

	Troubleshooting: TV Picture Issues	
Prepared by: Brian Nelson	Date: 7/26/2022	Models Affected: Consoles with embedded TV/tuners, or units with attached TVs

PROBLEM

The console or attached TV has picture distortion, pixelation, picture cutting in and out, or no picture displayed.

THINGS TO KNOW

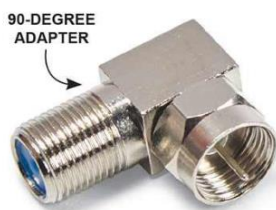
It's important to understand that with fitness equipment TV—whether embedded into consoles or attached to a console—the tuners often operate in an imperfect environment. Physical movement, electrical noise, and interference are commonplace, which makes proper and consistent installation very important for unimpeded operation.

Please refer to the Power and Technology Requirements document for specific tuner specifications.

THINGS TO CHECK/VERIFY

Follow the steps below for things you should check/verify if there are TV picture issues.

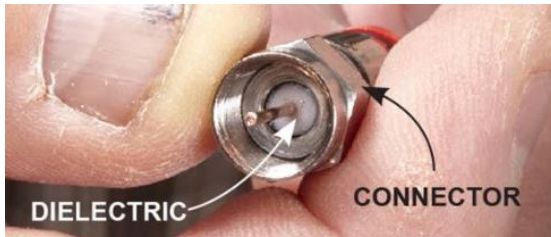
1. Check the software version on the console and check the current version available on the [Box](#). If the console has an older version of software, perform a software update.
2. Check the condition of the coaxial cables running to each unit. Verify that RG-6 (at minimum) coaxial cables are being used. This description will be printed on the cable jack. (See [Coaxial Cable](#) for more information.)
 - a. Are the cables damaged: flat, bent, not cut to length? If so, replace with good cables.
 - b. If there are drastic bends in the cable, can 90-degree connectors be added to eliminate the bends?



3. Verify the connectors (fittings) that are used on the coaxial cable.
 - a. Compression – Best and recommended
 - b. Crimp – Acceptable if installed correctly, but not recommended
 - c. Screw-on – Not good and not acceptable



4. Verify that ALL connections are tight. This include where the coax connects to the tuner and where it connects to the external connector at the base of the frame. Verify that the connectors have a good fit onto the cable.
 - a. The dielectric piece of coax must be flush with the inside of the connector. If it is not, you may need to install a new connector.



- b. Verify there are no stingers inside the connector. A stinger is a metal strand from the coaxial cable that is touching the center conductor.



5. Are splitters or taps being used? Are they being used in the appropriate place? Verify all cable connections are tight and there is no physical damage. Splitters and taps can often be installed behind the wall/floor outlet. Remove the outlet face plate to verify. (See [Splitters and Taps](#) for more information.)
6. Is an amplifier being used? Make sure all connections are tight and no physical damage is present. (See [Amplifiers](#) for more information.)
7. Perform channel scan on each unit affected.
8. Use a digital cable signal meter to test signal strength throughout the coaxial cable line. It is recommended to check the signal before and after each connection to check for signal loss. Refer to the Power and Technology guide for specific tuner requirements. (See [Signal Meters](#) for more information.)

BEST PRACTICES

- NEVER tell a customer to contact their cable provider to check signal strength. In most cases, the provider did not run the cable throughout the facility and they only care about the signal at the demarcation (where it enters the building). Go through all “Things to Check/Verify” and collect information. Provide this information to your local technical support prior to leaving the facility. This allows us to have the information you found in case the customer contacts us after you leave.
- If you find damaged coaxial cables, connectors, etc., fix one or two units then bring the customer over to show them the picture quality improvement. Show them what you did to fix it so they can repair the remaining units. Attach all miscellaneous receipts when filing your labor claim.
- Always check every place a coaxial cable has a connection. This includes inside of the fitness equipment.

Coaxial Cable

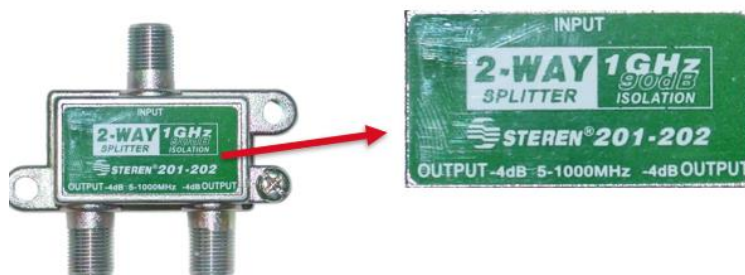
Cable television and Internet systems use RG-6 video cables to transmit high-frequency digital signals from satellite receivers. RG-6 cables designed for cable television and Internet usage have an impedance of 75 Ohm and are designed for durability.



