

**FEATURES:**

- Two signal channels with manual and automatic switching
- Frequency range 2 Hz to 200 kHz
- Cross-talk less than 60 dB
- Channel attenuation adjustable between 0,15 dB and approximately 40 dB
- Allows use of long cables between transducer and measuring instrumentation
- Outputs short circuit protected
- Fits B & K module system for rack mounting

**USES:**

- Power Supply for two microphone assemblies or preamplifiers
- Sound insulation measurements with B & K condenser microphones
- Vibration measurements with B & K accelerometers
- Remote switching between measuring points
- Simultaneous tape recording of sound and vibration data

The Two-Channel Microphone Power Supply Type 2807 is designed for use in connection with the B & K Microphone Preamplifiers Types 2619, 2627 and 2633. The 2807 supplies the necessary power for the preamplifiers and the 200V polarisation voltage for associated condenser microphones. In connection with preamplifiers, the 2807 acts as an impedance transformer with high input

## Two-Channel Microphone Power Supply



impedance and low output impedance allowing the use of long cables between the output of the 2807 and the equipment following it.

The 2807 further enables the use of the two channels simultaneously giving the possibility of measuring, for instance, sound and vibration at the same time, and the choice of manual or automatic switching between the two channels to one set of recording instruments connected to the output. This feature gives the possibility of building up measuring systems having the advantage of simplicity and flexibility.

### Description

As can be seen from the block diagram (Fig.1) the 2807 consists of a

power supply, two identical signal channels and a switching circuit.

The power supply gives the stabilised 200V polarisation voltage needed for condenser microphones and the power required for the various B & K preamplifiers.

The two signal channels each consist of a seven pin B & K standard input socket, a multiturn potentiometer acting as an attenuator having the approximate range of 0dB to -40dB re the nominal sensitivity of the input transducer, and a "push-pull" amplifier acting as an impedance transformer with 13Ω in series with 4,7μF output impedance and an attenuation of less than 0,15dB within the frequency range 2Hz to 200kHz.

The amplifiers are connected to the two output sockets by the function selector which has the following five modes:

1. Input 1 to Output 1  
Input 2 to Output 2
2. Input 1 to Output 1  
Input 2 disconnected  
Output 2 grounded
3. Input 2 to Output 1  
Input 1 disconnected  
Output 2 grounded
4. "Chopped Ext. Control"  
Externally controlled switching between the two inputs to Output 1.
5. "Chopped Int. Control"  
Switching between the two inputs and Output 1 controlled internally with a switching frequency of approx. 0,5 Hz.

Two lamps indicate which input is active.

The automatic channel selector consists of a relay controlled by an astable multivibrator. For external control (mode 4) a Level Recorder 2307 for instance can be used or the switch can be controlled by grounding the external control terminal.

The frequency response at the high end of the range is dependent on the load capacitance and the signal level.

Fig.2 shows typical curves for the frequency cut-off.

