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## How to Call Out From a Datalogger on an Alarm Condition via a Cell Phone

### MultiLogger Application Note #4

#### **Overview:**

One increasingly attractive method for communication in remote areas is via cell phone. Campbell Scientific offers the COM100 Cell Phone and the COM200 phone modem to fill this need. MultiLogger has several Alarm Actions built in and, with some additional programming, can be configured to use the cell phone to place outgoing calls during an alarm situation. The way to do this is to build an Alarm Action File.

An Alarm Action File contains instructions to execute in the event of an alarm. Alarms are enabled by checking Check Alarms in Channel Configuration, whether Direct Connect Instruments or Multiplexer Channels, and then entering high and low limits to check.

The purpose of this Application Note is to provide information on how to build and implement an Alarm Action file that will place an outgoing call on a COM100 cell phone to a user specified phone number in the event of an Alarm. The file also has instructions to manage power to the cell phone. The following steps are necessary:

- 1) The Alarm Action Instruction file must be built and stored in the MultiLogger program directory, usually Program Files\MultiLogger
- 2) The file name must be added to the [Alarm Actions] section of the MultiLogger setup file
- 3) The file must be selected in the Configuration form
- 4) The Initiate Telecommunication instruction must be configured
- 5) The dial out information must be entered
- 6) The power management parameters must be configured
- 7) Check Alarm must be selected and the limits set in the appropriate sensor's Channel Configuration

#### **A few words of warning:**

The reliability of the cell phone connection can vary over time at the same location. Changes in local weather conditions or the amount of cell phone traffic in the cell or adjacent cells may affect your ability to initiate or receive calls at the datalogger. These factors should be taken into consideration when planning an alarm system in a remote area.

Power consumption is always a consideration in battery operated systems. Cell phones can use as much as 3 Watts of power during transmission. With a standard 7 Amp hour 12 Volt battery this works out to about one day's worth of transmission time. We recommend a large battery, like a deep discharge marine type, and a solar charging system on the order of 50 Watts output. It's very likely that the system may need modifications to its power wiring and charging system(s) when the external battery is added.

While the cell phone can place a call it doesn't transmit any information. One method of identifying the calling datalogger is to have Caller I.D. installed on the number being called. Another method is to have the datalogger call a pager. With the proper programming the datalogger can send protocol numbers and an identification number to the pager. If the datalogger calls a voice phone the person who answers will hear "dead air" with no assurance that the datalogger placed the call.

**Instructions:**

- 1) Build the Alarm Action File call cell\_call.ins using the MultiLogger Editor (press the Setup button in MultiLogger, press New, select Instruction File). The file is listed at the end of the MAN (MultiLogger Application Note). The file may also be copied as received via e-mail or other means to the MultiLogger directory.
- 2) This file must be added to the multilogger.ini setup file. Save the work done in the previous step and exit the editor. Press the Setup button in MultiLogger. Scroll down to the [Alarm Action] section. Note the last entry and add the following:

**Action#n=Cell Call,cell\_call.ins**

Where **n** is the next number in the series of Alarm Actions. Save the changes, close the editor and restart MultiLogger.

Note: When future updates are applied to the installed version of MultiLogger these additions should remain after the update completes.

- 3) Select this new Alarm Action from the pull down menu in the Alarm Actions box on the MultiLogger Configuration screen. If the option doesn't appear in the menu check to see that multilogger.ini was modified correctly as described in Step 5).
- 4) Configure the P97 Initiate Communications instruction as needed for your application. Click on the gear icon adjacent to the Alarm Actions box to load the file **cell\_call.ins** into the editor. A detailed discussion of the instruction can be found in your Campbell Scientific CR10X Operator's Manual in the Instructions section. A short explanation of the settings used in this MAN follows:

P97 Initiate Telecommunications ;

1:[22 ] Modem/Baud Option (Phone Modem/9600 Baud)

This Parameter tells the system to expect a connection via a phone modem and prepare to transmit a 9600 baud

2:[5 ] Flag to Disable (Disabled when User Flag 5 is High)

;

This parameter disables the call if the user sets Flag 5 HI in Monitor

3:[60 ] Seconds Call Time Limit ;

This limits the call length to 60 seconds

4:[60 ] Seconds Before Fast Retry ;

This is a pause before retrying after a failure to call out

5:[3 ] Fast Retries ;

This calls for 3 retries after the pause above

6:[5 ] Minutes before Slow Retry ;

This sets the number of minutes between retries after the 3 fast retries described above

7:[User\_Location\_1 ] Failures Loc ;

This parameter specifies which location in which the number of failed attempts is stored. This example specifies User\_Location\_1 which is Input Location 19

8:[0 ] Call-back ID ;

This is the code that the datalogger sends when a call is completed.

