

PROFESSIONAL SCOREBOARD SYSTEM TECHNICAL SPECIFICATION FOR MULTI-PURPOSE SPORTS HALLS – WITH EDITABLE TEAM NAMES

1. Scope

This specification covers the supply, installation, commissioning, and operational requirements of a professional scoreboard system to be used in indoor sports such as basketball, volleyball, handball, various types of hockey, futsal, water polo, etc. The system shall be positioned in accordance with the architectural conditions of the venue and operate together with all its subcomponents.

2. Standards and Compliance

2.1. The scoreboard and 24/14 second **Shot Clock** devices shall have **FIBA Level 2** approval. In addition, the **Ball Possession Arrow Indicator** shall be **FIBA-approved**.

2.2. The system shall support basketball rules of **FIBA, EuroLeague, NBA, and 3x3**, volleyball rules of **FIVB**, and handball rules of **IHF**.

2.3. The system shall work with the **FIBA Whistle System** and provide suitable data output to broadcasters via the **FIBA Data Protocol**.

3. System Components

The following components shall be delivered together and operate as a single integrated scoreboard system:

- **Team Name, Score, and Game Time Panel**
- **Period, Team Foul, and Timeout Panel**
- **Player Foul and Player Score Panels (for two teams)**
- **24/14 Second Shot Clock Devices** (mounted above the backboards)
- **Control Units** (Main Console, **Shot Clock** Console, Game Time Console)
- **Ball Possession Arrow Indicator**
- **Backboard Lights** for basketball
- **24/14 second** backboard mounting brackets and **scoreboard mounting brackets**

4. Architecture, Communication, and Console

4.1. Control Console and Embedded Architecture: The console shall operate on an embedded architecture **without an operating system**; fully independent of Android / iOS / Windows, etc. This design shall provide **high responsiveness and low latency**.

4.2. Communication: Wireless communication shall be at **RF 868 MHz**; when required, wired communication shall be provided over **RS485 Half-Duplex** line. Game, player, and team information shall be transmitted over RS485 up to **1 km**. Wireless connection signals

4.3. Input Devices: The console shall include a membrane keypad; by connecting an external keyboard, team and player data (jersey number, foul, score) shall be entered directly.

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, Ñ, Ò
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, ñ

5. Functional Features

— Team name indicators on the upper left/right; team scores below; centered **game time** indicator at the bottom.

Score: 3 digits per team; range 0-199; digit height ≥ 30 cm; unused digits shall remain blank.

5.2. Period, Team Foul, and Timeout Panel

Period/Set: 1 digit, 0-9; digit ≥ 20 cm; Color: White. Overtime in basketball shall be indicated by the letter “O”. On period/set change, the clock and **Timeout** indicators shall be automatically adjusted according to the sport type.

Timeout Indicators (rights): 3 squares per team, side ≥ 5 cm, Color: Yellow. **Timeout duration:** 2 digits (0–99), digit ≥ 30 cm, Color: Yellow; countdown; dot indicators **flash** during timeout; **audible signal** at start/end; **pre-end warning** time adjustable; warnings can be disabled. When a team takes a **Timeout**, the relevant rights and duration indicators operate together. If required, **Timeout** duration can be displayed on the **24 s** devices.

Shot/Service arrows: 1 arrow per team; Color: Red (direction indicator).

5.3. Player Foul and Player Score Panels

— For both teams, **12 player rows** in an asymmetric layout: from outside to inside **jersey number – foul – score**.

Jersey number: 2 digits per player, 00–99; digit ≥ 12 cm; used as jersey number in basketball/handball; if there are more rows than the roster, unused rows shall be fully **blank**; in volleyball this field may be used as **set indicator**.

Player foul: 1 digit per player, 0–9, ≥ 12 cm; maximum 5 in Basketball/EuroLeague, maximum 3 in Handball; **blank at match start**, only the relevant row becomes visible when a foul is entered; flashes **at least 3 times** when changed; team foul count increases automatically.

Player score: 2 digits per player, 0–99, ≥ 12 cm; blank at match start, only the relevant row becomes visible when a score is entered; flashes **at least 3 times** when changed; the **team score increases automatically**.

5.4. 24/14 Second Shot Clock Devices and Backboard Lights

— Designed to **FIBA Level 2** standards; mounted above the backboards; displays countdowns for **game time** and **Shot Clock**.

