RS-485 Keypad

Heavy Duty Keypad

INSTALLATION & INSTRUCTION MANUAL

Essex Electronics

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Essex Electronics

Heavy Duty RS-485 Keypad

Document Information

Installation/Operation Manual for KTP-485 Keypads - May 2009.
This documentation is also applicable to prior revisions except where noted.

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Introduction

Overview - Heavy Duty RS-485 Keypad For Industrial Process Control Equipment

3x4 Keypad (left) and 2x6 Keypad (right)

The KTP Series 12-Pad features no moving parts, rugged stainless steel construction and circuit assembly encapsulation to ensure performance in high use or harsh environments. Ideal for process control equipment and SCADA systems, the KTP-485 Keypad is designed to provide bi-directional serial communications protocol in Hexadecimal 7-bit ASCII data. Configurable in the field, up to 128 keypads can be added on the RS-485 network with selectable parity and baud rates up to 115.2 kbps. Data can be transferred using either Polling Mode for complete master bus control or Event Mode which provides asynchronous data transfers on the bus. The RS-485 connection is slew rate limited and provided with +/- 15KV ESD protection. The RS-485 is available as a 3x4 or 2x6 Keypad. Custom graphics are available.

Keypad

Keypad Specifications

Input Voltage:	5VDC or 12 to 24VDC (Jumper Selectable)
Standby Current Draw:	25mA
Outputs:	4 Open Collector, 1/4 A Max to Ground
Keypad Switch Life:	>1 Billion Cycles
Keypad Operating Environment:	-40°C to +70°C (-40°F to +160°F), 100% Relative Humidity
3x4 Keypad Dimensions:	5-1/8"H x 3-3/8"W x 7/16"D (13 x 8.6 x 1.1 cm)
2x6 Keypad Dimensions:	7-1/8"H x 1-3/4"W x 3/4"D (13 x 8.6 x 1.1 cm)
3x4 Keypad Weight:	16 oz (454 gm)
2x6 Keypad Weight:	4.4 oz (125 gm)
LED's:	1 Red, 1 Green

Keypad Part Numbers

3x4 Keypad

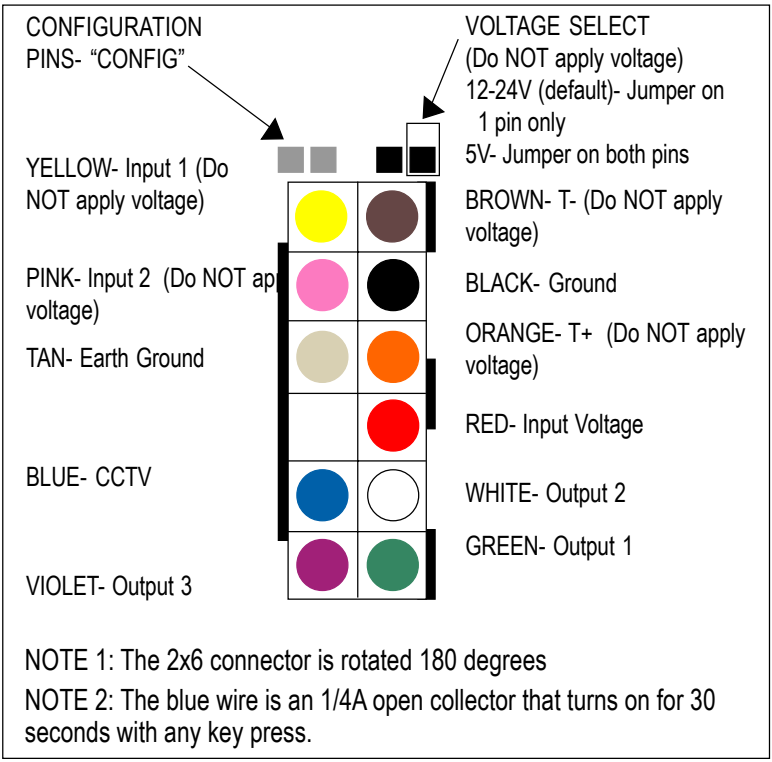
KTP-4853-BN	Brass Finished* Bezel
KTP-4853-SN	Stainless Steel Bezel
KTP-4853-KN	Black Bezel
KTP-4853-XX	No Bezel

2x6 Keypad

KTP-4852-BN	Brass Overlay
KTP-4852-LI	Illuminated
KTP-4852-SN	Stainless Steel Overlay
KTP-4852-LR	Braille Overlay

*Bezel is brass in appearance. Actual bezel is PVD-coated stainless steel.

