

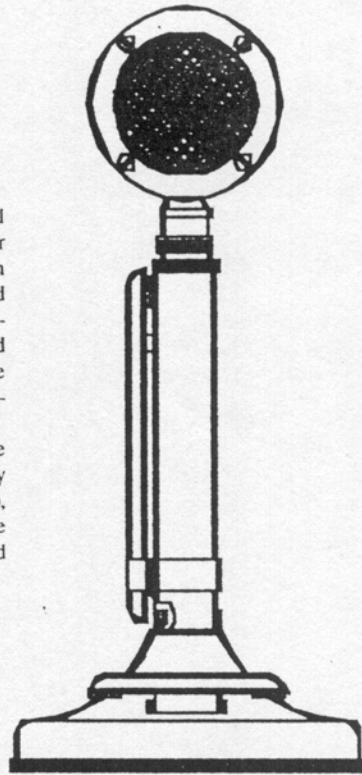
ASTATIC
MADE IN U.S.A.

**WORLD FAMOUS RADIO
COMMUNICATIONS MICROPHONES**

SIMPLY A CLASSIC
The Famous Crystal D104 Family!

**SILVER EAGLE
NIGHT EAGLE**

The ASTATIC SILVER EAGLE features the original D104 Super Talk-Power microphone with a rugged transistor amplifier. The D104 uses a metal sealed crystal, combined with an extra large diaphragm that gives the D104 a distinctive sound that has been the standard which all others have been compared for many years. The Silver Eagle is solidly constructed of brass and die cast zinc, and features an American Eagle embossed on the back of the D104 head. The mic is then polished to mirror finish and bright chrome plated. The ASTATIC NIGHT EAGLE has all of the features of the SILVER EAGLE with a unique new finish. The main mic body is done in a luxurious black, while the press bars, locking clamp, and grille screen are polished and bright brass plated. The NIGHT EAGLE also features an American Eagle embossed on the back of the D104 head.



**SILVER K EAGLE
NIGHT K EAGLE**

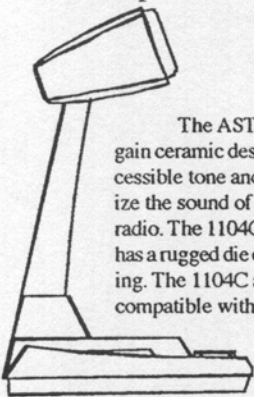
Equipped With ETS Circuitry

The Silver K Eagle and the Night K Eagle are new versions of the amplified D104 microphone. These microphones feature a unique End of Transmission Signal (ETS) with two different and distinctive sounds. The first sound is a Morse code "K" which is the universal telegraph abbreviation for "over". The second switch selectable sound is a multi-tone burst. The unique ETS circuitry has the following features:

- DUAL RELAYS:** Eliminates the annoying receiver pop that other "roger beep" microphones cause on electronics switching radios.
- LONG BATTERY LIFE:** The ETS circuit is only engaged when the microphone is un-keyed.
- FAIL SAFE DESIGN:** When battery power becomes low, the microphone automatically reverts to normal non-ETS operation to allow time to replace the battery.
- SWITCHABLE 20 dB PAD:** Useful to prevent over modulation and feedback on "hot" radios.

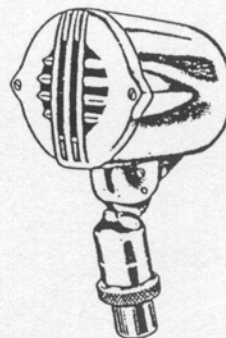
1104C

Dependable Base Station



The ASTATIC 1104C is an amplified high gain ceramic desk microphone. It features easily accessible tone and volume controls to help customize the sound of your voice for best results on any radio. The 1104C uses a standard 9 volt battery and has a rugged die cast zinc base and ABS upper housing. The 1104C amplifier and 6 wire cable make it compatible with all modern radio transceivers.

SILVER SIDEBANDER



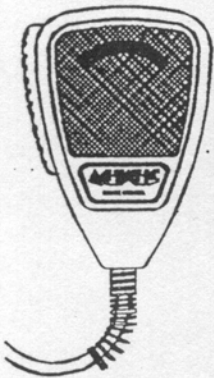
Specially designed for single side band but capable of excellent performance on all communication equipment. The base is attractive high polished chrome finish with grip-to-talk and push-to-talk operation. The 10DAL head is capable of a 90 degree head tilt with adjustable tension.

**A TRADITION OF EXCELLANCE
SINCE 1933**

ASTATIC
MADE IN U.S.A.

636L

Dynamic Noise Cancelling

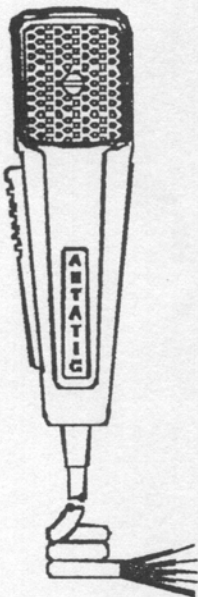


The Astatic 636L is a microphone that was designed for use in situations where there is high background noise levels, such as in trucks. Our commercial version of this mic is used in public service agencies, such as fire departments all over the United States. The 636L has a rugged ABS housing, polyurethane coated steel grille screen, and a dependable low impedance dynamic element.

BUM-1

So Rugged It Has a 3 Year Warranty!

For years this microphone has been used in places like factories and oil fields. Now Astatic is introducing a new version of this microphone to the communications world. The model number of this new microphone is the BUM-1 (Big Ugly Mic!). It has been rewired to work with virtually all C.B. radios and we even threw in a transformer to make it hotter. The microphone still retains all of the best features of the original design. Who says they don't build them like they use to!



Virtually indestructible housing made from Lexan®.

Specially tailored frequency response for maximum talk power with maximum reduction of background noise.

All stainless steel hardware.

Heavy duty leaf switch that is rated for a minimum of one million operations!

Large press-to-talk bar that can even be configured to lock on if desired.

Two way mounting either using a built in retractable steel loop or an included quick release hang up bracket.

Heavy duty, long life coil cord.

The microphone cartridge is protected with a Mylar barrier. If you spill a cup of coffee on the front of this microphone, it won't even notice! Guaranteed to be really UGLY! So ugly only a mother trucker could love....

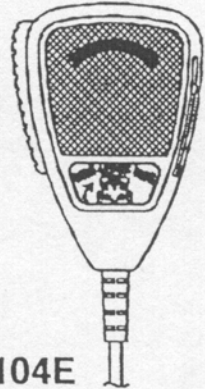
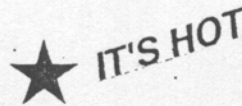
575M-6

Amplified Power Mic With Volume & Tone Controls



The Astatic 575M-6 is a transistorized ceramic hand-held microphone that features a unique combination of tone and volume controls mounted on the front housing. These controls help customize the sound of your voice for the best results on any radio. It uses a standard 9 volt battery, has a rugged ABS housing, and has a polyurethane coated steel grille screen.

