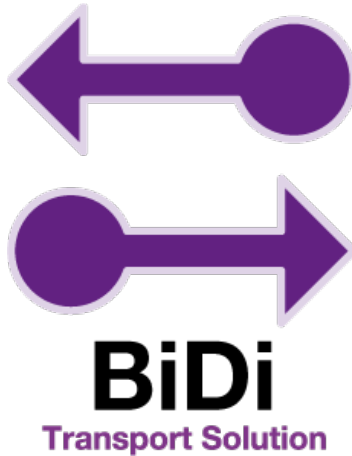


greenMachine®



greenMachine titan

Revision 1.1 – May 2021

LYNXTechnik **AG**®
Broadcast Television Equipment

THIS MANUAL SUPPORTS:	
titan from Revision	862
greenGUI from Revision	2.11.0

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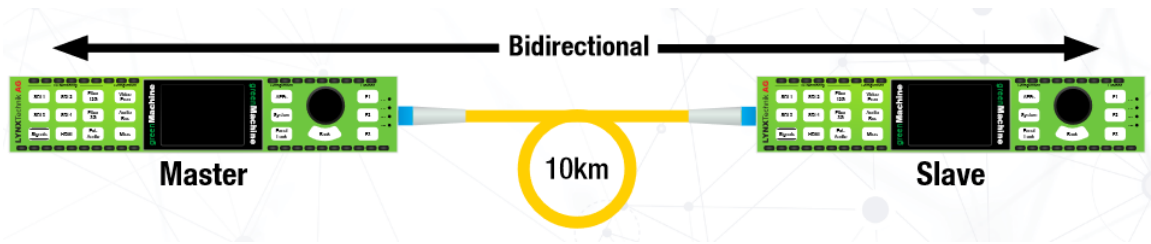
1. Overview

The BIDI Transport package is a cost-effective bidirectional transport solution that allows transportation of video, audio, ethernet, and GPI efficiently across two greenMachine Titan hardware devices. It is a flexible solution for applications that require an exchange of multiple signals on two single fiber links over long distance. A Master/Slave model of communication is used between the two greenMachine Titan hardware devices where one machine will act as a Master device while the other will be a Slave.

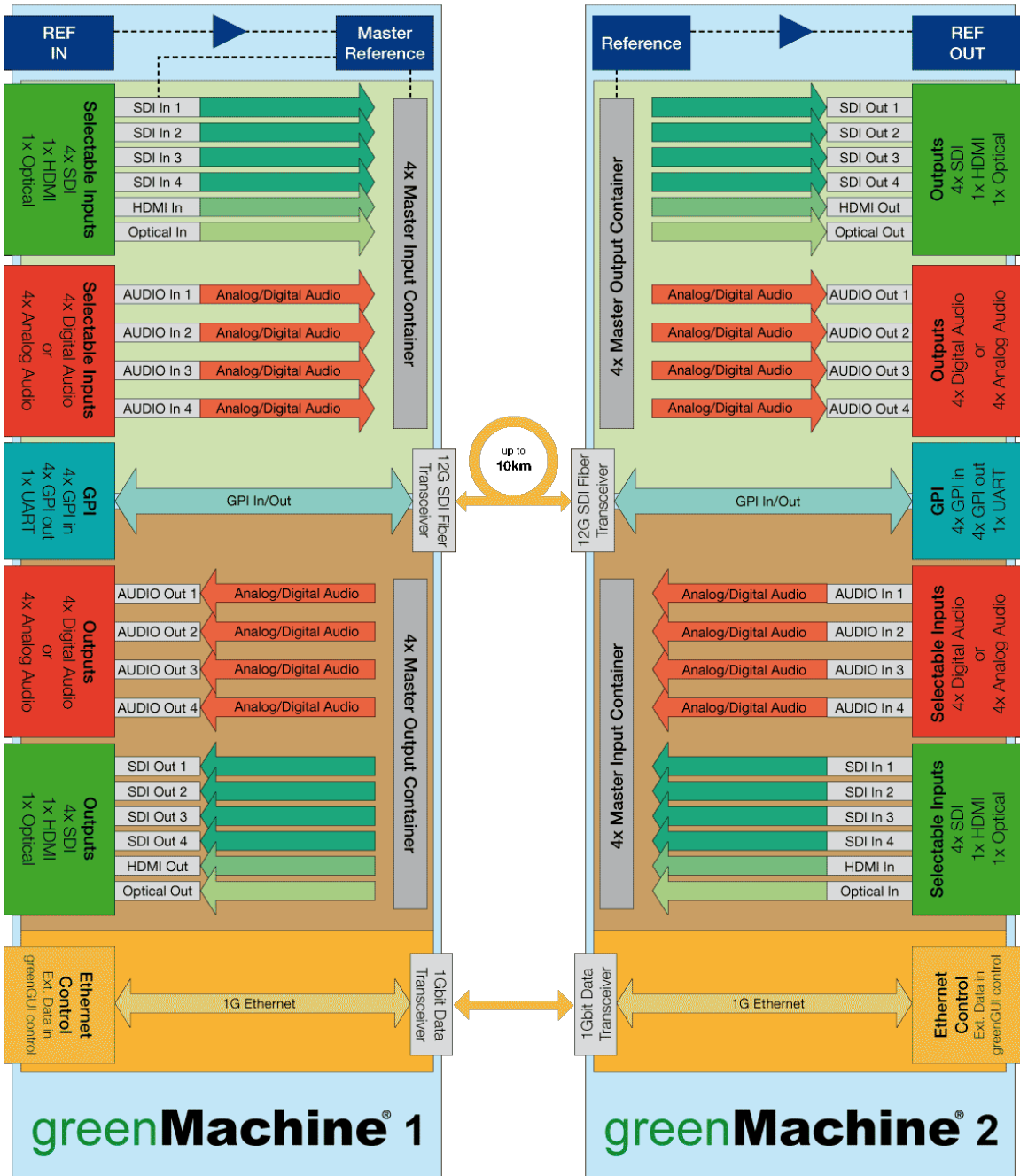
Six HD signals (1.485Gbit/s) or four 3G signals (2.97Gbit/s) or combination of signals up to 12Gbit/s with 4 external analog or digital audio signals and four GPIs can be transported via the fiber ports in both directions, simultaneously. The reference of one of the two greenMachines (aka the Master) is also transmitted to the other greenMachine (aka the Slave) and can be used in the remote location to synchronize cameras, as an example. A 1Gbit ethernet transport link provides easy control of the two greenMachine via greenGUI software.