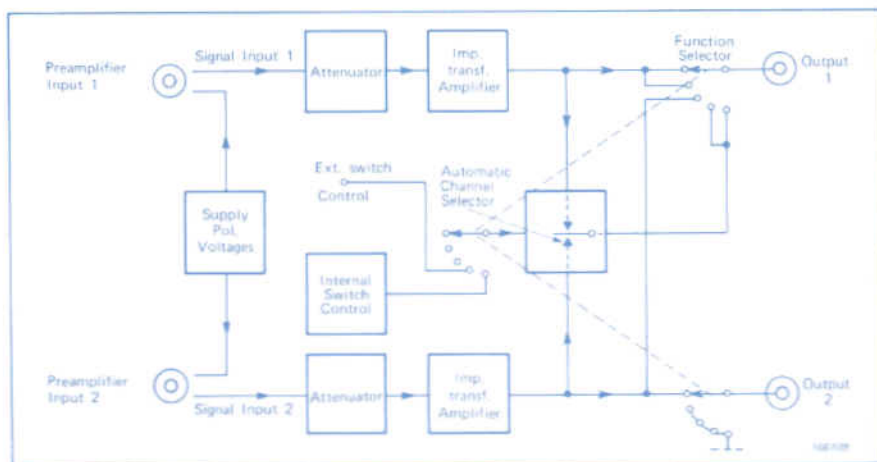


Fig.1. Block diagram of 2807

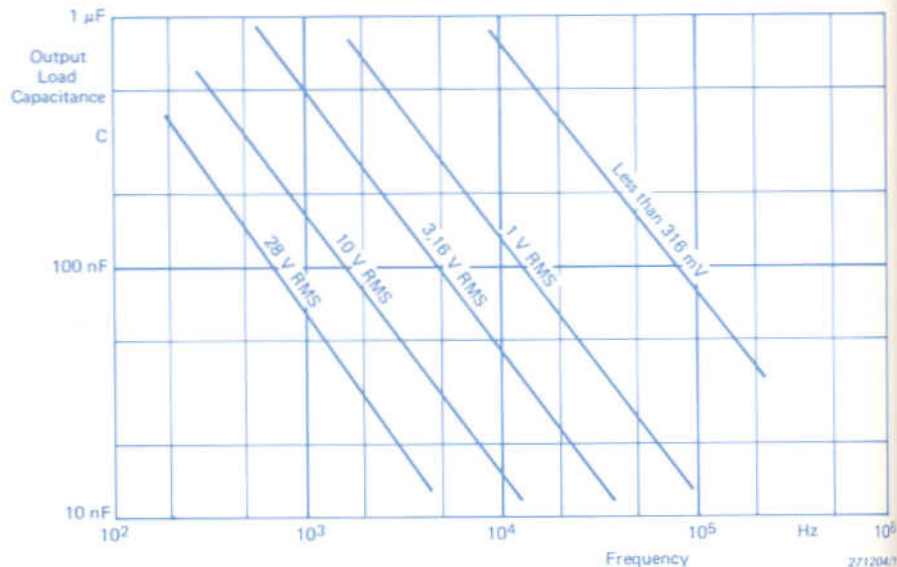


Fig.2. Typical curves showing the high frequency cut-off with capacitive loads at different output levels (Standard B & K coaxial cable capacitance is less than 100 pF/m.) The curve to the right indicates the 3 dB limits, the others indicate the limits for 1% distortion

## Specifications 2807

|  |   |  |
|--|---|--|
| <p><b>Frequency Range:</b><br/>2 Hz to 200 kHz (<math>\pm 0,2</math> dB)</p> <p><b>Attenuation:</b><br/>&lt; 0,15 dB. Adjustable down to -40 dB approx.</p> <p><b>Output Voltage:</b><br/>28 V RMS (2 Hz to 20 kHz)</p> <p><b>Max. Output Current:</b><br/>8 mA RMS</p> <p><b>Output Impedance:</b><br/>13 <math>\Omega</math> in series with 4,7 <math>\mu</math>F</p> <p><b>Inherent Noise:</b><br/>&lt; 15 <math>\mu</math>V (20 Hz to 200 kHz)</p> | <p><b>Cross-talk attenuation:</b><br/>&gt; 80 dB up to 20 kHz<br/>&gt; 60 dB at 200 kHz</p> <p><b>Chopper Frequency:</b><br/>approx. 0,5 Hz</p> <p><b>Switching Time:</b><br/>Typical 1 ms</p> <p><b>Polarisation Voltage:</b><br/>200 V. Stability better than 0,5% for <math>\pm 10\%</math> variation of mains-voltage</p> <p><b>Power Supply:</b><br/>100, 115, 127, 220, 240 V<br/>(50 to 400 Hz) <math>\pm 10\%</math> AC. 10 VA<br/>Complies with IEC 348 safety class I</p> | <p><b>Preamplifier Supply Voltages:</b><br/>+ 150 V (2 mA), Preamplifier anode voltage + 12,6 V (100 mA) and + 6,3 V (200 mA) for heating element in the preamplifier<br/>On both Input sockets 1 and 2</p> <p><b>Dimensions:</b><br/><b>Height:</b> 132,6 mm (5,2 in)<br/><b>Width:</b> 69,5 mm (2,6 in)<br/><b>Depth:</b> 200 mm (7,9 in)<br/>(B &amp; K module cabinet KK 0022, 2/12 of 19" rack module)</p> <p><b>Weight:</b><br/>2,2 kg (4,9 lb)</p> <p><b>Accessories Included:</b><br/>1 Power cord<br/>Fuses</p> <p style="text-align: right;">AN 0010</p> |
|--|---|--|

