



## Application notes



# RAy Switch Block Diagram

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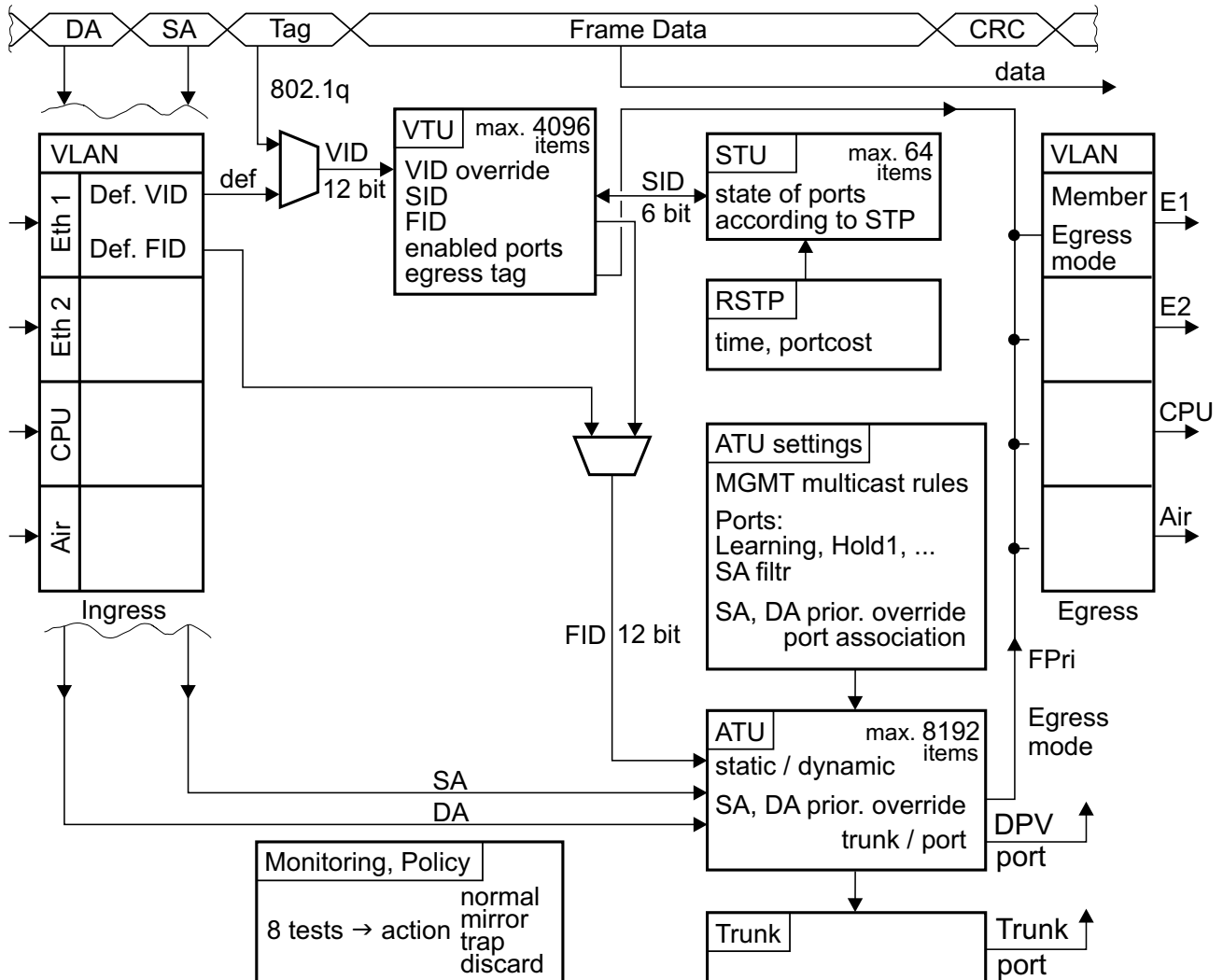
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# 1. Switch block diagram

This overview is intended to indicate the links in the Advanced menu and contexts in which they are used. For a more detailed description, see the User manual<sup>1</sup> and the RAY2 helps.

The scheme of frame processing and influence of each submenu is shown in the following diagram.



- The VLAN ID (VID) is allocated to the incoming frame according to its input port and the tag in the header of the frame.
- In the VLAN Table Unit (VTU), a Forwarding Information Database number (FID) is assigned to the framework according to VID. Determining the FID also affects the input port
- According to FID and Destination address (DA), an output port number is found in the Address Translation Unit table (ATU).
- The frame is sent from the switch via this port.
- Many other parameters affect this process, as described in the manual and in the built-in help.

