

# Configuring Selection Sets

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Although the ICON program only works on one type of data, a floating point number, there are many instances where these values are better displayed as text strings. It is often desirable to create a variable whose value is used to indicate a status. In this case the variable is programmed such that it is limited to integers in the range of 0 to 16,777,215. In the examples below a range of 0-7 is used in the event file status and 0-255 for the period file status.

## Example event file status

The first example concerns the status value of an event data item recorded in an event file. Each record contains the event number, date/time of occurrence, the event value and an event status.

By common usage, the following has evolved for event status:

Status value	Bit pattern	Meaning
0	0000	No alarm
1	0001	Clear alarm
2	0010	Low alarm
3	0011	Set low alarm
4	0100	High alarm
5	0101	Set high alarm
6	0110	Both high and low alarms
7	0111	Set both high and low alarms

In the above, the low bit is used to record the event in the event file. Notice it is only set when an alarm sets or clears. Therefore status values 1, 3 5 and 7 will be the only values recorded to the event file status. The status variable within the ICON program can take on any of the seven values and all seven definitions would be used if an HMI status variable object were used to display this status variable in real time on an HMI screen.

Therefore the following selection set status definition could be used with an event file and with an HMI variable display object.

From the above a selection set can be created as follows which can be used to display event status in an event report and for HMI variable objects used to display this status.

1. Go to the selection set configuration screen. This can be found at three locations – periodic file configuration, event file configuration and when configuring an HMI variable display object on any HMI screen. There is only one set of selection set definitions which can be edited from any of these three locations.
2. For this example the obvious procedure is to go to the “Program view” tab and select “Event file 1” under the “System Parameter Config” drop down list.

3. Click the "Selection Set" button.
4. To add a new selection set definition click the "Add Set" button.
5. Enter a definition name in the "Enter Selection Set Name" field. For example "Event alarm".
6. Now type in "No alarm" in the "Add Selection" field and click the "Add" button.
7. Type in "Clear alarm" in the "Add Selection" field and click the "Add" button.
8. Type in "Low alarm" in the "Add Selection" field and click the "Add" button.
9. Type in "Set low alarm" in the "Add Selection" field and click the "Add" button.
10. Type in "High alarm" in the "Add Selection" field and click the "Add" button.
11. Type in "Set high alarm" in the "Add Selection" field and click the "Add" button.
12. Type in "Both high and low alarm" in the "Add Selection" field and click the "Add" button.
13. Type in "Set both high and low alarm" in the "Add Selection" field and click the "Add" button.

If you make a mistake, click on the desired entry in the list, enter the correct words in the "Add Selection" field and click the "Replace" button. Or to delete the highlighted entry, click the "Delete" button.

For each entry you may click the "Set Properties" button. A new window appears where you may configure the parameters for this selection set text entry. You may configure:

1. Alignment. Often a selection of "Right" looks best in a display field but it can be edited later if "Center" or "Left" looks better.
2. Next pick your font size, 10 and 12 are the most common choices.
3. Pick your "Font Color". Black usually looks best.
4. Next select your background color. Use your mouse to drag the circle selector to the color you wish to use. Or enter the background color ID. Some standard colors are 00FF00 for dark green, 00CC00 for light green, CCCCCC for gray, FF0000 for dark red, CC0000 for light red, CCCC00 for light yellow and FFFF00 for dark yellow.
5. Some combinations that look good are black letters on a gray, red, yellow or green background. You might want to pick a light green or gray background for the No alarm and Clear alarm entries. A red background could be used for the other entries to highlight the fact that an alarm is in effect.
6. Leave the "Mask" and "Match" fields blank.

When done editing the text entries for the selection set, click "OK". To actually select which selection set to use for the event file, click to highlight the "Event alarm" entry in the "Select Existing Set" drop down list. Then click the "OK" button to exit selection set operations.

## **Example periodic file status**

Another example is used with the periodic file. A good example is a status value to accompany a data value which might represent the value of a pollutant in a stack in a stack monitoring application. Here one value may be the concentration of the pollutant. A second value could represent the "status" of this value.

The status value might be defined as follows:

Value	Bit pattern	Mask	Match	Priority (1 highest)	Meaning
0	00000000	00000000	00000000	10	Data normal (use a blank display)
1	00000001	00000001	00000001	9	Missing samples
2	00000010	00000010	00000010	8	Warning alarm
4	00000100	00000100	00000100	7	High alarm
8	00001000	00001000	00001000	2	Monitoring not required
16	00010000	00010000	00010000	5	In calibration
32	00100000	00100000	00100000	6	Calibration fail
64	01000000	01000000	01000000	4	Instrument failure
128	10000000	10000000	10000000	3	User disable
255	11111111	11111111	11111111	1	No Data

But there may be multiple bits set. For instance the data could be in a “Monitoring not required” mode and be in high alarm. But because the monitoring is not required the alarm can be disregarded.

Also, when a sample reaches a certain limit the warning alarm bit is set. When the level increases above the High alarm value the High alarm bit is set. In the first case the warning alarm should be displayed but in the second case the High alarm text should be displayed.

Again, the above is created with a selection set but in this case the selection set text entries are entered in priority order and a “mask” and “match” pair of values are added to each entry to determine if that selection state is selected because it is no longer a counting sequence.

So what do “mask” and “match mean? The value is bit wise anded with the mask value and if the resultant value equals the match value then that selection set text entry is displayed. If it does not match then the next entry is tested. This continues until a match is found.

To create this selection set repeat the steps used to create the Event status definition. For this example the obvious procedure is to go to the “Program view” tab and select “Data file 1” under the “System Parameter Config” drop down list.

Be sure and enter the entries in the priority order of 1 to 10 as listed above. Also enter the mask and match values.