SHURE

MICROPHONES

AND

ACOUSTIC DEVICES

CATALOG No. 157

FOR INFORMATION ON SHURE PICK-UPS AND CARTRIDGES SEE CATALOG No. 158

SHURE

BASIC CONSIDERATIONS IN MICROPHONE APPLICATIONS

Three Basic Types: A microphone is an instrument for converting sound energy into electrical energy. This is accomplished by Shure Brothers through three fundamental types of microphones: carbon, crystal, and dynamic. Each employs a specific fundamental principle of operation. Obviously the application determines the type of microphone to be used.

Carbon: In the carbon type, direct current flows through the microphone. As the pressures and rarefactions of the sound wave occur at the diaphragm, they cause the movement of the diaphragm of the microphone to press and release the carbon granules, decreasing and increasing the resistance of the microphone. Pulsating direct current results, the pulsating or alternating part having the same wave form as the original sound wave. High output level and ruggedness are characteristic of a carbon microphone. It is also practically unaffected by heat and humidity. Its high output is advantageous wherever space and weight are a factor, due to the fact that one or two preamplifier stages may be eliminated. The carbon microphone is widely used by military services, police, amateurs, airline and railroad companies for mobile communications.

Crystal: Crystal microphones employ Bimorph Rochelle salt crystals. The crystal element consists of two Rochelle salt slabs which are assembled in such a way that they respond to bending stresses. The two slabs are provided with three foil electrodes so that the assembly is capable of generating a potential between the inner and outer foils when subjected to a strain or bend.

In actual construction, a drive pin is connected to one or two corners of the crystal and the other end of the drive pin is attached to a diaphragm. The movement of the diaphragm and drive pin bends the crystal in accordance with the pressure of the sound wave. This creates an alternating potential of substantially the same wave pattern as the sound wave. A crystal microphone does not require a separate voltage or current source. The output of the microphone can be connected directly to the grid of an amplifier tube.

Crystal microphones are excellent general purpose microphones. They are available in specially designed models for communications use as well as standard models for public address and recording. Crystal microphones are also built by Shure Brothers for special applications, such as measuring of sound level, etc.

Dynamic: The moving-coil dynamic microphone consists of a coil element attached to a diaphragm. The coil element is suspended in a magnetic field. The sound wave, acting upon the diaphragm, causes the coil of wire to cut lines of flux in the magnetic field, with the result that a voltage is generated by the coil. This voltage is alternating in nature and corresponds to the original form of the sound wave on the diaphragm.

Shure Dynamic Microphones are available in a variety of models. Some are ideal for low cost communications work; others are perfect for high quality public address; and some models have been especially designed for high quality broadcasting.

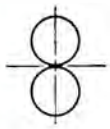
The advantages of a dynamic microphone are many. It is available in low or high impedance, thus permitting the use of long cable lengths. Shure Dynamic Microphones are very rugged and are not affected appreciably by severe conditions of weather, humidity, and handling.

Polar Response Characteristic: The microphone is the heart of the sound system. The difference between having a good or bad installation begins with the proper choice of the microphone. When you select a microphone, the greatest consideration should be given to the polar response of the unit, more commonly known as the "pickup pattern." Polar response characteristic describes the variation

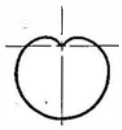
of sensitivity as a function of the direction of arrival of sound. It is commonly published as a function of angle in the horizontal plane. Microphones are available with the following polar characteristics:

1. Nondirectional—picks up sound with equal sensitivity from all directions.

2. Semidirectional (conventional type)—Practically nondirectional at low frequencies, becoming increasingly directional at higher frequencies.



3. Bidirectional—picks up sound from front and rear. Dead at sides.



4. Cardioid — microphone has heart-shaped pickup pattern—sensitive at front, dead at rear. Ratio of front-to-rear sensitivity for sounds arriving at random, 7 to 1.

5. Super-Cardioid—Improved cardioid pattern. Sensitive at front, dead at rear. Ratio of front-to-rear sensitivity for sounds arriving at random, 14 to 1.

