



Apr 18, 2015

Programmable GARAGE DOOR Controller (GDV I)-**ENHANCED (BS2E)**

This project grew out of my family occasionally leaving our garage door open (unsecured) all night and all day over the years. Even with a remote controlled Garage Door, we would sometimes drive off and forget. This could have led to property theft or worse, a home invasion in the middle of the night. Our first two homes did not have a motorized Garage Door unit and we even forgot and left both of the non-motorized Garage Doors open also. This unit can be hooked to any device you want to monitor when it's open or close between certain hours. Our current home came with the "Overhead Door" (Legacy Model 496CD/B) automatic garage door unit and this is what all of the initial testing on.

Before 2007 I had only read about Parallax Inc. and its products. After purchasing, building and testing a BOE-BOT, I let it sit for a few months. After leaving the garage door open and talking with my neighbors about their teenage kids doing the same thing, I wanted to figure out a way to program the BOE to automatically close my motorized garage door.

After 3 weeks of getting the (theory/parts/PBASIC code) correct, I was able to open & close the garage door with the BOE. The controlling factor of course is the BS2 & PBASIC program. During development I ran out of programming space numerous times and had to learn and re-learn different commands to make the code fit. Many thanks to contributing members from Parallax Forum for reducing my learning curve, plus my Commodore64 BASIC/Assembly Language programming knowledge had finally paid off. With Assembly Language, I preferred programming in modules to handle each task, but with only 2k of programming space in the BS2, this project required lots of sub-routines use, re-use and flags.

The board consists mainly of 5 sections, (BS2, PBASIC Program, DS1302 RTC, SSR, and Pull-up Resistors). All but one (1) I/O pin is being used with the BS2 Micro Controller.

I also used a (Velleman Inc.) Reed Relay switch in the Normally Open (NO) position when the garage door is secure. I recommend mounting the piece without the screws on top of the garage door with no more than a 3/4 inch gap from the second piece with the screws. Also you will need two (2) twin pair of **(28 gauge wire or Bell wire)**. First pair will run from the Reed Relay switch along with the second pair from the back of the automatic garage door opener (pins 1 & 2) to the GDV controller. Looking at Nuts & Volts Nov.07 pg. 38, Genie units appear to use the same pins.

NOTE: The pins used should be the same ones connected to your wall mounted push button switch leading into most homes.

On power up:

The program checks to see if the DS1302 RTC is running, if not, it's automatically programmed & started with default values. Then the "Main Menu" can be viewed, one selection at a time. "Arm, Alarm Window, Monitor24hr, Set Time, and Close Time" can all be selected and/or adjusted from here. The [Left] and [Right] buttons move you through the "Main Menu" and the [Select] button will take you to the available options for that selection.

ENHANCED FIRMWARE:

Five (5) new “Main Menu” selections have been added.

They are (Door Count/Auto Start/Ext. Alarm/Day Light Saving Time D.L.S.T & 12/24 mode).

1) ARM: This mode continuously monitors the Garage Door and if secure will turn on the Green LED, display “All-SECURE” and actively update the Date/Time on the LCD Screen. The Backlight turns off after sitting idle (no user input) for 30sec. This feature will be especially useful if the unit is mounted in your bed room. When the garage door opens, the program does a number of checks starting with turning on the Backlight, Red LED and displays “NOT-SECURE” and if it is within the alarm time an audible beep will be heard. The program will check to see if the 24hr monitoring mode is ON or OFF. If ON, it will start the “Close Time” routine no matter what the “ALARM WINDOW” time is set too. After the delay time is up, the program will start the normal closing process. If “ALL-SECURE”, the monitoring process will start over. If the 24hr monitoring mode is OFF, then the “Alarm Window” time is checked. If the current time is between these hours, then the Close Timer will start. Once the Close Time is completed, the program will start the normal closing process. Three (3) attempts are made at closing the door if needed; this ensures the door is not left in the open position. If NOT secure, after the third attempt, an intermittent audible alarm will sound until silenced, either by securing the Garage Door or turning on the “BY-PASS” switch. If the garage door is opened OUTSIDE of these set hours, the Backlight turns on, the Red LED will light, and the LCD screen will display “NOT-SECURE”, but NO audible alarm will sound, nor will the program try to close the garage door.

NOTE: If the Garage Door is open and the current HOUR has entered into the “Alarm Window” time, the program will start the normal closing process. Unless...the “BY-PASS” switch is on.

NOTE: When ALL-SECURE the Up-Switch will turn the Backlight back on for approximately 30sec. and the Select switch will take you back to the Main Menu.

NOTE: There will be a 30sec. delay while the program waits for the Garage Door to close before re-checking. Thirteen (13 ~ 14) seconds appears to be the average open or close time of most 7ft Garage Doors.

ENHANCED FIRMWARE:

1a) Arm: Now monitoring and closing to the “Minute” can be set.

