

KANTECH HARDWARE

Architectural and Engineering Specifications KT-1 One Door Controller

KANTECH

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KT-1 One Door Controller

1. General

The purpose of this section is to define the minimum system requirements of the one door PoE controller. The door controller shall be the intermediate level of the security system. It will perform the functions of alarm acquisition, decoding and validating the state of cards and collecting data on the entry/exit of personnel. Should one of the door controllers be defective, it shall not affect the operation of the others. The door controller shall be built on microprocessor-based technology and be adapted to proximity card readers. It shall have proven itself on similar access control applications.

2. Controller Functions

- a. The KT-1 (also KT-1-PCB) shall be a one door PoE controller with the ability to support two readers (in/out) for that door.
- b. The door controller shall fit over a single gang installation enclosure or cabinet mount.
 - a. The KT-1 shall be installed over an electrical box near the door. The reader, door contact, request to exit and others components shall be wired directly to the KT-1.
 - b. The KT-1-PCB (version of KT-1) shall be installed in cabinet. The reader, door contact, request to exit and others components shall be wired directly to the KT-1-PCB.
- c. The KT-1 shall offer a multi-purpose single touch button to assist the integrator in quick and efficient installations
 - a. The KT-1 touch button shall be used to enroll a new KT-1 to the SMS.
 - i. Holding a new KT-1 touch button for 6 seconds shall enroll itself the SMS on the same local network.
 - i. The operator shall simply choose the KT-1 from the enrollment list in order to:
 1. Assign a KT-1 to a connection
 2. Name the door
 3. Activate the exit reader
 4. Activate the door contact
 5. Activate the request to exit
 6. The SMS shall auto-fill the MAC address and Serial Number. Having to manually enter the MAC address or Serial Number in the auto-enrolment shall not be acceptable.
 - b. The KT-1 touch button shall be used to enroll a new KT-1 as a secondary controller to the head KT-1.
 - i. Having multiple controllers on the same local network, the KT-1 shall offer the ability for them to communicate over IP as one connection in the SMS.
 - ii. The Head KT-1 shall be able to communicate over the internet to the SMS server and with the local KT-1 controllers at the same time.
 - iii. When the head KT-1 is communicating over IP to the SMS, additional KT-1 controllers shall pass through the first KT-1 controller to reach the SMS via IP.
 1. The benefit of this feature is to reduce connections to a SMS server over the Internet. The SMS shall see only 1 connection with up to 32 controllers.
 - iv. Each of the KT-1 controllers shall allow for other controllers to communicate over RS-485.
 - v. It shall be conceivable to link multiple KT-1s over IP to the head KT-1 IP controller. Each controller can be connected to other Kantech controllers over RS-485, for a total of 32.

- vi. In the event that the head controller loses communication, all the controllers shall go to standalone mode, and local controller operators such as schedule, holiday, card swipes, inputs/outputs, shall continue to function as before.
- c. The KT-1 touch button shall be used as an optional request to exit.
 - i. Once configured, the KT-1 touch button shall be used as a request to exit device.
- d. The KT-1 touch button shall be used to indicate the status of the KT-1's network, communication (RS-485), lock and relays.
 - i. Holding the KT-1 touch button for 3 seconds shall activate the status LEDs for 10 minutes.
 - ii. Holding the KT-1 touch button for 3 seconds again shall deactivate the status LEDs
- d. The KT-1 touch button LED color shall be changeable in the SMS and shall also be turned off if required by the SMS.
- e. The KT-1 installation shall be modular based and easy to maintain. The controller shall be serviceable without the need to re-wire the entire KT-1 each time. The KT-1 shall offer a removable terminal for quick servicing.
- f. The KT-1 shall be a one door controller with the ability to have an in-and-out reader. The need to add additional modules for the exit reader shall not be acceptable.
- g. The door controller shall control all the functions of local components attached to it. It shall monitor the opening times of each of the doors after an authorized access. It shall start the buzzer in pulse mode to signify a pre-alarm when half of the opening time has elapsed, and in permanent mode when the entire time has elapsed.
- h. The controller shall allow the local decoding and validation of at least 100,000 access cards and authorize entry without the intervention of the gateway.
- i. The response time between the moment when a card is presented at the reader and when the door is unlocked shall not exceed half a second. If an access card that is not locally memorized is decoded by the local controller, it shall communicate with the gateway which will perform the verification and authorize entry if the card is valid for the door in question. In such a case, the response time between the time when a card is presented at the reader and when the door is unlocked shall not exceed one second.
- j. In case of communication failure, the door controller shall execute all its functions normally, store the last 20,000 events or alarms and send them to the gateway when the communication link is restored.
- k. The controller shall be equipped with flash memory. Any new configuration or upgrading of the program shall be capable of being done from an access system workstation. SMS shall automatically download the modifications without the need for the operator to manually download the data. The maximum time for completely charging all controllers shall not exceed five minutes.
- l. The entire database can be stored in memory. In addition, the real-time clock will remain active even if the emergency power fails.

