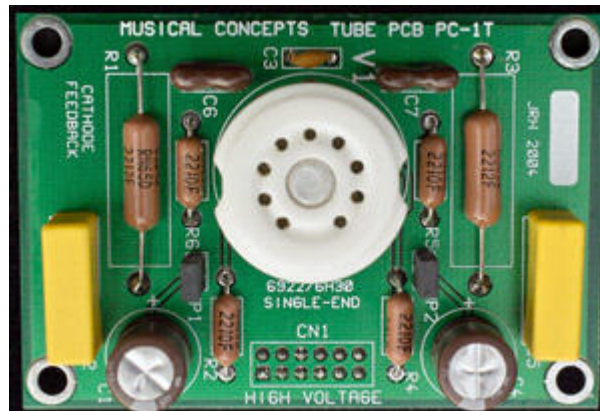


# Musical Concepts

## Chameleon

### PC-1T



#### Circuit Description

PC-1T is the standard Chameleon Active Board. The input signal is DC coupled. This vacuum tube line stage pre-amplifier uses a single twin triode(6DJ8/6922). It operates as a single-stage per channel grounded cathode voltage amplifier with 20dB gain and 1K Ohm of output impedance with global feedback applied. With global feedback(FB) it is actually known as a Plate Follower circuit. With the feedback disabled and the cathode bypass capacitor enabled the circuit has a very high gain. It sounds very good in non-FB mode though. PC-1T can be used with the 6H30Pi SuperTube, Russian 6N6P and other quality dual triode 9-pin tubes. **Any tube that you might decide to use must have the same pinout as the 6DJ8/6922.**

Your PC-1T Active Board has the facility to engage or bypass cathode feedback(CFB). Don't worry - it's not as complicated as it sounds. It is activated or switched off with a two pin header on each channel with shorting blocks that control this function. With the block fully engaged on the header pins this engages the cathode bypass mode. It is the recommended mode. Removing the shorting block will decrease gain to around 25dB and increase output impedance to 2.5K Ohm without global FB. You might realize that it eliminates any capacitor distortion too. You may wish to see how it reacts with your system. It is completely safe, but remember to turn off the preamp and remove the power cord before you make any adjustments. Remember any new capacitors like the ones on the PC-1T will require three weeks or more of break-in to sound their best.

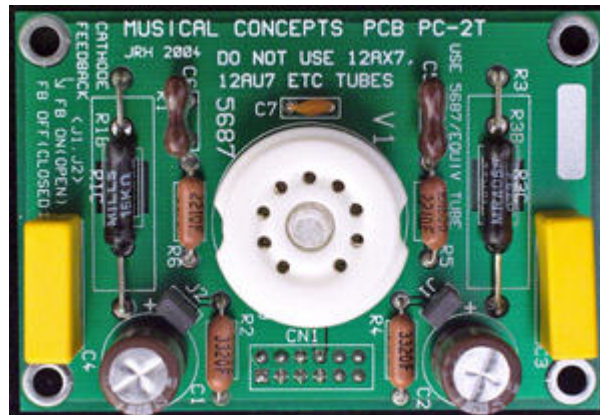
While the 6DJ8/6922 type tube is considered to be the PC-1T standard tube, other dual-triode 6V heater tubes can be used with the board by implementing appropriate resistor changes. Other tubes must have the same pin-out as the 6922 type. Please consult with Musical Concepts for alternate versions.

The same operation mode is used with some but not all Chameleon Active Boards. Individual optional Chameleon Active Boards have their own owner manuals because they are inherently different from each other.

# Musical Concepts

## Chameleon

### PC-2T



### Circuit Description

PC-2T is an optional Chameleon Active Board. The input signal is DC coupled. This vacuum tube line stage pre-amplifier uses a single twin triode (5687 or equivalents) on the Active Board. It operates as a Grounded Cathode voltage amplifier with 23dB gain and 1.7K Ohms of output impedance with global feedback disabled and cathode feedback enabled. You will probably find that this is the favored mode for the tube. With feedback you will have 20dB gain and 1.2K output impedance. This tube has an unusual pin-out. It is a very popular tube in a sense. It enjoys a wide underground following which is why we decided to offer a tube board for it. It has been used in some of the world's most expensive electronics and yet it is not than commonly used by many manufacturers. Therefore you will find these are plentiful on the NOS market. There are a few tubes which are considered equivalents. **DO NOT INSTALL TUBES THAT ARE NOT COMPLETELY EQUIVALENT TO THE 5687 TYPE!**

