



DEWETRON

OXYGEN ARINC 429

TECHNICAL REFERENCE MANUAL

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1 PREFACE

ARINC (Aeronautical Radio, Inc.) 429 is a technical standard for a widely used avionics bus in the air transport industry. This standard defines the transfer of digital data of avionics equipment. With DEWETRON's ARINC 429 option it is possible to receive and decode such digital data and visualize it.

1.1 INSTALLATION AND SYSTEM SETTINGS

The ARINC 429 option is automatically installed with OXYGEN 5.3 and above when purchasing a system with an ARINC module from DEWETRON and no extra license is needed. The ARINC module is a third-party hardware module from Altadt which is already built-in in the DEWETRON system. Therefore, all needed drivers for the ARINC module and the Altadt Software *AltaView* will be installed automatically with the installation of OXYGEN. No additional installations must be done by the user.

When using an ARINC module the button **ALTA_DT** must be turned on in the *System Settings > DAQ Hardware*.

Additionally, a forced initialization can be performed. If *ForceInit* is set on *False*, only the ARINC channels will be used which are available, all other channels which might be used by another software (i.e. AltaView) will not be used in OXYGEN. If *ForceInit* is set on *True* all ARINC channels will be used by OXYGEN. When changing any settings here, OXYGEN must be restarted before the settings are applied.

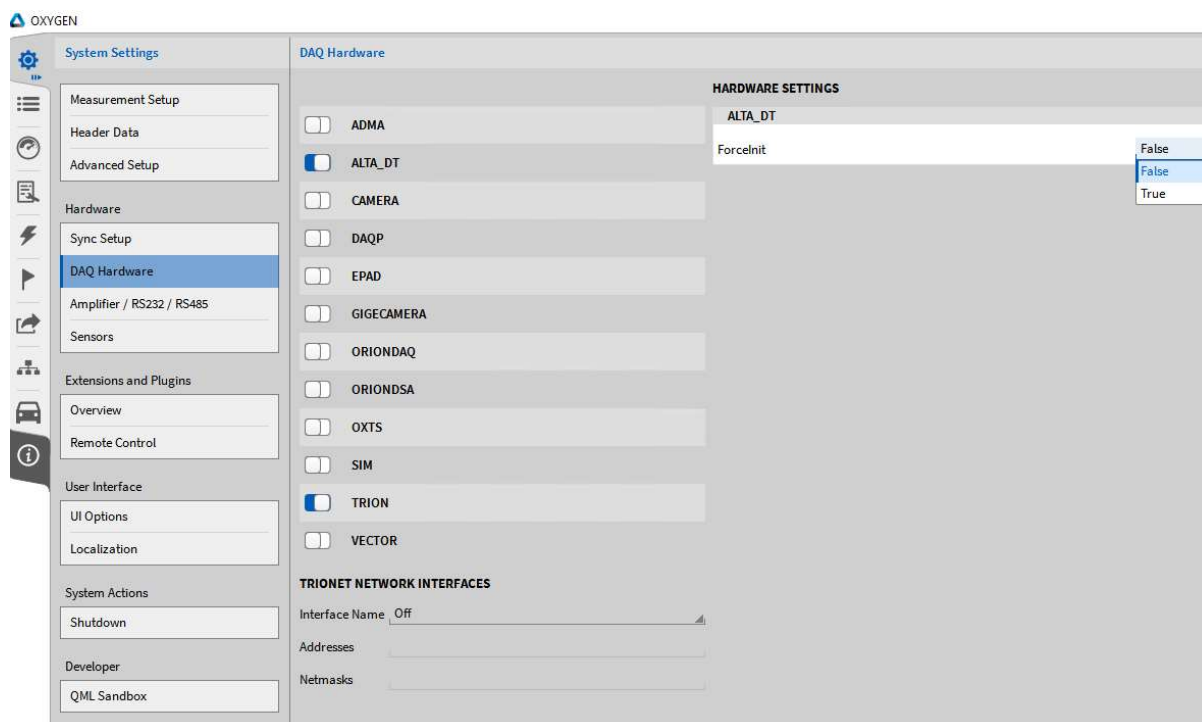


Figure 1: DAQ Hardware settings

2 SOFTWARE CONFIGURATION

This manual is only referring to the ARINC 429 option. For general software operation instructions, please refer to the latest version of the OXYGEN technical reference manual available on the CCC-portal (<https://ccc.dewetron.com/>).

