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PBA.pro
ARINC 429 Resource
Getting Started

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Table of Contents

Table of Contents 2
PBA.pro Arinc 429 Resource Component 3
General Board and Status Information 4
System Overview 4
Receiver Channel 6
Transmitter Channel 10
Bus Monitor (BM) 13
Replay Channel 15
Database Parameters 17

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PBA.pro Arinc 429 Resource Component

The PBA.pro A429 component implements a PBA.pro resource component for AIM's Avionics Databus Interface Modules for

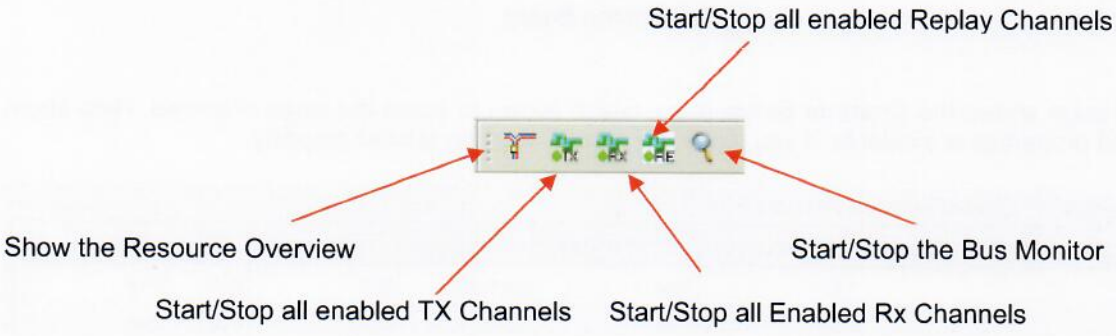
- Arinc 429

The functional groups for a specific resource type are identical for all three buses and consist of:

- general board control and status ('APIxxxx node')
- Channel nodes. Count depends on board configuration. 4, 8, 16, 24 and 32 channel boards available
- Bus monitor ('BM' node)
- Discretes (only present with the corresponding Hardware)



A single A429 Resource component adds the following menu entries to main menu and buttons to the tool bar:

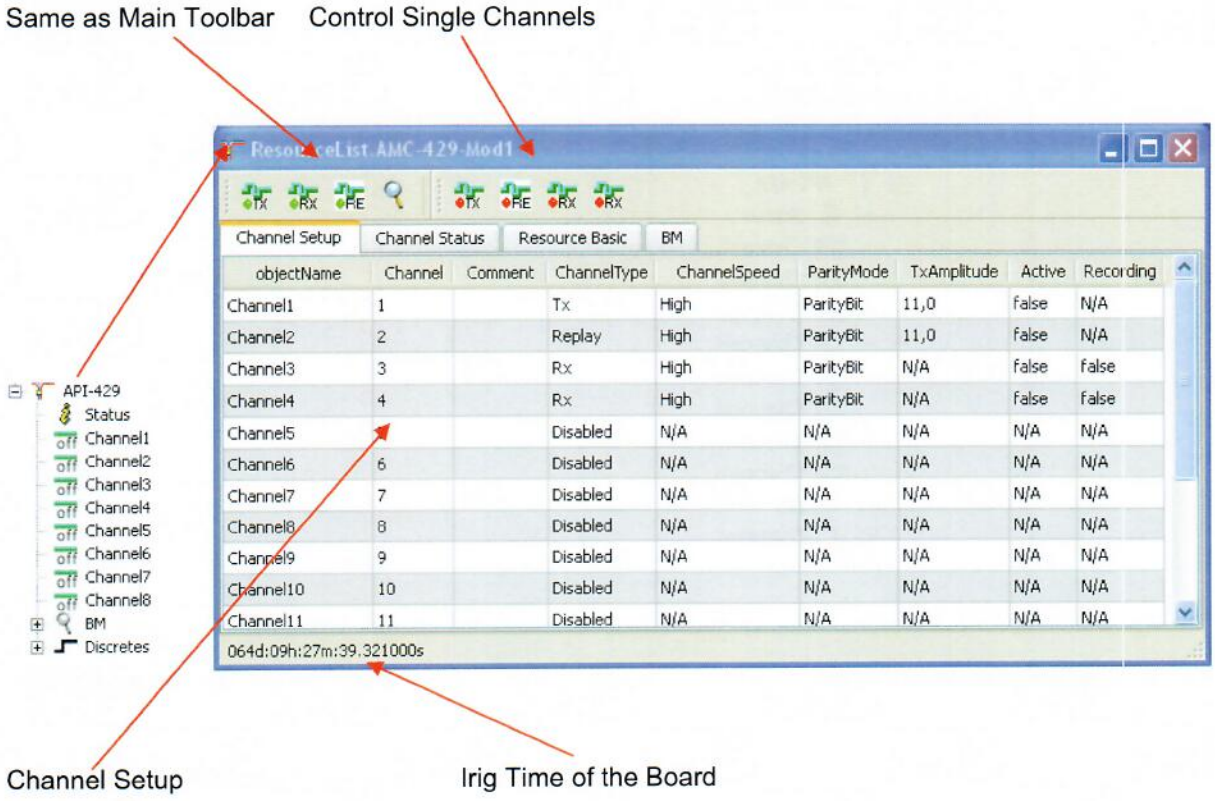


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General Board and Status Information

System Overview

Double click on the resource node (e.g. A429-Board1) node of the corresponding resource opens the board system overview.



The first page shows the **Channel Setup** page, which allows to setup the singe channels. Help about dedicated properties is available, if you move the mouse over the related property.