Some features in the Advanced menu require setting more than one parameter. For example, the choice of ports for communication affect submenus VLAN, STU, VTU, ATU settings and ATU.

In next pages you can view samples of the first column of each submenu arranged side by side with the parameters highlighted. Below each menu list is a brief description of these parameters.

<sup>1</sup> <http://www.racom.eu/eng/products/m/ray2/config.html#switch-adv>

### 1.1. Permitted ports IN, OUT

VLAN	STU	VTU	ATU settings	ATU
<p><b>Global</b></p> <p>Link authorization guard</p> <p>Remove one provider tag</p> <p>ARP without broadcast c</p> <p><b>Ports settings</b></p> <p>Port name p2 Eth1</p> <p>Egress mode unmodified</p> <p>802.1q mode disabled</p> <p>Discard tagged <input type="checkbox"/></p> <p>Discard untagged <input type="checkbox"/></p> <p>VTU priority override none</p> <p>Force default VID <input type="checkbox"/></p> <p>Default VID 1</p> <p>FID 0</p> <p>IGMP snooping <input type="checkbox"/></p> <p>ARP mirroring <input type="checkbox"/></p> <p>VLAN tunnel <input type="checkbox"/></p> <p>Member</p> <p>p2 Eth1 <input type="checkbox"/></p> <p>p4 Eth2 <input type="checkbox"/></p> <p>p5 CPU <input checked="" type="checkbox"/></p> <p>p6 Air <input checked="" type="checkbox"/></p>	<p><b>Add STU entry</b></p> <p>SID 1</p> <p>Label all</p> <p>Port state</p> <p>p2 Eth1 forwarding</p> <p>p4 Eth2 forwarding</p> <p>p5 CPU forwarding</p> <p>p6 Air forwarding</p>	<p><b>Add VTU entry</b></p> <p>VID 0</p> <p>Label</p> <p>FID 0</p> <p>SID 1 - all</p> <p>Use VID priority <input type="checkbox"/></p> <p>VID priority 0</p> <p>VID policy <input type="checkbox"/></p> <p>Member tag</p> <p>p2 Eth1 egress</p> <p>p4 Eth2 egress</p> <p>p5 CPU egress</p> <p>p6 Air egress</p>	<p><b>Global</b></p> <p>Aging timeout [s]</p> <p>Reserved multicast to CF</p> <p>Reserved multicast prior</p> <p>Reserved multicast DA</p> <p>01:80:c2:00:00:0x</p> <p>01:80:c2:00:00:2x</p> <p><b>Ports settings</b></p> <p>Port name p2 Eth1</p> <p>Learning <input checked="" type="checkbox"/></p> <p>Hold at 1 <input type="checkbox"/></p> <p>ATU refresh unlocked</p> <p>DA mapping <input checked="" type="checkbox"/></p> <p>Egress block none</p> <p>SA filtering disabled</p> <p>Learn limit 0</p> <p>SA priority override none</p> <p>DA priority override none</p> <p>Port association</p> <p>p2 Eth1 <input checked="" type="checkbox"/></p> <p>p4 Eth2 <input type="checkbox"/></p> <p>p5 CPU <input type="checkbox"/></p> <p>p6 Air <input type="checkbox"/></p>	<p><b>Add ATU entry</b></p> <p>FID 0</p> <p>MAC 00:00:00:00:00:00</p> <p>Label local</p> <p>Entry state stat</p> <p>Use MAC priority <input type="checkbox"/></p> <p>MAC priority 0</p> <p>Trunk member <input type="checkbox"/></p> <p>Trunk Id 0</p> <p>Port association</p> <p>p2 Eth1 <input type="checkbox"/></p> <p>p4 Eth2 <input type="checkbox"/></p> <p>p5 CPU <input checked="" type="checkbox"/></p> <p>p6 Air <input type="checkbox"/></p>
<p>port IN defines possible output ports</p>	<p>STU defines allowable ports for both input and output</p>	<p>VID defines possible output ports</p>	<p>SA record created in ATU according to Port association</p>	<p>output port assigned by SA record in ATU</p>

The output port (defined by FID and DA address) for the frame is found in the ATU table. To send the frame via this output port, the conditions set in columns VLAN, STU and VTU must also be met.

The records in ATU are created according to the "ATU settings / Port association". The port is usually designated by its own name, eg. p2 -> p2.

