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Radial® engineering

True to the Music™

Catapult™
4-Channel Audio Snake



User Guide

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Radial® Catapult™ User Guide

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Thank you for investing in the Radial Catapult™ modular snake, a Cat 5 mini snake and isolation system that is designed to clean up the stage, simplify setups and take advantage of pre-existing wire infrastructure networks. We are confident that once you become familiar with the functionality, you will soon expand your selection of modules to come up with many creative uses.

As with all new products, please take a few minutes to read through this manual in order to familiarize yourself with the various modules so that you can take full advantage of their functionality. If, after you have done your homework, you find yourself asking questions, please visit the Catapult FAQ page as this is where we post questions and answers from users along with updates. If afterwards, you still find yourself with more questions, feel free to send us a note at info@radialeng.com and we will do our very best to reply in short order.

Now get ready to snake along those cables with more expediency than ever before!

CATAPULT FEATURES



1. **INPUT:** XLR-F inputs used to connect a mic, instrument or mixer to pass the signal to the RX module.
2. **THRU:** XLR-M thru wired in parallel with the option of mic or line-level transformer isolation.
3. **HANDLE:** Protective steel handle makes it easy to pick-up and drop wherever needed.



4. **LIFT:** Lifts the Cat 5 cable ground path to help eliminate troublesome ground loop noise.
5. **IN/OUT:** Standard Ethernet connection for shielded Cat 5 cable depending on the model used to send/receive audio from Catapult modules.
6. **THRU:** Parallel connection from XLR outputs used to feed additional Catapult modules.
7. **BUMPER:** Used to protect the Ethernet connectors and ground lift switch from damage.

TRANSFORMER ISOLATION MODELS

MIC TRANSFORMER: TX4M and RX4M modules are transformer isolated at the XLR outputs and at the Ethernet THRU connector to create a mic level split for stage and studio use.



LINE TRANSFORMER: TX4L and RX4L modules are transformer isolated at the XLR outputs and at the Ethernet THRU connector to provide line level isolation to eliminate hum and buzz.



SIX MODELS AVAILABLE

There are six models available with three input and three output modules. Input modules have four XLR female inputs and four XLR male thru-puts. Output modules have two sets of four XLR male outputs. Connection between modules is done using standard RJ45 Ethernet connectors.

TX4 - Transmit with 4 XLR ins and 4 XLR outs
Part # R800 8022

RX4 - Receive with 8 XLR outs
Part # R800 8025

TX4M - Transmit 4 ins & 4 mic-level isolated outs
Part # R800 8023

RX4M - Receive 4 outs & 4 mic-level isolated outs
Part # R800 8026

TX4L - Transmit 4 ins & 4 line-level isolated outs
Part # R800 8024

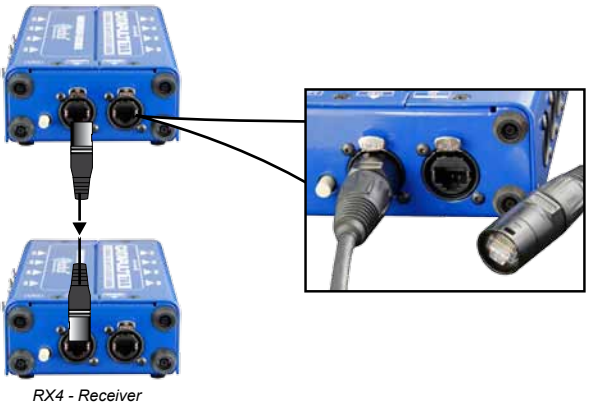
RX4L - Receive 4 outs & 4 line-level isolated outs
Part # R800 8027



INTRODUCTION

In its simplest form, the Catapult is a modular system that lets you drive four analog audio channels over a single Cat 5 shielded cable. (Note the cable must be shielded in order for phantom power to pass.) Where the Catapult differs from other sub-snakes is that each end features a heavy duty steel box (the input or output modules) which can be ordered with or without transformers. Transformers benefit by allowing you to split or isolate the signal to eliminate hum and buzz caused by ground loops.

Module inputs and outputs employ common 3-pin XLRs that are wired to the AES standard with pin-1 ground, pin-2 (+) and pin-3 (-). For added connectivity, the modules are equipped with two sets of XLRs that enable greater routing options. This enables a transformer-equipped module to be used as a stand-alone isolator. A choice of transformers enables the Catapult to be used for either mic level (-30dB) or line level (+4dB) applications.



