

Semi-Professional Scoreboard System – Technical Specification

(With Penalty/Exclusion Indicators, Suitable for Multi-Purpose Indoor Arenas)

1. Scope and Purpose

This specification defines the supply, installation, and operational requirements of a semi-professional scoreboard system (with penalty indicators) to be used in multi-purpose indoor sports halls. The system shall be usable for Basketball (FIBA, 3x3, NBA, EuroLeague modes), Volleyball, Handball, Futsal, Water Polo, and the various types of Hockey (field/indoor “salon”/hockey 5s/ice/underwater/rink/roller inline). The system shall offer placement and mounting suitable for the venue’s architecture.

2. Compliance and Approvals

- Shall have **FIBA Level 2** approval.
- Shall comply with **IHF** (Handball) and **FIVB** (Volleyball) rules.
- **24–14** second devices (Shot Clock) and backboard warning lights shall be designed and operated in full compliance with FIBA conditions.
- **Usage reference (mandatory):** The proposed brand’s timing, videoboard, or scoreboard systems shall have been used in at least **five** major events such as **EuroLeague, EuroCup, AfroBasket, BAL (Basketball Africa League)**, and the **FIBA Basketball World Championship**.

3. System Components

1. Main Display Panel

Includes Team Name, Score, Game Time (MM:SS), Period/Set, Team Foul, **Timeout**, Ball Possession/Service Arrows, **Exclusion Time** (depending on discipline) and Player Information Panels (jersey no. & player foul).

2. 24–14 Shot Clock Devices

Single-sided devices for each basket; shall display the game time and Shot Clock time by countdown. Per discipline rules, the surrounding red **Backboard Lights** (frame) and upper yellow **Backboard Lights** shall operate accordingly.

3. Control Units

Main Controller (multi-sport support), Shot Clock Controller, and Game Time Controller shall operate together in sync.

4. Backboard Warning Light System

Shall remain on for at least **2 seconds** at the end of the game time and Shot Clock time in compliance with FIBA conditions.

5. Mounting Hardware

Suitable carrying/mounting hardware is included for the scoreboard and the 24–14 Shot Clock devices.

4. Main Display Panel – Functional Requirements

4.1 Team Name Indicators

- **Input methods:** Directly via the membrane keypad on the Main Controller, or using a connected external keyboard — without requiring a computer.
- **Character height:** ≥ 16 cm.
- **Module type:** LED module.
- **Color:** Yellow (preferred).
- **Special-character support:** In addition to the Latin alphabet, the characters below shall be fully and correctly writable:
 - **Uppercase:** Ç, Ć, Ĭ, Ö, Š, Ü, À, Á, Â, Ä, Æ, È, É, Ê, Ë, Ì, Í, Î, Ï, Ñ, Ò, Ó, Ô, Õ, Æ, Ú, Û, Ý, Ž, Æ, ß
 - **Lowercase:** ç, ċ, ĭ, ö, š, ü, à, á, â, ä, æ, è, é, ê, ë, ì, í, î, ï, ñ, ò, ó, ô, õ, ù, ú, û, ý, ž, æ

4.2 Score Indicators

- **3 digits per team** (0–199).
- **Digit color:** The same within each team; **white** (preferred).
- **Digit height:** ≥ 25 cm.
- Unused positions shall remain **dimmed**.

4.3 Game Time (MM:SS)

- **4 digits (MM:SS);** count-up/count-down.
- **Last 60 seconds: 1/10-second** display.
- **Accuracy:** Max. tolerance ± 0.1 s per 100 minutes.
- **Audible signal:** Provided at time expiry.
- **Color:** Yellow (preferred).
- **Digit height:** ≥ 25 cm.

4.4 Period/Set Indicator

- **1 digit**, 0–9; ≥ 20 cm.
- **Color:** White (preferred).
- In basketball, overtime shall be shown by the letter “**O**”.
- On period/set increment/decrement, the game clock and **Timeout** values shall be automatically adjusted according to the discipline.

4.5 Team Foul Indicators

- **1 digit per team**, 0–9; ≥ 23 cm; **Red**.
- In basketball, a **square** indicator is used after the **4th** team foul.
- Automatic increment with player-foul entries; manual change also possible from the Main Controller.
- Automatic reset/adjustment at period changes per discipline.

4.6 Timeout Indicators

- **3 squares per team**; square side ≥ 5 cm; **Yellow** (preferred).

4.7 Ball Possession / Service Indicator

- **1 arrow per team**; **Red** (preferred).
- Indicates the **Ball Possession Arrow** team in Basketball and the serving team in Volleyball.

4.8 Player Jersey No. Indicators

- **Two digits for 12 players per team**; 00–99; ≥ 10 cm; **Yellow** (preferred).
- If the roster has fewer than 12 lines, the extra lines can be set fully off.
- In Volleyball, these digits may be used as set indicators.