## 1.2. Priorities FPri and QPri

VLAN	STU	VTU	ATU settings	ATU
<p><b>Global</b></p> <p>Link authorization guard</p> <p>Remove one provider tag</p> <p>ARP without broadcast c</p> <p><b>Ports settings</b></p> <p>Port name p2 Eth1</p> <p>Egress mode unmodif</p> <p>802.1q mode disabled</p> <p>Discard tagged <input type="checkbox"/></p> <p>Discard untagged <input type="checkbox"/></p> <p>VTU priority override <input checked="" type="checkbox"/> none</p> <p>Force default VID <input type="checkbox"/></p> <p>Default VID 1</p> <p>FID 0</p> <p>IGMP snooping <input type="checkbox"/></p> <p>ARP mirroring <input type="checkbox"/></p> <p>VLAN tunnel <input type="checkbox"/></p> <p>Member</p> <p>p2 Eth1 <input type="checkbox"/></p> <p>p4 Eth2 <input type="checkbox"/></p> <p>p5 CPU <input checked="" type="checkbox"/></p> <p>p6 Air <input checked="" type="checkbox"/></p>	<p><b>Add STU entry</b></p> <p>SID <input type="text" value="1"/></p> <p>Label <input type="text" value="all"/></p> <p>Port state</p> <p>p2 Eth1 <input type="text" value="forwarding"/></p> <p>p4 Eth2 <input type="text" value="forwarding"/></p> <p>p5 CPU <input type="text" value="forwarding"/></p> <p>p6 Air <input type="text" value="forwarding"/></p>	<p><b>Add VTU entry</b></p> <p>VID <input type="text" value="0"/></p> <p>Label <input type="text"/></p> <p>FID <input type="text" value="0"/></p> <p>SID <input type="text" value="1 - all"/></p> <p>Use VID priority <input checked="" type="checkbox"/></p> <p>VID priority <input type="text" value="0"/></p> <p>VID policy <input type="checkbox"/></p> <p>Member tag</p> <p>p2 Eth1 <input type="text" value="egres"/></p> <p>p4 Eth2 <input type="text" value="egres"/></p> <p>p5 CPU <input type="text" value="egres"/></p> <p>p6 Air <input type="text" value="egres"/></p>	<p><b>Global</b></p> <p>Aging timeout [s]</p> <p>Reserved multicast to CF</p> <p>Reserved multicast prior</p> <p>Reserved multicast DA</p> <p>01:80:c2:00:00:0x</p> <p>01:80:c2:00:00:2x</p> <p><b>Ports settings</b></p> <p>Port name p2 Eth1</p> <p>Learning <input checked="" type="checkbox"/></p> <p>Hold at 1 <input type="checkbox"/></p> <p>ATU refresh <input type="text" value="unlocked"/></p> <p>DA mapping <input checked="" type="checkbox"/></p> <p>Egress block <input type="text" value="none"/></p> <p>SA filtering <input type="text" value="disabled"/></p> <p>Learn limit <input type="text" value="0"/></p> <p>SA priority override <input checked="" type="checkbox"/> none</p> <p>DA priority override <input checked="" type="checkbox"/> none</p> <p>Port association</p> <p>p2 Eth1 <input checked="" type="checkbox"/></p> <p>p4 Eth2 <input type="checkbox"/></p> <p>p5 CPU <input type="checkbox"/></p> <p>p6 Air <input type="checkbox"/></p>	<p><b>Add ATU entry</b></p> <p>FID <input type="text" value="0"/></p> <p>MAC <input type="text" value="00:00:00:00:00:00"/></p> <p>Label <input type="text" value="local"/></p> <p>Entry state <input type="text" value="stat"/></p> <p>Use MAC priority <input checked="" type="checkbox"/></p> <p>MAC priority <input type="text" value="0"/></p> <p>Trunk member <input type="checkbox"/></p> <p>Trunk Id <input type="text" value="0"/></p> <p>Port association</p> <p>p2 Eth1 <input type="checkbox"/></p> <p>p4 Eth2 <input type="checkbox"/></p> <p>p5 CPU <input checked="" type="checkbox"/></p> <p>p6 Air <input type="checkbox"/></p>
2. port IN defines, which priorities (Pri) will be overwritten according to VID value		2. VID determines whether overwriting is carried and which value is assigned	3. the address of the frame defines, which Pri will be overwritten	3. ATU (address) determines whether overwriting is carried and which value is assigned

QPri is used when processing frames inside the switch.

FPri is used by the switch to determine the DSCP of an outgoing frame, when either of the parameters "override" has a value "frame".

1. Frame priority FPri and Queue priority QPri are determined by the QoS menu.
2. It is possible to change the priority in the VTU menu according to VID of the framework. The methods of application change are described in "VLAN / VTU priority override".
3. Another change can be enabled in the menu ATU for each frame according to its SA or DA. The methods of application change are described in "ATU settings / SA, DA priority override".

