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## **Telemetry Dynamic Simulator (TDSIM)**

### **CRC Insertion**

The TdSim application can insert CRC words where you want them, if you are in User Defined PCM mode. See the DynaSim Major Frame Process Overview drawing. You'll note that the last step prior to adding any error injection is to add the CRC data, if the option is set.

There are a gazillion CRC type routines used in the industry. This application only does a few, but the code is open enough to allow other CRC type routines to be added fairly simple.

CRC checking is a handy way to determine if your data is getting through the decom intact. Use of a PRN generator is nice, but that is random data, which bit syncs like. What about with varying data content, with longer strings of ones or zeros? Also, who actually sends a PRN pattern from their vehicle? The idea of a simulator is to get as close to real life as possible.

On your Main Startup banner, if you are in User Define PCM mode, you will have a CRC Setup button (labeled 'C'). Click that 'C' button and a window will open up for you to set the type of CRC data you want inserted.

- CRC Type
  - o CRC-32 – A CRC-32 will be performed on the data values. The result is a 32 bit word. If this is not checked, a CRC-16 is assumed.
    - The CRC-16 and CRC-32 calculations will result with the same result you would get if you ran the data through PKZIP. The CRC tables are from the Microsoft Systems Journal.
- PCM Word Start – Enter the minor frame word start (1 based index) where the CRC result will go. If you selected a CRC-16, you will need 16 bits, so if you have 8 bit words for your PCM stream, it will take up two consecutive words. If You selected a CRC-32, you will need 32 bits. Ensure you allow enough consecutive PCM words in a minor frame so it doesn't run off the end of the minor frame. It is checked for, but not corrected, so your result will be truncated if you don't follow the instructions.

Now for some options. As stated above, there are as many algorithms as there are engineers. In my opinion, any of the below options are wasteful and not needed, but are provided for your pleasure.

- Use PCM CRC Words for Calculation – If you check this box, then you want the CRC to include the values contained in the PCM words where the CRC result gets stored, before the result gets stored there. This is about meaningless unless you use the next option.
- Fill Value for PCM CRC Words – This is only available if you check the above box. You enter whatever fixed value you want to be in the PCM frame in the CRC word locations. When the calculation is made, this value will be part of the CRC calculation for the minor frame.
- Use Char String for Calculation – Arggggh. This is really wasteful. What it means is that once you've filled the values in a buffer (your minor frame), the values are converted to a hex string. The calculation is then performed on the hex string, rather than the data values. Not only have you added another conversion routine (to convert from data to a hex string), you've doubled the size of the buffer for the calculation (each data byte will require two hex string bytes).

The CRC check routines are really only valid for 8 bit words and 16 bit words. If your stream has 10 bit words, then it will be treated like 16 bit words for the calculations. If your stream has 6 bit words, then it will be treated like 8 bit words for the calculations. If this works for you, then fine. If not, then you should contact Lumistar and tell us what you want.