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KBDSER132 IC

Serial output keyboard encoder for up to 132 keys

General Description

The KBDSER132 IC is designed to provide a serial binary output encoder for keyboards up to 132 keys. The KBDSER132 IC contains all the logic necessary to encode a SPST keyboard switch array up to 12 by 11 in size and provide a serial binary output. The output is standard asynchronous format, using 8 bits, 1 stop and no parity at 9600 BPS. Other formats and encoding are available, contact the factory. The array can be a 12 x 11 array, but any smaller size may be used. The KBDSER132 handles debouncing and encodes the keys with no external parts. All timing is internally generated. No external diodes are required in the array to prevent key ghosting in a two key rollover situation. A .1 uF bypass capacitor is suggested across the VDD and VSS pins. The part uses the standard 28 pin .3 inch width SOIC package.

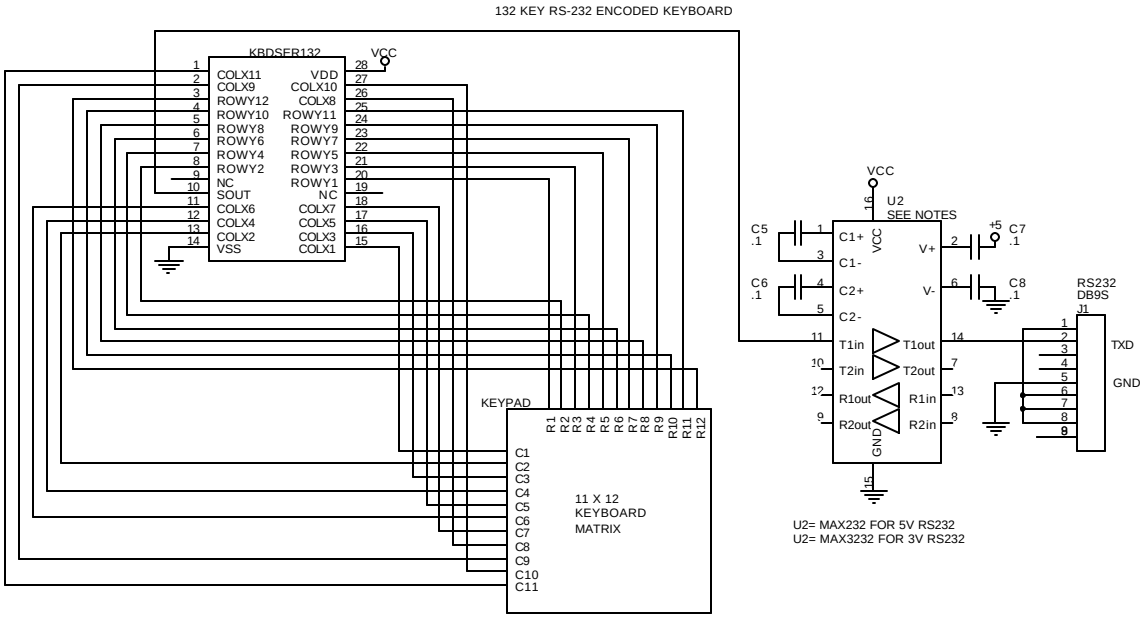
Features

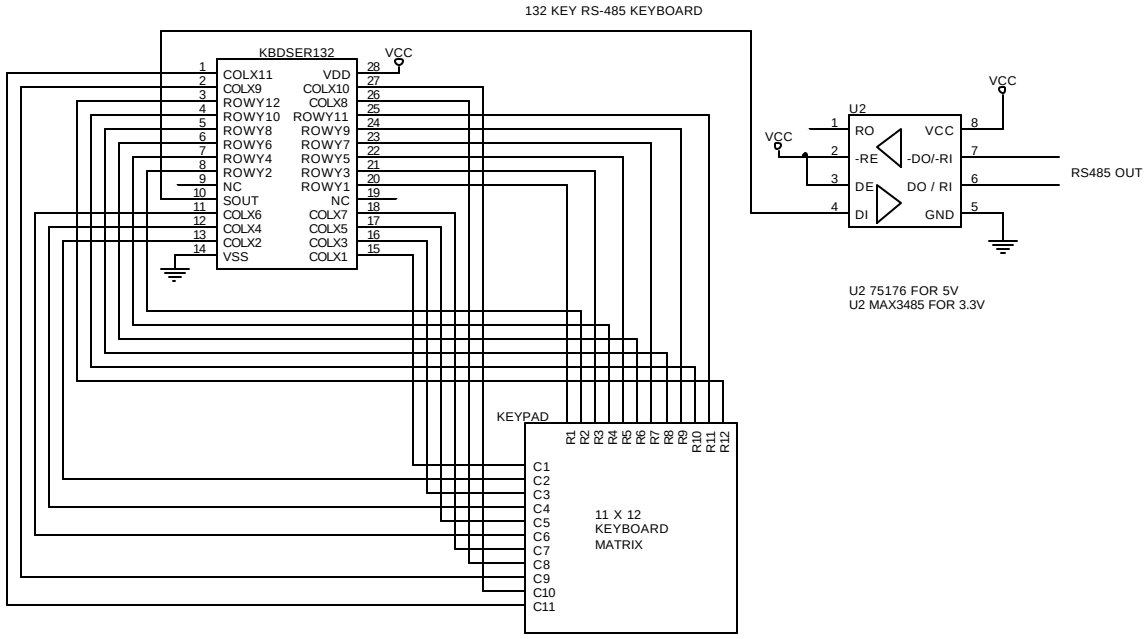
- Asynchronous serial output
- Fully encodes a key switch array. (up to 12 x 11)
- No external parts required.
- Low power consumption 5 mA typical.
- Supply voltage 2.4 to 5.25 volts.
- All timing internally generated.
- 2 Key rollover.
- On chip row input resistors.
- Internal key bounce elimination.
- TTL and CMOS compatible outputs.
- Part is in full production.
- SOIC and DIP 28 Pin Package.
- ROHS Compliant
- Low EMI

Applications

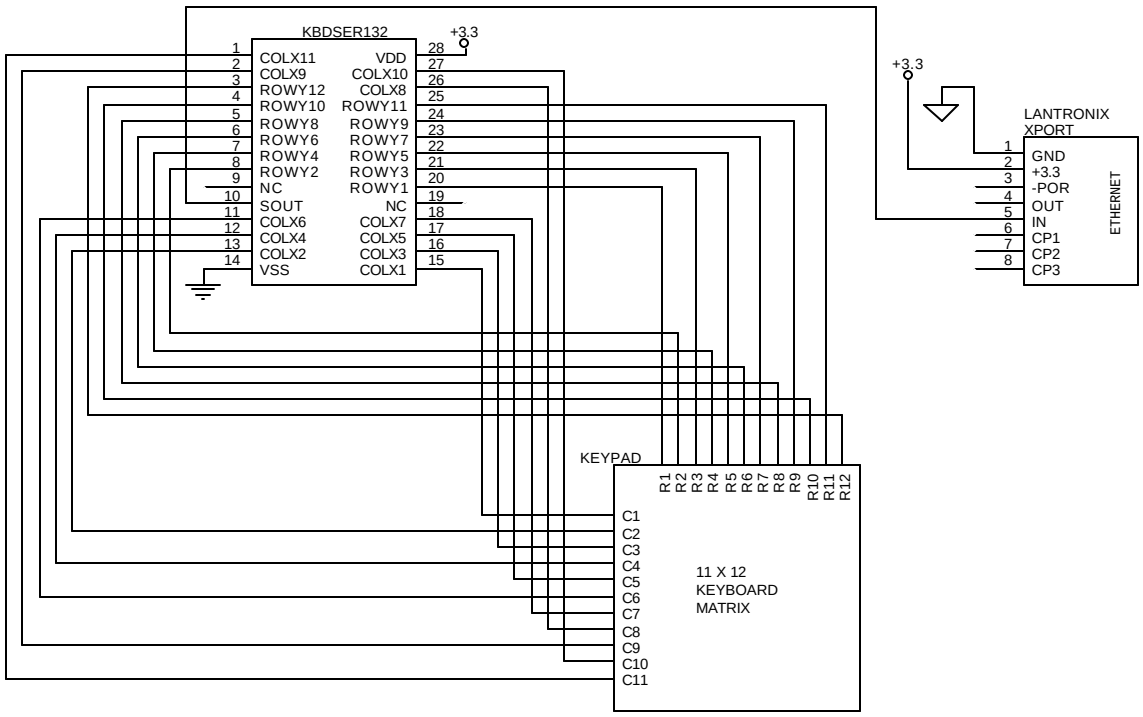
- Data Entry
- Security Alarms
- Handheld devices
- Machine Control
- Numeric Entry
- Telephones
- Computers
- Controls
- Gaming

