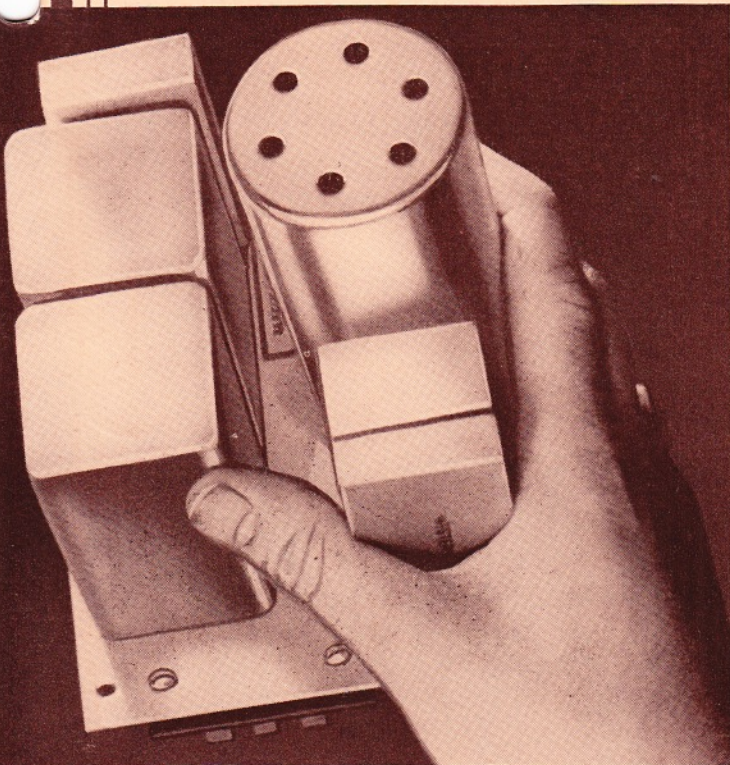


Western Electric



Pre-mixing and
Low Level Amplification

Tandem Operation
for Double Gain

High Overall Quality,
Space Economy
and Low Cost

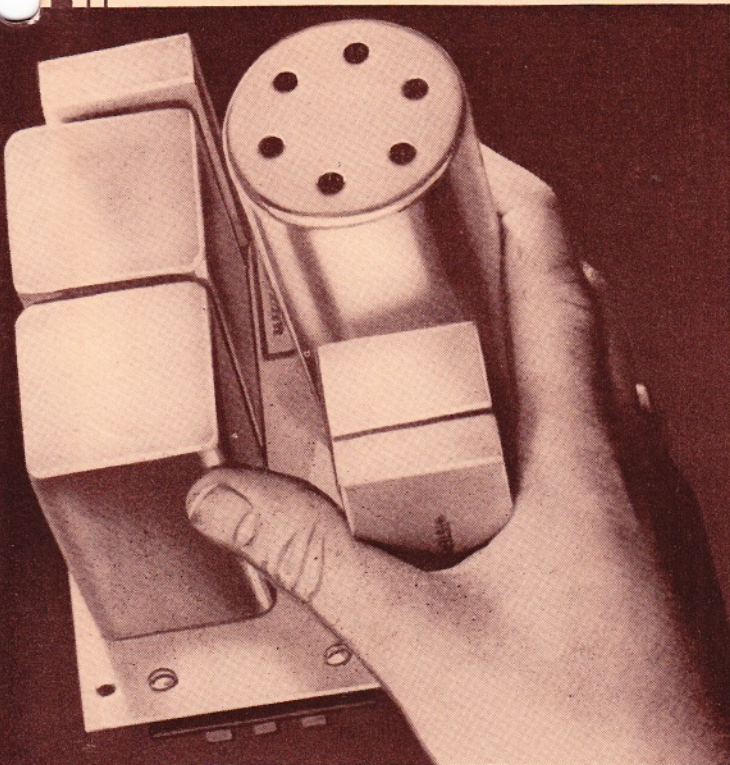
104B PRE-MIXING AMPLIFIER AND 15A RECTIFIER

THE 104B is another of Western Electric's advanced type, compact amplifiers, designed by Bell Telephone Laboratories. It is used in modern studio amplifier channels especially as a pre-mixing or low level amplifier to improve the signal to noise ratio by raising the audio levels at which the mixing function takes place. The 104B provides improved performance characteristics which field experience with its predecessor, the popular 104A, have proved desirable.