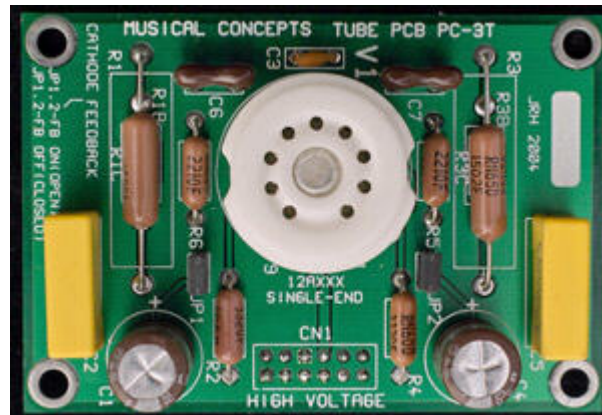
Your PC-2T Active Board has the facility to engage or bypass cathode feedback. Don't worry - it's not as complicated as it sounds. It is activated or switched off with a two pin header on each channel with shorting blocks that control this function. The shorting blocks will be engaged when you receive the preamp. This enables the cathode bypass mode. It is the recommended mode. Removing the shorting block will decrease gain to around 18dB and increase output impedance to 7.5K Ohm. You might realize that it eliminates any capacitor distortion too. It is worth trying to see how it reacts with your system. It is completely safe, but remember to turn off the preamp and remove the power cord before you make any adjustments. Remember any new capacitor like the one on the PC-2T will require three weeks or more of break-in to sound it's best.

The same operation is used with some, but not all Chameleon Active Boards. Individual optional Chameleon Active Boards are delivered with separate owner manuals because they are distinctly different from each other.

# Musical Concepts

## Chameleon

### PC-3T



#### Circuit Description

PC-3T is an optional Chameleon Active Board. The input signal is DC coupled. This board is analogous to the PC-1T, **but is designed for 12 VDC heater tubes**. It uses a single twin triode (12AU7, 12AT7, ECC99 or others). It operates as a single-stage per channel grounded cathode voltage amplifier. With global feedback (FB) it is actually known as a Plate Follower circuit. **Any tube that you might decide to use must have the same pinout as the 12AU7/ECC82.**

Your PC-3T Active Board has the facility to engage or bypass cathode feedback (CFB). Don't worry - it's not as complicated as it sounds. It is activated or switched off with a two pin header on each channel with shorting blocks that control this function. With the block fully engaged on the header pins this engages the cathode bypass mode. It is the recommended mode. Removing the shorting block will decrease gain and increase output impedance without global FB. You might realize that it eliminates any capacitor distortion too. You may wish to see how it reacts with your system. It is completely safe but remember to turn off the preamp and remove the power cord before you make any adjustments. Remember any new capacitors like the ones on the PC-1T will require three weeks or more of break-in to sound their best. With the feedback disabled and the cathode bypass capacitor enabled the circuit has a very high gain depending on the tube type. For instance with a 12AX7, most extreme case, it will have about 34dB gain and 30K output impedance (pretty high, should be used with older tube amps). If you apply FB then the gain is 20dB, output impedance is lowered to 6K. Still a 12AX7 is a lower current tube and should be used with high input impedance amps ideally. You will get surprisingly good sound with a solid-state amp though. Now let's look at the ECC99 - very different. You get 25dB gain and 2K out impedance. Adding feedback you will have 20dB gain and 1k Ohm output impedance. As you can see different tubes make all the difference. 12AU7 has 22dB gain and 4.5K output impedance. Global FB is not recommended with the 12AU7.

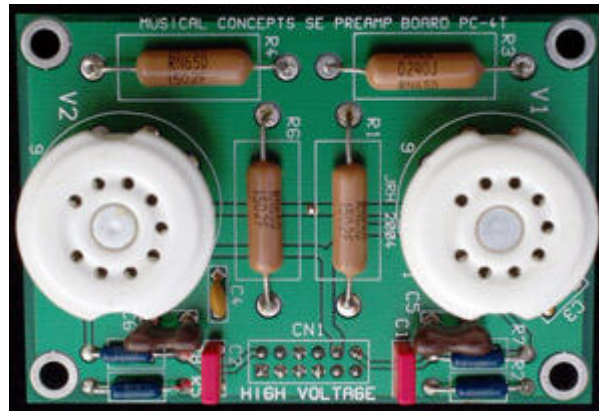
While the 12AU7 type tube is considered to be the PC-3T standard tube, other dual-triode 12V heater tubes can be used with the board by implementing appropriate resistor changes. Other tubes must have the same pin-out as the 12AU7 type. Please consult with Musical Concepts for alternate versions.

