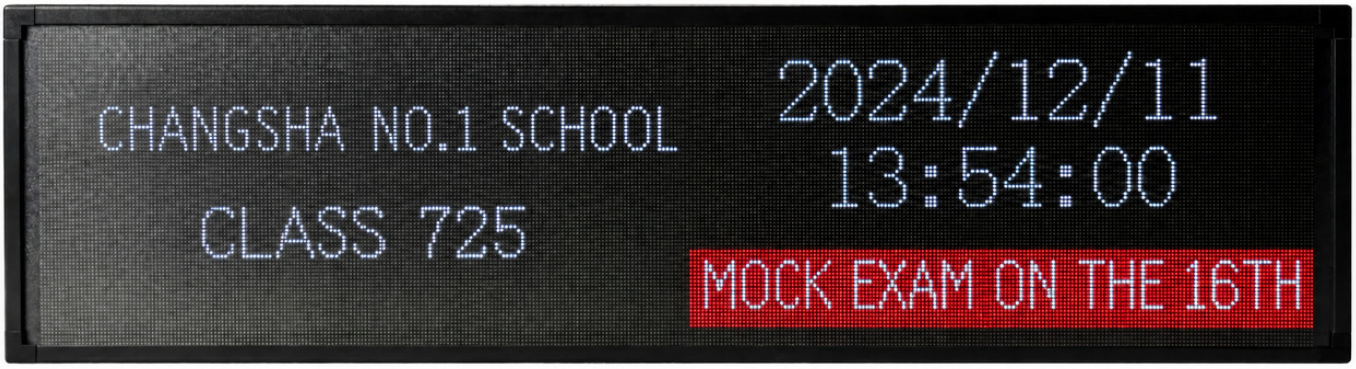
SYSTEM PROPOSAL

School synchronized clock system

Kingdom of Saudi Arabia | 9 November 2026

A GPS-referenced time system for 30 classrooms and the wider school, with six-digit time and message displays. The proposed network uses Ethernet for time and message data, and PoE for clock power.



Catalogue illustration of the SZ1867 message-display format. The proposed NTP and PoE configurations, dual-sided version and outdoor version require manufacturer confirmation.

85
clock units

7
building floors

1
GPS time server

System configuration

Provide 21 dual-sided corridor units and 64 single-sided units. Use a satellite-referenced NTP server, the school LAN and PoE access switches to serve the displays. Provide a separate, compatible message-management function.

The quantity includes 30 classroom clocks, as confirmed. Product selection retains the requested GPS and PoE architecture; the required message-display variants remain configuration items to be verified.

SCOPE

Clock schedule and requirements

Location	Calculation	Clock units	Faces
Classrooms	30 rooms x 1	30 single-sided	30
Corridors	7 floors x 3	21 dual-sided	42
Offices	20 rooms x 1	20 single-sided	20
Laboratories	5 labs x 1	5 single-sided	5
Other rooms	7 rooms x 1	7 single-sided	7
Playground	2 positions	2 single-sided	2
Total	**All school areas**	**85 units**	**106**

A dual-sided clock is one installed assembly with two visible faces. Display faces are not additional clock units. The 30-clock quantity applies to classrooms only.

Required display and system functions

Time and messages

Six-digit time is interpreted as HH:MM:SS, with an additional message area. Confirm the physical digit height, message style, colours and viewing distance before manufacture.

Synchronization and power

GPS provides the reference time. NTP distributes time over the LAN. PoE supplies power through Ethernet cabling; PoE itself is not a time-synchronization protocol.

