8.4. MBV ICD Tool (with Tutorial)

The Interface Control Definition (ICD) tool allows a host computer and an MBV model to share information via ethernet UDP packets by labeling and standardizing the information contained in the UDP packet. In other words, the ICD tool defines the XML packet layout. When creating an ICD, the user creates the packets that makeup the ICD and the members that makeup the packets.

For every model with network host inputs the user must create a new ICD. Before getting started boot MBV on your Telestra and login. The remainder of this section describes how to create a new ICD and provides a step-by-step tutorial.

Step 1: Creating a New ICD

1. Navigate to file in the top menu bar and select '**Start a New Model**.' Name the new model

   `ICD_Tutorial`

   Note: This will be an "empty" model focusing on demonstrating the ICD tool.

2. Navigate to the top menu bar and under Tools select '**ICD Tool**.' Then open the ICD tool and click 'Create' to create a new ICD.

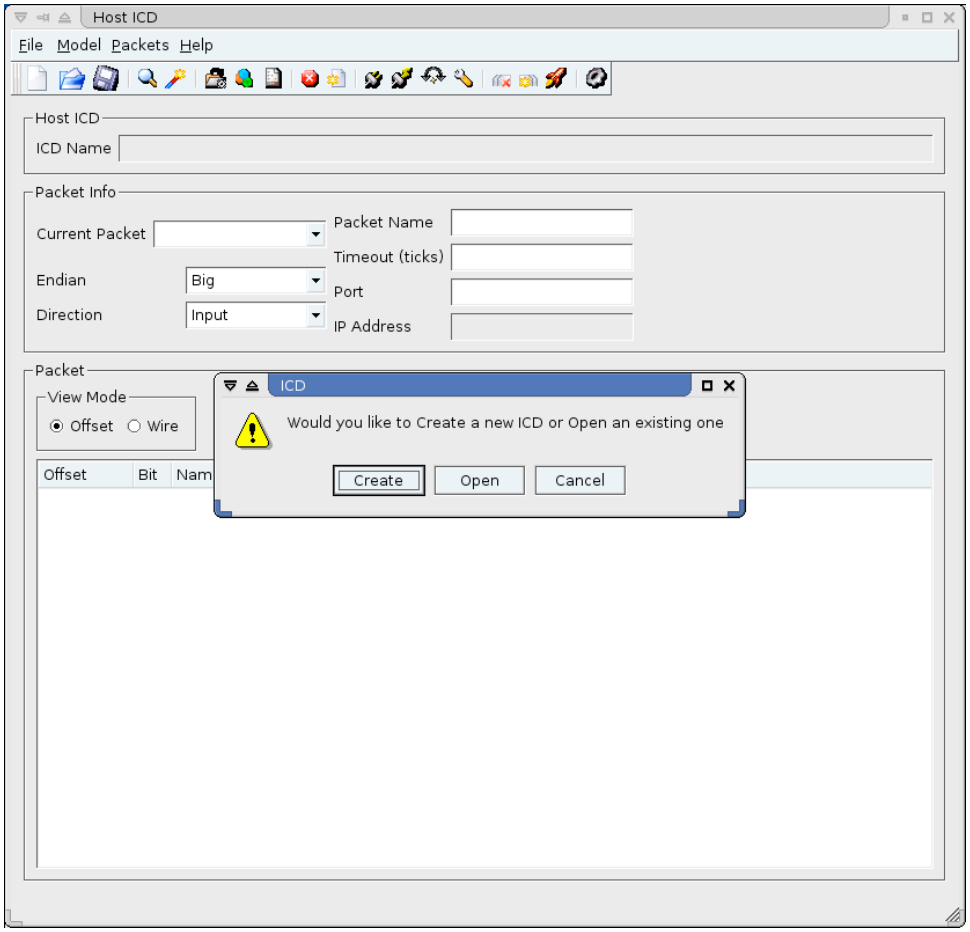

Figure 35: Creating an ICD

Step 2: Naming the ICD

You will need to name your ICD. This name is just an arbitrary name that will identify the ICD from the others. The standard naming convention is to use a name which corresponds with the function of the ICD.

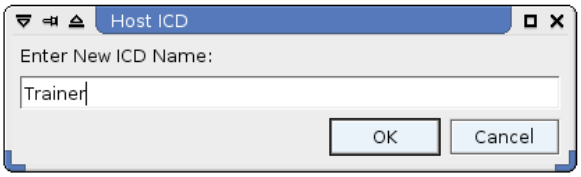

Figure 36: ICD Name

8.4.2 Adding Packets

The packets makeup the ICD. The user enters the values for each packet which will makeup the packets structure. Existing packets can also be edited by selecting a packet under the 'Current Packet' pull down menu.

The following inputs define the packet.