ROAD DEVIL



RD104E

The Ultimate In Noise Cancelling

The Astatic Road Devil (Model RD-104E) is an amplified noise cancelling microphone for close talking, hand held applications in CB, Amateur Radio, and SSB communications. The Road Devil features a high gain amplifier with electronic equalization to provide maximum talk power and intelligibility even under noisy conditions. The Road Devil amplifier and 6 wire cable make it compatible with all modern radio transceivers.

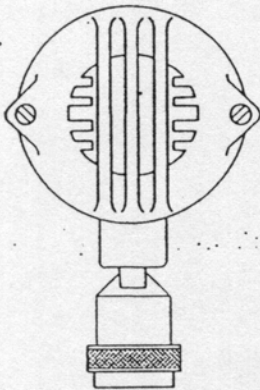
- Amplified Noise Cancelling
- Electronic Equalization for Maximum Talk Power
- Large External Volume Control
- Soft Molded "No-Stain" Vinyl Lip Guard
- Steel Grille Screen
- Rugged ABS Housing in Fire Red or Black
- Heavy Duty 6 Wire Cable
- Uses Standard 9 Volt Battery (Not included)
- Works with ALL modern transceivers

**D104M6 B
D104M6 C**

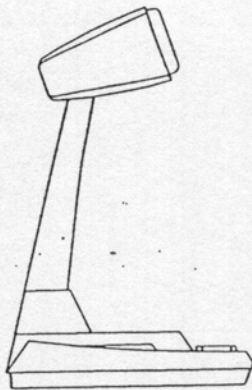
Ceramic Power Mic

The Astatic D104M-6B/C is the hand-held version of the D104 desk mic. Ruggedized for harsh mobile environments, the D104M-6B/C has an attractive chrome plated grille just like it's "big brother" with a tough ABS housing, transistor, amplifier and external gain control. It uses a standard 9 volt battery. The D104M6C has a polished chrome front housing.

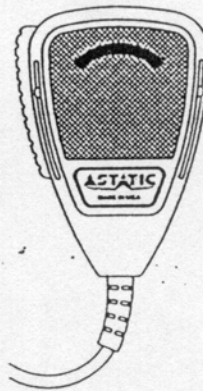




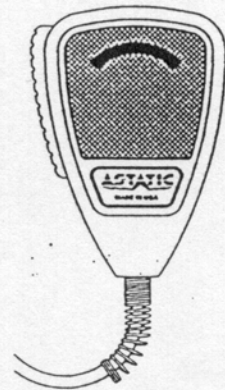
10DAL
10DAL.TIF



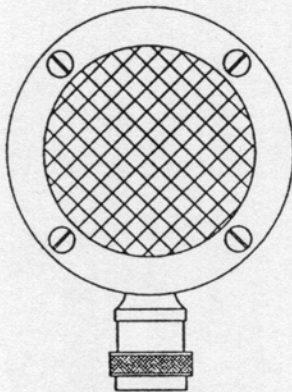
1104C
1104C.TIF



575M6
575M6, DX1, DX2, DX3
575.TIF



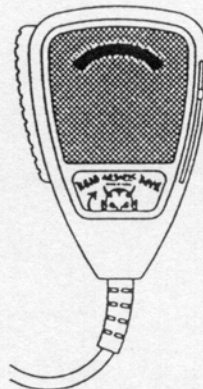
636L
636L DX1, DX2, DX3
636.TIF



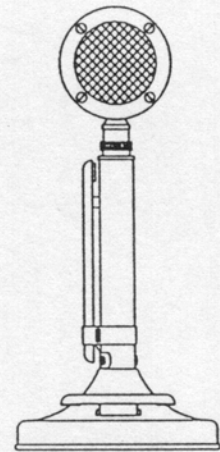
D104L
D104L.TIF



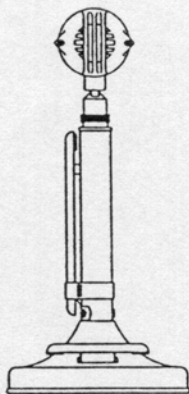
D104M6B
D104M6C
D104M6B DX1, DX2, DX3
D104M6C DX1, DX2, DX3
D104M6.TIF



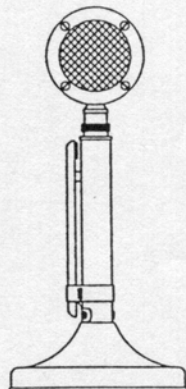
RD104E
RD104E DX1, DX2, DX3
RD104.TIF



SILVER EAGLE
NIGHT EAGLE
SILVER K EAGLE
NIGHT K EAGLE
TUP9D104 SP (SPECIAL)
TUP9D104.TIF



TUP9SE100A
TUP9100A.TIF



TUG9D104
TUG9D104.TIF



REAR VIEW OF
SILVER EAGLE
D104 HEAD
SE_BACK.TIF

ASTATIC
MADE IN U.S.A.

ASTATIC.TIF

ASTATIC

MADE IN USA

ROAD DEVIL

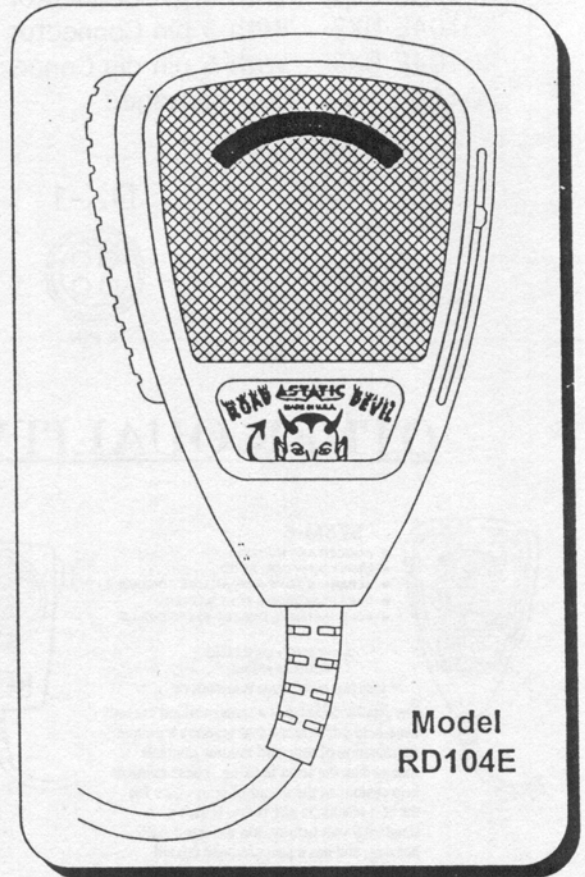
Noise Cancelling Electret Power Microphone

The Astatic Road Devil (Model RD-104E) is an amplified electret noise cancelling microphone for close talking, hand held applications in CB, Amateur Radio, and SSB communications. The Road Devil features a high gain amplifier with electronic equalization to provide maximum talk power and intelligibility even under noisy conditions. The Road Devil amplifier and 6 wire cable make it compatible with all modern radio transceivers.