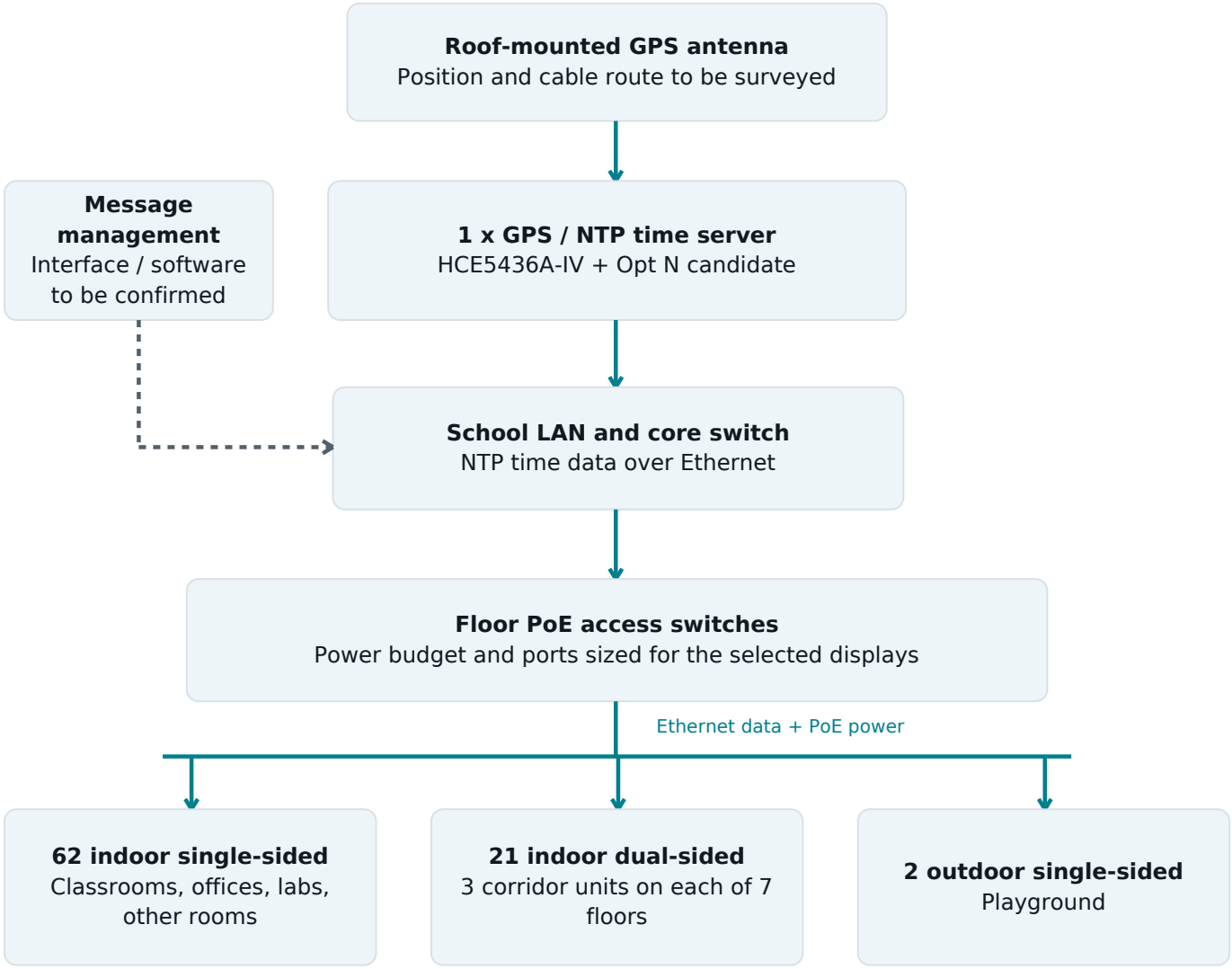
Location and visibility

Corridor clocks are dual-sided. Classroom, office, laboratory, other-room and playground clocks are single-sided. Two playground clocks need a separately verified outdoor configuration.

SYSTEM DESIGN

Network and time architecture

The timing path and message path share the network but perform different functions. The clock server is not assumed to provide a message-publishing service.



Functional schematic, not a cabling or floor plan. All display endpoints shown require confirmed NTP + PoE message-display configurations. Network equipment, antenna accessories and message software are separate scope items.

Time configuration

Keep the reference service on UTC. Configure the display time zone for Saudi Arabia, UTC+03:00, with daylight saving disabled, and verify the displayed local time during commissioning.

Power and continuity

The server and PoE switches need local electrical power. UPS support, if required, must cover both. A second server, automatic failover and a specified holdover duration are not included in the one-server scope.

BUILDING LAYOUT

Seven floor deployment layout

Provide three dual-sided corridor clocks on every floor. Allocate the indoor room clocks against the final room schedule rather than assuming that each floor has an identical room mix.



Seven floor zones are shown for allocation only. Floor labels do not define the actual architectural level names. Corridor clock positions, mounting heights and cable routes follow the surveyed sightlines and building drawings.

Indoor room allocation across the seven floors

Room group	Single-sided clocks	Allocation
Classrooms	30	By final classroom plan
Offices	20	By final office plan
Laboratories and other rooms	12	5 labs + 7 other rooms

Indoor total: 83 clock units. Playground: 2 further single-sided units. School total: 85 units.

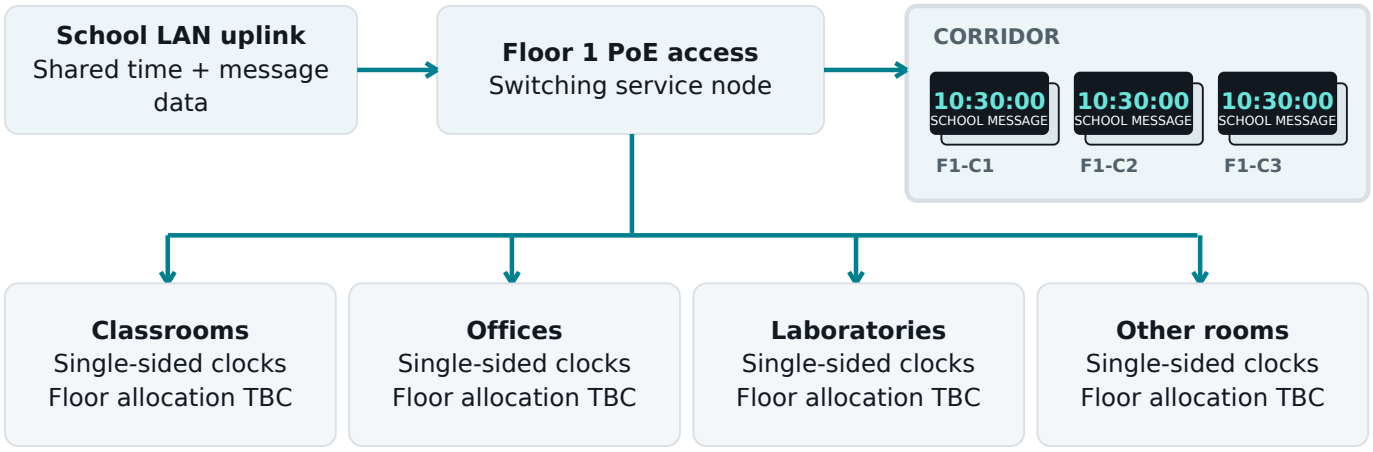
FLOOR NETWORK DIAGRAMS

Floors 1 and 2 synchronization

Both floors use the same school GPS/NTP source. The service nodes below show network distribution, not a fixed number of physical switches.