Keypad Connector Diagram



NOTE 1: The 2x6 connector is rotated 180 degrees

NOTE 2: The blue wire is an 1/4A open collector that turns on for 30 seconds with any key press.

Keypad

Configuring The Keypad

The keypad's Device Address and RS-485 Serial Communication settings are set using a special Configure Mode. To enter Configure Mode power must first be remove from the keypad. After power is removed, jumper the Configure Pins together and then apply power to the keypad. Leave the configure pins shorted until the keypad sounds 4 short beeps (about 4 seconds). At this time the Red LED will be ON and the Green LED will be Flashing Fast to indicate Configure Mode is active. After configuration has been completed, normal operation is restored by removing power from the keypad for several seconds and then reapplying power with the jumper removed from the configure pins.

Each item to be configured is done in the same way. First, the configuration item number digit is pressed. After this digit is entered, three short beeps will be output and the LED's will change to Red Flashing Flash and Green On Solid. Next the configuration values for that item are entered. After the values are entered the keypad will output 4 short beeps to indicate the configuration item has been set. It should be noted that the number of digits for the item's value varies with each item type. A Long beep at any time means an invalid entry was made and the item needs to be reentered from the start.

Configuring The Device Address

The Device Address is the address value that the keypad may respond to. It may be set to a value of 0x00 to 0x7F hex. To set the Device Address, enter the digit '1'. After the three beeps, enter three address digits (DDD) which are the DECIMAL Device Address for the keypad. These can be in the range of 000 to 127 (decimal) for address 0x00 to 0x7F (hex). After the third digit is entered the keypad will output 4 short beeps to indicate the address has been set.

Device Address:

1 D D D

D D D = DEVICE ADDRESS 3-DIGIT DECIMAL (000-127)

(FACTORY DEFAULT=001)

Configuring The Baud Rate / Parity

To set the keypad's RS-485 communication Baud Rate and Parity, enter the digit '2'. After the three beeps enter a single Baud Rate digit (B) followed by a single Parity digit (P). After the parity digit is entered, the keypad will output 4 short beeps to indicate the baud rate / parity has been set.

BAUD RATE / PARITY:
2 B P
| |

Baud Rate / Parity:
2 B P
| |
| P: 0- No Parity (FACTORY DEFAULT)
| 1- Odd Parity
| 2- Even Parity
|
B: 0 = 4800 Baud
1 = 9600 Baud
2 = 19.2K Baud (FACTORY DEFAULT)
3 = 38.4K Baud
4 = 57.6K Baud
5 = 115.2K Baud

Configuring The RS-485 Turnaround Delay

The Turn Around Delay is the time between when a command is received by the keypad and it begins to send its response. This allows time for the RS-485 bus to stabilize. This may be set to a delay of 0 to 4950 uSec in 50 uSec steps. To set the Turn Around Delay enter the digit '3'. After the three beeps, enter a two digit value (TT) from 00 to 99 which sets the delay to the value entered multiplied by 50 uSecs. After the second value digit is entered, the keypad will output 4 short beeps to indicate the baud rate / parity has been set.

Turnaround Delay Setting:

3 T T

T T = 2 Digit Turn Around Delay (00-99) Value

Delay = Value * 50uSec (DEFAULT 00 = 0 uSec)

Configuring The Power Up Indicator/Output Settings

When the keypad powers up or is reset, the Indicator/Outputs will always be set to a predefined state. This state may be programmed in the Configure Mode. It can also be programmed or changed using RS-485 commands. To program the settings in configure mode enter the digit '4'. After the three beeps enter Five Digits (A1,A2,A3,RL,GL) which set each of the 5 indicator/outputs to their power up state setting. See the table below. After the fifth digit is entered the keypad will output 4 short beeps to indicate the power up settings have been set.

Power Up Indicator/Output Settings:

4 A1 A2 A3 RL GL

GL: 0 - Green Off (FACTORY DEFAULT)
1 - Green On
2 - Green Off + Flash On Beep
3 - Green On + Flash On Beep
4 - Green Follow Input 1
5 - Green Follow Input 2
6 - Green Follow Input 1 + Flash On Beep
7 - Green Follow Input 2 + Flash On Beep
8 - Green Slow Flash
9 - Green Fast Flash

RL: 0 - Red Off
1 - Red On
2 - Red Off + Flash On Beep
3 - Red On + Flash On Beep (FACTORY DEFAULT)
4 - Red Follow Input 1
5 - Red Follow Input 2
6 - Red Follow Input 1 + Flash On Beep
7- Red Follow Input 2 + Flash On Beep
8 - Red Slow Flash
9 - Red Fast Flash

