

MULTI-PURPOSE HALL SCOREBOARD SYSTEM – TECHNICAL SPECIFICATION

1. Scope

This specification covers the procurement, installation, operation, and maintenance requirements of a multi-purpose scoreboard system and associated equipment to be used in indoor sports halls. The system will be used in the following branches: Basketball (including FIBA, NBA, EuroLeague, and 3x3 modes), Volleyball, Handball, Futsal, Water Polo, Field Hockey, Indoor Hockey, Hockey 5S, Ice Hockey, Underwater Hockey, Rink Hockey, Roller Inline Hockey (a total of at least 13 branches).

2. Standards and Compliance

- Compliance with a **FIBA Level 2-approved 24/14 Shot Clock** system for basketball and full conformity with FIBA rules.
- Compliance with **IHF** (Handball) and **FIVB** (Volleyball) rules for the relevant branches.
- Basketball modes: **FIBA, NBA, EuroLeague, and 3x3**.
- **League/Organization Compliance Requirement:** The proposed brand's timing, videoboard, or scoreboard systems must have been used in **at least five** major events as listed below and must be documented: **EuroLeague, EuroCup, AfroBasket, Basketball Africa League (BAL), World Championship**.

3. System Components

- **Score/Period/Game Time/Team Fouls/Timeout Duration/Exclusion and Player Foul Panel**
- **24–14 Second (Shot Clock) Devices** (mounted to backboards)
- **Control Units:** Main Console, **Shot Clock** Console, Game Time Console
- **Backboard mounting brackets** for the 24–14 devices
- **Main scoreboard panel mounting brackets**

4. Control Console Architecture and Communication

- **Embedded architecture and OS independence:** The console shall operate on an embedded architecture that does not require any desktop/portable operating system; this design provides high responsiveness and low latency.
- **Wireless and wired communication:** RF **868 MHz** wireless communication and, when required, **RS485** wired infrastructure support. Via **RS485 Half-Duplex** single line, game/player/team information shall be transmitted at least **1 km**.

- **Input devices:** The console shall include a membrane keypad; an external keyboard can be connected to enter team and player data (number, foul, score) directly.
- **Language and special character support:** The interface and data entry will support **Turkish, English, French, Spanish**; in addition to the Latin alphabet, the following special characters shall be fully usable in menus and name entry (full list):

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, Ʒ, Ɓ

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

5. Scoreboard Display Panel

The panel consists of three main sections: the center section (team names, scores, game time, period, attack/service indicators, team fouls, Timeout rights and Timeout duration, information on penalized players) and player information (jersey number and player foul count) on the right/left edges. Player rows support up to **16** players; the right and left panels are arranged symmetrically.

5.1 Score Indicators

- **3 digits per team, range 0–199.**
- **Digit height ≥ 25 cm.**
- **Color: White.**

5.2 Game Time (Main Panel)

- Format **MM:SS**, total **4 digits**; supports count up/down.
- Adjustable range **00:00–99:59**.
- **1/10 s** display during the **last 60 s**.
- Maximum tolerance **± 0.1 s per 100 min**; audible signal at expiry.
- **Digit height ≥ 25 cm**.
- **Color: Yellow**.

5.3 Period/Set

- **1 digit**, range **0-9**; in basketball, overtime is shown with the letter **“O”**.
- **Digit height ≥ 20 cm.**
- **Color: White.**
- On value changes, the clock/Timeout indicators are auto-adjusted according to the sport type.

5.4 Team Fouls

- **1 digit per team**, range **0–9**; **digit height ≥ 23 cm**.
- **Color: Red**.
- In basketball, per FIBA rules, after the **4th foul** a **square** symbol is displayed on the indicator.
- Team fouls increase automatically when a player foul is entered; at period changes values are automatically reset/adjusted according to the rules.

5.5 Timeout Rights and Timeout Duration

- **Three square dots per team** (side ≥ 5 cm); **color Yellow**.
- **Timeout duration: 2 digits, 0–99; ≥ 20 cm; color Yellow**.
- During the Timeout countdown, the dot indicators flash; audible warning at the start/end of the Timeout (a pre-end warning time can be set).