TX4 - Transmitter

RX4 - Receiver

Lifting the ground

Each catapult module is equipped with a ground lift switch. Set this in the 'out' position. Once connected, if you hear noise, try lifting the ground at one end or the other. It is usually best to lift the ground at the transmit end as it will generally be connected to a microphone whereas the receive end will be connected to an electronic device such as a mixer that is properly grounded to the electrical system for safety. However, lifting the ground will disconnect phantom power, which means that condenser mics or active DI boxes will not work.



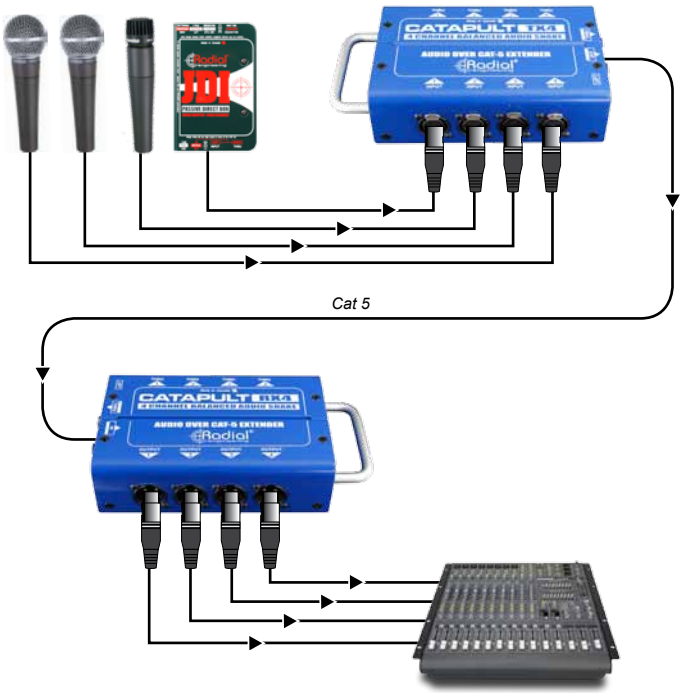
GND Lift

MAKING CONNECTIONS

As with all audio systems, it is good to turn your audio system off or turn system levels down to zero before making connections. This will avoid connection or power-up transients from damaging more sensitive components such as tweeters.

Using standard TX4 and RX4 (non-isolated) modules

To use the Catapult in the simplest form, connect the TX4 and the RX4 together using Cat 5 or Cat 6 cable. In order to pass 48V phantom power to feed your condenser mics or active direct boxes, the cable must have a shield. If you are transmitting line level signals, the shield is not required due to the twisted pair configuration, but it will still be beneficial as shielded cables are less susceptible to noise. As the twisted pairs are tightly wound together in a compact jacket, it's a good idea to send similar level signals together over the same wire as this will reduce crosstalk from higher signal levels (such as +4dB line levels) polluting lower output signals (such as -30dB mic levels). TX and RX modules are equipped with two sets of XLRs to enable greater connectivity. This is basically a simple Y-jack that can be handy in certain situations.

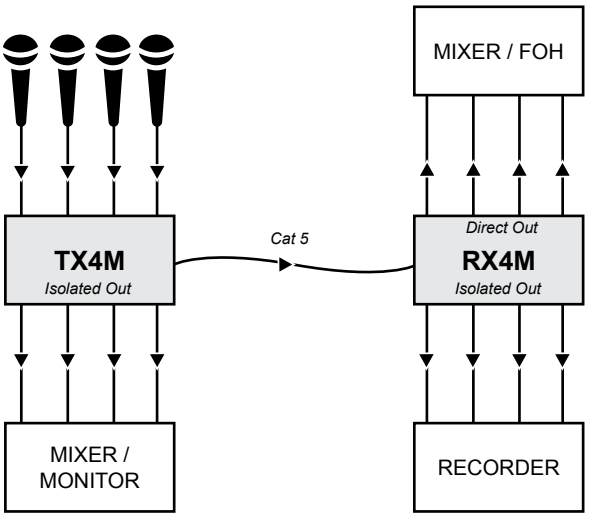


Using Mic Level TX4M and RX4M isolated modules

These modules are typically employed when splitting a mic signal between two mixers. Although the transformers may be ordered inside either the transmit TX4M or receive RX4M boxes, these are usually put inside the transmit box as this affords greater flexibility.

For instance, you may be doing a gig where your stage mics need to be sent to a monitor mixer by the stage, as well as a distant front-of-house mixing console. The TX4M would allow you to directly connect your microphones to the FOH console so it can provide phantom power, while high-performance Eclipse transformers keep the monitor mixer isolated and prevent ground loops.

You can also use the same TX4M module to isolate the microphones to feed a separate recording system. Transformers are truly amazing devices that surprisingly come in handy in all types of situations.