A3: 0 - OUT 3 Off (FACTORY DEFAULT)
1 - OUT 3 On

A2: 0 - OUT 2 Off (FACTORY DEFAULT)
1 - OUT 2 On

A1: 0 - OUT 1 Off (FACTORY DEFAULT)
1- OUT 1 On

Configuring The Event Mode Settings

The keypad will always send a response to a command. In addition, the keypad can be configured to send data asynchronously whenever keypad data has been entered or an input state changes. This is called “Event Mode.” The Event Mode may be programmed in the Configure Mode. It can also be programmed or changed using RS-485 commands. To program the Event Mode in configure mode, enter the digit ‘5’. After the three beeps, enter a single digit (EV) which sets the Event Mode of the keypad. After this digit is entered, the keypad will output 4 short beeps to indicate the Event Mode setting has been set.

EVENT OPERATION SETTINGS:

5 EV

|

EV: 0 - No Events Sent (FACTORY DEFAULT)

1 - Send Key Entry Events Only

2 - Send Input Change Events Only

3 - Send Input and Key Events

Keypad RS-485 Data Packet Formats

Packet Wrapper

Data transfer to and from the keypad is accomplished using an 18 ASCII character set. These characters are the start character, colon [:], the end character, asterisk [*], and the 16 characters representing a hexadecimal digit, [0-9,A-F].

All keypad information, both sent and received, is exchanged using a standard packet format. This packet is composed of a Header Field, a Data Field, and a Trailer Field.

The Header Field consists of three ASCII characters. The first start character is always an ASCII colon [:]. The next 2 characters are the 7 bit binary device address sent as 2 ASCII hex digits [00-7F].

The Data Field contains transaction information. This field would be a Command Data Field if the data is a command being sent to the keypad or a Response or Event Data Field if the data is a response or event being sent from the keypad.

The Trailer Field consists of three ASCII characters. The first 2 characters are an 8 bit binary Longitudinal Redundancy Check sent as 2 ASCII hex digits [00-FF]. This LRCC is calculated on all the data in the packet except the start character [:] and the end characters [*]. The last character in the trailer is always an ASCII asterisk [*].

All the Data Field types (Command, Response and Event) are wrapped inside this packet format.

RS-485 PACKET FORMAT

HEADER		DATA	TRAILER	
START [:]	DEV ADDR	Data Field	LRCC	END [*]

HEADER

START	ASCII, Colon [:]
DEV ADDR	A 7-bit binary Device Address sent as a 2-digit ASCII hex value [00–7F]

DATA

DATA FIELD	A Field containing either a Command, Response or Event Data Field.

TRAILER

LRCC	8-bit binary Longitudinal Redundancy Check value sent as 2 ASCII hex characters [00-FF]. The LRCC Excludes the Start and End characters.
END	ASCII Asterisk [*]

Commanding The Data Field

The Command Data Field consist of a Command Field and possibly a Data Field. The Command Field is a hex command value in the range of [00-6F] which is sent as 2 ASCII hex digits. The Data Field, if required, is comprised of ASCII hex character data [0-F] information. Most commands do not require a data field and are only the 2 ASCII hex command digits. Several commands require additional data and will have a Data Field. The length of the Data Field will depend on the command being sent. See Command Section.

COMMAND DATA FIELD FORMAT

COMMAND	DATA

COMMAND

The Command is the operation the keypad is to perform and is a value in the range of [00-6F] sent as 2 ASCII hex characters. These values are explained in the Command Section.

DATA

Most Commands do not require additional data and will not have a Data Field. A few commands require some additional data and that information is contained here. The length of the Data Field depends on the command being sent. This is explained in the Command Section.

Response Data Field

When a command is sent to the keypad, the keypad will respond with a Response Packet. This response is a standard packet containing the following Data Field.

The first field is a Command+Error Field containing the 7-bit binary command value it is responding to sent as a 2-digit ASCII hex digits. If the command caused an error, the value of the command will have the high order bit (0x80) turned on. If the high order bit is on, the Data Field will indicate the type of error. The one exception to this is if the Command+Error value is between 70 and 7F hex. In this case, the packet is an Event Generated Field and not a response to a command. See Event Generated Data Field.

The Data Size Field contains an 8-bit binary byte count sent as 2 ACSII hex digits. This value is the number of Data Bytes to follow.

The Data Field contains the response data. This data is always sent as ASCII hex characters (0-F).

