



Titan Networking Manual

Network Diagrams

INTRODUCTION

Lighting networks need to transfer a large amount of data. For the best reliability, you should use network wiring which is dedicated to the lighting system, physically isolated from other networks and uses simple hubs rather than intelligent switches. Connecting to an existing network with other network traffic is possible but can lead to problems both with the lighting equipment and with other IT equipment on the network. Intelligent Ethernet switches may drop or block lighting data.

There are a few ways for the console to communicate with lighting fixtures beyond the traditional DMX sockets. You can connect networked processing nodes, which allow you to control up to 64 universes of DMX. The console may also be networked with other Titan consoles for multi-user control, and for backup.

If the console has multiple network ports, DMX will output on all ports. You can set this from the DMX module properties in the DMX Settings window, each port is listed with a switch to enable or disable it.

Before the console can talk to another device over the network, it must be given a unique network address. This is called its "IP address".

A QUICK GUIDE TO IP ADDRESSING

This section explains the basics of IP addressing, and what you will need to know when setting up a lighting control network.

IP addresses will normally come in the format "w.x.y.z" where w, x, y and z are numbers between 0 and 255. For example, "192.168.0.1". Every object (or node or device) on a network should have a unique IP address. This is the same concept as DMX as each fixture requires a unique DMX address, for IP addresses the same is required.

IP ADDRESS

There is a strong possibility that if you set the IP address on one network device you will have to set it on all of them. If you manually set your IP address on the console you will have to do it on any TitanNet devices you are using and any Art-Net fixtures. Beware that some Art-Net fixtures have a fixed IP address in the range 2.x.x.x, in which case you must set the console to that range.

SUBNET MASKS

All devices or nodes on a network that wish to communicate with each other must have the same subnet mask. The mask determines which parts of the IP address are unique in that network to each node. If the part of the subnet mask is a 0, then the corresponding digit in an IP address must be unique for each fixture. If the part in a subnet mask is 255 then this part of the IP address needs to be the same for each node.

CHOOSING AN IP ADDRESS AND SUBNET MASK

This is the hardest part of setting up a network, as your IP address totally depends on what you are using on the network, what IP addresses you can and cannot change. Below are a number of different scenarios for standard lighting networks using a Titan console and what IP addresses should be set. These aren't guaranteed to work but try them if the scenario matches your network:

Titan and TNP, all output are standard DMX.

	IP Address	Subnet Mask
Titan console	192.168.1.30	255.255.255.0
TNP	192.168.1.31	255.255.255.0

Titan outputting over Art-Net Fixtures (and DMX).

	IP Address	Subnet Mask
Titan console	2.100.100.100	255.0.0.0
Art-Net Fixtures	2.x.y.z	255.0.0.0

Or

	IP Address	Subnet Mask
Titan console	10.100.100.100	255.0.0.0
Art-Net Fixtures	10.x.y.z	255.0.0.0

Where a combination of x, y and z are unique for these fixtures.

Titan and TNP outputting over Art-Net (and DMX).

	IP Address	Subnet Mask
Titan console	2.100.100.100	255.0.0.0
TNP	2.100.100.101	255.0.0.0
Art-Net Fixtures	2.x.y.z	255.0.0.0

Or

	IP Address	Subnet Mask
Titan console	10.100.100.100	255.0.0.0
TNP	10.100.100.101	255.0.0.0
Art-Net Fixtures	10.x.y.z	255.0.0.0

Where a combination of x, y and z are unique for these fixtures.

Never set the last number of an IP address to be 255. This is a special address which will not function correctly.

AUTOMATICALLY ASSIGNING IP ADDRESSES (DHCP)

There is another way of assigning an IP address via an automatic system called DHCP, where one of the computers on the network will automatically give other devices an IP address when it connects.

Generally, we would not advise using DHCP on a lighting network as many nodes do not support it. If you must operate on a network with DHCP, most DHCP servers will have a reserved range of "static" addresses which can be manually set. You can usually find these out from the DHCP server configuration.

PRIVATE IP ADDRESS RANGES

If your network is connected to the internet, it is important to use a private IP address range. These are special IP addresses that will not be routed onto the internet. They are:

Start Address	Final Address	Subnet Mask
10.0.0.0	10.255.255.255	255.0.0.0
172.16.0.0	172.31.255.255	255.255.0.0
192.168.0.0	192.168.255.255	255.255.255.0

For Art-Net, the 10.x.x.x range must be used.

SETTING THE CONSOLE'S IP ADDRESS

We recommend that you use the console's automatic IP setting function. However, if you need to you can also set the IP address using Windows Control Panel.

1. Switch to System mode and press [Network Settings]
2. Press [Local Area Connection].
3. Press [Subnet Mask] and ensure it is set to 255.0.0.0
4. Press [Set IP 2.*.*.*]
5. Press [Save settings]
6. Exit System mode

Note: Some equipment may operate on IP addresses 10.*.*.* (softkey D)

Titan Mobile: Network Discovery must be enabled in the Windows User Profile you are using, or consoles will not be able to see each other on the network. Ensure the Windows option 'Turn on network discovery' is selected in the Network Sharing options.

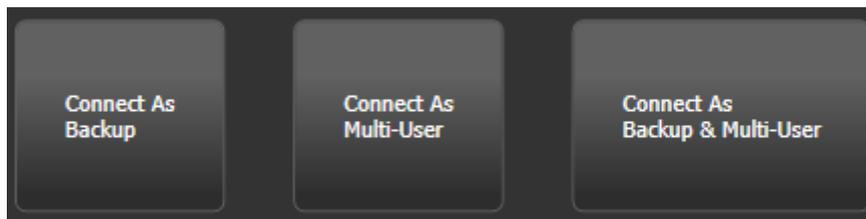
Avolites strongly recommends using a dedicated PC that does not have access to Internet or any third-party firewall/anti-virus software installed.

