



Electromechanical Switch Replacement

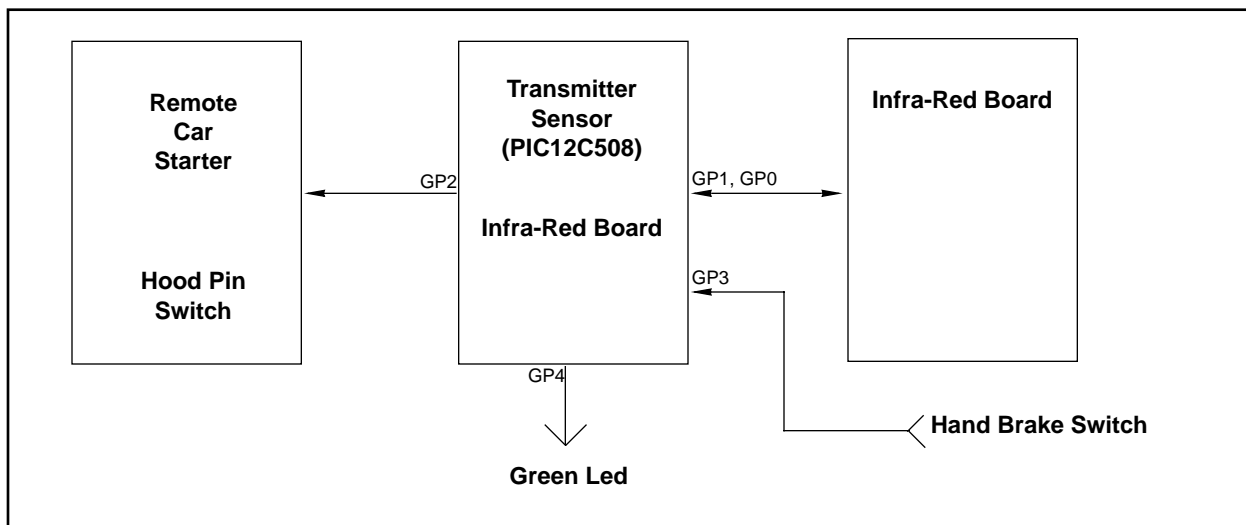
Transmission Sensor for Remote Car Starter

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APPLICATION OPERATION

This application is a transmission sensor for a car with a remote starter. Because it is an automatic car remote starter, it is relatively cheap while one for a manual car can be very expensive. The principle behind the application is very simple. There are two infra-red LED emitting lights in-line with two phototransistors so that when the shifter is engaged, it must cut one of the two rays. There is an additional Hand Brake sensor for most cars having the same systems (a pin switch that touches the body when the hand brake is up). There is also a green LED connected to the microcontroller that, when all conditions are good (Shifter in middle, Hand Brake On), the LED blinks five times to show the driver that the car is ready for starting from the remote Starter.

BLOCK DIAGRAM



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GRAPHICAL HARDWARE REPRESENTATION

SENSOR.HPP = Schematic in HP Printer format

SENSOR.PCB = Board in PCAD format

SOLD1X.HPP = Solder side of PCB in HP Printer
Format (1X)

COMP1X.HPP = Components side of PCB in
HP Printer Format (1X)

SOLD2X.HPP = Solder side of PCB in HP Printer
Format (2X)

COMP2X.HPP = Components side of PCB in
HP Printer Format (2X)

MICROCHIP TOOLS USED

MPLAB version 1.4

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APPENDIX A: SOURCE CODE

```
; Transmission Sensor For Remote Car Starter
; Philippe Labonne (PLAB97)
; Start : 5/6/97
; End   : 24/6/97

LIST      P=12C508
INDF      EQU      H'0000'
TMR0      EQU      H'0001'
PCL       EQU      H'0002'
STATUS    EQU      H'0003'
FSR       EQU      H'0004'
OSCCAL    EQU      H'0005'
GPIO      EQU      H'0006'
COUNTER   EQU      H'0007' ; Counter for wait routine
ACC       EQU      H'0008' ; Accumulator
REG       EQU      H'0009' ; Var. for previos state

MOV LW    02Ch                ; I/O Pin direction :
TRIS      GPIO                ; OOIIOI
CLRF      REG
CLRF      ACC
CLRF      COUNTER

Boucle    CALL      Delay1
          CALL      Delay1

          BSF      GPIO,1      ; Set the Infra-Red led ON
          CALL     Delay        ; Rise time
          BTFSS   GPIO,2      ; Look if CAP 1 is OK
          GOTO    Stop        ; Else Stop
          BTFSS   GPIO,3      ; Look if CAP 2 is OK
          GOTO    Stop        ; Else Stop
          BCF     GPIO,1      ; Set the Infra-Red led OFF

          BTFSC   GPIO,5      ; Look if Hand Brake is OK
          GOTO    Stop        ; Else Stop

          BTFSC   REG,0       ; Look if not allready Authorised to start
          GOTO    Boucle     ; If yes : start the loop again

          BSF     GPIO,0       ; Authorise the car to start
          BSF     REG,0       ; Save the state

          BSF     GPIO,4       ; Turn Green Led ON
          CALL    Delay1      ; Temp On
          BCF     GPIO,4       ; Turn Green Led OFF
          CALL    Delay1      ; Temp Off
          BSF     GPIO,4       ; Turn Green Led ON
          CALL    Delay1      ; Temp On
          BCF     GPIO,4       ; Turn Green Led OFF
          CALL    Delay1      ; Temp Off
          BSF     GPIO,4       ; Turn Green Led ON
          CALL    Delay1      ; Temp On
          BCF     GPIO,4       ; Turn Green Led OFF
          CALL    Delay1      ; Temp Off
          BSF     GPIO,4       ; Turn Green Led ON
          CALL    Delay1      ; Temp On
          BCF     GPIO,4       ; Turn Green Led OFF
          CALL    Delay1      ; Temp Off
          BSF     GPIO,4       ; Turn Green Led ON
          CALL    Delay1      ; Temp On
          BCF     GPIO,4       ; Turn Green Led OFF

          GOTO    Boucle
```

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```
;----- Routine Stop si pas correct pour demmarer ----
Stop      BCF      GPIO,1      ; Turn infra-red led OFF
          BCF      GPIO,0      ; Stop Car
          BCF      REG,0       ; Save Car state
          BCF      REG,1       ; Save Green Led State
          CALL     Delay1      ; Wait
          GOTO     Boucle      ; Restart the loop
```

```
;----- Short Time Delay -----
Delay     MOVLW    040h
          MOVWF    ACC
Innrlp    MOVLW    0FFh
          MOVWF    COUNTER
Inlp      DECFSZ   COUNTER,1
          GOTO     Inlp
          DECFSZ   ACC,1
          GOTO     Innrlp
          RETLW    000h
```

```
;----- Long Time Delay -----
Delay1    MOVLW    0FFh
          MOVWF    ACC
Innrlp1   MOVLW    0FFh
          MOVWF    COUNTER
Inlp1     DECFSZ   COUNTER,1
          GOTO     Inlp1
          DECFSZ   ACC,1
          GOTO     Innrlp1
          RETLW    000h

          END
```

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NOTES:

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