Floor 1 synchronization

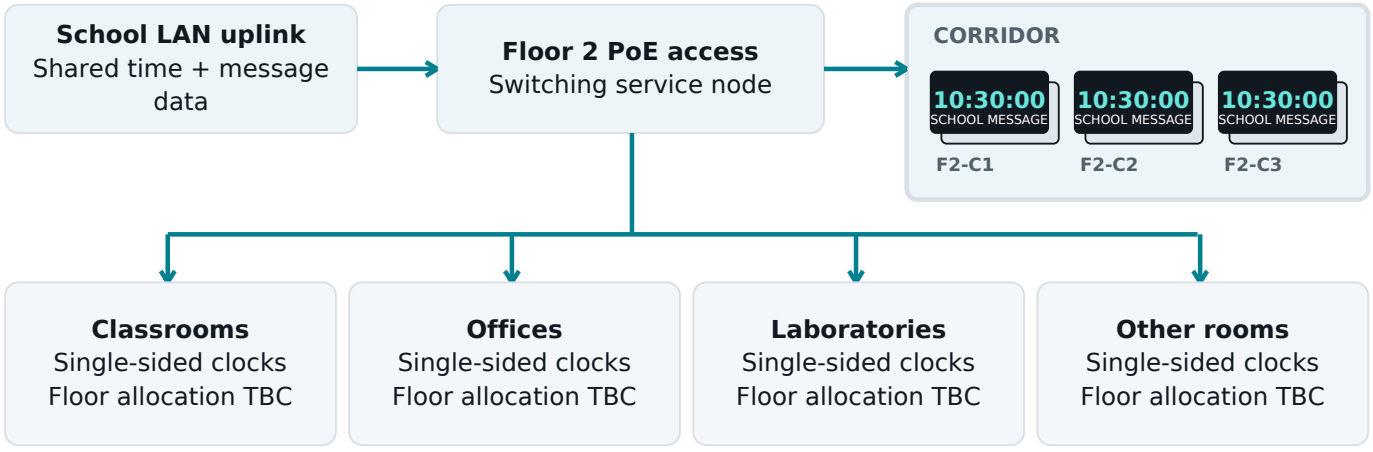
3 dual-sided corridor clocks



Room quantities follow the final floor schedule. All clock connections shown are proposed NTP + PoE; each completed corridor assembly has two display faces.

Floor 2 synchronization

3 dual-sided corridor clocks



Room quantities follow the final floor schedule. All clock connections shown are proposed NTP + PoE; each completed corridor assembly has two display faces.

TBC = to be confirmed. Room categories are allocation branches, not a statement that every category is present on every floor. Switch ports and PoE budgets follow the final equipment and cable schedule.

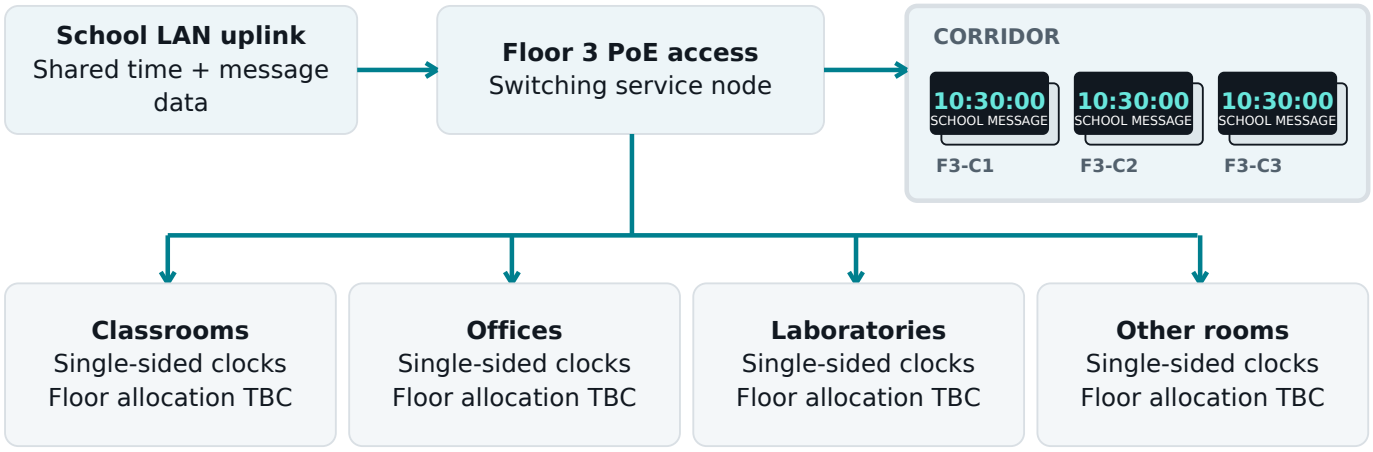
FLOOR NETWORK DIAGRAMS

Floors 3 and 4 synchronization

Both floors use the same school GPS/NTP source. The service nodes below show network distribution, not a fixed number of physical switches.

Floor 3 synchronization

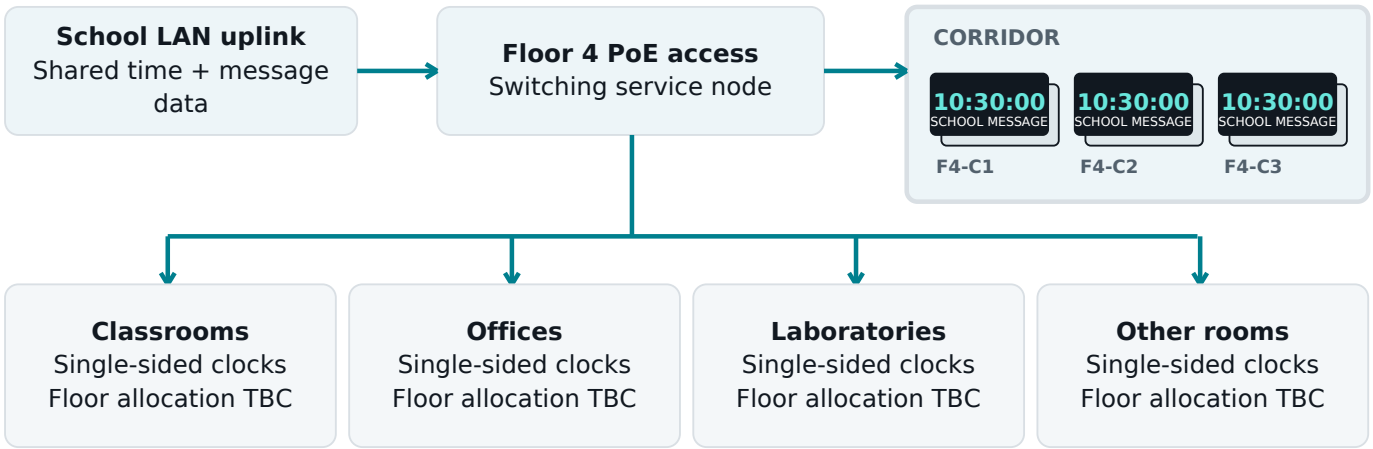
3 dual-sided corridor clocks



Room quantities follow the final floor schedule. All clock connections shown are proposed NTP + PoE; each completed corridor assembly has two display faces.

