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' {$STAMP BS2}
' {$PBASIC 2.5}
'*****************************************************************************************************
'* Program:  Control.BS2            Author:   Brian & Charlie                                        *
'* Date:     3/26/2010              Revision: 14.0                                                   *
'*****************************************************************************************************
'--------[ Program Description ]-------------------------------------------------------
'This program is the control program for Rover-Bot Wireless Control Box.
' --------[ I/O Definitions ]-------------------------------------------------------------------------
Joystick_LR0   PIN 0                    'Joystick, Left/Right, Left
Joystick_UD0   PIN 1                    'Joystick, Up/Down, Left
Joystick_LR1   PIN 2                    'Joystick, Left/Right, Right
Joystick_UD1   PIN 3                    'Joystick, Up/Down, Right
LCD            PIN 4                    '16x2 Serial LCD Pin.
Tx             PIN 5                    'Transmitter(27982)DATA pin
TxEnable       PIN 6                    'Transmitter(27982)TR pin
PowerDown      PIN 7                    'Wireless Sleep = 0
WiFi           PIN 8                    'Wireless Data TX=1 RX=0
PB0            PIN 9                    '0=None, 1=Increment
' --------[ Variables ]-----------------------------------------------------------------------------
PB1            VAR  Bit                 'Lights, Pushbutton, Normally Low
Counter        VAR  Nib                 'Enables Light Control
distanceLeft   VAR  Nib                 'Right Distance, Value
distanceRight  VAR  Nib                 'Left Distance, Value
Left_X         VAR  Byte                'Stores RC Value, Left X Joystick
Left_Y         VAR  Byte                'Stores RC Value, Left Y Joystick
Right_X        VAR  Byte                'Stores RC Value, Right X Joystick
Right_Y        VAR  Byte                'Stores RC Value, Right Y Joystick
Pos            VAR  Byte                'Position of Joystick
Distance       VAR  Word                'Ping Measurement
' --------[ Constants ]-----------------------------------------------------------------------------
T2400          CON     396              'Baud 2400, N
T9600          CON     84               'Baud 9600, N
T19K2          CON     32               'Baud 190K, N
LcdBaud        CON     T19K2            'Baud LCD
LcdBkSpc       CON     $08              'move cursor left
LcdRt          CON     $09              'move cursor right
LcdLF          CON     $0A              'move cursor down 1 line
LcdCls         CON     $0C              'clear LCD (use PAUSE 5 after)
LcdCR          CON     $0D              'move pos 0 of next line
LcdBLon        CON     $11              'backlight on
LcdBLoff       CON     $12              'backlight off
LcdOff         CON     $15              'LCD off
LcdOn1         CON     $16              'LCD on; cursor off, blink off
LcdOn2         CON     $17              'LCD on; cursor off, blink on
LcdOn3         CON     $18              'LCD ON; cursor ON, blink off
LcdOn4         CON     $19              'LCD on; cursor on, blink on
LcdLine1       CON     $80              'move to line 1, column 0
LcdLine2       CON     $94              'move to line 2, column 0
' --------[ Initialization ]--------------------------------------------------------------------------
HIGH PowerDown                          'Wakeup Wireless
PAUSE 200                               'Wait, Before Sending Data
' --------[Set Values ]-----------------------------------------------------------------------------
Left_X = 0                              'Set Left X = 0
Left_Y = 0                              'Set Left Y = 0
Right_X = 0                             'Set Right X = 0
Right_Y = 0                             'Set Right Y = 0
Counter = 0                             'Light Control = 0
' --------[ Main Program ]---------------------------------------------------------------------------
Main:
   GOSUB DataRx                         'Receive Data
   GOSUB Joystick                       'RC, Joysticks
   IF Left_X < 30 OR Left_X > 20 OR  Left_Y < 40 OR Left_Y > 25 THEN GOSUB Neutral ' Hold: Neutral
   IF Left_Y < 10 THEN GOSUB Backward   'Hold: Backward
   IF Left_Y > 35 THEN GOSUB Forward    'Hold: Forward
   IF Left_X < 15 THEN GOSUB Left       'Hold: Left
   IF Left_X > 40 THEN GOSUB Right      'Hold: Right
   IF PB0 = 1 THEN PB1 = PB1 + 1        'Pushbuttons
   IF Right_Y > 40 THEN GOSUB Up        'Move: Arm Up
   IF Right_Y < 20 THEN GOSUB Down      'Move: Arm Down
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   IF Right_X > 40 THEN GOSUB Open        'Claw: Open
   IF Right_X < 20 THEN GOSUB Close       'Claw: Close
   GOSUB DataTx                           'Do Not Run Code Below TX
GOTO Main
' --------[Subroutines ]-----------------------------------------------------------------------------
DataRx:
   LOW WiFi                               'LED RX=0
   LOW TxEnable                           'Enable Receiver
   SERIN Tx, 16572, [WAIT("DataTx"), DEC3 Distance, DEC1 distanceLeft, DEC1 distanceRight ]'Receives Data
   HIGH WiFi                              'LED RX=1
   PAUSE 10                               'Sync Pulse
RETURN