— While the **Shot Clock** is stopped, **game time continues**. When game time drops below **24 s**, the **Shot Clock** display either remains **off** or **synchronizes** with game time.

— **Shot Clock: 0–99 s**, can be started from **24**; controlled by **24 s / 14 s** buttons; **audible signal** at expiry.

— **Digit heights: game time ≥ 13 cm, Shot Clock ≥ 25 cm. Colors: game time Yellow, Shot Clock Red.**

— **Backboard Lights** on the frame (red) per FIBA: **red Backboard Lights** remain ≥ 2 s when **game time ends**; **yellow Backboard Lights** on the upper section remain ≥ 2 s when the **Shot Clock** ends.

— Game-end and Shot-end tones shall be **different**; **sound pressure ≥ 120 dBA (1 m)**.

— Pressing **24 s** and **14 s** **simultaneously** turns the **Shot Clock** display **off**.

— If game time is below **24 s / 14 s** and the relevant keys are used, **Shot Clock** digits shall **switch off automatically**.

— Devices shall have **software and hardware** compliant with **EuroLeague / EuroCup** rules.

5.5. Control Units

a) Main Console

— Supports **Shot Clock** and game time consoles.

— Supports at least **13 branches** including basketball, volleyball, handball, futsal, **3x3 basketball**, field/indoor/hockey 5S/ice/underwater/rink/roller inline hockey, and water polo.

— Basketball modes: **FIBA, EuroLeague, 3x3, NBA**.

— **Aluminum enclosure**, waterproof printed buttons; **IP54**.

- Game/Timeout/halftime durations and, in basketball, **24 s / 14 s** are customizable.
- **Timeout** pre-warning time adjustable; at period transitions **foul and Timeout values** are automatically adjusted; **inter-period Timeouts** can be given automatically and their start logic shall match the on-court flow.
- **Time difference** among main console – scoreboard – 24 s devices **< 0.05 s**.
- Single-operation reset of **only game, only player**, or **all** information.
- Basketball/volleyball/handball/futsal/hockey/water polo data stored in **separate memories**.
- Score entry via **Score +1 / +2 / +3 / -** keys.
- Display/control of up to **≤16 players** in basketball and **≤16** in handball.
- In handball, **≤5 simultaneous Exclusion Times**; if a new penalty is given to the same player, times are accumulated and tracked on the **same row**.
- In basketball, **last foul information** (jersey number and the ordinal of the foul) can be flashed for **10 s** on the **Exclusion Time Panel**.
- **Audible signals** and **Backboard Lights** are controlled **independently**.
- In volleyball, a **clock / count-up** may be shown on the main screen or the scoreboard.
- **Single-operation data refresh** after power outage; all updates other than physical changes on the scoreboard are performed via console software.
- **Timeout** durations may be shown on the **24 s** devices.
- Hardware capable of **remote update** (without opening the device).

b) Shot Clock Console

- Synchronized with the main console; **24 s / 14 s / Start / Stop** buttons; pressing **24 s + 14 s** simultaneously turns the **Shot Clock** indicator **off**.
- When **game time stops**, the **Shot Clock** stops in sync; cannot be started **before the match**.
- **≤ 0.5 kg, ABS body, IP54.**

c) Game Time Console

- Synchronized with the main console; **start/stop** and **manual audible signal** control.
- **≤ 0.5 kg, ABS body, IP54.**

5.6. Ball Possession Arrow Indicator

- Arrow-shaped indicator to show the team in possession; **Red; width and height ≥ 11 cm**; operates at **12 V**; LED or LED group on the back shows arrow direction; direction selection via a switch on top.

6. Mechanical, Electrical, and Visual Requirements

- Scoreboard body shall be **all-aluminum; height ≥ 190 cm, width ≥ 330 cm, thickness ≤ 8.5 cm**.
- Indicators: **SMD LED, 7-segment** design; a single/multiple LED failure shall **not** extinguish the entire segment.
- All numeric indicators shall be driven with **static driving technology** for clarity in

camera recordings.

— Installation shall be performed on a solid base visible to spectators/referees/players and compliant with safety rules. The front protection shall be **anti-reflective plexiglass** (reflect/lexan type).