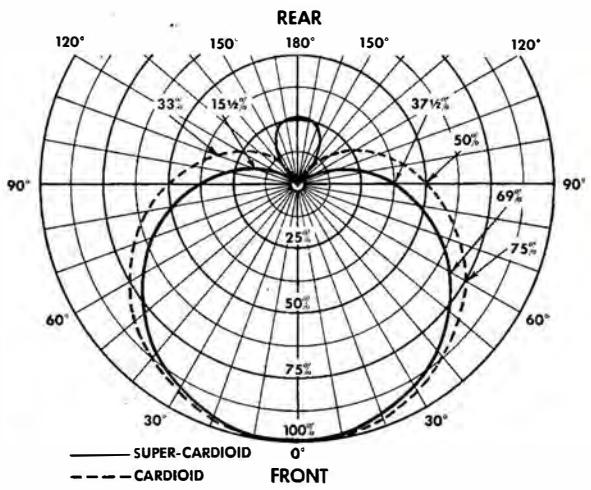
The latter two types of microphones solve many problems in sound and broadcast work. The cardioid and super-cardioid unidirectional microphones have a wide-angle response which diminishes sharply to a pronounced dead zone at the rear. This characteristic is especially helpful in stopping feedback, building up greater volume, simplifying microphone placement, allowing the performers to stand farther away from the microphone, eliminating undesirable reverberation and background noises.

In selecting directional microphones, however, be certain that the cardioid pattern covers the entire frequency range. A chain is only as strong as its weakest link, and if the cardioid microphone is relatively nondirectional at some frequencies, the microphone will feed back and howl at those frequencies. This is particularly common in some microphones at low frequencies.

Uniphase: The Shure Super-Cardioid uses the exclusive Shure Uniphase principle. In the Uniphase, sound acts upon the outside of the diaphragm and also enters a phase-shifting acoustic network within the microphone where it acts upon the inside of the diaphragm. When sound arrives from the front of the microphone, the inner pressure reinforces the outer pressure. When sound comes from the rear of the microphone the inner pressure cancels the outer pressure, causing a large reduction in sensitivity to sound coming from the rear of the microphone. This principle results in a cardioid or super-cardioid microphone with one transducer unit, wide-angle front pickup, and a reduction in pickup of random sound energy of 66% to 73%. The Shure super-cardioid and cardioid polar patterns are shown below.

Frequency Response: Fidelity of reproduction begins with the frequency response of the microphone. The entire system can be no better than the microphone it uses. For high quality Public Address, Broadcasting and Recording, it is essential to have a microphone with a peak-free, extended frequency response. For amateur broadcasting and communications work, it is desirable to provide a full and smooth high frequency end in order to promote crispness and intelligibility of speech at some expense of the overall fidelity. The higher priced Shure microphones are carefully engineered to provide a flat, wide-range response. Even the lowest cost microphones are designed to give peak-free performance with frequency range consistent with the price and best suited to the application for which the microphone is recommended.

Polar Response—Cardioid and Super-Cardioid



SHURE SUPER-CARDIOID

"BROADCAST"

MODEL 556

Model "556" is a Dynamic Super-Cardioid Microphone especially designed for Broadcasting. It is held within extremely close tolerances in frequency response and directivity, and is equipped with a special vibration isolation unit, which eliminates reproduction of vibration transmitted from the stand.

MODEL	CABLE	SHPG. WEIGHT	CODE	LIST PRICE
556	7 ft.	4½ lbs.	RUMUB	$85.00

General: Models 556 and 55 are Super-Cardioid type unidirectional moving-coil dynamic microphones providing wide-range high quality reproduction of sound. The true unidirectional characteristic of the "Unidynes," obtained by the "uniphase" principle provides highly satisfactory operation under adverse acoustic conditions where conventional microphones would be practically useless.

The microphones have a New Acousto-Mechanical circuit containing a moving-coil element, which operating in conjunction with a high flux magnet provides high efficiency and smooth peak free response from 40 to 10,000 cycles. The rear response is down approximately 15 db due to the "uniphase" unidirectional acoustic network.

The new moving-coil unit is provided with a double wind-screen to permit quiet out-door operation. As a precaution against mechanical vibration pickup, the unit in spring-suspended inside the microphone case.

The cases are modern in design with attractive streamlining and grille treatment, and are provided with swivels that allow the microphones to be aimed at the source of sound for best pickup.

Applications: Model 556 is especially constructed and tested to meet the requirements of the broadcast studio, and is held within close tolerances in frequency response and directivity.

Model 55 is suitable for high-quality recording, public address, and similar applications.

The true unidirectional characteristic of the "Unidynes" provides an easy solution to the feedback problem in reverberant locations, facilitates orchestral placement, permits best utilization of space in small broadcast studios, and allows practically complete exclusion of unwanted noises. The swivel allows the head to be tilted through an angle of 90°, permitting the microphone to be aimed at the source of sound.