- ◆ Amplified Electret Noise Cancelling
- ◆ Electronic Equalization for Maximum Talk Power
- ◆ Double PC Board Ground Planes for Maximum RF Feedback Suppression
- ◆ Large External Volume Control
- ◆ Soft Molded "No-Stain" Vinyl Lip Guard
- ◆ Steel Grille Screen
- ◆ Rugged ABS Housing in Fire Red or Black
- ◆ Heavy Duty 6 Wire Cable
- ◆ Uses Standard 9 Volt Battery (Not included)
- ◆ Works with ALL modern transceivers

SPECIFICATIONS

- | | |
|----------------------|--|
| • Type: | Amplified Electret Noise Cancelling |
| • Frequency Response | See Figure 2 |
| • Output Level | Open Circuit, -42 dB (0dB = 1 Volt/microbar) |
| • Impedance | 100 ohms (Matches all transceivers) |
| • Power | 9 Volt Battery (Neda 1604 or equiv. Not included.) |
| • Current Drain | 1.5 mA average |
| • Cable | Six wire, five conductors, one conductor shielded, coil cord. Can be wired to any 3, 4, 5, or 6 wire system. |
| • Housing | Durable Molded Black or Fire Red ABS |
| • Dimensions | 100mm (3 15/16") high x 75.4mm deep. |
| • Weight | 175 grams (6.2 oz.) |
| • Model Number | RD104E |
| • Connector | Available stripped and tinned or configured with 4 pin (DX1), 5 pin (DX2), or 5 pin DIN (DX3). |



Model
RD104E

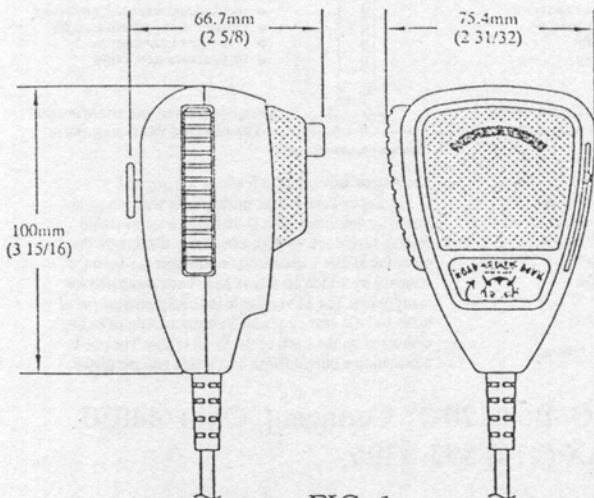


FIG. 1

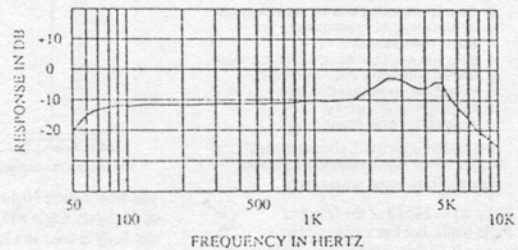


FIG. 2

CONNECTOR-CABLE CLAMPING

If you have purchased a microphone that does not have a connector, and the plug you have selected for your hookup requirements does not have a cable clamp suitable for this small diameter high quality microphone cable, use tubing as supplied by Astatic.

Simply slip tubing over cable prior to soldering of lead wires. Position it to ensure proper clamping of cable and tubing by the connector.

*For best noise cancelling operation, hold the microphone close to your mouth and set the mic. gain as low as possible. On initial setup, it is good practice to turn gain completely down. After turning on the transmitter,

The Astatic Road Devil is available as follows:

Fire Red

Black

RD104E Red No Connector
 RD104E DX1 With 4 pin Connector
 RD104E DX2 With 5 pin Connector
 RD104E DX3 With 5 pin din Connector
 RD104E Bulk Bulk Packaged

RD104E 2 Black No Connector
 RD104E 2 DX1 With 4 pin Connector
 RD104E 2 DX2 With 5 pin Connector
 RD104E 2 DX3 With 5 pin din Connector
 RD104E 2 Bulk Bulk Packaged

DX-1



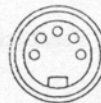
4 PIN

DX-2



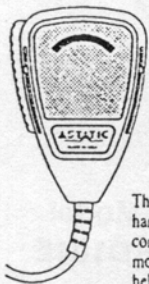
5 PIN

DX-3



5 PIN DIN

OTHER QUALITY ASTATIC MICROPHONES



575M-6

- RUGGED ABS HOUSING
- HEAVY DUTY COIL CORD
- SEPARATE TONE AND VOLUME CONTROLS
- USES STANDARD 9 VOLT BATTERY
- POLYURETHANE COATED STEEL GRILLE

AMPLIFIED CERAMIC MICROPHONE
 LIMITED ONE YEAR WARRANTY

The Astatic 575M-6 is a transistorized ceramic hand-held microphone that features a unique combination of tone and volume controls mounted on the front housing. These controls help customize the sound of your voice for the best results on any radio. It uses a standard 9 volt battery, has a rugged ABS housing, and has a polyurethane coated steel grille screen.

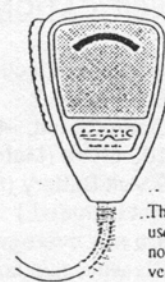


D104M-6B

- RUGGED ABS HOUSING
- HEAVY DUTY COIL CORD
- EXTERNAL VOLUME CONTROL ON BACK
- USES STANDARD 9 VOLT BATTERY
- CHROME PLATED BRASS GRILLE SCREEN

AMPLIFIED CERAMIC MICROPHONE
 LIMITED ONE YEAR WARRANTY

The Astatic D104M-6B is the hand-held version of the D-104 Desk mic. Ruggedized for harsh mobile environments, the D104M-6B has an attractive chrome plated grille just like its "big brother", with a tough ABS housing, transistor amplifier and external gain control. It uses a standard 9 volt battery.

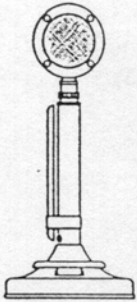


636L

- RUGGED ABS HOUSING
- HEAVY DUTY COIL CORD
- SOFT VINYLE LIP GUARD
- STAINLESS STEEL SPRING STRAIN RELIEF
- POLYURETHANE COATED STEEL GRILLE

DYNAMIC LO-Z NOISE CANCELLING MICROPHONE
 LIMITED ONE YEAR WARRANTY

The Astatic 636L microphone is designed for use in situations where there is high background noise levels, such as in trucks. Our commercial version of this mic is used in public service agencies, such as fire departments, all over the United States. The 636L has a rugged ABS housing, polyurethane coated steel grille screen, and a dependable low impedance dynamic element.