The 104B is housed in the smallest practicable space and provides every feature which the radio engineer demands of an up-to-the-minute pre-amplifier. It is the same size as the 104A Amplifier and mounts interchangeably with it.

In addition to its use in new installations the 104B should be selected when conversion to high level mixing is planned for existing studio channel bay equipments, such as Western Electric 701A. In such instances the compactness of the 104B makes it possible for a number of these amplifiers to be installed in existing bay cabinets.

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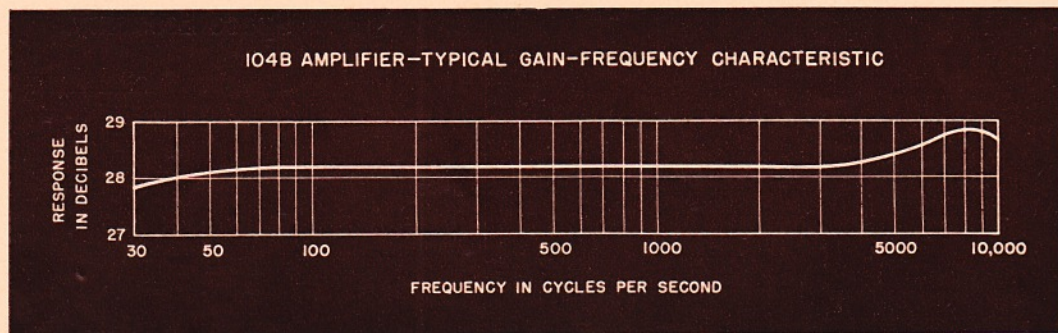
In addition to its use in new installations the 104B should be selected when conversion to high level mixing is planned for existing studio channel bay equipments, such as Western Electric 701A. In such instances the compactness of the 104B makes it possible for a number of these amplifiers to be installed in existing bay cabinets.

Western Electric

104B PRE-MIXING AMPLIFIER and 15A RECTIFIER

The 104B is a single stage, fixed gain amplifier with a gain of approximately 28 db. It will operate from an impedance of 30 or 250 ohms into an impedance of 30 or 500 ohms and may be used with either a dynamic or a ribbon type microphone. The frequency response is flat within ± 1 db from 30 to 10,000 cycles. For output levels as high as -20 db, the noise and distortion contributed by this amplifier are negligible when input and output impedances are properly matched and the recommended plate current and filament voltages are supplied.

Particular precautions have been taken in the design of the 104B Amplifier to guard against noise due to exposure to external magnetic fields and this is largely accomplished through the use of a doubly shielded input transformer.