DataTx:
   LOW WiFi                               'LED TX=0
   HIGH TxEnable                          'Enable Transmitter
   PULSOUT Tx,1200                        'Send Sync Pulse to Radio
   SEROUT Tx, 16572, ["DataRx",DEC Pos, DEC PB1] 'Sends Data
   HIGH WiFi                              'LED TX=1
   PAUSE 10                               'Sync Pulse
RETURN

Joystick:
  HIGH Joystick_UD0                       'Set PIN High
  RCTIME Joystick_UD0, 1, Left_X          'Set RC Timeconstant into Left-X
  PAUSE 2                                 'Wait
  HIGH Joystick_LR0                       'Set PIN High
  RCTIME Joystick_LR0, 1, Left_Y          'Set RC Timeconstant into Left-Y
  PAUSE 2                                 'Wait
  HIGH Joystick_UD1                       'Set PIN High
  RCTIME Joystick_UD1, 1, Right_X         'Set RC Timeconstant into Right-X
  PAUSE 2                                 'Wait
  HIGH Joystick_LR1                       'Set PIN High
  RCTIME Joystick_LR1, 1, Right_Y         'Set RC Timeconstant into Right-Y
  PAUSE 2                                 'Wait
RETURN

Neutral:
    SEROUT lcd, LcdBaud, [LcdBLoff,LcdCls, LcdOn1,LcdLine1]    'Initializes LCD
  SEROUT lcd, LcdBaud, ["Neutral"]                             'Sends text to LCD
  SEROUT lcd, LcdBaud, [LcdBLon, LcdOn1,LcdLine2]              'Initializes LCD
  SEROUT lcd, LcdBaud, ["Ping:",DEC3 Distance ]                'Sends text to LCD
  Pos = 0                                                      'Position Value
RETURN

Forward:
  SEROUT lcd, LcdBaud, [LcdBLoff,LcdCls,LcdOn1,LcdLine1]       'Initializes LCD
  SEROUT lcd, LcdBaud, ["Forward"]                             'Sends text to LCD
  SEROUT lcd, LcdBaud, [LcdBLoff, LcdOn1,LcdLine2]             'Initializes LCD
  SEROUT lcd, LcdBaud, ["Ping:",DEC3 Distance ]                'Sends text to LCD
  Pos = 1                                                      'Position Value
RETURN

Backward:
  SEROUT lcd, LcdBaud, [LcdBLoff,LcdCls,LcdOn1,LcdLine1]       'Initializes LCD
  SEROUT lcd, LcdBaud, ["Backward"]                            'Sends text to LCD
  SEROUT lcd, LcdBaud, [LcdBLoff, LcdOn1,LcdLine2]             'Initializes LCD
  SEROUT lcd, LcdBaud, ["Ping:",DEC3 Distance ]                'Sends text to LCD
  IF distanceLeft < 2 THEN GOSUB Error                         'IR tripped
  IF distanceRight < 2 THEN GOSUB Error                        'IR tripped
  Pos = 2                                                      'Position Value
RETURN