SILVER K EAGLE

MODEL TUP9D104SKE

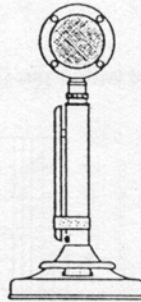
NIGHT K EAGLE

MODEL TUP9D104NKE

- FULLY AUTOMATIC END OF TRANSMISSION
- MORSE CODE "K" SWITCHABLE TO MULTI-TONE BURST.
- DUAL RELAYS ELIMINATE RECEIVER "POP".
- USES STANDARD 9 VOLT BATTERY
- FAMOUS D-104 SOUND QUALITY
- LONG LIFE LEAF SWITCH
- HEAVY DUTY COIL CORD

AMPLIFIED CRYSTAL MICROPHONE WITH END OF TRANSMISSION SIGNAL
 LIMITED ONE YEAR WARRANTY

The New Astatic "K" Eagle series has all of the features of the Silver Eagle or Night Eagle, but has a fully automatic end of transmission morse code "K" switchable to multi-tone burst. The K series microphones also incorporates dual relays to eliminate receiver "pop".



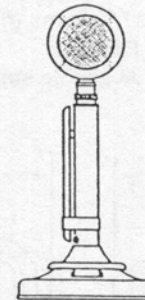
NIGHT EAGLE

MODEL TUP9-D104-NE

- BRASS AND DIE CAST ZINC CONSTRUCTION
- POLISHED TO A MIRROR FINISH AND CHROME PLATED
- USES STANDARD 9 VOLT BATTERY
- FAMOUS D-104 SOUND QUALITY
- LONG LIFE LEAF SWITCH
- HEAVY DUTY COIL CORD

AMPLIFIED CRYSTAL MICROPHONE
 LIMITED ONE YEAR WARRANTY

The New Astatic Night Eagle has all of the features of the Silver Eagle with a unique new finish. The main mic body is done in a luxurious black using a special polyurethane coating. The press bars, locking clamp, and grille screen are polished and then bright brass plated. The Night Eagle also features an American Eagle embossed on the back of the D-104 head.



SILVER EAGLE

MODEL TUP9-D104-SE

- BRASS AND DIE CAST ZINC CONSTRUCTION
- POLISHED TO A MIRROR FINISH AND CHROME PLATED
- USES STANDARD 9 VOLT BATTERY
- FAMOUS D-104 SOUND QUALITY
- LONG LIFE LEAF SWITCH
- HEAVY DUTY COIL CORD

AMPLIFIED CRYSTAL MICROPHONE
 LIMITED ONE YEAR WARRANTY

The Astatic Silver Eagle features the original D-104 Super Talk-Power microphone with a rugged transistor amplifier. The D-104 uses a metal sealed crystal, combined with an extra large diaphragm that gives the D-104 a distinctive sound that has been the standard by which all others have been compared for many years. The Silver Eagle is solidly constructed of brass and die cast zinc, and features an American Eagle embossed on the back of the D-104 head. The mic is polished to a mirror finish and bright chrome plated.

CTI Audio, Inc. * Harbor & Jackson Streets * P.O. Box 120 * Conneaut, Ohio 44030
 PHONE (216) 593-1111 * FAX (216) 593-5395

ASTATICMODEL
D104-M6B

TRANSISTORIZED Communications MICROPHONE

Quality performance Field Effect amplified microphones for amateur, citizens band, mobile, aircraft, marine applications.

FEATURES and SPECIFICATIONS

- **OUTPUT LEVELS*:** -44dB @ 1000 Hz re 1 volt/microbar into 1 megohm load.
-50 dB @ 1000 Hz re 1 volt/microbar into 5000 ohm load.
* At max. gain setting.
- **OUTPUT ADJUSTMENT:** Approx. 40 dB range adjustable, with knob in rear housing.
- **OUTPUT IMPEDANCE:** Below 5000 ohms.
- **RECOMMENDED LOAD:** 100 ohms and up; performs well over entire impedance range up to open circuit.
- **SOLID STATE:** Field effect transistor amplifier and ceramic element have good temperature and humidity tolerance.
- **FREQUENCY RESPONSE:** Tailored for voice range transmission for maximum intelligibility and clarity. (Refer to curve.)
- **POLAR PATTERN:** Semi-directional.
- **SWITCH:** Operated by push button. 4PDT switch with spring return disconnects battery in "OFF" position. Operates control circuit and amplifier in "ON" position. Long life trouble-free switch has smooth feel when operated by either hand.
- **CONTROL CIRCUIT:** The D104-M6B is factory wired so that "RE-LAY", "ELECTRONIC" or "SPECIAL" switching is determined by the hookup at the plug or in the transmitter for wired in units. (Refer to schematic.)
- **CABLE:** Five conductor (one conductor shielded) coiled cord that extends to 7½ feet. Durable strain relief bushing protects against cable breakage at microphone housing. Cable plugs in for easy field replacement.
- **HOUSING:** Attractive, durable high impact molded Cyclo-lac.
- **FINISH:** Black housing with bright chrome plated screen.
- **FULLY SHIELDED:** Reduces possibility of external interference and RF feedback.
- **BATTERY:** Uses 9 volt alkaline battery. NEDA-1604A, or equivalent, (not included).
- **MOUNTING BRACKET:** Design permits mounting on vertical or horizontal surface.
- **SIZE:** 3-3/8" high x 2-3/8" wide x 1-1/16" deep. (See drawing.)
- **WEIGHT:** 7-3/4 ounces.



