

TAP-X Autoformer Pre-Amplifier System

User Manual



Thank you for choosing the TAP-X pre-amplifier. Your ownership experience is very important to us so if at any time you have any questions please contact us directly at:

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An Introduction to the TAP-X

The TAP-X pre-amplifier is designed to offer features never before available in a passive pre-amplifier. It is important to note however that NONE of these features adds complexity to the signal path. Throughout the design of the TAP-X pre-amp system we focused on maintaining a pure and direct signal path between your source and your amplifier. Keeping the signal path clean and simple allows us to use only the finest parts throughout.

At the heart of the TAP-X is the Intact Audio Autoformer made by Dave Slagle. We take a modified version of this module (with slightly different level tap locations) and package it with the Bent Audio switching boards. This results in a remarkable volume control device with a very clean short signal path including the following features:

- Very small 1db step size from -52 db up to +7db
- 100% passive signal path
- Full remote control of volume, mute, right/left balance, display, and buffer mode.
- Up to +7db of gain
- Extremely close Right/Left channel level matching – closer than any traditional pot.

The above functions and features are all part of the one step volume control process - no additional circuits are introduced into the signal path to perform these functions.

Another significant benefit of the Autoformer is the way it treats impedances - the load your source 'sees' and the 'drive' to your amplifier. As the volume level is turned down to typical listening levels the output of the TAP-X does a better and better job of driving cables and amplifiers. From an impedance point of view the TAP-X 'looks' much like an active pre-amp. It does this - as it does with the above features - without adding additional circuitry to the signal path. This 'impedance translation' is one of the primary reasons that Autoformer/Transformer level controls are particularly well suited to passive pre-amplifier designs.

The modular design of the TAP-X Autoformer Pre-amp allows for many features not previously possible - like balance control and auto gain mode. This modular design also cleans up the 'rats nest' of wires inside other Autoformer / Transformer pre-amps and keeps the signal path much cleaner and shorter.

Component quality is extended beyond the Autoformer itself to all surrounding components. TAP-X uses only the highest quality components throughout. Arlon (Teflon like) PC board substrates and OCC long crystal copper wire are used for all signal path boards and wiring.

All these attributes combine to create a pre-amplifier with a very direct and clean signal path and yet one that offers full functionality.

A few notes about Models and Options

The TAP-X pre-amp is available in 3 basic models:

A single RCA Input unit with dual RCA Outputs

A single XLR Input unit with dual XLR Outputs

A full featured RCA unit with 6 Inputs + Tape Out + Sub Output + Main (100% passive) Output

Most the instruction set applies to all models but the single input models (as a result of not using the input switching board) do NOT have the following three features:

Input Switching:

This is kind of obvious but is mentioned here since the case still includes the leds and buttons for input switching. This way the unit could easily be modified in the future to turn it in to a full featured unit.

Sub Output:

This separate buffered and volume controlled output is not part of a single input unit. See below for a full description of this feature.

Switchable Buffer Stage:

See below for a full description of this feature.

One other difference of note is that the single input unit runs on a 9Vdc power supply while the full featured unit uses a 12VAC power supply. As long as you use the power unit supplied by us then all will work just fine.

Choosing the model you need is simple – if you have more than one source (or think there is a good chance you'll add a source in the future) then use the 6 input TAP-X. If you are quite sure you'll only have a single source then the One Input TAP-X is the best choice.

If you have a custom built TAP-X then most of the instructions will still match your pre-amps operation.

Unpacking and Installation

The TAP-X comes packed to ensure its safe travel and arrival. Carefully unpack the pre-amplifier from the packing box and remove the protective foam wrapping. Once the pre-amp is unpacked choose a location to put it into your system. Here are some guidelines for choosing a location:

Unlike resistor based passive pre-amps the TAP-X Autoformer Pre-amp actually behaves more like an active pre-amp from an impedance point of view. This means it will drive cables better on it's output than the source feeding it would. Although we are fans of keeping cables a reasonable length it is just fine to use moderately long cables from pre-amp to your power amp. Because of this the TAP-X may be located just like a traditional active pre-amp would be located - in your rack close to the source components (CD Player, Phono stage, etc). This is nice because it keeps the multiple cables needed from sources to the TAP-X nice and short.

Note that this is the opposite of traditional resistor based passive pre-amp's where the pre-amp to amp cable length must be kept VERY short for best performance – and is the reason the MicroTAP Resistor based passive uses separate modules located at each amp input for the attenuation. .

The TAP-X Autoformer consumes a very small amount of power and so it does not generate any heat. Any position in your rack that suits cable routing and user access will be just fine.