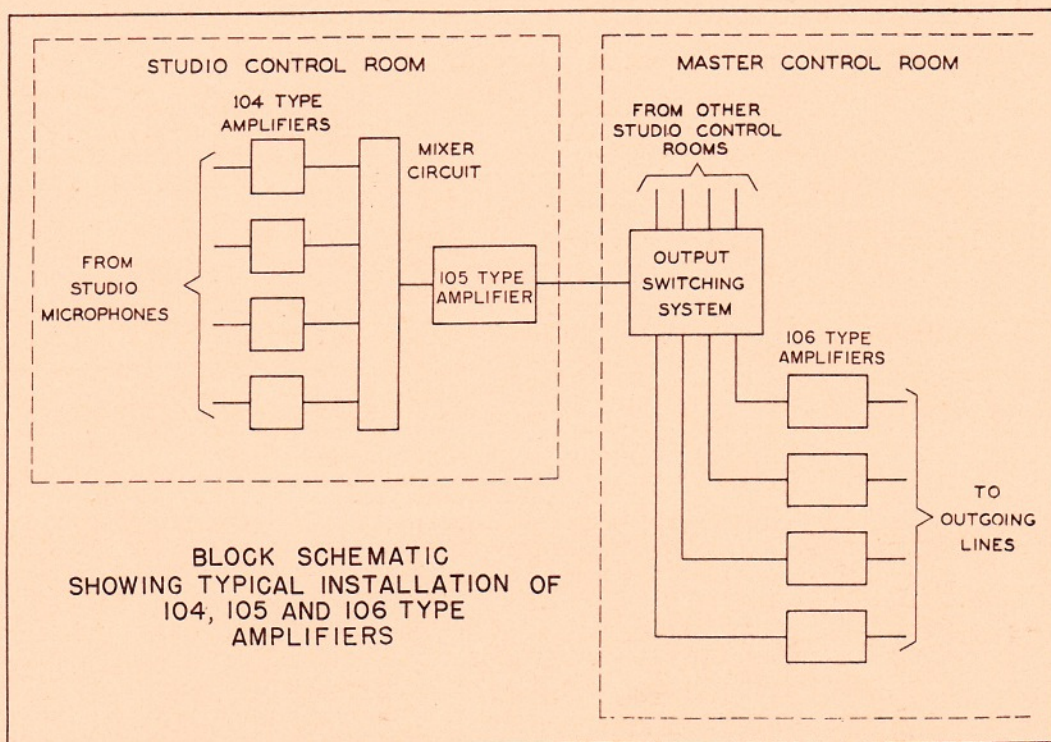
Assembly

The component parts of the 104B Amplifier are assembled on a $5\frac{1}{4}$ " x $4\frac{7}{8}$ " steel base designed for mounting on a 998 type Mounting Plate. The terminals of the amplifier project through the base into the recessed portion of the mounting plate where they are protected by the front mat. The mounting plate occupies only $5\frac{1}{4}$ " of space in a standard relay rack or equipment cabinet and accommodates as many as three 104B Amplifiers.

Plate Current Readings

The 998A Mounting Plate has a blank front mat while the 998B and the 998C have convenient switching facilities which connect an external meter to each amplifier for measuring the vacuum tube plate current. In the Western Electric 701A Speech Input Bay, the 262A Meter Panel is used for measuring the plate current. Where the 105 type Amplifier is available, its plate current meter acts in this capacity. In other applications, a Western Electric KS 10003 Meter may be used or, if this is not available, a 0.2 scale milliammeter with a 2,000 ohm series resistance may be included in the circuit and the meter reading multiplied by 20 to indicate the actual plate current of the vacuum tubes.

104B PRE-MIXING AMPLIFIER and 15A RECTIFIER



Power Supply

Each 104B Amplifier requires 0.32 ampere at 10 ± 0.3 volts AC for the tube filament. In addition, a properly filtered plate supply of approximately 0.6 milliampere at 200, 250 or 375 volts DC is required for each amplifier. Separate terminals are provided in the amplifier for each voltage. When a rectifier is used that does not include a complete filter circuit, it is recommended that a Western Electric 221A Retardation Coil and an 8 mf electrolytic condenser be used for each group of six pre-amplifiers in order to obtain proper plate supply filtering.

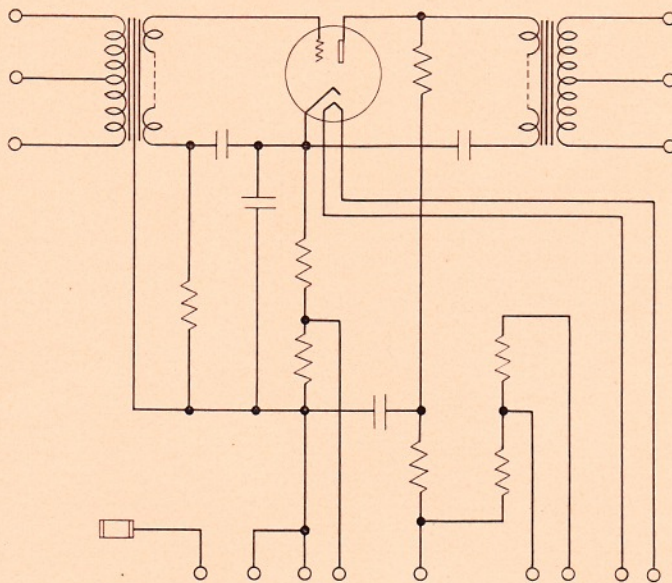
When from one to six 104B Amplifiers are used with the Western Electric 701A Speech Input Bay, the AC filament supply is available through the medium of the 263A Voltage Regulator Panel. The plate supply is available from the 8 type Rectifier and the 716A Filter. For installations using the 105 or the 106 type Amplifiers, filament and plate supplies for the 104B Amplifiers may be obtained from either of the former. The 105 type, without change, is capable of supplying power for six 104B Amplifiers and, with the addition of an external plate supply filter section consisting of a Western Electric 221A Retardation Coil and an 8 mf condenser, is capable of supplying up to twelve 104B Amplifiers. The 106 type Amplifier has an equivalent capacity except that it is necessary to add externally one