Example Circuits

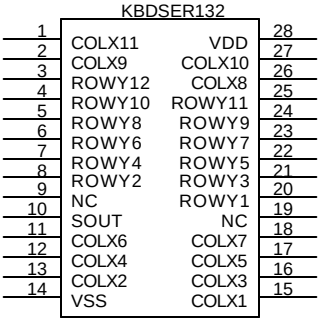




132 KEY ETHERNET KEYBOARD



Connection Diagram



Pin Description

Pin #	Description	Pin #	Description
1	Col X11	28	VDD
2	Col X9	27	Col X10
3	Row Y12	26	Col X8
4	Row Y10	25	Row Y11
5	Row Y8	24	Row Y9
6	Row Y6	23	Row Y7
7	Row Y4	22	Row Y5
8	Row Y2	21	Row Y3
9	NC	20	Row Y1
10	SOUT	19	NC
11	Col X6	18	Col X7
12	Col X4	17	Col X5
13	Col X2	16	Col X3
14	VSS	15	Col X1

Col X1 – Col X11
These pins are open drain column driver outputs to the key matrix.

Row Y1 – Row Y12
These pins are the row inputs from the key matrix. These inputs have 5.6K (nominal) pull up resistors on chip.

SOUT
This is the serial output pin. It may be tied directly to the UART receiver input of your UART or microprocessor; to a RS-232 driver such as the MAX232; a standard RS485 driver such as the 75176 or an Ethernet interface such as the Lantronix Xport. This pin is high in the idle state, the output format is 8 bits, 1 stop, no parity at 9600 BPS. Other output formats and baud rates are available, please contact the factory for information.

VSS
Connect to system ground.

VDD
Connect to supply voltage of 2.4 to 5 volts. A .1 uF decoupling capacitor to ground is recommended.

NOTES:

Make no connection to the NC pins. Pins 9 and 19 must be left unconnected.

Truth Table

The output codes of the KBDSER132 start at zero, and progress upwards in a binary count. Custom output codes are available, consult the factory for information.

	ROWY												
	1	2	3	4	5	6	7	8	9	10	11	12	HEX
COLX1	X												00
COLX1		X											01
COLX1			X										02
COLX1				X									03
COLX1					X								04
COLX1						X							05
COLX1							X						06
COLX1								X					07
COLX1									X				08
COLX1										X			09
COLX1											X		0A
COLX1												X	0B
COLX2	X												0C
COLX2		X											0D
COLX2			X										0E
COLX2				X									0F
COLX2					X								10
COLX2						X							11
COLX2							X						12
COLX2								X					13
COLX2									X				14
COLX2										X			15
COLX2											X		16
COLX2												X	17
COLX3	X												18
COLX3		X											19
COLX3			X										1A
COLX3				X									1B
COLX3					X								1C
COLX3						X							1D
COLX3							X						1E
COLX3								X					1F
COLX3									X				20
COLX3										X			21
COLX3											X		22
COLX3												X	23
COLX4	X												24
COLX4		X											25
COLX4			X										26
COLX4				X									27
COLX4					X								28

