



Portico[™] 5042

**TWO CHANNEL “TRUE TAPE”
EMULATION AND LINE DRIVER**

USER GUIDE

Serial No:

4	2						
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IMPORTANT

For your convenience, write your serial number on the box above and keep this guide in a safe place. The number can be found on the bottom of the product and also on the packaging materials.

This number must be quoted in all communications in order to obtain technical support and spare parts from either the factory or your dealer.

**BUILT ON CORNERSTONES OF TRADITION
SOARING TO TRANSCEND THE CONFINES OF CONVENTION**

Thank you for your purchase of the 5042 Two Channel "True Tape" Emulation/Line Amp unit. Everyone at Rupert Neve Designs hope you enjoy using this tool as much as we have enjoyed designing and building it. Please take note of the following list of safety concerns and power requirements before the use of this or any Portico Series™ product.

Safety

It's usual to provide a list of "do's and dont's" under this heading but mostly these amount to common sense issues. However here are some reminders:

- The amplifier and processing circuits use genuine "Class A" configurations. "Class A" is not efficient in terms of power utilization. We have placed sonic quality first in order of importance. The Portico 5042 dissipates about 8 watts, which means that it will get warm in use. The heat generated is radiated through the case work and by convection through the ventilation holes. Therefore the holes should not be covered or blocked. Portico modules may be stacked horizontally on a desk top or vertically in a rack without heat problems. The anti-slip feet may be removed while used in a rack, but should be retained for desktop use. Porticos should not be stacked immediately above or adjacent to other equipment that gets hot. Also bear in mind that other equipment may radiate strong hum fields which could spoil the performance of your Portico module.
- Electronic equipment and liquids are not good friends. If any liquid was spilled such as soda, coffee, alcoholic or other drink, the sugars and acids will have a very detrimental effect. Sugar crystals act like little rectifiers and can produce noise, "crackles" etc. SWITCH OFF IMMEDIATELY because once current starts to flow the mixture hardens, can get very hot (burnt toffee!) and cause permanent and costly damage. Please contact support as soon as possible at support@rupertneve.com for resolution.
- Don't operate a Portico in the rain! If it gets wet and you suspect that good clean water may have got in, Immediately unplug the unit, and remove it from the source of water. Take the cover and knobs off by removing the 2 back-most screws on both sides only. The cover and front panel will now slide forward and free of the unit. Gently wipe off any water that's visible with a soft cloth. Water may have percolated under the PCB and be hidden between the bottom cover and the PCB. Use a hair drier to blow and dry out any residual moisture. leave the unit for a few hours to completely dry out. If the moisture was due to CLEAN water, your Portico should be up and running without any further problem.
- Rear connecting cables can get very untidy when a number of Portico modules are stacked on your bench. It's a good idea to use cable ties to bunch the cords into a tidy form.
- Don't be tempted to operate a Portico with the cover removed. The cover provides magnetic screening from hum and R.F. stray fields.

POWER REQUIREMENTS

Each Portico 5042 module has a built in DC to DC converter that provide +/- 17.5 VDC for the amplifiers. The input is protected from reverse polarity, and must be center pin positive. The converters will work from any DC supply from 9 to 18 volts that is reasonably “clean”. Avoid using a Power Outlet on the same circuit as air conditioning or other equipment that regularly switches on and off. Unplug the Portico power unit(s) during a thunder storm or if it will be unused for a long period.

The power consumed over the 9 to 18 volt range is almost constant; the current varies with available voltage as follows:-

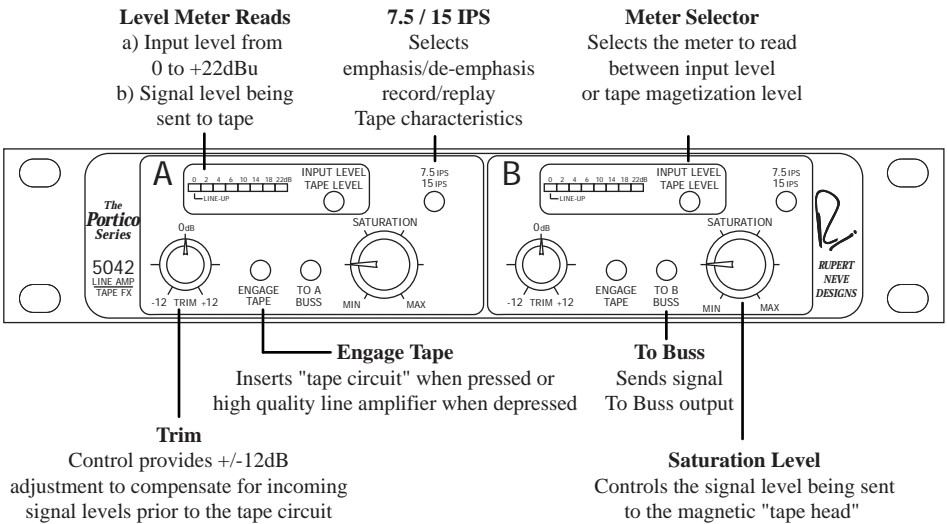
@ 9VDC	Current is	0.93A typical:	Power = 8.4 watts
@ 12VDC	Current is	0.68 A typical:	Power = 8.16watts
@ 15VDC	Current is	540 mA typical:	Power = 8.1 watts
@ 18VDC	Current is	450 mA typical:	Power = 8.1 watts