# Measuring Microphones, Studio Microphones, Hydrophones and Accessory Equipment

type 2811

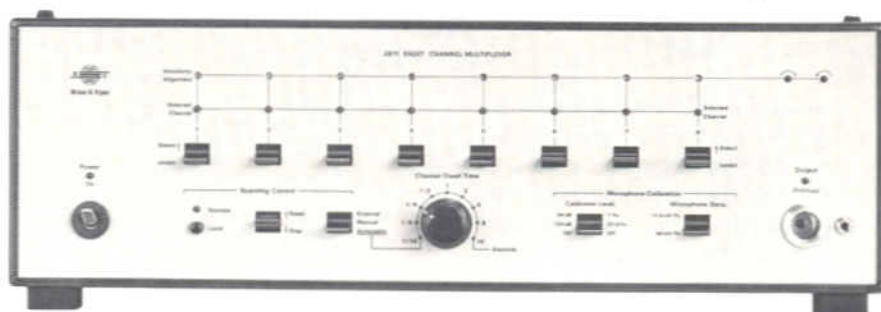
## 8 Channel Multiplexer

### USES:

- Sound power measurements with the Sound Power Calculator Type 7507 or Digital Frequency Analyzer 2131
- Reverberation-time measurements with Digital Frequency Analyzer Type 2131
- Multi-channel noise monitoring
- Multi-channel sound, vibration and electrical measurements

### FEATURES:

- Dual 8-channel system (Main and Subsidiary Multiplexers)
- Scanning of Main Multiplexer under manual, automatic or external control
- Both multiplexers controllable from IEC 625-1 bus interface
- By-passing or selection of individual channels
- Standard 7-pin B & K microphone socket inputs
- Dual-function input/output sockets
- Choice of 0 V, 28 V or 200 V polarization voltages
- Individual  $\pm 3$  dB channel sensitivity adjustment
- Dual-LED tuning-type indicator for calibration with Pistonphone or Microphone Calibrator
- Frequency response 2 Hz to 200 kHz  $\pm 0,5$  dB
- Crosstalk less than  $-80$  dB up to 20 kHz, less than  $-60$  dB up to 200 kHz



### Introduction

The Type 2811 is a dual 8-channel multiplexer intended mainly for acoustics applications. Its microphone inputs take the form of standard B & K 7-pin sockets which provide the power for microphone preamplifiers and a choice of polarizing voltage for condenser microphones. The 2811 provides transient-free electronic switching between channels under automatic, manual or external control. The selected channel is available at the output. Full conformity with the IEC 625-1 digital instrumentation bus permits the 2811 to be used in a variety of advanced acoustic, monitoring and automatic test applications.

### Description

#### Scanning Characteristics

Scanning may be performed either manually or automatically.

For manual scanning, a single "Reset — Step" front-panel paddle switch is provided. When pressed upwards this switch resets the Multiplexer to the channel with the lowest number which is not inhibited. When pressed downwards, it steps the Multiplexer to the next (higher numbered) channel which is not inhibited. Each channel is provided with its own three-position "Select - Inhibit" switch. The upper, spring-biased setting enables the corresponding channel to be selected (for

calibration, for example), overriding any scan which may be in progress. The lower setting inhibits the corresponding channel, causing it to be by-passed during a scan.

The channels may also be scanned automatically, using the built-in scan generator, or externally from a suitable clock source via an "External Scanning" Input socket or via the IEC Interface.

The built-in generator provides 9 scan rates, with channel dwell times from 1/16 s to 16 s in a binary sequence. It may be stopped and reset using the "Reset — Step" switch. When this switch is released again, the generator starts on a whole new dwell period with the channel selected.

