Configuring BRG Time Zone Clocks
3/11/15
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Time Zone Parameters

To configure a time zone clock to display the correct times you must determine three things about each time zone:

1. **Time Zone Offset**: This is the time differential between UTC or ZULU time and the selected time zone measured in hours. Eastern Time, for example, is -5 hours relative to UTC time and Germany is +1 hour relative to UTC time. Since some states have more than one time zone, you may need to verify the offset for a particular city or region in a state. Florida, for example, has both Central and Eastern time zones. The mode for time zone offset is mode 21.

2. **Daylight Savings Time (DST) Code**: Time adjustments for DST is controlled by codes in the mode settings that considers both the time shift for DST and the dates and times when DST starts and ends. The dates for DST in the northern hemisphere are generally opposite the dates for DST in the southern hemisphere as the seasons are reversed. DST is also subject to changes in governmental policy. Setting the codes for accurate DST codes require careful attention because some nations, states and counties do not observe DST. The mode for DST codes is mode 24 which points to a rule (mode 45 or 52).

3. **Forced Time Advance**: Afghanistan, Iran, India, and Newfoundland use a +30 minute forced time advance in addition to the time zone offset. The mode for forced time advance is mode 33.

4. Here is a sample time zone table and related mode settings:

<table>
<thead>
<tr>
<th>Zone Number</th>
<th>Zone Name</th>
<th>Mode 21 (UTC Offset)</th>
<th>Mode 24 (DST Rule)</th>
<th>Mode 33 (Forced Offset)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Eastern</td>
<td>-5</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Zulu</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>Germany</td>
<td>1</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>India</td>
<td>5</td>
<td>0</td>
<td>1</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>DST Rule</th>
<th>Date Range code</th>
<th>Custom Julian</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>46-20 46-21</td>
<td>52-1 52-2</td>
</tr>
<tr>
<td>11</td>
<td>46-22 46-23</td>
<td>52-3 52-4</td>
</tr>
<tr>
<td>20</td>
<td>45-36 45-37</td>
<td>52-5 52-6</td>
</tr>
<tr>
<td>21</td>
<td>45-32 45-33</td>
<td>52-7 52-8</td>
</tr>
<tr>
<td>22</td>
<td>45-34 45-35</td>
<td>52-9 52-10</td>
</tr>
<tr>
<td>23</td>
<td>45-36 45-37</td>
<td>52-11 52-12</td>
</tr>
<tr>
<td>24</td>
<td>46-38 46-39</td>
<td>52-13 52-14</td>
</tr>
</tbody>
</table>

BRG has posted a guide at the following link that lists a world wide range of locations and appropriate mode settings for time zone displays: [http://www.brgprecision.com/TimeZones.pdf](http://www.brgprecision.com/TimeZones.pdf)

If Asked - use '6409' for both the userID and password to download the guide.
Display Numbering
In order to correctly program a time zone display, the exact numbering of the displays is critical. Many time zone displays have the displays in a row and are numbered left to right.

If your time zone display has both time and date displays with the date below the time for each respective time zone, the display numbering is usually top left as 1, bottom left as 2, second left top as 3, and second left bottom as 4, etc. With these clocks, the time displays are numbered 1,3,5,7, etc. The date displays are numbered 2,4,6,8, etc.

If your time zone clock has multiple rows and columns you will need to determine the actual display numbering for your clock by using the special operation mode 6 which will cause the displays to show their display number instead of their normal time or date display. In examples shown below, the first display is usually the upper left or the center display.
Determining Display Number
By pressing and holding the MODE button down until the number 1 display performs a slow count up to 6 and then releasing the MODE button, the clock will then show the display numbering layout. The number one display is the only display that responds to the mode button. The display may blink for a few seconds when you first press the mode button but will stop blinking, go to 0 and then start the slow count upwards.

Be sure to hold the MODE button down until the first display counts all the way to 6 and then quickly release the MODE button.

The displays will show their respective numbers for about a minute and then the clock will automatically return to normal display. You should make notes regarding the display layout and numbers so that you can correctly match the mode settings to the correct display number.
Time Zone Mode Settings
Before actually setting the modes for a time zone display, you should fill out a mode table for your clock listing the time zones and their mode settings.

A blank 24 time zone worksheet for your use is provided at the end of this document.

