

SCOREBOARD SYSTEM TECHNICAL SPECIFICATION

1. Scope and Purpose

This technical specification covers the supply, installation, and operation of a semi-professional scoreboard system and its associated subcomponents to be used in sports halls for Basketball, Volleyball, Handball, Futsal, various types of Hockey (Field Hockey, Indoor Hockey, Hockey 5S, Ice Hockey, Underwater Hockey, Rink Hockey, Roller Inline Hockey), and Water Polo. The system shall be designed and installed with placement suitable to the hall infrastructure.

2. Compliance, Approval, and Experience Requirements

2.1. FIBA approval: The scoreboard system shall have **FIBA Level 2** approval.

2.2. Rules compliance: The system shall operate in accordance with **IHF** (Handball) and **FIVB** (Volleyball) rules for the relevant disciplines.

2.3. Major event experience: The proposed brand's timing, videoboard, or scoreboard systems shall have been used in at least **5 major events**, including major organizations such as **EuroLeague, EuroCup, AfroBasket, BAL (Basketball Africa League)**, and the **World Championship** (usage experience shall be documented).

3. System Components

- **Main Scoreboard Panel:** Includes Team Name, Score, Game Time, Period/Set, Team Fouls, **Timeout** indicators, and **Timeout** time fields. Player jersey number and player foul indicators are located on the right/left of the panel.
- **24/14 Shot Clock Devices and Backboard Warning Lights:** Display game and Shot Clock times; integrated with **Backboard Lights**.
- **Control Units:** Main controller, Shot Clock controller, and Game Time controller.
- **Mounting Hardware:** Suitable hanging/connection brackets for the scoreboard and 24/14 Shot Clock devices.

4. Main Scoreboard Panel — Mandatory Technical Features

4.1. General layout: The center section displays team names, score, game time, period, team fouls, team **Timeouts**, and **Timeout** time. On the right/left wings, player jersey numbers and player foul indicators are available for up to **12 players per team**. A symmetrical appearance is essential.

4.2. Team name indicators

- **Input:** Enterable via an external keyboard or the membrane keypad on the main controller.

- **Capacity:** Each team name supports **up to 8 characters**; character height ≥ 16 cm.
- **Special-character support** (mandatory for menus and name entry):
 - **Uppercase:** Ç, Ğ, İ, Ö, Ş, Ü, À, Á, Â, Ä, Æ, È, É, Ê, Ë, Ì, Í, Î, Ï, Ñ, Ò, Ó, Ô, Æ, Ú, Û, 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, ù, ú, û, ý, ž, æ
- **Construction:** LED module panels.

4.3. Score indicators

- **3 digits per team, range 0–199.**
- Digit height ≥ 25 cm.
- Unused positions shall remain **dimmed**.

4.4. Game time indicator (scoreboard)

- **MM:SS (4 digits)**; count-up/count-down.
- Period time adjustable within **00:00–99:59**.
- **1/10-second** display during the **last 60 seconds**.
- Tolerance **± 0.1 s per 100 minutes**.
- Audible signal at time expiration.
- Digit height $\geq$ **25 cm**.

4.5. Period/Set indicator

- **Single digit**, range **0-9**, digit height **≥ 20 cm**.
- In basketball, overtime is shown with the letter **“O”**.
- On period/set increment/decrement, the game clock and **Timeout** indicators auto-adjust according to the sport type.

4.6. Team foul indicators

- **1 digit per team**, range **0-9**, digit height ≥ 23 cm.
- In basketball, the status after the **4th team foul** is shown with a square in accordance with **FIBA** rules.
- When a player foul is entered, the team foul count increases **automatically**; it can also be changed manually from the controller.

- Automatic reset/adjustment at period changes.
- **Color: Red (mandatory).**

4.7. Timeout indicators

- **3 square dots per team**, square side ≥ 5 cm.

4.8. Timeout time indicator

- **2 digits**, range **0–99**, digit height ≥ 20 cm.
- Count-down; while the time runs, the **Timeout** dots **flash**.
- Audible warning is provided at the start/end of the **Timeout** and at a configurable early-warning time before the end.
- Display of the **Timeout** time on the **Shot Clock** devices can be programmed from the controller.

4.9. Ball possession / service indicators

- **1 arrow per team** (indicates **Ball Possession Arrow** in basketball, service in volleyball).