For the signal transport to occur, the two greenMachine Titans need to be connected via two single-mode fiber cables (when used with transceiver SFPs) or one single-mode fiber cable (when used with the optional bidirectional SFP modules).

The greenMachine titan hardware comes with a fully featured local control interface with an LCD which displays image previews and audio level meters of the processed video paths in addition to the graphical user interface.



2. Operation Modes



Operation Mode

2.1. Requirements

Hardware:

1. greenMachine titan (2x)
2. 12G SDI Bidirectional Optical Transceiver (2x)
OH-BD-12G-1270-LC and OH-BD-12G-1330-LC
3. Bi-directional Gigabit Ethernet Transceiver (2x)
OH-BD-51-1310-LC and OH-BD-51-1550-LC

Software:

1. Titan Firmware (Release Version)
2. [greenGUI](#)
3. BIDI Transport [constellation deployed](#) on both machines.
4. BIDI Transport [Licenses](#) (2x)

2.2. Hardware Setup

1. Insert the bidirectional SFPs to connect both greenMachine titans via a single fiber connection using the 12G Fiber port.
2. Insert the data SFPs in both greenMachine titans to connect the two machines via single fiber using Ethernet Fiber port.

2.3. Master/Slave Configuration

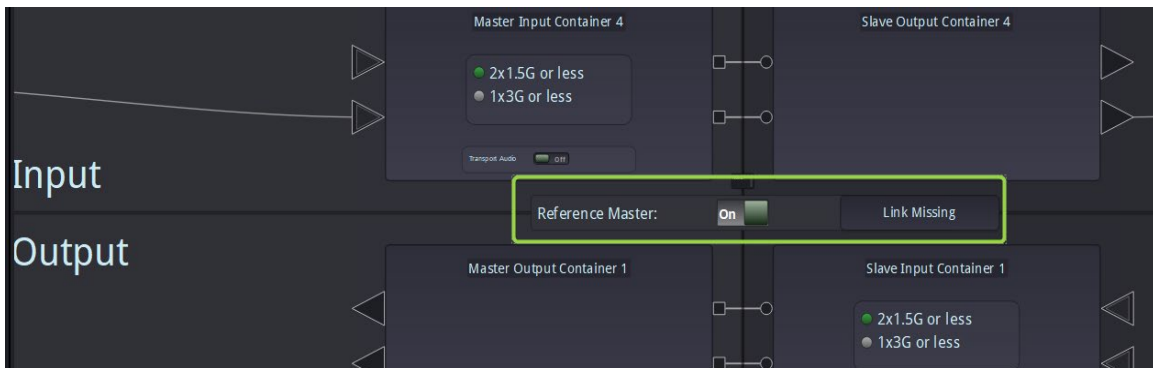


Fig. 1: Reference Master Switch

A Master/Slave model of communication is used between the two greenMachine titan hardware devices, where one machine will act as a Master device while the other will be a Slave. The Master device receives the Reference Signal and transmit this over fiber to reference the Slave as well.

