Technical Tip
COM400 Chassis IP Switch Settings

COM400 Settings Overview:

The COM400 chassis differs from previous COM chassis due to the presence of a Layer2 managed switch. Due to the number of tuners in a COM51 and the potential of having 138 HD streams within the system, the switch, specifically IGMP capabilities, is necessary so that COM51 cards are not overwhelmed by the amount of video data they are capable of outputting. By default, the COM400 is set to provide a stable environment, however, if you are using the system to output IP multicast video, a couple simple settings can be implemented for a more robust solution. In general, these settings are:

1. Log in at 192.168.10.chassis+1; username = "admin".
2. After upgrading to COM400_ST01.00.00 follow all ten manditory steps.
3. Enable flow control on all ports.
4. Verify IGMP Snooping is enabled.
5. Connect your managed Ethernet switch to one of the 10GbE ports (they can negotiate to 1GbE).
6. Enable Router Port for the port connected to the managed Ethernet switch.
7. Keep it simple. Don't depend on advanced settings or modes.
8. Be sure to persistently save your settings.

Chassis log in

IP address for chassis one is 192.168.10.2.
192.168.10.<chassis number +1>
Username is "admin"
PW is blank

Save Changes Running Config

The COM400 will revert to its saved running configuration after a power cycle. If you accidentally make changes and are unable to recover, a power cycle will revert the chassis back to where you started. Conversely, once changes are made to the system they must be saved as "running config" as described on page 7 of this document.

Port Definitions

When you first log into the COM400 the landing page will display the graphic shown below. Ports 1-11 are utilized in the COM400 chassis and a displayed as lit with a connection to each port is made. Refer to the table below for port definitions.

Port State Overview
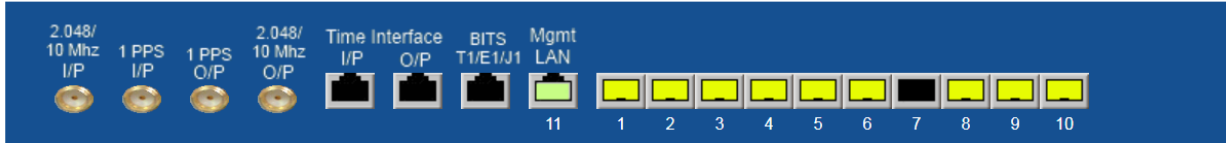
In this example all ports are connected except #7, the top QAM port.

Port #	COM400 Connection
1	COM51 slot 6
2	COM51 slot 5
3	COM51 slot 4
4	COM51 slot 3
5	COM51 slot 2
6	COM51 slot 1
7	QAM Port 2 (TOP)
8	QAM Port 1 (Bottom)
9	Unmanaged switch to both 1 GIG ports
10	Top 10 GIG
11	Bottom 10 GIG

Note: Since both 1 gigabit ports are connected to the same port on the layer 2 switch via an unmanaged switch all multicast traffic requested by one port will be present on the other. For this reason, it is recommended that the 1 gigabit ports not be used for multicast traffic.

Multicast Settings

From the main menu navigate to:
Configuration > IMPC > IGMP snooping > Basic Configuration

Verify **Snooping Enabled** is checked. If not, check the box and then click **Save**

Fast Leave should be unchecked unless a STB is connected directly to the COM400.

Select **Router Port** for the port connected to your core switch. This will allow all Multicast traffic through the port. The external switch can then handle all IGMP functions.

IGMP Snooping Configuration

Global Configuration	
Snooping Enabled	☑
Unregistered IPMCv4 Flooding Enabled	☐

Port Related Configuration

Port	Router Port	Fast Leave
*	☐	☐
1	☐	☐
2	☐	☐
3	☐	☐
4	☐	☐
5	☐	☐
6	☐	☐
7	☐	☐
8	☐	☐
9	☐	☐
10	☐	☐
11	☑	☐

Save   Reset

From the IPMC menu select VLAN Configuration.
Verify **Snooping** is enabled. If not check the box then click **Save**

Querier Election should be off if you are using a managed external Ethernet switch. Enable Querier Election if you don't have an external managed Ethernet switch.

IGMP Snooping VLAN Configuration

Start from VLAN 1 with 20 entries per page.

VLAN ID	Snooping Enabled	Querier Election	Querier Address
1	☑	☐	0.0.0.0

Save   Reset

Port Settings

From the main menu navigate to Configuration >Ports
This screen provided information for the state and settings of each port on the switch.
Verify that the port connected displays a green link light as shown in the figure below.

Flow Control
Some switches will use a flow control that allows the switch to request a slower data rate if the buffers start to fill. Checking the flow control box on the Port Settings page will allow the COM400 to respond to these requests. We recommend enabling flow control on all ports.
The screen capture below shows Flow Control enabled on all ports.