<table>
<thead>
<tr>
<th>Zone Number</th>
<th>Zone Name</th>
<th>Mode 21 (UTC Offset)</th>
<th>Mode 24 (DST)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Eastern</td>
<td>-5</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Zulu</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>Germany</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>4</td>
<td>India</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

The mode settings for the above table are as follows:

21:1 = -5
21:2 = 0
21:3 = 1
21:4 = 5
24:1 = 10
24:2 = 0
24:3 = 11
24:4 = 0

Note that the successive 1, 2, 3, and 4 refer to the display locations on the clock. For example, the mode setting 24-3 = 2 sets mode 24 for display 3 to a value of 2. This sets the DST code for Germany, the third display on the clock.

Please refer to the 'Navigating the Mode Menu System' section beginning on page 8 for guidance in the procedures for setting modes in your BRG clock.

The format is **MMRD**, where **MM** = month (1-12), **R** = instance of which week (1-5 5=last instance), **D** = day of the week (1-7), where 1=Monday and 7=Sunday.

For example, 357 represents the last Sunday in March, or 1117 represents the First Sunday in November.
Time Zone Digital Lettering

BRG time zone displays optionally display the name of the time zone using digital lettering displays which allows for changing the time zone label using the mode menu system or a computer connection to the clock. This guide is for manually changing the time zone labels using the 4 mode buttons on the clock or the handheld remote control and focuses on mode 51-n of the mode menu system.

If you are not familiar with the mode menu system, please review 'Navigating the Mode Menu System' on page 8 before attempting to change the zone labels to gain an understanding of how to use the mode menu system.

Display Type
Zone labels are of the bar segment or dot matrix type. The difference between the two is self-explanatory as the bar segment displays appear to have bars that illuminate and the dot matrix displays are made up of clusters of dots in a 5 x 7 matrix. The important difference in the two is that the bar segment displays are typically arranged in groups of eight characters and the dot matrix are arranged in groups of ten characters. The display length is significant when centering a label under a time zone display.

Label Centering
Before starting to change your digital lettering, take the time to list your new labels and determine how you are going to center them. As a general rule, count the characters in the label and subtract from the length of the display and divide the difference by 2. This will determine the number of blank spaces on either side of the active label.

For example, to center 'ZULU' in a bar segment display, the math for the spacing would be 8-4=4, 4/2=2 or 2 blanks in front of ZULU and two blanks trailing: 

---ZULU---

The spacing for ZULU in a dot matrix display would be 10-4=6, 6/2 = 3, or 3 leading and 3 trailing spaces:

----ZULU----
If the label is an odd number of characters like 'Eastern', most users prefer to offset the label slightly to the right under the display. The centering math for 'Eastern' for a dot matrix display is 10-7=3, 3/2=1.5. Since there is no ½ space, you would put 2 spaces on the left and one on the right:

---Eastern---

If your label is longer than the display you will need to determine the abbreviation you will use for the label. You can abbreviate to the exact length of the display or abbreviate to a shorter length and repeat the centering math for the abbreviation.

Digital Label Mode Settings
Before actually programming the digital lettering, you need to know how to navigate the mode menu system. Refer to page 8 for guidance.

Before entering the labels, you need to set mode 32-58 to 0 for easiest viewing of the labels as you enter them. Go to mode 32-58, press mode, and set the value to 0. Then press Timer Control to exit the mode system and save this change.

Once you have your label layout ready, you can enter the mode menu system and go to mode 51-1. Press the MODE button and you will see a cursor under the first character in the zone lettering and the number 1 in the first time zone display. At this point you are in the CURSOR mode of mode 51 and the first time zone display will show the current cursor position. Press the UP button and the cursor will move to the right. Pressing the DOWN button will move the cursor to the left. In this manner you can move across the labels to the character you want to insert or change.

Once you have located the cursor under the character position you want to change press the MODE button again and you will be in the CHARACTER mode where you can change the character in the position you are located at. The code for the current character will be shown in the first time zone display and the character itself will be shown in the cursor position. Some character codes will not be visible at the cursor position but the code for that character will show in the first time zone display. A blank character, for example, will not display at the cursor but will show a 32 in the first time zone display. When you press the UP button a sequence of characters will begin to display at the cursor position and the code for those characters will show in the first time zone display. By moving up and down through the sequence you can locate the character you need.

Upper case: letters A-Z have codes 65-90
Lower case: letters a-z have codes 97-122

Remember that code 32 is used to erase a character in the event you are programming a shorter legend than the previous one.
The trick to using mode 51 is to understand that the MODE button switches you from the CURSOR mode used to change position to the CHARACTER mode used to change the character displayed at the cursor position. Once you have selected the correct character for the indicated position, press the MODE button to return to the CURSOR mode and use UP to move to the next position. Press MODE again and you are in the CHARACTER mode and can select a new character for the current position.

