



420 Series RS232 Encoder for Keypad Applications - Installation Instruction

Storm 420 Series Encoders allow interfacing between a Storm keypad and host system using the RS232 communications protocol. This model will also drive a 4 line x 20 character LCD display. For additional information download the 420 Encoder Application / Engineering Manual from www.keymat.com

SPECIFICATIONS

Input Power 5V dc $\pm$ 0.25 V, regulated supply
RS232 Output (via 6 pin Molex 2.54mm (.100") Pitch KK®)

Overall Size W 89mm x L 66mm x H 32mm
Mounting Centres at 73.5mm x 43.2mm

Drives PowerTips 80 Character LCD Display
(uses Hitachi HD44780U LCD-II Controller/Driver)

Direct connection for underpanel fixing 12, 16, 20 way Storm Keypads
Ribbon Cable needed for top panel fixing 4, 12, 16 way Storm Keypads

Display Controls :

On host system : Ctrl + L - clears the display, Ctrl + C toggles cursor on and off

Keypad Connector (on reverse of pcb)												✓ = pin connection made		Direct connection to rear of keypad ?			
KEYPAD TYPE																	
20 WAY BACKLIT		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	YES			
20 WAY NOT BACKLIT		Fit polarising pin	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Fit polarising pin	YES			
12 / 16 WAY BACKLIT		Fit polarising pin	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Fit polarising pins	YES —fit polarising pins to positions 1,12 and 13			
12 / 16 WAY NOT BACKLIT		Fit polarising pins	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Fit polarising pins	YES			
4 WAY BACKLIT		Fit polarising pin	✓	Fit polarising pin	✓	✓	✓	✓	✓	✓	✓	✓	Fit polarising pin	NO —separate cable required - See Note 1 below STD version needs 5 way cable BACKLIT version needs 7 way cable Fit polarising pins as required			
4 WAY NOT BACKLIT		Fit polarising pins	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Fit polarising pins				
Encoder Pin		1	2	3	4	5	6	7	8	9	10	11	12	13			
R = ROW, C = COLUMN		LED CATHODE	TAMPER IN	R1	R2	C1	C2	C3	C4	R4	R3	R5 FUNCTION KEYS	TAMPER OUT	LED ANODE			
To Keypad																	
PIN 1 ON REVERSE																	
RS232 OUTPUT																	
DTR																	
GND																	
NC																	
RTS																	
RX																	
TX (Pin 1)																	
JUMPER SETTING CONTROLS BACKLIT KEYPAD LED COLOUR																	
RED																	
GREEN																	
JP8 FACTORY USE ONLY																	
Input Power Terminals																	
LCD Display Contrast Adjustment																	
LCD Display Connector, 16 pins, 0.1" square pins																	
Pin		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Symbol		Vss	Vdd	Vo	RS	RW	E	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7	A	K

Fitted to 4, 12 or 16 WAY KEYPAD

Configuration Switch Settings	1	2	3	4	5	6	7	8	Installation Checklist
4 Way Keypads	ON	CHARACTER ECHOING SELECTOR	OFF	ON	ON	ON	OFF	BAUD RATE SELECTOR OFF=9600 BAUD ON=1200 BAUD	✓ Keypad ✓ Encoder , configuration switch set ✓ Panel Fixing prepared ✓ +5V regulated supply ✓ RS 232 cable with 6 way Molex socket ✓ Ribbon cable keypad to encoder if needed ✓ LCD and 16 way ribbon cable if needed ✓ Polarisising pins fitted to encoder
12 and 16 Way Telephone Layout Keypads	ON		OFF	OFF	OFF	OFF	ON		
12 and 16 Way Calculator Layout Keypads	ON		OFF	ON	OFF	OFF	ON		
		ON = ECHO ON OFF = ECHO OFF							

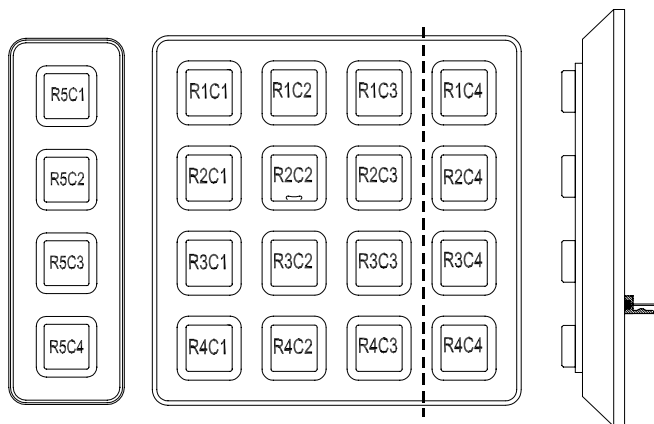
ROW / COLUMN DESIGNATIONS (KEYPADS FRONT VIEW)

For Example R1C2 = Row 1 Column 2. NB : A 20 way keypad is treated as 4 way + 16 way.

