

MULTI-PURPOSE INDOOR SCOREBOARD SYSTEM – TECHNICAL SPECIFICATION

1. Scope and Purpose

This specification defines the minimum technical requirements of a professional scoreboard system and its subcomponents to be used in indoor sports halls for basketball (**FIBA, EuroLeague, NBA, 3x3**), volleyball, handball, water polo, futsal, and various types of hockey (**field hockey, indoor hockey, hockey 5s, ice hockey, underwater hockey, rink hockey, roller inline hockey**).

The system shall include **FIBA Level 2** approved scoreboard and **24–14 second Shot Clock** devices; system-wide operation shall comply with **IHF** and **FIVB** rules.

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

This document has been prepared in professional specification language based on the attached technical content and the additional requirements provided.

2. System Composition

The system shall consist of the following subcomponents arranged in accordance with the hall architecture:

- **Team Name, Score and Game Time Panel**
- **Period, Team Foul and Timeout Panel**
- **Player Name Panels**
- **Player Information Panels**
- **24–14 Second Shot Clock Devices**
- **Control Units** (Main Console, Shot Clock Controller, Game Time Controller)
- **Ball Possession Arrow Indicator**
- **Digital Team Foul Markers**
- **Coach Timeout Buttons**
- **Backboard Light Strips for Basketball**
- **Shot Clock Backboard Mounting Brackets**
- **Scoreboard Mounting Brackets**

3. Team Name, Score and Game Time Panel

Layout: Team names for left/right at the top; team scores underneath; game time centered at the bottom.

3.1 Team Name Indicators

- Entry shall be via external keyboard or the membrane keypad on the main console.
- Each team name shall support **at least 12 characters**; character height ≥ 16 cm.
- Shall be of **LED module** construction.
- In addition to the Latin alphabet, the following special characters shall be fully supported:

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, ə, 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, ə

3.2 Score Indicators

- **3 digits per team; range 0–199.**
- Digit height ≥ 30 cm.
- The score color shall be the same for both teams.
- Unused positions shall remain dim.

3.3 Game Time Indicator

- **4 digits in MM:SS format; range 00:00–99:59.**
- Count up/down; tenths displayed during the **last 60 seconds.**
- Tolerance **±0.1 s per 100 minutes**; audible signal at expiration.
- Digit height **≥ 30 cm.**

4. Period, Team Foul and Timeout Panel

Top section: Left/right team fouls, period in the center, and **Ball Possession Arrow** on both sides of the period.

Bottom section: Left/right timeout entitlement indicators (**3 dots**), and timeout duration in the center.

4.1 Period/Set Indicator

- Single digit; **0–9** range.
- Digit height $\geq$ **20 cm**.
- In basketball, overtime is indicated by the letter **“O”**.

- On period/set increment/decrement, clock and timeout indicators may be automatically adjusted according to the game.

4.2 Team Foul Indicators

- **1 digit per team; 0–9 range; digit height ≥ 23 cm.**
- Color: **Red (mandatory).**
- In basketball, after the **4th foul**, once time is started, a square warning shall appear.
- When a player foul is entered, the team foul count increments automatically; at period changes, automatic reset per **FIBA**.

4.3 Timeout Indicators and Duration

- **Timeout entitlements: 3 squares** per team; square side ≥ 5 cm.
- **Timeout duration: 2 digits**, range **0–99**; digit height ≥ 30 cm.
- During timeout countdown, the dot indicators flash; audible signals at start/end; adjustable warning as the end approaches.
- If desired, timeout duration display can be programmed on the **Shot Clock** devices.

4.4 Attack/Service Indicator

- **1 arrow per team**; shows the team in possession in basketball and the serving team in volleyball. (Ball Possession Arrow)

5. Player Name Panels

- Located to the right and left of the scoreboard; **12 player names** per team.
- Entry via membrane keypad or external keyboard; character height ≥ 12 cm.
- Color: **Yellow (mandatory).**
- Empty rows can be set completely dim.
- Full support for the special character set (see Section 3.1).

6. Player Information Panels

Asymmetric view for both teams; from outside to inside: **jersey number – player foul – player score**.

6.1 Jersey Number

- **2 digits per player**; range **00–99**; digit height ≥ 12 cm.

- In volleyball, this field may be used as a **set indicator**.

6.2 Player Foul

- **1 digit per player**; range **0–9**; digit height ≥ 12 cm.
- Color: **Red (mandatory)**.
- Maximum **5** for Basketball (FIBA/EuroLeague); maximum **3** for Handball.
- Off at match start; flashes **at least 3 times** on change.