Navigating the Mode Menu System

The configuration of your clock/counter/timer can be programmed and modified using the 4 control buttons on the clock, hand held remote control, or through a serial or Ethernet connection to a PC. This guide is for manually configuring your device.

Changing the configuration of your device should be not be attempted without a defined purpose and an understanding of the mode changes required to achieve that purpose. Please review the ‘Tiger Digital Clocks-Technical Reference Manual’ before changing modes in your device. This manual is available in PDF format and can be printed directly from the website shown below. The complete manual is approximately 100 pages.

http://www.brgprecision.com/userdoc.html

The four buttons on the clock used for mode setting are MODE, UP, DOWN, and TIMER CONTROL. The remote uses the same four buttons with the MODE button marked as MODE MENU.

Button Functions

MODE: Enter the configuration menu and to shift between mode menu levels. MODE is also used to access the SPECIAL OPERATIONS that erase, save, and restore configurations or to perform diagnostic operations.

UP/DOWN: Index through mode levels and to change the value of the selected mode.

TIMER CONTROL: Exit the configuration menu. Clocks built before March 2003 will not have this feature. These older clocks require that you index the mode level down to mode 0 to exit the configuration menu. This is done by holding down the DOWN button when you are displaying a mode level and let the mode levels count down to 0 and then releasing the DOWN button.

Enter the Mode Menu System

Lockout
BRG clocks are shipped with a lockout feature enabled to prevent accidental changing of the time or the clock configuration.

To determine if the lockout is enabled, press the MODE button once. If the #1 display flickers, your clock is locked out. If the number 1 shows when you release the mode button, your clock is not locked out and you have entered mode 1.

**Lockout Override**
To override the lockout feature, press and hold the MODE button down until the display quits flickering and then quickly release the MODE button. The display will show the number 1, the first mode selection.

**Changing Mode settings**
The mode settings are divided into two main groups:
Modes 1-19 are single level modes. Mode 1, for example, allows you to access and change the current date in the clock.

Modes 20 and above are two level modes. These modes require that you first set the first menu level, press MODE, and then set the second menu level to access the mode value. The first level mode can select a parameter such as display format, time zone offset, or alarm setting. The second level mode will identify the specific display to be modified, the alarm number to be set, or other property specific to the first level mode setting. Two level modes are shown as nn-(n)n in this manual. 20-2, for example, indicates a first level mode of 20, and a second level mode of 2.

Once the single level or two level mode has been selected, pressing MODE will show the value of that mode and enable you to change the value for your application.
Pressing MODE again will return you to the mode selection.

Remember that the first level mode will be shown on the left side of the display and the second level mode (if available) will be on the right side.
The number value for any given mode will be on the right side of the display.

**Exit the Mode Menu**
Press TIMER CONTROL to exit the mode menu.
Clocks built before March 2003 will not have this feature. These older clocks require that you index the mode level down to mode 0 to exit the configuration menu. This is done by holding down the DOWN button when you are displaying a mode level and let the mode levels count down to 0 and then releasing the DOWN button.
Exercise-Single level mode settings
To become familiar with the mode menu system, this exercise will show you how to access the current date and year in your clock. The date is in mode 1, the year in mode 2.

ENTER the mode menu system (go to mode 1)
Press MODE again to show the value in mode 1. The display will show the current date in mm dd format.

Use the UP and DOWN buttons to change the date. Return the date to the current date.

Press MODE to return to the mode menu
Press UP to go to mode 2 (year)
Press MODE to show the value in mode 2
Press UP and DOWN to adjust the year. Return the year to the current year.
Press Mode to return to the mode menu
EXIT the mode menu system

Exercise-Two level mode settings
This exercise will demonstrate how to navigate the two level mode settings and set the time for alarm number 3 (27-3) and the day code for alarm number 3 (29-3).