Floor 4 synchronization

3 dual-sided corridor clocks



Room quantities follow the final floor schedule. All clock connections shown are proposed NTP + PoE; each completed corridor assembly has two display faces.

TBC = to be confirmed. Room categories are allocation branches, not a statement that every category is present on every floor. Switch ports and PoE budgets follow the final equipment and cable schedule.

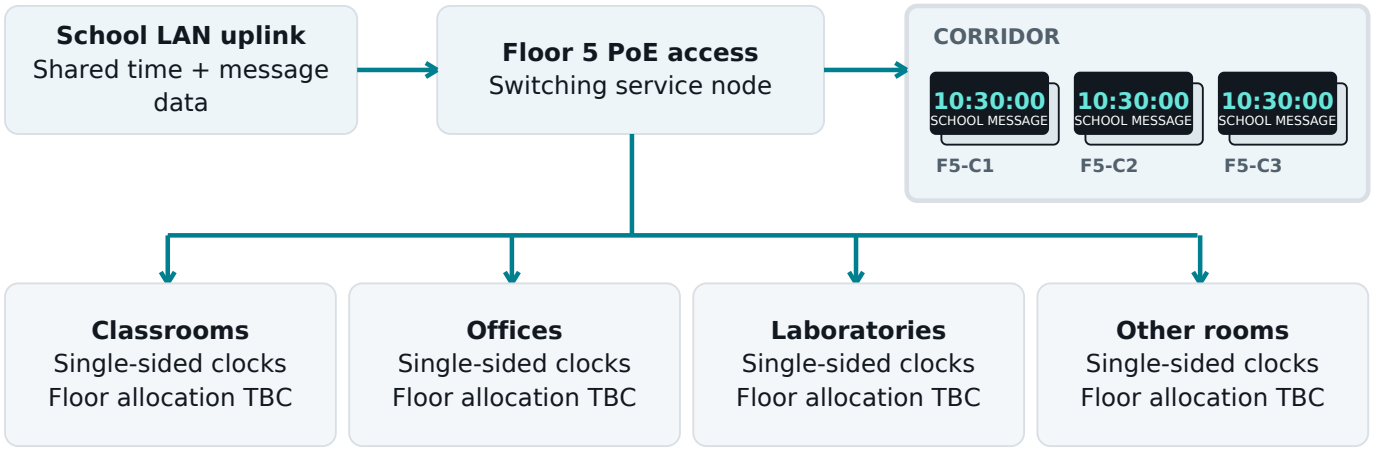
FLOOR NETWORK DIAGRAMS

Floors 5 and 6 synchronization

Both floors use the same school GPS/NTP source. The service nodes below show network distribution, not a fixed number of physical switches.

Floor 5 synchronization

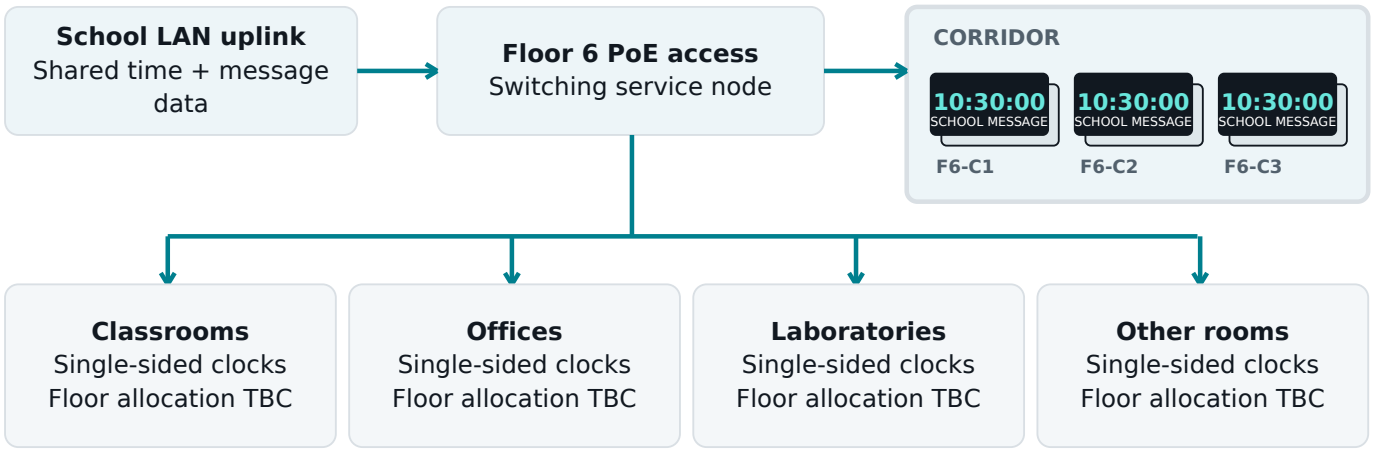
3 dual-sided corridor clocks



Room quantities follow the final floor schedule. All clock connections shown are proposed NTP + PoE; each completed corridor assembly has two display faces.

Floor 6 synchronization

3 dual-sided corridor clocks



Room quantities follow the final floor schedule. All clock connections shown are proposed NTP + PoE; each completed corridor assembly has two display faces.