4.10. Player jersey number indicators

- **2 digits per player per team**, range **00–99**, digit height ≥ 10 cm.
- If the roster is smaller than the number of panel rows, the relevant rows can be set fully off.
- In Volleyball, these areas may be used as set indicators.

4.11. Player foul indicators

- **1 digit per player**, range **0–9**, digit height ≥ 10 cm.
- For Basketball/EuroLeague, maximum **5**; for Handball, maximum **3** supported display.
- Off at the start of the game; when a foul is committed, only the relevant player's indicator turns on.
- On changes, it **flashes at least 3 times**.
- **Color: Red (mandatory).**

5. 24/14 Shot Clock Devices and Backboard Warning Lights

5.1. Approval and configuration: Devices shall be designed per **FIBA Level 2** standards; mounted above the backboards, and ceiling suspension shall be provided if necessary.

5.2. Time flow: When offense stops, the **game clock** continues; when the game time falls below **24 s**, the Shot Clock indicators either **turn off** or operate synchronized with the game clock. Range **0–99 s**; 24/14 start, stop, and resume-from-hold. Audible warning at Shot Clock expiration.

5.3. Digit sizes and colors: Game-time digit ≥ 13 cm; Shot Clock digit ≥ 25 cm. **Game-time color: Yellow, Shot Clock color: Red (mandatory).**

5.4. Backboard Lights:

- **Red backboard frame lights:** remain on ≥ 2 s at game-time end.
- **Yellow upper backboard lights:** remain on ≥ 2 s at Shot Clock end.
- Audible tones at the end of offense and game shall be **different**.
- **Sound level:** ≥ 120 dBA (1 m).

5.5. Controller interaction: When **24s** and **14s** buttons are pressed simultaneously, the Shot Clock indicator turns **off**. If the game time is below **24/14**, and the relevant keys are used, the Shot Clock digits **turn off automatically**.

5.6. League compliance: Devices shall have the infrastructure to support software/hardware compliant with **EuroLeague** and **EuroCup** competition rules.

6. Control Units

6.1. General architecture and communication

- **Embedded architecture:** The control console shall operate on an embedded architecture **without an operating system**, independent of Android / iOS / Windows. This provides high responsiveness and low latency.
- **Wireless/wired communication:** **RF 868 MHz** wireless and, when required, **RS485** wired infrastructure (Half-Duplex, single line, up to **1 km**). Wireless signals can be disabled via software.
- **Input devices:** The console includes a membrane keypad; team and player data (number, foul, score) can be entered directly by connecting an external keyboard.
- **Language support:** Turkish, English, French, Spanish. (Special-character set support is defined in item **4.2**.)

6.2. Main Controller

- Supports **24/14 Shot Clock** and Game Time controllers.

- Sport selections are easily made from the main controller; supported disciplines: Basketball (FIBA, EuroLeague, 3x3, NBA), Volleyball, Handball, Futsal, Field/Indoor Hockey, Hockey 5S, Ice Hockey, Underwater Hockey, Rink Hockey, Roller Inline Hockey, Water Polo (**at least 13 branches**).
- **Display:** Color TFT, $\geq 7''$, $\geq 800 \times 480$ px.
- **Keypad:** Waterproof printed buttons; aluminum front panel.
- **Brightness:** 100-level adjustment.
- Functions to turn **all indicators off**, and **LED/address test**.
- Game, **Timeout**, halftime, and **24/14 s** durations can be customized according to the rules.
- Early-warning time before the end of a **Timeout** is adjustable.
- Automatic transition at the end of periods; foul and **Timeout** values are automatically adjusted in line with **FIBA**.
- **Timeouts** between periods may be given automatically; initiated with **start** when referees leave the court.
- For team/media **Timeouts**, staging and start-to-run are available.
- Console–scoreboard–24s time difference < 0.05 s.
- Selective reset: only game data / only player data / all data.
- Discipline-based memory (basketball, volleyball, handball, futsal, hockey, water polo).
- Score increment keys: **+1 / +2 / +3 / -**.
- Player management up to **14** players in Basketball, **16** in Handball.
- In Handball, tracking up to **5** simultaneous penalties per team; added penalties for the same player are displayed cumulatively on the same line.
- In Basketball, last foul information (player number + which foul) is shown **flashing for 10 s**.
- Audible warnings and **Backboard Lights** can be controlled **independently**.
- In Volleyball, clock/count-up display; time section can be dimmed if required.
- Single-action data refresh after power outage.

- Scoreboard updates performed by software; the system receives updates **remotely without opening the device**.
- **Data output for broadcasters** is available.
- **IP54** protection class.