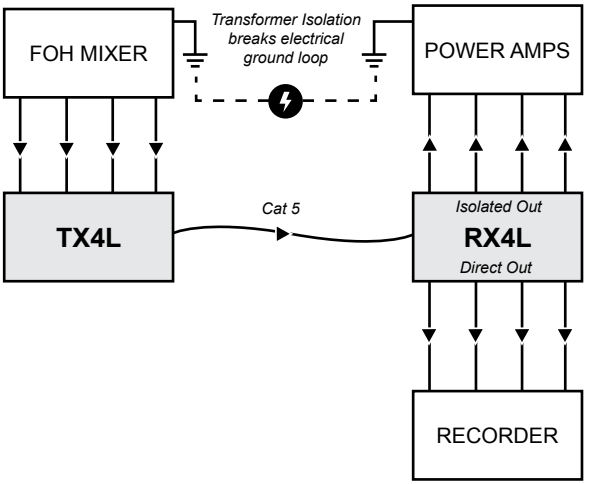


Using Line Level TX4L and RX4L isolated modules

As described above, transformers eliminate noise. These problems are often most predominant in situations where the two connection points are distanced from each other. In these setups, the electrical circuits are often on different power legs which can sometimes cause noise to enter the PA system. Isolating the signal allows the audio to pass while blocking the stray DC voltages that can disrupt the system.

Line level isolators are usually positioned at the receive end (RX4L) of the system as this generally affords greater flexibility. If using the Catapult as a return snake for monitors or from a crossover, isolating the stage from the front-of-house (FOH) can save hours of trouble shooting!

Simply connect the output from your console to the Catapult and the isolated outputs to your amp racks or powered speakers. The Eclipse transformers inside are capable of handling up to 15dB without distortion. If you like, you can use the non-isolated outputs to feed another piece of equipment such as a recorder.

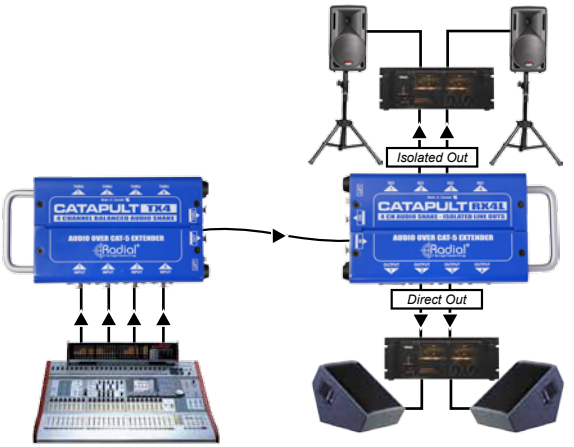


APPLICATIONS

The following are some of the various setups that are available using different combinations of Catapult modules.

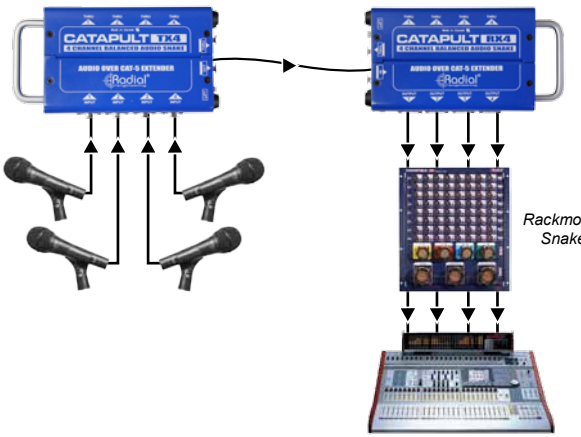
Using the Catapult as a return snake

The Catapult is the perfect return snake for corporate events where you need to run a couple of lines back to the stage and monitors. Use the RX4L line isolation module to eliminate ground loops.



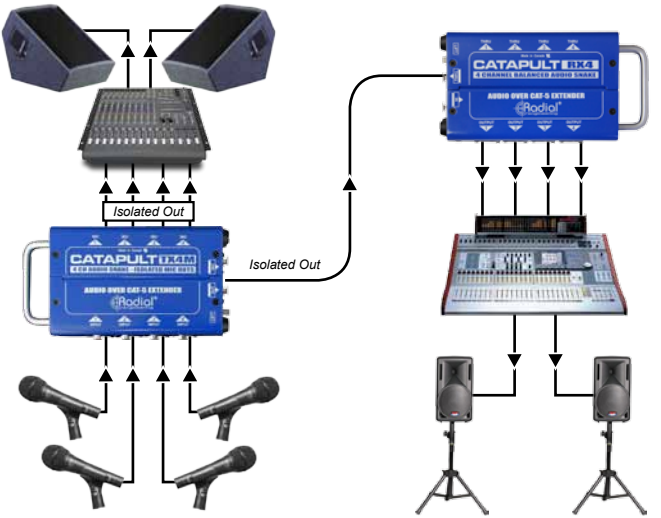
Using the Catapult as a sub snake on stage

Cleaning up the stage while reducing the set-up times has become essential in production. Use the Catapult at the front of the stage or next to the amps to create zones for quick deployment.