Channel Setup | Channel Status | Resource Basic | BM

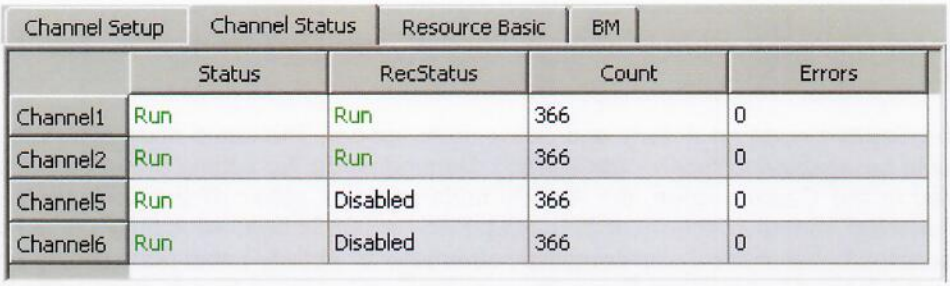
objectName	Channel	Comment	ChannelType	ChannelSpeed	ParityMode	TxAmplitude	Active	Recording
Channel1	1		Rx	Low	ParityBit	N/A	true	true
Channel2	2		Rx	Low	ParityBit	N/A	true	true
Channel3	3		Disabled	N/A	N/A	N/A	N/A	N/A
Channel4	4		Disabled	N/A	N/A	N/A	N/A	N/A
Channel5	5		Tx	Low	Pari			
Channel6	6		Tx	Low	ParityBit	11,0	true	N/A
Channel7	7		Disabled	N/A	N/A	N/A	N/A	N/A
Channel8	8		Disabled	N/A	N/A	N/A	N/A	N/A

Parity Mode of the Channel (Use Parity Bit for data or

A double click on the Channel property opens the Label Setup view, and a double click on the Active property starts/stops the channel operation. If the recording is active and recording data is available, a double click on the Recording property opens the recording file view.

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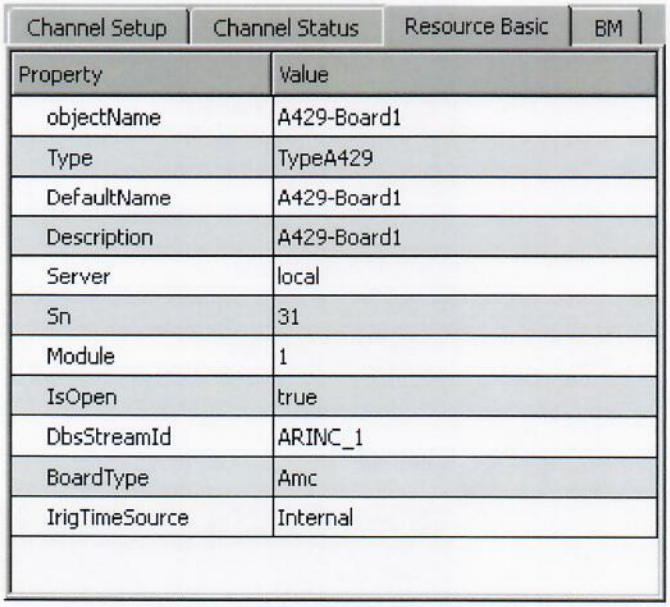
The second tab shows the **Channel Status** of each enabled channel. Disabled channels are not visible in this list.



	Status	RecStatus	Count	Errors
Channel1	Run	Run	366	0
Channel2	Run	Run	366	0
Channel5	Run	Disabled	366	0
Channel6	Run	Disabled	366	0

A double click on the Status property starts/stops the channel operation. A double click on the RecStatus property opens the recording file view and a double click on the Count property opens the Activity View List of the related channel.

The third tab contains **Resource Basic** Information and allows changing the name of the resource, selection of the used DBS node and the Irig Time Source.



Property	Value
objectName	A429-Board1
Type	TypeA429
DefaultName	A429-Board1
Description	A429-Board1
Server	local
Sn	31
Module	1
IsOpen	true
DbsStreamId	ARINC_1
BoardType	Amc
IrigTimeSource	Internal

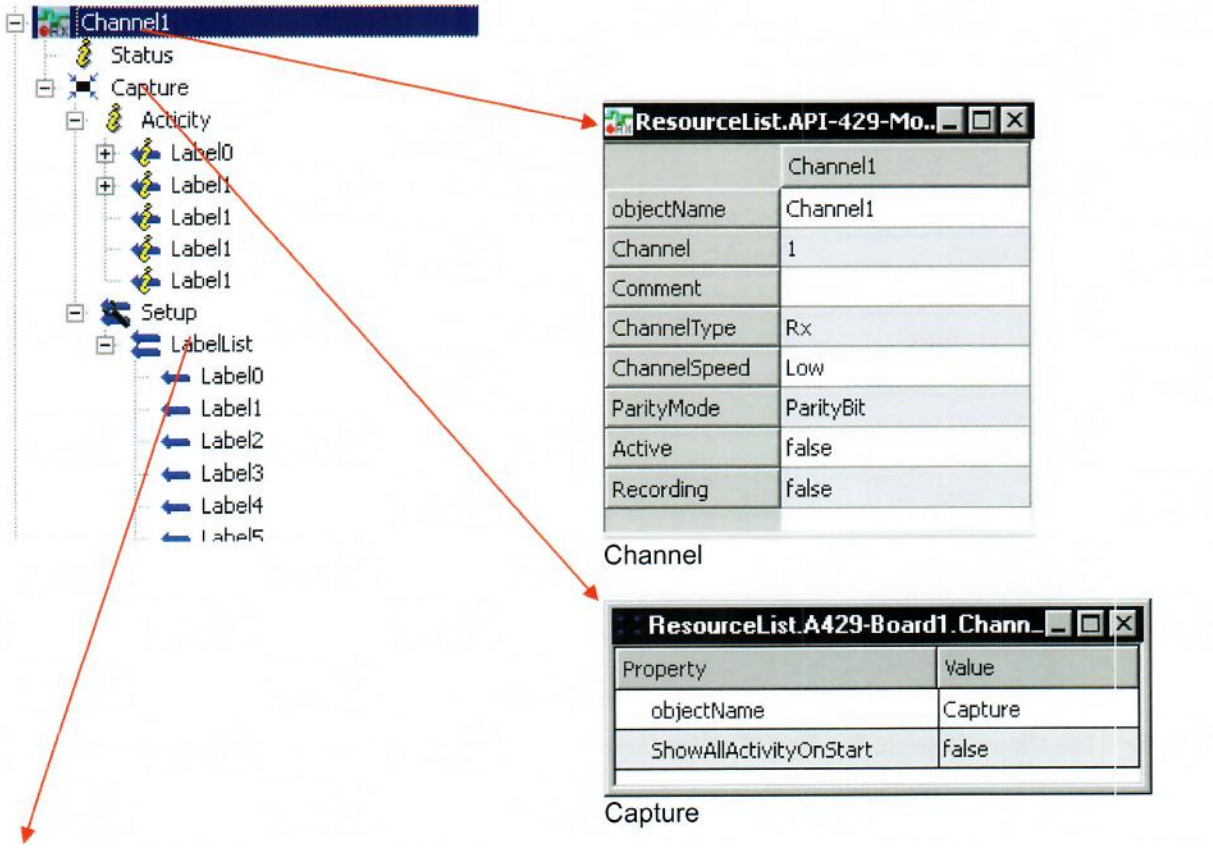
The forth tab allows to setup the **Bus Monitor** (see the corresponding chapter in this document).