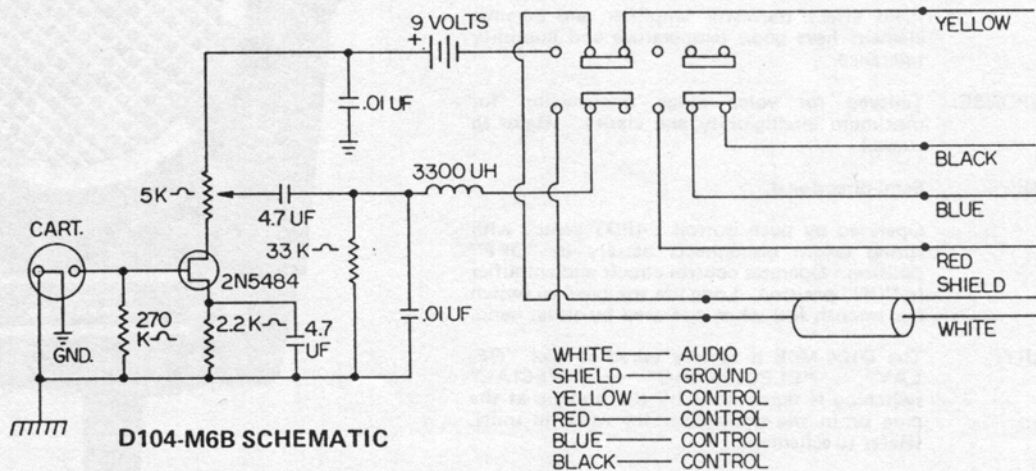
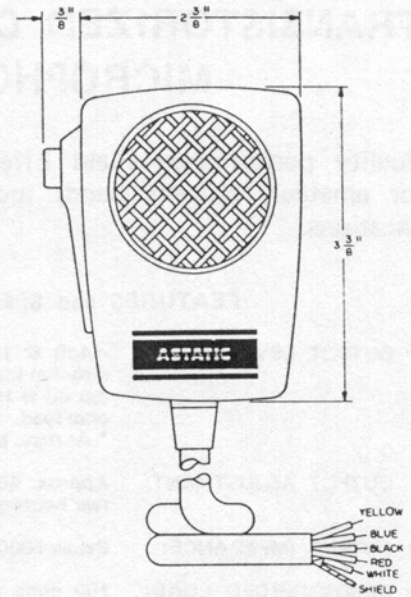
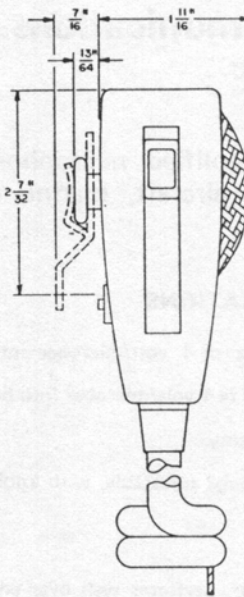
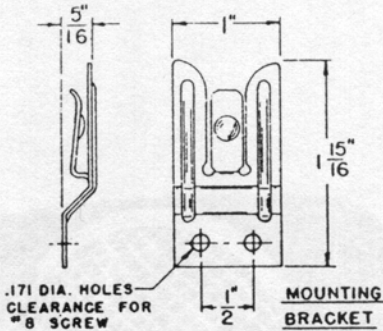
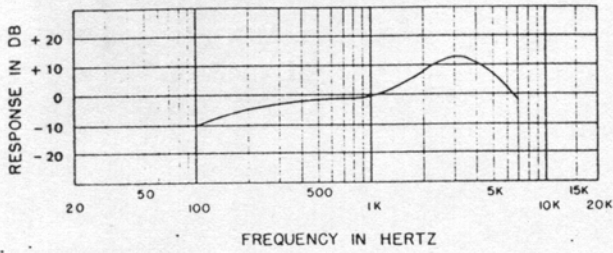
Model D104-M6B

ASTATIC

SPECIFICATIONS

MODEL D104-M6B

TYPICAL RESPONSE—FREQUENCY CHARACTERISTICS



Service Note: The Model D104-M6B is designed for easy, quick field replacement of the battery.

D104-M6B Instructions

BATTERY: The D104-M6B requires a 9 volt battery (not included). An alkaline battery should be used because they normally have sturdier terminals and will give much longer life.

BATTERY INSTALLATION: Remove the four screws. Carefully lift off the rear housing. Snap the battery into the battery clips located on the small vertical pc board. Be sure to observe the polarity as marked on the small pc board. Note that the wires from the coil cord should lay on top of the battery after it is installed. Replace the rear housing making sure that the gain control knob passes through the hole in the housing. Be careful not to over-tighten the four screws.

TRANSMITTER CONNECTIONS: Due to the variety of transmitters with which the D104-M6B can be used (including directly wired units), no matching plug for the transmitter is supplied. Proper plugs are available from dealers and distributors. Plug wiring data is shown on the schematic diagram as:

WHITE — AUDIO
SHIELD — GROUND
YELLOW — CONTROL

RED — CONTROL
BLACK — CONTROL
BLUE — CONTROL

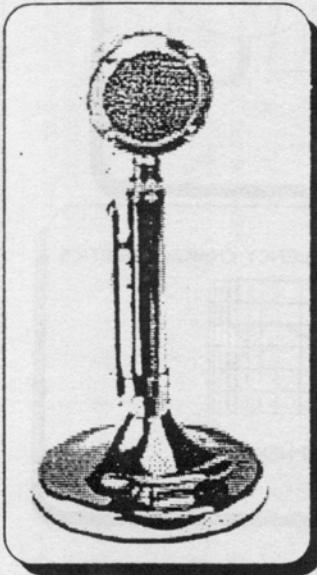
CONTROL CIRCUITS: The D104-M6B control circuits provide a 4PDT switch for maximum hookup flexibility. For ELECTRONIC switching, hook the Blue lead to ground. The Red lead is then transmit control and the Black lead is receive control. For RELAY switching, insulate the Black lead and use the Blue and Red leads for control. For SPECIAL applications, the Blue, Red and Black leads may be used to switch B+ or other functions as required. In addition, the Yellow lead is switched to ground in the unkeyed position and is open in the keyed position.

ACTIVATING THE MICROPHONE: Observe the gain control knob in the rear housing. Set this control counter-clockwise to zero gain. Plug the microphone connector into the transmitter. Depress the press-to-talk button. While talking into the microphone at a normal talking distance, slowly turn the gain control until modulation is at the desired level. Once properly set, the gain control should seldom require re-setting under equivalent operating conditions.

COMMUNICATIONS
MICROPHONES

ASTATIC
MADE IN U.S.A.

Silver K Eagle
TUP9D104SKE
Night K Eagle
TUP9D104NKE



The Silver K Eagle and the Night K Eagle are new versions of the amplified D104 microphone. These microphones feature a unique End of Transmission Signal (ETS) with two different and distinctive sounds. The first sound is a Morse code "K" which is the universal telegraph abbreviation for "over". The second switch selectable sound is a multi-tone burst. The unique ETS circuitry has the following features:

- ◆ **DUAL RELAYS**
Eliminates the annoying receiver pop that other "roger beep" microphones cause on electronics switching radios.
- ◆ **LONG BATTERY LIFE**
The ETS circuit is only engaged when the microphone is un-keyed.
- ◆ **FAIL SAFE DESIGN**
When battery power becomes low, the microphone automatically reverts to normal non-ETS operation to allow time to replace the battery.
- ◆ **SWITCHABLE 20 dB PAD**
Useful to prevent over-modulation and feedback on "hot" radios.
- ◆ **OPTIONAL VOX COMPATIBILITY**
If the microphone is used with an Amateur transceiver that has VOX, an optional switch can be added that will allow the microphone to be compatible with VOX operation.