A final note that may impact the location you choose for the TAP-X is that to use the remote control handset you must have a clear path from your seating position to the front panel of the TAP-X.

Back Panel View



Connections

Step 1 - Connect Your Source Components

First connect your source components to the TAP-X. The Standard TAP-X can accept up to 6 single ended (RCA) input connections. If you use less than 6 inputs then plug them into adjacent inputs starting at input number 1. The upper (red) RCA inputs are for the right channel and the lower (white) RCA inputs are for the left channel connections. Inputs are staggered to allow easier access to tighten the cable's RCA connectors.

Step 2 - Connect Your Amplifier(s)

Next connect the interconnect cables from the TAP-X to your amplifiers. Be sure your amplifiers are turned off while hooking cables up.

Connect OUT1 to your main speaker amplifiers. This output is run via the Autoformer modules and is normally used as a 100% passive connection from your source to amp. Optionally each input can be easily set to insert an active buffer stage in-line with the signal path. See below in the 'Buffer Button' section for more information on this.

Connect OUT2 (Sub Output) to the subwoofer. This output is run entirely separate from the Passive Main output (#1) and is isolated from the main signal path. Its level always 'follows along' with the main Autoformer Modules. This is designed to completely separate the sub connection so that you do not need to be at all concerned with a long cable connecting the pre-amp to the subwoofer amp affecting the main output's 100% passive signal path. If you are bi-amping then use this output to feed the bass amp in the system. Note the sub output is still full range and does not have a crossover function – that would be part of your subwoofer system.

Step 3 - Connect the TAPE Output

There are a set of TAPE output connectors on the back of the TAP-X pre-amp. These can be used to feed a Tape Deck or CD Recorder input jack. These output jacks are switched on and off via a button on the front panel (the TAPE button - as you might expect). When the led above the button is on the TAPE output jacks are a buffered feed straight from the currently selected input jack - at unity gain just as if you plugged your source directly into your recorder. A buffer circuit isolates this tape connection so that it can not affect the main amp's 100% passive signal path

Note:

This is a bit different than a traditional 'tape loop'. We have chosen this method over a tape loop because the traditional tape loop introduces additional contacts to the main signal path all the time - even when the tape function is not used. We prefer to keep the main signal path as clean as we can and only add features 'around' that main signal path.

These switched tape outputs can also be used to feed a headphone amp with its own built in volume control.

Connections - Cont'd

Step 4 - Power Connection.

Once the TAP-X is in position you can connect it's power supply. The power feeding the TAP-X is not terribly critical - there are no connections from power to the main output's passive signal path. In the case of the full feature TAP-X the power is used for the sub out level control and buffer circuit. Once the power is inside the TAP-X it is routed through a custom R-Core Tamura isolation/splitter transformer to derive the split rails for the buffer circuit power supply. Power draw is low so just plug the supply into the same power conditioner you use for your source components. If you run your system directly from the wall supply then just plug the TAP-X's power supply into the same wall outlets or power strip used. Connect the other end of the power cable into the 'PWR' jack on the back of the TAP-X. The display will light up. The following is the system configuration of a new TAP-X on initial power up:

- Volume is muted
- Source 1 is selected in Normal (no buffer) mode (green led)
- Display Mode is set to match the display toggle on the back of the unit (ON = display stays on / OFF = display goes off after a command is finished).
- TAPE Output is off

Setup

Step 5- Display Toggle Selection

On the back of the TAP-X is a display toggle switch. Since the display mode can also be selected via the front panel and via remote control all this toggle switch does is set the display mode on power up of the system - so after a power cycle it will power up in your preferred mode. The two selections for the toggle are:

'ON' - When this mode is selected the TAP-X will power up with the display mode set to ON. In this mode the front panel display will stay on continuously.

'OFF' - When this mode is selected the TAP-X will power up with the display mode set to OFF. In this mode the front panel display will be on while the TAP-X is executing a command and then turn off after a short timeout period. Use this mode if you prefer to have a dark listening room while listening.

Step 6 – Home Theater Bypass Button

On the back of the TAP-X (near the display toggle) is a small black push button labeled 'BYPASS'. This button can be used to program the currently selected input to 'lock' on any volume level. Pressing this button programs the currently selected input to the current volume and pressing the button again 'unlocks' the volume setting. The status of each input is shown via that inputs led on the front panel:

For normal (unlocked) mode the led is green (or orange if the main path buffer for that input is set to is active mode).

For lock (or bypass) mode the led will turn red.

The HT mode of each input is saved in non volatile memory so even after a power outage this programming is stored inside the TAP-X.