### 1.3. Output tag

VLAN	STU	VTU	ATU settings	ATU
<p><b>Global</b></p> <p>Link authorization guard</p> <p>Remove one provider tag</p> <p>ARP without broadcast c</p> <p><b>Ports settings</b></p> <p>Port name p2 Eth1</p> <p>Egress mode <input checked="" type="checkbox"/> unmodified</p> <p>802.1q mode <input type="checkbox"/> disabled</p> <p>Discard tagged <input type="checkbox"/></p> <p>Discard untagged <input type="checkbox"/></p> <p>VTU priority override <input type="checkbox"/> none</p> <p>Force default VID <input type="checkbox"/></p> <p>Default VID <input type="text" value="1"/></p> <p>FID <input type="text" value="0"/></p> <p>IGMP snooping <input type="checkbox"/></p> <p>ARP mirroring <input type="checkbox"/></p> <p>VLAN tunnel <input type="checkbox"/></p> <p>Member</p> <p>p2 Eth1 <input type="checkbox"/></p> <p>p4 Eth2 <input type="checkbox"/></p> <p>p5 CPU <input checked="" type="checkbox"/></p> <p>p6 Air <input checked="" type="checkbox"/></p>	<p><b>Add STU entry</b></p> <p>SID <input type="text" value="1"/></p> <p>Label <input type="text" value="all"/></p> <p>Port state</p> <p>p2 Eth1 <input type="text" value="forwarding"/></p> <p>p4 Eth2 <input type="text" value="forwarding"/></p> <p>p5 CPU <input type="text" value="forwarding"/></p> <p>p6 Air <input type="text" value="forwarding"/></p>	<p><b>Add VTU entry</b></p> <p>VID <input type="text" value="0"/></p> <p>Label <input type="text"/></p> <p>FID <input type="text" value="0"/></p> <p>SID <input type="text" value="1 - all"/></p> <p>Use VID priority <input type="checkbox"/></p> <p>VID priority <input type="text" value="0"/></p> <p>VID policy <input type="checkbox"/></p> <p>Member tag</p> <p>p2 Eth1 <input checked="" type="checkbox"/> egress</p> <p>p4 Eth2 <input type="checkbox"/> egress</p> <p>p5 CPU <input type="checkbox"/> egress</p> <p>p6 Air <input type="checkbox"/> egress</p>	<p><b>Global</b></p> <p>Aging timeout [s]</p> <p>Reserved multicast to CF</p> <p>Reserved multicast prior</p> <p>Reserved multicast DA</p> <p>01:80:c2:00:00:0x</p> <p>01:80:c2:00:00:2x</p> <p><b>Ports settings</b></p> <p>Port name p2 Eth1</p> <p>Learning <input checked="" type="checkbox"/></p> <p>Hold at 1 <input type="checkbox"/></p> <p>ATU refresh <input type="text" value="unlocked"/></p> <p>DA mapping <input checked="" type="checkbox"/></p> <p>Egress block <input type="text" value="none"/></p> <p>SA filtering <input type="text" value="disabled"/></p> <p>Learn limit <input type="text" value="0"/></p> <p>SA priority override <input type="text" value="none"/></p> <p>DA priority override <input type="text" value="none"/></p> <p>Port association</p> <p>p2 Eth1 <input checked="" type="checkbox"/></p> <p>p4 Eth2 <input type="checkbox"/></p> <p>p5 CPU <input type="checkbox"/></p> <p>p6 Air <input type="checkbox"/></p>	<p><b>Add ATU entry</b></p> <p>FID <input type="text" value="0"/></p> <p>MAC <input type="text" value="00:00:00:00:00:00"/></p> <p>Label <input type="text" value="local"/></p> <p>Entry state <input type="text" value="static"/></p> <p>Use MAC priority <input type="checkbox"/></p> <p>MAC priority <input type="text" value="0"/></p> <p>Trunk member <input type="checkbox"/></p> <p>Trunk Id <input type="text" value="0"/></p> <p>Port association</p> <p>p2 Eth1 <input type="checkbox"/></p> <p>p4 Eth2 <input type="checkbox"/></p> <p>p5 CPU <input checked="" type="checkbox"/></p> <p>p6 Air <input type="checkbox"/></p>
<p>2. the output port defines the default tag setting; it is used, if the VID of the frame is not found in the VTU</p>		<p>1.the VID (Member tag) determines if and how the frame is given an output tag</p>		

The tag assigned to an output frame based on VID is managed in the VTU menu. If a frame's VID is not found in the VTU table, the tag assigned to an output frame is determined by the input port (VLAN menu).



## Appendix A. Revision History

Revision 1.0	2017-11-28
First issue	