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Receiver Channel

If an Arinc 429 Channel is set up to Receive (Channel Type = Rx), the channel object has the following layout:

Beyond the *Capture* node an *Activity* and *Setup* node appear. The setup node allows to define which labels should be enabled to receive (default all). Depending on the setting of the property *ShowAllActivityOnStart* in the *Capture* node, the *Activity* node contains either all enabled labels or all Labels witch are enabled and have activity. If *ShowAllActivityOnStart* is true, an Activity Label node is shown for each enabled Label in the *Setup* container, otherwise an Activity Label node is only shown, if there is traffic on the related Label. If the Setup Property SdiEnabled is set to true, SDI sorting is enabled for the related Label. In that case you may have up to four activity labels for one setup label on the activity side.
Information on the dedicated properties of single objects is available as tool tip.



Channel

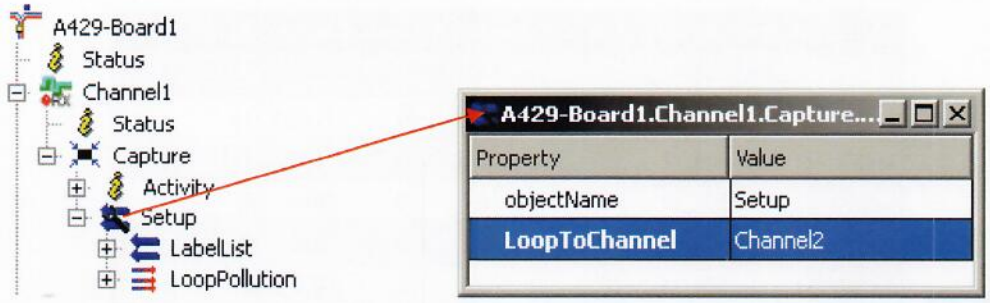
Capture

Channel5.Capture.Setup.LabelList

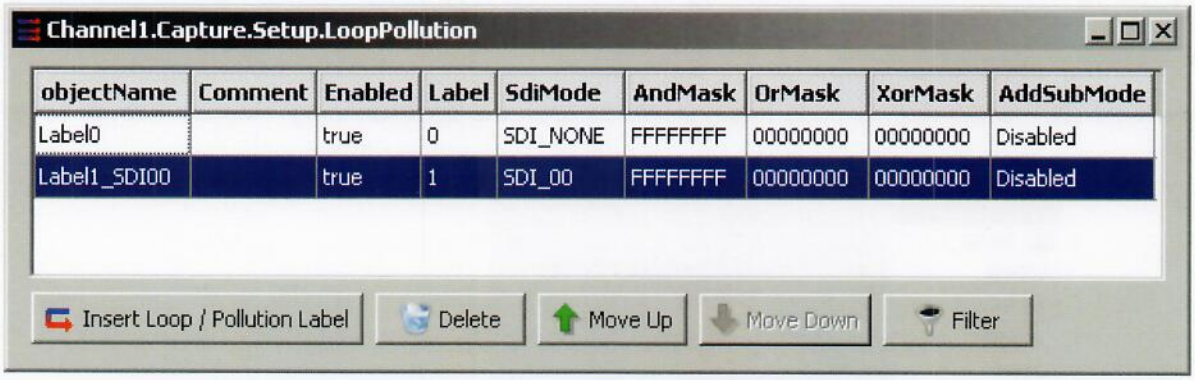
objectName	Comment	Label	Enabled	SdiEnabled	SdiName00	SdiName01	SdiName10	SdiName11	QueueSize
Label0		0	true	false	N/A	N/A	N/A	N/A	1
Label1		1	true	true	Label1_SD...	Label1_SD...	Label1_SD...	Label1_SD...	1

Rx Setup.LabelList

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On the *Setup* Node of a receiver channel it is possible to select another channel as loop channel. This allows the selection of dedicated labels from the receiver channel to be sent out on the loop channel. The loop channel cannot be used for normal Tx operation anymore. Furthermore it is possible to change all elements (label or data) of the received label.