Only ARINC 429 is supported by OXYGEN and hereinafter referred to as only ARINC for reasons of simplification. Since the ARINC module uses third-party hardware the module does not show up in the overview picture in the *Data Channel List* tab of OXYGEN. Therefore, no slot information is provided. Nonetheless, the used modules will appear first in the channel list as seen in Figure 2.

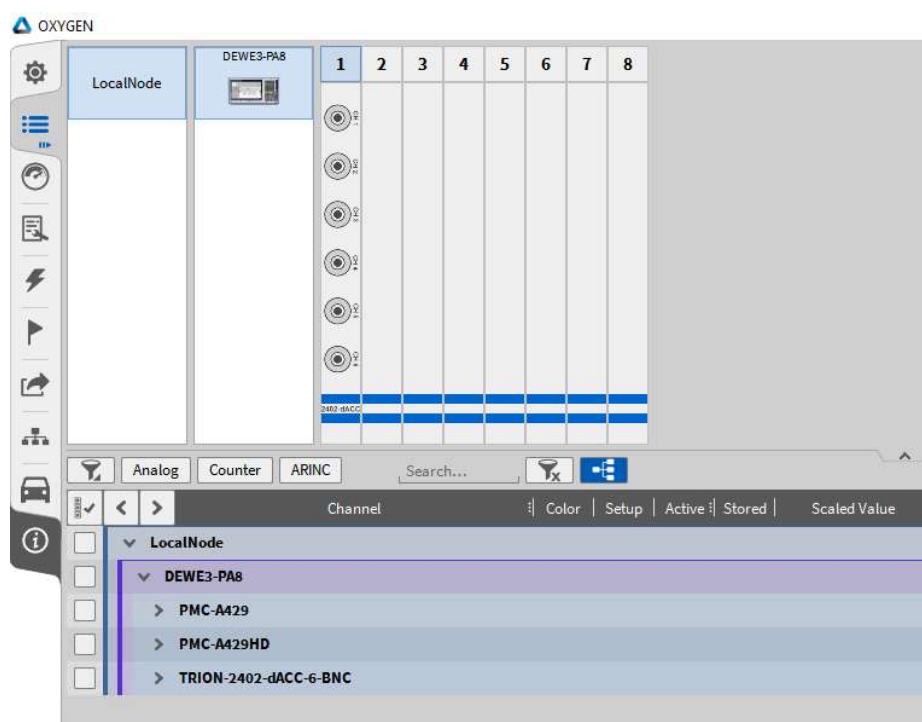


Figure 2: ARINC module in the channel list

When extending the ARINC section of one module, all available bus channels can be seen. It is possible within OXYGEN to receive the raw data stream and to decode the ARINC signals. A standard library is included and accessible in OXYGEN without further installations. This standard library includes equipment IDs and labels from the ARINC specification 429P1-19 (Digital Information Transfer System Set) with various Equipment IDs and corresponding labels.

By clicking on the small gear button of one of the bus channels, properties will open, seen in Figure 3. Following settings can be adjusted:

- Baud Rate: three different baud rates are available
 - o 100000 Baud
 - o 50000 Baud
 - o 12500 Baud
- Parity: this selection does not have an impact when only decoding ARINC signals but can be set when sending ARINC signals. The parity bit can be set to none, even or odd. Sending is currently not supported by OXYGEN and the Parity setting is NONE by default.