LINKING TO OTHER TITANNET SESSIONS

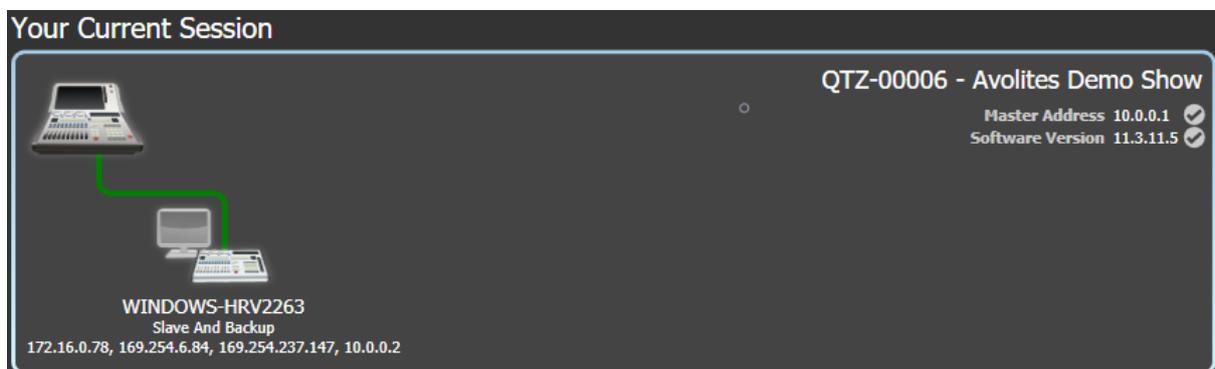
If multiple Titan consoles are connected in the same network you can choose to connect them as multi-user, backup, or both. This is also how you connect TitanNet processors to expand DMX outputs.

All consoles to be linked must be running the same version of Titan for this to work

1. Press the Disk button.
2. Press [TitanNet Sessions]
3. [Sessions View] opens a window that shows you how your console is connected to others, and what other TitanNet sessions are available. You can touch on another console in the window and click [Connect] to start a connection or use the other buttons to leave a session.



Or select [Backup], [Multi-User] or [Backup & Multi-User] to show a list of sessions which you can connect to. Click on the session to start the connection.



A green line shows a good connection, a dotted red line shows a problem with a connection. Unavailable consoles are shown with a red background.



Initially all consoles are "Master" consoles. If you connect to a session on another console as multi-user, you become a "Slave" on that console. The show on the Master is transferred across the network to the Slave. On the Slave you can choose to save the show locally or to save changes back to the Master console. The toolbar will show details of the master/slave status.

Console legends can be changed in the System menu using the [Console Legend] option.

Consoles connected in a multi-user session work on the same show. If the same handle worlds are selected then an action on one console is mirrored across them all, for example firing a cue on the slave console will also fire the cue on the master. If the master has motorised faders, the fader will move; if not, fader levels must match before they can take over. If different handle worlds are selected, users can work independently on their own pool of handles.

In all situations the master console outputs DMX and channels in a remote programmer are shown with a blue dot on the encoder wheel views. If two or more consoles are editing the same fixture, the last console to change any attribute will take over control of the fixture.

Slaves can leave a session using the [Leave Session] button in the Sessions View or in the TitanNet menu. The console will restore the local show it had loaded prior to joining. Master consoles have the option to [Terminate Session].

If a console is running as backup, it has options to [Takeover], [Sync now] and [Leave Session]. If [Takeover] is selected, the console will immediately become the master and take over DMX output with the chosen user and handle worlds selected. The console which was master will go into a dormant state with DMX disabled.

If a console is running as master, it has options to [Terminate Session] and [Connect]. If [Terminate Session] is selected, the console will remain as the master and continue as normal. The console which was slave will go into a dormant state with DMX disabled.

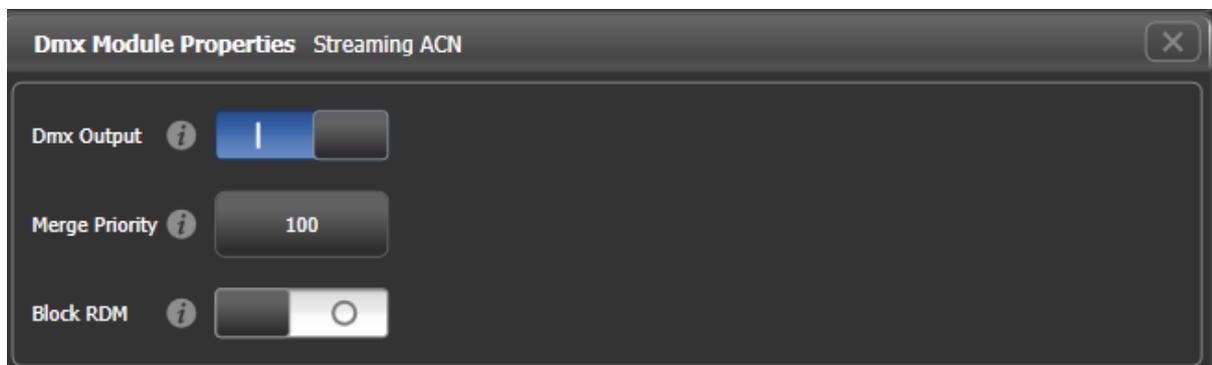
Master/Backup

Using the TitanNet Session, Titan consoles can connect and sync in the same network as multi-user, backup, or both. The master console in the session will output DMX and the slave will not. When joining a session in backup or multi-user and backup, the 'Takeover' button must be applied on the slave. This will then enable the DMX output on the slave and disable this on the master.

Redundant Masters

Avolites consoles can be networked in the same network as Masters. However, it is strongly recommended that only one master has DMX enabled.

Redundant masters can be networked using Streaming ACN (sACN/ANSI E1.31). This allows each console to set priorities ranging from 1 to 200, where 200 is the most important. So, if you have two streams on Universe 1, console A has a priority of 100 and console B has a priority of 150, the second stream will win.



The sACN priority of a console can be changed via the DMX Settings window.

1. Switch to System mode and press [DMX Settings]
2. Under 'Available Nodes', Press the setting cog for Streaming ACN
3. Enter a value into the 'Merge Priority' box.
4. Exit system mode

Top Tip: Pre-set macros for Streaming ACN priorities can be found in the 'Show Library'. Dependent on which Macro has been selected, this will then change the priority according to the pre-set Macro.

NETWORK DIAGRAMS

The following network diagrams illustrate best practise setups that can be applied using Avolites consoles.

Master/Backup | Physical DMX

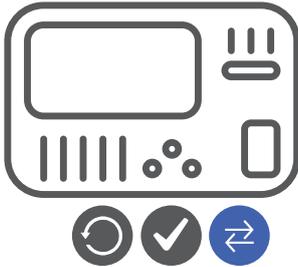
Normal Running



Console A



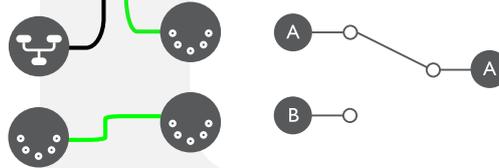
Console B



Titan Net Switch



DMX Switch



Explanation

In this particular setup, both consoles are linked together using a Titan Net Switch. Console A is the 'Master' and Console B is the 'Backup'.

