

PROFESSIONAL SCOREBOARD SYSTEM TECHNICAL SPECIFICATION

1. Scope and Purpose

This technical specification defines the minimum technical and operational requirements of a professional scoreboard system to be used in basketball (FIBA, 3x3, NBA, EuroLeague modes), volleyball, handball, futsal, water polo, and various types of hockey (field hockey, indoor hockey, Hockey 5S, ice hockey, underwater hockey, rink hockey, roller inline hockey, floorball). The system shall be positioned in accordance with the hall's architecture and operate together with all of its components.

2. Standards, Approvals, and International References

- The scoreboard system shall have **FIBA Level 1** approval. Relevant sub-components including the 24/14 second **Shot Clock** devices and indicators of possession shall meet FIBA requirements.
- The system shall comply with **IHF** (handball) and **FIVB** (volleyball) rules.
- The proposed brand's timing, videoboard, or scoreboard systems shall have references for use in at least **five** major international events (e.g., **EuroLeague, EuroCup, AfroBasket, Basketball Africa League (BAL), FIBA Basketball World Cup/World Championship**).

3. System Architecture and Control Console

- The control console shall operate on an embedded architecture that does **not** use a general-purpose operating system; it shall be independent of Android/iOS/Windows. This structure shall provide high response speed and low latency.
- **Communication:** RF 868 MHz wireless and, when required, RS485 wired infrastructure shall be provided. Over the RS485 line, game, player, and team data shall be transmitted up to **1 km**.
- The console shall include a membrane keypad; with an external keyboard, team and player data (jersey number, foul, score) can be entered directly.
- **Language support:** Turkish, English, French, and Spanish. In all menus and name fields, special characters shall be fully supported:
UPPERCASE: Ç, Ğ, İ, Ö, Ş, Ü, À, Á, Â, Ã, Ä, Å, Æ, È, É, Ê, Ë, Ì, Í, Î, Ï, Ñ, Ò, Ó, Ô, Õ, Æ, Ú, Û, Ý, Ž, Æ, ß
lowercase: ç, ğ, ı, ö, ş, ü, à, á, â, ã, ä, å, æ, è, é, ê, ë, ì, í, î, ï, ñ, ò, ó, ô, Õ, ù, ú, û, ý, ž, æ
- Brightness control shall have **100 levels**. There shall be functions to **black out/test** indicators.
- **Power:** At least **7 hours** of operation with Li-Ion battery; full charge within **2 hours** with a **CE-certified** adapter.

- After a power outage, data can be refreshed with a single operation.
- The system shall accept **remote updates** without opening the device.
- There shall be data output compatible with the **FIBA Whistle System** and **FIBA Data Protocol** for live broadcasts.
- **Enclosure:** Aluminum; **IP54** protection.

4. System Components

- **Team Name Panels**
- **Score and Game Time Panel**
- **Period/Set, Team Foul, and Timeout Panel**
- **Player Information Panels**
- **Exclusion Time Panel**
- **Cube 24/14 s Shot Clock Devices** (above backboard)
- **Controller Units** (main controller, Shot Clock controller, game time controller)
- **Ball Possession Arrow Indicator**
- **Digital Team Foul Markers**
- **Time Keeper For Locker Rooms**
- **Coach Timeout Buttons**
- **Backboard Light Strips** and mounting brackets
- **Scoreboard mounting brackets**

5. Team Name Panels

- Two separate panels shall be provided for both teams.
- A team name shall support **up to 12 characters**; character height shall be **no less than 32 cm**.
- Panels shall be **LED module** type and **white** in color.
- Name entry shall be via the console membrane keypad or external keyboard.
- Special character support shall be identical to the scope given in Section 3.

6. Score and Game Time Panel

- **Score: 3 digits per team (0–199), digit height ≥ 40 cm, white.**
- **Game time: MM:SS** (with **1/10 s** display during the last **60 seconds**), adjustable **00:00–99:59**; audible signal at the end. **Digit height ≥ 40 cm, yellow.**

7. Period/Set, Team Foul, and Timeout Indicators

- **Period/Set: 1 digit (0–9), ≥ 30 cm, white.** In basketball, the overtime period shall be indicated by the letter “O”. On period/set changes, the game clock and timeout indicators shall be automatically adjusted according to the sport.
- **Team Foul: 1 digit per team (0–9), ≥ 35 cm, red.** In basketball, after the **4th team foul**, when the clock is started, a **square** shall be displayed. When a player foul is entered, the team foul shall increase automatically; it shall be automatically adjusted on period changes.
- **Timeout Rights: 3 square dots per team (edge ≥ 5 cm), yellow.**
- **Timeout Duration: 2 digits (0–99), ≥ 30 cm, yellow;** countdown; audible warning at start/end and a pre-end early warning. If desired, the timeout duration can be displayed on the **Shot Clock** devices.
- **Attack/Service Arrows: 1 arrow per team, red.** (Functions as **Ball Possession Arrow** in basketball and service indicator in volleyball.)