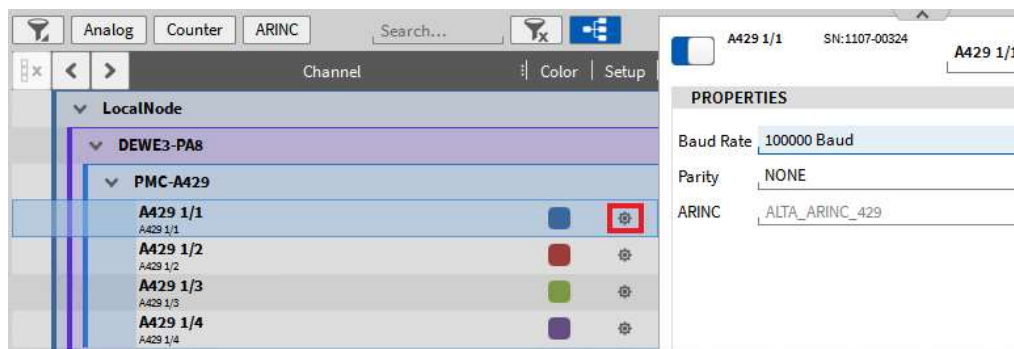


Figure 3: Channel properties of an ARINC bus channel

2.1 DECODING SIGNALS

In order to decode an ARINC signal, select the respective ARINC bus channel of the module and click on the **+** button in the lower left corner. A pop-up window will appear and the *ARINC Decoder* can be selected when scrolling down (see Figure 4).

It is not possible to create the *ARINC Decoder* without having a respective ARINC bus channel selected in the channel list.

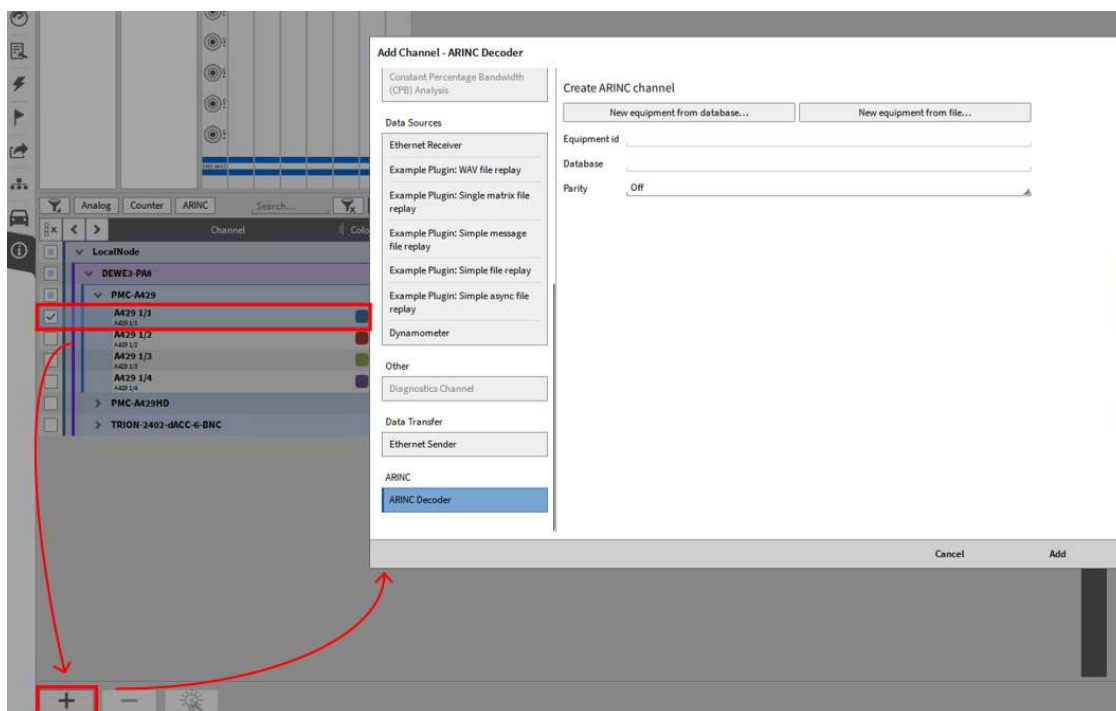


Figure 4: Creating an ARINC Decoder channel

There are two possibilities to decode ARINC signals by adding new equipment from the database or from a file.

The database is referring to the included standard library, which was mentioned before. No further installations must be performed to have access to this standard library. This standard library includes equipment IDs, which are denoted in hexadecimal and their respective labels, which are denoted in octal by convention (see Figure 5). For decoding a signal, the equipment ID can be selected, whereas all respective labels will be decoded, or single labels of the same equipment ID can be selected. It is not

possible to select labels from different equipment IDs withing the same selection. However, it is still possible to decode more labels from another equipment ID on the same bus.

