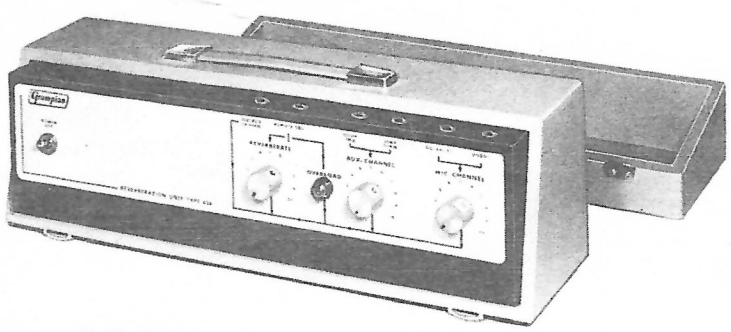
Grampian
SOUND EQUIPMENT

REVERBERATION AND AMBIOPHONIC UNITS

Grampian have been manufacturing high performance, low cost artificial reverberation systems for several years.

Though they were originally intended for semi-professional applications it is pleasing to note that a very high proportion of the units sold are in full professional use in studios throughout the world. It is believed that no other system can approach the performance to cost ratio of current models.



GENERAL DESCRIPTION

REVERBERATION UNIT TYPE 636

This instrument, intended for either amateur or professional use, employs a pair of mechanical (spring) delay lines with electro-magnetic transducers to simulate the reverberant effect of a 'live' hall. The total reverberation time (defined as the time taken for a sound to die away to one millionth of its original intensity) at 300 Hz is greater than 2 seconds.

There are two signal paths through the instrument, a direct path via which the unmodified signal reaches the output and the reverberation path described above which embodies a separate gain or "reverberation" control. This enables the ratio of reverberant to direct sound to be varied from zero to approximately 1/1. A muting switch may also be connected in the reverberation path.

Two independent input channels are provided; a low level channel specifically intended for low impedance moving coil or ribbon microphones and a low or high level, high impedance channel which can accept signals from guitar pick-ups, crystal gramophone pick-ups, tape pre-amplifiers etc., or from a bridging connection to a 600 Ω line.

The single microphone channel is arranged to accept either a balanced or unbalanced input connection and embodies a novel variable negative feedback circuit which will accept the very large input signals associated with close microphone technique without danger of over-loading the associated pre-amplifier.

The output of the unit is 300mV across 600 Ω impedance, and may be fed through long lines with very little high frequency loss. An indicator lamp serves as a combined overload indicator and protective device.

The electronic circuits embodied in the instrument are fully transistorised; particular care has been taken to ensure minimum noise and high gain stability over a wide range of operating temperatures.

Power supplies for the unit are derived from two nine volt dry batteries thereby eliminating mains borne interference, earth "loop" problems, and other sources of hum, while making the apparatus fully portable.

It should be stressed that this instrument is intended to be used for improving the recorded quality of music and vocals especially when recording takes place under abnormally "dead" acoustic conditions; and for dramatic effects — it is NOT intended to provide the "flutter-echo" effect associated with electric guitars on "pop" music recordings.

TECHNICAL SPECIFICATION

INPUTS

Two independently controlled input channels are provided, one for 25 Ω microphones and the other for high impedance signals.

Microphone Channel:-
Connection: Balanced or unbalanced.
Matching Impedance: 25 Ω (600 Ω & 200 Ω to order)
Sensitivity: 20 μ V across 25 Ω

Auxiliary Channel:-
Connection: Unbalanced.
Matching Impedance: (a) 50K Ω (b) 1M Ω
Sensitivity: (a) 10mV (b) 500mV

OUTPUT

Connection: Unbalanced.
Source Impedance: 600 Ω
Programme Level: −8dBm (300mV).
Maximum Level: +2 dBm (1V)
Frequency Response: ± 2dB 35 Hz-20 kHz on all inputs

NOISE

Both channels closed — 68 dBm at output.
Reverb. fully on.

REVERBERATION PATH.

Delay Times: 29 and 37 milliseconds nominal.
Reverberation Time: 2 seconds at 300 Hz
Frequency Response: ± 3 dB 100 Hz to 6kHz
Direct/Reverb. Ratio: 1/1 Maximum.
Overload Indicator: 6.5 volt 1 watt L.E.S. panel lamp.
Remote Switch: Mutes reverberation, connection via standard jack socket isolated from earth.

POWER SUPPLY

Two 9 volt batteries. Ever Ready P.P.9. or equivalent I.E.C. SPEC. 6F100 *(Batteries extra, not supplied with instrument)*
Consumption: 50 mA average on speech and music.

CONTROLS

Three rotary controls for Mic. gain, Aux. Gain, Reverberation, together with overload indicator lamp, and on/off switch, mounted on vertical front panel.

CONNECTIONS

6 standard jack sockets grouped in pairs on top of the instrument.