— Connectors shall be easy to plug/unplug and **moisture-resistant**; internal wiring with **grouped data cables** shall be clean/simple; cables shall be uncut, unspliced, and with sockets; driver boards shall be **short-circuit protected**.

— Power supplies shall be **CE-certified**; **LED lifetime $\geq 50,000$ hours**; integrated/processors used in the circuit shall be **ST, Toshiba, Texas, NXP, or Green Micro**.

— Operational temperature **$-40\text{ }^{\circ}\text{C} \dots +55\text{ }^{\circ}\text{C}$** .

— External power and data cables shall conform to **manufacturer-approved sizes/standards**; installation diagram and fuse values shall be **manufacturer-approved**; data and power cables shall be **protected** and **concealed**.

— For safety and maintenance, the scoreboard shall be **suspended from at least one point** with a **hoist or motor of ≥ 500 kg capacity**.

7. Certification, Broadcast, and Warranty

7.1. Products shall have **RoHS** and **CE** certificates.

7.2. The manufacturer shall have an **ISO 9001 Quality System** conformity certificate.

7.3. A **broadcast data output** shall be available on the main console.

7.4. A Turkish **user manual** and **warranty certificate** shall be delivered; **warranty period is 2 years**.

8. Usage History (Major Event Requirement)

The proposed brand's timing, videoboard, or scoreboard systems shall have been **used in at least five** major international events such as **EuroLeague, EuroCup, AfroBasket, BAL (Basketball Africa League), and the World Championship**.

SUMMARY TABLE – System Overview (Highlighted Mandatory Features)

Component / Field	Digits / Size	Color	Mandatory Feature
Team Name	Character height $\geq$ 16 cm, ≥ 12 characters	Yellow	LED module; full special-character support (complete list)
Team Score (each team)	3 digits, 0–199, ≥ 30 cm	White	Unused digits blank

Component / Field	Digits / Size	Color	Mandatory Feature
Game Time (main panel)	MM:SS (4 digits), ≥ 30 cm	Yellow	Last 60 s with 1/10 s , tolerance ±0.1 s / 100 min , audible signal
Period/Set	1 digit, ≥ 20 cm	White	Overtime “O”
Team Foul (each team)	1 digit, 0–9, ≥ 23 cm	Red	Square warning after 4th foul; automatic increase/reset
Timeout Rights (each team)	3 squares, side ≥ 5 cm	Yellow	Flash during Timeout
Timeout Duration	2 digits, 0–99, ≥ 30 cm	Yellow	Countdown; start/end audible; adjustable pre-warning
Shot/Service Arrows	—	Red	Left/right direction indicator
Player Jersey No. (per person)	2 digits, 00–99, ≥ 12 cm	Yellow	Extra rows blank
Player Foul (per person)	1 digit, ≥ 12 cm	Red	Max. 5 (Basketball/EuroLeague), max. 3 (Handball); flash warning
Player Score (per person)	2 digits, 0–99, ≥ 12 cm	White	Flash on change; team score auto-increments
24/14 – Game Time	≥ 13 cm	Yellow	Game time indicator (backboard unit)
24/14 – Shot Clock	≥ 25 cm	Red	24/14 buttons; audible at end; 24+14 → off
Backboard Lights	—	Red (frame), Yellow (upper)	Remain ≥ 2 s at relevant end
Audible Signals	—	—	≥ 120 dBA (1 m) ; different tones for game/Shot Clock
Ball Possession Arrow Indicator	≥ 11 × ≥ 11 cm, 12 V	Red	Arrow shape; rear LED direction indicator

Component / Field	Digits / Size	Color	Mandatory Feature
Scoreboard Dimensions	≥ 190 cm (H) × ≥ 330 cm (W) × ≤ 8.5 cm (T)	—	Aluminum body; anti-reflective plexi front
Console Display	≥ 7" TFT, ≥ 800×480	—	100-step brightness control
Communication	RF 868 MHz / RS485 (≤ 1 km)	—	RF can be disabled; Half-Duplex line
Compliance / Modes	—	—	Basketball FIBA/EuroLeague/NBA/3x3; FIVB/IHF support
FIBA Integration	—	—	FIBA Level 2, FIBA Whistle & FIBA Data Protocol
Durability / Environmental	—	—	-40 °C...+55 °C; CE, RoHS; ISO 9001; IP54 (consoles)
Warranty	2 years	—	User manual and warranty certificate delivered