An external clock and reset timing-generator can be connected to the "External Scanning" Input. When the manual mode is selected, both the external clock generator and the "Reset — Step" switch can control the scanning. If the external mode has been selected, only the external clock generator is allowed to control the scanning. Examples of suitable external clock generators are Sound Power Calculator Type 7507, Building Acoustics Analyzer Type 4418 and another 2811 ("External Scanning Out" socket).

The scan may also be controlled by a digital instrumentation bus con-

forming to the requirements of IEC Publication 625-1, IEEE Std. 488 and ANSI MC 1.1-1975. A 5-digit switch on the rear panel enables the device address to be selected by the user. The bus interface may be used to exercise full control of the scanning, i.e., selection of a specified channel, selection of the output of another, cascaded 2811 ("From Extension"), step to next channel or reset to first channel.

To minimise the risk of problems with ground loops, the common line (ground) of the digital circuitry of the 2811 is connected permanently to its chassis. This is separated from the analogue signal common (screen) by a non-linear link, which offers a high resistance to induced noise currents, but a low resistance to fault currents. The two common lines may also be linked by a metal strap available at the rear panel.

When the 2811 is connected to a digital instrumentation bus, a Subsidiary Multiplexer is available in the same cabinet. This Subsidiary Multiplexer operates on the same eight inputs as the Main Multiplexer, but is unaffected by any of the front panel switch settings. Selection of a specified channel on the Subsidiary Multiplexer is made via the bus (see Fig.1).

Up to four 2811s may be connected in cascade, giving a multiplexer system of up to 32 channels. When such a system is controlled via an instrumentation bus, only one address need be used; or each 2811 can have its own address. When only one address of the bus is used, interface control of scanning functions is limited to stepping and resetting of the Main Multiplexers.

### Signal Characteristics

Microphone input to the 2811 is by eight B & K standard 7-pin preamplifier sockets, which also carry power supply lines for B & K microphone preamplifiers (Types 2618, 2619 and 2627) and polarizing voltages for condenser microphones. A single switch on the rear panel selects polarizing voltages of zero, 28V or 200V. Each channel is provided with a BNC Direct Input /Output socket, which may be used either for monitoring or recording in-