4.9 Player Foul Indicators

- **1 digit per player**; 0–9; ≥ 10 cm; **Red**.
- Max. **5** fouls shown in Basketball/EuroLeague, max. **3** in Handball.
- At the start of the game, player foul indicators are off; when a foul occurs, the relevant player is shown, others remain off.
- On changes, flash at least **3** times.

4.10 Exclusion Time Indicators (Discipline-Dependent)

- For Handball, Hockey types, Futsal, and Water Polo: **2 digits jersey no. + 3 digits Exclusion Time**, displayed for **1 player per team**.
- **Exclusion Time** runs **synchronized** with the game clock; range **0:00–9:59**.
- **Digit height:** ≥ 16 cm.
- **Colors:** Jersey number **Yellow**, time **Red**.
- In Basketball, the last committed foul may be flashed for **10 s** with the player number and which foul it is.

5. 24–14 Shot Clock Devices

- **FIBA Level 2** approved; mounted on opposite backboards.
- When the game clock drops below **24**, the Shot Clock may be hidden or synchronized with the game clock.
- Shot Clock range **0–99 s**; **24s start**, **14s reset**, stop/start functions.
- Audible signal is given at Shot Clock expiry and shall be a **different tone** from the game-end signal.
- **Sound level:** ≥ 120 dBA (1 m).
- **Digit heights:** Game clock ≥ 13 cm, Shot Clock ≥ 25 cm.
- **Colors:** Game clock same as the main scoreboard game clock (**Yellow**); Shot Clock **Red**.
- **Backboard Lights:** Red (game time end) and Yellow (Shot Clock end) — each stays on ≥ 2 s.
- **Compliance:** Programmable/applicable software/hardware conditions to meet **EuroLeague** and **EuroCup** competition rules.

6. Control Units

6.1 Main Controller

- **Multi-discipline support:** Basketball, Volleyball, Handball, Futsal, 3x3 Basketball, Field Hockey, Indoor Hockey, Hockey 5s, Ice Hockey, Underwater Hockey, Rink Hockey, Roller Inline Hockey, Water Polo (**at least 13 disciplines**).
- **Basketball modes:** FIBA, EuroLeague, 3x3, NBA.
- **Display:** Color TFT, $\geq 7"$, $\geq 800 \times 480$.
- **Keypad:** Printed, waterproof, long-life membrane; aluminum front protection.

- **Input:** Team/player names can be entered via membrane or external keyboard without a computer.
- **Languages:** Turkish, English, French, Spanish (**at least 4**).
- **Special-character support:** All characters listed in Section **4.1** are fully supported in menus and names.
- **Connections:** RF wireless (can be disabled by software) + **RS485 Half Duplex single line** up to **1 km**.
- **Brightness:** **100-level** adjustment.
- **Test/blackout:** All indicators can be turned off/tested from the controller.
- **Time management:** Game, **Timeout**, halftime, and Basketball **24s/14s** durations customizable per discipline rules.
- **Timeout warning:** Early-warning signal time is adjustable.
- **Period transitions:** Automatic option; foul and **Timeout** values are automatically adjusted per **FIBA** rules.
- **Team/media Timeouts:** Staged and started by **start** command.
- **Sync error:** Difference between Main Controller and scoreboard/24s devices **< 0.05 s**.
- **Reset scenarios:** Single-action reset of game / player / all data.
- **Memory:** All player/team/time data stored separately per discipline.
- **Score entry:** **Score +1/+2/+3** and **Score -**.
- **Player capacity:** Up to **14** players in Basketball, **16** in Handball.
- **Handball penalty management:** Track **5** different players per team; new penalties add to existing time (shown on the same line).
- **Independent control:** Audible warnings and **Backboard Lights** controlled independently.
- **Volleyball time:** Clock/count-up on main screen and scoreboard; the time section can be dimmed if needed.
- **After power loss:** Data on the controller can be reloaded to the scoreboard with a single action.
- **Updates:** Remote software update without opening the device.

- **Enclosure/IP:** Aluminum enclosure; **IP54**.

Control Console – Architecture & Communication

The console shall operate on an embedded architecture **without an operating system**, independent of Android/iOS/Windows. This provides high responsiveness and low latency. Communication shall be via **RF 868 MHz** wireless and, when required, **RS485** wired infrastructure. The console shall include a membrane keypad; team and player data (number, foul, score) can be entered directly using an external keyboard. Turkish, English, French, and Spanish languages and the full special-character set shall be supported.

6.2 Shot Clock Controller

- Synchronized with the Main Controller.
- **24s/14s/Start/Stop** keys; when **24s+14s** are pressed simultaneously, the Shot Clock is hidden/turned off.
- When the game clock stops, the Shot Clock stops in sync.
- Shot Clock cannot be started before the match begins.
- **Mass:** ≤ 0.5 kg; comfortable handheld use.
- **Material/IP:** ABS, **IP54**.