Western Electric

104B PRE-MIXING AMPLIFIER and 15A RECTIFIER

filter section similar to that described for the 105 type Amplifier for each group of six 104B Amplifiers.

When none of the power sources mentioned in the foregoing paragraphs is available, then a Western Electric 15A Rectifier is particularly recommended to supply plate and filament power to as many as twelve 104 type Amplifiers. Detailed description of this Rectifier is given on page 6 of this bulletin.



Schematic Diagram of 104B Amplifier

SPECIFICATIONS

Electrical Characteristics

Gain

Approximately 28 db.

Output Power

60 microwatts (-20 db)

Output Noise Level

Negligible

Distortion

Negligible

Source Impedance

30 or 250 ohms

Output Impedance

30 or 500 ohms

Frequency Response

Flat within ± 1 db from 30 to 10,000 cycles

Power Supply

Filament 0.32 amp. at 10 ± 0.3 volts AC or DC

Plate 0.6 milliamperes at 200, 250 or 375 volts DC

Power Consumption

Approximately $3\frac{1}{2}$ watts

Vacuum Tubes

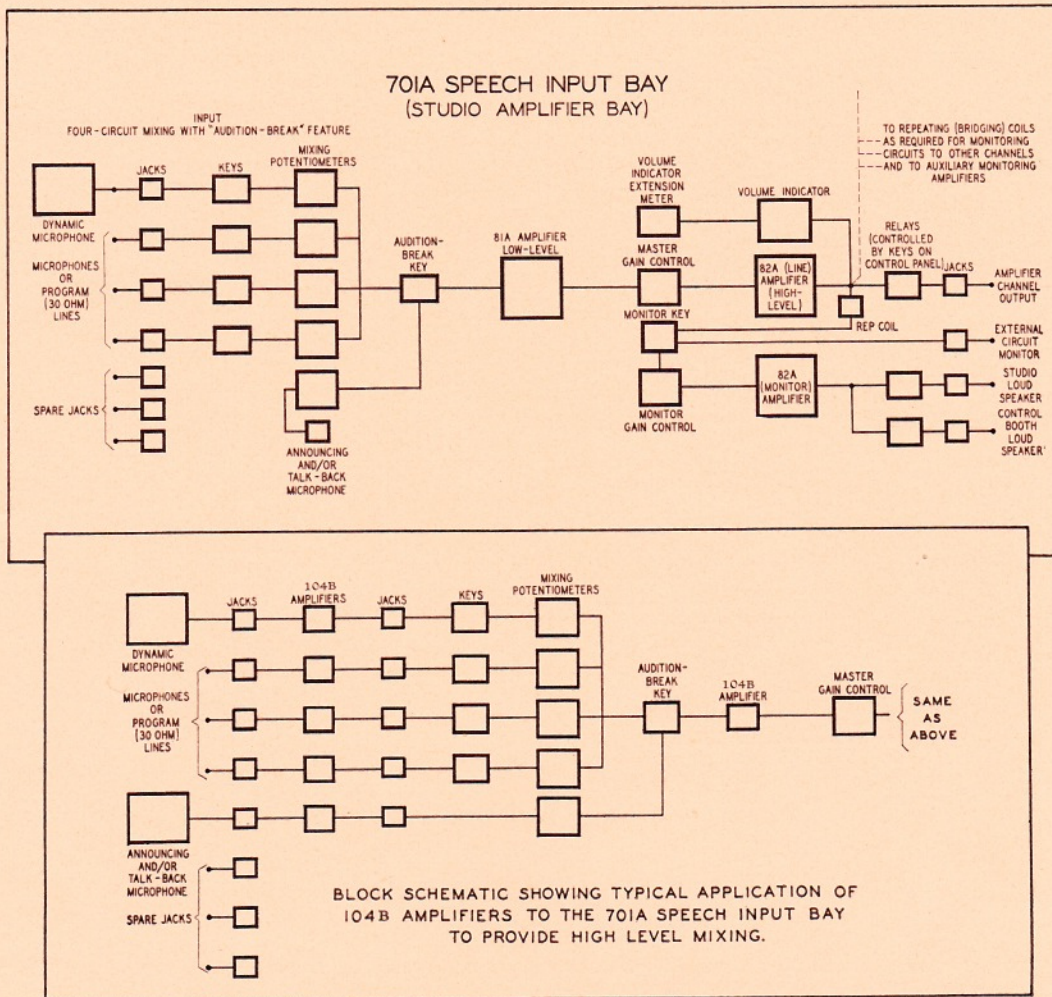
1 Western Electric 262B Vacuum Tube
(Should be ordered separately)