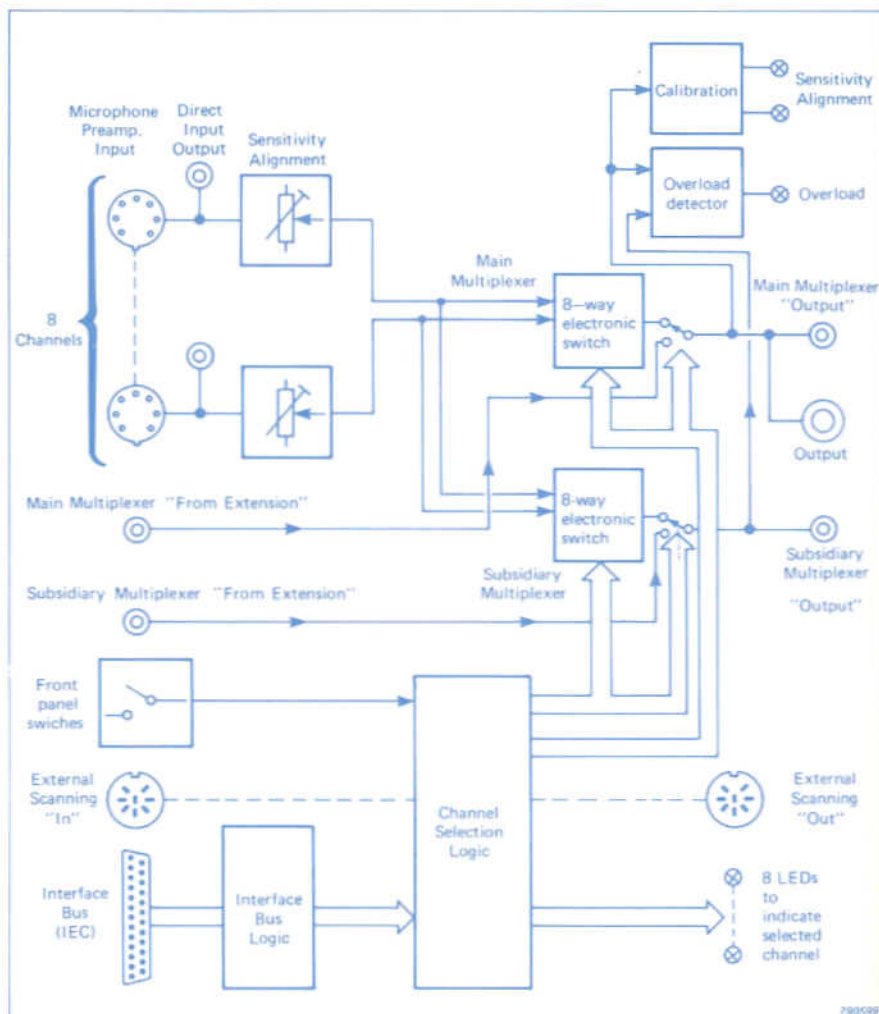


Fig.1. System diagram of Type 2811

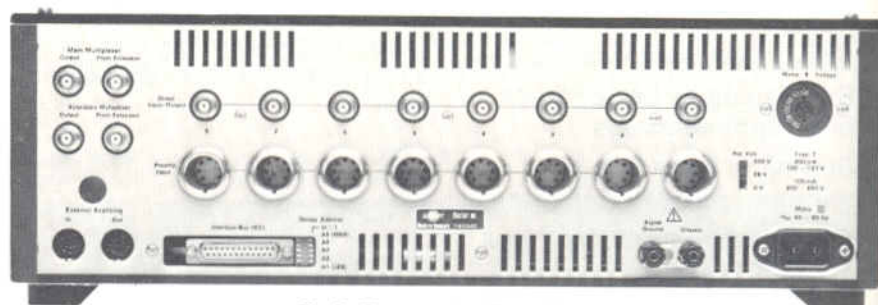


Fig.2. Rear panel of Type 2811

dividual microphone outputs, or as an input for non-acoustic signals (such as vibration or general instrumentation signals) to the multiplexer.

Each channel input is provided with  $\pm 3$  dB sensitivity adjustment, for easy calibration with Pistonphone Type 4220 or a Sound Level Calibrator Type 4230 when the Multiplexer is being used in sound measurement systems. A tuning-type Sensitivity Alignment indicator,

employing two LEDs, permits easy adjustment of all eight channels.

The Main Multiplexer signal output is available at both front and rear panels. The Subsidiary Multiplexer signal output is present only on the rear panel.

The maximum output level in both multiplexers is 5 V peak; when this is exceeded, an LED lights to indicate overload. The input limits are from 3.5 V to 7 V peak, depending

on the Sensitivity Alignment setting. The 2811 has an extended frequency response from 2 Hz to 200 kHz ( $\pm 0.5$  dB limits), enabling it to be used with a wide variety of transducers. Over the audio frequency range of 20 Hz to 20 kHz, for which it is primarily intended, the response is flat within  $\pm 0.1$  dB.

### Start/Stop Function

The 2811 incorporates a facility which provides additional control of some instruments from an IEC bus. For example, start of an averaging sequence in the Type 7507 Sound Power Calculator cannot be controlled from its own Interface Bus socket. However, this may be controlled from the Interface Bus socket of the 2811 through a control cable to the 7507. Furthermore, Type 1405 Noise Generator and Type 4205 Sound Power Source may be stopped and started via a control cable from the 2811. The instruction to stop or start may be sent to the 2811 over the IEC bus (as in Fig.5).

## Applications

### Sound Power Determination

The Type 2811 Multiplexer has been designed chiefly for making measurements on the sound power of consumer and industrial products in conjunction with the Sound Power Calculator Type 7507.