An external, robust and reliable high quality mains power unit, similar to the type used with the better quality laptop computers is supplied. This power unit converts your A.C. mains voltage, typically anything from 100 to 240 Volts depending on where you live, to the required low voltage D.C. (9 to 18 Volts). You will encounter many types of mains power wall sockets in different countries. One of the advantages of this method of feeding equipment is that external power units will work from almost any of the very wide range of mains supply voltages and frequencies that are found world-wide.

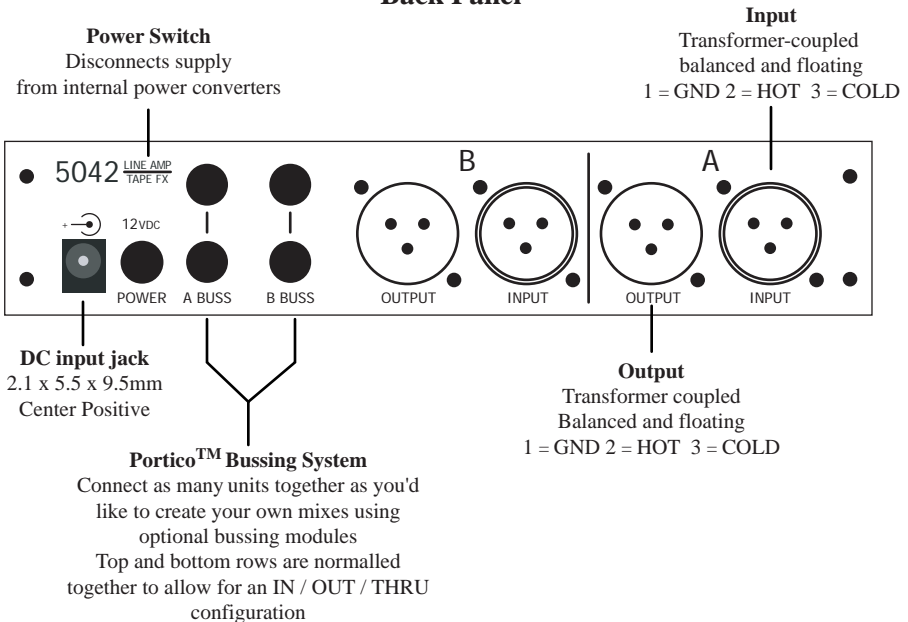
Portico™ 5042 module power units leave the factory with standard U.S. plugs. Any good quality connecting cord may be substituted.

Several sizes of power units available for use when feeding two, eight or more Portico™ 5042 modules together, depending upon the configuration that has been ordered. There are no special requirements for these Portico™ low voltage power units other than that they must be of good quality, reliable and able to supply enough current for the number of Portico™ modules in use. The power unit(s) supplied with your Portico™ meets these requirements.

5042 Two Channel "True Tape" Emulation/Line Amp Front Panel



5042 Two Channel "True Tape" Emulation/Line Amp Back Panel



The Portico™ 5042 consists of two identical Line Driving amplifiers having transformer balanced inputs and outputs. The sonic quality of these amplifiers is such that, by providing galvanic isolation, simple single-sided circuit topology, and freedom from grounding problems they are capable of enhancing the sonic quality of many signal sources, especially those of digital origin.

The sonic “Signature” is one of extreme purity and the image is consistent with that of Rupert Neve’s original designs of 35 – 40 years ago. More detailed discussion on the sonic image and the way in which an analog designer’s approach can sweeten and “warm” some of the cold, storage and editing processes, may be found on rupertneve.com.