- **Endian**- Selects the default Endianess (Big or Little) of the packet data. This can also be set and overridden in the RMS>>Host pages. *ASTi recommends using RMS to set this value.*
- **Direction**- Defines whether the packet data is to be received as input or is to be transmitted as output.
- **Timeout (ticks)**- This value represents the number of 100 Hz system frames that can occur before loading the initialization/default values set in the UDP inputs assets in your model. Loading these values will only occur if packet information is not received on this port within the time represented by the number of frames. If a packet is received in this time frame, the count is rest. A value of zero (0) means the interface never times out and initialization/default parameters are not loaded.
- **Port**- The port number selects the default UDP receive port for the packet data if this is an input packet, or the transmit UDP port if this is an output packet. This can also be set and overridden in the RMS>>Host pages. *ASTi recommends using RMS to set this value.*
- **IP Address**- If the packet is an output packet this field will allow setting the destination IP address (i.e. the host computer you wish to send the data to). This can also be set and overridden in the RMS>>Host pages. *ASTi recommends using RMS to set this value.*

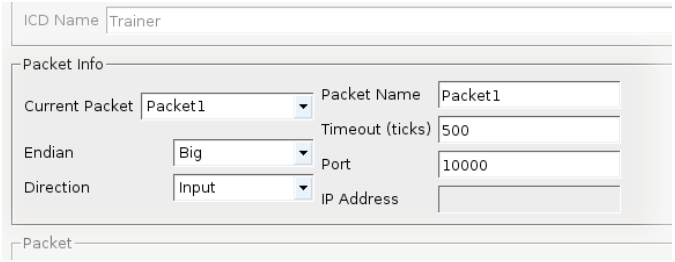

Figure 37: ICD Packet Information

Step 3: Adding a Packet to the ICD

1. Select the packet icon from the top tool bar and name it

   `Packet1`

2. Select **Packet1** from the '**Current Packet'** pulldown list.

You have now added a packet now you must add members, continue to the next tutorial.

8.4.3. Choosing a View Mode

There are two ways to view the ICD interface, most of the changes will be performed in 'Offset' view.

- **Offset view** shows the "variable" name. This is the name of the packet entry at its lowest level. One level up from this is a wire name.
- **Wire view** allows abstraction of the variable name. It is the name you see on the MBV desktop when you middle-click on a component to create a link. It's also the name you see in the Host UDP assets and cables in your model. Wires can also be bundled by adding a name to identify the bundle.

8.4.4. ICD Packet Members

The user adds members to define each packet. The following inputs must be defined for each member.

- **Name**- Enter the variable name. If you change the variable name of an existing member than the wire name under the wire view needs to be changed as well.
- **Type**- Sets the variable type and data type for the member. ASTi recommends sticking to common/basic <type> variables. **Note**: This variable type must match the variable type of the component variables it connects to in the model.
- **Offset**- Sets the offset location in the ethernet packet for the data associated with this member.
- **Bit Offset**- This is only needed for bit packed booleans.
- **Size**- Identifies the size of the data in bytes.
- **Units, Range, and Comments**- These are used to provide additional information and are not used for anything functional.
- **Default**- Not used.

Step 4: Adding a Member

You can add a member by clicking the icon button at the top of the ICD page or right click in the workspace (shown below). You'll be asked to provide a member name (in this case the same name will be used for the wire names.)

Add a member and name it,

```
SineWave_Frequency
```

Note: The user can also edit, move, or delete existing members by right clicking or choosing the proper icon in the tool bar.

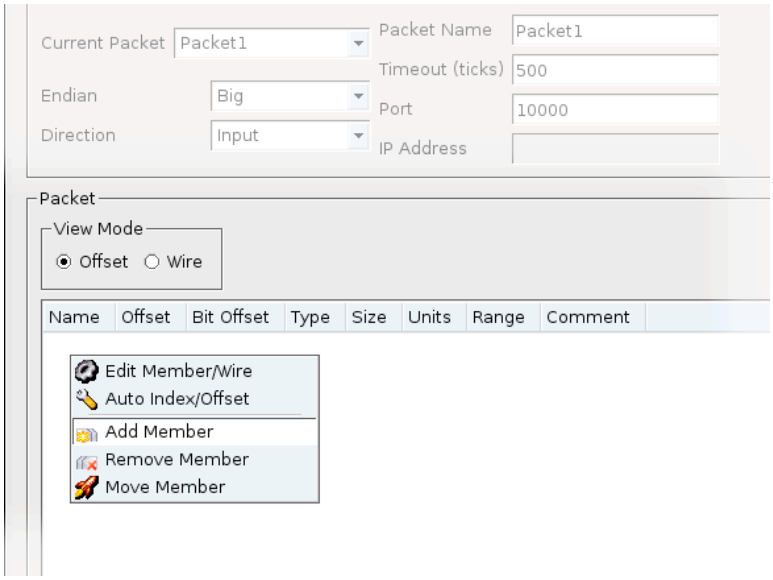

Figure 38: Adding Members

Step 5: Defining the Member

After adding a member, you must define the member name, type, offset, bit offset, and size.