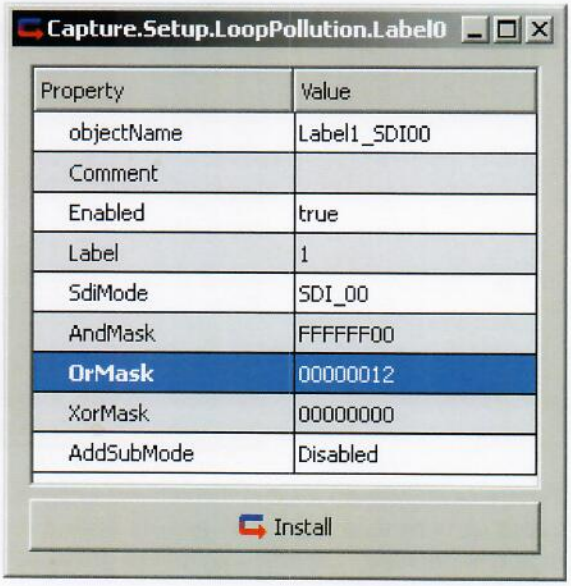
Each Loop/Pollution Label is attached to exactly one Rx Setup Label. This may be selected with the Properties Label and SdiMode.
The default configuration (*AndMask* = 0xFFFFFFFF, the other Masks equal to Zero) will forward the selected labels on the selected loop channel without modification.
Via *AndMask* and *AddSubMode* Properties you may change the data of the received Label according the selected function.

E.g. the Function

Label = 1
AndMask = 0xFFFFFF00
OrMask = 0x000000012

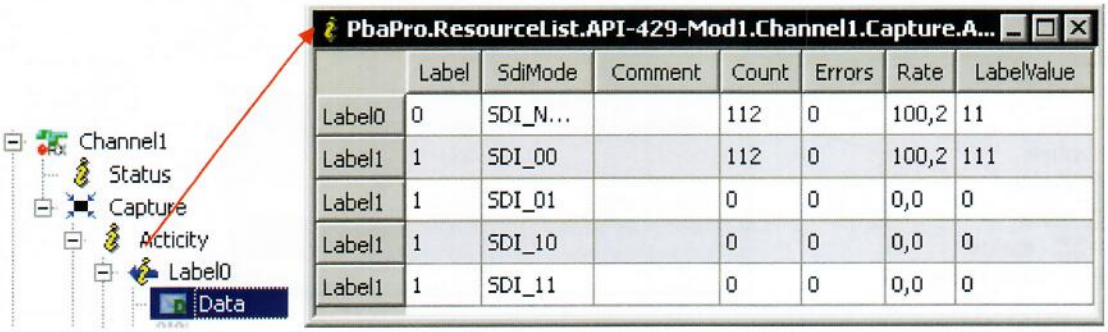
will apply the two masks to the received label 1. This will cause the label number to be changed to 12 Hex == 22 Oct. The data of the label will not be affected. The label 1 data, received on the Rx channel, will be send out on Label 22 (Oct) on the selected loop channel.

With other bit patterns you may also modify the data. If *AddSubMode* is selected you may specify a value, which is added or subtracted from the received label.



The values may also be modified during runtime. Click to the *Install* button, after you have made all your changes, to write the changed values to the board.

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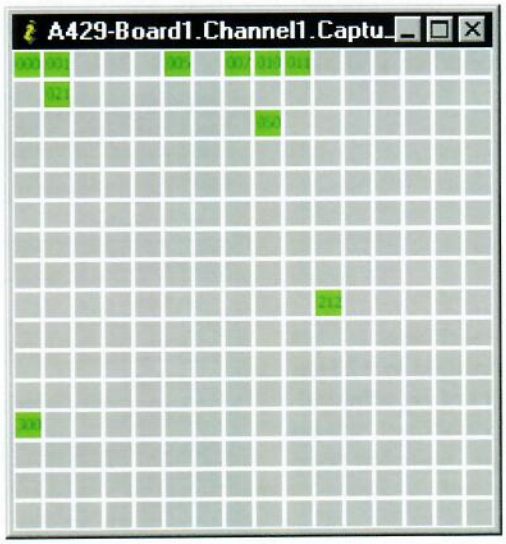
Rx Activity List

The Rx Activity list shows the current status of the received labels. Depending on the property *ShowAllActivityOnStart* on the capture node, the view shows only enabled labels with activity, or it shows all enabled activity labels.

By a right click to the *Activity* node it is possible to open the corresponding "*Receive Activity Label View*"



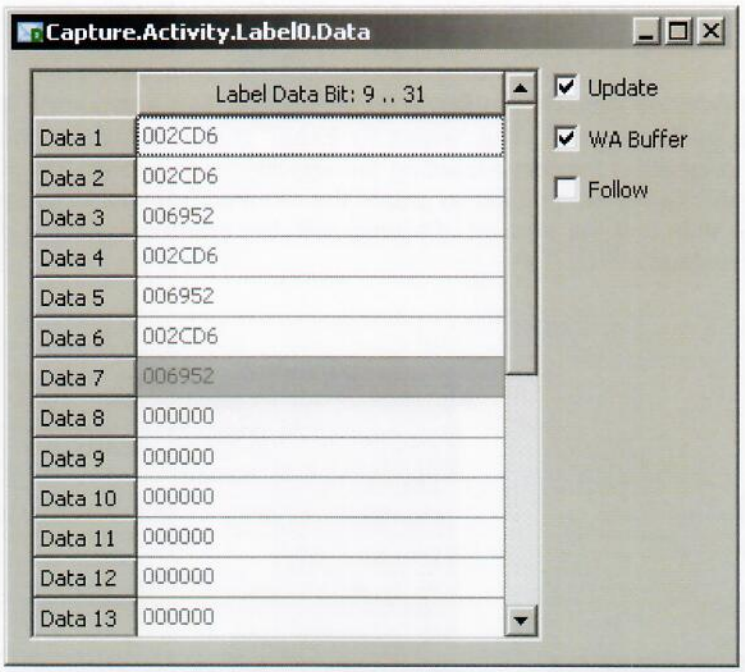
This view shows a quick overview of all labels and their activity.