A single 2811 can multiplex (scan) up to 8 microphones. If more than 8 microphone positions are required, up to three more 2811s may be added, to scan sequentially up to 32 microphones. The multiplexed output is fed to the Sound Power Calculator as shown in Fig.3. Sound power measurements

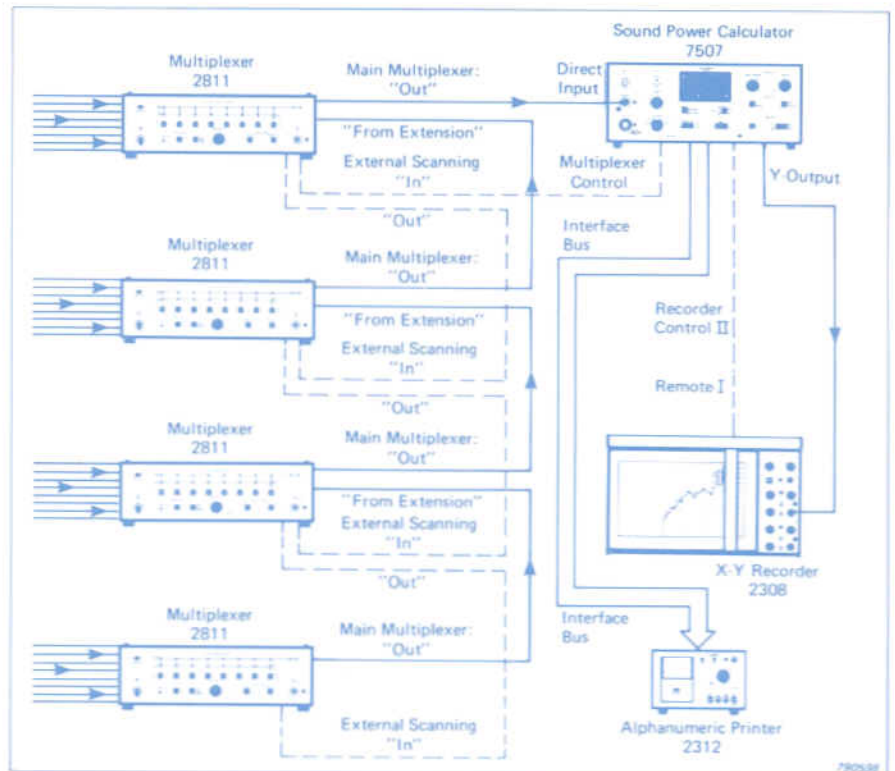


Fig.3. Use of 2811 for sound power determination

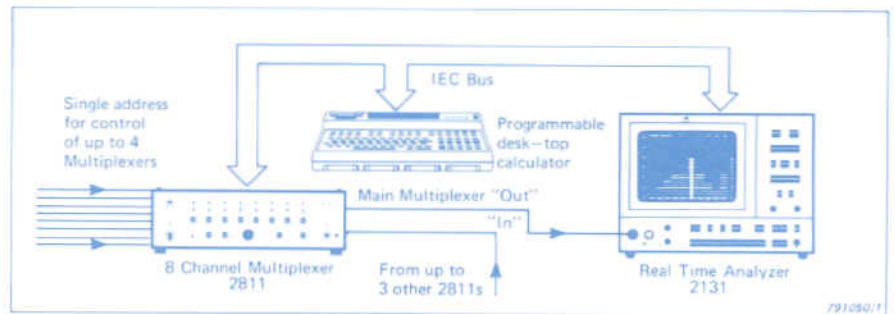


Fig.4. Use of 2811 in frequency analysis or sound power measurement, showing control of up to four 2811s from a single address of the IEC bus

may also be made using a Digital Frequency Analyzer Type 2131 as shown in Fig.4.

### Reverberation Time Measurement

The 2811 may be combined with a Real-Time Analyzer and a calcula-

tor for automated reverberation-time measurements, as shown in Fig.5.