Both consoles are in perfect working order and are synced using 'TitanNet Sessions' located in the 'Disk' menu.

Console B is connected via Backup, Multi-user or Backup & Multi-user.

The DMX switch is configured to receive DMX that is being sent from Console A.

Fixture



Advantages & Disadvantages

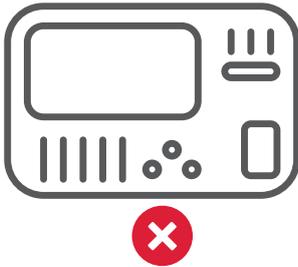
- ✔ Show file is copied to the backup console during quick and auto-save.
- ✘ If a problem occurs on the master, it's very likely to occur on the backup.

Master/Backup | Physical DMX

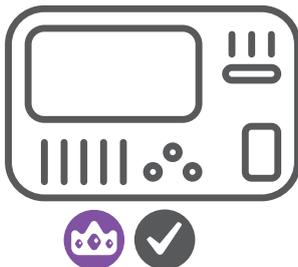
Backup Running



Console A



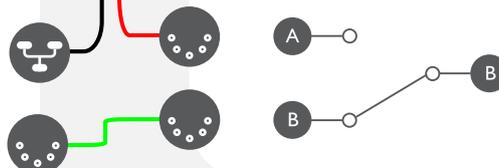
Console B



Titan Net Switch



DMX Switch



Explanation

Console A has failed, been removed or the user has decided to takeover the session and changed the DMX switch to send the output from Console B. Console B is now the 'Master'.

To takeover over the master, the 'Takeover' button must be pressed in the 'Titan Net Sessions' workspace on Console B.

Fixture



Legend



Master/Backup | Streaming ACN

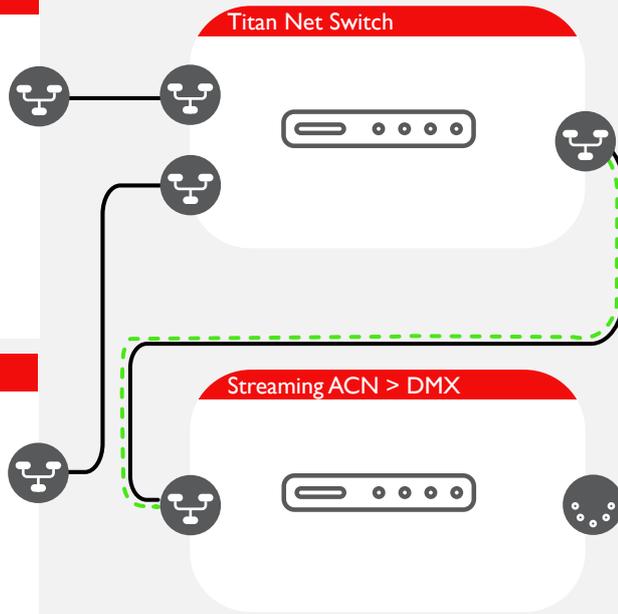
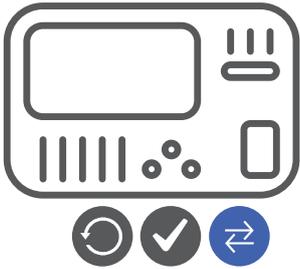
Normal Running



Console A



Console B



Explanation

In this particular setup, both consoles are linked together using a Titan Net Switch. Console A is the 'Master' and Console B is the 'Backup'.

Both consoles are in perfect working order and are synced using 'TitanNet Sessions' located in the 'Disk' menu.

Console B is connected via Backup, Multi-user or Backup & Multi-user.

Console A is sending DMX to the output via streaming ACN. This can be assigned via the 'DMX Settings' workspace.

Fixture



Advantages & Disadvantages

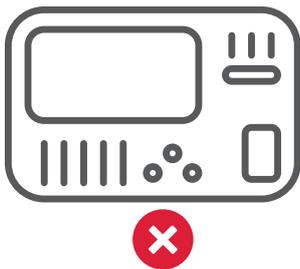
- ✔ Show file is copied to the backup console during quick and auto-save.
- ✔ Instant output switch over. Requires no user interaction.
- ✘ If a problem occurs on the master, it's very likely to occur on the backup.
- ✘ Conflicting sACN frames can occur on the network/output if the master re-appears and is connected after a takeover has been applied.

Master/Backup | Streaming ACN

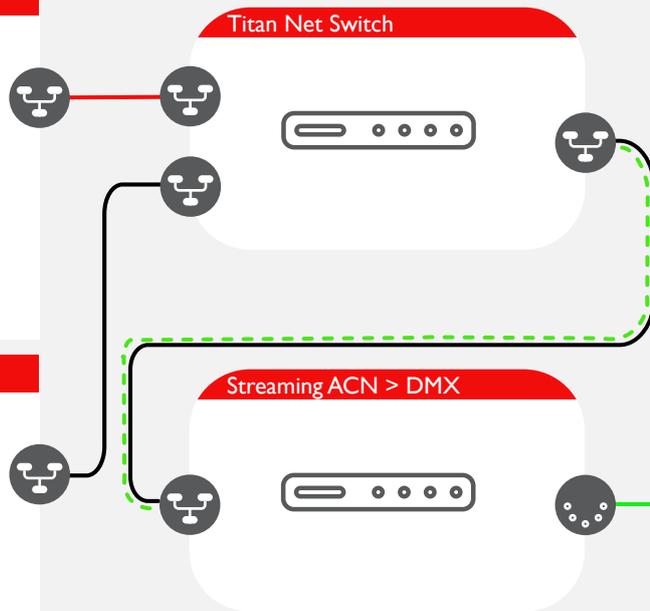
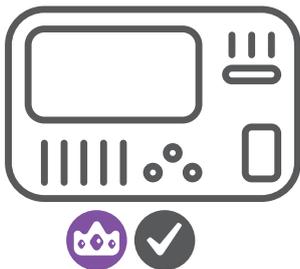
Backup Running



Console A



Console B



Explanation

Console A has failed, been removed or the user has decided to takeover the session, therefore, Console B is now the 'Master'.

To takeover over the master, the 'Takeover' button must be pressed in the 'Titan Net Sessions' workspace.

Console B is sending DMX to the output via streaming ACN.