6.3. Shot Clock Controller

- Synchronized with the main controller.
- Buttons: **24s, 14s, Start, Stop**; when **24s+14s** are pressed together, the Shot Clock indicator **turns off**.
- When the game clock stops, the Shot Clock stops in sync.
- The Shot Clock cannot be started before the match begins.
- **Weight < 0.5 kg**; ABS material; **IP54**.

6.4. Game Time Controller

- Synchronized with the main controller.
- Manual control of game-time **start/stop** and audible warnings.
- **Weight < 0.5 kg**; ABS material; **IP54**.

7. Installation and General Technical Matters

- **Panel body**: Entirely aluminum.
- **Dimensions**: Height ≥ 150 cm, Width ≥ 220 cm, Thickness ≤ 8.5 cm.
- **Indicators**: SMD LED, 7-segment, static drive (clear for camera recording).
- Single LED failures shall **not** cause the entire segment to go dark.
- **Installation**: Performed with safety, on a solid base, easily visible by referees, players, and spectators.
- **Connectors**: Easy to plug/unplug; moisture-resistant.
- **Front protection**: Anti-glare transparent plexiglass (reflective/lexan type) that prevents light reflection.
- **Internal wiring**: Clean and tidy with grouped data cables; cables shall be uncut, unspliced, and socketed.
- **Driver boards**: Short-circuit protected.

- **Power supplies:** CE-certified.
- **Product conformity:** RoHS and CE.
- **LED lifetime:** $\geq 50,000$ hours.
- **Operating temperature:** $-40\text{ }^{\circ}\text{C} \dots +55\text{ }^{\circ}\text{C}$.
- **Cables:** External power and data cables per manufacturer-approved dimensions and standards; data/power cables shall be installed protected and **not visible**.
- **Installation drawings and fuse ratings:** Manufacturer-approved.
- **Software update:** The controller system shall have hardware capable of receiving **remote updates**.
- **Warranty:** 2 years.
- **Manufacturing quality:** The manufacturer shall have **ISO 9001** Quality Management System certification.

SUMMARY TABLE — System Overview (Highlighted Mandatory Items)

A) Indicators — Size and Mandatory Color Information

Area / Device	Digit / Item	Size (min.)	Color (mandatory if stated)
Team Name	Characters	$\geq 16\text{ cm}$	—
Score	3 digits / team (0–199)	$\geq 25\text{ cm}$	—
Game Time (Scoreboard)	4 digits (MM:SS)	$\geq 25\text{ cm}$	—
Period/Set	1 digit (0–9 / “0”)	$\geq 20\text{ cm}$	—
Team Foul	1 digit / team (0–9)	$\geq 23\text{ cm}$	Red
Timeout Indicator	3 squares / team	$\geq 5\text{ cm}$ (side)	—
Timeout Time	2 digits (0–99)	$\geq 20\text{ cm}$	—
Ball Possession / Service	1 arrow / team	—	—

Area / Device	Digit / Item	Size (min.)	Color (mandatory if stated)
Arrow			
Player Jersey No.	2 digits (00–99)	≥ 10 cm	—
Player Foul	1 digit (0–9)	≥ 10 cm	Red
24/14 Device — Game Time	Digit	≥ 13 cm	Yellow
24/14 Device — Shot Clock (24/14)	Digit	≥ 25 cm	Red
Backboard Lights — Game End	Red frame	—	Red (≥ 2 s)
Backboard Lights — Shot Clock End	Upper yellow light	—	Yellow (≥ 2 s)

B) Mandatory Items

- **FIBA Level 2** approval; compliance with **IHF** and **FIVB** rules.
- Embedded, **OS-less** control architecture (OS-independent) → low latency.
- **RF 868 MHz** wireless + **RS485** wired communication (up to **1 km**).
- Triple synchronization (console–scoreboard–24s) < **0.05 s**.
- Static-drive LED driving (camera-compatible, clear image).
- Independent control of **Backboard Lights** and audible warnings.
- **Remote updates** (without opening the device).
- **100-level** brightness.
- Special-character sets and UI language support for **Turkish, English, French, Spanish**.
- **CE / RoHS** product conformity; CE-certified power supplies.
- Aluminum body, **IP54** protection class (controllers), operating range **–40 °C ... +55 °C**.
- Usage experience in ≥ **5** major organizations, including **EuroLeague, EuroCup, AfroBasket, BAL, World Championship**.