- m. The door controller shall be modular in design, allowing it to be expandable by addition of entry/electronic modules. The door controller shall acquire alarms, monitor states, and manage and provide electrical power to the following local components, such as, but not limited to:
 - i. Magnetic contacts
 - ii. Electric strikes
 - iii. Card readers
 - iv. Exit request sensors
 - v. Buzzers
 - vi. Motion sensors
 - vii. Glass break detectors
- n. The KT-1 controller shall supervise up to 4 onboard monitoring points.
 - i. From the SMS, it shall be possible to determine for each of the points if they are none, single, or double, end of line supervision.
 - ii. All the onboard points shall be configured as the same supervision types, or they shall be able to overwrite the default supervision setting, and replace it with their own.
 - iii. Each of the points shall inform the SMS during an alarm, a short circuit, grounding, an open circuit, or upon return to normal, when programmed as double end of line supervision.
 - iv. The need to cut resistors or change jumper/dip switches on the KT-1 controller to change the supervision type shall not be acceptable.
 - v. These points shall be located up to six hundred (600) meters away and be connected by a cable made up of 2 unshielded 22 gauge wires.
 - vi. Additional inputs points may be added to the KT-1 by using expansion modules.
- o. The KT-1-PCB version controller shall have two onboard Form C relays. The KT-1 controller shall have two onboard open collector outputs.
- p. The KT-1 door controller shall be able to power door opening devices such as strikes.
 - i. The door lock output shall be 12 volts DC 250ma when the KT-1 is powered over PoE.
 - ii. The door lock output shall be 12 volts DC 750ma when the KT-1 is powered over PoE+ or 12volts DC 2.2amp.
 - iii. The controller shall supervise and report to the SMS any fault or tampering of the lock devices.
- q. The KT-1 door shall able to perform the following operations from the SMS workstation, web or mobile:
 - i. Lock and unlock door
 - ii. Temporarily unlock door using a customizable timer (ignores door contact) for up to 18 hours
 - iii. Unlock a door as a “one time access”
 - iv. Return the door back to schedule
 - v. Enable and disable readers
 - vi. Arm and disarm doors with alarm integration

- r. Each KT-1 shall support 8 different Wiegand card formats.
 - From the SMS, the operator can choose from an extensive list of pre-existing drivers. If the driver does not exist, new drivers can be created and then downloaded to the controller.
- s. The controller shall be able to accommodate four readers or keypads and allow the integration of various types of readers such as Proximity, Magnetic, ABA, Wiegand or bar codes for each software configuration without using keypads or switches.
 - i. The reader terminal shall have the following input and output connections:
 1. Data 0 and Data 1 terminals
 2. 5 Volts 125mA output terminal
 3. 12 Volt 125mA output terminal
 4. Ground terminal
 5. Four outputs (led, Buzzer, out1, out2)
 - These outputs shall be pre-programmed from the SMS. The operator shall have the ability to change them.
 - ii. When using reader and/or keypads device, the controller shall be allowed to accept per reader/door:
 1. Only a card
 2. Keypad pin numbers or card swipes
 3. A card and then keypad pin number
 - a. This feature shall be enabled on a schedule
 - b. This feature shall offer the possibility of activating it to certain card holders. All other card holders shall present their cards and enter the door based on their access level.
- t. The KT-1 door shall support Americans with Disabilities Act (ADA) settings.
 - i. Each door shall have a main door unlock timer and a door opened contact timer.
 - ii. Each door shall have a secondary unlock timer and a door opened contact timer.
 - iii. Doors shall be able to activate the lock output and a relay, when triggered as ADA.
 - iv. The card holder shall be programmed in the SMS as ADA.
- u. The KT-1 door shall support multi-swipe to be able, but not limited, to :
 - a. Toggle door unlock
 - b. Unlock door
 - c. Relock door
 - d. Temporarily unlock door
 - e. Activate relay
 - f. Temporarily activate relay
 - g. Arm door partition