RESPONSE DATA FIELD FORMAT

COMMAND+ERROR	DATA SIZE	DATA

COMMAND+ERROR

8 bit binary value sent as 2 ASCII hex characters [00-FF]. The 8 bit value is the command value sent by the master The value will have hex 0x80 added to the command value if an Error occurred If the first character is an ASCII [7] the packet was generated from an event and not from a poll command. It must be treated as an Event Generated Data Field.(See Event Generated Field)

DATA SIZE

8 bit binary value sent as 2 ASCII hex characters [00-FF] indicating the number of ASCII data characters to follow in the DATA Field

DATA

ASCII hex character data [0-F] information of the character length specified in DATA SIZE

Event-generated Data Field

If the keypad has an Event Generated mode enabled it will send packets whenever events for which that mode are enabled occurr. If Event Mode is Disabled no Event Generated packets will ever be sent. The Event Generated data field is a standard packet containing the following Data Field.

The Event Field contains two ASCII digits. The first digit is always an ASCII [7] indicating this is an Event Generated Field. The second digit is the type of event being reported. This will be an ASCII value of [0-1].

The Data Size Field contains an 8 bit binary byte count sent as 2 ACSII hex digits. This value is the number of Data Bytes to follow.

The Data Size Field contains an 8 bit binary byte count sent as 2 ACSII hex digits. This value is the number of Data Bytes to follow.

The Data Field contains the Event data. This data is always sent as ASCII hex characters [0-F]. This data can be either Keypad Data Entered or Input States depending on the Type digit.

AN EVENT GENERATED DATA FIELD

EVENT		DATA SIZE	DATA
ASCII [7]	TYPE		

EVENT

An Event Generated Field. The first character will always be an ASCII [7] followed by a TYPE.

TYPE

Type Of Event – ASCII [0-1]

TYPE = 0

Keypad Data Entered

Data will be ASCII Hex keypad data [0-B] of length DATA SIZE

TYPE = 1

Input State Changed / Reset Occurred

DATA SIZE Will be ASCII [01] for a single data character to follow. DATA Will Be A 4 bit binary value sent as a Single ASCII hex character [0-F]

Format of the 4 bit value

Bit 0 = Input 1 status

Bit 1 = Input 2 status

Bits 2-3

00 No reset has occurred

01 Soft reset has occurred

10 Watchdog reset has occurred

11 Hard reset has occurred

Keypad Commands and Responses

Reset Keypad Command - [00]

The Reset command causes the keypad to do a complete reset. The indicators will return to their power up state. If the keypad was in the Listen Only mode it will be reset to normal. This command will not return a response.

RESET KEYPAD → [00]

No Response Is Provided From Keypad.

Read Keypad Firmware Version - [01]

The Read Keypad Firmware Version command returns a response containing the firmware version of the keypad. The response contains a 16 bit binary version values sent as 4 ASCII hex digits.

READ KEYPAD FIRMWARE VERSION → [01]

Response Data Field:

CCNNDDDD

CC = 01 (Echo Command)

NN = 04 (4 Bytes DATA)

DDDD = Keypad Version (4 Hex Digits)

Set Listen Only Mode - [02]

The Set Listen Only Mode command puts the keypad into the Listen Only Mode. In Listen Only Mode, the keypad will act on any commands sent to it, but it will not send any Response or Event Data. It is provided mainly to disable a keypad that may be malfunctioning. Once the keypad is in Listen Only Mode, it can only be returned to normal mode with a Reset Command or a Power Reset. This command will not return a response.

SET LISTEN ONLY MODE → [02]

No Response Is Provided From Keypad.

Read Keypad Counters - [03]

The Read Keypad Counters command returns a response containing the keypad communication counter values. The response contains 5 groups of 16 bit binary counter values sent as 4 ASCII hex digits. The BUS Message Count is the number of packets that the keypad has received. The BUS Error Count is the number of packets the keypad received that contained an error. The BUS Exception Count is the number of packets received that were not framed correctly. The BUS Overflow Count is the number of packets received that exceed 255 characers. The BUS SLAVE Message Count is the number of packets that the keypad has sent. The SLAVE NAK Count is the number of error response packets the keypad has sent.

READ KEYPAD COUNTER VALUES → [03]

Response Data Frame:

CCNNTTTTVVVVWWWWXXXXYYYYZZZZ

CC = 03 (Echo Command)

NN = 18 (0x18 {24 Dec) Bytes Of DATA)

TTTT = BUS Message Count (4 Hex Digits)

VVVV = BUS Error Count (4 Hex Digits)

WWWW = BUS Exception Count (4 Hex Digits)

XXXX = BUS Overflow Count (4 Hex Digits)

YYYY = SLAVE Message Count (4 Hex Digits)

ZZZZ = SLAVE NAK Count (4 Hex Digits)

Reset Keypad Counters - [04]

The Reset Keypad Counters command resets all the keypad communication counters to zero. It returns a standard response of zero length.

