

# PTP Basics

## How to deal with multiple PTP Grandmasters

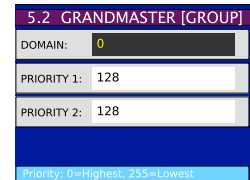
A PTP Domain is a network or a part of a network where all devices synchronize to a single Grandmaster clock. The Grandmaster clock sends Announce messages, establishing the synchronization hierarchy. When Announce messages are no longer received, it is assumed the Grandmaster was taken offline and, using the Best Master Clock Algorithm (BMCA), another device becomes the Grandmaster.

If more than one device is assuming the state of Grandmaster in the same PTP domain, something is wrong and it is essential to remedy this for proper sync.

### • PTP Domain

The first parameter to examine is the PTP Domain. Make sure all devices are on the same PTP domain. The PTP domain of the DXD is set in the Grandmaster menu 5.2.

The PTP Domain is also visible in the PTP Port Status page and on the Main Display: 'Reference Sources' for the DXD-8 and 'PTP Ports' page on the DXD-16.



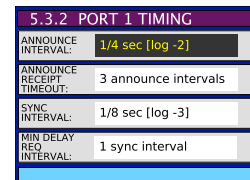
### • Timing Values

The selection of the Grandmaster is done via the BMCA or Best Master Clock Algorithm. Announce messages carrying the BMCA attributes are advertised by devices on the network. These attributes are compared and, using the BMCA, a GM is selected. At that point, the other devices on the network go from advertising to listening while the GM keeps advertising by transmitting Announce messages at a regular interval. If the GM stops transmitting these messages, another device will take its place and become the GM.

For the BMCA to function properly, all devices on the PTP domain must have the same **Announce Interval** and the same **Announce Receipt Timeout** (this is an IEEE 1588 requirement).

Announce Interval and Announce Receipt Timeout are set in the Port Timing menus:

- DXD-8: menu 5.4
- DXD-16: separate menus for each of the 4 ports: 5.3.2, 5.4.2, 5.5.2 & 5.6.2



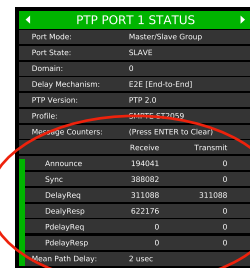
Note: AES67 and SMPTE ST2059 have different default values for those 2 parameters. When using the 2 profiles simultaneously, be sure to use set a common value for these parameters such as the ones proposed in AES-R16.

### • Troubleshooting tools

To confirm that PTP messages are transmitted properly through the switch(es), to and from the DXD, **message counters** are included in the PTP Port Status pages.

As a PTP follower (PTP slave), the DXD should receive Announce messages from the Grandmaster; as a Grandmaster, the DXD should transmit Announce messages to the other devices on the network.

Note: In PTPv1 there are no Announce messages (the data is in the Sync messages). So only Sync messages will be transmitted by the DXD-16 when set as a v1 GM.



When messages are not transmitted properly, it could be due to improper switch settings. Make sure it is set properly (see IGMP below).

