Dynamic Noise Filter

Model 1000

SERIAL NO. 179

OPERATING AND SERVICE MANUAL

Burwen
LABORATORIES, INC.
209 MIDDLESEX TURNPIKE, BURLINGTON, MASS. 01803 TEL. (617) 273-1488

Burwen
LABORATORIES, INC.
209 MIDDLESEX TURNPIKE, BURLINGTON, MASS. 01803 TEL. (617) 273-1488

TABLE OF CONTENTS

Burwen
LABORATORIES, INC.
209 MIDDLESEX TURNPIKE, BURLINGTON, MASS. 01803 TEL. (617) 273-1488

MODEL 1000 DYNAMIC NOISE FILTER OPERATING INSTRUCTIONS

The Dynamic Noise Filter reduces noise by attenuating the high and low frequencies when there is no music or speech present. The upper cutoff frequency increases gradually and automatically from 1100 cps toward 32 kc with an increase in the high frequency content of the program material. Similarly, the low cutoff frequency is gradually lowered from 350 cps toward 13 cps with increasing low frequency content in the program material. Separate sensitivity controls are provided for the high and low frequency sections of the Bandwidth Controller and a cutoff control limits the maximum high frequency response. Operation normally begins to take place just above the noise level of the program material at both high and low frequencies.

PATCHING INTO YOUR SYSTEM

Since the Dynamic Noise Filter reduces the noise from all sources ahead of it the best place to use it is as the last instrument in the signal chain. It can be connected at the output of the studio console working on the mixed down signal ahead of a 2 or 4 track mastering recorder. In this case the Filter reduces the noise to that of one generation of tape; or it can be connected just ahead of the disc cutting system, in which case all tape noise ahead of the Filter is reduced. The Dynamic Noise Filter can be used more than once such as before and after a 2 track tape master.

EQUALIZATION

The Bandwidth Controller, which determines the upper and lower cutoff frequencies, measures the signal energy content at the high and low frequencies and is most sensitive at 6.6 kc and 85 cps. With most program material it performs best on a flat response signal but works quite satisfactorily with the individual channel equalization used in multitrack recording. For use with extremely noisy program material, such as old 78 rpm records which may have more distortion and noise than useful signal in the 6.6 kc region, it is frequently advantageous to cut off the high frequencies at 12 dB/octave ahead of the Dynamic Noise Filter in the region of 4 - 6 kc. Alternatively, the high frequencies can be depressed or rolled off by means of tone controls so the upper cutoff frequency of the Dynamic Noise Filter will respond more to the middle frequency content of the program material than to the high frequency content. Equalization for pleasing response in this case should follow the Dynamic Noise Filter. In using the Dynamic Noise Filter bear in mind that channels 1 and 2 use a common bandwidth controller as do channels 3 and 4.

INPUT AND OUTPUT CONNECTIONS

The input to the Active Transformer in the Dynamic Noise Filter is differential the same as when a conventional transformer is used. However, the output is a single ended dc coupled amplifier whose common is connected to the chassis. The input will withstand 25 V rms input overvoltage and the output will withstand a short-circuit, but do not test these features first. Also, avoid feeding any voltage into the output terminals from another piece of equipment.

The pin connections on the Dynamic Noise Filter chassis are as follows:

Input, female
- Pin 1, ground
- Pin 2, inverting input (may be grounded)
- Pin 3, non-inverting input (high)

Output, male
- Pin 1, ground
- Pin 2, ground
- Pin 3, high

Plug the power cord into 115 V, 60 cps. For 230 V operation use a screwdriver to set the slide switch on the rear of the chassis before connecting the power cord. Note that only one power line ground is permissible in an audio system. Otherwise circulating ground currents may cause hum. Therefore, in many cases it is necessary to use the 3 to 2 prong adapter plug which eliminates the chassis connection to the power line ground. Set the rear panel switches for the proper terminating impedances. The input impedance can be set at either 100k or 600 ohms. The output is designed to feed anything from 150 ohms to an open circuit and there is no advantage in terminating the output. If the output switch is set at 600 ohms a 600 ohm resistor is added in series with the output and there will be a 6 dB loss when feeding a 600 ohm load. This switch is occasionally used when the outputs of two units are to be mixed together in parallel but in most cases the output switch should be set at low Z which provides an internal impedance of less than .5 ohms.