Fixture



Legend

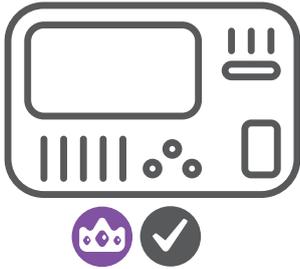
- Active Signal
- Non-Working DMX/Network Connection
- Working DMX Connection
- Working Network Connection
- Sync
- Non-Working
- Working
- DMX
- Ethernet
- Master
- Backup

Redundant Masters | Physical DMX

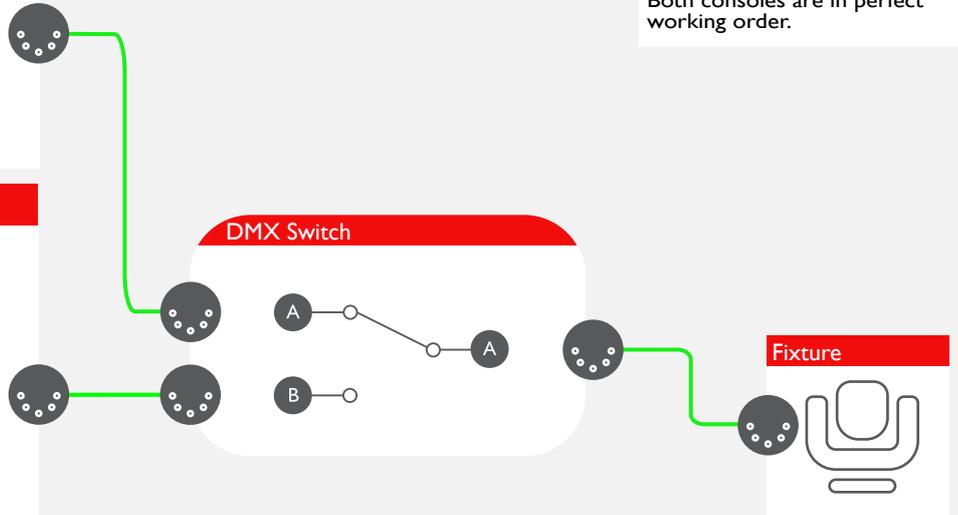
Normal Running



Console A



Console B



Explanation

Both Console A and B are Master. Using a DMX Switch, DMX signal is being output by Console A.

Both consoles are in perfect working order.

Running A Show

Advantages & Disadvantages

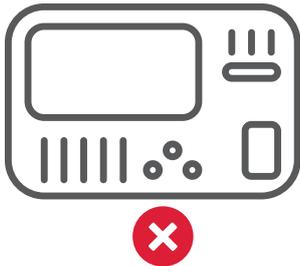
- ✓ Easy to setup
- ✓ Faster switch over in comparison to the 'Master/Backup | DMX Physical' setup
- ✗ Show file not copied
- ✗ Requires manual DMX switch over to be applied

Redundant Masters | Physical DMX

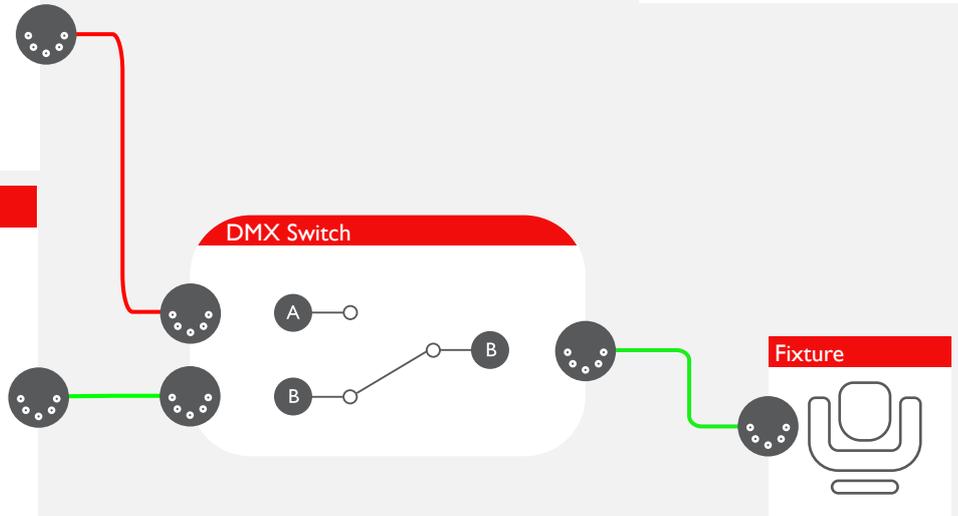
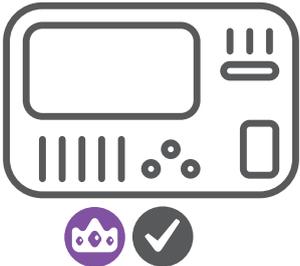
Backup Running