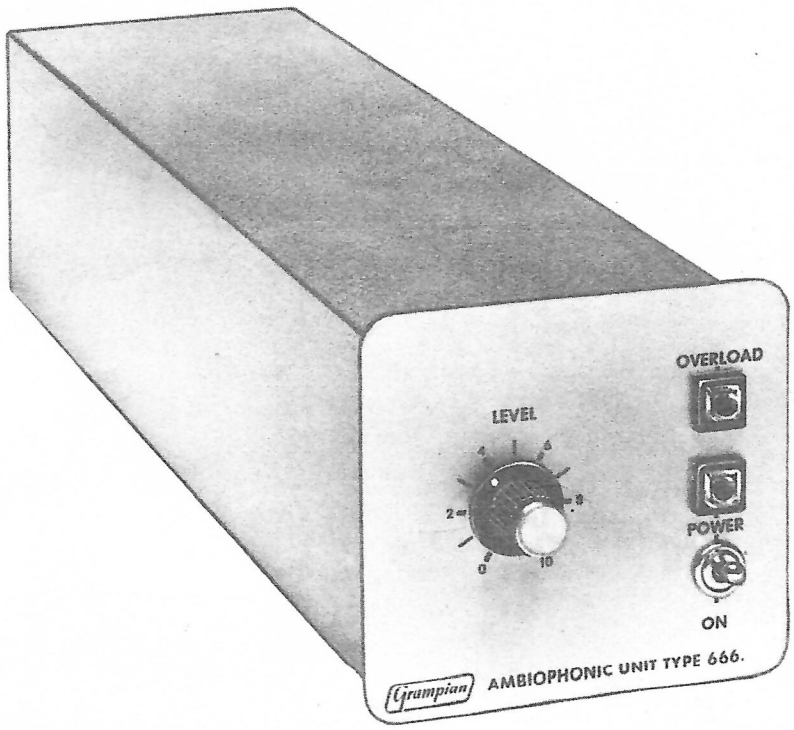
SIZE Approximately 444 x 133 x 158mm overall. (17½" x 5¼" x 6¼")

WEIGHT 5.4 kg (12 lb) complete with batteries and lid.

FINISH

Grey Vynide covered wooden carrying case with detachable lid. Panel finish satin silver and eggshell black. A Power pack to operate the unit from 200/250 volts a.c. mains is also available.

AMBIOPHONIC UNIT - TYPE 666



AN 'AMBIOPHONIC' UNIT TO ALTER APPARENT ROOM ACOUSTICS

The original Grampian type 636 reverberation unit has been available for many years. Because of its relatively high quality at moderate cost, it has proved popular with both amateur and professional users, and is standard equipment with many broadcasting and recording organisations.

We have received many enquiries from the owners of High Fidelity reproducing equipment, asking whether the type 636 is suitable for connection to their systems, to provide additional reverberation on the reproduction of discs, pre-recorded tapes and broadcasts. There are three main reasons why this is not very satisfactory.

1 Most broadcasts and ready-made recordings are balanced by expert engineers, and already contain (subject to the limits of personal preference) an optimum amount of reverberation.

2 In general, reverberation is more effective when added to the sound of small groups of instruments, or solo instruments, as is done in recording, not as a "blanket" to the whole recording.

3 The majority of high fidelity systems in use today are stereophonic — it is not satisfactory merely to connect one reverberation unit in each of the stereo channels. To generate stereophonic reverberation effectively a system of mixing and splitting of the signals through the reverberation unit is required.

However, instead of altering the **recorded material** one may alter the apparent **acoustic properties of the listening room.**

Ambiophonic Unit Type 666 provides such facilities.

AMBIOPHONIC UNIT - TYPE 666

GENERAL DESCRIPTION

Much research has been done on the modification of auditorium and room acoustics by electronic means. It is now possible to reduce or increase the natural reverberation time ("liveliness") of an auditorium by means of signals, picked up by microphones, electronically modified, and fed to loudspeakers in various parts of the hall. These devices are so effective that most listeners are totally unaware of their presence.

In broadcasting it has been found that adjusting the reverberation time of the studio, regardless of reverberation added to the transmitted programme, has materially improved the performance given by orchestral players.

The Grampian Type 666 "Ambiophonic" unit, though it uses the same delay system as the type 636 reverberation unit, is primarily intended to be used as a means of increasing the reverberation time of high fidelity listening rooms and small auditoria (the term "Ambiophonic" has been coined to describe a system in which reverberated signals are fed to a number of loudspeakers situated in various parts of the listening area).

When using the unit as an aid in sound reproduction, it is possible to suit the acoustics of the listening room to the type of programme material merely by turning a knob — from the usual "dead" response for modern jazz, to a full cathedral effect. The unit is connected across the loudspeaker of the reproducing equipment (two independent connections are provided for stereo use). The output of the "Ambiophonic" unit is connected to one or (preferably) more small loudspeakers placed in selected positions around the listening room. From the domestic point of view, the necessity for adding loudspeakers to the existing system may be looked upon as a nuisance, but the loudspeakers used may be very small as neither a wide frequency range nor good transient response are desirable. In a typical living room, three five-inch loudspeakers, mounted in very small cabinets, high up on picture-rails or curtain pelmets are unobtrusive and most satisfactory.

