

INDOOR SPORTS SCOREBOARD AND TIMING SYSTEM

TECHNICAL SPECIFICATION (WITH EXCLUSION TIME INDICATOR)

1. Scope and Application Area

This technical specification covers the minimum technical and functional requirements for a scoreboard and timing system to be used in indoor sports halls for Basketball, 3x3 Basketball, Volleyball, Handball, Futsal, Water Polo, and various types of Hockey such as Field/Indoor/Ice, Rink, Roller Inline, 5S, and Underwater. The system consists of the main scoreboard panel, 24/14 **Shot Clock** devices, backboard warning lights, control units, and mounting/hardware elements.

2. Standards, Compliance, and Approvals

- **FIBA Level 2 approval:** The scoreboard and 24/14 **Shot Clock** devices shall have FIBA Level 2 approval. Basketball modes: FIBA, NBA, Euroleague, and 3x3 competitions shall be supported.
- **International rules:** The system shall comply with IHF rules for Handball and FIVB rules for Volleyball.
- **Major event experience:** The proposed brand's timing, videoboard, or scoreboard systems must have been used in at least five major events such as Euroleague, EuroCup, AfroBasket, BAL (Basketball Africa League), and the World Championship.
- **Electrotechnical conformity:** Products shall have CE and RoHS certificates. The manufacturer shall hold an ISO 9001 Quality Management System certificate.

3. System Components and Minimum Requirements

3.1 Team Name, Score, Period/Set, Game Time, Team Foul, Timeout, Ball Possession/Service, and Exclusion Panels/Elements

The panel shall display team names, scores, game time, period/set, team fouls, team **Timeouts**, Ball Possession/Service indication, as well as the penalized player number and **Exclusion Time**. Layout: team names left/right, scores below them, centered game time with Timeout indicators beside it, period and Ball Possession/Service arrows below, and at the very bottom the penalized player number and Exclusion Time.

a) Team Name Indicators

- Can be entered via an external keyboard or the membrane keypad on the main console.
- Supports at least 8 characters; character height ≥ 16 cm.
- LED module structure.

- Full support of the character set (Latin + special characters) shall be provided:
 - **Uppercase:** Ç, Ğ, İ, Ö, Ş, Ü, À, Á, Â, Ã, Ä, Æ, È, É, Ê, Ë, Ì, Í, Î, Ï, Ñ, Ò, Ó, Ô, Õ, Æ, Ú, Û, Ý, Ž, ß, ß
 - **Lowercase:** ç, ğ, ı, ö, ş, ü, à, á, â, ã, ä, æ, è, é, ê, ë, ì, í, î, ï, ñ, ò, ó, ô, õ, ù, ú, û, ý, ž, ð

b) Score Indicators

- **3 digits per team (0–199);** digit height ≥ 25 cm.
- Unused positions shall remain dimmed.

c) Game Time (Match Clock)

- **MM:SS** format, **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 minutes;** audible warning at the end.
- Digit height ≥ 25 cm.

d) Period/Set Indicator

- Single digit, **0–9,** digit height ≥ 20 cm.
- In basketball, overtime is shown with **“O”**. Clock and Timeout management shall auto-adjust by sport type.

e) Team Foul Indicators

- **1 digit per team, 0–9,** digit height ≥ 23 cm.
- In basketball, after the **4th** foul, a square symbol is applied on the indicator. Automatic increment tied to player fouls and automatic reset at period changes shall be provided.
- Digit color shall be **Red**.

f) Timeout Indicators

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

g) Ball Possession/Service Indicators

- **1 arrow per team** (indicates the attacking team in basketball / serving team in volleyball).

h) Exclusion Time Indicators

- For Handball/Hockey/Futsal/Water Polo, the player jersey number (**2 digits**) and **Exclusion Time (3 digits)** shall be shown per team for a single player at a time.
- Jersey: **0–99**, Exclusion: **0:00–9:59**, digit height ≥ 16 cm.
- The Exclusion timer shall run in sync with the game clock.
- In basketball, the last foul committed shall flash on the Exclusion panel for **10 s** with the player number and which foul it is.