The microphones are unusually rugged and are practically immune to the effects of moisture, temperature and mechanical vibration.

CALIBRATION SERVICE

As a service to the Electro-Acoustic Industry, Shure Brothers laboratories offer a calibration service on the "556" and "55" microphones for use as secondary standards. The price for a calibration from 60-10,000 cycles per second is $25.00, net.

DYNAMIC MICROPHONES

All microphones have the standard 5/8"-27 thread and may be mounted on any Shure desk, banquet, or floor stand.

Model 556 "Broadcast" has a 7-foot two conductor shielded cable, trimmed for the attachment of any type plug. The cable is held by screw terminals in the base of the isolation unit and may be easily replaced by longer lengths.

Model 55 "Unidyne" has 25 feet of two conductor shielded cable with a detachable plug.

Impedance Data: Models 556 and 55 Microphones are of the multi-impedance type. They may be worked directly into a 30-50 ohm line, a 150-250 ohm line, or a high impedance input. Selection of these impedances is accomplished by changing the position of the switch at the rear of the microphone. The switch positions are marked "L" for low impedance (30-50 ohms), "M" for medium impedance (150-250 ohms), and "H" for high impedance (35,000 ohms).

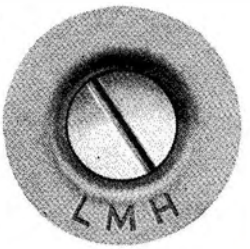
The low and medium impedance positions of the Model 556 may be fed into a standard low or medium impedance input amplifier or into an amplifier with high impedance input. In the latter case, Shure Model A86A Cable-Type Transformer is available for coupling the low impedance line to the amplifier input. The double winding primary of the Shure Model A86A Cable type transformer permits coupling either a 30-50 ohm line or 150-250 ohm line to high impedance input.

The low and medium impedance positions are recommended where long cable lengths are required or under conditions of severe hum disturbances. The permissible line length is practically unlimited, since neither response nor level is appreciably affected by reasonable lengths of line.

The high impedance position on the Models 556 and 55 Microphones may be used with any amplifier with an input impedance of 100,000 ohms or more.

MULTI-IMPEDANCE SWITCH ON MODELS "55" AND "556"

IMPED. TABLE	OUTPUT LEVEL
L—35-50 ohms	56.1 db below 1 Milliwatt per 10 bar signal
M—150-250 ohms	56.8 db below 1 Milliwatt for 10 bar signal
H—High impedance	55 db below 1 volt per bar



"UNIDYNE"

MODEL 55

Model 55 has the same mechanical properties as the 556, with the exceptions noted on the opposite page, referring to the vibration isolation unit. It has been most widely used in high-quality public address, recording, communications, small studio and remote broadcasting.

The Unidyne is perhaps the most widely used and publicized microphone in the world for public address. It has been specified by outstanding acoustic engineers for nationally-known artists and important events.

MODEL	CABLE	SHPG. WEIGHT	CODE	LIST PRICE
55	25 ft.	4½ lbs.	RUMUL	$55.00

TWO NEW HIGH-OUTPUT DYNAMIC MICROPHONES

THE "SONODYNE"

MODEL 51

General: The Model 51 Sonodyne is a pressure dynamic high-output microphone with wide-range frequency response and typical semi-directional pickup characteristics. It features the Shure Multi-Impedance Switch. You may select the proper operating impedance by merely changing the position of the impedance switch. The "Sonodyne" operates on the principle of a moving-coil element in a magnetic field. A high-flux magnet is used in the magnetic circuit, which together with a specially designed moving system and associated acoustic network, provides high efficiency and smooth, peak-free response. Each microphone is provided with a built-in receptacle and a two-conductor shielded plastic-jacketed cable with microphone plug attached. The rich Pearl-Gray case is functionally designed for improved acoustical performance and modern appearance. Frequency response 60-10,000 c.p.s.

Applications: The "Sonodyne" is ideal for all general purpose use, including public address, recording, communications, and similar applications.