Control Functions

TRIM control provides +/- 12dB adjustment of gain to compensate for incoming signal levels prior to feeding the TAPE circuit

ENGAGE TAPE push button inserts the “Tape” circuit when pressed (illuminated).

The Meter push button switch selects the meter to read INPUT LEVEL or TAPE SATURATION LEVEL

INPUT LEVEL reads the balanced signal level at the input of the Portico™ 5042.

TAPE LEVEL reads the signal level being sent to the simulated Tape Head. (Equivalent to Record Level in a real Tape Recorder)

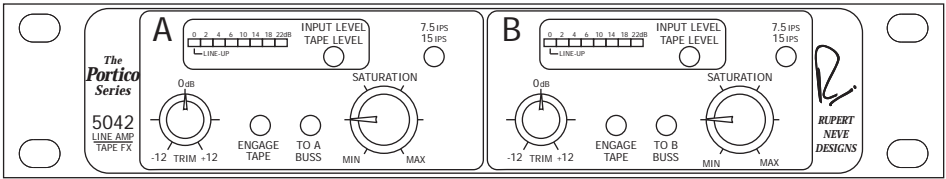
LINE UP The incoming signal level should be set by adjustment of the “TRIM” control so that this first LED starts to light (0 dB). When the Meter Selector is set to TAPE LEVEL there is no meter reading unless ENGAGE TAPE push button is pressed.

7.5 IPS – 15 IPS Push button selects the emphasis/de-emphasis, Record/Replay Tape characteristic.

SATURATION Controls the signal level being sent to the magnetic Tape Head.

At the same time the gain of the replay amplifier is reduced. As the SATURATION level increases, the replay gain is reduced so that the overall IN/OUT signal level remains more or less constant. In a real Tape recorder, you would adjust the Record and Replay gain controls separately. In the Portico™ 5042 the Record and Replay gain controls are coupled so that the overall IN/OUT signal level only varies as the “Tape” saturation level changes. As you approach maximum SATURATION setting, the output signal level will drop due to the effect of extreme saturation.

The Portico™ 5042 host line amplifier has a much higher output level capability than the “Tape” circuit embodied within it. The gain of the Record and Replay amplifiers has been adjusted so that with the TRIM control set to 0 dBu and the ENGAGE TAPE button OUT, an incoming signal of 0 dBu, will cause the first meter LED to illuminate. With the ENGAGE TAPE button pressed and the SATURATION control at MIN, the same first meter LED will continue to light regardless of whether the meter Button is IN or OUT, i.e. INPUT LEVEL or TAPE LEVEL. This is the minimum recommended Record Level. With the meter switched to TAPE LEVEL, rotating the SATURATION control Clockwise progressively illuminates the LEDs. With the SATURATION control rotated to MAX, the maximum recommended Record level is achieved. At MAX, with an incoming 0 dBu signal, the Tape circuit is running just below clipping point



If the incoming signal is low, (for example from a consumer Hi-Fi source), it is recommended that you rotate the TRIM control clockwise to bring the incoming signal up to the point where the first, or LINE UP LED is just illuminated.

MAIN OUTPUT

The main output signal comes from the output transformer secondary which is balanced and ground free. A ground free connection ensures virtual freedom from hum and radio frequency interference due to ground loops. Ideally the output of this module should be fed to a balanced destination such as the input to another Portico™ module or one of the many high quality vintage modules still in current use.

The Main Output may be used with one leg grounded without any change in performance. If the destination is to unbalanced equipment, do not “ground” one leg at the Portico™ output. Simply make connection as you would to a balanced destination. The fact that the destination is unbalanced means that the connection becomes grounded one side (“cold” or “earth”) by that item of equipment. No further grounding is needed to avoid ground loops.

Maximum output level of the Portico™ 5042 is +25dBu, which provides a large margin over and above the likely maximum requirement of any destination equipment to which the Portico™ 5042 is connected.

BUSS OUTPUT

When the TO A BUSS or TO B BUSS button is engaged, an unbalanced Monitor output signal is fed to a high impedance Buss output (i.e. through 4,700 ohms). It is intended for use with the Portico™ 5014 Stereo Buss Mixer - Monitor module and with similar projected units as they are added to the Portico™ series.

This Buss Monitor connection is derived at the Line Output of the Portico™ 5042 pre output transformer. A TRS patch cord is used to connect the Portico™ 5042 Buss output to one of the 5014 inputs. The signal level at the output of the Portico™ 5014 is designed so that it is equal in level to that at the Portico™ 5042 output.