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2) Set Alarm: Military format (0000 – 2400) ONLY. Using the [Up] and [Down] buttons will allow you to adjust the “Alarm Window” Start and Stop time. Only the HOURS can be adjusted...NOT Minutes. After adjusting the Start Hour press the Select button and adjust the Stop Hour, then press the Select button again and you will return to the Main Menu. Now when the “ARM” mode is selected, the “ALARM WINDOW” time will be in effect if the Garage Door is opened.

Ex.: Start-2100 -to- Stop-0800. So at 2100hr and before 0800hr when “ARMed”, the program will be monitoring the Garage Door. Any time before the Start hour or after the Stop hour the program will only turn on the Red LED, display “NOT-SECURE”, and turn the Backlight on. If the current hour enters into the “Alarm Window” start time, and, the Garage Door is open, it will start the normal closing process, unless the “BY-PASS” switch is on.

Ex.: “Alarm Window” HOURS...1800hr (6:00pm) to 0300hr (3:00am), 0100hr (1:00am) to 1700hr (5:00pm), 1200hr (12:00pm...noon) to 2300hr (11:00pm).

NOTE: If the “Alarm Window” time(s) entered are the same, Ex.: Start: 1400 – Stop: 1400, then the program looks at this as 24hr monitoring. Meaning every time the Garage Door is open, the delay Close Time is in effect, unless the “BY-PASS” switch is on.

On power up or reset, the default values are always loaded...2100hr (9:00pm) to 0800hr (8:00am) with Monitor24 set to “OFF”.

ENHANCED FIRMWARE:

2a) Set Alarm: The “Alarm Window” time can now be set to the “Minute” using the new direct input format. A Left & Right cursor movement has been added to allow easier input/adjustment of these times. All values can now be changed on the same screen by using the [Up] and [Down] buttons. This will allow you to make changes as needed before exiting this option. When you change a value, you “**MUST**” press [Select] and get an audible feedback so that the new values can be saved to the DS1302 RTC RAM. After you press [Select] at the last screen input/adjustment location, you will move to a new screen waiting for the user to press [Select] again. If [Select] is not pressed within 5sec. the program will return back to the “Alarm Window” entry screen. When you press [Select] you will move to the next menu option/selection of either (Except, Change, or Cancel) of the current adjustments.

(“X-cep / C-hng / C-anx”)

{Accept changes /Go back to make changes /Cancel any changes made and use previous time}.

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3) Monitor24: [Up] and [Down] buttons toggles the “ON” or “OFF” 24 hour monitoring of the Garage Door. If set to the “ON” position, either day or night the normal closing sequence starts. When set to the “OFF” position, the “Alarm Window” time is in effect.

ENHANCED FIRMWARE:

3a) Monitor24: Has been changed to a simple toggle “ON” or “OFF” by pressing [Select].

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4) Set Time: Military format (0000 – 2400) ONLY. This setting freed up additional programming space with the BS2 micro-controller. On first power up, the DS1302 RTC is not running, so default values are loaded into the DS1302 RTC. You can change these settings by using the [UP] and [DOWN] buttons in the Set Time selection. By default Seconds=00. After your final adjustment for “DAY” of the week (1=Sun, 2=Mon, 3=Tue, etc.), the DS1302 RTC will automatically be updated and started.

NOTE: If main power is removed, the Battery backup will maintain the correct time.

ENHANCED FIRMWARE:

4a) Set Time: Screen input format has been improved to allow a more flexible input/adjustment method. A Left & Right cursor movement has been added to allow easier adjustment of the time. When ONLY moving the cursor Left or Right the previous saved value is displayed for each location. All values can now be changed on the same screen by using the [Up] and [Down] buttons. This will allow repeated changes of any Date/Time value before exiting the “Set Time” option. When you change a value, you “**MUST**” press [Select] and get an audible feedback so that the new values can be saved to the DS1302 RTC RAM. When you press [Select] at the last screen input/adjustment location, you will move to a new screen waiting for the user to press [Select] again. If [Select] is not pressed within 5sec. then you will return back to the “Alarm window” entry screen. If the [Select] is pressed, you will move to the next menu option/selection of either (except, change, or cancel) of the current adjustments.

("X-cep / C-hng / C-anx")

{Accept time /Go back to make changes /Cancel any changes made and use previous time}.

NOTE: The setting of the "Day Of The Week" will automatically be calculated & set.

5) Close Time: On power up, the default Close Time is 20 minutes (20m). The delay Close Time can be adjusted up or down in increments of 10m, with a maximum of 90m. So any time you open the Garage Door, you will have from (10m, 20m...90m) minutes, before the closing sequence starts.

ENHANCED FIRMWARE:

5a) Close Time: No Change

: ENHANCEMENTS TO FIRMWARE:

6) Door Count: Added to menu selection... (Count fixed at 1)

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7) Auto Start : If the "ON" option is selected, after any type of Re-Boot the controller will restore all previous "Main Menu" configurations/settings and ("Arm"...Selection 1) will automatically be selected and the normal Monitoring process will begin.

