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// ***** RUNLOOP *****

void runloop(int loopcount) {
    _Bool continueRunLoop = TRUE;
    char str[64] = "";
    char choice = 'q';
    unsigned char c = 0;
    unsigned int i;
    unsigned int pin = 0;
    unsigned int value = 0;
    unsigned int value2 = 0;
    // poll Timer()
    if(debug_user_timer.TIMER_ENABLED) {
        Timer();
    }
    // poll Tick()
    Tick();
    // poll LCD_Display
    DISPLAY_Tick();
    // debug info
    printf("\n\nMIOS.ACSim(%i) >> ", loopcount);
    // read input
    fgets(str, 32, stdin);    // MAX chars = 32; this is NOT protected
    // against buffer overflows!!!
    choice = str[0];
    switch (choice) {

        case 'q': // quit
        case 'x':
            continueRunLoop = FALSE;
            break;

        case ' ': // OK
            debug_din_value[DEBUG_BUTTON_OK] = 0;
            DIN_NotifyToggle(DEBUG_BUTTON_OK,
            debug_din_value[DEBUG_BUTTON_OK]);
            break;

        case '+': // ENC++
            for(i=0;i<32;i++) { if(str[i]=='+') { c++; } }
            ENC_NotifyChange(DEBUG_ENCODER, c);
            break;

        case '-': // ENC --
            for(i=0;i<32;i++) { if(str[i]=='-') { c--; } }
            ENC_NotifyChange(DEBUG_ENCODER, c);
            break;
    }
}
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    case 'a': // AIN...
        sscanf(str, "a%i,%i", &pin, &value);
        if((pin > DEBUG_AIN_NUM) || (value > 1023)) {
            printf("! max_pin=9, max_value=1023 !");
            pin = 0; value = 0;
        } else {
            printf("scanning pin %i: %i", pin, value);
            // "set" pin values:
            debug_ain_value[pin] = value;
            AIN_NotifyChange(pin, value);
        }
        break;

    case 'b': // System Realtime BYTE
        debug_MIDI_byteNum = 0; // sending single byte, maybe without
MIDI_START/_STOP
        sscanf(str, "b%i", &pin);
        MPROC_NotifyReceivedByte(pin);
        debug_MIDI_byteNum = 0;
        break;

    case 'd': // DIN...
        sscanf(str, "d%i,%i", &pin, &value);
        // invert value for easier remembrance
        value = value ^ 0x1;
        debug_din_value[pin] = value;
        DIN_NotifyToggle(pin, value);
        break;

    case 'e': // ENC # ++/--
        sscanf(str, "e%i", &pin);
        if(pin > DEBUG_ENC_NUM) {
            printf("! max_enc = %i", (DEBUG_ENC_NUM - 1));
            return;
        }
        for(i=3;i<32;i++) {
            if(str[i]=='+') {
                c++;
            } else if(str[i]=='-') {
                c--;
            }
        }
        ENC_NotifyChange(pin, c);
        break;

    case 'j': // set jumper pin
        sscanf(str, "j%i", &pin);
        switch(pin) {
            case 10:
                PORTCbits.RC5 = 1;
                Timer();

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        PORTCbits.RC5 = 0;
        Timer();
        break;
    case 14:
        PORTDbits.RD4 = 1;
        Timer();
        PORTDbits.RD4 = 0;
        Timer();
        break;
    default:
        printf("pin %i not (yet?) supported", pin);
        break;
}
break;

case 'm': // MIDI Receive (m msgType, argA, argB)
    sscanf(str, "m%i,%i,%i", &pin, &value, &value2);
    MPROC_NotifyReceivedEvtnt(pin,value,value2);
    break;

case 'n': // send note_on (n noteValue, volume, {channel})
    sscanf(str, "n%i,%i,%i", &pin, &value, &value2);
    if((value2 < 1) || (value2 > 16)) { value2 = 1; }
    MPROC_NotifyReceivedEvtnt((143+value2),pin,value);
    break;

case 'r': // random
    pin = ACRandomPin();
    value = ACRandomInt();
    printf("scanning pin %i: %i", pin, value);
    // "set" pin values:
    debug_ain_value[pin] = value;
    AIN_NotifyChange(pin, value);
    break;

case 't': // test function
    sscanf(str, "t%i", &value);
//     for example:
//     IIC_SPEAKJET_Transmit14bit(value);
//     printf("\nDEC: %i \tPARAM3: %X \tPARAM2: %X \tPARAM1: %X",
value, MIOS_PARAMETER3, MIOS_PARAMETER2, MIOS_PARAMETER1);
    break;

default:
    // nothing...
    break;
}

if(continueRunLoop) {
    runloop(++loopcount);
}

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}

// ***** MAIN *****
int main(int argc, char **argv) {
    int exit_code = 0;

    // manual:
    printf("\n+++++ MIOS-DEBUG-CONSOLE +++++\n");
    printf("(r)and (a)(pin),(value) (d)(pin),(state) \n");
    printf("(e{opt.})(++)(-) (j)umper(pin) \n");
    printf("(m)idi(msg),(argA),(argB) \n");
    printf("(n)ote_on(value),(velocity},{channel} \n");
    printf("(SPACE)OK e(x)it + [ENTER] \n\n");

    // init debug
    sranddev(); // set the random seed

    // init MIOS
    MIOS_BOX_STAT.BS_AVAILABLE = 1;
    Init();
    DISPLAY_Init();

    printf("\n");

    // runloop
    runloop(0);

    return exit_code;
}
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