Most often this is used to program an input connected to a home theater processor so that the input will jump to level 54 (unity gain) when that input is selected. As a non HT input is once again selected the level jumps back to the prior level setting. A level 54 setting connects the input jack directly to the output jack. An alternate level can also be used if you'd like. Each time that source is selected the level will jump to the programmed level and you use the HT processors level control to set the volume - which also controls the other channels such as rear channels, etc... If your HT processor already had its levels set for the same amplifiers directly connected to the HT Processor then using level 54 (unity gain) on the TAP-X will maintain proper surround channel vs main channel levels. If you are installing the processor new or making other changes in the system then you should set the TAP-X to an HT mode for that processor input BEFORE you set your surround levels. That way the system levels will be correct each time that input is selected.

The volume could simply be set manually to the same level each time you use that input. The HT button is simply a handy way to make the level jump automatically to the same volume each time that input is selected and more importantly to automatically return to the previous level setting when a non HT input is again selected.

NOTE:

In some systems switching to an unused input will cause a small amount of hum at the speakers. This is because with no input connected the signal path is 'hanging in the breeze' picking up whatever noise is floating by. For unused inputs HT mode can be engaged and set to volume level 1. Then when selected the level is so low that there will be no hum.

Using The TAP-X

The Front Panel

Display Button / Led:

Each button press toggles between the 2 display modes. When the led is on (display mode on) the display stays on continuously. When the led is off (display mode off) the display will be on while you are using the pre-amp / remote functions and then after a short timeout the display turns off for dark listening. The Red button on the upper left corner of the remote also toggles the display mode.

TAPE Button / Led:

The TAPE button toggles between TAPE Output On and TAPE Output off. See TAPE output connection details above for information on how the TAPE Output functions.

Mute Button / Led:

This button toggles between mute and normal volume modes. When the mute led is on the system is muted. The mute button on the remote also toggles mute mode. Adjusting volume via the remote or the volume knob resets the TAP-X to not muted.

Left Channel Volume Display:

This numeric led displays the current volume of the left channel.

- In Mute Mode the display reads double dashes "--"
- The lowest volume level (level 1) is -52db attenuation
- Unity Gain (0db attenuation) is at level 54
- The highest volume level (level 61) is +7db of gain

Volume Knob:

Not much to say - it's a volume knob.

Right Channel Volume Display:

This numeric led displays the current volume of the right channel.

- In Mute Mode the display reads double dashes "--"
- The lowest volume level (level 1) is -52db attenuation
- Unity Gain (0db attenuation) is at level 54
- The highest volume level (level 61) is +7db of gain

Using The TAP-X

The Front Panel - Continued

Just to the right of the Right channel numeric display are the source select functions:

Source Down Button:

Each button press changes the selected source to the next lower source. If this button is pressed while source 1 is selected the source wraps around to source 6. The current source is indicated via a row of leds just above the source buttons.

Buffer Button:

Pressing this button toggles the currently selected source between 'Normal' and 'Buffered' mode. The selected Buffer mode is indicated via the source leds just above the source buttons. Normal mode is indicated by a green led and buffered mode is shown by the source's led turning orange. There is a button on the remote to toggle the buffer mode (upper right corner of remote handset).

Note:

Buffer mode places a unity gain buffer in the signal path before the Autoformers. It is only intended to be used if one of your non critical sources (ie. a VCR or older Tuner) should have trouble driving a passive pre-amp - the buffer can be selected to allow the source to be used in the system.

Please don't spend time trying to 'predict' if you need the buffer or not. It is VERY simple to experiment with the buffer mode - just sit listening to music and toggle the buffer mode using the remote handset. The best sounding mode is the correct mode! It is expected that you won't use buffer mode on your main sources - I have yet to find a system where I like buffer mode better than 100% passive mode with the primary source. It's really added as a helper in case any of your additional (lower quality) sources have trouble driving a passive pre-amp.

Buffer mode selection is automatically stored for each input in non volatile memory - so it will be saved after power is lost. This way each source will remember its preferred mode so once those modes are set you do not have to adjust the buffer mode buttons again.

As you toggle between Normal and Buffer Mode note there are 2 buffer modes - one has the decimal point in the left volume display on and the next has the decimal point in the right volume display on. Right now TAP-X pre-amps have both these modes running through identical buffers. There is a location inside the TAP-X to allow a buffer daughter board to be added so the TAP-X would have two different buffer modes. This way if we ever run into a buffer that we really like and one that could be useful even of very good sources it can easily be added to units in the field without any re-programming needed.

Source Up Button:

Each button press changes the selected source to the next higher source. If this button is pressed while source 6 is selected the source wraps around to source 1. The current source is indicated via a row of leds just above the source buttons.

