

```
/*
 * Serial port driver for 16Cxx chips
 * using software delays.
 *
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 */

/*
 * Tunable parameters
 */

#include <pic.h>
#include <conio.h>

/* Transmit and Receive port bits */

static bit TxData @ (unsigned)&PORTA*8+3; /* bit3 in port A */
static bit RxData @ (unsigned)&PORTA*8+2; /* bit2 in port A */
#define INIT_PORT TRISA = 7 /* set up I/O direction */

/* Xtal frequency */

#define XTAL 4000000

/* Baud rate */

#define BRATE 9600

/* Don't change anything else */

#define DLY 3 /* cycles per null loop */
#define TX_OHEAD 13 /* overhead cycles per loop */
#define RX_OHEAD 12 /* receiver overhead per loop */

#define DELAY(ohhead) (((XTAL/4/BRATE)-(ohhead))/DLY)

void
putch(char c)
{
    unsigned char dly, bitno;

    bitno = 11;

    INIT_PORT;
    TxData = 0; /* start bit */
    bitno = 12;
    do {
        dly = DELAY(TX_OHEAD); /* wait one bit time */
        do
            /* nix */ ;
        while(--dly);
        if(c & 1)
            TxData = 1;
        if(!(c & 1))
            TxData = 0;
        c = (c >> 1) | 0x80;
    } while(--bitno);
}
```

```
char
getch(void)
{
    unsigned char    c, bitno, dly;

    for(;;) {
        while(RxData)
            continue; /* wait for start bit */
        dly = DELAY(3)/2;
        do
            /* nix */;
        while(--dly);
        if(RxData)
            continue; /* twas just noise */
        bitno = 8;
        c = 0;
        do {
            dly = DELAY(RX_OHEAD);
            do
                /* nix */;
            while(--dly);
            c = (c >> 1) | (RxData << 7);
        } while(--bitno);
        return c;
    }
}
```

```
char
getche(void)
{
    char c;

    putchar(c = getch());
    return c;
}
```