IMPEDANCE TABLE	OUTPUT LEVEL
L—35-50 ohms	~~56.5~~ 53.0 db. below 1 Milliwatt for 10 bar signal
M—150-250 ohms	~~56.0~~ 52.5 db. below 1 Milliwatt for 10 bar signal
H—High Impedance	52 db below 1 volt per bar

MODEL	CABLE	SHPG. WEIGHT	CODE	LIST PRICE
51	20 ft.	4⅝ lbs.	RUSON	$31.00

THE "ECONODYNE"

MODEL 52

The "Econodyne" is a sturdy dynamic microphone that offers high-quality performance for low cost. It is a pressure dynamic microphone with smooth frequency response and semi-directional pickup characteristics. Frequency response 60-8000 c.p.s. The microphone is provided with a single-conductor plastic-jacketed attached cable.

Applications: The "Econodyne" is the ideal microphone for low-cost public address, recording, communications and similar installations.

MODEL	CABLE	OUTPUT	IMPED-ANCE	SHPG. WEIGHT	CODE	LIST PRICE
52	15 ft.	52 db below 1 volt per bar	High Impedance	2½ lbs.	RUMIN	$20.00

"MONOPLEX" CRYSTAL SUPER-CARDIOID

The Shure "Monoplex" is a **high output** Super-Cardioid Crystal Microphone with the patented Shure "Uniphase" principle. It employs the same type of acoustic phase shifting network used in the highest cost Shure broadcast microphones. It provides a reduction of approximately 15 db of sound approaching from the rear—over a broad range of frequencies, and reduces pickup of random sound energy by 73%. It offers the advantages of higher-priced super-cardioid performance at low cost. Model 737A is a unidirectional wide-range diaphragm type microphone. The true unidirectional "super-cardioid" characteristic of the "Monoplex" allows highly satisfactory operation under adverse conditions of background noise and reverberation where a conventional microphone would be practically useless. The "Monoplex" contains a diaphragm-type element combined with acoustical networks which cause cancellation of sound pressures for sounds incident from the rear. The crystal is "Metal-Seal" covered to withstand adverse climatic conditions. Case is pivoted at the rear and may be conveniently pointed in the direction of the desired sound, or pointed upwards for non-directional horizontal plane pickup. Pearl Gray finish.

Applications: The Shure "Monoplex" is excellent for high-quality public-address, communications, all types of recording and similar applications.

The true wide-range unidirectional characteristic of the "Monoplex" creates an easy solution to the feedback problem in reverberant locations, facilitates orchestral placement, permits good utilization of space in small recording or broadcasting studios, and allows a practically complete exclusion of unwanted noises.

Frequency response is from 60 to 10,000 cycles over a wide range angle at the front, yet practically unaffected by sound approaching from the rear. (Rear response down approximately 15 db.) Permits more volume without feedback—simplifies microphone and speaker placement—greatly improves systems using conventional microphones.

MODEL 737A

The Shure "Monoplex" is a high-output, unidirectional crystal microphone. It is the only super-cardioid crystal microphone, and as such ranks far above ordinary crystal microphones. Its high output provides that extra "push" that is needed for different applications, where a "strong" voice is a "must." Has special "Metal-Seal" Graphoil Bimorph Crystal for long life. Swivel head permits aiming at source of sound. Built-in cable connector. Standard 5/8"-27 thread. Height 4". Width 3 3/32". Thickness 1 7/8".

MODEL	CABLE	OUTPUT	IMPED.	CODE	LIST PRICE
737A	20 ft.	53 db below 1 volt per dyne per sq. cm.	High Imped-ance	RUMON	$29.00

THE NEW "VERSATEX" VERSATILE CRYSTAL MICROPHONE

MODEL 718A

General: Model 718A "Versatex" is an extremely versatile high-output diaphragm type crystal microphone. The "Versatex," the versatile crystal microphone, is suitable for placement on table top, desk top, or other flat surface; it fits conveniently in the palm of the hand for use as a hand microphone; and it may be used on a conventional floor stand for home recording, public address systems, and similar purposes. The "Versatex," the versatile crystal microphone, has typical semi-directional properties. The crystal used is a Bimorph unit with special-process moisture-proofing. The microphone is provided with a built-in protective resistor to give increased protection against radio frequency burn-outs when used with radio transmitters. The Model 718A "Versatex" is supplied with a 7-foot shielded plastic-jacketed cable.

Applications: The Model 718A Versatex has a frequency response of 60-8000 c.p.s. with a specially engineered voice response for maximum intelligibility. It is the ideal "Ham" microphone and is also very suitable for home recording, low cost P. A. Systems, Call Systems, and similar uses. The durable plastic case of the Versatex makes this microphone especially safe for use with amateur equipment. The cartridge unit is mounted in rubber to provide mechanical isolation from the case, so that the microphone may be handled or carried about without annoying mechanical noise pickup.