The same operation is used with some but not all Chameleon Active Boards. Individual optional Chameleon Active Boards have their own owner manuals because they are inherently different from each other.

# Musical Concepts

## Chameleon

### PC-4T



### Circuit Description

PC-4T is a twin tube Active Board. **It is designed specifically for tubes with 6VDC filament (heater) power.** The input signal is DC coupled. The standard version of this vacuum tube line stage preamplifier board uses dual twin-triode (6DJ8, 6922, etc.) with it's PC-4T Active Board. It operates as a Constant Current Grounded Cathode, CCGC, voltage amplifier with 28dB gain and about 100 Ohms of output impedance with feedback disabled. That is a high gain indeed. Tubes with lower mu which offers a lower overall gain are desirable too. For instance, tubes like the 6N6P or 6H30Pi are popular with this board. **Any tube that you decide to use must have the same pinout as the 6DJ8/6922.**

The circuit is completely feedback free when used as suggested. The PC-4T active circuitry is composed of two stages per channel. The first triode is a grounded cathode voltage amplifier. The second stage is a cathode follower, but with a twist. Its cathode resistor is loaded back into the cathode of the first stage where both cathode currents go thru that first stage cathode resistor. These currents are 180 degrees out of phase so they cancel at the first stage cathode.

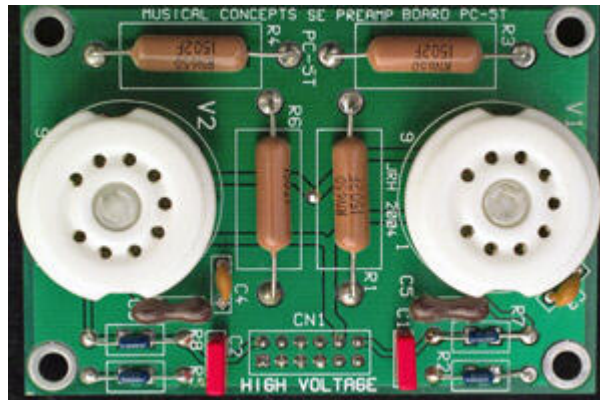
Advantages of this topology are that the gain is increased plus you have the low output impedance of a cathode follower. It is like having a cathode bypass cap on the first stage without the possible capacitor coloration. But wait, there's more. Since the currents in each stage are equal and opposite it is like having a constant current load requirement for the power supply. This cancellation effect makes the power supply 'look' very large. Well, of course, the power supply is very large as designed, but why not have 'the bigger yet' effect.

The same operation is used with some, but not all Chameleon Active Boards. Individual optional Chameleon Active Boards are delivered with separate owner manuals because they are distinctly different from each other.

# Musical Concepts

## Chameleon

### PC-5T



### Circuit Description

PC-5T is twin tube Active Board. **It is designed specifically for tubes with 12VDC filament (heater) power.** The input signal is DC coupled. The standard version of this vacuum tube line stage Active Board preamplifier uses dual twin triode(12AU7, ECC82, etc.). It operates as a Constant Current Grounded Cathode, CCGC, voltage amplifier with 22dB gain and 400 Ohms of output impedance with feedback disabled. **Any tube that you might decide to use must have the same pinout as the 12AU7/ECC82.**

The circuit is completely feedback free when used as suggested. The PC-5T active circuitry is composed of two stages per channel. The first triode is a grounded cathode voltage amplifier. The second stage is a cathode follower, but with a twist. Its cathode resistor is loaded back into the cathode of the first stage where both cathode currents go thru that first stage cathode resistor. These currents are 180 degrees out of phase so they cancel at the first stage cathode.

Advantages of this topology are that the gain is increased plus you have the low output impedance of a cathode follower. It is like having a cathode bypass cap on the first stage without the possible capacitor coloration. But wait, there's more. Since the currents in each stage are equal and opposite it is like having a constant current load requirement for the power supply. This cancellation effect makes the power supply 'look' very large because current variations are very small. Well, of course, the power supply is already very large as designed, but why not have 'the bigger yet' effect in addition.

The same operation is used with some, but not all Chameleon Active Boards. Individual optional Chameleon Active Boards are delivered with separate owner manuals because they are distinctly different from each other.