

MULTI-PURPOSE INDOOR SPORTS SCOREBOARD SYSTEM – TECHNICAL SPECIFICATION

1. SCOPE AND PURPOSE

This specification covers the supply, installation, operation, and acceptance principles of a professional scoreboard system to be used in indoor sports such as basketball, volleyball, handball, different types of hockey, futsal, and water polo. The system shall have **FIBA Level 2** approval and shall fully comply with the rules of the relevant disciplines.

1. BASIS, COMPLIANCE AND REFERENCES

- **FIBA Level 2** approval (scoreboard and 24/14-second systems), integration with the **FIBA Whistle System** and **FIBA Data Protocol**.
- **International usage reference:** The proposed brand's timing, videoboard, or scoreboard systems shall have actual usage in at least five major organizations such as **EuroLeague, EuroCup, AfroBasket, BAL (Basketball Africa League)** and **World Championship/FIBA Basketball World Cup**.
- **Basketball modes:** It shall support the complete rules of **FIBA, EuroLeague, NBA, and 3x3**.

1. OVERALL SYSTEM ARCHITECTURE AND COMMUNICATION

The control console shall operate on an **embedded architecture without an operating system**, independent of Android / iOS / Windows. This structure shall provide high response speed and low latency.

Communication shall be provided via **RF 868 MHz wireless** and, when required, **RS485** wired infrastructure. With **RS485 Half Duplex**, game, player, and team data shall be transmitted up to **1 km** over a single line.

The console shall include a **membrane keypad**; by connecting an external keyboard, team and player data (number, foul, score) can be entered directly.

The interface shall support **Turkish, English, French, and Spanish** languages. Special characters shall be fully supported in team and player names:

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, Æ, Æ;

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, æ, æ.

1. SYSTEM COMPONENTS AND CONTENT

The system shall consist of the following units, arranged to suit the venue layout: **Team Name/Score/Game Time Panel; Period/Team Foul/Timeout Panel; Player Name Panels; Player Information Panels; Exclusion Time Board; 24–14 Second Shot Clock Devices; Control Units; Ball Possession Arrow Indicator; Digital Team Foul Markers; Coach Timeout Buttons; Backboard Light Strips** and necessary mounting brackets.

4.1. Team Name, Score and Game Time Panel

Layout: Team names for left/right at the top; scores beneath them; game time centered at the bottom.

Team Name Indicators:

- Entry shall be made via the membrane keypad on the main console or via an external keyboard; no computer shall be required.
- Each team name shall support at least **12 characters**; character height shall be **not less than 16 cm**; color **yellow**.
- Full special-character support shall be provided (see Section 3).

Score Indicators:

- **3 digits per team**; range **0–199**.
- Digit height at least **30 cm**; color **white**; unused positions dimmed.

Game Time Indicator:

- **MM:SS (4 digits)**; count up/down; adjustable **00:00–99:59**; tenths displayed during the last **60 s**; **±0.1 s per 100 minutes**.
- Audible signal at expiration; digit height at least **30 cm**; color **yellow**.

4.2. Period, Team Foul and Timeout Panel

Top row: left/right team fouls, center period and, on both sides, attack/service arrows; bottom row: left/right timeout entitlements (**3 dots** each) and, in the center, the timeout duration.

- **Period/Set: 1 digit, 0–9**; digit **≥20 cm**; color **white**; in basketball, overtime is indicated by the letter “**O**”; automation per rules.
- **Team Foul: 1 digit per team, 0–9**; digit **≥23 cm**; **red**; square symbol after the 4th foul; automatic increment and reset.
- **Timeout Indicator: 3 squares per team**; side **≥5 cm**; color **yellow**.
- **Timeout Duration: 2 digits (0–99)**; digit **≥30 cm**; **yellow**; countdown; audible signals at start/end and pre-warning; option to display on **24-second** devices.
- **Attack/Service Arrows: One Ball Possession Arrow** per team; **red**.

4.3. Player Name Panels

16 player names per team; character **≥12 cm**; **yellow**. Entry via console or external keyboard; empty rows can be dimmed; full special-character support.

4.4. Player Information Panels

From outside to inside: jersey number, player foul, player score.

