Time – Time	3 digits (0:00–9:59)	16 cm	—	Synchronized with game clock
Player Jersey No.	2 digits	12 cm	—	Extra rows can be blanked
Player Foul	1 digit (0–9)	12 cm	Red	≥ 3 flashes on change; BB: max. 5, HB: max. 3
Player Score	2 digits (0–99)	12 cm	—	≥ 3 flashes on change; auto-increases team score
24–14 Device – Game Time	2 digits	13 cm	Yellow	When < 24, synchronized/off
24–14 Device – Shot Clock	2 digits (0–99 s)	25 cm	Red	24/14/Start/Stop; audible at end
Ball Possession Arrow Indicator	Arrow LED	11 cm (W×H)	Red	12 V; FIBA-approved
Backboard Lights	Frame/Upper	—	Red/Yellow	On ≥ 2 s at expiries; sound ≥ 120 dBA