5.6 Attack/Service Indicator

- **1 arrow per team; color Red**.
(*This indicator corresponds to the **Ball Possession Arrow** / **Ball Possession Arrow Indicator** depending on the mounting.*)

5.7 Player Jersey Numbers

- **2 digits per player, 00–99; ≥ 10 cm; color Yellow**.
- If the squad has fewer players than rows, unused rows remain off.
- In volleyball, this field may also be used as a set indicator.

5.8 Player Fouls

- **1 digit per player, 0–9; ≥ 10 cm; color Red**.
- Maximum **5** in Basketball/EuroLeague, **3** in Handball.
- At changes, at least **3** flashes; initially off at match start, becomes active when a foul is given.
- In basketball, the **last foul** is shown on the **Exclusion Time Indicator** for **10 s** with jersey number and which foul it is.

5.9 Exclusion Time (Handball, Hockey, Futsal, Water Polo)

- Display up to **2 players simultaneously per team: 2 digits jersey number (0–99) + 3 digits Exclusion Time (0:00–9:59)**.
- **≥ 16 cm**; jersey number **Yellow**, Exclusion Time **Red**.
- Operates **synchronized with game time**.

6. 24–14 Second (Shot Clock) Devices

- Mounted to the **backboards**, single-faced per side (opposing each other).
- **Shot Clock** range **0–99 s**; start from **24**, pause, and resume from the last value.
- Audible signal at Shot Clock expiry; when **game time falls below 24 s**, the Shot Clock indicators either synchronize with game time or remain off.
- **Game time** digit height **≥ 13 cm (Yellow)**, **Shot Clock** digit height **≥ 25 cm (Red)**.
- **Backboard Lights (red)** compliant with FIBA for **game time** expiry (on for **≥ 2 s**), **Backboard Lights (yellow)** for **Shot Clock** expiry (on for **≥ 2 s**).
- Shot Clock and game-end audible signals are of **different tone**; intensity **≥ 120 dBA (1 m)**.
- When **24s** and **14s** buttons are pressed simultaneously, the Shot Clock display remains **blank**.
- Hardware/software structure in accordance with **EuroLeague/EuroCup** competition rules.

7. Control Units

7.1 Main Console

- Supports the **Shot Clock** and **Game Time** consoles; branch settings are easily made from the main console.
- At least **7" TFT** color display (**≥ 800×480**).
- Waterproof printed keypad adhered to aluminum front protection; long-life buttons.
- Data entry without a PC via **external keyboard + membrane keypad**.
- Wireless (RF) connection; can be disabled by software.
- Languages: **Turkish, English, French, Spanish** (full special character set support).
- **100-step brightness** control on the scoreboard.
- Functions to **switch off all indicators** and **LED/address test**.

- **Game/Timeout/halftime/24-14** durations can be customized in accordance with the rules.
- Timeout pre-end warning time is adjustable.
- Automatic rule-based settings for **period transitions**; between-period Timeouts are queued and started in line with the start logic.
- Time deviation between the main console and the scoreboard/24 devices **< 0.05 s**.
- Single-action reset of **game info / player info / all info**.
- In basketball, audible signals and **Backboard Lights** can be controlled **independently**.
- In volleyball, **clock / count-up** can be shown on the main screen; the time area can be turned off if required.
- After power failure, all data on the console can be refreshed in a **single action**.
- Software updates can be performed **remotely without opening** the device.
- Housing material **aluminum**; protection class **IP54**.

7.2 Shot Clock Console

- Operates **in sync** with the main console; **24s, 14s, Start, Stop** buttons.
- **24s + 14s** simultaneously → Shot Clock display **turns off**.
- When **game time** stops, the Shot Clock stops **in sync**; it **cannot be started before** the match.
- **≤ 0.5 kg**, hand-held use; **ABS** housing; **IP54**.

7.3 Game Time Console

- Operates **in sync** with the main console; **Start/Stop** and **manual control of audible signals**.
- **≤ 0.5 kg**; **ABS** housing; **IP54**.