If there is activity on a label the related entry is displayed in green, if errors are detected it is displayed in red. A click to a label with activity shows the properties of the related label as long as the mouse button is pressed. The intensity of the green colour corresponds to the amount of received labels.

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If the *QueueSize* property of the label is set to a different value than 1, the Setup as well as the Activity Label will hold a new sub node called *Data*. This node represents the Label Value Queue. A double click to the *Rate* or *LabelValue* property in the Activity List opens the Label Data View (if available).



By default the data at the first position is the last received value. This behaviour may not be desired: if the data values are to be read by script, it is not possible to know exactly which data index in the buffer belongs to which received label. For this the *Wrap Around Mode* can be enabled, either from this dialog by checking “WA Buffer”, or by setting the property *WrapAroundBuffer* on the Setup side to true.

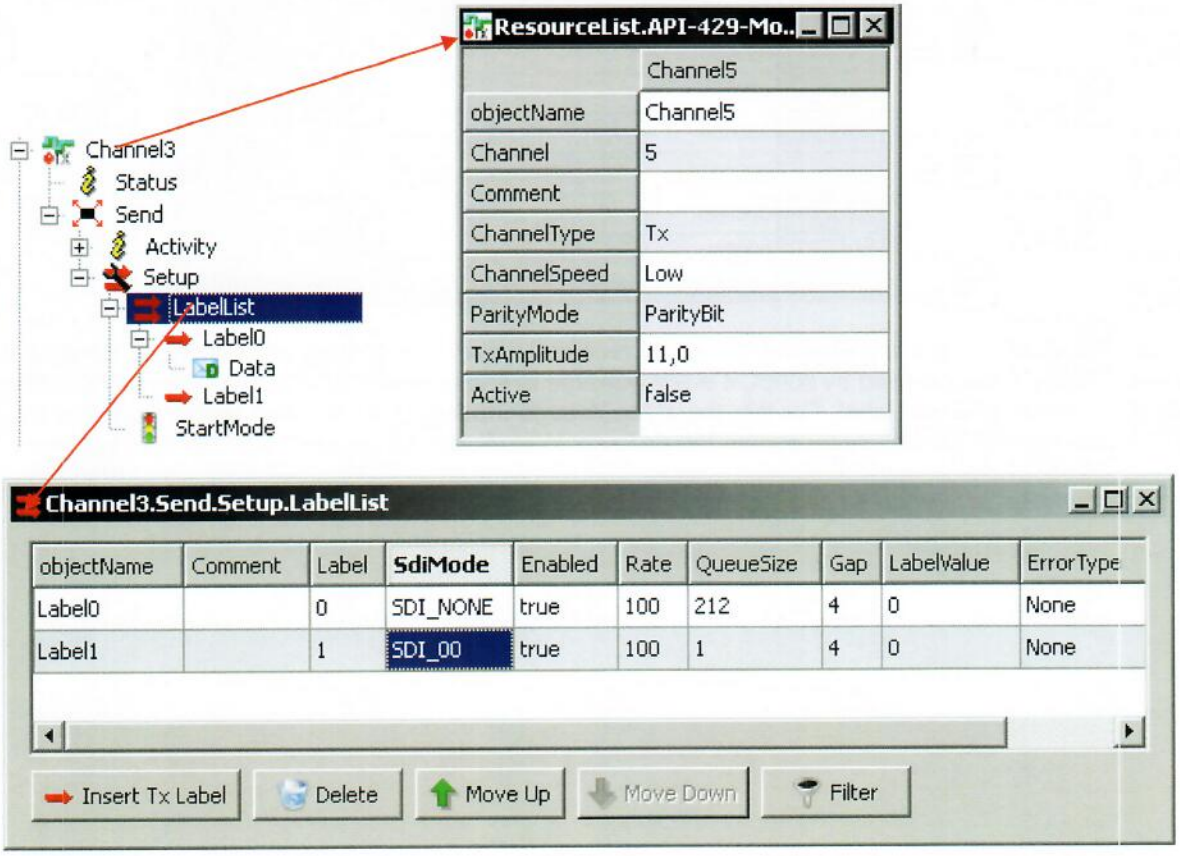
If *WrapAroundBuffer* is enabled, the last received label is highlighted.

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Transmitter Channel

If an Arinc 429 channel is set up to transmit (Channel Type = Tx) the channel object has the following layout:

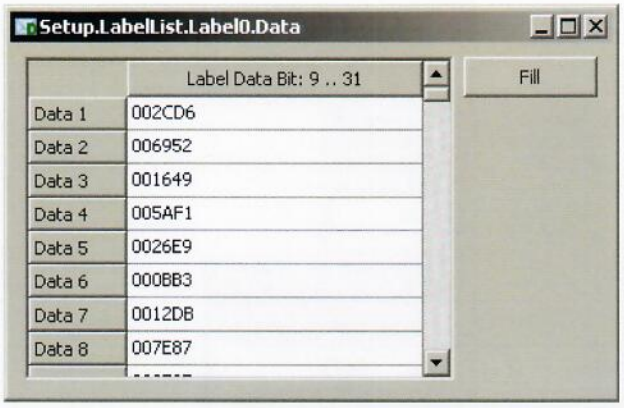
Beyond the *Send* node *Activity* and *Setup* nodes appear. The setup node allows the definition which Labels are set up for sending. The "Insert Tx Label" Button allows to create a new label transfer. PBA.pro tries to create a framing according the specified rate Information. If you use many odd *Rate* values it may not always be possible to create the required framing, because the setup tries to determine the frame time and the amount of frames with the *greatest common divisor* and the *least common multiplier* methods.



The *LabelList* allows to set up the Tx labels for sending. If a *Rate* of 0 is selected the Label is set up as an acyclic label, which may be send on request, either by script or from the Tx Activity List by a double clicking on the *Count* property.