Installation: The Model 718A Versatex, is designed for placement on a flat surface and also may be held or carried in the hand. The microphone is provided with a regular 5/8"-27 thread for use on any floor stand. No other connections need be made except the cable connection to the amplifier. Shipping weight 1½ lbs.

MODEL	CABLE	OUTPUT	IMPED.	CODE	LIST PRICE
718A	7 ft.	53 db below 1 volt per bar	High Impedance	RUTEX	$10.00

CRYSTAL MICROPHONES

707A shown on S34B stand

707A CRYSTAL

The Model 707A has been designed to give good-quality performance at low cost. It has good response characteristics, is free from peaks, and has typical semidirectional pickup. It uses moisture-proofed Bimorph Crystal, mechanically isolated. Ideal for voice and music reproduction. Suitable for low-cost P. A. systems, call systems, amateur 'phone transmitters and similar applications.

It is finished in Pearl Gray finish with highly-polished plating on front grille. Natural life-like reproduction. High output level of 53 db below 1 volt per bar at end of cable. Has a seven-foot single-conductor shielded cable with spring protector. The case is a heavy die casting, is simple in design and in excellent taste. Standard 5/8"-27 thread. Diameter 2 3/8". Shipping weight 1 1/4 pounds. Model 707A Crystal Microphone (Stand not included).

MODEL	CABLE	OUTPUT	IMPEDANCE	CODE	LIST PRICE
707A	7 ft.	53 db below 1 volt per bar	High Impedance	RUDOFF	$13.50
707A—20	20 ft.	56.5 db below 1 volt per bar		RUDOK	$15.00

CRYSTAL MICROPHONES

STRATOLINER

The microphone is always in the public eye. It is the only part of the sound system your audience or buyers see. The Shure "Stratoliner" gives you the opportunity to use an expensive-looking microphone even when low cost is an important factor. High output level (53.0 db below 1 volt per bar) with wide-range response (free from undesirable peaks) for good reproduction of either voice or music. Uses genuine Bimorph Crystal. When placed horizontally, the 708A is semidirectional; used vertically (microphone pointed straight up) it becomes non-directional in the horizontal plane, and performers may be placed all around it without frequency discrimination. A swivel is provided to permit tilting of the microphone through an angle of 90°. Case dimensions, diameter 2 1/2", length 4 7/16". Stand thread 5/8"—27. Shipping weight 2 1/2 pounds. Frequency response is 60-8000 c.p.s. Pearl Gray finish.

MODEL	CABLE	OUTPUT LEVEL	IMPEDANCE	CODE	LIST PRICE
708A	7 ft.	53.0 db below one volt per bar	High Impedance	RUDUM	$21.00
708A—20	20 ft.	56 db below one volt per bar		RUVAT	$22.50

"SPECIAL" MICROPHONES AND ON-OFF SWITCHES

SHURE 76B LAPEL MICROPHONE

Designed for Public Address, lecturing, portable transmitters, and all general uses for intelligible reproduction of speech. Permits user to move freely. It is a pressure-actuated diaphragm-type crystal microphone. The crystal used is a Graphoil (high capacity) Bimorph crystal, moisture-sealed. The microphone is inconspicuous, and weighs only 1½ ounces. Response from 40 to 6,000 c.p.s. High frequency response accentuated for maximum intelligibility. Free from undesirable peaks. 1⅞" diameter. Gray finish. Lapel clip. 25-foot shielded single-conductor cable. Shipping weight 1 pound. Output level: 57 db below 1 volt per bar.

Model 76B. Code: RULOP. List Price $27.00.

MILITARY CARBON—100 SERIES

High-quality, carbon microphones specially designed for military and police equipment and other uses where ruggedness and dependability are vital factors. Clear, crisp voice response. High output. Easy to use, fits snugly into palm of hand. Heavy duty switch for push-to-talk performance. Furnished with hook for suspension and bracket for wall mounting, plus Kellogg "Koiled Kord" cable. Adopted as standard microphone by leading manufacturers of police transmitters. Output level: 32 db below 1 volt for 10 bar speech signal. Net weight 14 oz. Shipping weight 1 pound. Case dimensions: 3¾" high, 1¾" deep, 2¾" wide.