Advertised Port Speed - Informational
The 10G ports "advertise speeds between 100M and 10G. If your switch is having problems auto-negotiating the connection, you can shut off advertised speeds above the rated bandwidth of your switch port.

MTU - Informational
COM51 maximum transmission units (MTU) is 1500. Some external switched may prefer the COM400 switch settings be set to a matching MTU (Frame Size) setting. The lowest MTU setting available in the COM400 switch is 1580 as shown below on port 11.

In the capture below Flow control enabled on all ports (recommended)
Port 11 has been set with:

- Advertised port speeds set to 100M and 1G (optional as needed)
- MTU set to 1580 (optional as needed)

Port Configuration

| Port | Link | Speed | | Adv Duplex | | Adv speed | | | | | | Flow Control | | | PFC | | Maximum |
		Current	Configured	Fdx	Hdx	10M	100M	1G	2.5G	5G	10G	Enable	Curr Rx	Curr Tx	Enable	Priority	Frame Size
*			<>	✔	✔	✔	✔	✔	☐	☐	☐	✔			☐	0-7	10240
1	🟢	1Gfdx	Auto	✔	✔	✔	✔	✔	☐	☐	☐	✔	✕	✕	☐	0-7	10240
2	🟢	1Gfdx	Auto	✔	✔	✔	✔	✔	☐	☐	☐	✔	✕	✕	☐	0-7	10240
3	🟢	1Gfdx	Auto	✔	✔	✔	✔	✔	☐	☐	☐	✔	✕	✕	☐	0-7	10240
4	🟢	1Gfdx	Auto	✔	✔	✔	✔	✔	☐	☐	☐	✔	✕	✕	☐	0-7	10240
5	🟢	1Gfdx	Auto	✔	✔	✔	✔	✔	☐	☐	☐	✔	✕	✕	☐	0-7	10240
6	🟢	1Gfdx	Auto	✔	✔	✔	✔	✔	☐	☐	☐	✔	✕	✕	☐	0-7	10240
7	🔴	Down	Auto	✔	✔	☐	✔	✔	✔	☐	☐	✔	✕	✕	☐	0-7	10240
8	🟢	2.5Gfdx	Auto	✔	✔	☐	✔	✔	✔	☐	☐	✔	✕	✕	☐	0-7	10240
9	🟢	2.5Gfdx	2.5Gbps FDX	☐	☐	☐	☐	☐	☐	☐	☐		?		☐	0-7	10240
10	🔴	Down	Auto	✔	✔	✔	✔	✔	✔	✔	✔	✔	✕	✕	☐	0-7	10240
11	🟢	100fdx	Auto	✔	✔	☐	✔	✔	☐	☐	☐	✔	✕	✕	☐	0-7	1518

Following these simple steps have been tested and proven using a variety of managed Ethernet switches from well-known manufacturers. No other advanced or further setup should be necessary for the COM400 and COM51 cards to work properly in a Multicast environment. If other specific settings are required by the managed Ethernet switch provider that you have selected, please continue with caution!

Save Changes to Running Configuration

Once you have verified that the changes you have made are correct, save the changes to running configuration so they become persistent and do not revert to default after a power cycle.

Navigate to:

Maintenance > Configuration > Save as startup-config

Click **Save Configuration**

Save Running Configuration to startup-config

Please note: The generation of the configuration file may be time consuming, depending on the amount of non-default configuration.

Save Configuration

Changing the Chassis Management IP address (OPTIONAL)

Making changes in this area can affect system communication. Proceed with caution.

Management IP address should only be changed when it is necessary to manage the entire system from a different subnet. The COM51 cards IP address will need to be changed to the same subnet as the chassis. Change the COM51 card IP address and add an alternate IP address for the QAM before proceeding.

To change the IP address used to access the COM400 chassis navigate to:

Configuration->System->IP

IP Configuration

Mode | Host ▼ |

IP Interfaces

Delete	VLAN	Enable	DHCPv4								IPv4	
			Type	IfMac	Client ID		Hostname	Fallback	Current Lease	Address	Mask Length
					ASCII	HEX					
☐	1	☐	Auto ▼	Port 1 ▼				0		192.168.10.2	16

Add Interface

IP Routes

| Delete | Network | Mask Length | Gateway | Next Hop VLAN |

Add Route

Save   Reset

Click on **Add Interface**

Set the following:

VLAN = 2

Fallback =1

IP address = new management IP address (for this example we will use 10.0.0.251)

Mask Length = 16

Click on **Save**

IP Interfaces

Delete	VLAN	Enable	DHCPv4								IPv4	
			Type	IfMac	Client ID		Hostname	Fallback	Current Lease	Address	Mask Length
					ASCII	HEX					
☐	1	☐	Auto ▼	Port 1 ▼				0		192.168.10.3	16
☐	2	☐	Auto ▼	Port 1 ▼				0		172.16.80.99	16

Then navigate to:

Configuration->VLANs->Configuration

In order to access the chassis and the associated COM cards and QAM from the same port all connected ports will need to be set to the same VLAN.

