



Synco™ living

Communication

Devices of the Synco living range

- **Wireless communication KNX Radio (868 MHz)**
- **Bus communication KNX TP1**

Communication

Konnex

For devices used for the control of technical equipment and different types of systems installed in houses or buildings, communication based on open standards is becoming more and more important. The Siemens Synco living system is based on the open **Konnex** communication standard.

In 1999, the 3 Associations

- EIBA European Installation Bus Association
- BCI BatiBUS Club International
- EHSA European Home System Association

founded the Konnex Association with the objective to unite EIB (European Installation Bus), BatiBUS and EHS (European Home System) in one system. As a result, **Konnex (KNX)** evolved.

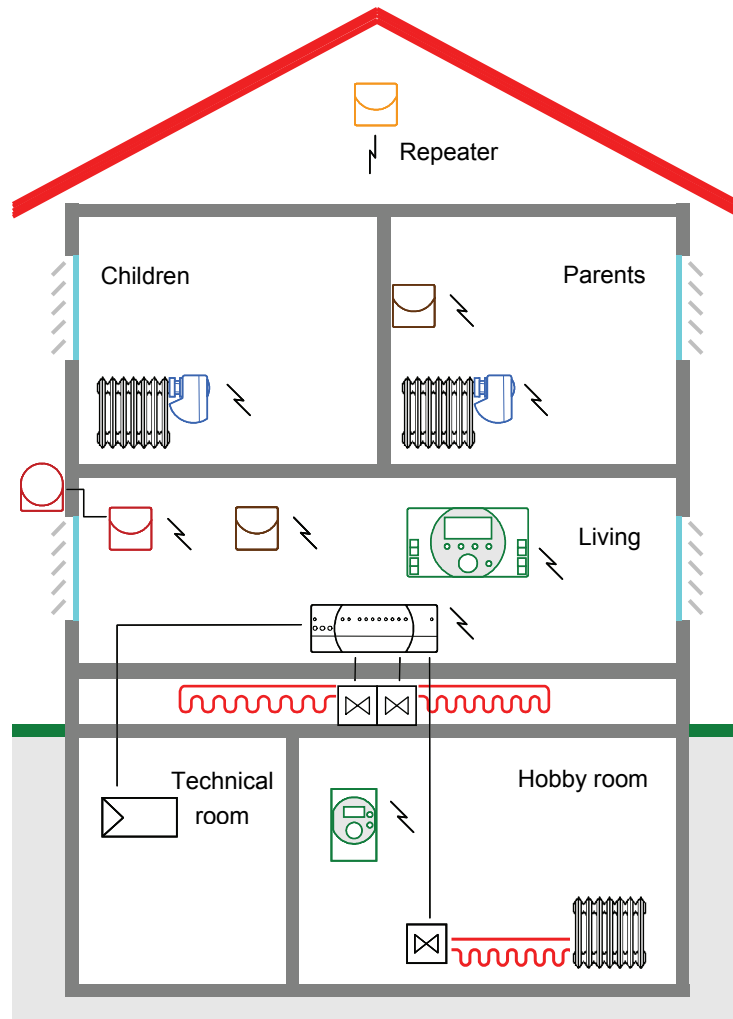
Konnex supports the trend toward the "smart house", which means that the various types of building services plant including lighting and security communicate via the same network. Konnex is based on the following principles:


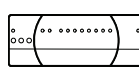






- Consistent support of wire-bound and wireless communication
- Interplay of products of different manufacture in the same communication network based on defined application profiles (e.g. hager and Siemens GAMMA wave)
- Straightforward commissioning of systems
- KNX certification

Communication media

In the Siemens Synco living system, the Konnex protocol is used for the transmission of process data between the devices and for commissioning and remote operation of the devices via the service and operator tool.

Synco living uses the 2 communication media **KNX RF** and **KNX TP1**.