Source LEDs:

Above the source/phase buttons are a row of 6 leds. They indicate the selected source number. The left most led is source 1 and the right most led is source 6.

Green = Normal (Buffer Mode Off)
Orange = Buffer Mode On
Red = HT bypass (lock to volume 'xx').

Remote Handset Functions

Display On / Off (The Red button on the upper left corner):

Each button press toggles between the 2 display modes. When the display led is on (display mode on) the display stays on continuously. When the led is off (display mode off) the display will be on while you are using the pre-amp / remote functions and then after a short timeout the display turns off for dark listening.

Buffer Mode (The Black button on the upper right corner):

Pressing this button toggles the currently selected source between 'Normal' and 'Buffer' mode. The current buffer mode is indicated via the source leds just above the source buttons. Normal mode is indicated by a green led and 'Buffer Mode' is shown by the source's led turning orange. Note that there are 2 'stops' in buffer mode. Both these are identical for now – the extra stop is included to allow a future buffer to be easily inserted into your TAP-X.

Mute (center of volume/balance grid):

This button toggle between mute and normal volume modes. When the mute led is on the system is muted. The mute will be canceled when the volume is adjusted by the remote handset or by the volume knob on the front of the pre-amp.

Volume UP / Down ('+' and '-):

The volume up and down buttons step the volume up or down 1 step (1db) per button press or if held down continuously they continuously adjust volume.

Balance Left / Right ('<' and '>'):

The Balance Left / Right buttons step the volume levels to adjust the balance. This adjustment moves the sound to the right or left side by 1 volume step per button press (or if held down continuously balance will progressively move in the desired direction). A sliding / alternating balance is implemented where the level adjustment to move balance alternates from left or right, etc... This way the overall volume level of the system is maintained. Also you can slide balance over to one side and then slide it back to the original volume by pressing the opposite balance button. If you hold the button down constantly while moving back towards center then the balance will stop as it reaches center. This is handy when adjusting balance back to the middle point.

Source Select Buttons:

The buttons labeled '1' through '6' on the bottom portion of the remote handset directly access each of the 6 source inputs on the TAP-X. These direct buttons (rather than next/prev) are used to make sure that macro functions programmed into a (user supplied) advanced programmable handset function repeatably.



TAP-X Features and Specifications

Features:

- * Continuous 1db Level Steps from -52 to +7db
- * Gain Mode automatically engages as the level is turned above unity gain (step 54)
- * Remote Control of Level, Balance, Input Select, Buffer Mode, Mute, and Display
- * Front Panel Control of Level, Input Select, Buffer Mode, Mute, TAPE, and Display
- * Buffered and Switched TAPE Output (6 input version only)
- * 100% passive or Buffer Mode for main output via remote or front panel (6 input model only)
- * Any Input(s) can be programmed as an HT Input via a simple back panel button press
- * Separate Buffered and level controlled Sub Output (6 input model only)
- * Six input version = 6 RCA Inputs + SUB Out + Main Out
- * One input version = 1 RCA In + Dual RCA outputs
- * Custom Remote Control Handset
- * Display Dark setting for HT or dark listening
- * Optional Channel Expansion Modules have trim up / trim down buttons for each channel

Performance:

- * 'Teflon like' Arlon PCB Material used for Signal Path Circuit Boards
- * Extreme quality relays rated for billions of operations
- * Modular Design for minimum internal wiring keeping the signal path VERY clean
- * Expansion modules connect via fiber optic cables - no chance of ground loops
- * Entire Control System enters sleep mode after each command - NO clock noise

Endurance:

- * A Minimum of Mechanical Parts - Maintenance free operation
- * All switching via sealed relays rated for billions of operations
- * Optical Encoder Level Control rated for millions of operations
- * Optional Fiber Optic Expansion ports to add unlimited additional channels

Autoformer Pre-amp Specifications:

- * Bandwidth: Below 10 Hz to over 100 KHz (+/- 1db)
- * Right Channel to Left Channel Level Matching: Closer than +/- .05dB
- * THD: < 0.0008%
- * Step Size: 1db (Mute / -52dB to +7db)
- * Maximum Input Level: > 10V RMS
- * Standard TAP-X has 2 Channels - Right/Left
- * Maximum Channels: Unlimited
- * Inputs: 6 RCA.
- * Outputs: 2 RCA (100% Passive / Buffered and SUB Output)
- * TAPE Outputs: 1 RCA (6 input version only)
- * HT Bypass Inputs: Any of the 6 inputs programmed as HT via button press
- * Size: 17"W x 8"D x 3-1/4"H