MODEL	SWITCH ARRANGEMENT	CABLE	CODE	LIST PRICE
101C	Two Wire Relay Switch normally open (No microphone switch).	4 ft. 4 Conductor Unshielded	RUCEG	$30.00
102C	Relay normally open. Microphone switch normally open.	4 ft. 4 Conductor Unshielded	RUCEM	$30.00

MICROPHONE "ON-OFF" SWITCHES

In many microphone applications a switch is not wanted at the microphone. Therefore switches are not built into Shure Microphones. But, whenever a switch is needed these "On-Off" switches plug into the microphone quickly and conveniently. You can depend on them. No soldering necessary.

Model A83A. Quickly attached to any cable-connector type Shure Microphone. Internal plug establishes connections. Bakelite arrow knob.

Code: RUNIM List Price $4.35

Model A84A. Momentary "On-Off" Switch. Press-to-talk Bakelite disc.

Code: RUNID List Price $4.90

Model A85B. Momentary Relay-Type Switch. Normally-open switch closes circuit comprising one conductor and shield of outgoing cable for operation of relay or other device; remaining conductor and shield of cable carry microphone output. Must be used with two-conductor shielded cable, and only with crystal and high impedance dynamic microphones. Standard Shure cable-connector receptacle. Satin Chrome finish. Bakelite disc. 1¾" high x 1⅛" wide x 2" deep. Furnished without cable. Shipping weight ¾ pound.

Code RUNAT List Price $8.20

A83A

A84A

A85B

STANDS
CABLE TYPE TRANSFORMER

MODERN DESK STAND

Model S36A. Beautiful, streamlined Desk Mount with stable support at correct height. Fits Shure connector-type Microphones, concealing plug in base. Adapter plate and tubing provided for other type microphones. Removable button at front for installation of ⅜″ standard bushing switch or volume control. Pearl Gray finish. Base: 2½″ high, 5″ wide, 7″ long. Shipping weight 1½ pounds. Model S36A. Code: RUSEF. List Price $4.35

TAKE-APART STAND

Model S34B. Handy low-cost stand for desk or hand use. One twist of handle locks it securely in base for use as a table stand, or releases handle for use in hand. Metal base, wood handle. Metal top threaded ⅝″—27. Height over all 6 11/16″. Base diam. 4½″. Length of handle 5⅞″. Shpg. wt. 1 lb.

Code RUKAB. List Price $2.15.

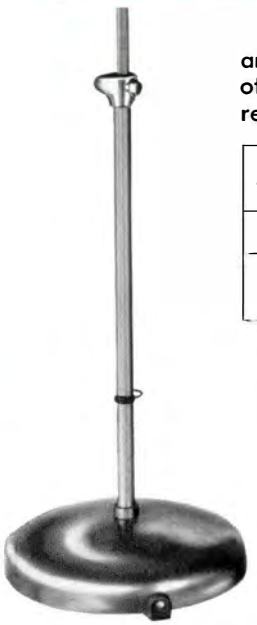
Model A41B. Microphone Handle. Threaded ⅝″—27. Code: RUJAD. List Price $.85

CABLE TYPE TRANSFORMER

Model A86A is a high-quality cable-type transformer which offers additional versatility when used in conjunction with Shure Models 55, 556, and 51 Dynamic Microphones, which employ the impedance matching switch. It solves the frequent problem of installations requiring long lengths of microphone cables without the loss of high-frequency response. Model A86A matches 35 to 50 and 150 to 250 ohm microphones to high impedance amplifier input. Compact, sturdy. Case diameter 1⅝″, length 2⅞″, 7 foot cable. Shipping weight 1½ pounds. Model A86A. Code: RUDEB. List Price $13.10