8. Technical and Mechanical Requirements

- Scoreboard panel body entirely **aluminum**.
- Dimensions: **Height ≥ 215 cm, Width ≥ 220 cm, Thickness ≤ 8.5 cm**.
- Display technology: **SMD LED, 7-segment; static drive** (clarity in camera recordings).

- In a segment LED failure, the **entire segment must not** turn off (resistance to partial failures).
- Installation shall prioritize visibility for spectators/referees/players and safety; data/power cables shall be **protected** and **not exposed**.
- Front protection: **anti-glare plexiglass** (reflect/lexan type).
- Internal wiring: **grouped data cables**, tidy and clean; cables shall **not** be cut/spliced/unsocketed.
- Driver boards **short-circuit protected**.
- **CE-certified** power supplies; **LED life $\geq 50,000$ hours**.
- Operational temperature **$-40\text{ }^{\circ}\text{C}$... $+55\text{ }^{\circ}\text{C}$** .
- External power/data cables and installation diagram/fuse values shall be **manufacturer-approved**.

9. Software/Operation Features

- **Branch-based memories** (basketball, volleyball, handball, futsal, hockey, water polo, etc.).
- Ability from the main console to **display Timeout duration on the 24s devices**.
- **Remote test** and **addressing** functions for indicators.

10. Documentation and Warranty

- Products shall have **RoHS** and **CE** certificates.
- **User manual** and **warranty certificate** shall be delivered.
- The system shall have a **minimum 2-year warranty**.

SUMMARY TABLE – System Overview

Component / Area	Digit Structure & Range	Digit Height	Color	Mandatory Feature
Team Score (per team)	3 digits, 0–199	≥ 25 cm	White	Main panel
Game Time (main panel)	MM:SS, 00:00–99:59; last 60 s	≥ 25 cm	Yellow	Audible signal; ± 0.1 s/100 min

Component / Area	Digit Structure & Range	Digit Height	Color	Mandatory Feature
	with 1/10 s			
Period/Set	1 digit, 0–9; overtime “0”	≥ 20 cm	White	Automatic sport-type adjustment
Team Fouls (per team)	1 digit, 0–9	≥ 23 cm	Red	Square indicator after 4th foul
Timeout Rights (per team)	3 square dots	Side ≥ 5 cm	Yellow	Flash during Timeout countdown
Timeout Duration	2 digits, 0–99	≥ 20 cm	Yellow	Audible at start/end
Attack/Service Arrows	1 arrow (per team)	—	Red	Direction indication (Ball Possession Arrow)
Player Jersey No (per player)	2 digits, 00–99	≥ 10 cm	Yellow	16 player rows
Player Foul (per player)	1 digit, 0–9	≥ 10 cm	Red	≥ 3 flashes on change
Exclusion Time (per team)	2-digit jersey no + 3-digit time (0:00–9:59)	≥ 16 cm	Yellow / Red	Synchronized with game time (Exclusion Time Indicator)
24/14 – Game Time (over backboard)	MM:SS	≥ 13 cm	Yellow	Over backboard
24/14 – Shot Clock	0–99 s	≥ 25 cm	Red	24/14/Stop/Start control
Backboard Lights	—	—	Red (game) / Yellow (Shot Clock)	≥ 2 s on at each expiry
Wireless/Wired	RF 868 MHz / RS485 Half-Duplex	—	—	Data transmission up to 1 km
Time Sync	Difference < 0.05	—	—	Main console–scoreboard–

Component / Area	Digit Structure & Range	Digit Height	Color	Mandatory Feature
	s			24s
Brightness	100 steps	—	—	Set from main console
Console Architecture	Embedded, OS-independent	—	—	Low latency / high response
Input	Membrane keypad + external keyboard	—	—	Direct name/number/foul entry
Endurance	IP54 (consoles), aluminum body	—	—	–40 °C ... +55 °C
Signals	≥ 120 dBA (1 m), different tones	—	—	Separate tones for game/Shot Clock
Approval/Compliance	FIBA Level 2, IHF, FIVB	—	—	EuroLeague/EuroCup rule compliance
Reference Use	≥ 5 major events	—	—	EuroLeague, EuroCup, AfroBasket, BAL, World Championship