RESET KEYPAD COUNTERS → [04]

Response Data Frame:

CCNN

CC = 04 (Echo Command)

NN = 00 (Zero Data Length - No Data)

■ Read Flash Power-Up Indicator/Output Settings - [05]

The Read Flash Power-Up Indicator/Output Settings command returns a response containing the current keypad power-up indicator/output state settings stored in flash memory. The response contains 5 binary state values sent as single ASCII hex digits. These are the state values stored in flash memory that the indicator/outputs will be set to on power-up or a keypad reset. Refer to the Indicator State Table for the various indicator/output state values.digits. These are the state values stored in flash memory that the indicator/outputs will be set to on power-up or a keypad reset. Refer to the Indicator State Table for the various indicator/output state values.

GET FLASH POWER-UP INDICATOR/OUTPUT SETTINGS → [05]

Response Data Frame:

CCNNVWZYXZ

CC = 05 (Echo Command)

NN = 05 (05 Bytes DATA)

V = OUT 1 Setting* (1 Hex Digit)

W = Out 2 Setting* (1 Hex Digit)

X = OUT 3 Setting* (1 Hex Digit)

Y = RED LED Setting* (1 Hex Digit)

Z = GREEN LED Setting* (1 Hex Digit)

*See Indicator States Table For Values

Set Flash Power-Up Indicator/Output Settings - [06]

The Set Flash Power-Up Indicator/Output Settings command sets the power-up indicator/output state values in flash memory. These values are used to set the state of the indicator/outputs on a power-up or reset. The command requires 5 additional data digits after the [06] command digits. These digits are the 5 indicator/output state values to set sent as single ASCII hex digits. Refer to the Indicator State Table for the various indicator/output state values. After executing this command the keypad will write the new values to flash then halt operation for 50 miliseconds. It will then Reset The Keypad. This command will not return a response.

WARNING: This command writes to Flash Memory. The Flash Memory can only be written to a LIMITED number of times (approx. 100,000 write cycles). DO NOT USE IT for every keypad state change. It is only provided to set up the special case of setting the indicator/outputs states when a power or keypad reset occurrs. Overuse will cause the Flash Memory to Fail.

SET FLASH POWER-UP Indicator/Output SETTINGS → [06]
This command is followed by 5 Hex Digits which set the individual Indicator/Output Power-Up States.
The complete command takes the form:

06VWXYZ

- V = OUTPUT 1 State Value* (1 Hex Digit)
- W = OUTPUT 2 State Value* (1 Hex Digit)
- X = OUTPUT 3 State Value* (1 Hex Digit)
- Y = RED LED State Value* (1 Hex Digit)
- Z = GREEN LED State Value* (1 Hex Digit)
- *See Indicator States Table For Values

No response from keypad
Keypad Is Reset

Disable Keypad Input- [10]

The Disable Keypad command puts the keypad in a mode where no data will be accepted. If a key is pressed, there will be no beep or LED flash, and the input will be ignored. No Event Packet will be sent if the keypad has an Event Mode enabled. It returns a standard response of zero length.

DISABLE KEYPAD INPUT → [10]

Response Data Frame:

CCNN

CC = 10 (Echo Command)

NN = 00 (Zero Data Length - No Data)

Enable Keypad Input - [11]

The Enable Keypad command restores the keypad mode to normal data input operation. This command is used to exit Disable Keypad Mode. It returns a standard response of zero length.

ENABLE KEYPAD INPUT → [11]

Response Data Frame:

CCNN

CC = 11 (Echo Command)

NN = 00 (Zero Data Length - No Data)

Tamper Alarm For 15 Seconds - [12]

The Tamper Alarm 15 Sec command will put the keypad in Tamper Mode for 15 seconds. When the keypad is in Tamper Mode, it will flash both LEDs and output a continuous beep for 15 seconds. During this time, the keypad will be Disabled and will not accept any data. At the end of the 15 second Tamper Interval, the keypad will return to normal operation. It returns a standard response of zero length.