- v. If the KT-1 door is equipped with a card reader, the controller shall offer to connect two different supervision points as request to exit mechanisms (REX).
 - i. At a minimal level, the REX device shall shunt the door contact so that no alarm is generated when a person is exiting the door.
 - ii. Each REX shall be programmed independently from each other so it shall be possible to determine:
 - 1. If the REX will unlock the door locking device to follow the unlock time programmed in the SMS door configuration.
 - 2. In high traffic locations, the REX shall be programmed as a resettable REX, this function will reset the shunting time of the door contact.
- w. The KT-1 shall interface with any external alarm system, thereby arming or disarming the system by presenting a valid card to an entry / exit door. It also shall be possible to associate a keypad with a reader forcing the cardholder to enter a number in the keypad after presenting a card. This integration shall only be possible with the use of a Corporate Gateway or EntraPass Special Edition. At a minimum, it shall be possible to:
 - i. Set a monitored input as an arming button
 - ii. Associate a usage schedule with an arming button
 - iii. Set the exit and entry delay
 - iv. Determine whether the system must wait for a valid access to arm
 - v. Determine whether the system must wait for a valid access card swipe and appropriate pin number to disarm
 - vi. Determine whether the door must relock on arming request
 - vii. Associate a monitored input with an alarm panel condition
 - viii. Lock a door unlocked by a schedule when armed
- x. The KT-1-PCB shall allow interface with the DSC PowerSeries® or Maxsys 4020 intrusion panel, thereby eliminating hardwired integration between KT-1-PCB controller and the DSC PowerSeries® or Maxsys 4020 intrusion panel. The DSC PowerSeries® or Maxsys 4020 intrusion panel shall communicate directly to a KT-1-PCB controller using a data cable. This integration shall only be possible with the use of a Global Gateway, KT-NCC, Multi-site gateway or EntraPass Special Edition. The SMS shall allow for:
 - i. Single / multiple partition arming and disarming via reader
 - Disarm via card only or forced valid card and pin
 - ii. Single / multiple partition arming and disarming via operator commands
 - iii. Receive events from intrusion panel
 - iv. Receive partition names, user codes and zone names programming
 - v. Update user codes
 - vi. Assign user codes to cardholders
- y. The KT-1 shall have the ability to connect via key switch arming and inputs to virtually any intrusion panel. The external intrusion integration shall allow for specific access levels to have the right to arm and disarm. The access levels can be different for arming and disarming if needed by the administrator.
- z. In all communication methods, the door controller shall retain in its memory all necessary data, such as, but not limited to, card numbers, access levels, schedules, holidays, door, relays and input programming. In case of communication failure, the door controller shall execute all its functions normally without going into a degraded mode.

- aa. Each KT-1 shall have over 6 onboard LEDs to indicate the status of various controller components, such as relay status, door, IP status. The LED shall clearly indicate the RS-485, lock, relays and network status. The controller shall have a multi-indication heartbeat LED light that shall indicate the exact status of the KT-1 controller. There shall be a heartbeat LED status.