Follow the steps below for a Master/Slave setup via greenGUI:

1. Run greenGUI
2. Select a greenMachine (with reference present at input) from the rolodex, either at Location "A" or Location "B", to be configured as the reference Master.
3. Go to *Control*> *Main* tab.
4. Zoom in and set the parameter "Reference Master" to "ON" as shown in Fig. 1

After Setting one of the greenMachines as a Master, the Slave configuration can only be done through the Master.

Note: Only one greenMachine must be set to Reference Master, else transport will not work. If both machines are set to SLAVE, transport will not work either. Parameter configuration at Slave via greenGUI will not have any influence, it can only be configured through Master.

2.4. Video Transport

Six HD signals (1.485Gbit/s) **or** four 3G signals (2.97Gbit/s) **or** combination of signals up to 12Gbit/s with 4 external analog or digital Audio Signals and four GPIs, UART can be transported via the fiber ports in both directions, simultaneously. MADI Transport is also possible using the Optical In 1.

The reference of the Master greenMachine is transmitted to the Slave greenMachine and can be used in the remote location to synchronize (e.g., cameras etc.).

It can be used to extend a 1Gbit ethernet circuit to the remote location, or vice versa.

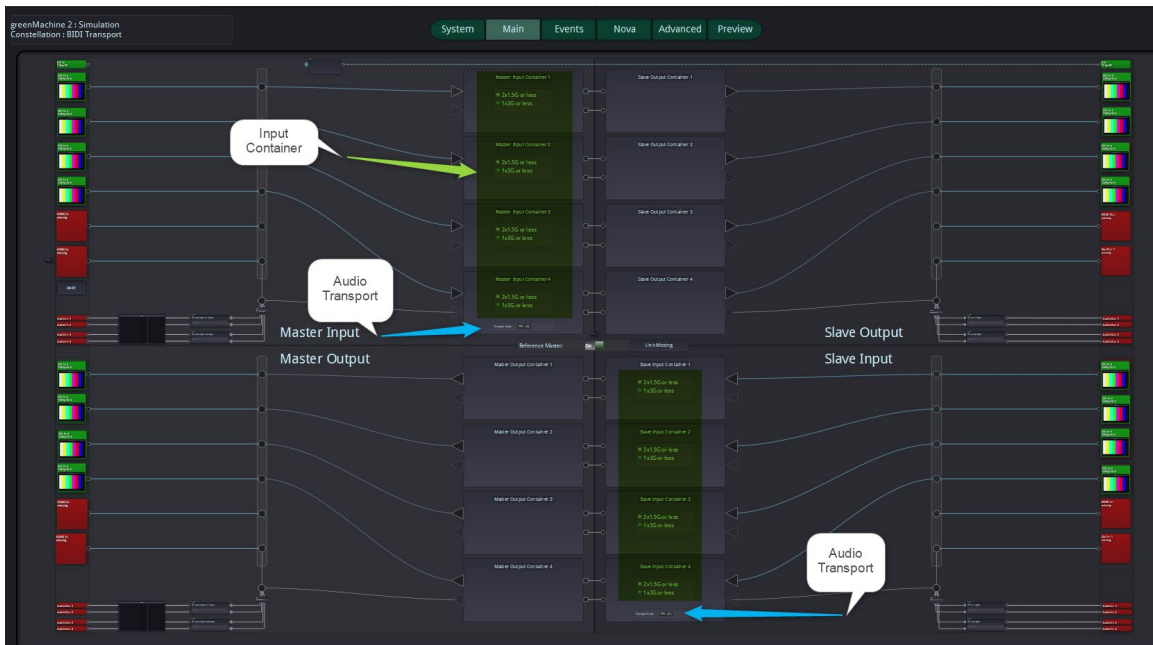


Fig.2: Transport Settings

The signal transport configuration of both Master and Slave in BIDI Transport are done through the Master machine as shown in Fig: 2. above.

Configure Input Containers and route Input Signals:

1. Run greenGUI
2. Select the GreenMachine set as reference Master (Fig.1)
3. Go to Control > Main
4. Set the Input containers to either 2x 1.5G or 1x 3G mode at both Master and Slave

5. Connect signals to the SDI/HDMI/Fiber inputs according to the container setting
6. Drag and route aero paths from the input containers to the input slots.