Set Allowed Access VLANs to 2

Refer to the chart on page 1 to identify the ports being used

Set each port to be used on VLAN2 to the following settings:

Mode = Hybrid

Port VLAN =2

Once the port is changed you will no longer be able to access the COM400 on the default IP address. It is recommended to leave one port on VLAN1 so the chassis can be accessed with the default IP.

In the example below both one gigabit ports (port 9) and the top 10 gigabit port (port 10) will use the new VLAN IP assignment. Connecting directly to the bottom 10gigabit port (port 11) will allow connection with the default IP address.

Ports 5, 6, and 8 have been set to the new VLAN settings. This sets COM51 cards in slot one and two and the QAM to VLAN2.

Global VLAN Configuration

| Allowed Access VLANs	2
Ethertype for Custom S-ports	88A8

Port VLAN Configuration

Port	Mode	Port VLAN	Port Type	Ingress Filtering	Ingress Acceptance	Egress Tagging	Allowed VLANs	Forbidden VLANs
*	<> ▼	1	<> ▼	☑	<> ▼	<> ▼	1	
1	Access ▼	1	C-Port ▼	☑	Tagged and Untagged ▼	Untag All ▼	1	
2	Access ▼	1	C-Port ▼	☑	Tagged and Untagged ▼	Untag All ▼	1	
3	Access ▼	1	C-Port ▼	☑	Tagged and Untagged ▼	Untag All ▼	1	
4	Access ▼	1	C-Port ▼	☑	Tagged and Untagged ▼	Untag All ▼	1	
5	Hybrid ▼	2	C-Port ▼	☐	Tagged and Untagged ▼	Untag Port VLAN ▼	1-4095	
6	Hybrid ▼	2	C-Port ▼	☐	Tagged and Untagged ▼	Untag All ▼	1-4095	
7	Access ▼	1	C-Port ▼	☑	Tagged and Untagged ▼	Untag All ▼	1	
8	Hybrid ▼	2	C-Port ▼	☐	Tagged and Untagged ▼	Untag Port VLAN ▼	1-4095	
9	Hybrid ▼	2	C-Port ▼	☐	Tagged and Untagged ▼	Untag Port VLAN ▼	1-4095	
10	Hybrid ▼	2	C-Port ▼	☐	Tagged and Untagged ▼	Untag Port VLAN ▼	1-4095	
11	Access ▼	1	C-Port ▼	☑	Tagged and Untagged ▼	Untag All ▼	1	

Save   Reset

To verify the change has taken effect connect your PC to a 1 gigabit port, or the top 10 gigabit port. Change the IP settings in your PC's ethernet connection to the correct subnet to access the new IP address.
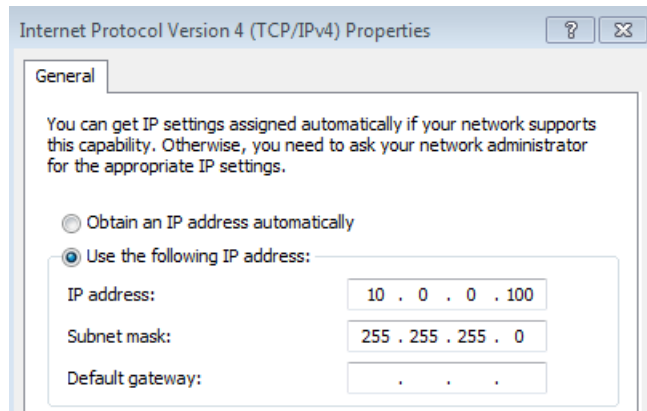
Enter the new IP address into the browser and verify you connect to the COM400 and the COM51 cards.

Change your IP setting back to match the default 192.168.3.XX subnet 255.255.0.0. Connect to the bottom 10 gigabit port and verify you can access the COM400 at the default 192.168.10.2 address.

If you run into problems, reboot the COM400 chassis and all configurations will return to default.

Debugging Tips

A few tools are very helpful for assisting in debugging any IP multicast network.

- Inexpensive managed Ethernet switch with known working settings. Try to use this instead of the expensive core switch.
- Unmanaged Ethernet switch. This can be placed between the core switch and the IP receiver. A PC running Wireshark can also be connected to the unmanaged Ethernet switch to see all of the multicast IP packets being sent to the IP receiver.
- PC with Wireshark.