Console A



Console B



Explanation

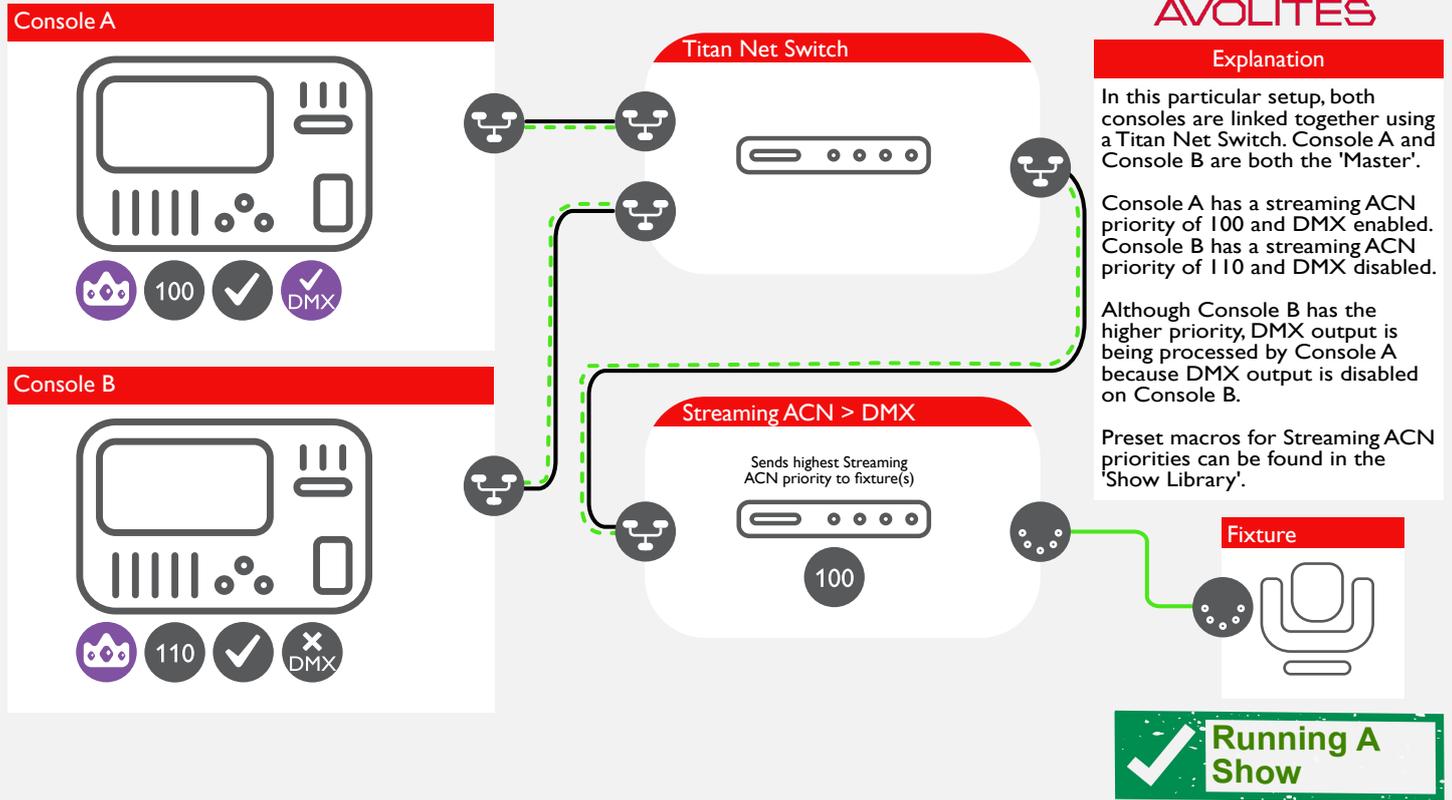
Console A has failed, been removed or the user has changed the DMX switch to send the output from Console B.

Legend

- Working DMX Connection
- Non-Working DMX/Network Connection
-
-
-
-

Redundant Masters | Streaming ACN

Normal Running

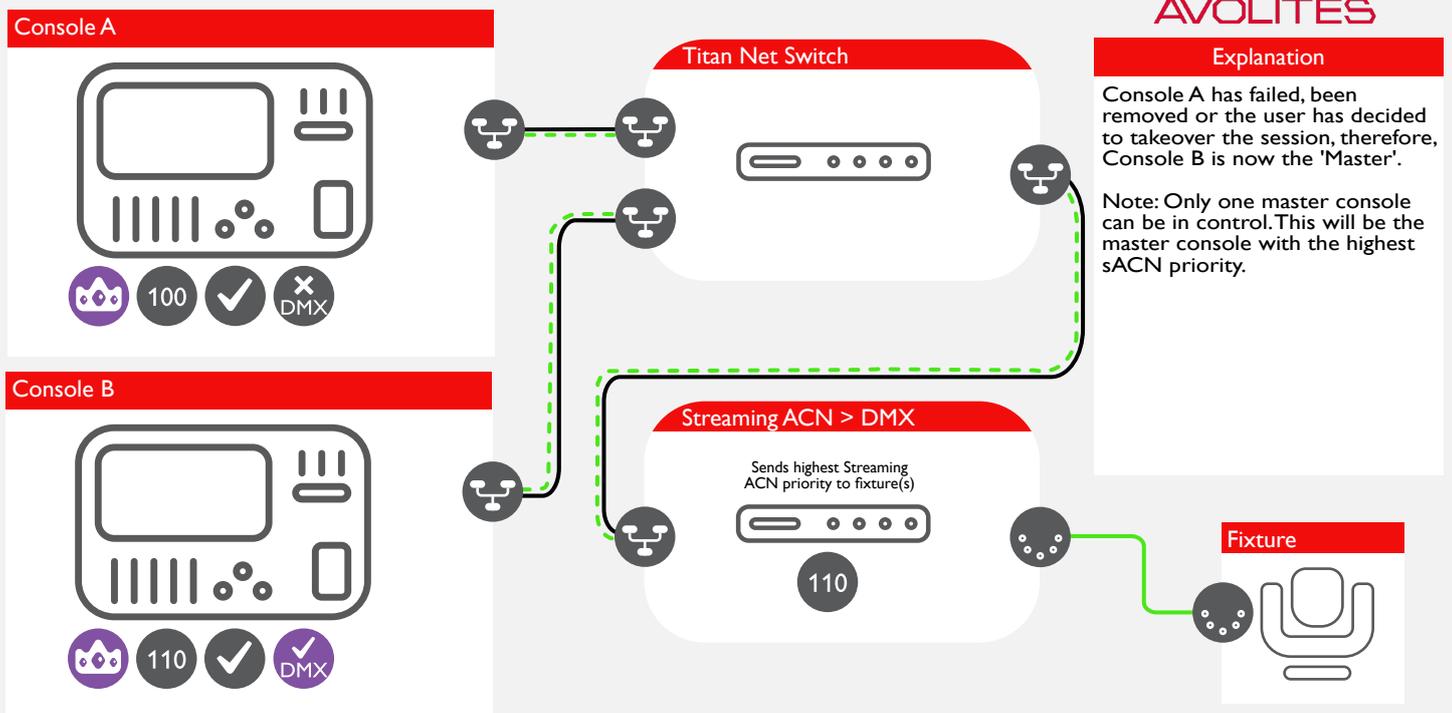


Advantages & Disadvantages

- ✓ Instant takeover that requires no user interaction compared to the 'Master/Backup | sACN' setup
- ✓ Faster switch over in comparison to the 'Master/Backup | DMX Physical' setup
- ✗ Streaming ACN priorities are not supported by all sACN nodes
- ✗ Show file not copied