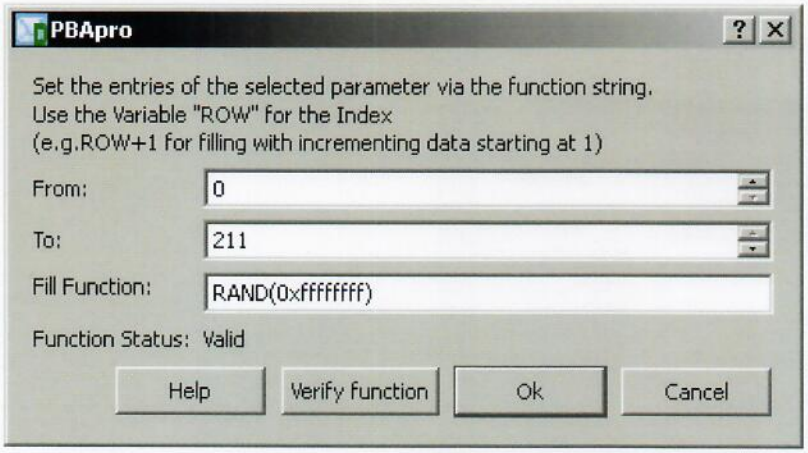
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The Data node allows editing the Tx Data Queue, if a *QueueSize* of more than one is selected.



If you click on the fill button, you may fill the queue with data according a PPFunciton.

Click on the Help Button to get a description of the supported syntax.

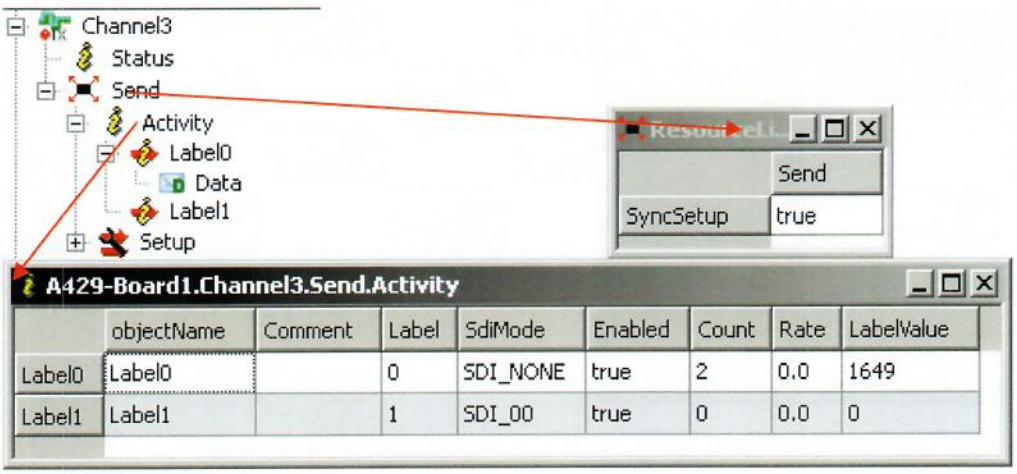


e.g.

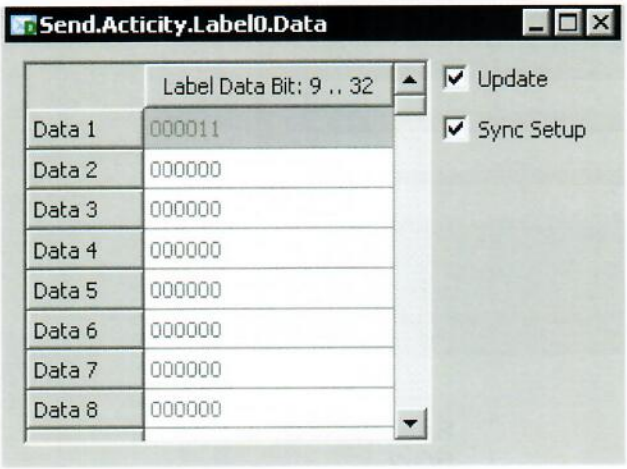
Fill with Random Data	RAND(0xffffffff)
Fill with Incrementing Data	ROW
Fill with a Sinus Function	SIN(ROW/10)*20+20

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On the *Activity* side you may view the status of each transmit label.



The Tx Activity list shows the status of each Tx Label. Acyclic labels (setup with a *Rate* of 0) may be sent manually via a double click to the *Count* property. A double click on the *Rate* property will open the Label Data View.

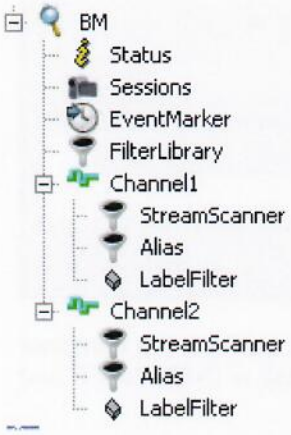


If you have selected a queue for transmit labels, the related label will have a *Data* member, which allows editing the values in the Queue. On the Activity node, the window shows the Checkbox *Sync Setup*, which causes all changes made on the Activity node to be adopted on the related Setup label. The preset of this Checkbox may be defined via the property *SyncSetup* on the *Send* node. If sync setup is not enabled, all changes are lost when the Tx channel is restarted.