Gain Control

None

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104B PRE-MIXING AMPLIFIER and 15A RECTIFIER



Mechanical Characteristics

Base Size

5 1/4" x 4 7/8"

Depth (Front to Rear)

6 3/4"

Mounting

As many as three 104B Amplifiers may be mounted on a 998A, 998B or 998C Mounting Plate.

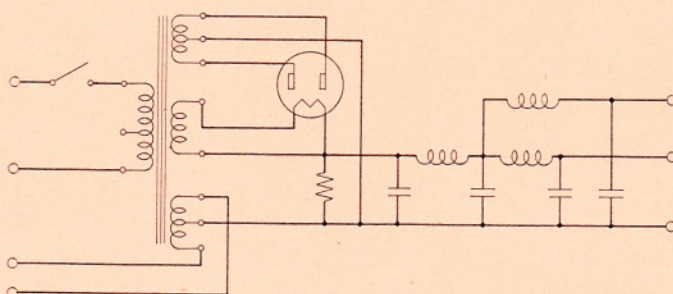
Finish

The front mats of the 998 type Mounting Plate are available in dark aluminum gray or in black finish. Dark aluminum gray is standard and is supplied on all orders unless otherwise specified. The code suffixes shown in the following list designate the color of finishes and the entire code number, including the suffix, should be specified in the order:

Western Electric

104B PRE-MIXING AMPLIFIER and 15A RECTIFIER

Code No.	Finish	Type of Plate Current Meter Switch
998A-15	Dark Aluminum Gray	None
998A-3	Black	None
998B-15	Dark Aluminum Gray	Rotary
998B-3	Black	Rotary
998C-15	Dark Aluminum Gray	Push Buttons
998C-3	Black	Push Buttons



Schematic Diagram of 15A Rectifier

15A RECTIFIER

Western Electric's new, compact 15A Rectifier is a full-wave vacuum tube rectifier, specifically designed to supply power to Western Electric 104 type Amplifiers.

The high voltage DC plate supply output consists of two circuits with filters for smoothing the rectifier current. These circuits will deliver a maximum current of six milliamperes each at approximately 250 volts DC. The DC output voltage varies from a maximum of approximately 310 volts when delivering power to one 104 type Amplifier to a minimum of approximately 250 volts when delivering the full output power of 12 milliamperes.