- 5) Enter the phone number to call. The phone number will be entered in one or more of the P68 Extended Parameters instructions. The format is one digit per parameter line. A "13" must be entered after the last digit to indicate the end of the phone number.
- 6) Configure the two P92 instructions to describe the "power window". During normal operation the phone will only be powered during this time. In the following example the window is open (power is on) between 8:00 AM and 8:00 PM. In the first P92 the first parameter is the number of minutes after midnight corresponding to 8:00 AM. In the second P92 the first parameter corresponds to 8:00 PM. These first parameters should be modified to reflect the time during the day when the phone is to be powered.
- 7) Determine which instruments will be monitored for alarm conditions. Determine what those alarm conditions are. In the Channel Configuration screen of those instruments, from the Type text box select Low and High. Enter the alarm conditions in the Low Limit and High Limit boxes.

**Instruction File cell\_call.ins**

```

P20  Set Port(s)          ;
1:[9799                   ] C8,C7,C6,C5 Options  ;
2:[9999                   ] C4,C3,C2,C1 Options  ;

P91  If Flag/Port        ;
1:[18                     ] Flag/Port Options (Do if Flag 8 is High);
2:[30                     ] Command Code Option (Then Do)  ;

P86  Do                  ;
1:[47                     ] Command Code Option (Set Port 7 High) ;

P4   Excite-Delay (SE)   ;
1:[1                      ] Reps ;
2:[1                      ] New Range (2.5 mV Slow Range) ;
3:[12                     ] SE Channel ;
4:[2                      ] Ex Chan (Excite all reps w/Exchan 2) ;
5:[3000                   ] Delay (units 0.01 sec) ;
6:[0                      ] mV Excitation ;
7:[ScratchLoc1           ] Loc ;
8:[0                      ] Mult ;
9:[0                      ] Offset ;

P97  Initiate Telecommunications ;
1:[22                     ] Modem/Baud Option (Phone Modem/9600 Baud);
2:[5                      ] Flag to Disable (Disable if Flag 5 is High)
3:[30                     ] Seconds Call Time Limit ;
4:[60                     ] Seconds Before Fast Retry ;
5:[3                      ] Fast Retries ;
6:[5                      ] Minutes before Slow Retry ;
7:[UserLoc12             ] Failures Loc ;
8:[0                     ] Call-back ID ;

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P68  Extended Parameters 4 Digit ;
1:[5           ] Option      ;
2:[2           ] Option      ;
3:[6           ] Option      ;
4:[9           ] Option      ;
5:[8           ] Option      ;
6:[0           ] Option      ;
7:[0           ] Option      ;
8:[13          ] Option      ;

P68  Extended Parameters 4 Digit ;
1:[0           ] Option      ;
2:[0           ] Option      ;
3:[0           ] Option      ;
4:[0           ] Option      ;
5:[0           ] Option      ;
6:[0           ] Option      ;
7:[0           ] Option      ;
8:[0           ] Option      ;

P94  Else ;

P92  If time is ;
1:[480         ] Minutes (Seconds --) into a ;
2:[1440        ] Interval (same units as above) ;
3:[47          ] Command Code Option (Set Port 7 High) ;

P92  If time is ;
1:[1200        ] Minutes (Seconds --) into a ;
2:[1440        ] Interval (same units as above) ;
3:[30          ] Command Code Option (Then Do) ;

P91  If Flag/Port ;
1:[28          ] Flag/Port Options (Do if Flag 8 is Low)
      ;
2:[57          ] Command Code Option (Set Port 7 Low) ;

P95  End ;

P95  End ;

```