Hint: To find the type variable for your member open up the object and view the schematic (see arrow 1 below). Then double-click on the input option needed (2). Look under the Type values to find the value needed (3). Return to the ICD packet member inputs and enter the Type (4).

After you have finished editing the packet select 'Ok' and your member is created.

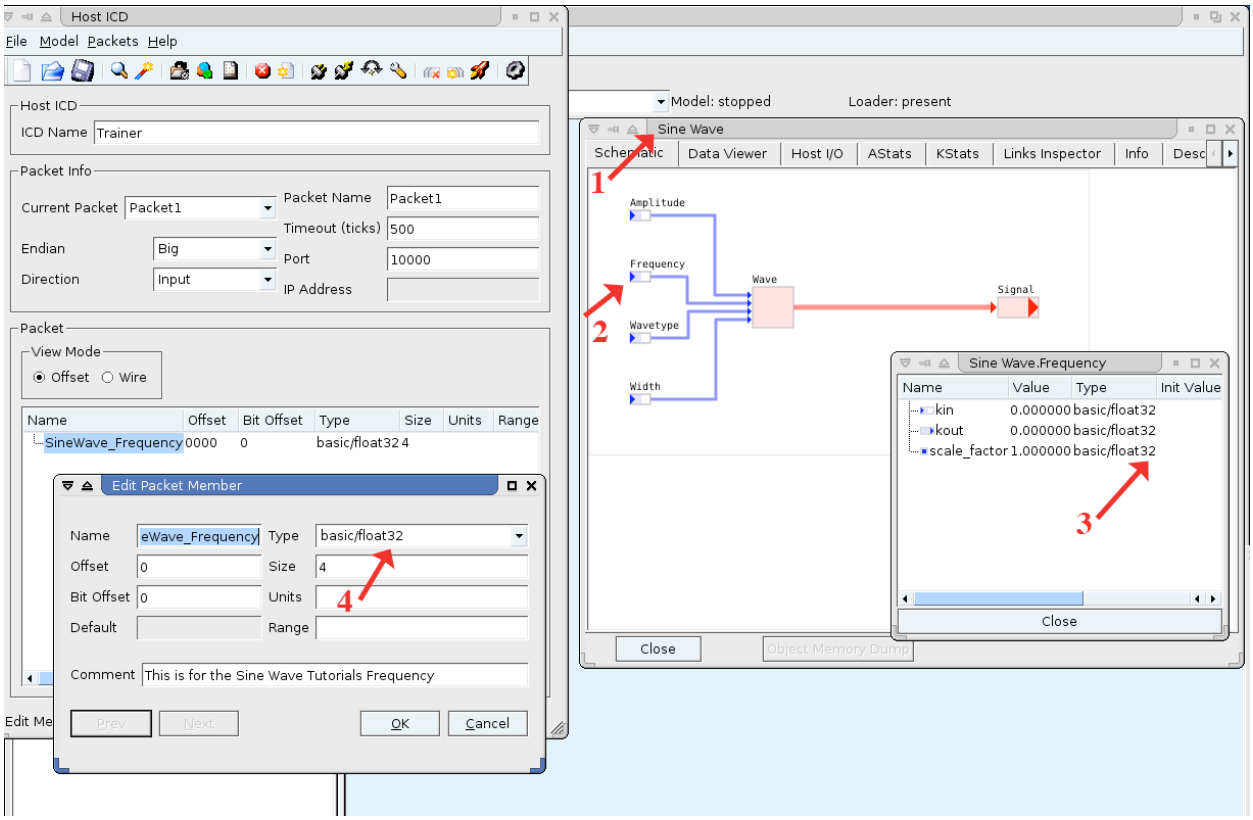

Figure 39: Setting the Member Type

8.4.5. Setting Offsets

To set offsets the view mode must be in Offset mode. There are several ways to edit offsets individually or grouped together.

- Edit offsets by editing each member through the edit member window.
- Highlight a particular member and use the +/- keys to increment and decrement the current offset number.
- Highlight a block of members (drag your mouse across them or click on the first entry and then shift/click on the last entry) and use the +/- keys to increment and decrement all offset values in the highlighted block.

  Hint: You can also select different members across the packet and use the control button to perform the same operation (i.e. the members do not need to be in a continuous block.)

- There is also an auto offset function which will automatically set the offsets of all the highlighted members. Highlight a block of members and right-click to select “auto Index/offset.” This will set the offsets starting at the input offset number (shown below).

Note: You can click on any of the column names to sort the list (alphabetical, etc.) The tool does not currently check for overlaps so be diligent!