TBC = to be confirmed. Room categories are allocation branches, not a statement that every category is present on every floor. Switch ports and PoE budgets follow the final equipment and cable schedule.

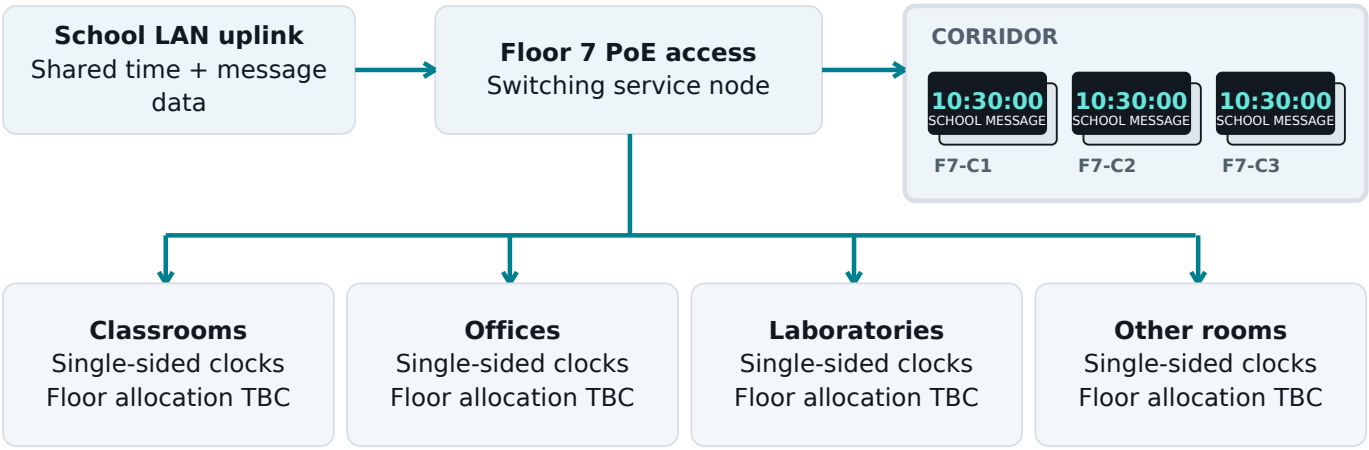
FLOOR NETWORK DIAGRAMS

Floor 7 synchronization

The seventh floor follows the same synchronization and PoE distribution principle, with three dual-sided corridor clocks connected to the school time service.

Floor 7 synchronization

3 dual-sided corridor clocks



Room quantities follow the final floor schedule. All clock connections shown are proposed NTP + PoE; each completed corridor assembly has two display faces.

Room allocation across all seven floors

School room group	Total clocks	Floor allocation
Classrooms	30 single-sided	To be confirmed by room schedule
Offices	20 single-sided	To be confirmed by room schedule
Laboratories	5 single-sided	To be confirmed by room schedule
Other rooms	7 single-sided	To be confirmed by room schedule
Indoor room subtotal	**62 single-sided**	**Building-wide total, not per floor**

Add 21 corridor assemblies and 2 playground clocks to the 62 indoor room clocks: 85 clock units in total. A dual-sided assembly counts as one unit.

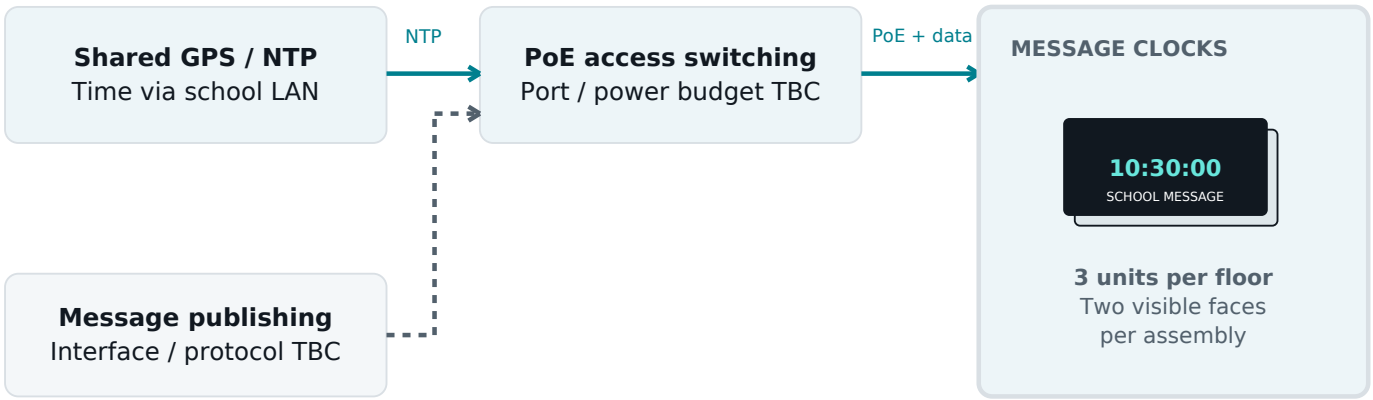
SCENE SYNCHRONIZATION DIAGRAMS

Corridors and classrooms

Each scene draws time from the shared school service. Solid links show network connections; dashed links show the proposed message-management path.