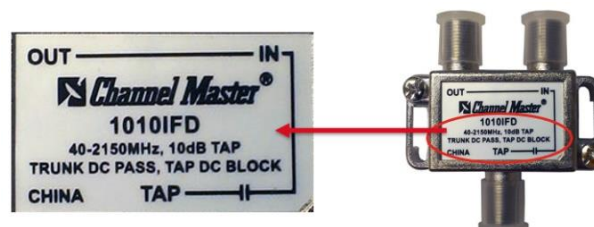
Splitters and Taps

Splitters are considered more of a “dead-end” device where a single feed from the outside feed is divided a certain number of times—it would be used at the end of the line to feed the row of units. Unlike a tap, the signal experiences 3.5 decibels of loss. Splitters are usually limited to four outputs to prevent excessive loss. It is important to not “stack” splitters since this loss is additive. Once a signal loses roughly 12 decibels of signal, very often the decoder or tuner cannot reconstruct the original feed.

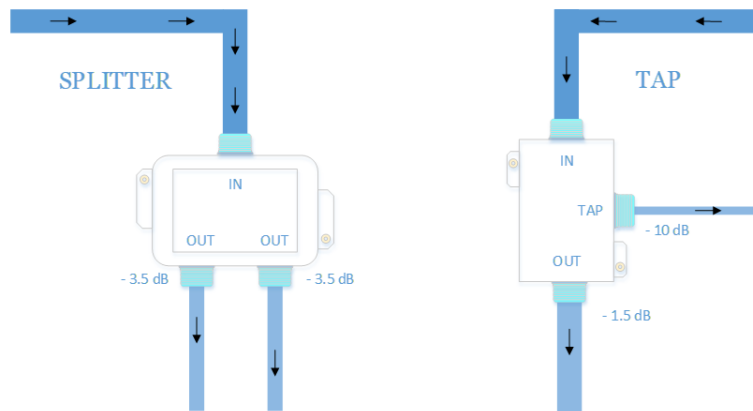
Effect of splitters: A splitter will cut the signal by 3.5 dB at each output for every doubling of ports. Meaning, a two-way will cut 3.5dB, a four-way will cut 7 dB, and so on. For this reason, a broadband amplifier is used before the input of the splitter to compensate for the splitter insertion loss.



Taps are low-loss devices used to feed multiple televisions or decoder set-top boxes in a given space. Common places for coaxial tap use are in schools, businesses, and facilities where multiple displays/TVs must be fed from a common signal source. The coaxial lead from the source is called the trunk line, screwed to the tap's input where the signal experiences roughly 1 decibel of signal loss. Each television is then connected to the tap. The tap device includes an output leg, leading to another tap and so on. Taps have varied levels of attenuation, with the highest attenuation device installed first, gradually reducing as the signal continues down the line. The closest taps have the highest attenuation, while taps at the end of the hall have the lowest attenuation.



Shown below is the basic signal concept of splitters and taps.