Note: The Input Containers 1-4 are either set to 2x 1.5G or 1x 3G depending on the input signal. A container set to 2x 1.5G will not process a 3G signal. For Audio Transport, an additional parameter needs to be turned on at both slave and master as mentioned in "Fig.2: Transport Settings". When Audio Transport is turned ON, Container 4 can only be set to 2x 1.5G and used only for up to 1.5G transport.

2.5. Audio Transport

- **Embedded Audio**

Audio embedded within any of the SDI video signals is transported seamlessly.

- **External Audio, Analog, or AES (balanced)**

Four audio channels may be transported in both directions simultaneously in one of two ways.

Discrete:

With 'Transport Audio' and '2x 1.5G' switched to the ON position on both Master and Slave units, Ext. Audio is automatically routed to container 4. In this configuration the audio is transported on the second 1.5G channel. 1.5G video cannot be transported on the same channel, but container 4 channel 1 can be used for a single SDI signal up to 1.5G. A typical application would be for remote comm links when embedding in SDI feeds is undesirable or complex.

Embedded:

Should the user wish to transmit 6x1.5G or 4x3G video plus additional audio at the same time or simply use BIDI Transport to embed live remote audio into an SDI line, it is possible to embed the ext. Audio into Container 1 SDI video. This overwrites either group 1 & 2 or 3 & 4 of the incoming video in that container.

Embedding and groups are selected in the 'Embed' control box as shown in Fig.3.

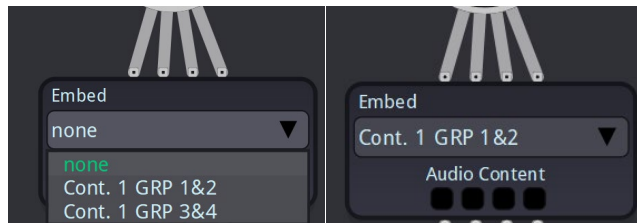


Fig 3: Embed Control Box

- **MADI**

An optional MADI SFP (single- or multimode) can be fitted into the 3G/MADI SFP socket.

Also, to transport MADI it is required to turn Audio Transport ON.

2.6. FAQ

1. How to achieve 6x 1.5G signals to transport?

6x 1.5G consists of: 4x HD-SDI; 1x HD-SDI via optional optical or mini coax SFP; 1x HDMI.

2. How to setup 3G or 1.5G transport?

Each of the four containers can be used either for 1x3G signal or 2x 1.5G. When a container is set to 1.5G, a second path will become available.

3. What are the restrictions at container 4?

When Ext. (External analog or AES) audio needs to be transported, the Audio Transport parameter is turned "ON", the second 1.5G channel at Container 4 will not be available anymore.

4. Is it possible to transport a 12G single link using Input 4 of greenMachine in BIDI-Transport?

No, each container can handle max. a 3G signal, so a 4x3G A QL- 2SI is possible, but It is not possible to transfer a 12G single link.

5. How is the GPIO activated and transferred?

GPIO is transferred automatically and continuously. It cannot be switched on or off.

6. What is the UART connection for and how is it controlled?

UART is intended to control another (non-LYNX) device on the slave side. UART is also always transmitted. Only Audio Transport needs to be turned on, no further configuration is required.

7. How to set the UART Parameter on Slave?

The slave's UART parameters are set automatically so that there is always a master-> slave UART connection. The parameters must be set on the master side only.

8. How to route Input Signals to the containers?

To assign an Input to a container, drag the arrow from container to the Input. To disconnect a container from the Input, just click the arrowhead. (Fig. 4)

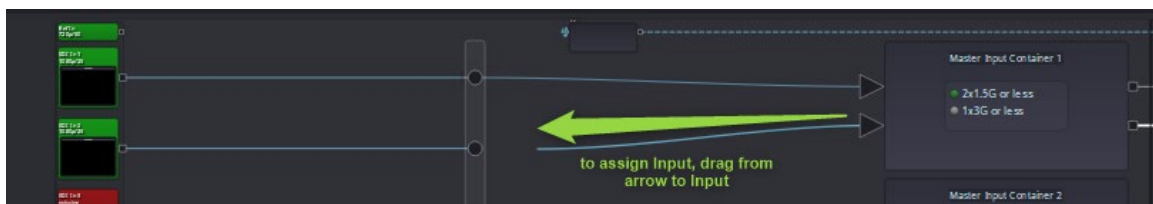


Fig.4:Assign connection.

Technical Support

If you have any questions or require support, please contact your local distributor for further assistance.

Technical support is also available from our website:

<http://support.lynx-technik.com/>

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Contact Information

Please contact your local distributor; this is your local and fastest method for obtaining support and sales information.

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