

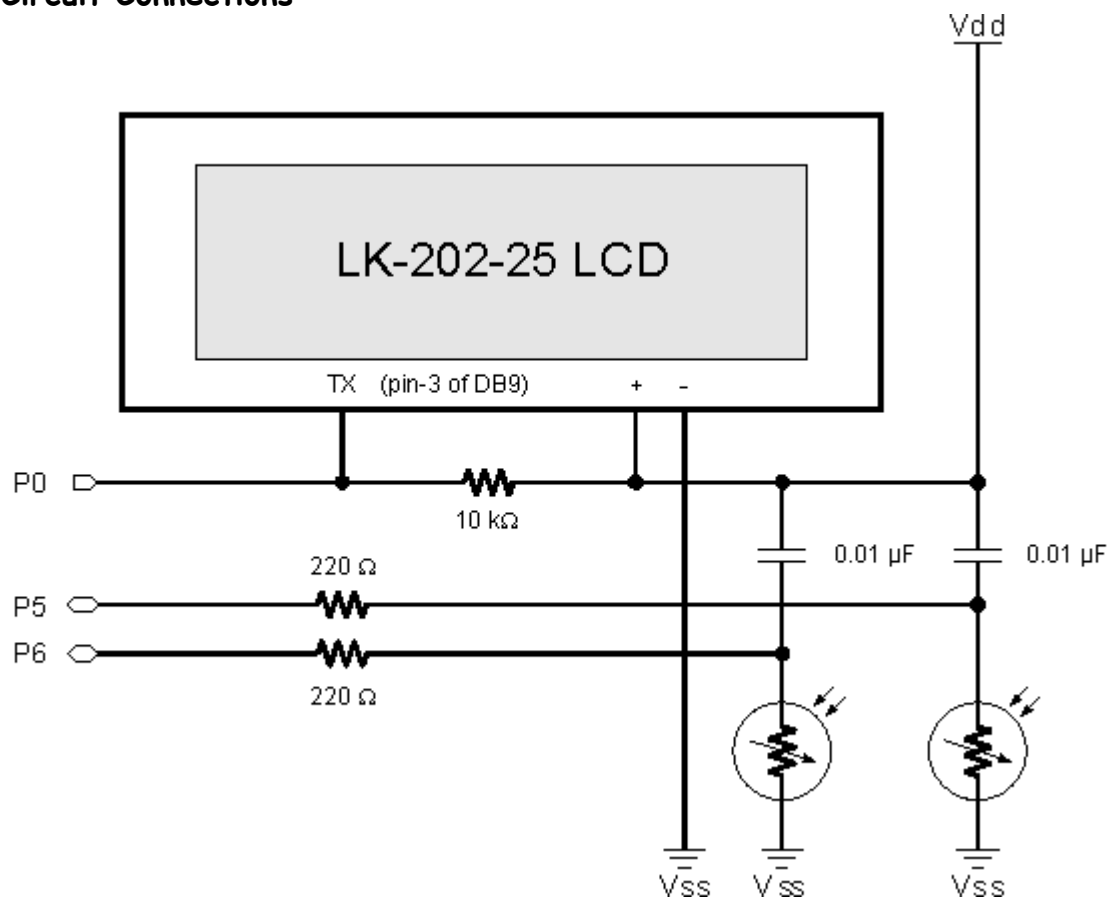
## Theory of Operation

This will show how to make a simple light meter with a basic stamp 2 and the LK\_202\_25 2x20 LCD. The circuit works by polling 2 rctime circuits. When the stamp is powered or after a reset the LCD will instruct the user to cover the photo resistors this will allow the stamp to set a threshold for a darkness level. Once the setup is done the LCD will display the current light reading. The user can then remove the cover from the Photo resistors. The bars on the LCD then should move up and down depending on the level of light detected.

## Part list:

Description	Part Number	Quantity
Basic Stamp®	Bs2-ic	1
2x20 Serial LCD with Keypad Interface	30057	1
Photo resistor	350-00009	2
220 ohm resistor 1/4 watt	150-02210	2
0.01 uF 50V poly capacitor	200-01031	2
10K ohm resistor 1/4 watt	150-01030	1

## Circuit Connections



## Test code:

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'Interface the bs2 to the LK202-25 for light detection
'Lk_202_meter_1_0.bs2
'{$STAMP BS2}
'{$PBASIC 2.5}

' ----[ Declarations ]-----
'RCTIME pins
pres_01      PIN      5           'Pin for Rctime circuit on I_O 5
pres_02      PIN      6           'Pin for Rctime circuit on I_O 6

'LCD
'Interface
tx           PIN      0           'Transmit pin to LCD
Rx          PIN      1           'Receive pin from LCD
Baud        CON      32          'Equals baud rate of 19.2k
Int         CON      254         'To be placed before each instruction