There to, repeat the steps by selecting the ARINC bus channel in the channel list, again clicking on the + button in the lower left corner, selecting ARINC decoder and choosing the respective labels from the internal database.

In this way, labels from multiple equipment IDs can be received and decoded on the same ARINC bus.

New equipment can also be added from a file by simply clicking on the *New equipment from file...* button and selecting the respective file from the drive.

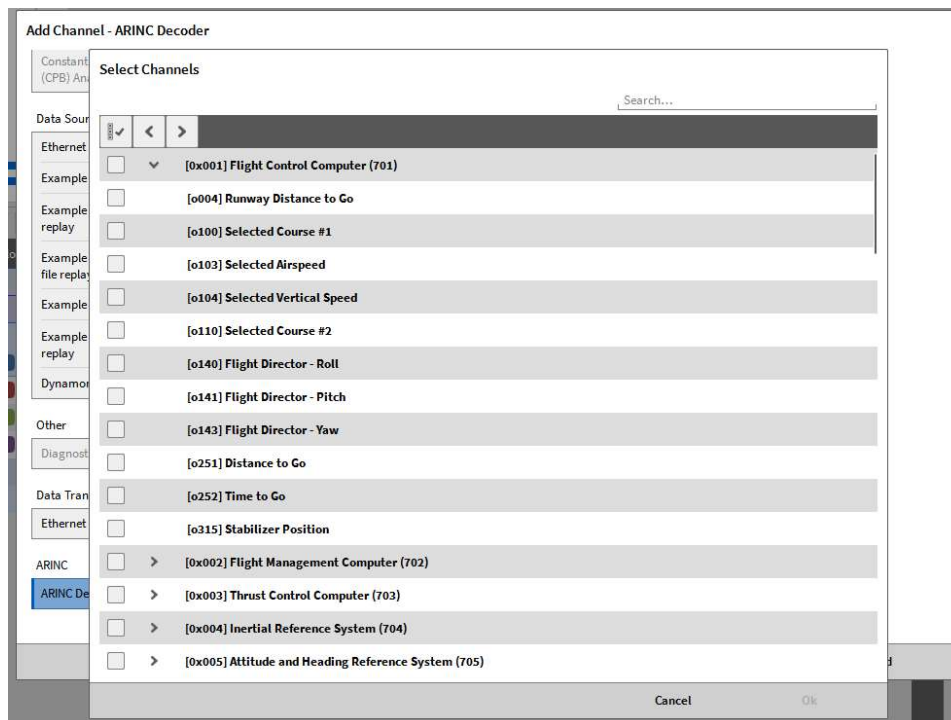


Figure 5: Adding an ARINC Decoder channel using the included database

After selecting the desired labels, click on Ok and the previous pop-up window will appear again. Some information can be seen there depending on the made selection, seen in Figure 6. The equipment ID of the selected label(s) is shown again as a decimal value. Database will state if the internal database was used or the path of the selected file.

Parity is off by default. If it is set to even or odd, the parity bit of the signals will be checked accordingly and the ARINC message will be discarded if it does not match.

Create ARINC channel

Equipment id

Database

Parity

Figure 6: Creating an ARINC channel

After creating the ARINC channels, either from the database or from a selected file, a new section in the channel list will appear: ARINC_PLUGIN Channels. Each equipment ID and the respective labels appear in this section. Different channel settings are available, denoted as 1 through 3 in Figure 7.

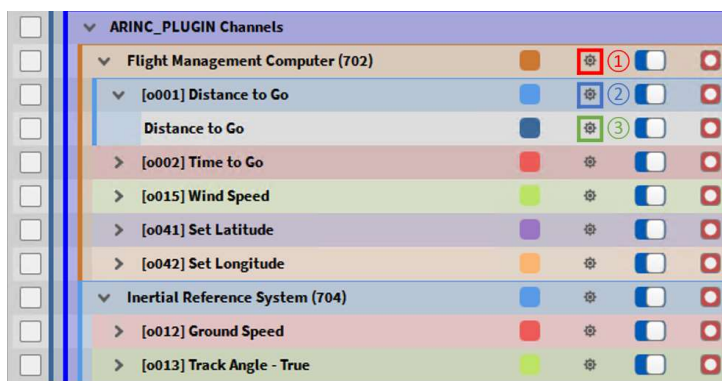


Figure 7: Created ARINC channels: Equipment ID with respective labels

To delete created ARINC channels, select the respective signal, label or equipment ID channel and click on the – button in the lower left corner.