Corridor synchronization

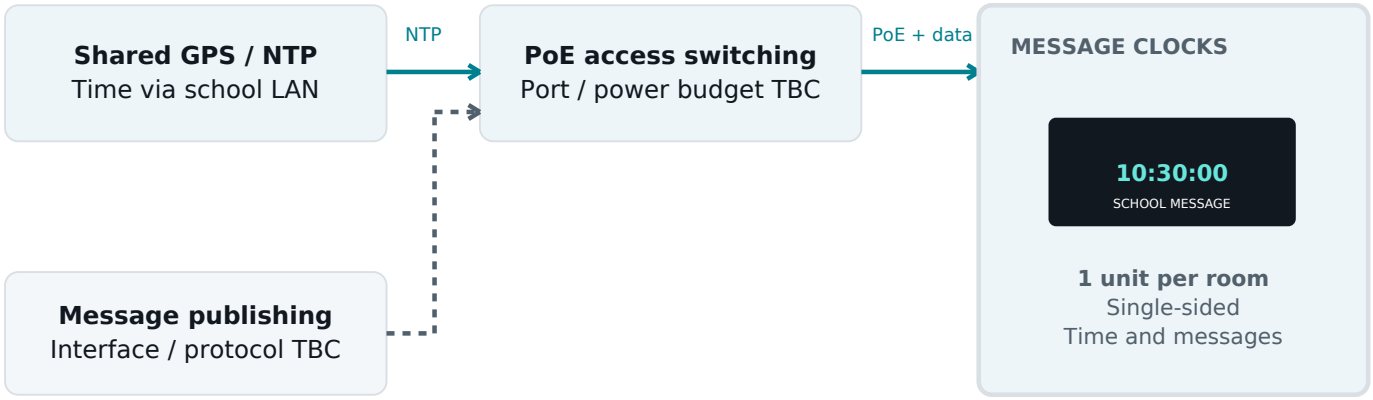
21 dual-sided assemblies



Provide three corridor assemblies on each floor. Orient both faces for the intended walking directions. Confirm the power demand and Ethernet-port count of each dual-sided assembly.

Classroom synchronization

30 single-sided clocks



Provide one clock in each classroom. Position the time and scrolling-message display where it can be read from the teaching and seating areas without covering boards or safety signage.

One central GPS/NTP server serves all scenes. Network nodes are functional symbols, not additional equipment quantities. Combined NTP/PoE message displays remain subject to configuration confirmation.

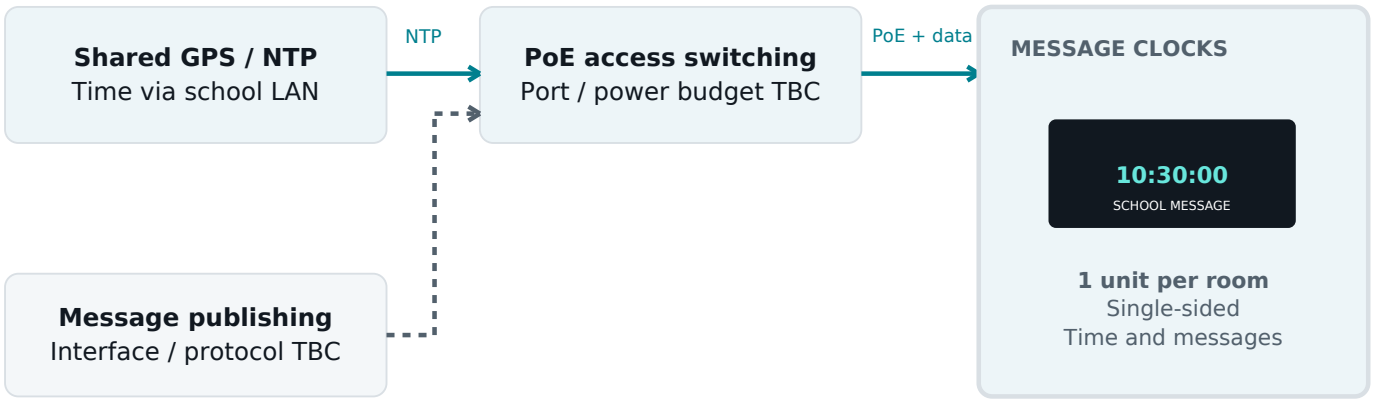
SCENE SYNCHRONIZATION DIAGRAMS

Offices and laboratories

Office and laboratory clocks use the same time reference as the classrooms and corridors. Message content and operator permissions follow the selected publishing configuration.

Office synchronization

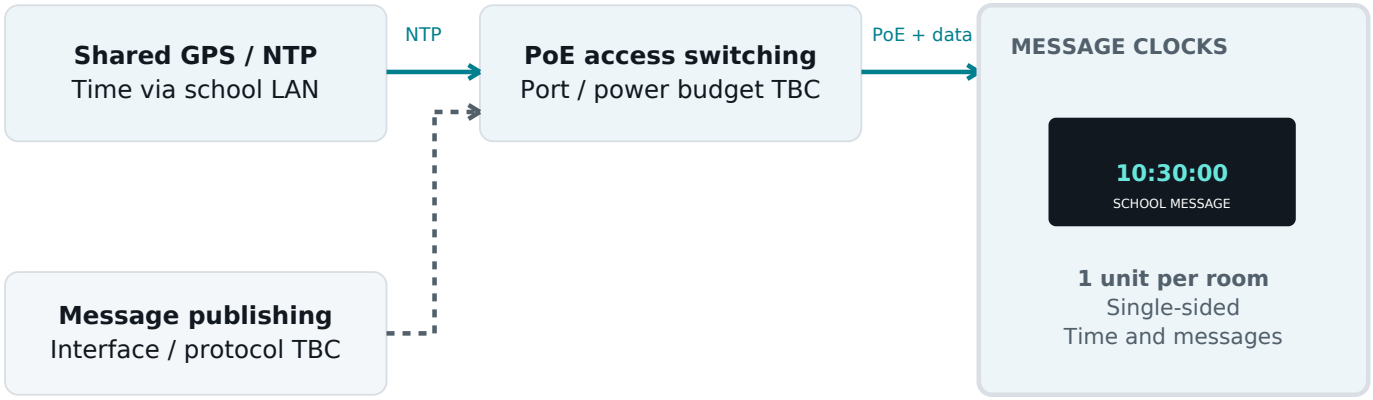
20 single-sided clocks



Provide one clock in each of the 20 offices. Connect each unit to the local PoE access service and select a clear sightline from the occupied work area.

Laboratory synchronization

5 single-sided clocks



Provide one clock in each of the five laboratories. Confirm mounting, glare and environmental suitability for the room. Agree any specialised timing requirement separately from the school clock display.