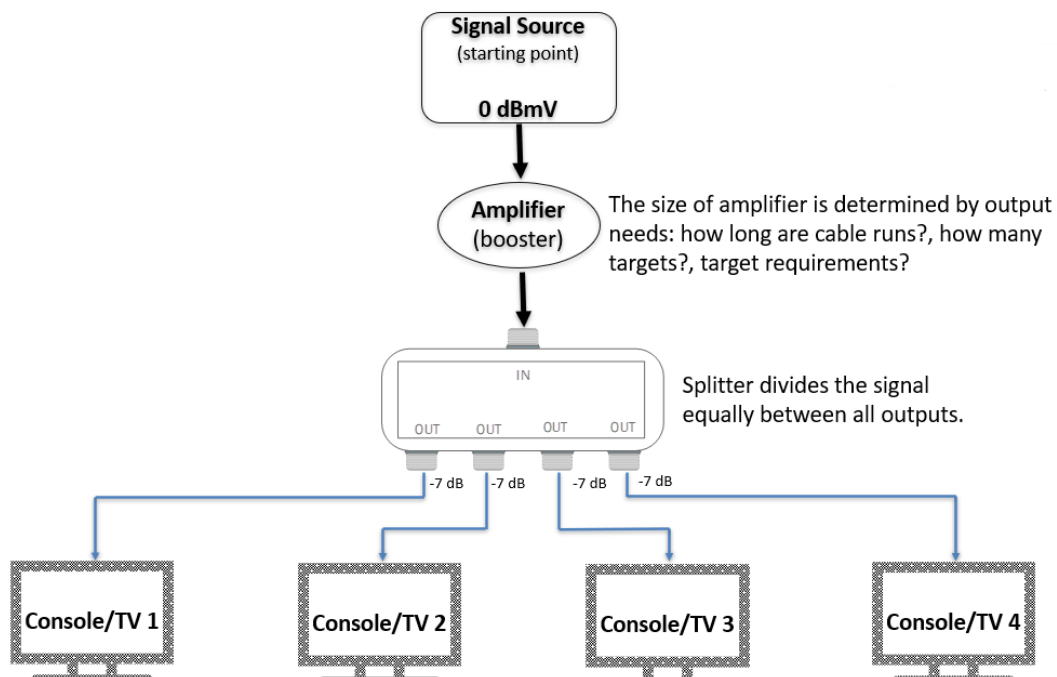


Amplifiers

An amplifier is essentially a tap that incorporates a built-in booster and uses AC power. These devices often have an adjustable potentiometer, allowing the user to raise or lower the amount of signal from the booster as needed. These devices mitigate the effects from multiple splits and longer coaxial cable runs exceeding 200 feet, where losses usually test the limits of the signal.

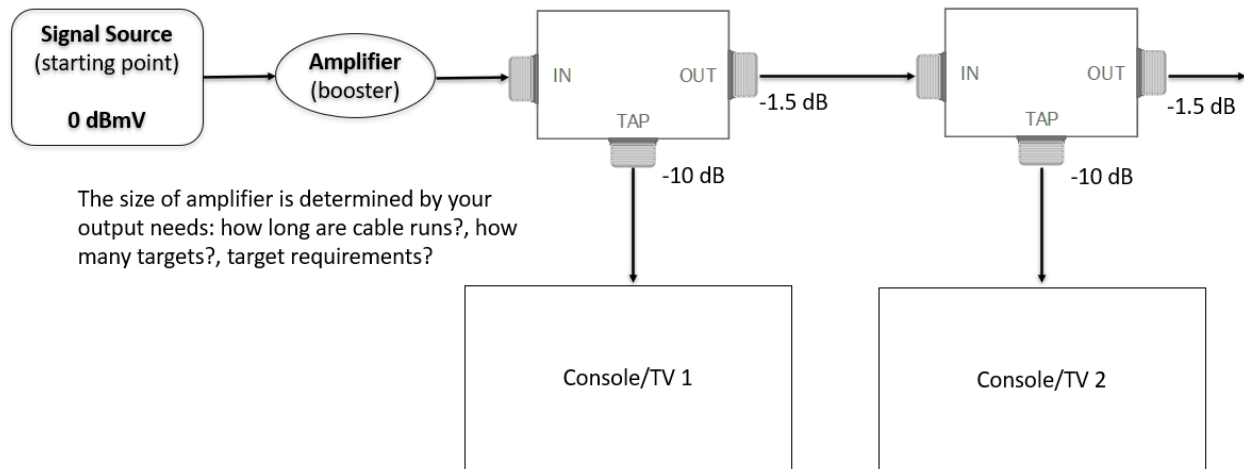


Signal distribution using amplifier and splitters



Signal distribution using amplifier and taps

Taps are used when multiple devices need a signal over a long run of cabling.



Signal Meters

Signal meters can be expensive but is a great investment. We encourage you to shop around and don't be afraid to buy a used meter. Independent contractors often update meters as new technology comes out and will post their used meters on Craigslist and other online shopping sites.

Digital meters, such as the Televes meter shown to below, can paint a color picture for you on not only telling you what the signal strength is but can often help you determine if there are other factors such as noise coming into the line that can negatively affect the signal.

The Holland meter, also shown below, is a less expensive option however it will only show you the signal strength.

Televes® H30/H45 meter – this meter will give you signal strength for each channel as well as C/N, Pre and Post BER as well as has an easy color-coded guide when testing against FCC standards.



Holland® ST-4000D meter - this meter will give you signal strength readings for each channel. It is a less costly option than a digital meter.