'Commands
Auto_Wrap_On  CON      67         'See manual for LCD for more detail
Auto_Wrap_Off CON      68         'See manual for LCD for more detail
Scroll_On    CON      81         'See manual for LCD for more detail
Scroll_Off   CON      82         'See manual for LCD for more detail
Cursor_pos   CON      71         'Needs Column and row
Cur_home    CON      72
Under_Line_On CON      74         'See manual for LCD for more detail
Under_Line_Off CON      75         'See manual for LCD for more detail
Blinking_On  CON      83         'See manual for LCD for more detail
Blinking_Off CON      84         'See manual for LCD for more detail
Cursor_Left  CON      76         'See manual for LCD for more detail
Cursor_Right CON      77         'See manual for LCD for more detail
Clear_screen CON      88         'See manual for LCD for more detail
Contrast     CON      80         'Needs level $00 to $FF
Backlight_On CON      66         'Set $00 = on, minutes max $FF
Backlight_Off CON      70         'See manual for LCD for more detail
GP_pin_off   CON      86         'Needs $01 to $06 for pin #
GP_pin_on    CON      87         'Needs $01 to $06 for pin #

'Key pad
Repeat_on    CON      126        '$00 = resend key $01 = key up/down
Repeat_off   CON      96         'See manual for LCD for more detail
Auto_Trans_On  CON      65         'Sends key press data immediately
Auto_Trans_Off CON      79         'Stores 10 key presses until polled
Clear_buffer  CON      69         'See manual for LCD for more detail
Poll_keypad   CON      38         'Polls LCD for last key press
Debounce_time CON      85         'Set in 6.554ms units default 52mS

'Bar graphs
Wide_vert_bar CON      118        'Initialize wide vertical bar
Naro_vert_bar CON      115        'Initialize narrow vertical bar
Draw_vert_bar CON      61         'Column $01/$20,height $00/$20
Horz_bar     CON      104         'Initialize horizontal bar
Draw_horz_bar CON      124         'See manual for LCD for more detail
Cusstom_char CON      78         'See manual for LCD for more detail
Large_dig    CON      110        'See manual for LCD for more detail
Place_lrg_dig CON      35         'Column $01 to $12 digit $00 to $09

'Variable
temp1        VAR      Byte       'Working variable
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temp2          VAR      Byte      'Working variable
light_1        VAR      Byte      'storage variable
light_2        VAR      Byte      'storage variable
pres_1_max     VAR      Word       'storage variable
pres_2_max     VAR      Word       'storage variable
off_set1       VAR      Byte      'storage variable
off_set2       VAR      Byte      'storage variable
' -----[ Initialization ]-----
PAUSE 500
Initialize:    'label
SEROUT Tx,Baud,[Int,Clear_screen]      'Clears screen
SEROUT Tx,Baud,[Int,Wide_vert_bar]      'Initialize vertical bar
'Sends text to LCD at specified curser position
SEROUT Tx,Baud,[Int,Cursor_pos,6,1,"Cover photo",int,Cursor_pos,5,2,
" resistors"]
'Setup loop for pin numbers in rctime circuit
FOR temp1 = 5 TO 6                        'this will loop until temp1 = 6
PAUSE 2000                                'pause for 200 seconds
'Sends text to LCD at specified curser position and clears screen
SEROUT Tx,Baud,[Int,Clear_screen,Int,Cursor_pos,7,1,"Reading"]
PAUSE 2000                                'pause for 200 seconds
GOSUB Read_Pres                            'jumps to label
IF temp1 = 5 THEN light_1 = temp2          'temp2 = light_1 if read from pin 5
IF temp1 = 6 THEN light_2 = temp2          'temp2 = light_1 if read from pin 5
NEXT                                        'Stays with in loop until temp1 = 6
'Sends text to LCD at specified curser position and clears screen
SEROUT Tx,Baud,[Int,Clear_screen,Int,Cursor_pos,3,2,"Pres 01"]
'Sends text to LCD at specified curser position
SEROUT Tx,Baud,[Int,Cursor_pos,13,2,"Pres 02"]
off_set1 = light_1 / 14 MIN 1              'finds offset for light_1
off_set2 = light_2 / 14 MIN 1              'finds offset for light_2

' -----[ Main Routine ]-----
Main:                                            'label
temp1 = 5                                       'temp1 to read from photo resistor 1
GOSUB read_pres                               'jumps to label
light_1 = temp2                               'reads amount to stores in light_1
temp1 = 6                                       'temp1 to read from photo resistor 2
GOSUB read_pres                               'jumps to label
light_2 = temp2                               'reads Rctime and stores in light_2
GOSUB bars                                    'jumps to label
GOTO main

' -----[ Subroutines ]-----
Bars:                                          'label
'Draws vertical lines that relate to the amount of light that is being seen
SEROUT Tx,Baud,[Int,Draw_vert_bar,1,light_1 / off_set1 MAX 16]
SEROUT Tx,Baud,[Int,Draw_vert_bar,2,light_1 / off_set1 MAX 16]
SEROUT Tx,Baud,[Int,Draw_vert_bar,11,light_2 / off_set2 MAX 16]
SEROUT Tx,Baud,[Int,Draw_vert_bar,12,light_2 / off_set2 MAX 16]
RETURN                                        'Jumps to next line under last gosub
Read_pres:                                    'label
HIGH temp1                                    'Sets pin to a logical high
PAUSE 1                                       'Pauses for 1 ms to let cap discharge
RCTIME temp1,1,temp2                          'Reads the time it take to discharge the
cap
RETURN                                        'Jumps to next line under last gosub

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