One central GPS/NTP server serves all scenes. Network nodes are functional symbols, not additional equipment quantities. Combined NTP/PoE message displays remain subject to configuration confirmation.

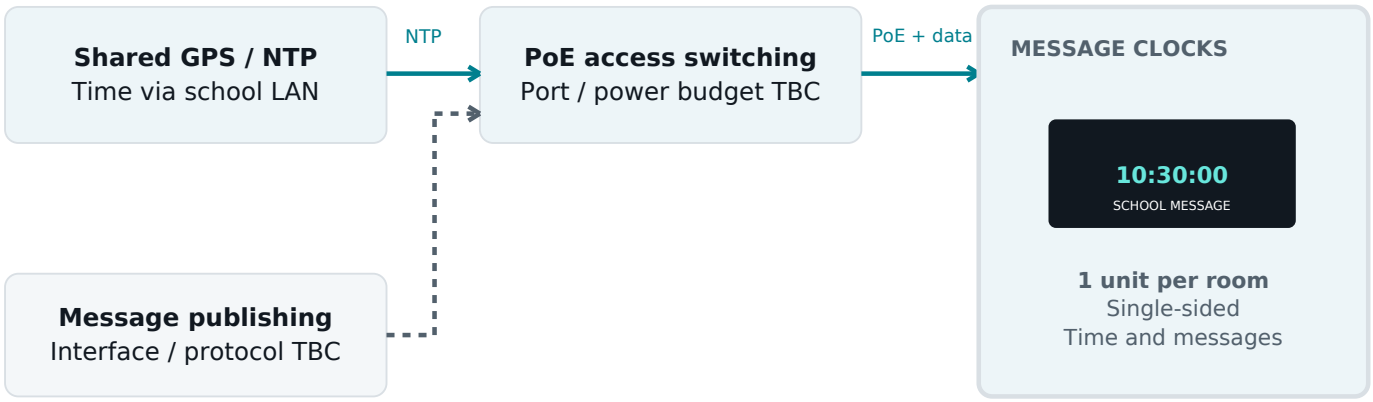
SCENE SYNCHRONIZATION DIAGRAMS

Other rooms and playground

The seven other-room clocks follow the indoor room connection principle. The two playground clocks require a verified outdoor display and protected network installation.

Other room synchronization

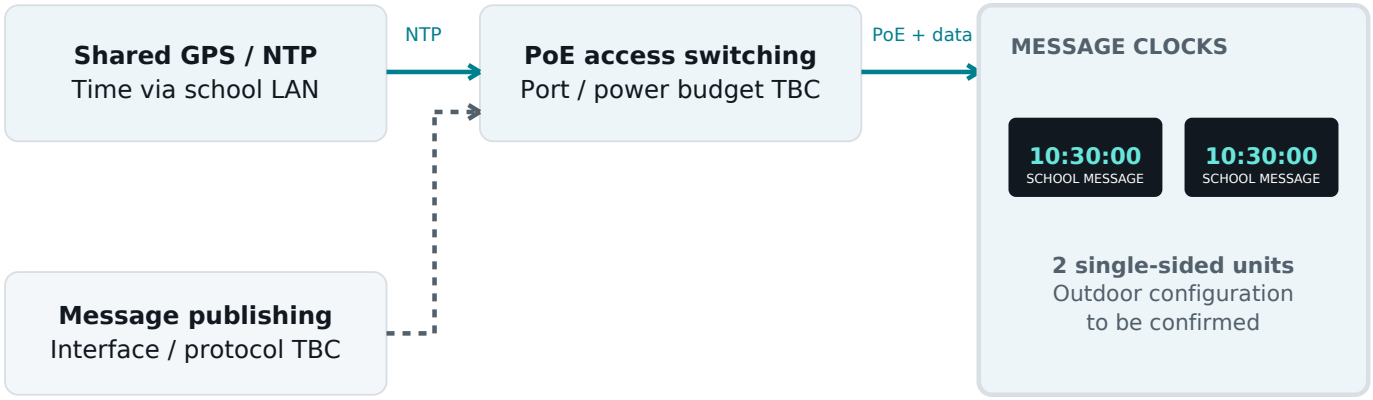
7 single-sided clocks



Provide one clock in each designated other room. Confirm the room use, display position and cable path in the final room schedule.

Playground synchronization

2 single-sided clocks



Orient both outdoor units toward their viewing areas. Confirm weather resistance and daylight readability. Keep copper Ethernet channels within 100 m; use fibre and a protected local PoE node where required.

One central GPS/NTP server serves all scenes. Network nodes are functional symbols, not additional equipment quantities. Combined NTP/PoE message displays remain subject to configuration confirmation.

CATALOGUE BASIS

Product selection

GPS referenced NTP server candidate

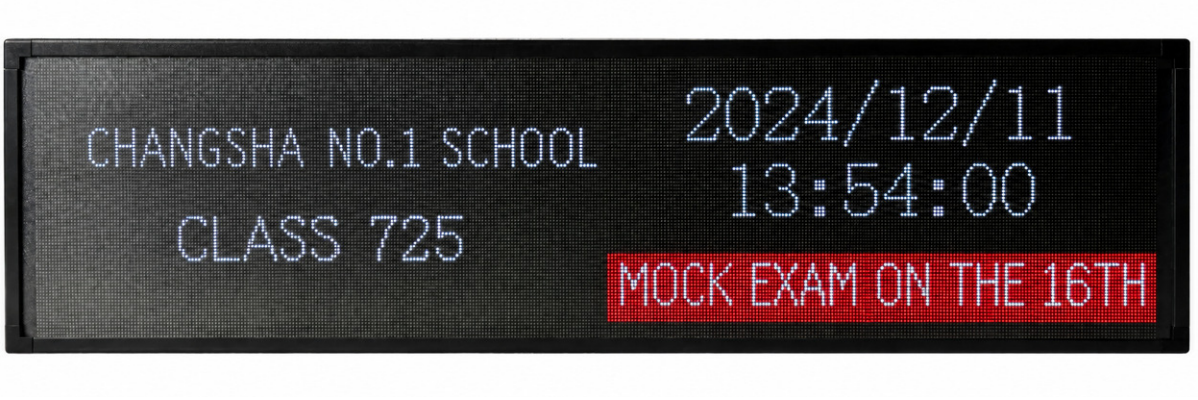


HCE5436A-IV with Opt N
The clock-server catalogue lists a 1U chassis, four 10 MHz outputs, four 1PPS outputs and dual AC inputs. NTP and RJ45 monitoring are available through Opt N. [1, p. 4]