6.3 Player Score

- **2 digits per player**; range **0–99**; digit height ≥ 12 cm.
- When a value is entered, the team score **increments automatically**; flashes **at least 3 times** on change.

7. 24–14 Second (Shot Clock) Devices

- **FIBA Level 2** approved; mounted on opposite backboards.
- Shot Clock **0–99 s**; start from **24**, stop, resume from hold.
- When the Shot Clock stops, **game time continues**; when game time falls below **24/14 s**, behavior shall comply with synchronization rules.
- Audible signal: different tones; sound pressure ≥ 120 dBA (**1 m**).
- **Game time digit ≥ 13 cm; Shot Clock digit ≥ 25 cm.**
- Colors: **Game time Yellow; Shot Clock Red.**
- **Backboard Lights:** at game-time expiry **Red (≥ 2 s)**; at Shot Clock expiry **Yellow (≥ 2 s)**.
- Program/hardware structure shall comply with **EuroLeague** and **EuroCup** rules.

8. Control Units

8.1 General

- There shall be a **Main Console**, a **Shot Clock Controller**, and a **Game Time Controller**.
- Buttons shall be labeled with international symbols and wording appropriate to their functions.
- Connectors shall conform to quality standards and be easy to attach/detach.

8.2 Architecture and Communication

- The control console shall operate on an **embedded architecture without an operating system**; independent of Android / iOS / Windows.
- The structure shall provide **high response** and **low latency**.
- **Communication: RF 868 MHz** wireless and, when required, **RS485 Half Duplex** single-line wired (up to **1 km**).
- Wireless signals can be **disabled by software**.

8.3 Main Console (Central Console)

- Supports the Shot Clock and Game Time controllers; settings for different sports can be easily configured.
- **Sport support:** at least **13 disciplines** including basketball, volleyball, handball, futsal, water polo, and various hockey types; in basketball: **FIBA, EuroLeague, 3x3 and NBA** modes.
- **Display:** color TFT, $\geq 7"$, $\geq 800 \times 480$ px.
- **Keypad:** waterproof printed buttons; aluminum front protection; direct data entry via membrane keypad and external keyboard.
- **Language/characters:** **Turkish, English, French, Spanish**; full support of the special character set.
- **Brightness: 100-step** adjustment; functions for **blanking/testing** all indicators.
- **Timings:** game/timeout/interval and **24/14 s** settings customizable per rules; adjustable end-of-timeout warning.
- **Automation:** period transitions and foul/timeout values automatically arranged per **FIBA**; **between-period timeouts** can be given automatically and start with the game start.
- **Synchronization:** difference between console and indicators **< 0.05 s**.
- **Data operations:** reset only game / only player / all information with a single operation; discipline-based separate memory; score control **Score +1/+2/+3/-**.
- **Player counts:** up to **14** players for basketball, **16** for handball for display/control.
- **Handball exclusion tracking:** up to **5 different exclusions per team**; new exclusion adds to the existing time.

- In basketball, the last foul may be shown on the **Exclusion Time Board** as jersey number and foul order with a **10 s flash**.
- **Sound & Lights: Backboard Lights** and audible signals are controlled independently.
- **Volleyball:** clock/count-up display; dimmable if needed.
- After a power cut, data is restored in a **single operation**.
- **Updates:** can be performed remotely via console software **without any physical modification** to the scoreboard and **without opening the device**.
- **Integration:** works with the **FIBA Whistle System**; live broadcast data output via the **FIBA Data Protocol**.
- **Enclosure/IP:** aluminum housing; **IP54** protection.

8.4 Shot Clock Controller

- Operates synchronized with the main console; buttons **24s, 14s, Start, Stop**.
- When **24s + 14s** are pressed together, the indicators turn off.
- If the game clock stops, the Shot Clock stops in sync; cannot be started **before** the contest.
- **Weight < 0.5 kg; ABS material; IP54.**

8.5 Game Time Controller

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

9. Ball Possession Arrow Indicator

- Arrow-shaped; **SMD LED; FIBA approved**.
- Body dimensions: width/height ≥ 11 cm; operating voltage **12 V**.
- Color: **Red**; rear LED/LED group indicating the arrow direction; direction selection by switch.

10. Digital Team Foul Markers

- May operate synchronized with the main console or independently; **FIBA approved**.