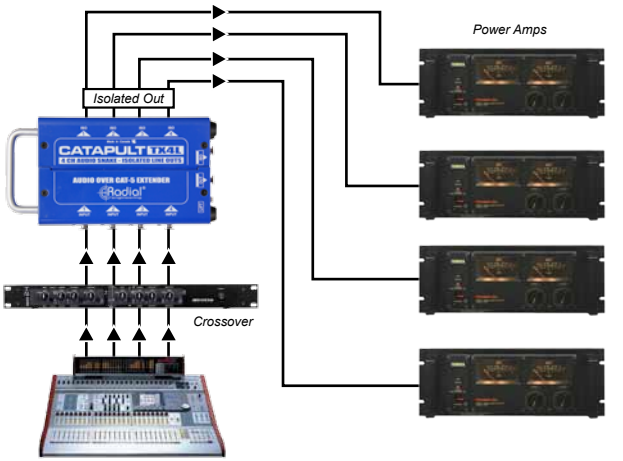
Using the Catapult as a 4-channel mic splitter

Use the Catapult TX4M to split the mics between the monitor desk and front-of-house with Eclipse transformer isolation to deliver a noise-free signal, saving hours of tedious trouble shooting.



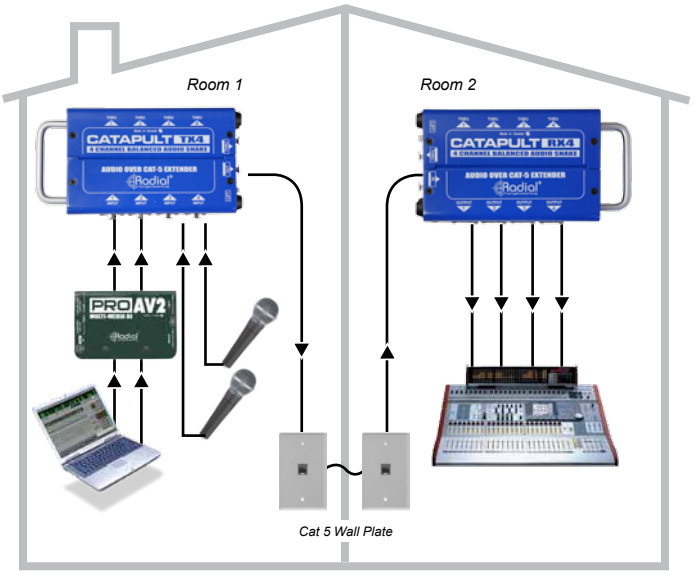
Using the Catapult as a line isolator

The Catapult TX4L is the perfect 4-channel line isolator. Simply connect it in line with any line audio device to eliminate hum and buzz caused by ground loops.



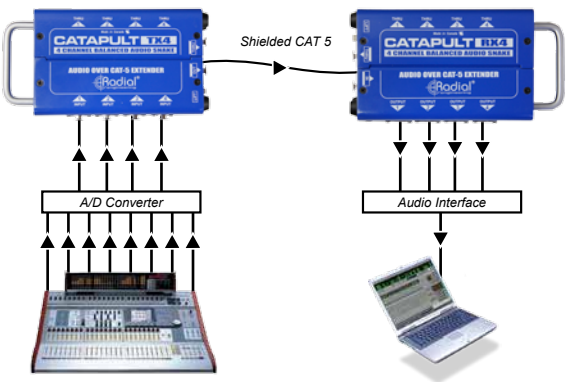
Using the Catapult to network audio

Use the pre-existing Cat 5 or Cat 6 wiring in the building to network audio from one room through the walls to another. The XLR connections at each end make it easy!



