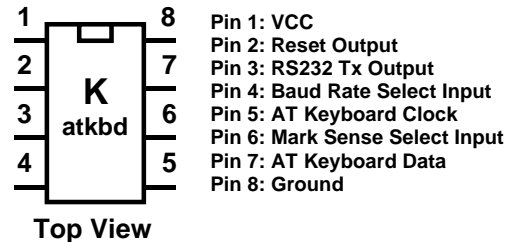


FEATURES

- Direct serial input from PC-AT Format Keyboard
- RS232 ASCII asynchronous serial output
- Selectable 9600 or 1200 baud rate output
- Selectable High or Low True serial output
- Serial Data Format: 8 bit, No Parity, 1 Stop Bit
- Power Consumption: approx. 5 ma
- No external oscillator or crystal required
- Operating Voltage: 5 VDC, built in oscillator
- CTL-ALT-DEL sense with reset output
- Control and Alternate keys decoded
- Function keys decoded
- Power Consumption: 5 ma

DESCRIPTION

The Katkbd2 provides an easy means to use a standard IBM PC-AT keyboard with small embedded microprocessors. The Katkbd2 uses a Microchip PIC12F6832 single chip microprocessor and requires minimal components for operation.



Introduction

The Katkbd2 was designed to fulfill a need for a universal AT keyboard interface that can be used as a standard function block in small embedded projects. The PC-AT keyboard interface is complex and it's timing presents a challenge to a small embedded design. Rather than bog down the design and dedicate limited hardware resources to a keyboard driver, a Katkbd2 chip can be used to interface the keyboard to a standard 8 bit asynchronous serial interface. It is a one chip keyboard format converter that is inexpensive and occupies a small portion of a circuit board. All alphanumeric keys are converted to standard ASCII. Control keys are also converted to ASCII, for example CTL-C = 3h (0x3). When the ALT key is pressed an ALT_DWN code is sent and keys are sent normally. When ALT is released an ALT_UP code is sent. The Control-Alt-Delete key sequence is detected and will cause a low true reset pulse to be asserted on one of the Katkbd2 output pins. This allows an easy way to implement a user requested reset.

Baud Rate

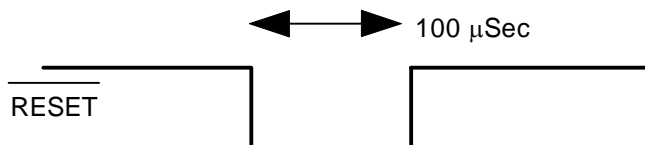
Two baud rates can be selected via pin 4 on the Katkbd2. When this pin is high (pulled up) 9600 baud is selected, when this pin is low (grounded) 1200 baud is selected. The original Katkbd IC incorporated an internal pull up on this pin, the new design requires an external pull up to select 9600 baud.

The Katkbd2 uses the internal oscillator inside the PIC12F683 as a timebase for baud rate generation. This oscillator is accurate to +/- 1% with a regulated 5 volt supply. This is well within the RS232 specification.

Output Sense

To allow maximum flexibility in output interfacing, the Katkbd2 can be configured to provide either a high true marking output or a low true marking output. High true is standard and in most cases would be used to connect directly to an embedded processor's serial input. If it is required to drive an RS232 level converter that inverts the signal, low true marking would be used. Pin 6 determines which mode is in force. This pin has an internal pullup so if it is left unconnected it will be pulled to a high level. When this pin is high standard high true marking is selected, when this pin is grounded low true marking is selected.

Reset Output Timing



Whenever the CTL, ALT, and DELETE keys are pressed at the same time the Katkbd2 will output a low true reset pulse on pin 2. The duration of this pulse is approx. 100 microseconds. This reset pulse will also be output at powerup after the Katkbd2 has completed it's internal initialization.

Typical Katkbd2 Application: Figure 1 is a schematic of a typical Katkbd2 application :