MODEL A86A

FLOOR STANDS



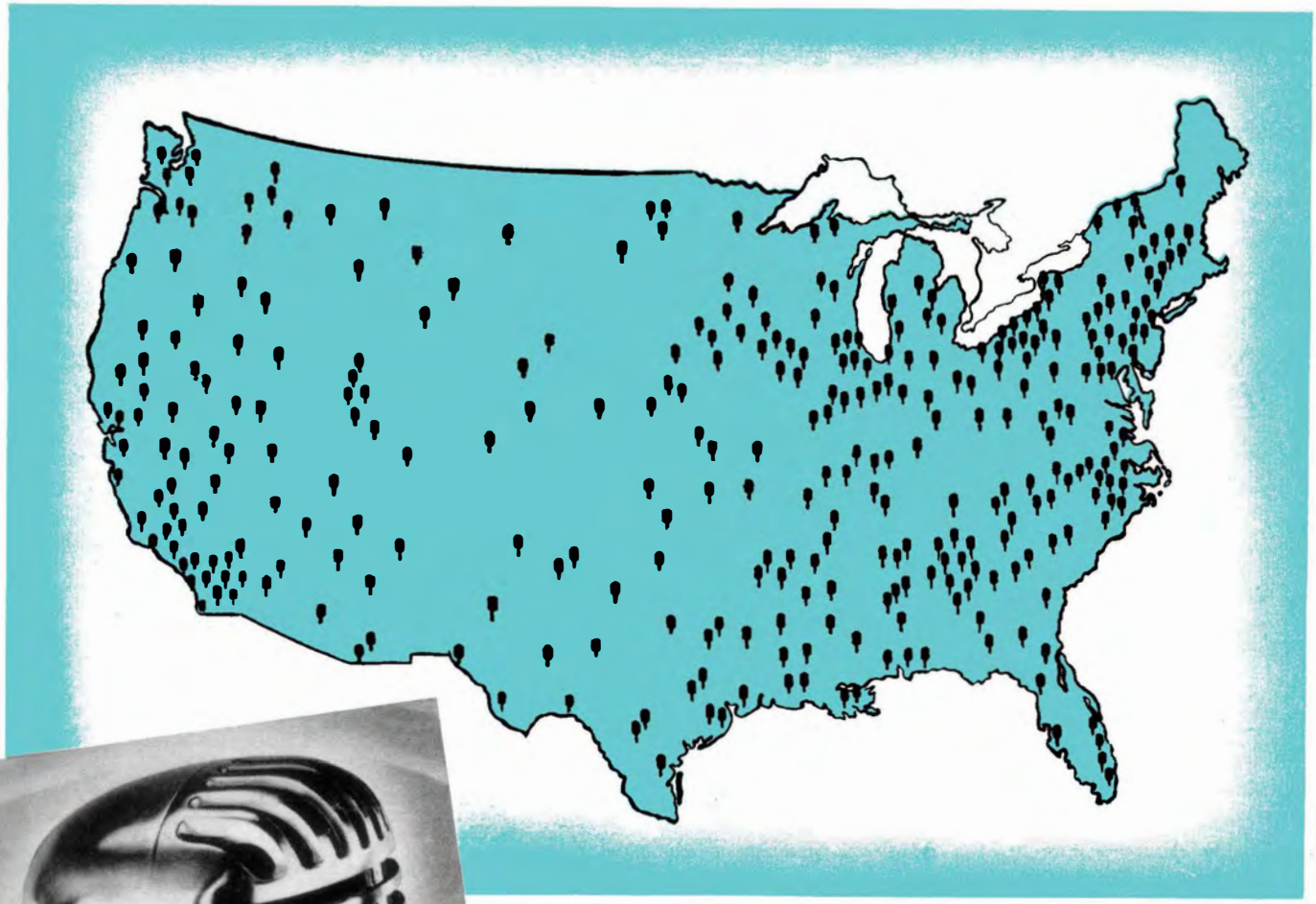
MODEL S61

The new Shure Floor Stands have been designed to look smart and work perfectly. They will fit into any type of installation because of their design and rich hammered finish. Stabilized base cushioning reduces floor noise pickup by 10 to 18 db. Color: Pearl Gray.

MODEL	BASE STYLE	WEIGHT OF BASE	BASE DIAM.	HEIGHT ADJUSTMENT	SHPG. WT.	CODE	LIST PRICE
S61	Round	9¼ lbs.	12″	44″—68″	14 lbs.	RUSIT	$17.50
S65	Tri-pod	9¼ lbs.	17⅞″	46″—70″	14 lbs.	RUSIV	$20.00

Pictured at right is the new Shure Locking Device that is compact and sturdy. Just push the button to raise or lower the microphone. Life-tested 5000 times. This lock is precision made, will stand up under rough and tumble treatment.

MODEL S65



***MANY LEADING RADIO AND TELEVISION BROADCAST STATIONS ARE USING SHURE SUPER-CARDIOID DYNAMIC MICROPHONES FOR STUDIO AND REMOTE PROGRAMS**

***Over 1000 in U. S. alone.**

SHURE BROTHERS, Inc.

Microphones and Acoustic Devices

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