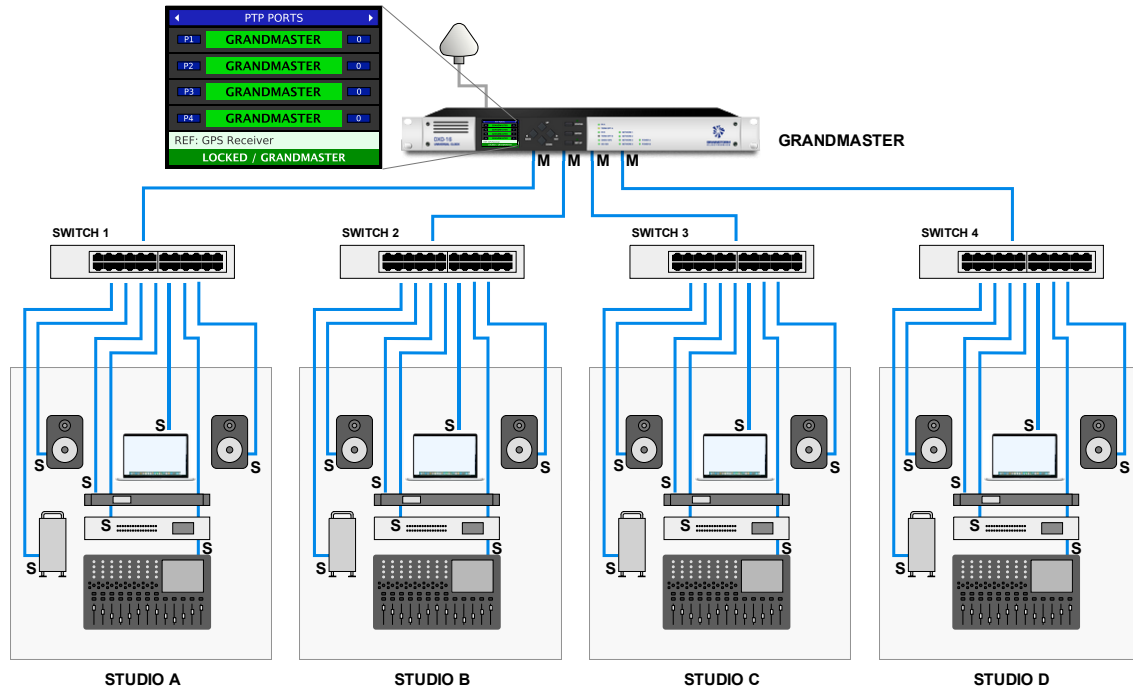
### • IGMP

The DXD supports IGMPv2. IGMP is a communication protocol that, through the use of Multicast Group Membership, allows the network to direct multicast transmissions only to devices that have requested them.

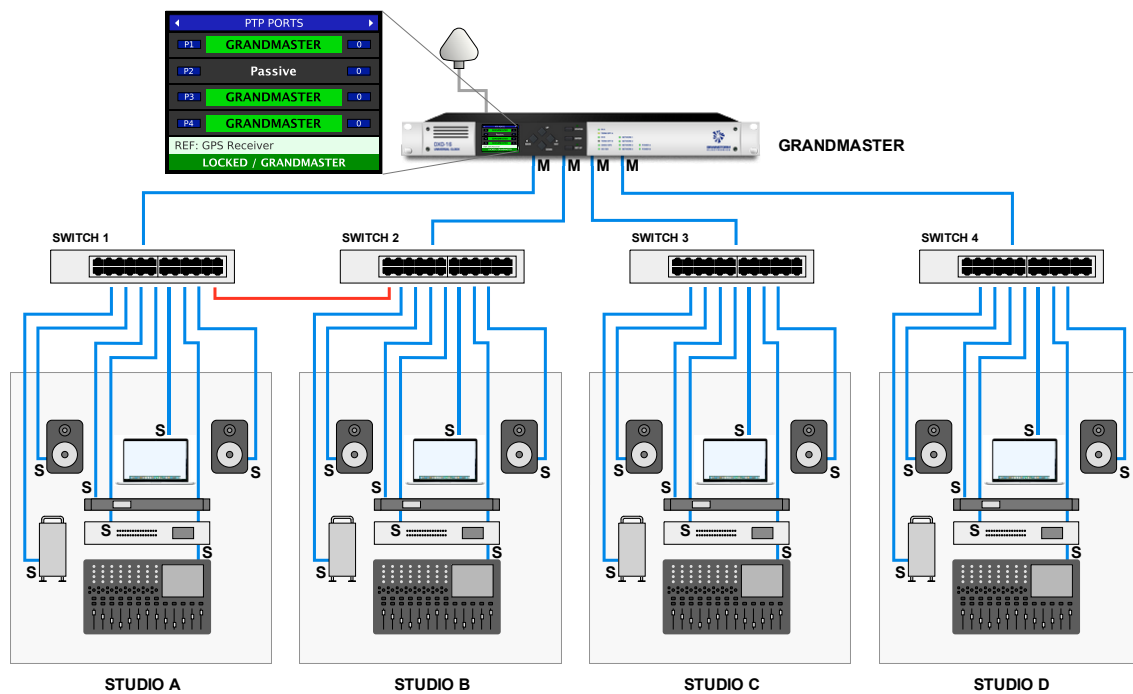
**IGMP snooping** should be enabled at the switch to which the DXD is connected to prevent the switch from "flooding" all of its ports with unrequested multicast messages.

## • DXD-16 Multiple Grandmaster ports

When connecting the 4 DXD-16 ports to 4 separate networks, each port can assume the state of Grandmaster as long as the networks remain separate.



In the scenario above, the 4 ports do not 'see' each other and each assumes the state of GRANDMASTER.



When Studio A is connected to Studio B (red line above), port 1 'sees' port 2. As a result, port 2 goes PASSIVE and port 1 becomes the Grandmaster for studio B.