- Color: **Red**; digit height ≥ 25 cm; digit width **12.5 cm**.
- **Aluminum** body; no sharp edges.
- Up to the **4th foul**: numeric; **after the 4th foul**, when play restarts, the display turns **fully red**.

11. Coach Timeout Button (Handball, Water Polo)

- When pressed, **game time stops**; **Timeout** countdown starts.
- Mounted ≥ 1 m above floor; connection cable ≥ 5 m; no sharp edges.

12. General Technical Matters

- Panel body **aluminum**; panel dimensions: height ≥ 190 cm, width ≥ 545 cm, thickness ≤ 8.5 cm.
 - Indicators: **SMD LED, 7-segment**; a segment shall **not** go completely dark upon a single LED failure.
 - **Static-drive** LED driving for camera/broadcast clarity; anti-glare **plexiglass** front protection.
 - **Mounting**: in a secure visible area; connectors shall be moisture-resistant and easy to attach/detach.
 - **Internal wiring**: clean/simple with grouped data cables; cables shall **not** be cut/spliced/socketed.
 - Driver boards short-circuit protected; power supplies **CE-certified**.
 - LED lifetime $\geq 50,000$ hours; processors **ST, Toshiba, Texas, NXP, Green Micro**.
 - Operating temperatures **-40...+55 °C**.
 - External power and data cables shall be to approved sizes/standards; wiring diagram/fuse ratings approved.
 - Data and power cables shall be shielded and concealed; mounting from **at least two points** with equipment of ≥ 500 kg capacity.
 - **Data output for broadcasters** on the console.
 - **ISO 9001 Quality System; RoHS and CE** compliance.
 - Delivery of **user manual and warranty certificate**; **minimum 2-year** warranty.
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SUMMARY TABLE – System-Wide (Highlighted Mandatory Elements)

A) Indicators: Mandatory Sizes and Colors

Indicator / Panel	Required Digit/Field Height	Required Color	Quantity / Placement	Note
Team Name	≥ 16 cm (characters)	—	2 sides	—
Score (Team)	≥ 30 cm	— (same for both teams)	3 digits × 2	—
Game Time (Main Panel)	≥ 30 cm	—	4 digits	—
Period / Set	≥ 20 cm	—	1 digit	Overtime shown as “O”
Team Foul	≥ 23 cm	Red	1 digit × 2	—
Timeout Rights (dot-type)	≥ 5 cm (square side)	—	3 dots × 2	—
Timeout Duration	≥ 30 cm	—	2 digits	—
Attack / Service	—	—	1 arrow × 2	Ball Possession Arrow
Player Names	≥ 12 cm (characters)	Yellow	12 rows × 2	—
Player Jersey No	≥ 12 cm	—	2 digits × 24	—
Player Foul	≥ 12 cm	Red	1 digit × 24	—
Player Score	≥ 12 cm	—	2 digits × 24	—
Shot Clock – Game Time	≥ 13 cm	Yellow	2 units	—
Shot Clock – Shot Time	≥ 25 cm	Red	2 units	—
Backboard Lights –	≥ 2 s (display)	Red	2 backboards	Surrounding

Indicator / Panel	Required Digit/Field Height	Required Color	Quantity / Placement	Note
Game Time				light
Backboard Lights – Shot Clock	≥ 2 s (display)	Yellow	2 backboards	Top light
Ball Possession Arrow Indicator	≥ 11×11 cm (body)	Red	1 set	—
Digital Team Foul Markers	Digit ≥ 25 cm (width 12.5 cm)	Red	2 units	—

B) System-Level Mandatory Elements

- **FIBA Level 2** approved scoreboard and **24–14 s Shot Clock** devices; **FIBA-approved** Ball Possession Arrow Indicator and **Digital Team Foul Markers**.
- Operation with the **FIBA Whistle System**; live broadcast data output via the **FIBA Data Protocol**.
- **Embedded architecture without an operating system**; independent of Android/iOS/Windows; **high response** and **low latency**.
- **Communication: RF 868 MHz** wireless + **RS485 Half Duplex** single line (**1 km**).
- **Time synchronization:** console–indicator difference < **0.05 s**; game time tolerance ± **0.1 s / 100 min**.
- **Audible signals:** different tones for Shot Clock and game time; ≥ **120 dBA (1 m)**.
- **Static-drive LED** driving; anti-glare **plexiglass** front protection.
- **IP54** for controllers; **aluminum** body; **LED lifetime** ≥ **50,000 hours**.
- **ISO 9001, RoHS, CE** compliance; ≥ **2 years** warranty.