CHANNELS

Each Model 1000 Dynamic Noise Filter chassis is wired for four channels. Modules are plugged in in accordance with each individual customer's order. Normally the channel connectors on the rear of the chassis that are operational are as follows:

Number of channels	Connector numbers
1	1
2	1,2
3	1,2,3
4	1,2,3,4
2 independent	1,3

Additional modules for more channels can be inserted at any time and no adjustments are required. Due to the high accuracy of Burwen Laboratories modules, they are completely interchangeable with negligible stereo tracking errors.

OPERATING CONTROLS

The controls for all four channels are ganged together. The outer black knobs control channels 1 and 2 and these are friction ganged to the inner red knobs which control channels 3 and 4. Start with the LF SENSITIVITY and HF SENSITIVITY controls at their maximum counterclockwise position. Set the FILTER switch at WIDEBAND. This is an A-B switch and in the WIDEBAND position the Dynamic Noise Filter behaves as a flat unity gain amplifier. Adjust the input signal level (normally +4 dBm @ 0 vu) and equalize the signal for most pleasing results.

Now set the FILTER switch at AUTOMATIC. This brings the Dynamic Noise Filter into operation and you will note an attenuation of the bass and treble. Using a quiet section of the program material, advance the LF SENSITIVITY control clockwise until the low frequency rumble just begins to come through. Next advance the HF SENSITIVITY control clockwise until the hiss just begins to increase. The program material will now automatically increase the bandwidth. If necessary, the controls can be readjusted for best compromise between noise reduction and some loss of the high or low frequencies in the program material.

Program material having excessive extreme high frequency content or excessive noise and distortion in the high frequency region can be improved by rotating the CUTOFF control counterclockwise. This control places a limit on the maximum high frequency bandwidth beyond which the response rolls off at 6 dB/octave.

Burwen
LABORATORIES, INC.
209 MIDDLESEX TURNPIKE, BURLINGTON, MASS. 01803 TEL. (617) 273-1488

MODEL 1000 DYNAMIC NOISE FILTER SERVICING INSTRUCTIONS

WARRANTY OF QUALITY

Burwen Laboratories warrants its products to be free from defects in material and workmanship. For a period of two years from the date of shipment to the original purchaser, we will service at the factory, or at our option, ship a replacement for any device which fails in normal use to meet its published specifications. Burwen Laboratories normally maintains a stock of modules and critical components reserved for rapid field replacement.

INSTALLATION PROBLEMS

Be sure the unit is connected in accordance with the operating instructions. If the neon pilot lamp lights and no signal passes through the Dynamic Noise Filter recheck the input and output connections to see that they conform with the instructions. Connect the input and output cables together to see that a signal passes directly from one cable to the other. Be sure your cables are plugged into operating channels and not into empty channels.

If you are certain the input and output connections are correct and there is signal at the input but still no signal at the output, then it is suggested you remove the top cover to see if any of the modules have worked their way out of their sockets or any of the internal power supply plugs have loosened. Do not remove the bottom cover as the power supply is attached to this cover.

If the unit still does not work, please contact the factory immediately. Frequently we can diagnose problems by telephone from an adequate description of the symptoms. Factory authorization is required before returning the unit for repair. Follow the instructions for return of the unit to the factory.