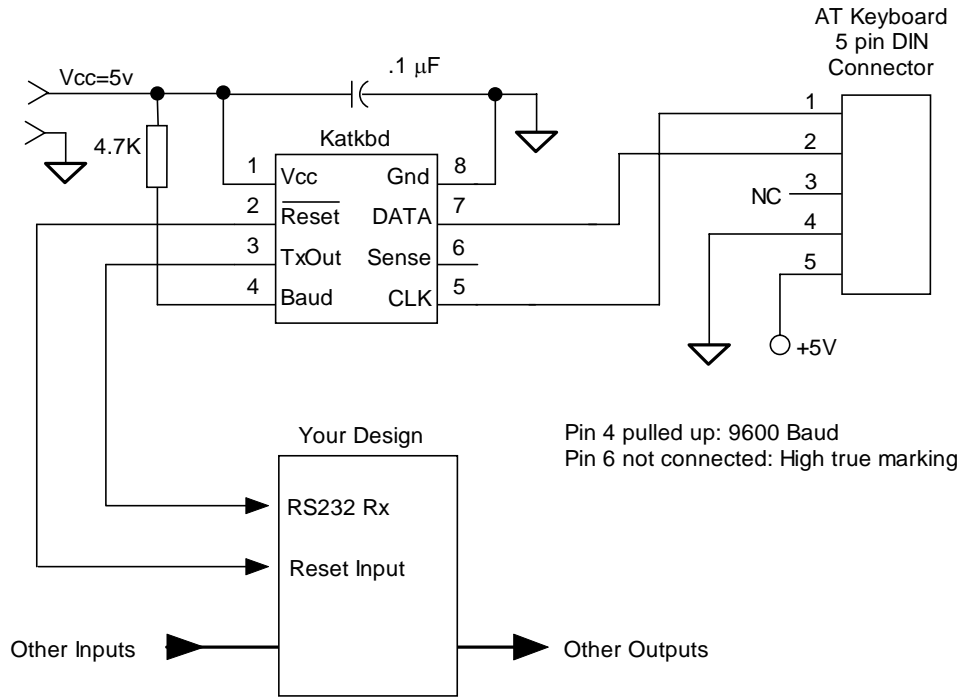


Figure 1

RS232 Level Converter: Figure 2 is a schematic of a very simple RS232 level converter that does not require external +12 or -12 VDC power source. It uses unused RS232 control lines on the RS232 interface to provide these voltages. It requires that the RTS output is asserted low and the DTR output asserted high. Most any low power op amp can be substituted for the LM301. The DB9 connector represents the serial connector on a PC serial port.

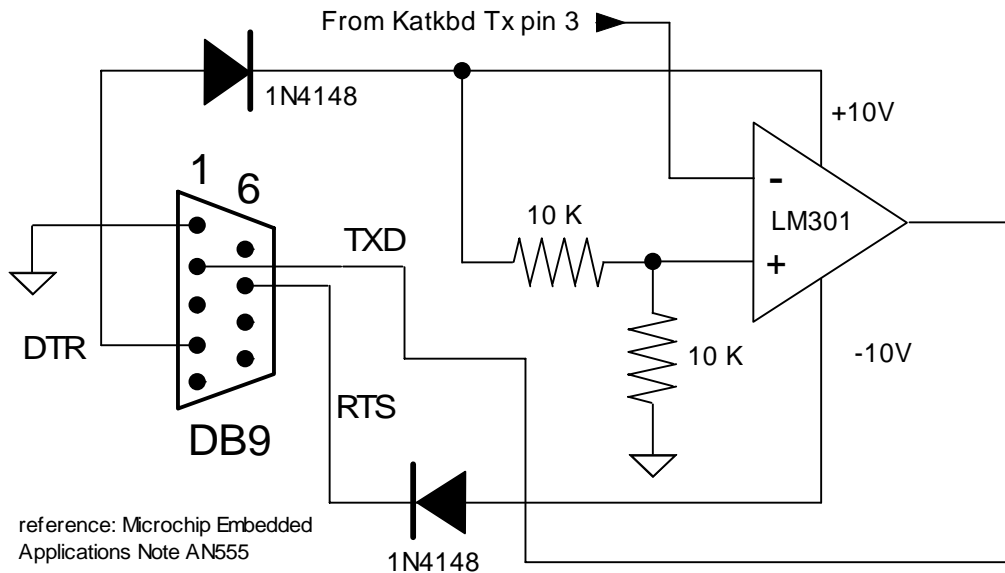


Figure 2

Function Key Definitions

Following is a table of the output codes sent when these keys are pressed.

```

#define NULL      0x00      ; Unencoded key
#define BS        0x08      ; Backspace
#define TAB       0x09      ; Tab
#define ENTER     0x0D      ; Enter
#define ESC       0x1B      ; Esc
#define DEL       0x7f      ; Delete

#define F1        0x80      ; Function key F1
#define F2        0x81      ; Function key F2
#define F3        0x82      ; Function key F3
#define F4        0x83      ; Function key F4
#define F5        0x84      ; Function key F5
#define F6        0x85      ; Function key F6
#define F7        0x86      ; Function key F7
#define F8        0x87      ; Function key F8
#define F9        0x88      ; Function key F9
#define F10       0x89      ; Function key F10
#define F11       0x8A      ; Function key F11
#define F12       0x8B      ; Function key F12
#define INSERT    0x8C      ; Insert
#define PGUP      0x8D      ; Page Down
#define PGDN      0x8E      ; Page Up
#define LEFT      0x8F      ; Left Arrow
#define RIGHT     0x90      ; Right Arrow
#define UP        0x91      ; Up Arrow
#define DOWN      0x92      ; Down Arrow
#define END       0x93      ; End
#define HOME      0x94      ; Home
#define ALT_DWN   0x96      ; Sent when ALT key is pressed
#define ALT_UP    0x97      ; Sent when ALT key is released
#define LWIN      0x99      ; Left Windows Key (left of spacebar)
#define RWIN      0x9A      ; Right Windows Key (right of spacebar)
#define MENU      0x9B      ; Windows Menu Key (next to RWIN key)
#define BREAK     0x9C      ; Break Key
#define PSCRN     0x9D      ; Print Screen

#define KBDOK     0x98      ; Sent after Katkbd2 and keyboard
                           ; have powered up successfully

```

Operational Notes:

Katkbd supports repeat for those keys that repeat.
Both ALT keys return the same keycode

The Katkbd2 is fully guaranteed and if you are not satisfied please return the Katkbd2 IC for a full refund. Any questions will be handled by snail-mail or e-mail via these addresses:

Steven T. Elliott K1EL or e-mail: K1EL@k1el.com
43 Meadowcrest Drive
Bedford, NH 03110 USA

Watch the K1EL Website for latest updates and new product offerings: <http://www.k1el.com>