TAMPER ALARM FOR 15 SECONDS → [12]

Response Data Frame:

CCNN

CC = 12 (Echo Command)

NN = 00 (Zero Data Length - No Data)

Tamper Alarm For 30 Seconds - [13]

The Tamper Alarm 30 Sec command acts the same as the Tamper Alarm 15 Sec except the Tamper Inverval is set to 30 Seconds. It returns a standard response of zero length.

TAMPER ALARM FOR 30 SECONDS → [13]

Response Data Frame:

CCNN

CC = 13 (Echo Command)

NN = 00 (Zero Data Length - No Data)

Tamper Alarm For 60 Seconds - [14]

The Tamper Alarm 60 Sec command acts the same as the Tamper Alarm 15 Sec command, except that the Tamper Inverval is set to 60 Seconds. It returns a standard response of zero length.

TAMPER ALARM FOR 60 SECONDS → [14]

Response Data Frame:

CCNN

CC = 14 (Echo Command)

NN = 00 (Zero Data Length - No Data)

Stop Tamper Alarm Immediately- [15]

The Stop Tamper Immediately command will immediately cancel any Tampe Mode and return the keypad to normal operation. It returns a standard response of zero length.

STOP TAMPER ALARM IMMEDIATLY → ASCII [15]

Response Data Frame:

CCNN

CC = 15 (Echo Command)

NN = 00 (Zero Data Length - No Data)

Read Keypad INput Data - [20]

The Read Keypad Input Data command will return any data that has been input to the keypad since the last Read command. Its response will contain a two-digit value (NN) indicating the number of digits that were input. If this value is [00] zero, then no data was input and no data digits will follow. If the value is one to hex F [01-0F], then that is the number of digits that were input and that is the number of digits that will follow the two (NN) digits. These ASCII hex digits will be between zero and hex B [0-B]. The values [0-9] are the keys 0-9. The hex value [A] is the asterisk key "*" and the hex value [B] is the pound sign key "#".

READ KEYPAD INPUT DATA → [20]

Response Data Frame:

CCNN~

CC = 20 (Echo Command)

NN = Number of Digits Input

If 00 No Keypad Data Input

~ = Keypad Input Digits Of Length NN

Read Input Status - [21]

The Read Input Status command will return the current state of the two Inputs and indicate if any reset has occurred since the last Input Read command. Its response will contain a two digit value (NN) which will always be [01] indicating a single data digit will follow. The values for the following Data Digit (D) are explained in the following table.

READ INPUTS STATUS → [21]

Response Data Frame:

CCNND

CC = 21 (Echo Command)

NN = 01 (1 Byte DATA)

D = Input Status (4 bit binary sent as ASCII Hex Digit)

Bit 0 = Input 1 Status

Bit 1 = Input 2 Status

Bits 2-3 (These Bits are reset upon a read)

00 No reset has occurred

01 Soft reset has occurred

10 Watchdog reset has occurred

11 Hard reset has occurred

Read Keypad Input Data & Input Status - [22]

The Read Keypad Input Data & Input Status command will return both Keypad Data & Input Status in a single response. Its response will contain a two-digit value (NN) indicating the number of digits that will follow. If this value is one [01], then no data was input and only a single Input Status digit will follow. If the value is greater than one, then that number of Keypad data digits minus 1 will follow the Input Status digit. These Keypad Data digits and Input Status digit take the same form as discussed in the two previous commands. (Read Keypad Data & Read Input Status.)

GET KEYPAD INPUT DATA & INPUTS STATUS → [22]

Response Data Frame:

CCNND~

CC = 22 (Echo Command)

NN = Number of KEYPAD Chars +1

If 01 No Keypad Data Input

Data is only Input Status Byte

D = Input Status (See D In Command 21 Above)

~ = Keypad Input Digits of Length NN-1

Read Current Indicator/Outputs States - [27]

The Read Current Indicator/Output State command will return the current states of all six of the outputs and keypad indicators. Its response will return a two digit value of [06] to indicate that six data digits will follow (NN). These digits are followed by six data digits. These six digits contain the current state of the individual output / indicators. The order of the output / indicator digits (VWXYZQ) is listed in the table below. Each of these will have a value that indicates the state of that particulay output / indicator. The states that these values represent are listed in Indicator States Table.

