The Application Note is pertinent to our CTIU and Unidrive Family Range

Creating a Unidrive Fault Screen with the CTIU Operator Interface Unit

It is often desirable to offer a special Fault Screen on an HMI Operator Interface Unit upon a Drive Fault. This application note will outline a procedure to allow you to create a Fault Screen such as the one shown below on our CTIU multi-line units:

In order to create a Fault screen, you will need the CTIU Configuration program.

The CTIU configurator can be downloaded from our website at or by clicking on the link below:

http://www.emersonct.com/download_usa/software_drives.htm

The CTIU has the ability to create Alarm screens which would be called up in the event of a Drive Fault.
An ALARM screen can be setup by selecting ALARMS under the Edit pull down menu:

![Configure Alarms screenshot]

This will cause the following setup screen to appear:

![Configure Alarms setup]

The configurator is looking for a location in the drive that becomes a 1 when an Alarm is to be displayed. Unfortunately, the Unidrive creates a 1 when the Drive is Healthy at parameter #10.01. We need the opposite.
Creating a Drive Tripped or Drive Faulted bit

There are at least a couple of ways I can think of to invert the Drive Healthy bit in order to create a Drive Faulted bit.

#1 The easiest method would be to use an un-used output (if you have one). Check to see if you have any wire on pin 24,25 or 26 of your Unidrive or pins 48,49 or 50 if you are using the UD50 Extended I/O Module.

For example, let’s say that you did not need the standard drive output that is provided on pin 24 which is typically setup to indicate Zero Speed or At Speed (depending on Open Loop or Closed Loop operation).

All we would need to do is make parameter #8.10 monitor the Drive Healthy bit (#10.01) and invert it by setting #8.11=1.

In this manner, the CTIU could be looking at #8.01 for indication when then Drive has faulted.
Another method that could be used if there were no un-used outputs, would be to use one of the Programmable Logic Gates within Menu 9.

We would set the Gate inputs to monitor the Drive Healthy bit (#10.01) and invert it by setting #9.08=1.

In this manner, the CTIU could be looking at #9.01 for indication when the Drive has faulted.

Once you've decided on a method to create the Drive Faulted bit, you are ready to make the ALARM setup assignments.
On my setup I was not using pin 24 so I used the method as described in #1. Therefore, the CTIU Alarm page will be activated by parameter #8.01 in the Unidrive.

Once we have setup the ALARM register, we can now create the ALARM or Fault Screen itself.
One could now create a screen similar to that shown below:

Perhaps Flash this line for more attention.
Now as far as displaying a phrase for the Drive Fault, we could create a specific phrase for each of the Drive Faults. Listed below are only some of them:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UV</td>
<td>DC Bus Under voltage ((&lt;\ 450V\ DC))</td>
</tr>
<tr>
<td>OV</td>
<td>DC Bus Over voltage ((&gt;\ 830V\ DC))</td>
</tr>
<tr>
<td>OI.AC</td>
<td>AC instantaneous current trip **</td>
</tr>
<tr>
<td>OI.br</td>
<td>Instantaneous braking circuit over current **</td>
</tr>
<tr>
<td>PS</td>
<td>Power supply trip (Internal drive fault)</td>
</tr>
<tr>
<td>Et</td>
<td>External trip (see p10.32)</td>
</tr>
<tr>
<td>OV.SPd</td>
<td>Overspeed of motor (see p3.08 for threshold)</td>
</tr>
<tr>
<td>Prc2</td>
<td>Processor 2 trip (UD70 Applications Module)</td>
</tr>
<tr>
<td>SEP</td>
<td>Trip detected in small option module (eg. Resolver break)</td>
</tr>
<tr>
<td>ENC.OVL</td>
<td>Encoder supply or F/D output overload</td>
</tr>
<tr>
<td>ENC.PH1</td>
<td>Encoder phasing failure - U missing *</td>
</tr>
<tr>
<td>ENC.PH2</td>
<td>Encoder phasing failure - V missing *</td>
</tr>
<tr>
<td>ENC.PH3</td>
<td>Encoder phasing failure - W missing *</td>
</tr>
<tr>
<td>ENC.PH4</td>
<td>Encoder phasing failure - UVW connections *</td>
</tr>
<tr>
<td>ENC.PH5</td>
<td>Encoder phasing failure - A missing *</td>
</tr>
<tr>
<td>ENC.PH6</td>
<td>Encoder phasing failure - B missing *</td>
</tr>
<tr>
<td>ENC.PH7</td>
<td>Encoder phasing failure - A/B swapped *</td>
</tr>
<tr>
<td>ENC.PH8</td>
<td>Autotune general failure*</td>
</tr>
<tr>
<td>It.br</td>
<td>IxT on braking resistor (see p10.30)</td>
</tr>
<tr>
<td>Oh1</td>
<td>Drive overheat (Drive thermal model protection)</td>
</tr>
<tr>
<td>It.AC</td>
<td>IxT overload in motor (see p4.15)</td>
</tr>
<tr>
<td>Oh2</td>
<td>Excessive heatsink temperature detected by thermistor (see p7.04)</td>
</tr>
<tr>
<td>OA</td>
<td>Excessive ambient temperature (&gt;70°C)</td>
</tr>
<tr>
<td>TH</td>
<td>Thermistor trip - excessive heat in motor (see Input spec)</td>
</tr>
<tr>
<td>THS</td>
<td>Thermistor short circuit (see Input spec)</td>
</tr>
<tr>
<td>OP.OVLd</td>
<td>Overload of 24V output, or digital outputs</td>
</tr>
<tr>
<td>CL1</td>
<td>Current loop 1 loss (Trip level is 3mA in 4-20 or 20-4mA modes)</td>
</tr>
<tr>
<td>CL2</td>
<td>Current loop 2 loss (Trip level is 3mA in 4-20 or 20-4mA modes)</td>
</tr>
<tr>
<td>CL3</td>
<td>Current loop 3 loss (Trip level is 3mA in 4-20 or 20-4mA modes)</td>
</tr>
<tr>
<td>SCL</td>
<td>Serial comms loss (serial mode 2 only)</td>
</tr>
</tbody>
</table>