The T-UP9 Stands have a built-in two stage silicon transistor amplifier having high impedance input. The output impedance is suitable for the inputs of all commercial transmitters or transceivers.

The T-UP9-D104 Series is a combination of the original super talk-power D104 microphone with a transistorized rugged, versatile T-UP9 Stand.

The unique ASTATIC "Plug-in" microphone design permits the use of any one of a series of available compatible model microphone cartridges.

| Element | Microphone | Cartridge |
|---------|------------|-----------|
| Crystal | D-104 | MC-320 |
| Ceramic | — | MC-321 |
| Dynamic | 10-DA | — |

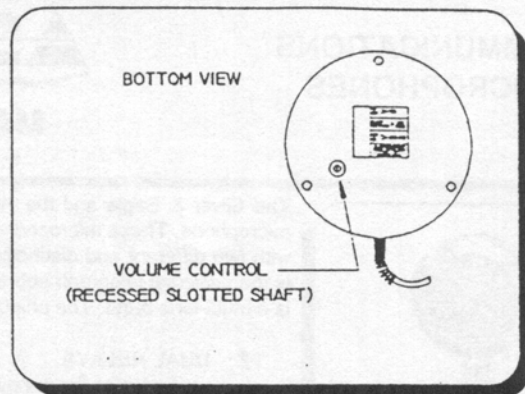
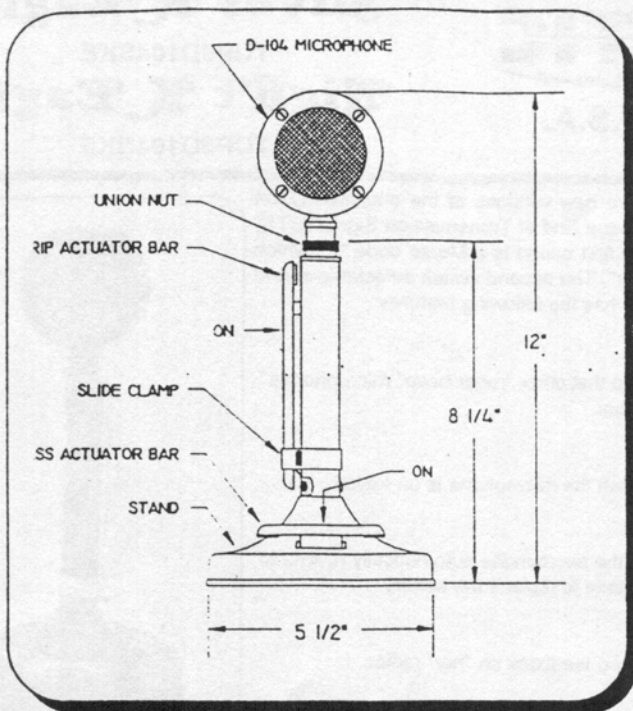
Manufactured in the U.S.A. by ASTATIC.

- * D-104 MICROPHONE: High quality metal sealed type crystal.
- * MICROPHONE RECEPTACLE: On top of stem, offers instant microphone change versatility.
- * GRIP-TO-TALK BAR
- * PRESS-TO-TALK BAR
- * WEIGHT: 2lbs. 11 oz.
- * FREQUENCY RESPONSE: T-UP9 essentially flat 200 Hz - 20K Hz.
T-UP9-D104, tailored.
- * OUTPUT LEVEL: at 1000 Hz. (20 dB pad off)
1 Meg. Load = -20 dB re 1V/microbar
5000 Load = -26 dB re 1V/microbar
- * POLAR PATTERN: Semi-directional
- * OUTPUT IMPEDANCE: 5000 ohms max.
- * AMPLIFIER VOLTAGE GAIN: 26 dB.
- * BATTERY TYPE: 9 Volt; Eveready 216, Burgess 2V6, Ray-O-Vac 1604, etc. (Not included).
- * BATTERY DRAIN: 1.2 ma.
- * TEMPERATURE RANGE: Approx. -30 C to +45 C (Limited by crystal).
- * FINISH:
Silver K Eagle - Bright Chrome Plate
Night K Eagle - Black with Polished brass plated switch bars, screen, and slide clamp.

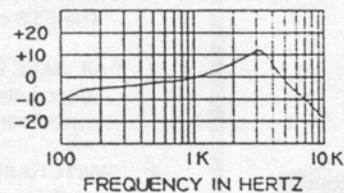
ASTATIC
MADE IN U.S.A.

Harbor & Jackson St., Conneaut, OH 44030
(216) 593-1111 FAX (216) 593-5395
A Division of CTI Audio, Inc.

ASTATIC T-UP9 SERIES MICROPHONES



TYPICAL D-104 RESPONSE FREQUENCY CHARACTERISTICS



CONNECTOR - CABLE CLAMPING

If the microphone plug you have selected for your hook-up requirements does not have a cable clamp suitable for this small diameter high quality microphone cable, use the tubing as supplied. Simply slide the tubing over the cable prior to soldering the leads to the connector. Position it to ensure proper clamping of the cable and tubing by the connector.

SPECIAL INSTRUCTION NOTES

1. When wiring microphone cables and plugs to equipment, the color codes for the cable and for the equipment are not necessarily the same. Be careful to connect wires to the correct terminals.
2. On initial setup it is good practice to turn gain completely down. After turning on the transmitter, slowly turn the up until desired modulation level is reached. This procedure aids in getting gain properly set without going through periods of excessive distortion and over modulation. If the gain control is touchy to adjust or if you are experiencing over-modulation or feedback, use the 20 dB pad switch to reduce the microphone gain.
3. Occasionally R.F. feedback presents a problem. The solution is basically good installation.
 - a. Antenna Feedline standing wave ratio must be low.
 - b. Good grounding eliminates a "hot" transmitter chassis condition which can couple R.F. into unwanted places. On base stations, all grounds should be as short as possible and connect to a common point.

Radios that have been modified by removal of limiter circuits, or have had unauthorized adjustments to increase output power are more likely to have R.F. feedback problems.

ONE YEAR LIMITED WARRANTY

Astatic Microphones are warranted for one year from the date of purchase to be free from defects in material and workmanship. In the event of such defect, the product will be repaired or replaced at our option with a new unit of equal or superior value. This will be at no charge if carefully packed and delivered prepaid to Astatic, together with the sales slip or other proof of purchase date. The unit will be returned promptly prepaid. This Warranty excludes exterior finish, appearance items, or malfunction due to abuse or operation under other than specified conditions. Consequential or incidental damages are excluded.

Astatic also maintains complete facilities for non warranty service of our products. For repair information please write:

Service Department
Astatic
P.O. Box 120
Harbor & Jackson Streets
Conneaut, OH 44030-120

Through the continued efforts of our engineering staff, we are constantly making improvements and changes to these specifications. We reserve the right to do so without prior notice or obligation.