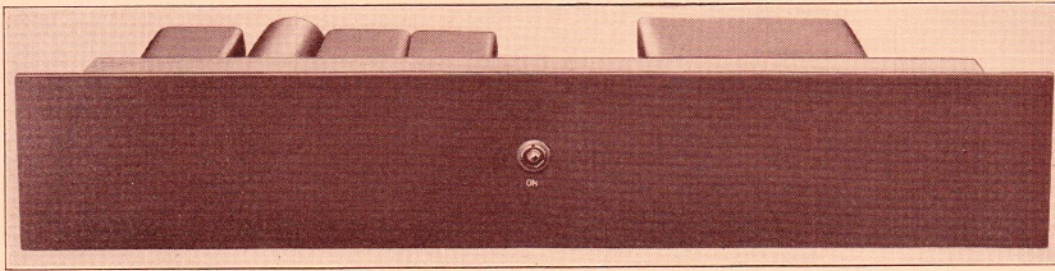
Filament power is supplied by a separate 10 volt winding on the power transformer. This winding will deliver a maximum current of 3.8 amperes at approximately 10 volts which is sufficient to operate twelve 104 type Amplifiers.

The 15A Rectifier operates from a 105-125 volts, 50-60 cycle AC supply. When delivering full load the input power consumption is approximately 60 watts.

The 15A Rectifier is 19" wide, 3½" high and 7" deep. It is designed to mount on a standard relay rack or equipment cabinet. The larger component parts

Western Electric

104B PRE-MIXING AMPLIFIER and 15A RECTIFIER



15A Rectifier—front view

are assembled on the rear of a metal panel with the terminals projecting into a protective recessed section at the front where the smaller components and wiring are located. The panel has a front mat which fastens in place from the rear by means of two screws. It may be removed easily for access to the terminals and the wiring. The power supply switch which controls both the AC and DC output projects through the face of the mat.

Vacuum Tube

One Western Electric 274A Vacuum Tube. (Should be ordered separately.)

Finish

The front mats are finished as specified below. The code number suffix indicates the color. The complete number, including the suffix, should be specified in the order:

Code No.	Finish
15A-3	Black
15A-15	Dark Aluminum Gray

ADDITIONAL INFORMATION

For additional information regarding the Western Electric 104B Amplifier and the 15A Rectifier or other Western Electric Broadcasting Equipment, you are invited to address any Western Electric distributor listed on the last page of this bulletin.



DISTRIBUTOR IN THE UNITED STATES

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International Standard Electric Corporation

67 Broad Street New York, U. S. A.

Associated, Allied or Affiliated Companies

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Cia Standard Electric Argentina,
(Street Address, Calle Cangallo
1286),

Buenos Aires

AUSTRALIA

Standard Telephones and Cables
Pty. Ltd., 258-274 Botany Road,
Alexandria,

Sydney, N. S. W.

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4 Rue Boudevyns, P. O. Box 526,
Antwerp

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Postal 430 (Street Address, Ave-
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Rio de Janeiro

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China Electric Co., Ltd., 269 Lay
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fein, Cairo

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Le Materiel Telephonique, 46
Quai de Boulogne, Boulogne-Bil-
lancourt (Seine), Paris

GERMANY

Standard Elektrizlits Gesell-
schaft A/G., Genest Strasse 5,
Berlin-Schöneberg

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Standard Telephones and Cables,
Ltd., Connaught House, 63, Ald-
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HOLLAND

Bell Telephone Manufacturing Co.,
Scheldestraat 160-162,
The Hague

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Standard Villamosagi Reszveny
Tarsasag, Ujpest 4, n. Budapest

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Ltd., 4, Esplanade East (P. O.
Box 413), Calcutta

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Fabbrica Apparecchiature per
Comunicazioni Elettriche, via
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Milan, (5-19)

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Nippon Electric Co., Ltd., 2 Mita
Shikokumachi, Shiba-Ku, Tokyo

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Radio, S.A. 37 Calea Victoriei,
Bucuresti

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dries St. (P. O. Box 515),
Pretoria

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Standard Electrica, S/A., Calle
Ramirez de Prado 7 (Post Office
Box 7940), Madrid

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Bell Telephone Manufacturing Co.,
10 Bubenberglplatz, Berne

YUGOSLAVIA

Jugoslavensko Standard Electric
Company, Akcionarno Drustvo,
Kralja Aleksandra ul. 17,
Beograd