Important trips - drive trips immediately:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEF</td>
<td>Internal EEPROM failure</td>
</tr>
<tr>
<td>Ph</td>
<td>Loss of an AC supply phase (Always stops before tripping)more...</td>
</tr>
<tr>
<td>rS</td>
<td>Failed during stator resistance measurement</td>
</tr>
<tr>
<td>ST GL</td>
<td>Size 5 Spurious trip</td>
</tr>
<tr>
<td>SEP EC</td>
<td>Small option module encoder comms failure.</td>
</tr>
<tr>
<td>SEP EF</td>
<td>Small option module encoder fault.</td>
</tr>
</tbody>
</table>

However, to save you time I’ve already created a Fault List file that can be imported to save you all this time.
The phrases that will pop up will be:

000 : Unknown Trip Code
001 : DC Bus UnderVoltage
002 : DC Bus OverVoltage
003 : AC OverCurrent Trip
004 : Braking Overcurrent
005 : Internal Supply Trip
006 : External Trip Pin 30
007 : Motor Overspeed Trip
008 : Co-Processor Trip
009 : Resolver/SmallOption
010 : Encoder Supply Trip
011 : U Channel Problem
012 : V Channel Problem
013 : W Channel Problem
014 : UVW Connections ??
015 : A Channel Problem
016 : B Channel Problem
017 : Connections-AB PH7
018 : Encoder Failure-PH8
019 : Braking Overload
020 : Ixt Overload Trip
021 : Heatsink (Ixt)-Oh1
022 : Drive was Hot! Oh2
023 : Electronics was Hot!
024 : Motor was Hot!
025 : MotorThermistor Bad
026 : Drive 24v Overloaded
027 : mA Current Ref1 Loss
028 : mA Current Ref2 Loss
029 : mA Current Ref3 Loss
030 : Communication Loss
031 : Data EEPROM Failure
032 : AC Input Phase Loss
033 : Stator ohms range ?
034 : Uni 5 Spurious Trip
035 : SOM Enc Comms failed
036 : SOM Encoder Fault
037 : UD78 is not present?
041 : No Such Parameter-41
042 : Write to Read Only42
043 : Parameter Write Only
044 : Value OverRange 44
045 : IObox Link Failure ?
046 : Stack Overflow 46
047 : Internal Error 47
048 : Internal Error 48
049 : Wrong OS Loaded 49
050 : Divide by 0 Math 50
051 : Array Range Error 51
052 : Control Word Trip 52
053 : DPL Program Wrong 53
054 : DPL Task Overrun 54
055 : RS485 Comms Trip 55
056 : Fieldbus or Wrong OS
057 : Illegal OS Call 57
058 : Internal Error 58
059 : Internal Error 59
060 : CTNet Hardware 60
061 : CTNet Baud/Node Err
062 : CTNet Baud Conflict
063 : CTNet Duplicate Node
064 : Illegal Cyclic Rate
101 : Uni5 OverTemperature
102 : HeatSink Hot Unit 1
103 : HeatSink Hot Unit 2
104 : HeatSink Hot Unit 3
105 : HeatSink Hot Unit 4
106 : HeatSink Hot Unit 5
107 : HeatSink Hot Unit 6
108 : HeatSink Hot Unit 7
109 : HeatSink Hot Unit 8
110 : PowerSupply Unit 1
111 : PowerSupply Unit 2
112 : PowerSupply Unit 3
113 : PowerSupply Unit 4
114 : PowerSupply Unit 5
115 : PowerSupply Unit 6
116 : PowerSupply Unit 7
117 : PowerSupply Unit 8
118 : OverCurrentAC Unit 1
119 : OverCurrentAC Unit 2
120 : OverCurrentAC Unit 3
121 : OverCurrentAC Unit 4
122 : OverCurrentAC Unit 5
123 : OverCurrentAC Unit 6
124 : OverCurrentAC Unit 7
125 : OverCurrentAC Unit 8
126 : DCOverVoltage Unit 1
127 : DCOverVoltage Unit 2
128 : DCOverVoltage Unit 3
129 : DCOverVoltage Unit 4
130 : DCOverVoltage Unit 5
131 : DCOverVoltage Unit 6
132 : DCOverVoltage Unit 7
133 : DCOverVoltage Unit 8
134 : DCOverCurrent Unit 1
135 : DCOverCurrent Unit 2
136 : DCOverCurrent Unit 3
137 : DCOverCurrent Unit 4