COLX4						X							29
COLX4							X						2A
COLX4								X					2B
COLX4									X				2C
COLX4										X			2D
COLX4											X		2E
COLX4												X	2F
COLX5	X												30
COLX5		X											31
COLX5			X										32
COLX5				X									33
COLX5					X								34
COLX5						X							35
COLX5							X						36
COLX5								X					37
COLX5									X				38
COLX5										X			39
COLX5											X		3A
COLX5												X	3B
COLX6	X												3C
COLX6		X											3D
COLX6			X										3E
COLX6				X									3F
COLX6					X								40
COLX6						X							41
COLX6							X						42
COLX6								X					43
COLX6									X				44
COLX6										X			45
COLX6											X		46
COLX6												X	47
COLX7	X												48
COLX7		X											49
COLX7			X										4A
COLX7				X									4B
COLX7					X								4C
COLX7						X							4D
COLX7							X						4E
COLX7								X					4F
COLX7									X				50
COLX7										X			51
COLX7											X		52
COLX7												X	53
COLX8	X												54
COLX8		X											55
COLX8			X										56
COLX8				X									57
COLX8					X								58
COLX8						X							59
COLX8							X						5A

COLX8								X					5B
COLX8									X				5C
COLX8										X			5D
COLX8											X		5E
COLX8												X	5F
COLX9	X												60
COLX9		X											61
COLX9			X										62
COLX9				X									63
COLX9					X								64
COLX9						X							65
COLX9							X						66
COLX9								X					67
COLX9									X				68
COLX9										X			69
COLX9											X		6A
COLX9												X	6B
COLX10	X												6C
COLX10		X											6D
COLX10			X										6E
COLX10				X									6F
COLX10					X								70
COLX10						X							71
COLX10							X						72
COLX10								X					73
COLX10									X				74
COLX10										X			75
COLX10											X		76
COLX10												X	77
COLX11	X												78
COLX11		X											79
COLX11			X										7A
COLX11				X									7B
COLX11					X								7C
COLX11						X							7D
COLX11							X						7E
COLX11								X					7F
COLX11									X				80
COLX11										X			81
COLX11											X		82
COLX11												X	83

Absolute Maximum Ratings

Symbol	Description	Min	Typical	Max	Units	Notes
T_{stg}	Storage Temperature	-55	25	+100	°C	
T_a	Operating Temperature	-40		+85	°C	
V_{dd}	V_{dd} - V_{ss} Voltage	-0.5		+6.0	V	
V_{io}	Input Voltage	V_{ss} - 0.5		V_{dd} +0.5	V	
I_{mio}	Maximum current into any pin	-25		+50	mA	
ESD	Electrostatic Discharge Voltage	2000			V	Human Body Model ESD
LU	Latch up current			200	mA	