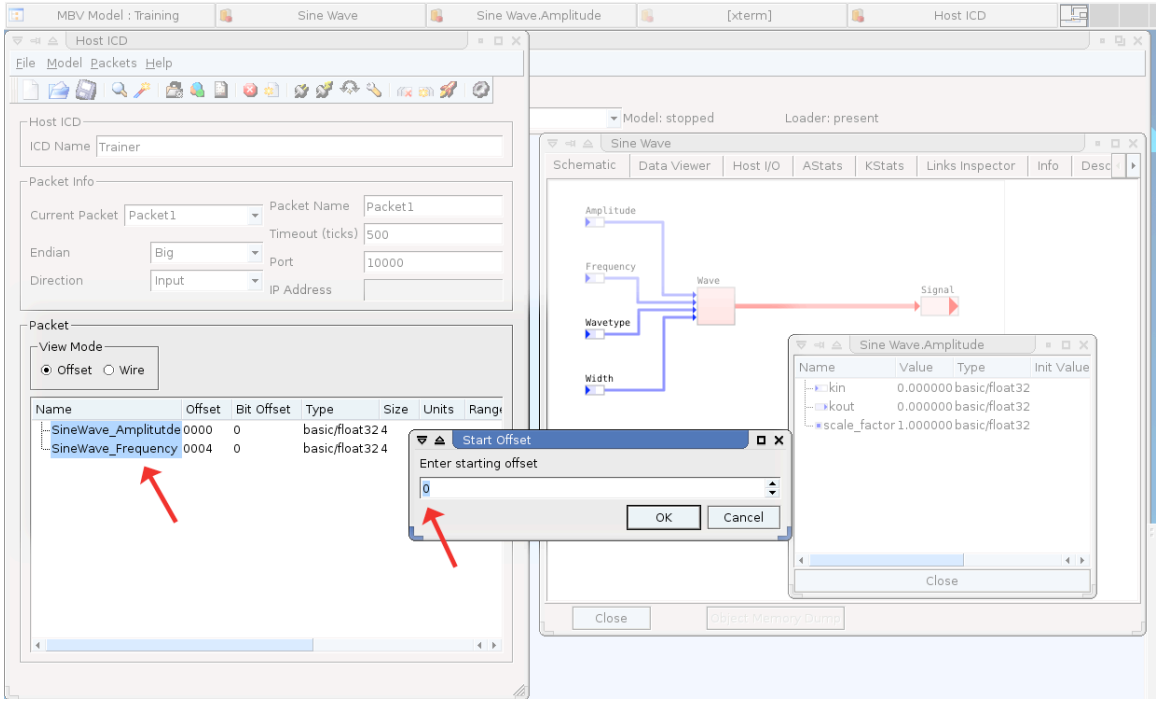

Figure 40: Setting Offset

8.4.6. Saving Changes

After completing changes to the ICD the user should either Save or Save As. Use Save As to change the name of the XML file to help track revisions. This saves the changes to the XML file but have yet to be implemented in the model.

8.4.7. Implementing Changes in Your Model

After saving the ICD XML file, the changes need to be added to the model. To add the changes to the model, click on the 'Create Assets' (magic wand) icon button or select this action from the top menu under model.

MBV will then recreate the Host Assets in the model using the currently selected (and updated) ICD file. These changes will be made to the currently loaded MBV model. A prompt will appear when this process is complete. Larger models may take a few minutes, so be patient.

After implementing the changes, reload the model in MBV and look for warning/error entries in the reporting screen at the bottom of the MBV development environment window.

Hints: You can also select the 'Clear MBV Log' entry under the Debug menu before reloading because it is easier to find any errors. Watch for warnings regarding type or size mismatches and link errors which could occur if you change the wire name of a variable. To correct type/size problems you'll need to return to the ICD tool. To correct link errors you'll need to create the new link and delete the old one. Reload after these changes and check the reporting window to see if you have cleared everything.

8.5. Changing an Existing ICD

The user must change the existing ICD to make changes to the host interface. The following describes how to edit a member in a step-by-step example.

1. Load the model you wish to change and select the ICD tool.
2. When the ICD tool opens you will have two options:

   A) Create a new ICD or

   B) Open an existing ICD

   You will choose to open an existing ICD.

   When you select to open an existing ICD you will be given a list of XML files from previous ICD files generated and saved by the tool for the currently loaded model.

   Note: If you don't purge these files you can rack up a long list. The ICD files are found in the ICD folder one level down from your top level model folder.
3. Pick the file you wish to change (this will most likely be the latest file).
4. Change the view mode to Offset.
5. Double-click on the entry/member you wish to modify, or click to highlight the entry.
6. Right click and select Edit Member/Wire, or click on the gear icon at the top of the page. The Edit Packet Member window will pop up. 

After making changes to the ICD tool, save the changes and then click the "Magic Wand" tool to create the asset.