138 : DCOverCurrent Unit 5
139 : DCOverCurrent Unit 6  
140 : DCOverCurrent Unit 7  
141 : DCOverCurrent Unit 8  
142 : Unknown Fault Unit 1  
143 : Unknown Fault Unit 2  
144 : Unknown Fault Unit 3  
145 : Unknown Fault Unit 4  
146 : Unknown Fault Unit 5  
147 : Unknown Fault Unit 6  
148 : Unknown Fault Unit 7  
149 : Unknown Fault Unit 8  
150 : Configuration Unit 1  
151 : Configuration Unit 2  
152 : Configuration Unit 3  
153 : Configuration Unit 4  
154 : Configuration Unit 5  
155 : Configuration Unit 6  
156 : Configuration Unit 7  
157 : Configuration Unit 8  
158 : Small Module Missing  
159 : Servo Phasing Wrong?  
160 : UD55 Memory Corrupt?  
161 : No Cloning Data ??  
162 : Wrong Drive Type  
163 : UD55 is Read only ?  
164 : Co-Processor Missing  
165 : Menu 20 Data Missing  
166 : Cloning Conflict ?

Place the cursor on the line where you want the Fault Phrase to appear then click on the Format Text Selector icon.
Parameter #10.20 in the Unidrive will indicate the Fault Code of the last trip. We would want to decode that into a text phrase.

Now click on EDIT TABLE.
Now click on IMPORT TABLE

The Fault Trip list can be imported from a text file named UniTrips.txt
This should pull in a proper text phase for each Unidrive fault. Click OK after this.

![Text Table 1](image)

Now your Fault Screen should look as shown below:

![Fault Screen](image)
Remote Fault Reset

If you wish to Reset the fault from the CTIU, this can be accomplished by assigning a key to write a Reset command to the Unidrive.
Double click on the selected key you choose for Reset.

Set up the key as follows:
**Testing**

If you wish to test this, make a Main Customer screen on Page 1 and perhaps another screen on page 2. Cause a drive fault by going to #10.38 and enter 10 for instance. The Alarm screen should appear for trip 10 (**Encoder Supply Trip**)

Try the Remote Reset by depressing the F1 key.

**Embellishment**

A small but nice embellishment to the Fault screen would be to change the message about "**Depress F1 to Reset the Fault**". This would be nicer if it would indicate to the user that his F1 closure had indeed reset the Fault. To accomplish this we could use the FORMAT BIT STRING function
Set to Drive Healthy Bit then scroll down to an un-assigned phrase

Then click on EDIT TOKENS

Modify as follows:
By the way, to get this special character, go to EDIT and select INSERT SPECIAL CHARACTER.
Summary

An example file for a CTIU110 is available from our website within the Application Note Area under Application Notes for AC Drives/Unidrive CTAN246.

This application note outlined a method to accomplish the requirement without using internal programming. We could also have written a short program within the Math section of the CTIU. Note however that the CTIU50 does not support Math functions.

A more eloquent example of this same kind of function is illustrated in CTAN248 where a small program is created using the Math functions of the CTIU.

Other applicable Application Notes

CTAN245  Creating Power Up Splash Screen
CTAN247  Creating a Fault History Screen
CTAN248  Creating Unidrive Fault Screen using Maths

Questions ??  Ask the Author:

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