Redundant Masters | Streaming ACN

Backup Running

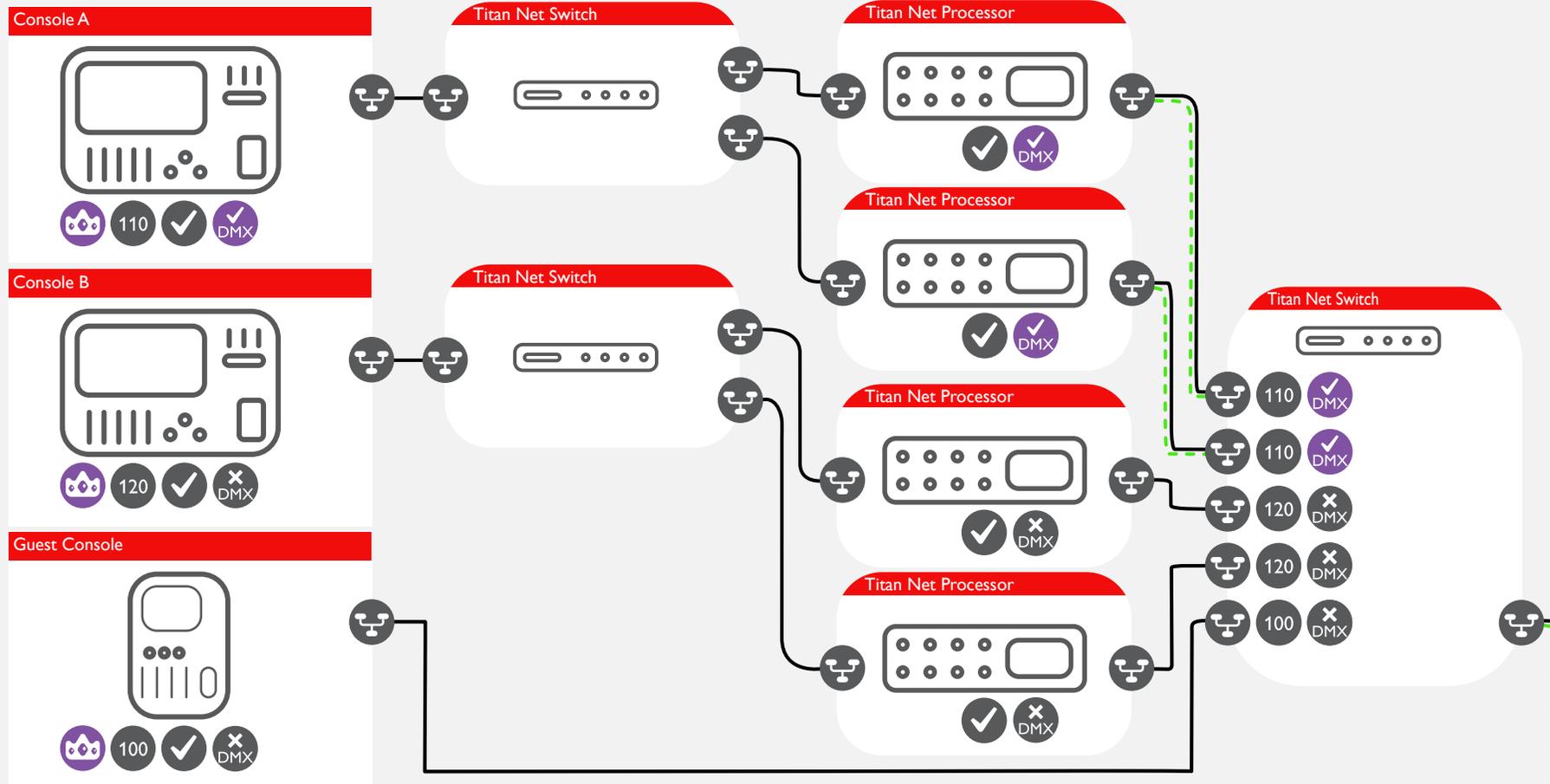


Legend

- - - Active Signal
- Working DMX Connection
- Working Network Connection
- DMX Enabled
- Master
- Working
- DMX
- Ethernet
- DMX Disabled
- 100 Streaming ACN Priority

Redundant Masters | TNPs | Guest Console

Normal Running



Explanation

In this particular setup, Consoles A and B are linked using Titan Net Switches to multiple Titan Net Processors. Console C is the visiting console that is also linked using a TNS that is connected to the multiple TNPs. Consoles A, B and C are all 'Master'.

Console A has a streaming ACN priority of 110 and DMX enabled. Console B has a streaming ACN priority of 120 and DMX disabled. Console C has a streaming ACN priority of 100 and DMX disabled.

Although Console B has the higher priority, DMX output is being processed by Console A because DMX output is disabled on both Consoles B and C.

Connecting the TNP to a TitanNet Session as a backup is not recommend.

Advantages & Disadvantages

- ✔ Instant takeover that requires no user interaction compared to the 'Master/Backup | sACN' setup
- ✔ Faster switch over in comparison to the 'Master/Backup | DMX Physical' setup
- ✔ Only one console can be in control
- ✘ Streaming ACN priorities are not supported by all sACN nodes
- ✘ Show file not copied