8. Player Information Panels

- **16 player rows** per team; in order: player names, jersey number (**2 digits, 0–99**), player foul (**1 digit, 0–9**), player score (**2 digits, 0–99**).
- **Player names:** character height ≥ 16 cm, **yellow**; if the roster has fewer rows than the panel, the extra rows can be dimmed.
- **Jersey number:** character height ≥ 15 cm, **yellow**; can be used as a set indicator in volleyball.
- **Player foul: ≥ 15 cm, red;** maximum **5** in basketball, **3** in handball; on change, flashes at least **3 times**.
- **Player score: ≥ 15 cm, white;** flashes at least **3 times** on change; in basketball and handball, indicators are dim at match start and only the relevant player becomes visible when a score is entered.

9. Exclusion Time Panel (Handball, Hockey, Futsal, Water Polo)

- **Up to 3 players simultaneously per team: jersey number 2 digits (0–99) + Exclusion Time 3 digits (0:00–9:59).**
- Exclusion Time shall run **synchronized** with the game clock.

- **Digit height ≥ 20 cm.** Jersey number **yellow**, Exclusion Time **red**.
- In basketball, the jersey number of the player who committed the foul and the ordinal number of the foul shall be displayed **flashing for 10 seconds**.

10. Cube 24/14 Second Shot Clock Devices (Above Backboard)

- **FIBA Level 1** approved; either **2×2 faces** per single backboard or a single **1×4-face** unit; mounted above the backboard (if mounting on the backboard is not possible, suspended from the ceiling aligned above the backboard).
- Shot Clock **0–99 s**; **24 s / 14 s** start, stop, and resume functions; audible signal at the end.
- When **game time drops below 24 seconds**, the Shot Clock indicator shall operate in synchronized or hidden mode.
- **Digit heights:** game time ≥ 13 cm; Shot Clock ≥ 25 cm; **game time yellow, Shot Clock red**.
- When **24s** and **14s** buttons are pressed simultaneously, the Shot Clock indicator shall turn **off**.
- The Shot Clock cannot be started **before the game begins**.
- Programmatic and hardware structure compliant with **EuroLeague** and **EuroCup** competition rules.

11. Controller Units

a) Main Controller

- Shall support the Shot Clock controller and the game time controller.
- Settings for different sports shall be performed easily; at least **13 sports** shall be supported (**basketball, volleyball, handball, futsal, 3x3 basketball, field hockey, indoor hockey, Hockey 5S, ice hockey, underwater hockey, rink hockey, roller inline hockey, floorball, water polo**, etc.).
- Shall include **FIBA, EuroLeague, 3x3, and NBA** modes for basketball.
- Color **TFT display $\geq 7"$, $\geq 800 \times 480$ px**.
- Team/player names can be entered **without a computer** via membrane keypad and external keyboard.
- Special character support (Section 3) shall be usable in menus and name fields.

- Brightness control (**100 levels**), indicator blackout/test, adjustable game/timeout/interval and **24/14 s** durations; at period changes, foul and timeout values shall be automatically regulated; option to automatically start timeouts between periods; adjustable pre-end timeout warning.
- Compatibility with the **FIBA Whistle System** and **FIBA Data Protocol**; remote update support.
- **Enclosure:** Aluminum; **IP54**.

b) Shot Clock Controller

- Shall operate synchronized with the main controller.
- Buttons: **24s, 14s, Start, Stop**.
- When **24s** and **14s** are pressed simultaneously, the Shot Clock indicator shall turn **off**.
- When the **game clock stops**, the Shot Clock shall stop in sync.
- The Shot Clock cannot be started **before the game begins**.
- **Weight ≤ 0.5 kg; ABS material; IP54**.

c) Game Time Controller

- Shall operate synchronized with the main controller.
- Provides start/stop control of the **game time** and manual control of audible warning signals.
- **Weight ≤ 0.5 kg; ABS material; IP54**.

12. Ball Possession Arrow Indicator

- Arrow-shaped indicator; SMD LED; **red**; width and height **at least 11 cm; 12 V** operation.
- Direction selection by a switch on top; on the rear, an LED/LED group indicating the arrow direction.
- **FIBA-approved** structure.