### Building Insulation Measurements

For investigations into noise transmission paths in large buildings, the

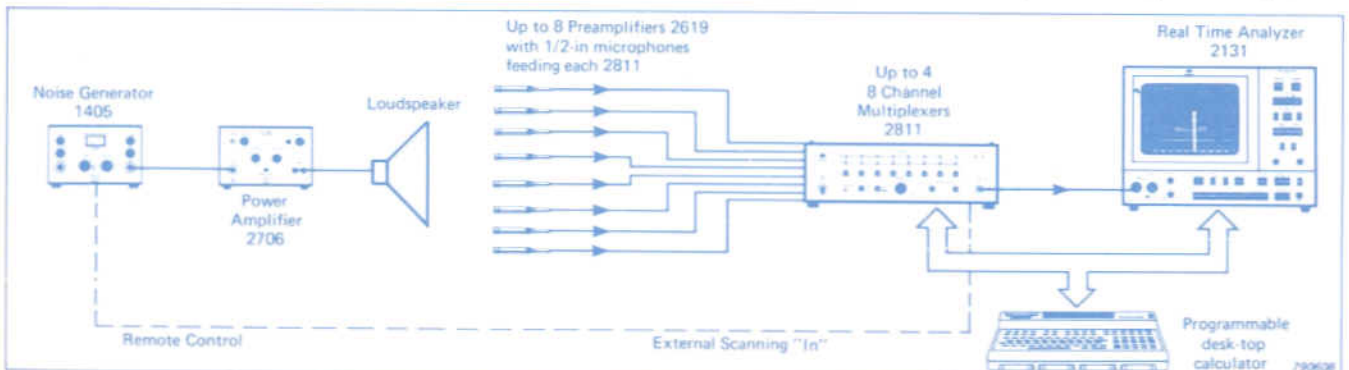


Fig.5. Automated system for reverberation-time measurements

Type 2811 Multiplexer may be used in conjunction with the B & K Type 4418 Building Acoustics Analyzer (or the earlier Type 4417) to facilitate

measurements of sound pressure levels in different parts of the structure. Multiplexers may be used in both source and receiving rooms to obtain

spatial averaging of sound pressure level and measure receiving room reverberation-time.

## Specifications 2811

### Preamplifier Inputs:

**Connector:** Accepts B & K 7-pin plug JP 0701 as used on B & K microphone preamplifiers

**Signal Impedance:** 300 k $\Omega$  in parallel with 50 pF

**Power Supplies:** + 6.3 V DC heater supply and + 12.6 V DC supply (each supply 480 mA total for all eight sockets); + 150 V DC (2 mA) supply; and choice of 0, + 28 V DC or + 200 V DC polarization voltage

**Maximum signal:** 3.5 to 7 V Peak depending on setting of Sensitivity Alignment

### Direct Input/Outputs:

**Connector:** Accepts standard BNC plug JP 0035

**Signal:** As for Preamplifier Inputs (corresponding sockets are wired in parallel)

**Impedance:** When used as monitor with Microphone Preamplifier Type 2619, less than 25  $\Omega$

### "From Extension" Inputs:

**Connector:** Accepts standard BNC plug JP 0035

**Impedance:** Matches Multiplexer "Output"

**Maximum Signal:** 5 V Peak

### Multiplexer Outputs:

**Connectors:** Accepts standard BNC plugs JP 0035. Main Multiplexer output available on front panel socket accepting B & K standard coaxial plug JP 0101

**Impedance:** Less than 20  $\Omega$ . May be loaded with minimum 5 k  $\Omega$  in parallel with maximum 1 nF

**Maximum signal:** 5 V Peak

### Automatic Scanning Control:

9 switch-selectable dwell times, 1/16 s to 16 s. Accuracy  $\pm$  1%

### Manual Scanning Controls:

**Facilities:** Selection of any channel, inhibition of any channel during scanning, stepwise scanning, reset to beginning

### External Scanning "In" and "Out":

Pair of standard 8-pin DIN sockets accepting plug JP 0802 and control cable AQ 0034, for cascade interconnection of up to four 2811 s, carrying all scanning control signals

"In" interfaces fully to the Type 7507 Sound Power Calculator and the Type

4418 Building Acoustics Analyzer, and may be used for other combinations (open-collector TTL-compatible)

Both "In" and "Out" carry a signal (pin 5) which may be set (low) and reset (high) via the Interface Bus

### Interface Bus (IEC):

**Connector:** 25-way male connector accepting cables AO 0194 and AO 0184. Conforms to IEC 625-1, compatible with IEEE Std. 488/ANSI MC1.1