4 Way Front View

12 / 16 Way Front View

Side View



PIN-OUT FOR 4, 12 and 16 WAY MATRIX KEYPADS

4 WAY KEYPAD (NO BACKLIGHT)
CONTACT CONNECTIONS
(REAR VIEW)

PINS	• • • • •
PIN NUMBER	5 4 3 2 1

CONTACT MATRIX

PIN	ROW / COLUMN
1	R5
2	C4
3	C3
4	C2
5	C1

4 WAY BACKLIT KEYPAD
CONTACT CONNECTIONS
(REAR VIEW)

PINS	• • • • •
PIN NUMBER	7 6 5 4 3 2 1

CONTACT MATRIX

PIN	ROW / COLUMN
1	LED POWER
2	R5
3	C4
4	C3
5	C2
6	C1
7	LED POWER

12 / 16 WAY KEYPAD (NO BACKLIGHT)
CONTACT CONNECTIONS
(REAR VIEW)

PINS	• • • • •
PIN NUMBER	8 7 6 5 4 3 2 1

CONTACT MATRIX (NO BACKLIGHT)

PIN	ROW / COLUMN
1	R1
2	R2
3	C1
4	C2
5	C3
6	C4 (16 WAY ONLY)
7	R4
8	R3

12 / 16 WAY BACKLIT KEYPAD
CONTACT CONNECTIONS
(REAR VIEW)

PINS	• • • • •
PIN NUMBER	10 9 8 7 6 5 4 3 2 1

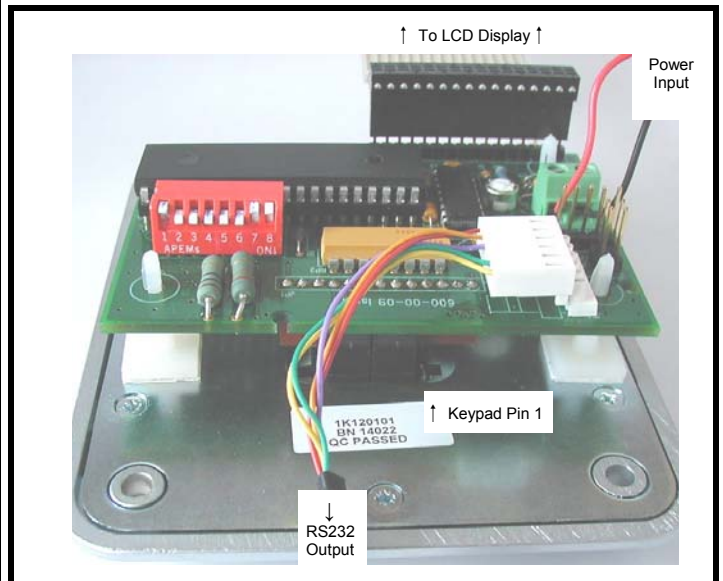
CONTACT MATRIX (WITH BACKLIGHT)

PIN	ROW / COLUMN
1	LED POWER
2	R1
3	R2
4	C1
5	C2
6	C3
7	C4 (16 WAY ONLY)
8	R4
9	R3
10	LED POWER

Mounting Details Page 2 of 4
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TYPICAL INSTALLATION

(rear view, encoder direct connection to keypad, LCD display used)



ASCII CODE TABLES

4 WAY KEYPAD ASCII CODES

ROW/ COLUMN	R5
C1	11
C2	12
C3	13
C4	14

NOTE 1 : These codes are non-printing ASCII device control codes. The application software will need to assign usage

NOTE 2 : The COMMON pin on a 4 way is termed ROW 5 to be consistent with applications using 4 function keys.