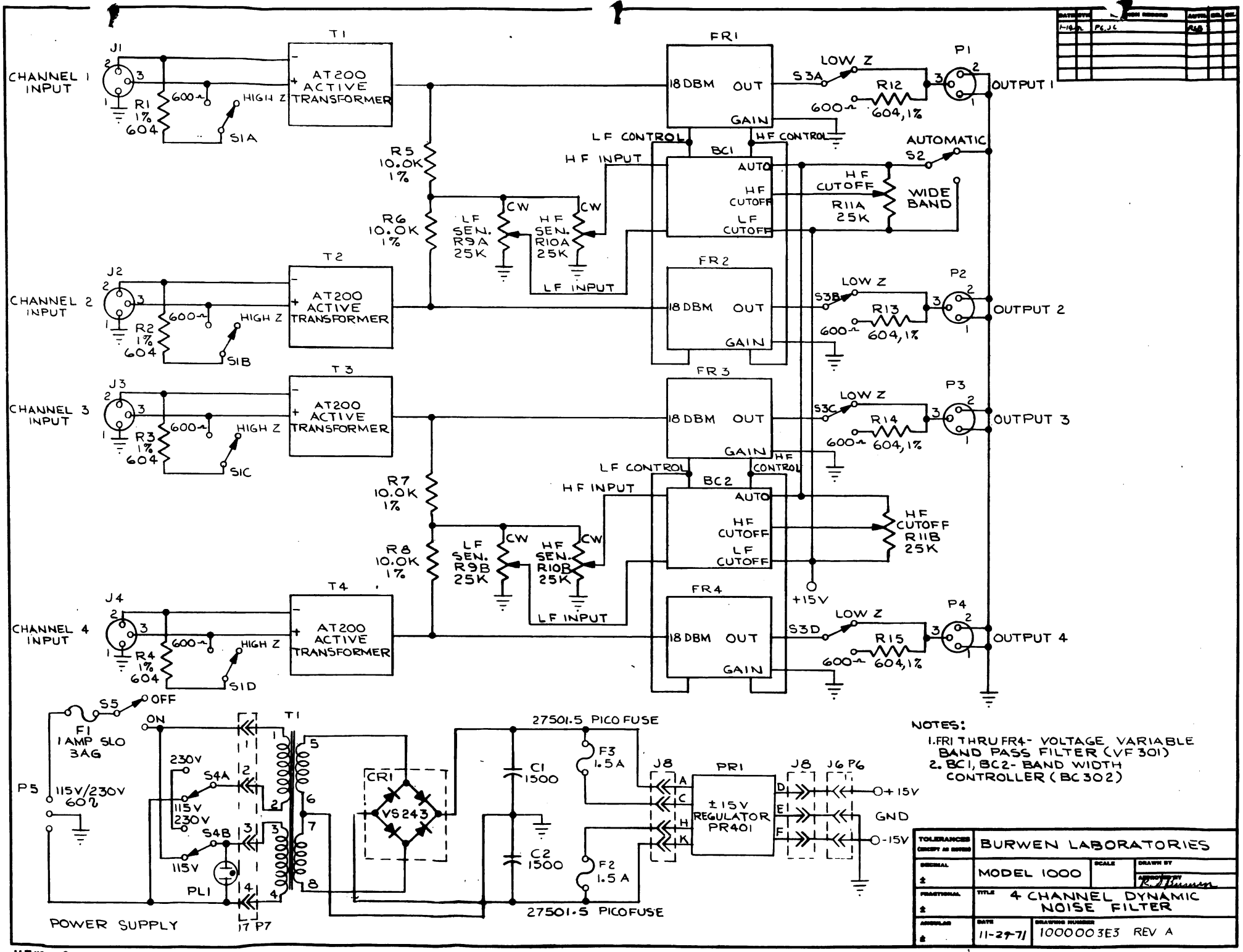
FIELD SERVICE

Because of its modular construction, field servicing is generally quite simple. Customers are encouraged to make the simpler repairs such as replacement of modules in the field. If you are unable to solve the problem, write or phone us an adequate description of the symptoms. We may be able to solve the problem over the telephone or rapidly ship you a replacement part. If you prefer, your instrument may be returned to the factory for repair after receiving our authorization.

SERVICING PROCEDURE

Symptoms	Check
Pilot lamp out, operation on signals	If signals pass normally and the line voltage switch at the rear of the unit is set for the proper voltage, replace the pilot lamp.
Pilot lamp out, no signals	Disconnect the input and output cables and connect them together to be sure that signals pass through each cable. Inspect the power line fuse at the rear of the chassis. Fuses occasionally wear out but more often the cause of a fuse failure is some internal component failure. If the fuse has failed, remove the top cover and make an ohmmeter check across C1 and C2 for shorts. Check for a circuit through the picofuses F2 and F3 mounted on the regulator connector. Check for shorts across each diode of CR1. Try reversing the ohmmeter leads if the resistance appears low. If the fuses CR1, C1, and C2 appear to be normal then replace the power line fuse and reapply power.
Power fuse blows again	If after following the above procedure the fuse blows again, remove J8 from the power supply regulator PR1 and check CR1, C1, C2, F1, and F2 again. Replace the power line fuse and check for +28 V to ground across C1 and -28 V to ground across C2. If the fuse blows again the trouble can be a shorted resistor in the pilot lamp or a short inside the power transformer T1.
Pilot lamp lights, no signal	If a signal will pass through the input and output cables try replacing the Voltage Variable Bandpass Filter in the inoperative channel with the Filter from the operative channel. If this change does not solve the problem, replace the Active Transformer. If replacing a module solves the problem, contact Burwen Laboratories for a replacement.
Pilot lamp light on, no signal all channels	Check the positive and negative 15 V supply voltages on the master circuit board. If either voltage is 0, this will cause a near 0 voltage on the other side. Check the voltages on each side of the picofuses F2 and F3, normally +26 V and -26 V. Check for shorts from each side of each fuse to ground with and without J8 plugged onto the power supply regulator.
	Caution Be careful to replace J8 on the power supply regulator so that all pins mate. Replacement on the wrong pins will damage the Model PR401 Power Supply Regulator.