READ CURRENT INDICAOR/OUTPUT STATES → [27]

Response Data Frame:

CCNNVWXYZQ

CC = 27 (Echo Command)

NN = 06 (06 Bytes DATA)

V = OUTPUT 1 State Value* (1 Hex Digit)

W = OUTPUT 2 State Value* (1 Hex Digit)

X = OUTPUT 3 State Value* (1 Hex Digit)

Y = RED LED State Value* (1 Hex Digit)

Z = GREEN LED State Value* (1 Hex Digit)

Q = Beeper/Tamper State Value* (1 Hex Digit)

*See Indicator States Table for Values

Set Indicator/Outputs States - [3X]

The Set Indicator/Output States command will set the state of any or all of the Indicator/Outputs. This command uses a special format that allows from 1 to all six indicator/outputs to be set with a single command of minimum length. The commands first digit is always an ASCII [3] to indicate this is a set indicator/output command. The second digit is the ASCII number [1-6] of two digit indicator/output setting pairs that will follow. A setting pair consists two digits. The first digit is the indicator/output select digit (see below) which selects which indicator/output will be set. The second digit is the state value to set the selected indicator/output to (see the. Indicator States Table) . The order of the selected indicator/outputs does not matter. There must be at least one and no more than six pairs in a command. It returns a standard response of zero length.

SET INDICATOR/OUTPUT STATES → [3X]

Response Data Frame:

CCNN

CC = 3X (Echo Command)

NN = 00 (Zero Data Length - No Data)

Indicator/Output Select Digits:

1 = Select Output 1

2 = Select Output 2

3 = Select Output 3

4 = Select Red LED

5 = Select Green LED

6 = Select Beeper

SET INDICATOR/OUTPUT Example-1

To set the Beeper to output 3 short tones, use the command:

3163

31 Set Indicator Command(3) with 1(1) Pair to follow

63 Pair-1 Select Beeper(6) - Set to 3 short tones (3)

SET INDICATOR/OUTPUT Example-2

To set Red LED, follow Input B and BeeperOutput 1 Medium Tone, use the command:

326545

32 Set Indicator Command(3) with 2(2) Pairs to follow

65 Pair-1 Select Beeper(6) - Set to 1 Medium Tone (5)

45 Pair-2 Select Red LED(4) - Set to Follow Input B(5)

SET INDICATOR/OUTPUT Example-3

To set Output 1Pulse, Output 2 On, Output 3 Off, Red LED On, Green LED Fast Flash and Beeper Output Long Tone, use the command:

36122130415967

36 Set Indicator Command(3) With 6(6) Pairs To Follow

12 Pair-1 Select Output 1(1) - Set to Pulse(2)

21 Pair-2 Select Output 2(2) - Set to On(1)

30 Pair-3 Select Output 3(3) - Set to Off(0)

41 Pair-4 Select Red LED(4) - Set to On(1)

59 Pair-5 Select Green LED(5) - Set to Fast Flash(9)

67 Pair-6 Select Beeper(6) - Set to Long Beep(7)

INDICATOR STATE TABLE

OUTPUT - SET/READ STATE VALUES (VWX):

0 = Off
1 = On
2 = 1 Second Pulse

LED - SET/READ STATE VALUES (YZ):

0 = Off
1 = On
2 = Off & Beeper Flash
3 = On & Beeper Flash
4 = Track Input A
5 = Track Input B
6 = Track Input A & Beeper Flash
7 = Track Input B & Beeper Flash
8 = Slow Blink
9 = Fast Blink

BEEPER/TAMPER - READ STATE VALUES (Q):

0 = Beeper Off / Tamper Alarm Inactive
1 = Beeper On / Tamper Alarm Inactive
2 = Beeper Off / Tamper Alarm Active
3 = Beeper On / Tamper Alarm Active

BEEPER - SET STATE VALUES:

0 = Off
1 = 1 Short Beep
2 = 2 Short Beeps
3 = 3 Short Beeps
4 = 4 Short Beeps
5 = 1 Medium Beep
6 = 2 Medium Beeps
7 = 1 Long Beep
8 = Force Beeper On (Only a “Beeper Off” command will clear a “Forced Beeper On” command)

Notes

Notes

Warranty & Repairs

Limited Lifetime Warranty

(effective date May 1, 2006)

Essex Electronics Inc. warrants that at the time of original purchase from Essex Electronics Inc., the products specified below are free from defects in workmanship and material. Subject to the conditions and limitations set forth below, Essex Electronics Inc. will, at its option, either repair or replace any part of its products that prove defective by reason of improper workmanship or materials. Repaired parts or replacement products will be provided by Essex Electronics Inc. on an exchange basis, and will be either new or refurbished to be functionally equivalent to new. Essex Electronics Inc. reserves the right to discontinue a product for any reason, without notice, at any time. If a product that has been discontinued proves defective and if Essex Electronics Inc. is unable to repair or replace the product, within the terms expressed in this Limited Lifetime Warranty, a substitute product may be provided at the Essex Electronics Inc.'s election, as a replacement for the original discontinued product.