3. Global Gateway Integration

- a. The controllers connected under a Global Gateway shall function in the same manner as mentioned in the document (unless specified as corporate gateway only). The controller shall be connected via Ethernet or RS-485 to a Global Gateway or KT-NCC. The Global Gateway or KT-NCC shall receive all events and decide what commands the controllers will perform based on the events received or pre-defined tasks
- b. In the case of communication loss with the Global Gateway or KT-NCC, the controllers shall continue to work as mentioned in this document without any loss of controller features.
- c. Refer to *EntraPass Global Architectural and Engineering specification* for complete functionality.

4. Power requirements

- a. The controller shall have its own power unit and be able to support connected components using direct current. In case of AC failure, when using the power supply wiring instead of PoE, a 12 volt 7 amp/hour battery shall maintain all system functions for at least 3.25 hours with a full load of 1.5amp. When power at power terminals falls below a critical threshold, the controller shall shut down. This will avoid an erratic performance of the system that could generate bad commands or information.
- b. When a door controller is affected by failure of alternating current or by a defect in external batteries, the SMS shall be informed immediately.
- c. The KT-1 shall offer an optional power supply, transformer and battery backup if not powered over PoE. The Power supply shall be CSA/UL certified
- d. To prevent any damage from external sources, each of the protected power outputs of the door controller shall be equipped with a **resettable fuse** device against power overload that requires no human intervention when the overload is removed.
- e. The KT-1 shall have a 128mb of RAM memory to retain the programming data such as cards, schedule relays, doors and others. In case of AC and battery backup failure, the information shall be kept for a minimum of 75 hours.

5. Input and output functionality

- a. Inputs shall be programmed as any of the following functions but not limited to:
 - i. Door contacts
 - ii. T.Rex (Request to Exit Detector) buttons or sensors
 - iii. Interlock mantrap sensors and inputs
 - iv. Floor Selection for Elevator Application
 - v. Elevator floor confirmation
 - vi. External Alarm System Status (Armed / Disarmed)
 - vii. External Alarm System Alarm (Alarm / Secure)
 - viii. External Alarm System Zones
 - ix. Relays to trigger on each input in alarm event
 - x. Input shunting: a single or a group of inputs can be permanently or temporarily 'shunted' to a secure state. Shunt methods include:

1. Input Shunting by another input: when an input in alarm is programmed to shunt another input / group of inputs.
 2. Input Shunting on Unlock: when an input is temporarily set to its actual state (alarm or secured) after an access granted.
 3. Manual Shunt: operator can manually 'Shunt' an input to a secure state.
 4. Disarmed Door Shunt: when alarm system is disarmed, some inputs may be 'Shunted' to a secure state.
 5. Entry / Exit Delay Shunt: when a user is in the process of disarming / arming the alarm system and entry / exit delay prevails, some inputs may be 'Shunted' to a secure state.
- xi. Arming / Disarming Request
 - xii. Postpone Arming Request
- b. A built-in tamper shall be a non-programmable 'Fixed-Function' input. It shall be used to identify tampering of the KT-1.
 - c. Relays shall be programmed as any of the following functions limited to:
 - i. Each relay shall have the option of being programmed to follow the lock output terminal.
 - ii. Each relay shall be have the option, but not limited to:
 1. Follow an activation schedule to activate automatically during this schedule
 2. Follow a disable relay schedule. This schedule will disable the relay from functioning and being activated from other components such as inputs and door actions.
 3. Manual operations from the SMS

6. Communication Methods

- a. The controller shall have be able to communicate via, RS-485 or Encrypted Ethernet
 - i. Encrypted Ethernet communication
 1. The first controller of every loop shall have the possibility to communicate with the Global Gateway, KT-NCC, Multi-Site Gateway or EntraPass Special Edition over a low bandwidth 128-bit AES Encrypted network.
 2. When communicating via Internet or GSM connection the communication shall be a secured 128-bit AES Encrypted Ethernet communication.
 3. The communication via Internet connection shall be extremely low bandwidth, no more than 5Kb/second when sending 10 messages and less than 1Kb/minute during standby. The controllers shall be able to communicate to the SMS via DNS (domain name).
 4. The remote controller location shall not be required to have a static public IP address for their Internet connection
 5. The controller shall support:
 - a. TCP and UDP protocols
 - b. DHCP for communication and initial communication
 - c. Default Static IP address for initial programming to be used with non DHCP networks