2.2 CHANNEL SETTINGS

This section will explain the channel settings of the created ARINC channels. If the channel settings are changed, they can be saved in a setup file in order to use those individual channel settings. The settings of the equipment ID channel are seen in Figure 8.

- Equipment ID: the equipment ID can be edited in this field.
- Input Channel: the used ARINC bus channel can be changed here, by clicking on the button (1) in Figure 8) and selecting another bus channel.
- Parity: the parity bit is off by default but can be set to even or odd in this field. The parity bit will be checked and the ARINC message discarded if it does not match. This setting is the same as when creating an ARINC decoder channel seen in Figure 6.

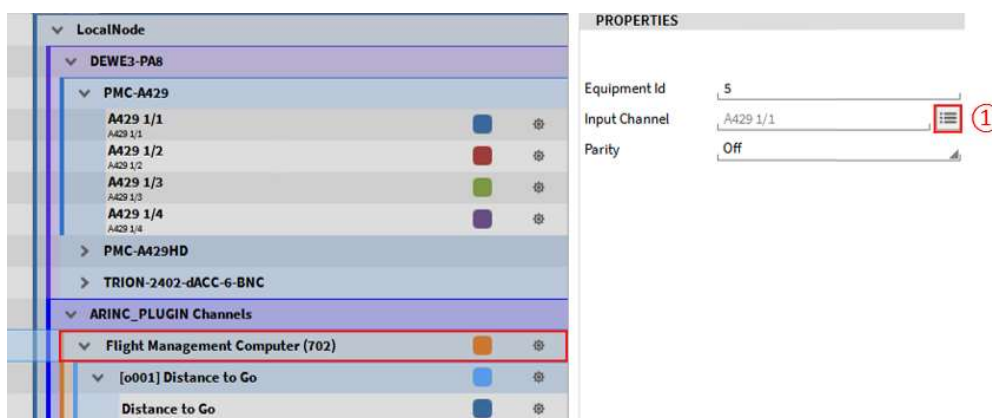


Figure 8: Channel settings of equipment ID channel

The settings of the label channel are seen in Figure 9.

- Label ID: the label ID can be edited here and must be entered in octal.
- SDI: the Source Destination Identifier (SDI) can be edited here.

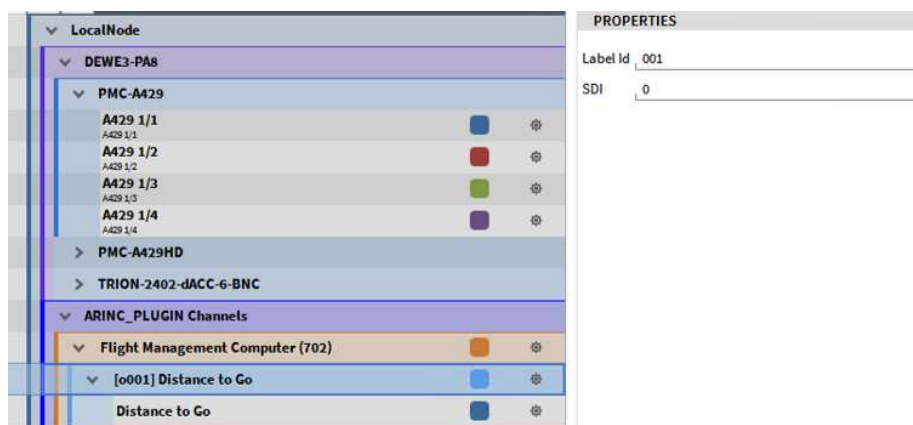


Figure 9: Channel settings of label channel

The setting of the signal channel can be seen in Figure 10.

- Bit Length and Bit Offset: the bit length and the bit offset can be set, whereas the offset can be adjusted in a range of 0...32. For a detailed explanation of the resolution and bit length, please refer to the ARINC standard mentioned in section 2.
- Data Encoding: bcd, signed and unsigned can be chosen as data encoding.
- Signal Encoding Unit: the signal unit can be set here. Note that the unit is not also automatically set in the Scaling but must be set individually.
- Scaling Gain and Scaling Offset: a gain and offset can be set here within a defined range.