- **Jersey number: 2 digits (00–99), ≥12 cm, yellow;** set indicator in volleyball.
- **Player foul: 1 digit (0–9), ≥12 cm, red;** max 5 in basketball, max 3 in handball; flashes on change.
- **Player score: 2 digits (0–99), ≥12 cm, white;** automatically increments the team score; flashes on change; set score in volleyball.

4.5. Exclusion Time Board

Display of player exclusions in handball, hockey types (field, indoor, 5s, ice, underwater, rink, roller inline) and futsal, as well as water polo. Up to **2 players simultaneously per team**: jersey number (**2 digits**) + exclusion time (**m:ss, 3 digits, 0:00–9:59**); digit **≥16 cm**; jersey number **yellow**, exclusion time **red**; synchronized with game time. In basketball, the most recent foul information is displayed with a **10-second flash**.

4.6. 24–14 Second Shot Clock Devices (Above Backboard)

FIBA Level 2 approved; suitable for mounting above the backboard. When the **Shot Clock** stops, the game time continues to run. When the game time falls below **24 s**, the shot-clock indicator is off or runs in sync. Shot Clock **0–99 s**; audible signal at expiration. **Game time digit ≥13 cm (yellow); shot clock digit ≥25 cm (red)**.

Backboard Lights: At game-time expiration, **red lights ≥2 s**; at shot-clock expiration, **yellow lights ≥2 s**. Audible signals have different tones; sound level **≥120 dBA (1 m)**. Pressing **24s+14s simultaneously** hides the shot-clock indicator. Programmatic and hardware compliance with **EuroLeague/EuroCup** rules.

4.7. Control Units

Three units: **Main Console**, **Shot Clock Controller**, and **Game Time Controller**.

Main Console:

- Embedded, operating-system-free architecture; **RF 868 MHz** and **RS485** communication. The wireless link can be disabled by software.
- **Sport support:** Basketball, volleyball, handball, futsal; 3x3 basketball; field hockey, indoor hockey, hockey 5s, ice hockey, underwater hockey, rink hockey, roller inline hockey, and water polo.
- **Basketball modes:** FIBA, EuroLeague, 3x3, and NBA.
- **Display:** Color TFT **≥7"**, **800×480** pixels.
- **Front panel:** Aluminum, IP54; waterproof printed buttons.

- **Input:** Membrane keypad and external keyboard; team/player names and number-foul-score entry without a computer.
- **Brightness/Test: 100-level** brightness; ability to blank all displays; LED/address tests; rule-based automation (period/foul/timeout).
- **Accuracy:** Time difference between the console and the scoreboard/24–14 second devices **< 0.05 s**; quick reset options; discipline-based memory.
- **Penalty/Signal:** Penalty accumulation in handball; **10-second flash** for the last foul in basketball; independent control of buzzer and **Backboard Lights**; clock/count-up indicator in volleyball.
- **Reliability:** One-step data restoration after a power outage; remote update support.
- **Integration:** Broadcast data output; compliance with **FIBA Whistle** and **FIBA Data Protocol**.

Shot Clock Controller:

- Synchronized with the main console; **24s, 14s, Start, Stop**; pressing **24s+14s** turns off the shot-clock indicator; cannot be started before the contest; **≤0.5 kg; ABS; IP54**.

Game Time Controller:

- Synchronized with the main console; manual control of **Start/Stop** and audible signal; **≤0.5 kg; ABS; IP54**.

4.8. Ball Possession Arrow Indicator

Arrow-shaped, **SMD LED, red, 12 V; FIBA approved**; width and height **≥11 cm**; rear direction indication; direction selection by switch.

4.9. Digital Team Foul Markers

To be placed on the right and left of the scorer's table; can operate synchronized with the main console or independently. **FIBA approved; red**; digit height **≥25 cm**; width **12.5 cm**; **aluminum** body; free of sharp edges. After the **4th foul**, when the game restarts, the display turns **fully red**.

4.10. Coach Timeout Button

Used in handball and water polo; when pressed, **game time stops** and the **Timeout** time starts; mounted **≥1 m** above the floor; no sharp edges; connection cable **≥5 m**.

1. MECHANICAL, ELECTRICAL AND SAFETY REQUIREMENTS

Panel body **aluminum**; height **≥250 cm**, width **≥545 cm**, thickness **≤8.5 cm**. **SMD LED** and **7-segment** digits; a single LED failure shall not cause the entire segment to go dark; **static driving** for camera clarity. Mounted securely on a solid base; connectors easy to attach/detach and moisture-resistant.