ENTER the mode menu system (go to mode 1)
Press UP to mode 27 (first level mode)
Press MODE to access the second level of mode 27. The display will show a 27 on the left with a 1 on the right. The 1 is the second level mode indicating that you are at the mode to set the alarm time for alarm number 1.
Press UP twice to go to alarm 3. The display shows a 27 on the right and a 3 on the left. You are now ready to access the alarm time for alarm number 3.
Press MODE to show the value of 27-3. The default value is 12:00 am for a 12 hour format or 0:00 for a 24 hour format clock.
Press UP and DOWN to adjust the time for this alarm.
Press Mode to return to the mode menu (27-3).
Note:
Now that you have set the time for alarm 3, you need to also set the day code for alarm 3 (mode 29-3). In order to go to mode 29 you must first return to the first level of menu 27. This is done by decrementing the second level menu until only the first level menu selection is showing.

Press DOWN three times. You are now at first level mode 27.
Press UP twice to go to mode 29.

Press MODE to access the second level of mode 29. The display will show 29 on the left and 1 on the right. This mode is for the day code for alarm 1 (29-1).

Press UP twice to go to mode 29-3, the day code for alarm 3.

Press MODE to display the value in 29-3. The default is 0 indicating that no day code has been set for alarm 3. The alarm is not activated. For this exercise, you will not change this value and leave alarm 3 inactive.

Press MODE to show the selected mode (29-3).

EXIT the mode menu system

Notice that the MODE button is used to enter the mode menu, move from the first level to the second level of the mode menu, and to enter and exit the value display for the selected mode.

SPECIAL OPERATIONS
These commands perform global operations to save, restore, and erase configurations and to execute diagnostic features.

Performing the SPECIAL OPERATIONS
Press and HOLD the MODE button until the #1 display slowly counts up to the desired SPECIAL OPERATION number and then release the MODE button. If the mode lockout has been enabled, the display may flash for a few seconds when the MODE is first pressed and then will go to zero and begin to slowly count up.

Be sure to HOLD the MODE button down until you see the desired number and then quickly release the MODE button.

NOTE: Special Operation 4 requires the additional step of clicking the TIMER CONTROL button after releasing the MODE button while the number 4 is still showing to verify that you wish to save a new custom configuration.

If you have made changes to the configuration and you are trying to save these changes with Special Operation 4 and you accidentally release the mode button on 2 or 3, the clock will be reset to factory defaults (2) or the last custom configuration (3) will be reloaded and you will lose all of the changes you were trying to save.
SPECIAL OPERATION 0- Stops analog clock pulsing
Effective only when the clock is configured as an Analog Master clock. Used to pause pulsing during analog clock set up.

SPECIAL OPERATION 1-Software Reset

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The following 3 special operations are **extremely** powerful and must be carefully considered **before** using to prevent total loss of your clock's custom programming.

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SPECIAL OPERATION 2- Restores the clock to factory defaults.
Overwrites all custom features and operates as a simple clock. Multiple time zone displays, digital lettering, timer and counter features, serial communications and other custom features will be disabled. Often used to reset a clock to a known, default, configuration before re-configuring for a new function.

SPECIAL OPERATION 3- Recalls custom configuration.
Used to restore the clock to the last custom configuration saved with Special Operation 4. Often used when temporary changes to the clock need to be replaced with the last custom configuration or to recover from erroneous programming to the last good custom configuration.

SPECIAL OPERATION 4- Save current configuration.
When this operation is executed, the current configuration of the clock is saved as the custom configuration and stored in a secondary memory location. This configuration can be recalled using Special Operation 3 when necessary. This operation should only be used when the clock is configured exactly the way you want it and you want to overwrite the previous custom configuration. Once this action is performed, the previous custom configuration is lost forever and cannot be recovered.

SPECIAL OPERATION 6- Show Zone Number of multiple time zone display.
Displays will indicate their relative ordering in the clock. Useful for applying time zone rules and display formats to the correct displays in multiple display clocks. Bar segment or dot matrix alphanumeric displays will not show their display number. Press UP or DOWN to exit this operation.

SPECIAL OPERATION 7- Illuminate all displays
Test feature used to verify that all displays are functional with no missing dots or segments. Press UP or DOWN to exit this operation.
<table>
<thead>
<tr>
<th>Zone Number</th>
<th>Zone Name</th>
<th>Mode 21 (UTC Offset)</th>
<th>Mode 24 (DST)</th>
<th>Mode 33 (Forced Offset)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
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<td></td>
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<td>3</td>
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<td>24</td>
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</tr>
</tbody>
</table>

The format is **MMRD**, where **MM** = month (1-12), **R** = instance of which week (1-5 5=last instance), **D** = day of the week (1-7), where 1=Monday and 7=Sunday. For example, 357 represents the last Sunday in March, or 1117 represents the First Sunday in November.