Additionally, the channel can also be scaled by adding a scaling factor/sensitivity in the sensor scaling section.

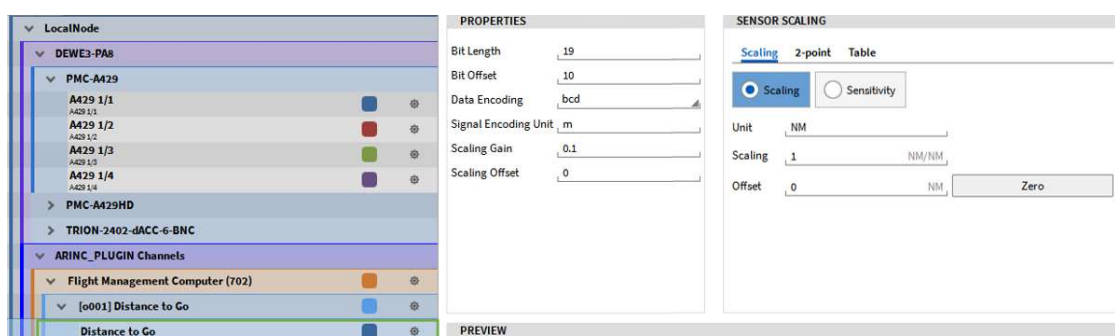


Figure 10: Channel settings of signal channel

3 DATA RECORDING AND ANALYSIS

For general software operation instructions, please refer to the latest version of the OXYGEN technical reference manual available on the CCC-portal (<https://ccc.dewetron.com/>).

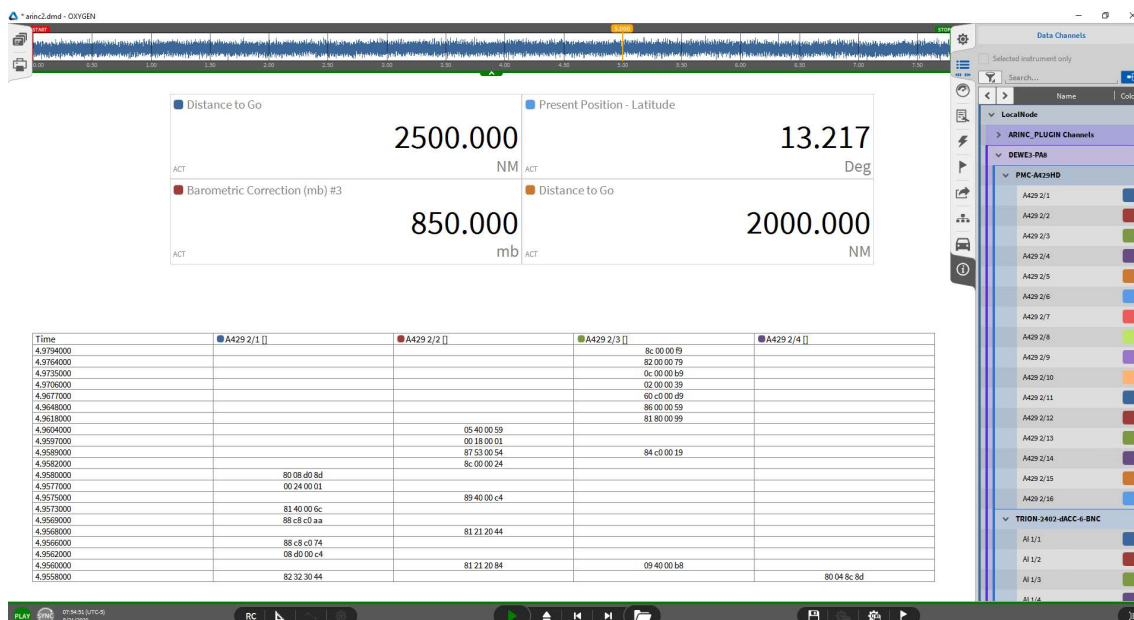


Figure 11: Measurement screen of a recorded data file with ARINC signals

The decoded ARINC signals can be used in instruments like a recorder, digital meter or table. Just drag and drop the desired channel into the instrument to display the decoded values.