Front protection: Anti-reflection reflective/lexan-type transparent **plexiglass**. **Internal wiring:** Clean and simple layout with grouped data cables; cables shall **not** be cut/spliced/socketed.

Driver boards short-circuit protected; **CE-certified** power supplies; LED lifetime **≥50,000 hours**. Integrated circuits/processors: **ST, Toshiba, Texas, NXP** or **Green Micro**.

Operating temperature **-40 °C ... +55 °C**. External power and data cables in manufacturer-approved sizes and standards; wiring diagram and fuse ratings approved; data and power cables shall be shielded and not visible; **data output for broadcasters** shall be available.

Suspension with at least a **500 kg** capacity **chain block/motor**, from **at least two points**.

1. DOCUMENTS, TRAINING, WARRANTY

ISO 9001 quality management certificate.

The product shall have **RoHS** and **CE** certificates.

A **Turkish user manual** and **warranty certificate** shall be delivered.

Warranty period: 2 years.

1. ACCEPTANCE AND TEST

During factory and site acceptance tests, the functions of all indicators, brightness levels, time synchronization, audible signal levels, **Backboard Lights**, direction and timeout indicators, communication among the console–scoreboard–24/14-second devices, **RF 868 MHz** and **RS485** communication, and data integrity shall be verified.

Rule-based automation and display logic for basketball (**FIBA/EuroLeague/NBA/3x3**), volleyball (**FIVB**), handball (**IHF**), futsal, water polo, and the relevant hockey types shall be validated with on-site scenario tests.

SUMMARY TABLE – OVERALL SYSTEM (HIGHLIGHTED MANDATORY ELEMENTS)

SECTION	CRITICAL VALUE / SIZE	COLOR / FEATURE
FIBA Compliance	FIBA Level 2; FIBA Whistle & Data Protocol	Integration mandatory
International Reference	≥5 organizations: EuroLeague, EuroCup, AfroBasket, BAL, World Championship	In-field usage required
Basketball Modes	FIBA, EuroLeague, NBA, 3x3	Full rules
Team Name Character	≥16 cm	Yellow

SECTION	CRITICAL VALUE / SIZE	COLOR / FEATURE
Score (3 digits per team)	≥30 cm, 0–199	White
Game Time (MM:SS)	≥30 cm, 00:00–99:59; tenths in last 60 s	Yellow
Period/Set	≥20 cm, 0–9; overtime: “O”	White
Team Foul	≥23 cm, 0–9	Red
Timeout Indicator	3× squares / team; side ≥5 cm	Yellow
Timeout Duration	2 digits; 0–99	Yellow
Attack/Service Arrows	—	Red
Player Names	≥12 cm	Yellow
Player Jersey No	≥12 cm; 00–99	Yellow
Player Foul	≥12 cm; 0–9	Red
Player Score	≥12 cm; 0–99	White
Exclusion Time – Jersey No	≥16 cm	Yellow
Exclusion Time – m:ss	≥16 cm; 0:00–9:59	Red
24–14 – Game Time	≥13 cm	Yellow
24–14 – Shot Clock	≥25 cm; 0–99 s	Red
Backboard Lights	At expiration ≥2 s	Game: Red / Shot: Yellow
Audible Signal	≥120 dBA (1 m)	Different tones for Shot/Game
Console Architecture	OS-less embedded	Low latency
Communication	RF 868 MHz; RS485 (1 km)	Half Duplex
Input Method	Membrane keypad + external keyboard	Computer-free entry

SECTION	CRITICAL VALUE / SIZE	COLOR / FEATURE
Language/Alphabet	TR/EN/FR/ES + special characters	Ç Ğ İ Ö Ş Ü ..., ç ğ ı ö ş ü ...
Panel Dimensions	≥250×545×≤8.5 cm (H×W×T)	Aluminum body
LED/Segment	SMD; 7-segment; static drive	No full segment blackout
Environmental Conditions	−40 °C ... +55 °C	LED ≥50,000 hours
Mounting Safety	≥500 kg capacity; at least two points	Chain block/motor
Documents	ISO 9001; CE; RoHS	—
Warranty	2 years	—