Symptoms (continued)	Check
Abnormal filterting action, channels 1 and 2 or channels 3 and 4	Replace the Bandwidth Controller and check for normal operation. If no spare is available, remove a Voltage Variable Bandpass Filter and check the high frequency and low frequency dc control voltages. In the wideband position each voltage is +5.0 V. In automatic each voltage varies from .2 V to +5 V with the signal. Vary the high frequency and low frequency controls to see that each control voltage follows the signal level.
FACTORY REPAIRS	If authorization for return to the factory for repair has been received repack the Model 1000 with its power cord using the original packing material. Ship via air or via United Parcel Service and insure for the full purchase value.



NOTES:

1. FR1 THRU FR4 - VOLTAGE VARIABLE BAND PASS FILTER (VF 301)
2. BC1, BC2 - BAND WIDTH CONTROLLER (BC 302)

BURWEN LABORATORIES	
MODEL 1000	
4 CHANNEL DYNAMIC NOISE FILTER	
DATE 11-29-71	1000003E3 REV A

DYNAMIC NOISE FILTER

MODEL 1000
CHASSIS PARTS LIST

Drawing No. 10000010L1-B
5/8/72

ITEM	DESCRIPTION
C1	1500, 50 V, CG152U50B1, Mallory
C2	1500, 50 V, CG152U50B1, Mallory
CR1	Bridge rectifier, VS243, Varo
F1	1 amp, slo-blo, 3AG, Littelfuse Fuseholder, 342014A, Littelfuse
F2	1.5 amp, pico fuse, 2750l.5, Littelfuse
F3	1.5 amp, pico fuse, 2750l.5, Littelfuse
J1	D3F, Switchcraft
J2	D3F, Switchcraft
J3	D3F, Switchcraft
J4	D3F, Switchcraft
J6	07QK3F, Switchcraft
J7	57GB5F, Switchcraft
J8	EC5108, Burndy

ITEM	DESCRIPTION
P1	D3M, Switchcraft
P2	D3M, Switchcraft
P3	D3M, Switchcraft
P4	D3M, Switchcraft
P5	AC3G, Switchcraft Power cord 8', 18-3, Type SVT, 17258-S, Belden 3 - 2 prong adapter, Leviton
P6	57KD3M, Switchcraft
P7	05UK5M, Switchcraft
PL1	5-703 with 22k resistor built in, Drake (amber) Holder, 508-7538-504, Dialco
R1	RN55D6040F, Mepco
R2	RN55D6040F, Mepco
R3	RN55D6040F, Mepco
R4	RN55D6040F, Mepco
R5	RN55D1002F, Mepco
R6	RN55D1002F, Mepco
R7	RN55D1002F, Mepco
R8	RN55D1002F, Mepco

ITEM	DESCRIPTION
R9	Dual potentiometer, 25k ±10%, 15% clockwise log taper, WA1433, CTS
R10	Dual potentiometer, 25k ±10%, 15% clockwise log taper, WA1433, CTS
R11	Dual potentiometer, 25k ±10%, 15% clockwise log taper, WA1433, CTS
R12	RN55D6040F, Mepco
R13	RN55D6040F, Mepco
R14	RN55D6040F, Mepco
R15	RN55D6040F, Mepco
S1	4PDT, sub-miniature toggle, 7401G, C & K
S2	SPDT, sub-miniature toggle, 7101G, C & K
S3	4PDT, sub-miniature toggle, 7401G, C & K
S4	DPDT, slide switch, screwdriver slot, 115 - 230, Continental Wirt
S5	SPST, toggle, A H & H, 82601
T1	Power transformer, Burwen Laboratories Spec. No. T402-2

MODULES

ITEM	DESCRIPTION
BC1	BC302 Bandwidth Controller
BC2	BC302 Bandwidth Controller
FR1	VF301 Voltage Variable Bandpass Filter
FR2	VF301 Voltage Variable Bandpass Filter
FR3	VF301 Voltage Variable Bandpass Filter
FR4	VF301 Voltage Variable Bandpass Filter
T1	AT200 Active Transformer
T2	AT200 Active Transformer
T3	AT200 Active Transformer
T4	AT200 Active Transformer

Note: The above modules are required for four channels. For a lesser number of channels the modules required are as follows:

One Channel	BC1, F1, and T1
Two Channels	BC1, F1, F2, T1, and T2
Three Channels	BC1, BC2, F1, F2, F3, T1, T2, and T3
Two Independent Channels	BC1, F1, and T1 BC2, F3, and T3