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- d. Domain Name Resolution (DNS)
 6. The controller shall communicate with the SMS Global Gateway, KT-NCC, Multi-Site Gateway or EntraPass Special Edition via Local Area Network (LAN) and Wide Area Network (WAN).
 - a. If communicating over WAN; there shall not need for ports to be opened on the controller side.
 - b. The controller side of the network shall have a public DHCP IP address or static IP address.
 - c. Controllers that require a public static IP address to communicate over WAN shall not be permitted.
 - ii. RS-485:
 1. The KT-1 controllers shall communicate with the SMS Multi-Site Gateway or EntraPass Special Edition KT-NCC, or global gateway computer via RS-485 using a VC-485 or USB-485.
 2. The KT-1 controllers shall be wired in daisy chain using an RS-485 cable.
 - b. The controller shall be connected together on a loop that handles up to 32 controllers using two unshielded 24-gauge wires over a distance of 4,000 feet. They shall communicate at a speed of 115 200 bauds. (Reference: Belden # 1227A)

7. Technical Specifications

- a. The KT-1 shall be powered by PoE, PoE+ or a 12volts DC 2.2amp power supply
- b. The operating temperature shall be 2°C to 40°C (35°F to 104°F)
- c. The KT-1 shall support the following reader types: Wiegand, proximity, bar code, magnetic integrated keypad, smartcards and other
- d. The KT-1 shall have 4 monitored input zones. The inputs shall be programmable NO/NC. The inputs shall support no, single or double end of line resistance.
- e. The door locking devices shall output up to 12Vdc 750mA (when powered with PoE+ or 12volts DC) supervised for the lock output device.
- f. Reader power output shall be 12Vdc 400mA for each readers
 - The reader power shall be protected and supervised.
- g. The KT-1 auxiliary power output shall 12Vdc 500mA.
- h. The KT-1 shall offer four auxiliary outputs per reader for the led and buzzer, out1 out2.
 - Each led, buzzer, out1 and out2 output shall output 12Vdc 25mA maximum.
- i. The two onboard Form C relay controlled outputs shall support current of a maximum 30Vdc 3Amps when using the KT-1-PCB.
- j. The two onboard open collector outputs controlled outputs shall support current of a maximum 12volts dc 25mA when using the KT-1.
- k. The KT-1 shall have the following certifications:
 - i. EN55022, EN60950, EN50130-4 :20122, EN60839-11-1 Grade 1
 - ii. FCC: Class A
 - iii. UL 294 Listed
 - iv. UL 1076 when connected with KT-NCC, EntraPass Global Edition and using a redundant server.
 - v. C-Tick

- vi. CE
- vii. NMB-003
- viii. IC
- ix. RoHS

Testing Agencies

1. The following hardware have been tested and listed by Underwriters Laboratories (UL) for UL 294 for Access Control System Units.
 - a. KT-300
 - b. KT-1 and KT-1-PCB
 - c. KT-400
 - d. IP link
 - e. P225W26
 - f. P225KPW2
 - g. P225XSF
 - h. P225KPXSF
 - i. P325W26
 - j. P325KPW26
 - k. P325XSF
 - l. P325KPXSF
 - m. KT-MOD-REL8
 - n. KT-MOD-INP16
 - o. KT-MOD-OUT16
 - p. KT-3LED-Plate

2. The hardware shall comply with the following regulatory requirements:
 - a. FCC Part 15 Class A
 - b. ICES-003
 - c. CE
 - d. ECCN for AES 128 bit encryption for IP communication
 - KT-1, IP Link or KT-400 only
 - e. Government standards NISPOM 5-313 Automated Access Control Systems, DICD Annex F 2.3 Accept/Reject Threshold Criteria, JAFAN Annex D 2.3 Accept/Reject Threshold Criteria