This Limited Lifetime Warranty extends only to the original retail or wholesale Buyer and the original site of installation. It does not cover any damage to this product or parts thereof, if the product is installed in violation of the applicable codes or ordinances, or is not installed in accordance with our installation instructions. This warranty will only include the normal operating life of the LED's which will be 10 years from the date of the original sale. It does not cover any damage that results from accident, abuse, misuse, natural disaster, insufficient or excessive electrical supply, abnormal mechanical or environmental conditions, or any unauthorized disassembly, repair, or modification. This Limited Lifetime Warranty

also does not apply to any product on which the original identification or date of manufacture information has been altered, obliterated or removed. In no event shall Essex Electronics Inc. be liable for any damage to persons, property or area surrounding the installation site caused by any malfunction of the product manufactured by Essex Electronics Inc.

Essex Electronics Inc. will not pay, nor be responsible for, shipping, transportation or delivery charges, or other cost of removal of a defective product or installation of a replacement product. The original component replaced under this Limited Lifetime Warranty in any system shall become the property of Essex Electronics Inc., and as such will, at our request, be returned to our factory with transportation charges paid by the Buyer.

Limited Lifetime Warranty

The Essex Electronics Inc. products with a manufactured date of 5/1/06 to the present date that are covered by this Limited Lifetime Warranty are Keypads, Keyless Entry Access Control Systems and accessories.

Essex Electronics, Inc.'s liability and Buyer's remedy under this warranty is limited to the repair or replacement at Seller's election of the product, or parts thereof, returned to Essex Electronics Inc. at Buyer's expense and shown to Essex Electronics Inc.'s reasonable satisfaction to have been defective.

Notice of any defect must be sent to Essex Electronics, Inc., 1130 Mark Avenue, Carpinteria, California, 93013, USA and must include the date code of the unit, description of the defect and factory assigned Return Authorization #. Upon receipt of such notification, Essex will determine whether to repair or replace. We also reserve the right to have our representative make any inspection or repairs, or furnish replacements.

This warranty excludes Elevator and Vehicle Keyless Entry Access Control Systems. A separate warranty applies to Keyless Entry systems manufactured for these applications.

Disclaimer of Warranties: Limitation of Buyer's Remedies

Except for the repair or replacement at seller's option which is expressly set forth above, Essex Electronics Inc. extends no warranty of any kind, express or implied, and disclaims any implied warranty of merchantability or suitability for purpose for which sold, with respect to the keypads, keyless entry coded access system or accessories. Except for the limited repair or replacement specified above, under no circumstances will Essex Electronics Inc. be liable to buyer under or in connection with any manufacture or sale of any of the products set forth above under any tort, negligence, strict liability, contract or other legal or equitable theory, or for incidental or consequential damages, or buyer's cost of effecting insurance coverage.

The foregoing limited lifetime warranty expressed herein constitutes the sole and entire warranty with respect to the products set forth above and is in place of any and all other warranties, express or implied.

This warranty may not be expanded or extended by any oral representation, written sales information, advertising, drawings or otherwise. Essex Electronics Inc. is not responsible hereunder for incidental damage to person or property, or other incidental or consequential damages. The remedies of the buyer shall be limited to those provided in this limited lifetime warranty to the exclusion of any and all other remedies, including, without limitation, incidental or consequential damages.

This Limited Lifetime Warranty shall be governed by and interpreted in accordance with the California Uniform Commercial Code and by the procedural laws of the State of California. Any

lawsuit or other action which arises out of, relates to, or is in connection with the manufacture or sale of the products set forth above shall be governed by California law, and the venue for any such action shall be the Superior Court of the State of California in and for Santa Barbara County, California.

Repair Policy

Should it be necessary for a component or a system to be returned for repair, it must be accompanied with an RA# (Return Authorization Number) issued by the factory. Please call 1-800-KEYLESS (800-539-5377) to obtain an RA#. All returns must be sent to the factory freight prepaid. Collect shipments will not be accepted at any time. Standard turnaround time is ten (10) working days from the date of receipt. Repaired components will be returned UPS Ground (or equivalent). Any other shipping requests or instructions will be at the customer's expense.

At the factory's discretion, warranty repairs will include repair or replacement, update and testing. Returns and repairs out of the warranty period or in warranty with damage not covered under warranty shall be subject to a repair charge. All non-warranty repair freight charges are paid for by the customer. Non-warranty repair charges are returned COD. (Factory Authorized Distributors are subject to standard terms).

Essex Electronics

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