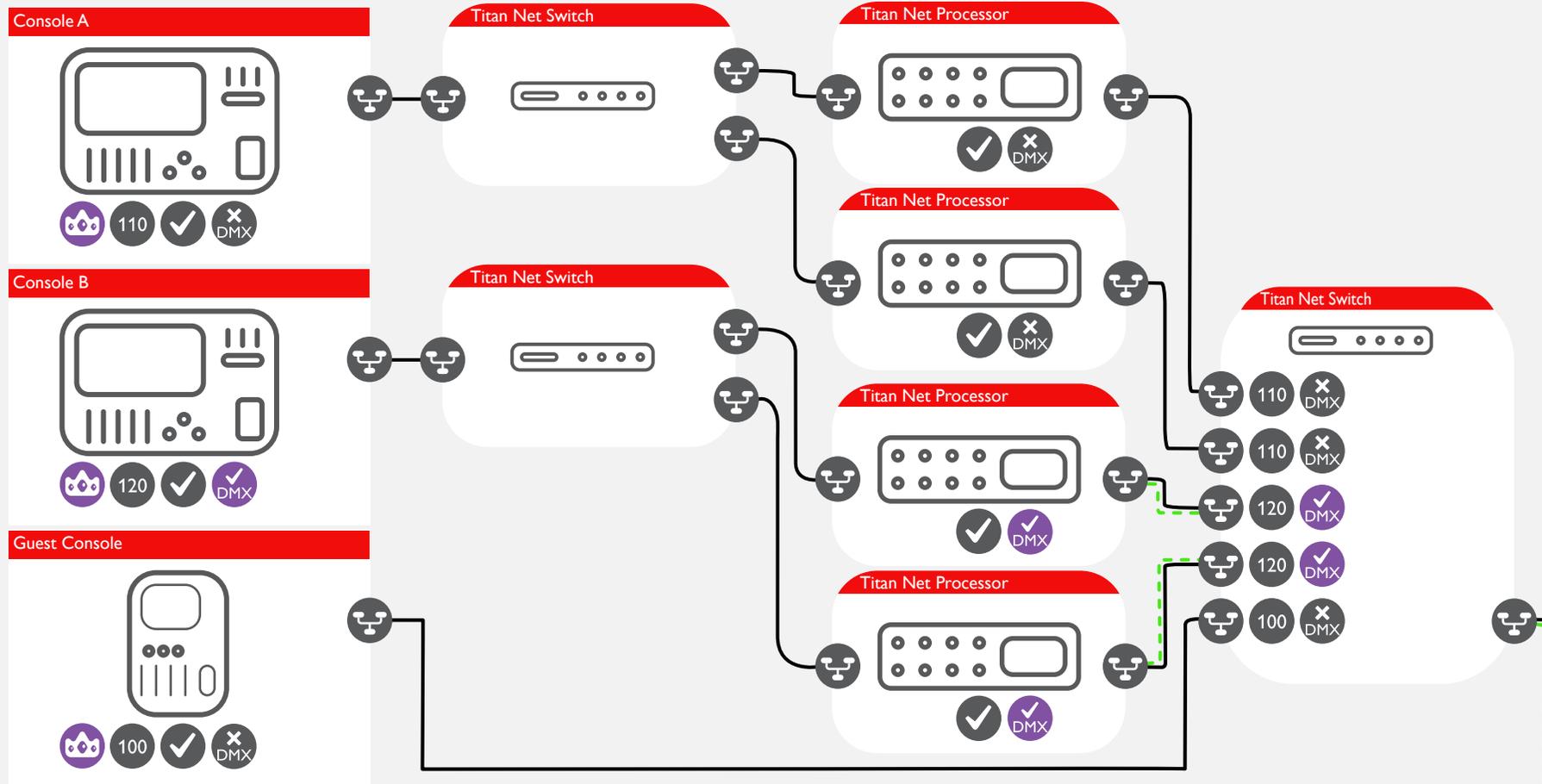
Legend

Non-Working DMX/Network Connection	Active Signal	Working DMX Connection	Working Network Connection	DMX Enabled	Master	Working	DMX	Ethernet	DMX Disabled	Streaming ACN Priority	Sync



Redundant Masters | TNPs | Guest Console

Backup Running



Explanation

In this particular setup, Consoles A and B are linked using Titan Net Switches to multiple Titan Net Processors. Console C is the visiting console that is also linked using a TNS that is connected to the multiple TNPs. Consoles A, B and C are all 'Master'.

Console A has a streaming ACN priority of 110 and DMX disabled. Console B has a streaming ACN priority of 120 and DMX enabled. Console C has a streaming ACN priority of 100 and DMX disabled.

Console B has the higher priority and DMX is enabled. Therefore is sending DMX to the output.

Connecting the TNP to a TitanNet Session as a backup is not recommend.

Advantages & Disadvantages

- ✔ Instant takeover that requires no user interaction compared to the 'Master/Backup | sACN' setup
- ✔ Faster switch over in comparison to the 'Master/Backup | DMX Physical' setup
- ✔ Only one console can be in control
- ✘ Streaming ACN priorities are not supported by all sACN nodes
- ✘ Show file not copied

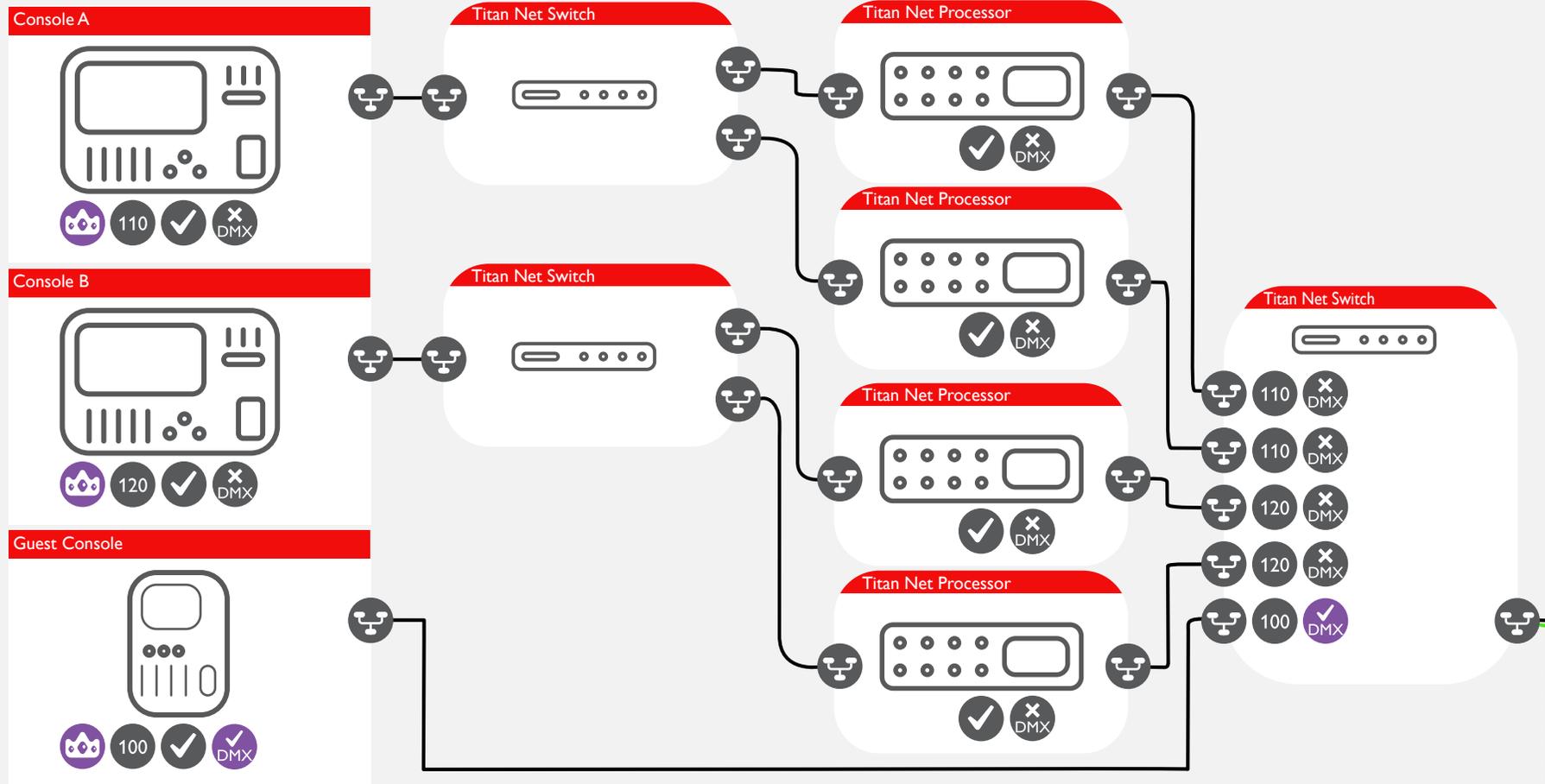
Legend

Non-Working DMX/Network Connection	Active Signal	Working DMX Connection	Working Network Connection	DMX Enabled	Master	Working	DMX	Ethernet	DMX Disabled	Streaming ACN Priority	Sync



Redundant Masters | TNPs | Guest Console

Guest Running



Explanation

In this particular setup, Consoles A and B are linked using Titan Net Switches to multiple Titan Net Processors. Console C is the visiting console that is also linked using a TNS that is connected to the multiple TNPs. Consoles A, B and C are all 'Master'.