ASTATIC

MODEL 636L

MODEL 636L

NOISE CANCELLING DYNAMIC MICROPHONE

The Astatic Model 636L is a noise cancelling dynamic microphone designed for close talking, hand held applications in CB, Amateur Radio and SSB communications. The 636L has a rugged, dependable dynamic element (the same type element used in professional two-way radio) in a modern "tear drop" styled housing.

The frequency response is tailored for maximum intelligibility and clarity in voice communications with a 360° minimization of background noise. A soft lip guard is positioned to assure proper close talk spacing by the operator. Molded in high impact Cynolac, the Model 636L comes with a six wire coil cord which allows for relay, electronic or virtually any type hook up with almost any transmitter/transceiver.

The Model 636L has a low impedance output and a long life, trouble free DPDT switch, factory wired normally open.

Manufactured in the U.S.A. by Astatic, producer of quality microphones since 1932.

SPECIFICATIONS

- TYPE: Dynamic Noise Cancelling
- FREQUENCY RESPONSE: 100 to 5000 Hz
- OUTPUT: -58 dB (0dB = 1 mw/10 microbars)
-76 dB (0dB = 1 volt/microbar)
-152dB EIA
- IMPEDANCE: 200 ohms, matches 50 to 1000 ohms
- CABLE: Six wire, five conductors, one conductor shielded, coil cord. Durable strain relief protects against cable breakage at the microphone housing. Can be wired to any 3, 4, 5 or 6 wire system.
- SWITCH: Operated by a press-to-talk lever, DPDT long life, trouble free switch with spring return, smooth operating, wired normally open.
- HOUSING: Durable molded black Cynolac
- DIMENSIONS: 100mm (3 15/16") high x 75.4mm (2 31/32") wide x 66.7mm (2 5/8") deep
- WEIGHT: 284 grams (10 oz.)



APPLICATIONS

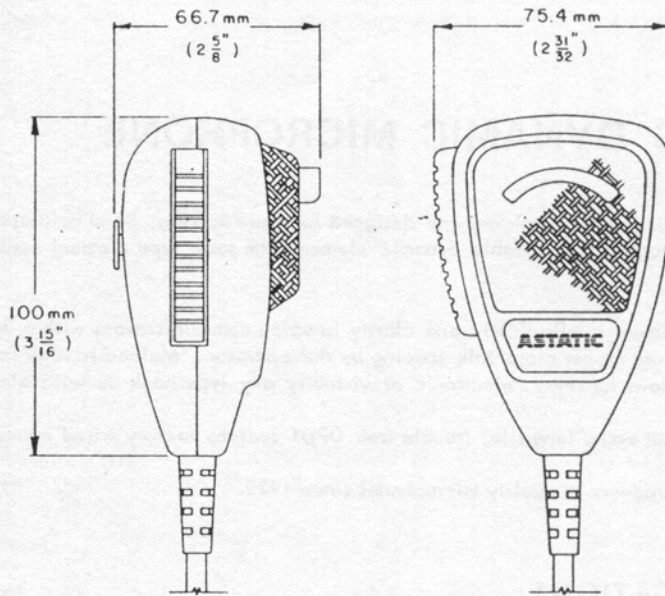
The Astatic Model 636L, because of its professional sound, rugged construction and highly effective background noise reduction capabilities, is an excellent choice for CB, amateur radio and SSB applications.

ASTATIC

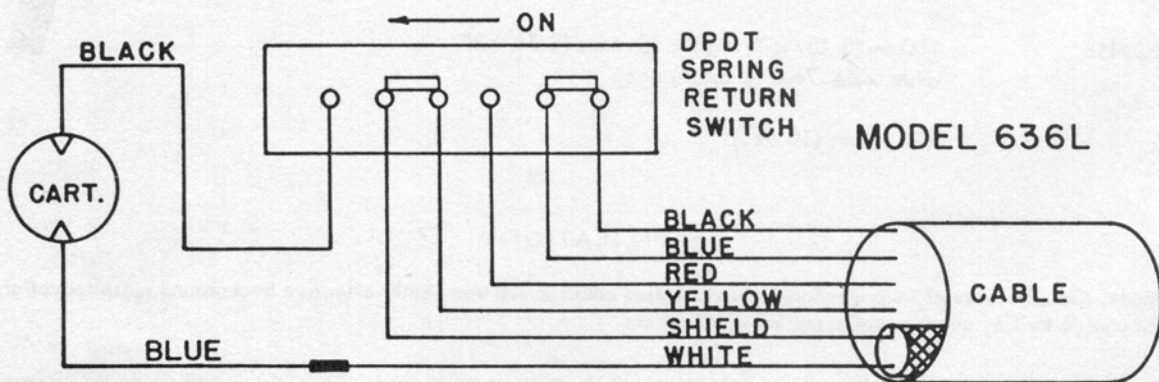
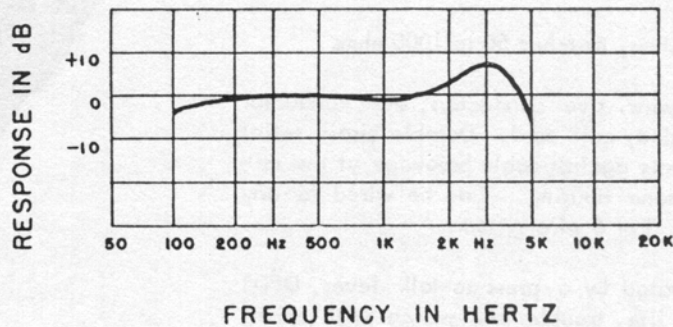
• Harbor and Jackson Streets • P. O. Box 120 • Conneaut, Ohio 44030
PHONE (216) 593-1111 • FAX (216) 593-5395

SPECIFICATIONS

MODEL 636L



FREQUENCY RESPONSE CURVE



ASTATICMODEL
575M-6

TRANSISTORIZED MICROPHONE WITH EXTERNAL TONE AND VOLUME CONTROLS

The Astatic 575M-6 ceramic power microphone offers the CB'er modern "tear-drop" styling and features along with the sound and "talk-power" made famous by the Astatic D104 for over 40 years.

An output impedance compatible with the inputs of almost all commercial transceivers and externally adjustable high gain amplifier ensures desired modulation level. The 575M-6 has easily accessible slide controls for volume and tone adjustment so that the correct modulation level and tone quality can be set for each operators voice. The 575M-6 pre-amplifier is powered by a readily available, easily replaced, 9 volt battery. The 575M-6 has a six wire coil cord which allows for relay, electronic or virtually any type hookup with almost any transceiver. The audio line is open during receive.