	Central apartment unit QAX910		Heating circuit controller RRV918
	Room unit QAW910		Meteo sensor QAC910
	Room temperature sensor QAA910		RF repeater ERF910
	Radiator control actuator SSA955		Primary controller (heat generation)

KNX TP1: Wire-bound communication (Twisted Pair, EIB-compatible)

- For integrating other EIB / Konnex devices in the central apartment unit
- For commissioning / remote operation of the central apartment unit
- For wire-bound communication between zones / apartments and central systems or equipment, such as
 - primary heat generation (Synco 700)
 - telephone gateway (OZW775) for plant supervision and remote operation

For detailed information about KNX TP1, refer to Data Sheet CE1N3127en.

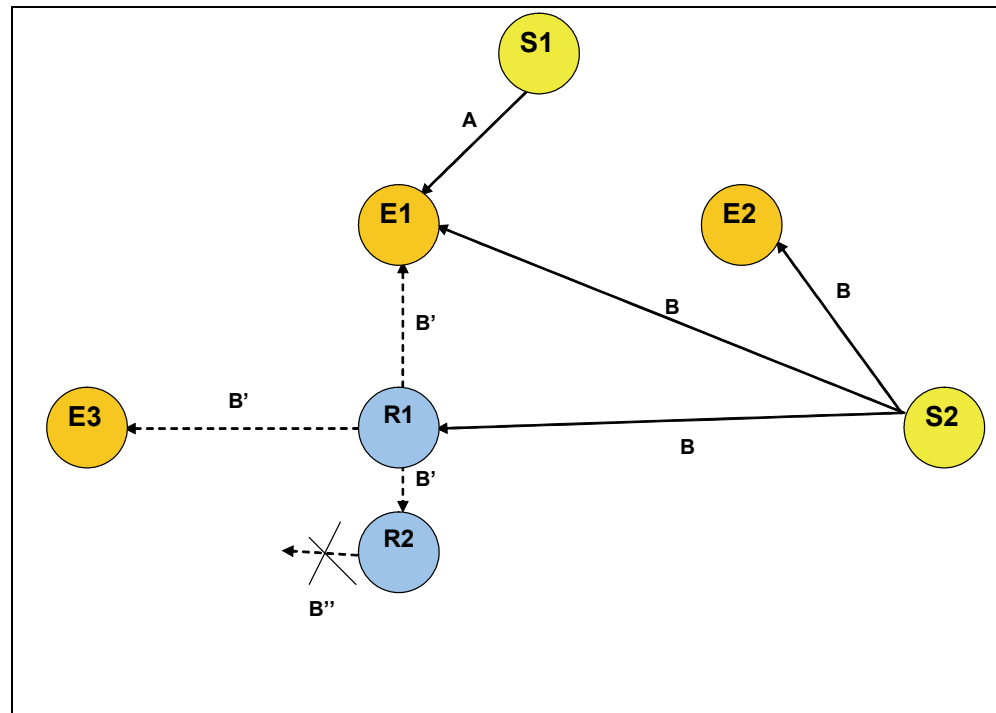
KNX RF: Radio communication 868 MHz

KNX RF covers heating control, light and blind control, security (smoke detectors, window contacts), etc., within a zone / apartment with no need for bothersome cabling. The frequency band used (868 MHz) ensures a high level of reliability.