7a) Auto Start: Has been changed to a simple toggle "ON" or "OFF" by pressing [Select].

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8) Ext. Alarm: If the "ON" option is selected then +5vdc is applied to the "Ext. Alarm pin" thru a 10K ohm resistor before the closing process starts. This +5vdc is only there for a few seconds. There will be two (2) 1 minute delays before the door closing process begins. With an External Alarm attached, this can serve as a warning for anyone near the closing door/device that the closing process has started.

8a) Ext. Alarm: Has been changed to a simple toggle "ON" or "OFF" by pressing [Select].

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9) D.L.S. Time: If the "ON" option is selected then the 2nd weekend of March (spring forward) one (1) hour or the 1st weekend of November (fall backwards) will be observed as the Daylight Savings period. The times will automatically be adjusted at 2:00 am for either time periods.

9a) D.L.S. Time: Has been changed to a simple toggle "ON" or "OFF" by pressing [Select].

For Residents of Arizona and Hawaii set to "OFF".

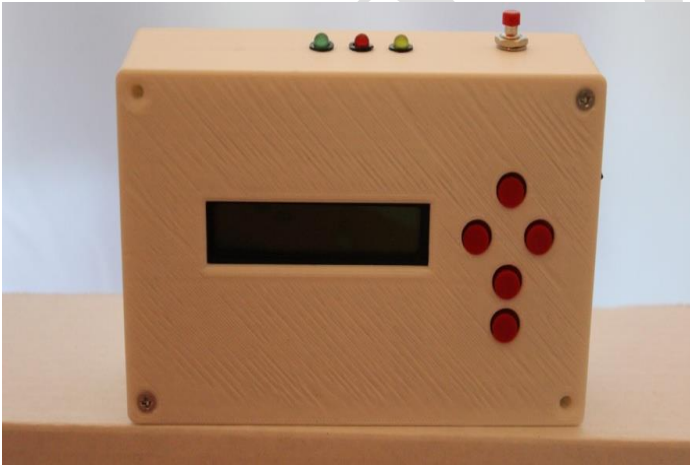
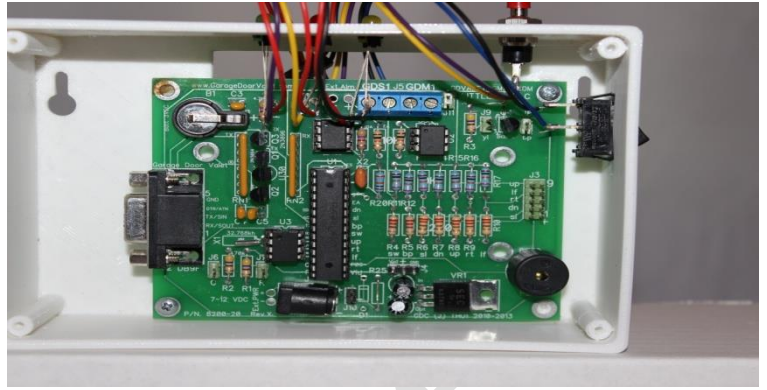
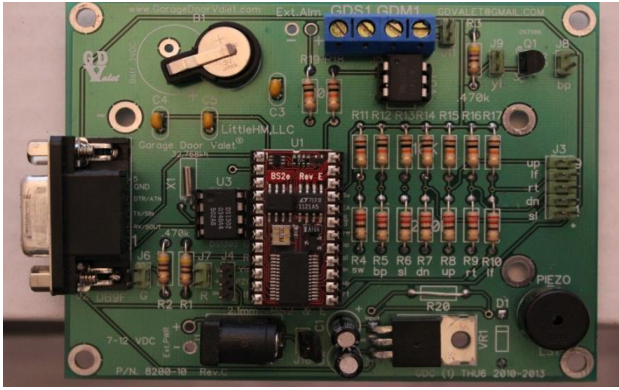
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10) 12/24 Mode: Current time can be DISPLAYED in either format (Civilian or Military).

10a) 12/24 Mode: Has been changed to a simple toggle "12" or "24" by pressing [Select].

If the "BY-PASS" switch is in the ON position, the opening and closing of the Garage Door will not be monitored. Either the RED or Green LED is turned off, the AMBER LED is turned ON and the LCD Screen will display "BY-PASS".

NOTE: In the "BY-PASS" and "NOT-SECURE" modes, the current (Date and Time) will NOT be actively updated on the LCD Screen. This allows you to know when the event happened. The DS1302 RTC will be maintaining the correct (Date and Time) in the background and the LCD Screen will be actively updated when back in the "ALL-SECURE" mode.





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So if you've ever forgotten to secure the garage door, this unit when properly setup will attempt to secure your motorized garage door for you. If it cannot be secured then the Audible Alarm sounds, Red LED lights, Backlight turns on and the LCD Screen will display "NOT-SECURE"...

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