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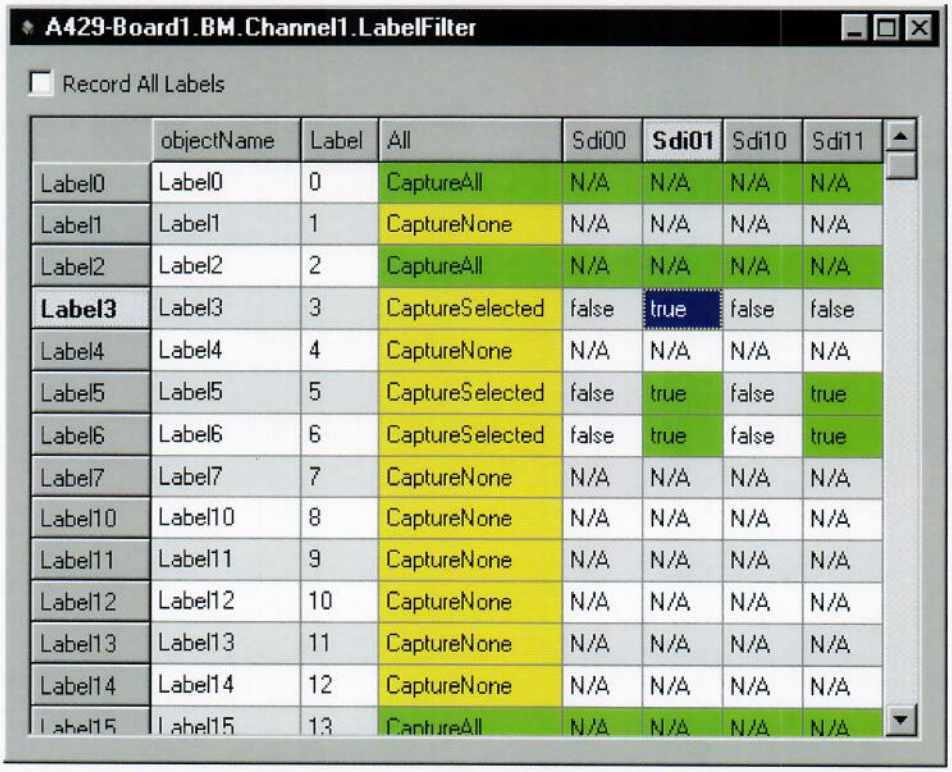
Bus Monitor (BM)

The Bus Monitor (BM) node offers access to all BM related functions of the PBA.pro, which allow recording the data received on a channel. You may only record on receiver channels. The basic Bus Monitor functionality is documented in the PBA.pro Getting Started Document (Chapter Common PBA.pro Bus Monitor Functionality).



For the description of Status, Sessions, EventMarker, Filter Library, StreamScanner and Alias please refer the Document above.

The ***'LabelFilter'*** node offers configuration of H/W implemented filters down to Label/SDI Level.

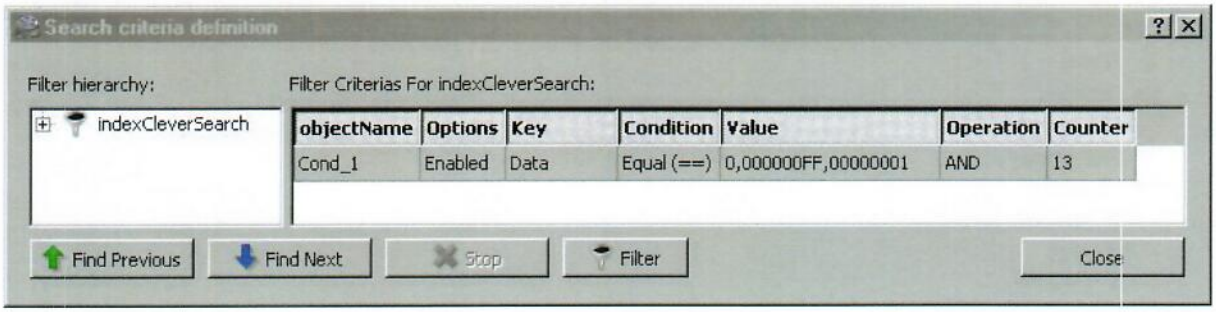


	objectName	Label	All	Sdi00	Sdi01	Sdi10	Sdi11
Label0	Label0	0	CaptureAll	N/A	N/A	N/A	N/A
Label1	Label1	1	CaptureNone	N/A	N/A	N/A	N/A
Label2	Label2	2	CaptureAll	N/A	N/A	N/A	N/A
Label3	Label3	3	CaptureSelected	false	true	false	false
Label4	Label4	4	CaptureNone	N/A	N/A	N/A	N/A
Label5	Label5	5	CaptureSelected	false	true	false	true
Label6	Label6	6	CaptureSelected	false	true	false	true
Label7	Label7	7	CaptureNone	N/A	N/A	N/A	N/A
Label10	Label10	8	CaptureNone	N/A	N/A	N/A	N/A
Label11	Label11	9	CaptureNone	N/A	N/A	N/A	N/A
Label12	Label12	10	CaptureNone	N/A	N/A	N/A	N/A
Label13	Label13	11	CaptureNone	N/A	N/A	N/A	N/A
Label14	Label14	12	CaptureNone	N/A	N/A	N/A	N/A
Label15	Label15	13	CaptureAll	N/A	N/A	N/A	N/A

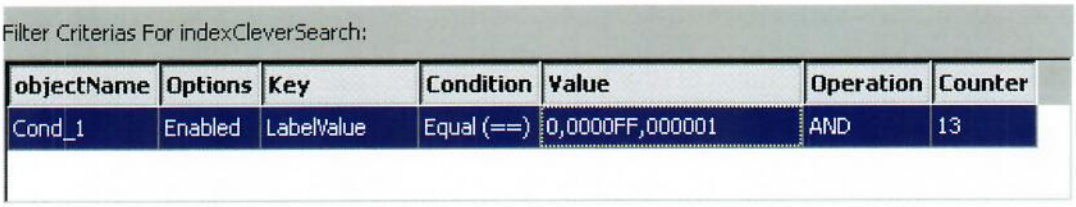
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Tips on Searching for 429

A 429 Message provides 2 data type properties. The first one is the *LabelValue* property, which contains only the payload of the label, excluding label number and Sdi (if present), The *Data* property includes also the label number and Sdi information.