**Functions implemented:** Source Handshake (SH $\emptyset$ ), Acceptor Handshake (AH1), Talker (T $\emptyset$ ), Listener (L2), Service Request (SR $\emptyset$ ), Remote Local (RL1), Parallel Poll (PP $\emptyset$ ), Device Clear (DC $\emptyset$ ), Device Trigger (DT $\emptyset$ ), Controller (C $\emptyset$ )

**Main Multiplexer Facilities:** Selection of a specified channel, Selection of "From Extension" input, Step to next channel, Reset to first channel

**Subsidiary Multiplexer Facilities:** Selection of a specified channel (1 to 8), Selection of "From Extension" input

**Start/Stop instructions:** Commands to another instrument via External Scanning sockets (pin 5)

### Signal Characteristics:

**Frequency Response:** 2 Hz to 200 kHz  $\pm$  0.5 dB, 20 Hz to 20 kHz  $\pm$  0.1 dB

**Max. total harmonic distortion:**

| Sine Output Level | 2 Hz to 20 kHz | 2 Hz to 200 kHz |
|-------------------|----------------|-----------------|
| 1 V RMS           | 0.03%          | 0.2%            |
| 3.5 V RMS         | 0.1%           | 0.3%            |

**Maximum crosstalk:** -80 dB, 2 Hz to 20 kHz; -60 dB, 2 Hz to 200 kHz (with 50  $\Omega$  source impedance at all inputs)

**Maximum broadband noise:** 12  $\mu$ V, 2 Hz to 20 kHz; 30  $\mu$ V, 2 Hz to 200 kHz

**Interference rejection:** 100 A/m magnetic field increases broadband noise in the audio range (20 Hz to 20 kHz) to not more than 20  $\mu$ V

### Calibration Facility:

Enables alignment of connected microphones to within  $\pm$  0.1 dB relative to each other, and to output selectable, 12.5 or 50 mV/Pa  $\pm$  0.25 dB (plus calibrator deviation), dependant on sensitivity of connected microphones. Range of adjustment  $\pm$  3 dB

### Temperature Range:

**Operating:** 5° to 40°C (41° to 104°F)

**Storage:** -25° to 70°C (-13° to 158°F)

### Humidity Range:

0 to 90% relative humidity providing there is no condensation

### Dimensions (nett):

**Height:** 132.6 mm (5.22 in)

**Width:** 430 mm (16.9 in)

**Depth:** 200 mm (7.87 in)

### Weight:

6.5 kg (14.3 lb)

### Cabinet:

Supplied as model A (light-weight metal cabinet), B (mahogany cabinet), or C (as A but with flanges for mounting in standard 19-in rack)

### Power Supply:

100, 115, 127, 200, 220, 240 V single phase AC mains 50/60 Hz. Approximate power ratings are 13 VA alone, 21 VA with 8 Microphone Preamplifiers Type 2619, and 28 VA with 8 Microphone Preamplifiers Type 2627. Complies with safety class II of IEC Publication 348 and requirements for U.S. FCC class B Computing Device in respect of electromagnetic compatibility

### Accessories included:

|                      |         |
|----------------------|---------|
| 1 mains cable        | AN 0020 |
| 4 BNC plugs          | JP 0035 |
| 1 B & K coaxial plug | JP 0101 |
| 2 8-pin DIN plug     | JP 0802 |
| 2 100 mA fuses       | VF 0026 |
| 3 200 mA fuses       | VF 0012 |
| 2 4-mm banana plugs  | JB 0002 |
| 1 screwdriver        | QA 0001 |

### Accessories Available:

|   |         |
|---|---------|
| Control cable   | AQ 0034 |
| IEC 625-1 interface cable (2 m)                           | AO 0194 |
| IEC (male, slide-lock) to IEC 625-1 interface cable (2 m) | AO 0184 |
| Adaptor to convert IEEE instrument to IEC 625-1           | AO 0195 |
| BNC signal cable (0.6 m)                                  | AO 0133 |
| BNC signal cable (1.2 m)                                  | AO 0087 |
| BNC signal cable (3 m)                                    | AO 0142 |
| Coaxial screened cable in free length                     | AC 0002 |
| Screened 7-core cable                                     | AC 3029 |