Additionally, the raw data stream in hexadecimal can be visualized in OXYGEN in the table instrument, by using the actual bus channels of the module, and not the decoded signal channels. Such an example can be seen in Figure 11 in the table instrument. The raw data stream is also stored in the .dmd file.

3.1 OFFLINE DECODING

Offline decoding is also supported in OXYGEN. Thus, ARINC channels can also be created offline, after the raw ARINC data has been recorded.

For the offline decoding, follow the same steps as described in section 2.1 Decoding Signals.

3.2 EXPORT DATA

ARINC signals can also be exported in different formats. Only decoded ARINC signals can be exported, it is not possible to export the raw data stream.

Hereby, go to the Export Settings, seen in Figure 12, select the equipment IDs, labels etc. which should be exported and choose a corresponding export format and any additional settings if needed.

The export folder can also be set here.

For more detailed explanations about the export settings and formats, please refer to the OXYGEN technical reference manual available on the CCC-portal (<https://ccc.dewetron.com/>).

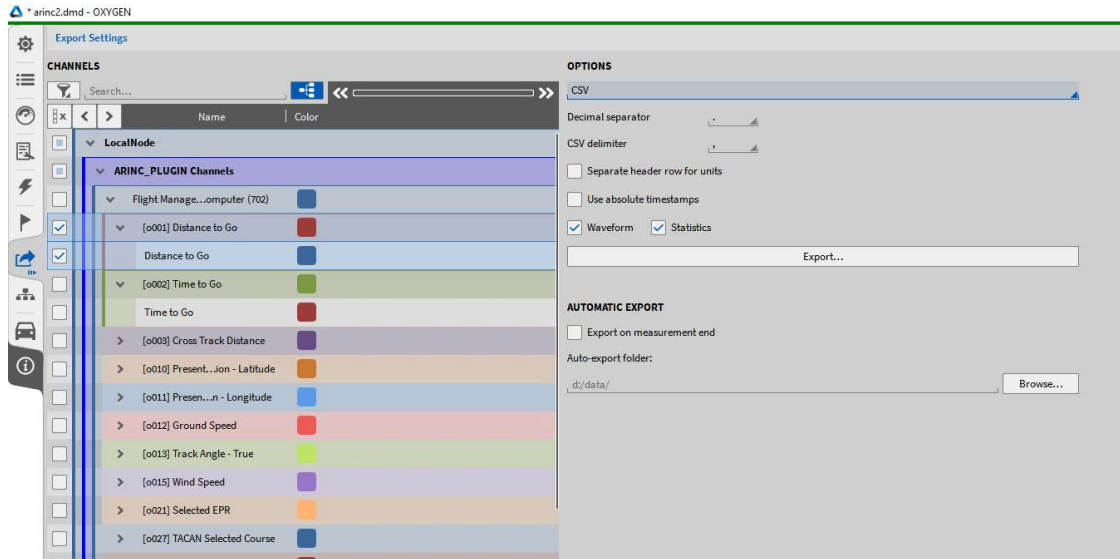


Figure 12: Export settings

4 TROUBLESHOOTING

Board is not displayed in OXYGEN

- Check, if the necessary libraries are properly installed within OXYGEN program folder. Copy the files:

C:\Program Files\Alta Data Technologies\Alta Software\ADT_L0_API\Win64\bin\ADT_L0.dll

C:\Program Files\Alta Data Technologies\Alta Software\ADT_L1_API\Win64\bin\ADT_L1.dll

to the following location:

C:\Program Files\DEWETRON\OXYGEN\bin

- When the drivers are installed correctly, and the libraries are correctly updated in “C:\Program Files\DEWETRON\OXYGEN\bin”, but the ARINC board is not recognized in OXYGEN, turn off the measurement device and remove the ARINC board from the device. Now restart the device and open the tool “AltaView Bus Analyzer”, a shortcut to the tool should be available on the desktop. It could be, that the driver installation has not been finished correctly, when opening the “AltaView Bus Analyzer” this will be done automatically.



When the tool is opened the installation is finished and it can be closed again. Now shut down the device, attach the ARINC board again and restart the system. The ARINC board should be available now in OXYGEN.

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