6.3 Game Time Controller

- Synchronized with the Main Controller.
- Manual control of game-time **start/stop** and audible warnings.
- **Mass:** ≤ 0.5 kg; **ABS, IP54**.

7. General Technical Matters

- **Panel body:** Entirely aluminum.
- **Dimensions:** Height ≥ 150 cm, Width ≥ 220 cm, Thickness ≤ 8.5 cm.
- **LED/Digits:** SMD LED, 7-segment; **static drive** (camera clarity).
- Design shall prevent a full segment blackout upon single LED failures.
- **Installation:** On a solid base, visible to spectators/referees/players, with safety precautions.
- **Connectors:** Easy plug-and-play; moisture-resistant.
- **Front protection:** Anti-glare plexiglass (special reflective/lexan type) preventing light reflections.

- **Internal layout:** Grouped data cables; clean/tidy internal structure. No cut/spliced/unsocketed cables.
- **Protection:** Driver boards short-circuit protected.
- **Power supplies:** CE-certified.
- **LED lifetime:** $\geq 50,000$ hours.
- **Component brands:** ST, Toshiba, Texas, NXP, Green Micro.
- **Operating temperature:** $-40...+55$ °C.
- **Cabling:** External power and data cables to manufacturer-approved sizes/standards; installation diagrams and fuse values manufacturer-approved.
- **Concealment:** Data and power cables shall be routed protected and **not visible**.
- **Broadcast:** Data output for broadcasters shall be present on the Main Controller.
- **Product conformity:** RoHS and CE.
- **Documentation/Warranty:** User manual and warranty certificate shall be delivered; **minimum 2-year warranty**.

SUMMARY TABLE — System-Wide (Highlighted Mandatory Items)

A) Indicators — Digit / Format, Size, Color, Mandatory Features

Component / Indicator	Digit / Format	Size (Digits/Symbols)	Color (Mandatory/Preferred)	Mandatory Features
Team Name	Alphanumeric (LED module)	≥ 16 cm (character height)	Yellow (preferred)	Entry via membrane & external keyboard; full special-character list support
Score	3 digits (0–199)	≥ 25 cm	White (preferred)	Unused positions dimmed
Game Time	4 digits (MM:SS)	≥ 25 cm	Yellow (preferred)	Last 60 s: 1/10 s; ± 0.1 s/100 min; audible at end

Component / Indicator	Digit / Format	Size (Digits/Symbols)	Color (Mandatory/Preferred)	Mandatory Features
Period/Set	1 digit (0-9, "O")	≥ 20 cm	White (preferred)	Auto actions per discipline on period/set increment
Team Foul	1 digit (0-9)	≥ 23 cm	Red	Square indicator after 4th foul; auto increment/reset
Timeout Indicators	3 squares / team	Side ≥ 5 cm	Yellow (preferred)	—
Ball Possession / Service Arrows	1 arrow / team	—	Red (preferred)	—
Player Jersey No.	2 digits (00-99)	≥ 10 cm	Yellow (preferred)	Extra rows can be fully off
Player Foul	1 digit (0-9)	≥ 10 cm	Red	≥3 flashes on change; basketball max 5, handball max 3
Exclusion Time (discipline-dependent)	2 digits no. + 3 digits time	≥ 16 cm	No.: Yellow, Time: Red	Synchronized with game clock; 0:00-9:59
24-14 — Game Clock	MM:SS (sync)	≥ 13 cm	Yellow (same as main clock)	FIBA compliant; coordination with yellow Backboard Lights
24-14 — Shot Clock	SS (0-99)	≥ 25 cm	Red	24/14 reset; different tone; ≥ 120 dBA @1 m
Backboard Lights	Red / Yellow —	—	Red / Yellow	On durations at ends ≥ 2 s

Component / Indicator	Digit / Format	Size (Digits/Symbols)	Color (Mandatory/Preferred)	Mandatory Features
Panel Dimensions	—	H ≥ 150 cm / W ≥ 220 cm / T ≤ 8.5 cm	—	Aluminum body; anti-glare plexiglass front
Language Support	TR / EN / FR / ES	—	—	All special characters fully supported in menus and names
Controller Display	Color TFT	≥ 7" / ≥ 800×480	—	100-level brightness; test/blackout
Communication	RF + RS485	—	—	RF 868 MHz; RS485 Half Duplex 1 km
Console Architecture	Embedded (OS-less)	—	—	Independent of Android/iOS/Windows; low latency
Protection & Conformity	IP / Certificates	—	—	Controller IP54 ; RoHS & CE ; LED life ≥ 50,000 h