13. Digital Team Foul Markers (Basketball)

- To be placed to the right and left of the scorer's table; can operate synchronized with the main controller or independently.

- **Color:** red; **digit height ≥ 25 cm; width 12.5 cm;** aluminum housing; no sharp edges.
- After the **4th team foul**, when the game time is started, the screen shall show **red**.

14. Time Keeper For Locker Rooms

- Shall be synchronized with the console's game time.
- **MM:SS** (with **1/10 s** display during the last **60 s**); **digit height ≥ 13 cm**.

15. Coach Timeout Buttons (Handball, Water Polo)

- When pressed, the game clock stops and the **Timeout** countdown starts.
- Mounting height **at least 1 m**; no sharp edges; connection cable **at least 5 m**.

16. General Technical Matters

- The panel body shall be **aluminum**.
- Indicators shall be **SMD LED-based**; in single/multiple LED failures, the whole segment shall **not** go dark.
- All numeric indicators shall use **static drive** technology for clear camera capture.
- Installation shall be on a solid surface ensuring easy visibility by spectators/referees/players.
- Front protection shall be **anti-glare plexi** that prevents reflections.
- Internal wiring shall be orderly with grouped data cables; there shall be **no** cut/spliced/unsocketed cables; driver boards shall be **short-circuit protected**.
- Power supplies shall be **CE-certified**; LED lifetime at least **50,000 hours**; processors shall be from **ST, Toshiba, Texas, NXP, or Green Micro**.
- Operating temperature **-40 °C ... $+55$ °C**.
- External power and data cables, and installation diagrams/fuse ratings shall be **manufacturer-approved**; data and power cables shall be installed in protective conduits along hidden routes.
- There shall be data output on the console for **broadcast organizations**.
- Hanging safety shall be ensured from **at least two points** using systems with adequate load capacity.
- The manufacturer shall have an **ISO 9001** quality management system.

- The product shall have **RoHS** and **CE** certificates.
- The **user manual** and **warranty certificate** shall be delivered; the system shall have a **2-year warranty**.

17. Summary Table — Dimensions, Colors, and Mandatory Technical Attributes

Component	Digit/Text	Height/Size	Color	Mandatory Technical Attributes
Team Name Panel	Text (≤ 12 characters)	≥ 32 cm	White	LED module; special character support
Score (per team)	3 digits (0–199)	≥ 40 cm	White	—
Game Time	MM:SS (+1/10 s)	≥ 40 cm	Yellow	00:00–99:59; audible signal at end
Period/Set	1 digit (0–9)	≥ 30 cm	White	Overtime shown by ‘O’ in basketball
Team Foul	1 digit (0–9)	≥ 35 cm	Red	Square indicator after 4th foul
Timeout Rights	3 squares / team	Edge ≥ 5 cm	Yellow	Flash during timeout
Timeout Duration	2 digits (0–99)	≥ 30 cm	Yellow	Start/end audible; pre-warning; displayable on Shot Clock
Attack/Service Arrows	Arrow indicator	—	Red	1 per team
Player Names	Text (≤ 16 characters)	≥ 16 cm	Yellow	—
Player Jersey No	2 digits (0–99)	≥ 15 cm	Yellow	Set indicator in volleyball
Player Foul	1 digit (0–9)	≥ 15 cm	Red	BB max 5; HB max 3; ≥ 3 flashes
Player Score	2 digits (0–99)	≥ 15 cm	White	≥ 3 flashes on change
Exclusion Time	No (2d) + Time (3d)	≥ 20 cm	Yellow/Red	Synchronized with game; 10 s flash in BB
24/14 Shot Clock	0–99 s	≥ 25 cm (shot); ≥ 13 cm (game)	Red / Yellow	24/14/Start/Stop; sync; dual-button blanking
Possession Indicator	Arrow	$\geq 11 \times 11$ cm	Red	12 V; switchable direction; FIBA compliant
Digital Team Foul Markers	1 digit	≥ 25 cm (height); 12.5 cm (width)	Red	FIBA compliant; no sharp edges
Time Keeper For Locker Rooms	MM:SS (+1/10 s)	≥ 13 cm	—	Synchronized with console

Component	Digit/Text	Height/Size	Color	Mandatory Technical Attributes
Control Console	—	—	—	TR/EN/FR/ES; special characters; RF 868 + RS485 (1 km); 100-level brightness; battery ≥ 7 h; IP54; remote update; FIBA Whistle & Data