METER

An eight segment LED bar-graph meter is fitted for each channel, calibrated with two scales selected by the adjacent Push Button switch:

INPUT LEVEL Calibrated: 0 dB, 2dB, 4dB, 6dB, 10dB, 14dB, 18dB 22dB

TAPE LEVEL Indicates the level being fed to the Tape circuit, or Amount of Tape Saturation.

A Power On/Off switch on the rear panel disconnects the external Power source.

Tape Recorders were first used by professional recording studios in the late 1940's, soon after WW2. They were adapted from the German Magnetofon that had been used by the German Navy to improve security of communications with their submarines.

It could be claimed that the magnetic tape recorder was the device that really made the modern Music Recording Industry possible. Before that time recordings were cut on lacquer or wax master disks. Although the sound quality of the Long Playing record achieved a very high standard, no editing or "dubbing" was practical.

The tape recording channel consisted of a "Drive" amplifier that fed the magnetic "Record" head winding through a constant current circuit. A replay amplifier, connected to the "Playback" head, with suitable equalization, then amplified the very small signals from this "Playback" head to restore line level. Because of the high impedances and the impossibility of controlling this dynamic process by, for example using negative feedback, the process was somewhat non-linear, exhibiting compression at high levels, noise at low levels and considerable 3rd. harmonic distortion at the low frequencies. The frequency response depended on many factors such as the quality of tape, the head design and, not least, frequent expert maintenance required to optimize the performance on a daily basis.

In spite of the limitations, "Tape" sound, in the hands of a professional who knew how to get the best from the medium, was pleasant, enhancing the sound of many instruments and smoothing over deficiencies in some of the more aggressive sounding microphones.

With these factors in mind, together with nostalgic memories of tape recordings over many years, we set about reproducing the classic sound of tape!

Because of the non-linearity referred to, tape distortion varies with signal level. When the level is very high, the signal is compressed and if it is too high it will clip. (which is a highly unpleasant sound!)

In order to avoid the need for adjustment of both record and playback levels, these two controls have been ganged so that as the record level is increased, the replay level is decreased.

The tape level meter provides a good reference that, with care, will indicate the approximate maximum record level of an actual recorder.

You can expect to experience a classic rise in frequency response around 300 Hz and a slight ringing due to the pre-emphasis at around 12 to 15 kHz., depending on the setting of the 7.5/15 i.p.s. switch. Low frequency Third harmonic distortion is probably the most immediately audible effect that you will hear. The effect on certain musical instruments is quite incisive, producing the characteristic coloring of a real tape recorder.

However, tape recorders are actually very good and these effects are not always obvious to the inexperienced listener. We did not set out to make a "bad" tape recorder!

Line Amp Specifications

(Measurements with tape circuit disengaged)

Noise:

Measured at Main Output, un-weighted, 400 Hz-22 kHz, Terminated 40 Ohms Balanced.
 With Gain at Unity Better than -100 dBu.

Frequency Response:

Measured at +10dBu, trim at unity.

Main Output: @ 10 Hz. -0.50 dB
 @ 200 kHz -3 dB

Maximum Output Level:

Balanced and Floating Transformer Output: +25 dBu.

Total Harmonic Distortion and Noise:

@ 1kHz, +20 dBu output level, no load.

Better than 0.0015%.

@ 20Hz, +20 dBu output level, no load:

0.250% typical. Mostly 2nd and 3rd Harmonic**Crosstalk:**

Measured Channel to Channel: Better than -90 dB @ 16kHz

Buss Output:

Output is designed to feed the RND 5014 Buss-mixer, Monitor Amplifier at the internal system level of -2.5 dBu. Output level of the RND 5014 is then equal to that of the 5042.

Tape FX Specifications

(Measurements with tape circuit engaged)

Maximum Output Level:

Gain trim at Unity, Saturation at Min: +25 dBu

Gain trim at Unity, Saturation at Max: +6 dBu

Noise:

Measured at Main Output, un-weighted, 400Hz-22kHz, input terminated 40 Ohms Balanced.

With Gain at Unity, Saturation control at Min: Better than -70 dBu

With Gain at Unity, Saturation control at Max: Better than -90 dBu

Frequency Response:

Tape engaged, 7.5 IPS -3 dB @ 16 kHz

Tape engaged, 15 IPS -3 dB @ 20 kHz

Low frequency response varies with input gain and saturation settings.

Total Harmonic Distortion and Noise:

Tape Engaged: Approximately 1-2% 2nd and 3rd Harmonic below 1 kHz

Crosstalk:

Measured Channel-to-Channel,

Maximum Saturation: Better than -80 dB @ 16kHz

BLOCK DIAGRAM