Left:
  SEROUT lcd, LcdBaud, [LcdBLoff,LcdCls,LcdOn1,LcdLine1]       'Initializes LCD
  SEROUT lcd, LcdBaud, ["Left"]                                'Sends text to LCD
  SEROUT lcd, LcdBaud, [LcdBLoff, LcdOn1,LcdLine2]             'Initializes LCD
  SEROUT lcd, LcdBaud, ["Ping:",DEC3 Distance ]                'Sends text to LCD
  Pos = 3                                                      'Position Value
RETURN
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Right:
  SEROUT lcd, LcdBaud, [LcdBLoff,LcdCls,LcdOn1,LcdLine1]       'Initializes LCD
  SEROUT lcd, LcdBaud, ["Right"]                               'Sends text to LCD
  SEROUT lcd, LcdBaud, [LcdBLoff, LcdOn1,LcdLine2]             'Initializes LCD
  SEROUT lcd, LcdBaud, ["Ping:",DEC3 Distance ]                'Sends text to LCD
  Pos = 4                                                      'Position Value
RETURN

Up:
  SEROUT lcd, LcdBaud, [LcdBLoff,LcdCls,LcdOn1,LcdLine1]       'Initializes LCD
  SEROUT lcd, LcdBaud, ["Neutral,Arm Up"]                      'Sends text to LCD
  SEROUT lcd, LcdBaud, [LcdBLoff, LcdOn1,LcdLine2]             'Initializes LCD
  SEROUT lcd, LcdBaud, ["Ping:",DEC3 Distance ]                'Sends text to LCD
  Pos = 5                                                      'Position Value
RETURN

Down:
  SEROUT lcd, LcdBaud, [LcdBLoff,LcdCls,LcdOn1,LcdLine1]       'Initializes LCD
  SEROUT lcd, LcdBaud, ["Neutral,Arm Down"]                    'Sends text to LCD
  SEROUT lcd, LcdBaud, [LcdBLoff, LcdOn1,LcdLine2]             'Initializes LCD
  SEROUT lcd, LcdBaud, ["Ping:",DEC3 Distance ]                'Sends text to LCD
  Pos = 6                                                      'Position Value
RETURN

Open:
  SEROUT lcd, LcdBaud, [LcdBLoff,LcdCls,LcdOn1,LcdLine1]       'Initializes LCD
  SEROUT lcd, LcdBaud, ["Neutral,A Open"]                      'Sends text to LCD
  SEROUT lcd, LcdBaud, [LcdBLoff, LcdOn1,LcdLine2]             'Initializes LCD
  SEROUT lcd, LcdBaud, ["Ping:",DEC3 Distance ]                'Sends text to LCD
  Pos = 7                                                      'Position Value
RETURN

Close:
  SEROUT lcd, LcdBaud, [LcdBLoff,LcdCls,LcdOn1,LcdLine1]       'Initializes LCD
  SEROUT lcd, LcdBaud, ["Neutral,A Close"]                     'Sends text to LCD
  SEROUT lcd, LcdBaud, [LcdBLoff, LcdOn1,LcdLine2]             'Initializes LCD
  SEROUT lcd, LcdBaud, ["Ping:",DEC3 Distance ]                'Sends text to LCD
  Pos = 8                                                      'Position Value
RETURN

Error:
   PAUSE 5
  SEROUT lcd, LcdBaud, [LcdBLoff,LcdCls,LcdOn1,LcdLine1]       'Initializes LCD
  SEROUT lcd, LcdBaud, ["Neutral"]                             'Sends text to LCD
  SEROUT lcd, LcdBaud, [LcdBLoff,LcdCls, LcdOn1,LcdLine2]      'Initializes LCD
  SEROUT lcd, LcdBaud, ["IR Detected!"]                        'Sends text to LCD
RETURN

GOTO Main
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