3.2 24/14 Shot Clock Devices and Backboard Warning Lights

- Single-faced devices designed per **FIBA Level 2** and mounted above the backboard; they show game time and Shot Clock countdown.
- While the Shot Clock is stopped, the game clock continues; **0–99 s** display.
- Start from **24 s**, stop/restart, 14-second rule support; **120 dBA (1 m)** audible signal at expirations.
- **Digit heights:** Game time ≥ 13 cm, Shot Clock ≥ 25 cm.
- **Colors (mandatory):** Game time = **Yellow**, Shot Clock = **Red**.
- **Backboard Lights:**
 - Red backboard frame light: ≥ 2 s on at game-time expiration.
 - Yellow top backboard light: ≥ 2 s on at Shot Clock expiration.
- Audible signal tones shall differ between game-time and Shot Clock expirations.
- Programmable hardware/software to meet **Euroleague/EuroCup** competition requirements shall be available.
- When **24s** and **14s** buttons are pressed simultaneously, the Shot Clock display shall be hidden. If the game time drops below **24/14**, and an intervention is made from the controller, the Shot Clock digits shall automatically turn off.

3.3 Control Units

3.3.1 Main Controller (Multi-Sport, Embedded Architecture)

- Runs on embedded architecture; independent of Android / iOS / Windows. This architecture provides high responsiveness and low latency.
- Communicates via **RF 868 MHz** wirelessly and **RS485** wired when needed. Through **RS485 Half Duplex** single line, game/player/team data is transmitted up to **1 km**.

- Team and player data (number, foul, score) can be entered directly via membrane keypad and an attachable external keyboard.
- Color **TFT display** $\geq 7"$, **800×480** resolution; multi-sport UI.
- **Languages (min 4):** Turkish, English, French, Spanish.
- **Character set (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, Õ, Æ, Ú, Û, Ý, Ž, Ñ, 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, õ, ù, ú, û, ý, ž, ñ
- **Sport modes:** At least 13 branches including Basketball, Volleyball, Handball, Futsal, Field/Indoor/Ice, Rink, Roller Inline, 5S and Underwater Hockey, plus Water Polo.
- **Basketball modes:** FIBA, Euroleague, 3x3, NBA.
- **Time sync:** Time difference between the main controller, scoreboard, and 24s devices < 0.05 s.
- **Lighting control:** 100-level brightness on the scoreboard; “turn off/test all indicators” function.
- **Game parameters:** Game/Timeout/halftime/24–14 s durations can be customized per rules; Timeout-end warnings adjustable; at period transitions, foul and Timeout values are automatically adjusted per FIBA.
- **Data management:** Separate memories for team/player/time data for Basketball/Volleyball/Handball/Futsal/Hockey/Water Polo; single-action reset of only game, only player, or all information.
- **Score input:** Single-press **Score +1/+2/+3** and **Score -**.
- Independent control of **Backboard Lights** and audible signals in basketball.
- In volleyball, a clock or count-up can be shown on the main screen and scoreboard (time section can be dimmed if needed).
- Data can be refreshed with a single action after a power outage.
- Software updates without physical change on the scoreboard; remote updates without opening the device.
- **Enclosure:** Aluminum housing, **IP54**.

3.3.2 Shot Clock Controller

- Synchronized with the main controller; buttons: **24s, 14s, Start, Stop**.
- When **24s + 14s** are pressed simultaneously, the 24s device closes the Shot Clock display.
- Shot Clock cannot be started before the match.
- **Weight ≤ 0.5 kg, ABS enclosure, IP54.**

3.3.3 Game Time Controller

- Synchronized with the main controller; manual start/stop of game time and audible warnings.
- **Weight ≤ 0.5 kg, ABS enclosure, IP54.**

3.4 Mounting and Placement

- Placement shall suit the hall structure.
- The 24/14 **Shot Clock** devices shall be mounted above the backboard in accordance with FIBA conditions; if mounting to the backboard is not possible, they shall be suspended from the ceiling aligned above the backboard.
- The scoreboard shall be mounted on a safe, solid base visible to spectators/referees/players.
- Mounting brackets shall be supplied for the scoreboard and 24/14 devices.