The search condition in the figure shown above, using the *Data* property will work on the complete label data and will find in this example all messages to label 1, due to the Mask is 0x000000FF and the value of interest 0x00001.



The same condition on the *LabelValue* Property, will find any messages having a 1 in the low byte of the payload. The related label number and SDI are ignored.

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Replay Channel

If an Arinc 429 channel is set up for replay (Channel Type = *Replay*) the channel object will have the following layout:



The replay node allows setting up the channel for replay of a previously recorded Label.

The *Replay* node offers following properties:

ResourceList.AMC-429-Mod1.Channel1.Replay

Property	Value
objectName	Replay
Active	inactive
RecordingFile	D:\PBA.Pro\Tests\regression\scripts\Arinc\test.pprec
RecordingStream	Channel3
SyncReplay	false

The *Active* property indicates if the respective channel is currently replaying.
The *RecordingFile* property is used for choosing a recording file which is to be processed.
RecordingStream specifies a certain stream in the recording file, which will be replayed by the corresponding channel. An Arinc 429 recording file may consist of multiple streams recorded on different receiver channels. After selecting a recording file, the *RecordingStream* property allows selection of a stream via a Drop-Down-List of the available streams from the recording file.
The last property, *SyncReplay,* is used for configuring the channel for synchronous replay. This allows starting the replay on different replay channels. When a replay channel which is enabled for synchronous replay is started, all other replay channels (also 1553/AFDX) which are configured for synchronous replay will be started too. The replay of these streams will start depending on the timestamps of their first message. For this to work, all used resources should be time synchronized, and the recordings have to be recorded to the same time with synchronized resources.

The *Replay* node offers a subordinate *Status* node that displays the status of current replay.



This node contains the following properties:

AMC-429-Mod1.Channel1...

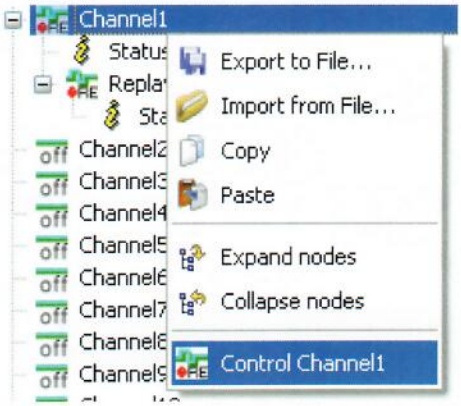
Property	Value
objectName	Status
EntriesToReplay	10189
EntriesReplayed	0
Progress	0

EntriesToReplay indicates how many entries are contained in the recording stream currently selected.

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The property *EntriesReplayed* shows how many entries have been replayed yet.
Progress displays the progress of the replay session in per cent.

Replay for a certain channel can be started or stopped by right-clicking on the corresponding *Channel* node and selecting *Control Channel x* in the appearing Pop-Up menu.



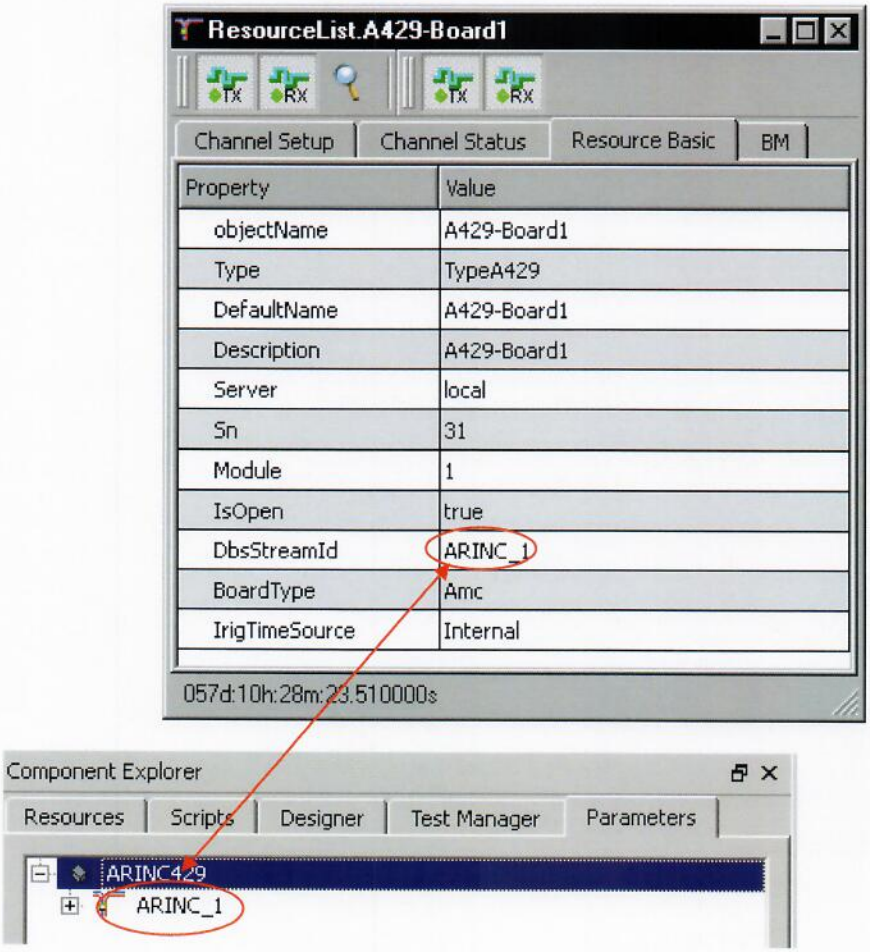
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Database Parameters

If the related parameter component is installed, the A429 Resource component supports database parameters.

The ARINC_1 parameters are related to the 429 resource with the same *DbsStreamId*.

For a detailed description of the database functions of the A429 component/resource please see the documentation of the database component (ppdbs).



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