Confirm the GPS receiving configuration, antenna and accessories, NTP service capacity, network settings and full ordered option code. The four physical signal outputs do not limit NTP service to four clocks and do not establish capacity for 85 clock units.

Catalogue product illustration. The exact supplied option configuration must match the final equipment schedule.

Message display design basis



SZ1867 dot-matrix display format
The general catalogue shows school announcements and HH:MM:SS. The listed unit is single-sided, 676 x 182 x 50 mm, with 220 V supply; character height depends on the customised design. [2, p. 3]

The standard SZ1867 entry is not a verified NTP/PoE solution. The required PoE, NTP, scrolling-message, dual-sided and outdoor configurations need manufacturer confirmation. Final dimensions may differ from the standard entry.

EQUIPMENT SCHEDULE

Display configurations and scope

The following display types are project descriptions, not new catalogue model numbers. Select the final orderable variants only after the manufacturer confirms the combined functions.

Project display type	Units	Required configuration
Indoor single-sided	62	30 classrooms + 20 offices + 5 labs + 7 other rooms; HH:MM:SS and message area; NTP + PoE.
Indoor dual-sided	21	Corridor assemblies; HH:MM:SS and message area on both faces; NTP + PoE; compatible suspension or bracket.
Outdoor single-sided	2	Playground displays; HH:MM:SS and message area; NTP + PoE; verified outdoor enclosure and readability.
GPS / NTP time server	1	HCE5436A-IV + Opt N candidate; GPS receiver configuration, antenna and accessories to be confirmed.

Associated system items

Item	Sizing basis
PoE switches and network uplinks	Serve seven floor zones and two playground positions. Switch quantity follows cable routes, port counts and power demand.
Message management	Compatible publishing software or controller, user access, message grouping and scheduling scope to be confirmed.
Installation materials	Ethernet and fibre links as required, brackets, rack accessories, antenna cable, surge protection and earthing.
Power and backup	Server and switch power supplies; UPS capacity and backup duration only if included in the final scope.

Confirm Ethernet-port count and maximum PoE draw per assembly, especially for dual-sided clocks. Do not size switches by display-face count or apply a single-sided power figure to a dual-sided unit.

DELIVERY SEQUENCE

Installation and commissioning

1 Finalise the site and product configuration

Confirm the room schedule, floor plans, viewing distances, mounting heights and playground exposure. Resolve the manufacturer configuration items before equipment is ordered.

2 Verify a representative display sample

Demonstrate six-digit time plus messages on the chosen single-sided and dual-sided formats. Verify scrolling-message operation, language rendering, colour, brightness, legibility and message behaviour during loss of connectivity.

3 Build and test the time and power network

Install the GPS antenna in a suitable sky-view location. Verify antenna lock, NTP service and display time zone. Test the selected PoE standard, per-port power and total switch budget under maximum display load.

4 Install clocks by the location schedule

Fit 30 classroom, 21 corridor, 20 office, 5 laboratory, 7 other-room and 2 playground units. Label each unit, port and cable. Confirm that corridor units are readable from both intended directions.

5 Test operation and recovery

Check all clocks against the same reference; agree the acceptable display-to-display time difference before testing. Verify GPS loss, network interruption, power restoration and message restoration using the agreed acceptance criteria.

6 Complete handover

Provide final equipment codes, IP and port schedules, cable and mounting drawings, configuration backup, operating instructions and test records. Train the nominated school operator to publish and withdraw messages.

Acceptance records

Record each clock location, face orientation, network identity, power draw, time-synchronization result and message-display result. Record the outdoor environmental specification and protection arrangements separately.

Time-source performance is not an end-to-end clock-display accuracy guarantee. System capacity, NTP behaviour and outage performance must be verified with the selected display configuration.

FINAL SELECTION

Configuration confirmations

Item to confirm	Required decision or evidence
Combined endpoint functions	An orderable display configuration supporting NTP, PoE, HH:MM:SS and the required message function together.
Message behaviour	Separate time and message areas or a combined layout; scrolling method; message length; font size; language, including Arabic if required; group control and scheduling.
Dual-sided construction	One assembly with two faces; final dimensions, weight, fixing, Ethernet-port count, power and behaviour of both faces.
Outdoor specification	IP rating, sunlight visibility, operating temperature, UV resistance, mounting and surge/earthing arrangement for the two playground units.
Time server and network	GPS receiver and antenna package; Opt N configuration; capacity for the installed NTP clients; PoE class/standard; local supply compatibility and applicable Saudi requirements.

Catalogue references

[1] Clock Server for Time Synchronization

HCE5436A-IV / Opt N: page 4. System-integration boundaries: page 2.

Open catalogue PDF

[2] Sync Clocks English Catalogue

SZ1867 message format: page 3. PoE-listed clock models: page 4.

Open catalogue PDF

[3] HCE Digital Synchronized Clocks Catalogue

NTP examples: pages 3 and 6. PoE and IP ratings are not specified: pages 10-11.

Open catalogue PDF

The general catalogue includes PoE models, while the HCE catalogue includes NTP models. These separate listings do not establish a combined NTP, PoE and message-display configuration. The proposed architecture keeps the requested GPS and PoE approach and identifies the product confirmations needed to implement it.