12 / 16 WAY TELEPHONE KEYPAD ASCII CODES

ROW/ COLUMN	C1	C2	C3	C4
R1	31	32	33	61
R2	34	35	36	62
R3	37	38	39	63
R4	2A	30	23	2E

12 / 16 WAY CALCULATOR KEYPAD ASCII CODES

ROW/ COLUMN	C1	C2	C3	C4
R1	37	38	39	1B
R2	34	35	36	0C*
R3	31	35	33	05
R4	7F	30	0D	2E

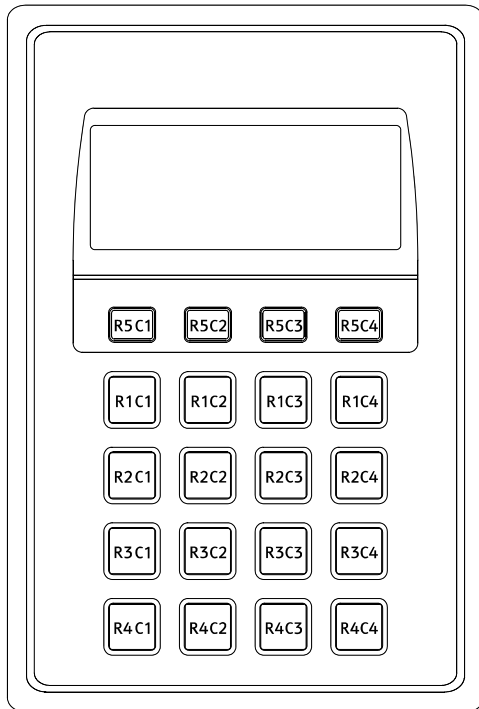
* = Form Feed Code to give CLEAR function

Fitted to INTEGRATED 20 WAY KEYPAD AND DISPLAY

Configuration Switch Settings	1	2	3	4	5	6	7	8	Installation Checklist
Integrated 20 Way Keypad and Display - Telephone Layout	OFF	CHARACTER ECHOING SELECTOR	ON	OFF	OFF	ON	OFF	BAUD RATE SELECTOR OFF=9600 BAUD ON=1200 BAUD	✓ Integrated 20 way Keypad ✓ Encoder , configuration switch set ✓ LCD and 16 way ribbon cable if needed ✓ Panel Fixing prepared ✓ +5V regulated supply ✓ RS 232 cable with 6 way Molex KK socket ✓ 13 way ribbon cable keypad to encoder if needed ✓ Polarising pins fitted to encoder
Integrated 20 Way Keypad and Display - Calculator Layout	OFF		ON	ON	ON	ON	OFF		
Note : Remove Jumpers from JP3 and JP4 in this configuration.		ON = ECHO ON OFF = ECHO OFF							

ROW / COLUMN DESIGNATIONS (KEYPAD FRONT VIEW)

For Example R1C2 = Row 1 Column 2. NB : A 20 way keypad is treated as 4 way + 16 way.



ASCII CODE TABLES

Row / Column	Telephone Layout		Calculator Layout	
	Character	ASCII	Character	ASCII
R5C1	▲	11	▲	11
R5C2	▲	12	▲	12
R5C3	▲	13	▲	13
R5C4	▲	14	▲	14
R1C1	1	31	1	31
R1C2	2 ABC	32	2	32
R1C3	3 DEF	33	3	33
R1C4	A	41	ENTER	1B
R2C1	4 GHI	34	4	34
R2C2	5 JKL	35	5	35
R2C3	6 MNO	36	6	36
R2C4	B	42	CLEAR	0C
R3C1	7 PQRS	37	7	37
R3C2	8 TUV	38	8	38
R3C3	9 WXYZ	39	9	39
R3C4	C	43	?	05
R4C1	* CLR	2A	*	7F
R4C2	0	30	0	30
R4C3	# ENT	23	#	0D
.	ENTER	2E	CANCEL	2E
ANTI-TAMPER OPEN CIRCUIT		07*		07*
* = CODE REPEATS EVERY 10 SECONDS WHILST CONDITION REMAINS ACTIVE				

PIN-OUT FOR 20 WAY KEYPAD

20 WAY KEYPAD
CONTACT CONNECTIONS
(REAR VIEW)

PINS	• • • • • • • • • • • • • • • •
PIN NUMBER	13 12 11 10 9 8 7 6 5 4 3 2 1

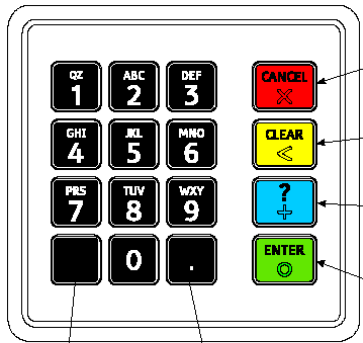
CONTACT MATRIX

PIN	ROW / COLUMN
1	NOT USED
2	TAMPER IN
3	R1
4	R2
5	C1
6	C2
7	C3
8	C4
9	R4
10	R3
11	R5
12	TAMPER OUT
13	NOT USED

Fitted to 6000 SERIES PINPAD

Configuration Switch Settings		R3	1	2	3	4	5	6	7	8	Installation Checklist
6000 Series Pinpad - Basic Layout		fitted	OFF	CHARACTER ECHOING SELECTOR ON = ECHO ON OFF = ECHO OFF	ON	OFF	ON	OFF	OFF	BAUD RATE SELECTOR OFF=9600 BAUD ON=1200 BAUD	✓ Keypad ✓ Encoder , configuration switch set ✓ Panel Fixing prepared ✓ +5V regulated supply ✓ RS 232 cable with 6 way Molex KK socket ✓ 13 way ribbon cable keypad to encoder if needed ✓ Polarisng pins fitted to encoder
6000 Series Pinpad - UK Layout		Remove before use	OFF		ON	OFF	ON	OFF	OFF		
6000 Series Pinpad - USA Layout		Remove before use	OFF		ON	ON	ON	OFF	OFF		
Note : R3 may need to be removed depending on the configuration required.											