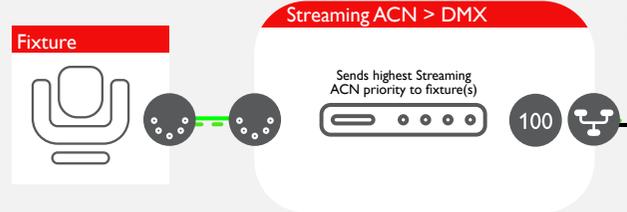
Console A has a streaming ACN priority of 110 and DMX disabled. Console B has a streaming ACN priority of 120 and DMX disabled. Console C has a streaming ACN priority of 100 and DMX enabled.

Although Console B has the higher priority, DMX output is being sent by Console C because DMX output is disabled on both Consoles A and B.

Connecting the TNP to a TitanNet Session as a backup is not recommend.

Advantages & Disadvantages

- ✓ Instant takeover that requires no user interaction compared to the 'Master/Backup | sACN' setup
- ✓ Faster switch over in comparison to the 'Master/Backup | DMX Physical' setup
- ✓ Only one console can be in control
- ✗ Streaming ACN priorities are not supported by all sACN nodes
- ✗ Show file not copied

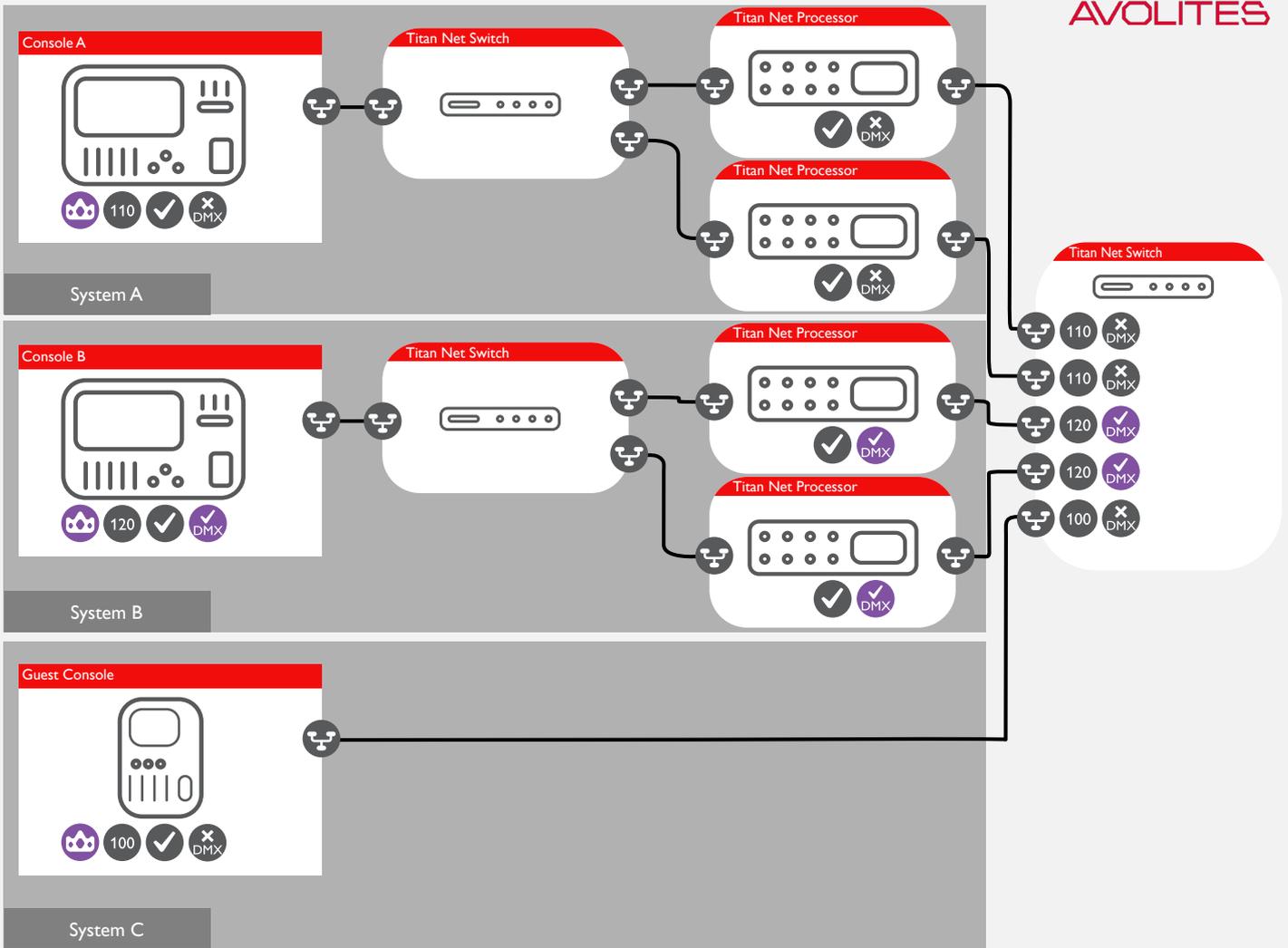


Legend

- Non-Working DMX/Network Connection
- Active Signal
- Working DMX Connection
- Working Network Connection
- DMX Enabled
- Master
- Working
- DMX
- Ethernet
- DMX Disabled
- Streaming ACN Priority
- Sync



Additional Information



Explanation

The above diagram is divided into three different systems. If the console fails in System A, then it is not possible to connect to this system to control the Titan Net Processors with a desk from System B or C. The same will apply for System B. If the console fails, it is not possible to control the Titan Net Processors with a desk from System A or C.