Engineering notes KNX RF

Mounting location	<p>To ensure optimum radio coverage, the following points should be observed:</p> <ul style="list-style-type: none">• The distance to devices with electromagnetic emissions, such as wireless telephones, TV sets, PCs, microwave appliances, etc., should be at least 1 m• Larger items made of steel or construction elements with metal meshes (e.g. special glass or concrete), or metal foils in thermal insulation materials, mirrors or metal-coated heat absorbing glass, can have an impact on the range• The typical range between transmitter and receiver in residential buildings is 30 m, or across 2 floors, or 2 concrete ceilings. But depending on the type of house or building and the materials used, the effective range can be considerably greater or smaller. If greater distances are to be covered, RF repeaters should be used
Radio repeaters	<p>RF repeaters are used where transmitter and receiver are too far apart or where the radio signal is dampened by construction elements or equipment inside the house. The RF repeater receives radio telegrams from devices in its own system via the QAX910 central apartment unit and passes them on. The repeaters will be configured such that the telegrams they repeat are only telegrams received from devices with crucial ranges.</p>
Location of RF repeaters	<ul style="list-style-type: none">• If the radio path exceeds 30 m or stretches across more than 2 concrete ceilings or floors, an RF repeater should be used• If unexpected problems in terms of range occur, an RF repeater can be easily fitted at a later stage• Per system, up to 3 RF repeaters can be operated in <u>parallel</u>. Rerepetition across several repeaters (cascading) is not possible (also refer to the "Repeater example" on the next page)• If possible, the RF repeater should be located between transmitter and receiver of a crucial radio path

Repeater example



S1, S2 Transmitters
 E1, E2, E3 Receivers
 R1, R2 RF repeaters

- S1 sends telegram A directly to E1 with no repetition
- S2 sends telegram B directly to E1 and E2; however, E3 is too far away from S2 and can only be reached via repeater R1
- R1 repeats signal B from S2 and reaches devices E3 and E1 through B'; hence, E1 receives signal B from S2 directly and via R1
- R2 receives the repeated signal B'; retransmission by R2 is not possible

Compatibility of RF repeaters

The only type of RF repeater suited for use on Synco living plants is the ERF910. GAMMA wave RF repeater type UP 141 is not compatible with the Synco living system.

The Synco living system and the ERF910 repeater support the repetition of **GAMMA wave** radio telegrams.

- GAMMA wave actuators matched to the QAX910 central apartment unit can be directly assigned to an RF repeater
- Other GAMMA wave devices that do not directly communicate with the central apartment unit and – for this reason – have not been matched to it, can subsequently be acquired on the central apartment unit and assigned to an RF repeater

The Synco living system does not support the repetition of **Hager tebis** radio telegrams. If there are range problems in connection with Hager tebis TX devices, a Hager RF repeater will be required.

Technical data KNX RF

Frequency	868.3 MHz (868.0 – 868.6 MHz band) conforming to EN 300 220, CEPT ERC 70-03
Duty Cycle	<1 % to prevent interference with neighboring systems, transmitters may be switched on for short periods of time only (relative on time or duty cycle); devices operating with the 868 MHz band may use the radio channel for no more than 1 % of the time, thus ensuring high levels of availability and reliability of communication; typical radio channel usage of the Siemens Synco living devices is far below 1 %
KNX Protocol layers:	
- Physical Layer	- common Physical Layer Definition of Konnex and M-bus to EN 13757-4
- Link Layer Transport Protocol	- common Link Layer Definition of Konnex and M-bus to IEC870-5-2
- Higher potocol layers	- Konnex Layers 2, 3, 4 and 7 (analogous to TP1)
Modulation / data coding	FSK (frequency shift keying) / Manchester coding
Transmit power	typically 10 mW, max. 25 mW
Data rate	16.384 kBit/s
Data backup	high transmission reliability through CRC data block protection
Range (direct reception without repeater)	typically: - 30 m in the building - 300 m in open space
Number of RF devices per system	max. 64
Commissioning	devices are connected by pressing a button (easy installation)
Device identification	devices are integrated in the system during commissioning by means of an unambiguous 48-Bit identification number the 48-Bit identification number is contained in every radio telegram; this offers a clearly defined boundary to neighboring radio systems

KNX RF device classes	<ul style="list-style-type: none"> - unidirectional, sending only: specially suited for battery-powered sensors (very low power consumption and long battery life) - bidirectional, always ready to receive: specially suited for mains-powered devices - bidirectional, synchronous receive operation, time slot method: specially suited for battery-powered devices (low power consumption)
Number of RF repeaters per system	max. 3
Compatibility with M-bus radio	due to common definition of the lower protocol layers for KNX and M-bus radio, data exchange on the physical level is possible