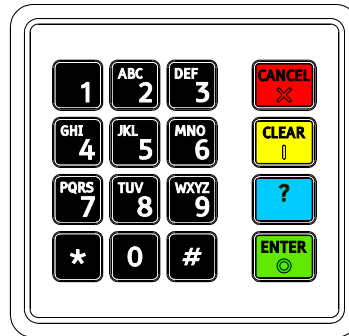
BASIC LAYOUT



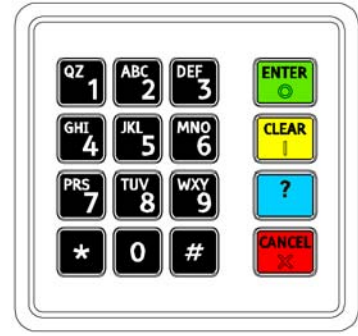
BLANK KEY
No Key Code with
Standard Firmware

Key Code = Decimtal Point

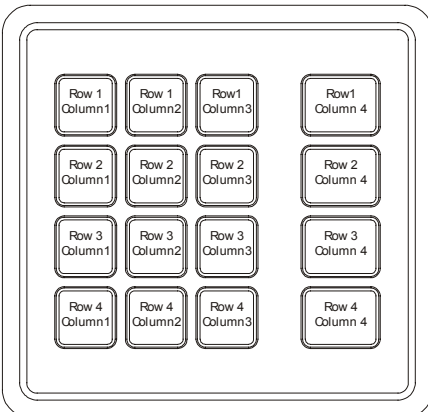
UK LAYOUT



USA LAYOUT



ROW / COLUMN DESIGNATIONS



PIN-OUT FOR 16 WAY MATRIX PINPAD

CONTACT CONNECTIONS
(REAR VIEW)

PINS	• • • • • • • • • • • • • • • •
PIN NUMBER	13 12 11 10 9 8 7 6 5 4 3 2 1

CONTACT MATRIX

PIN	ROW / COLUMN
1	NOT USED
2	TAMPER
3	R1
4	R2
5	C1
6	C2
7	C3
8	C4
9	R4
10	R3
11	NC
12	TAMPER
13	NOT USED

ASCII CODE TABLES

Row / Column	Basic Layout			UK Layout			USA Layout		
	Marking	Base Key	ASCII	Marking	Base Key	ASCII	Marking	Base Key	ASCII
R1C1	1 QZ	Black	31	1	Black	31	1 QZ	Black	31
R1C2	2 ABC	Black	32	2 ABC	Black	32	2 ABC	Black	32
R1C3	3 DEF	Black	33	3 DEF	Black	33	3 DEF	Black	33
R1C4	CANCEL	Red with raised Cross	0D	CANCEL	Red with raised Cross	0D	ENTER	Green with raised circle	1B
R2C1	4 GHI	Black	34	4 GHI	Black	34	4 GHI	Black	34
R2C2	5 JKL	Black with Homepip	35	5 JKL	Black with Homepip	35	5 JKL	Black with Homepip	35
R2C3	6 MNO	Black	36	6 MNO	Black	36	6 MNO	Black	36
R2C4	CLEAR	Yellow with raised vertical line	7F	CLEAR	Yellow with raised vertical line	7F	CLEAR	Yellow with raised vertical line	7F
R3C1	7 PRS	Black	37	7 PQRS	Black	37	7 PRS	Black	37
R3C2	8 TUV	Black	38	8 TUV	Black	38	8 TUV	Black	38
R3C3	9 WXY	Black	39	9 WXYZ	Black	39	9 WXY	Black	39
R3C4	?	Blue with raised Plus	05	?	Blue	05	?	Blue	05
R4C1		Black	No Code	*	Black	2A	*	Black	2A
R4C2	0	Black	30	0	Black	30	0	Black	30
R4C3	.	Black	2E	#	Black	23	#	Black	23
R4C4	ENTER	Green with raised circle	1B	ENTER	Green with raised circle	1B	CANCEL	Red with raised Cross	0D
ANTI-TAMPER OPEN CIRCUIT			07*			07*			07*

*= CODE REPEATS EVERY 10 SECONDS WHILST CONDITION REMAINS ACTIVE.
TO RESET—DISCONNECT POWER FOR 30 SECONDS.