The type 666 is built to professional standards throughout. It is mains powered, and contains its own 2·5 watt push-pull amplifier for driving the "Ambiophonic" loudspeakers. The unit is arranged for mounting in a cabinet with the other equipment of the reproducing system and has only two controls — the mains switch and a knob for adjusting the amount of "Ambiophonic" reverberation.

The use of the unit with live performers in auditoria will normally be the responsibility of a professional sound engineer, since it is necessary to have microphones and a pre-amplifier mixer system, to pick up the original sound. This equipment is often already available in auditoria as part of the public address installation. For all but small halls, it will also be necessary to use an additional amplifier to feed the "Ambiophonic" loudspeakers, as more of these will be required than under domestic conditions.

The type 666 has also been designed for a further important application not involving Ambiophony. Many professional users of the type 636 reverberation unit connect it to studio mixing consoles where the microphones input and direct signal path of the unit are not required. A number of our type 636 units have been specially modified to eliminate the direct path signal. But it is evident that a basically simpler, mains powered unit, with suitable input and output arrangements, is more satisfactory.
The type 666 fulfills these requirements exactly — it has no direct path, but offers twin, isolated "zero level" bridging input connections, and twin, isolated "zero level" outputs enabling it to be used with either monophonic or stereophonic mixing consoles.

This unit is manufactured for two specific uses:—

1 To artificially increase the reverberation times of listening rooms, small auditoria, etc. by feeding reverberated signals to a number of small loudspeakers distributed around the listening area.

2 To be used in conjunction with a professional sound mixing console to provide an artificial reverberation facility, on monophonic or stereophonic systems.

The reverberation device used in the unit is the same as that used in the well known Grampian type 636 Reverberation Unit, but the Ambiophonic unit has no direct signal path. It has two high impedance line-bridging input connections, suitable for connection to the loudspeaker circuits of sound reproducing equipment. The signals from these inputs are mixed and fed via the level control to the reverberation spring driver amplifier, which incorporates an overload indicator lamp. The output from the reverberation springs is connected to a 2·5W push-pull power amplifier which feeds the ambiophonic loudspeakers, and provides two zero-level 600Ω outputs for professional use.

The unit is fitted with an aluminium case, with satin finished front panel; it is primarily intended for mounting in a console or equipment cabinet.

AMBIOPHONIC UNIT - TYPE 666

TECHNICAL SPECIFICATION

INPUTS:

Connection – Twin, unbalanced via standard 5 pin 180° DIN socket.
(Earth: pin 2, Lines: pins 1 and 4)
Terminal Impedance – 10KΩ (For 600Ω bridging connection).
Sensitivity – 2dBm (approx. 600 mV) from either line for rated output
(other input terminated in 600Ω).

OUTPUT:

Loudspeaker:

Connection – Terminal strip, one side earthy.
Load Impedance – Minimum 5Ω (e.g. 3 x 15Ω loudspeakers in parallel)
Maximum Power – 2.5W continuous into 5Ω at 1kHz with 5% T.H.D. from 220V a.c. supply.

600Ω Lines: (Loudspeaker output not used)

Connection – Twin, unbalanced, via standard 5 pin 180° DIN socket
(Earth: pin 2, Lines: pins 3 and 5).
Source Impedance – 600Ω resistive.
Rated Output Level – OdBm (0.775v) on each line.
Maximum Output Level + 10dBm (2.5v) on each line.
Distortion – less than 1% T.H.D. in amplifier at rated output level.

GAIN:

Overall Voltage Gain + 2dB at 600Ω output.
Overload Indicator – Tungsten lamp set to glow at rated output on sine wave drive.
(Lamp: 6v, 0.15A).

NOISE: Less than -45dBm at either 600Ω output.

REVERBERATION CHARACTERISTICS:

Frequency Response – 100 Hz to 6kHz nominal.
Delay Times: – 29 and 37 milliseconds nominal.
Reverberation Time – 2 seconds at 300 Hz.
1.5 seconds at 3kHz.

POWER SUPPLY:

Connection – 2 metres (6ft.) 3 core lead permanently attached at rear of unit.
Mains Voltage – 100-125 volts, 200-250 volts, a.c., 40-60 Hz.
Consumption – 8VA.
Indicator – High brightness neon.
Fuses – a.c. 1 amp.
d.c. 1 amp. Cartridge type.

CONTROLS: Numerically calibrated rotary level control, mains switch.

OPERATING TEMPERATURE: 0 – 50 C Ambient.

SIZE: Overall – 460 x 120 x 135 mm (18" x 4¾" x 5¼").

WEIGHT: 3.2 Kg . (7 lb).

PANEL FINISH: Satin Aluminium with black lettering.

PLUGS SUPPLIED: One DIN 180° 5 pin.

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