DC Electrical Characteristics

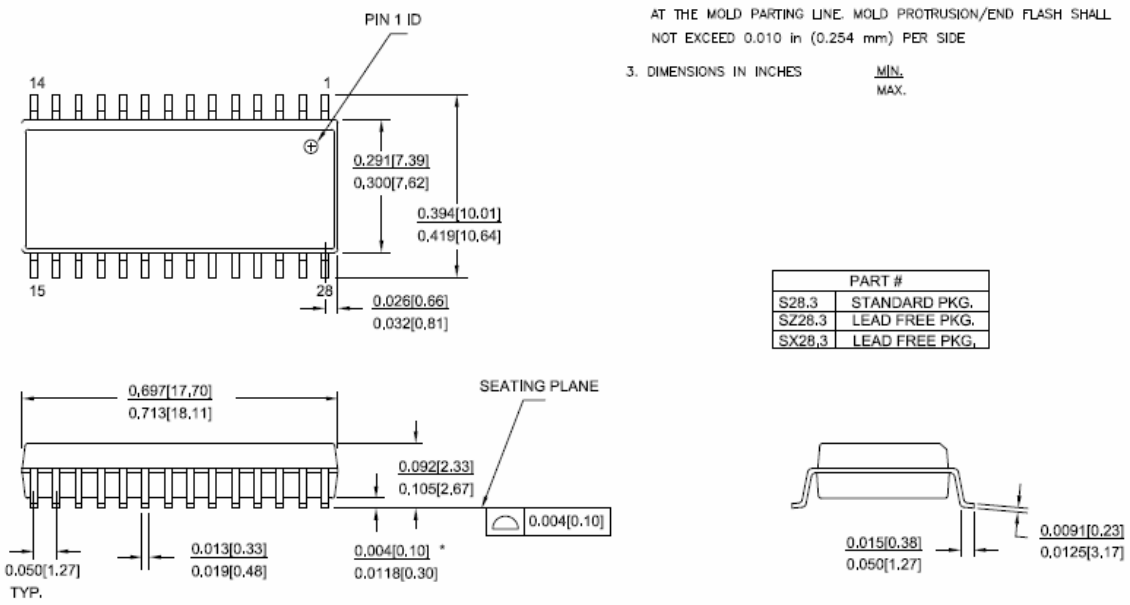
Symbol	Description	Min	Typical	Max	Units	Notes
V_{dd}	Supply Voltage	2.4		5.25	V	
I_{dd}	Supply Current		5	8	mA	Note 1
V_{oh}	High Output Level	V_{dd} - 1.0			V	I_{oh}=10 mA
V_{ol}	Low Output Voltage			0.75	V	I_{ol}=25 mA
V_{ih}	Input High Level	2.1			V	
V_{il}	Input Low Level			0.8	V	
I_{oh}	High Level Source Current			10	mA	
I_{ol}	Low Level Sink Current			25	mA	
C_{io}	Capacitive load		3.5	10	pF	
I_{il}	Input leakage		1		nA	
R_{pu}	Pull Up Resistors On Row Inputs	4	5.6	8	k?	

Note 1: Vdd=5VDC, all inputs and outputs open

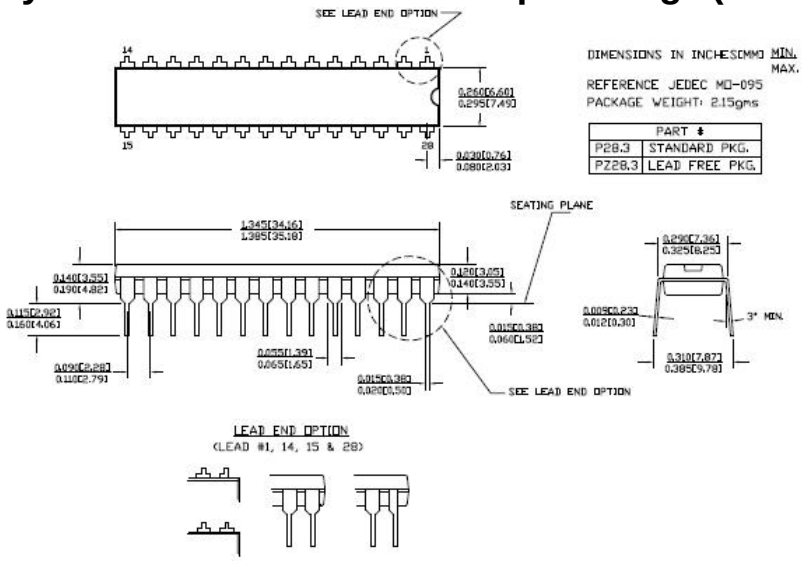
Theory Of Operation

The KBDSER132 IC is a custom programmed microprocessor designed to encode keyboards and provide a serial output. The open drain COL X pins are pulsed low one at a time, and the ROW Y pins are sampled to check for key switch closures. If a key is detected, scanning stops until the key is released. The pressed key is encoded and transmitted in standard asynchronous format on the SOUT key. The key is transmitted using 8 data bits, 1 stop bit and no parity. Baud rate is 9600 BPS. When the key is released scanning continues. A program such as REALTERM may be used to view the binary data as hexadecimal. Hyperterm will not show data in hexadecimal format.

Physical Dimensions SOIC-28



Physical Dimensions 28 Pin Dip Package (-DIP Suffix)



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