4. General Technical Matters

- Scoreboard body: **Aluminum**; height **≥ 150 cm**, width **≥ 200 cm**, thickness **≤ 8.5 cm**.
- **SMD LED** and **7-segment** structure for indicators; a failure of one/several LEDs shall **not** darken an entire segment.
- **Static drive** technology shall be used for camera clarity.
- Connectors shall be easy to plug/unplug and moisture-resistant.
- Front protection: anti-glare transparent plexiglass (reflective/lexan type) to prevent light reflection.
- Internal wiring with grouped data cables; neat/clean—no cut/spliced/unsocketed cables.
- Driver boards short-circuit protected; power supplies **CE-certified**.
- **LED lifetime ≥ 50,000 hours**; operating temperature **-40 °C ~ +55 °C**.

- External power and data cables shall be to manufacturer-approved dimensions/standards; installation diagram and fuse ratings shall be manufacturer-approved.
- Data and power cables shall be routed in protective conduits and not visible; subject to manufacturer approval.
- A data output for broadcasters shall be present on the main controller.
- User manual and warranty certificate shall be delivered.
- **System warranty period: 2 years.**

5. Deliverables and Checks

- Factory acceptance tests, on-site functional tests, and trainings shall be carried out.
- After installation, sport-based configurations (compliant with FIBA/IHF/FIVB) shall be demonstrated and handed over.
- Spare parts and consumables list, software/version information, and update procedures shall be documented.

SUMMARY TABLE – System Overview (Highlighted Mandatory Items)

Component / Indicator	Digits / Size (Mandatory)	Color (Mandatory Provisions)	Main Mandatory Feature
Team Name	Characters ≥ 16 cm, ≥ 8 characters	(No mandatory provision)	External keyboard + membrane keypad, broad special-character set
Score (per team, 3 digits)	Digit ≥ 25 cm, 0–199	(No mandatory provision)	Empty positions dimmed
Game Time (MM:SS)	Digit ≥ 25 cm	(No mandatory provision)	00:00–99:59, 1/10 s in last 60 s, ± 0.1 s tolerance
Period/Set	Digit ≥ 20 cm, 0–9	(No mandatory provision)	Overtime “O” in basketball
Team Fouls (per team)	Digit ≥ 23 cm, 0–9	Red	Square indicator after 4th foul

Component / Indicator	Digits / Size (Mandatory)	Color (Mandatory Provisions)	Main Mandatory Feature
Timeout Indicator (per team)	≥ 3 pcs, ≥ 5 cm square	(No mandatory provision)	—
Ball Possession/Service Arrows	1 each	(No mandatory provision)	—
Exclusion Panel (jersey + time)	Jersey 2 , Time 3 digits	(No mandatory provision)	Exclusion timer synchronized with game clock
24/14 Shot Clock – Attack Time	Digit ≥ 25 cm , 0–99	Red	120 dBA at end
24/14 Shot Clock – Game Time	Digit ≥ 13 cm	Yellow	24/14 rule scenarios
Backboard Frame Light (game end)	—	Red	≥ 2 s on
Backboard Top Light (Shot Clock end)	—	Yellow	≥ 2 s on

Mandatory Items (System-Wide)

- **FIBA Level 2** approval (scoreboard + 24/14 **Shot Clock**).
- Multi-mode basketball: **FIBA / NBA / Euroleague / 3x3** support.
- Major event field experience: ≥ **5** events including Euroleague, EuroCup, AfroBasket, BAL, and World Championship.
- Embedded architecture (OS-independent) + **RF 868 MHz** wireless and **RS485** wired communication (up to **1 km**).
- Time synchronization < **0.05 s**, **120 dBA** audible warning, static-drive LED (broadcast clarity).
- **IP54** protection (controllers), aluminum body, broad special-character support.