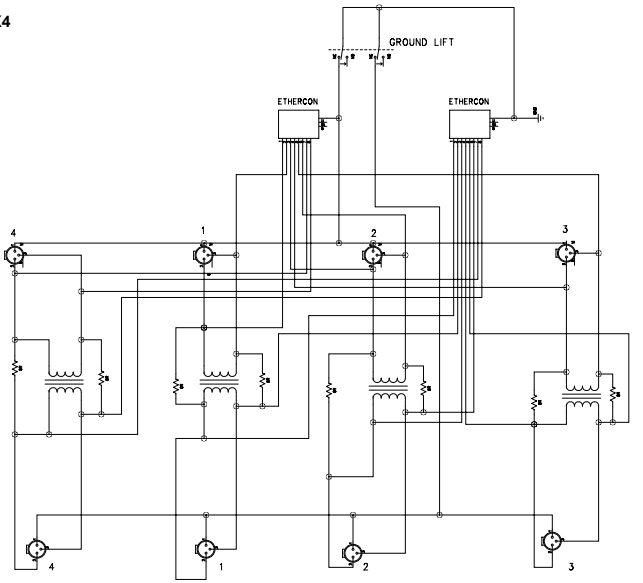
Run four AES signals across Cat 5 cable platform

110 Ohm AES signals can easily travel across Cat 5 and Cat 6 Ethernet cable. Connect to the four Catapult TX4 XLRs for eight channels of audio for remote recording.



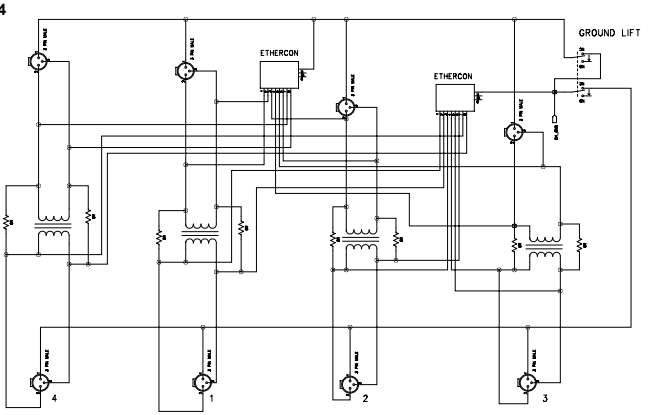
BLOCK DIAGRAM*

TX4



Units will have either transformers or zero ohm jumpers installed

RX4



Units will have either transformers or zero ohm jumpers installed

** Subject to change without notice.*

SPECIFICATIONS*

TX4 - RX4

Audio circuit type:	Passive splitter
Frequency response:	7Hz ~ 20KHz
Total harmonic distortion:	0.0005% @ 1kHz
Dynamic range:	140dB
Gain:	0db/-0.8dB
Maximum Input:	+35dBu
Minimum load impedance:	100 ohms
Common mode rejection:	>103dB

TX4L - RX4L

Audio circuit type:	Passive line splitter, transformer based
Frequency response:	7Hz ~ 20KHz
Total harmonic distortion:	0.0007% @ 1kHz
Dynamic range:	140dB
Gain:	0db/-5.7dB
Maximum Input:	+35dBu
Minimum load impedance:	100 ohms
Common mode rejection:	>113dB

TX4M - RX4M

Audio circuit type:	Passive mic splitter, transformer based
Frequency response:	7Hz ~ 20KHz
Total harmonic distortion:	0.001%
Dynamic range:	140dB
Maximum Input:	+35dBu
Minimum load impedance:	100 ohms
Intermodulation distortion:	0.003%
Common mode rejection:	>113dB

Features

Handle:	Makes it easy to move your catapult
Ground lift:	Disconnects ground on RJ45 connector

General

Construction:	14-gauge steel chassis & outer shell
Size:	L: 8” x W: 4.5” x H: 2”
Weight:	2.6 lbs
Warranty:	Radial 3-year, transferable

** Subject to change without notice.*

THREE YEAR TRANSFERABLE LIMITED WARRANTY

RADIAL ENGINEERING LTD. (“Radial”) warrants this product to be free from defects in material and workmanship and will remedy any such defects free of charge according to the terms of this warranty. Radial will repair or replace (at its option) any defective component(s) of this product (excluding finish and wear and tear on components under normal use) for a period of three (3) years from the original date of purchase. In the event that a particular product is no longer available, Radial reserves the right to replace the product with a similar product of equal or greater value. In the unlikely event that a defect is uncovered, please call 604-942-1001 or email service@radialeng.com to obtain a RA number (Return Authorization number) before the 3 year warranty period expires. The product must be returned prepaid in the original shipping container (or equivalent) to Radial or to an authorized Radial repair centre and you must assume the risk of loss or damage. A copy of the original invoice showing date of purchase and the dealer name must accompany any request for work to be performed under this limited and transferable warranty. This warranty shall not apply if the product has been damaged due to abuse, misuse, misapplication, accident or as a result of service or modification by any other than an authorized Radial repair center.

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