SPECIFICATIONS

- TYPE: Transistorized Ceramic
- FREQUENCY RESPONSE: Adjustable (See Fig. 1)
- MAXIMUM OUTPUT LEVEL: -38dB below 1 volt/microbar at 1K Hz into 1 megohm load.
-44 dB below 1 volt/microbar at 1K Hz into 5000 ohm load.
- OUTPUT ADJUSTMENT: 40 dB minimum range with external slide control.
- IMPEDANCE: 5000 ohms max.
- RECOMMENDED LOAD: 100 ohms and up; performs well over entire impedance range up to open circuit.
- SOLID STATE: Field effect transistor amplifier and ceramic element have good temperatures and humidity tolerance.
- EXTERNAL VOLUME CONTROL: Easily adjusted external slide control for gain adjustments.
- TONE CONTROL: Easily adjusted external slide control (See Fig. 1)
- POLAR PATTERN: Semi-directional
- SWITCH: Operated by press-to-talk lever. 4 PDT battery in "off" position. Operates control circuit and amplifier in "on" position. Long life trouble free switch has smooth feel when operated by either hand.
- CONTROL CIRCUIT: 575M-6 is factory wired so that "Relay", "Electronic" or "Special" switching is determined by the hookup at the plug or in the transmitter for wired in units.
- CABLE: 575M-6 supplied with five conductor (one conductor shielded) coiled cord that extends to 2.3m (7½ feet). Durable strain relief bushing protects against cable breakage at microphone housing.
- HOUSING: Attractive, durable high impact molded black plastic.
- FULLY SHIELDED: Reduces possibility of external interference and RF feedback.
- BATTERY: 9 volt; Eveready 216, Burgess 206, Ray-O-Vac 1640, etc. (Not supplied)
- BATTERY LIFE: Approximately 6 months (based on normal usage).
- MOUNTING BRACKET: Design permits mounting on vertical or horizontal surface.
- SIZE: 100mm (3-15/16") high x 75.4mm (2-31/32") wide x 54.8mm (2-5/32") deep.
- WEIGHT: 227 grams (8 oz.)

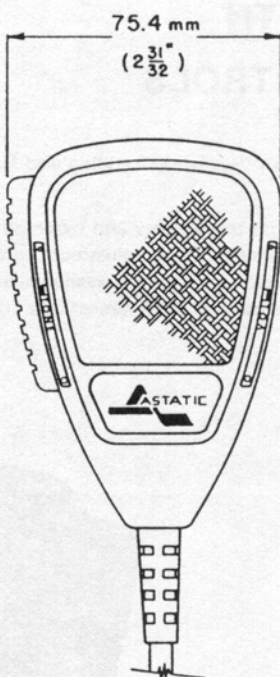
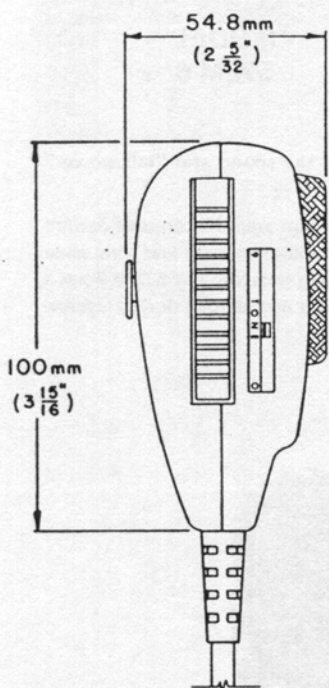


Model 575M-6 (6 wire)

ASTATIC

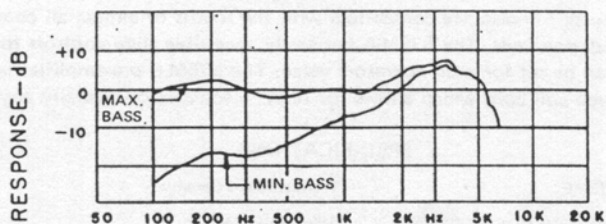
SPECIFICATIONS

MODEL 575M-6



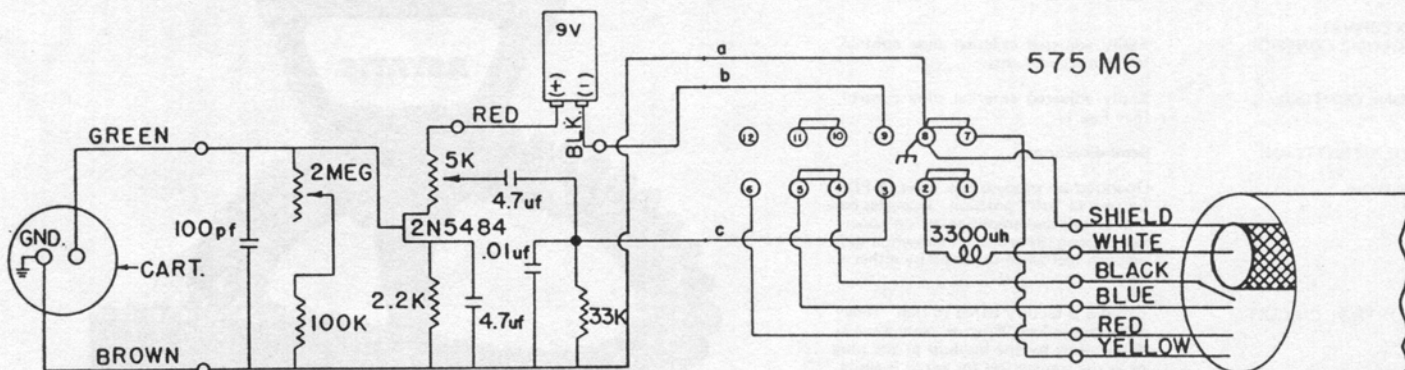
RESPONSE CHARACTERISTICS

TYPICAL FREQUENCY



FREQUENCY IN HERTZ

Fig. 1



BATTERY REPLACEMENT

Remove the rear housing by removing the four screws. Carefully lift off the rear housing. Unsnap the battery from the battery connector and install a new battery. Carefully replace the rear housing and fasten with the four screws previously removed. Depress the switch lever fully while tightening the screws.

VOLUME AND TONE ADJUSTMENTS

At a speaking distance of approximately 2 inches (or the position you prefer) with the external volume control set at 0 and the tone control set in the center position, adjust the volume control for the correct modulation level. Sliding the volume control toward 9 increases the volume. The external tone control should then be adjusted for the most intelligible sound. Slide the tone control toward 0 for an increase in bass response and toward 9 for a decrease in bass response.

Communications
Microphones

ASTATIC
MADE IN U.S.A.

SILVER EAGLE
NIGHT EAGLE
T-UP9STAND

The T-UP9 Stand has a built-in two stage silicon transistor amplifier having high impedance input. The output impedance is suitable for the inputs of all commercial transmitters or transceivers.

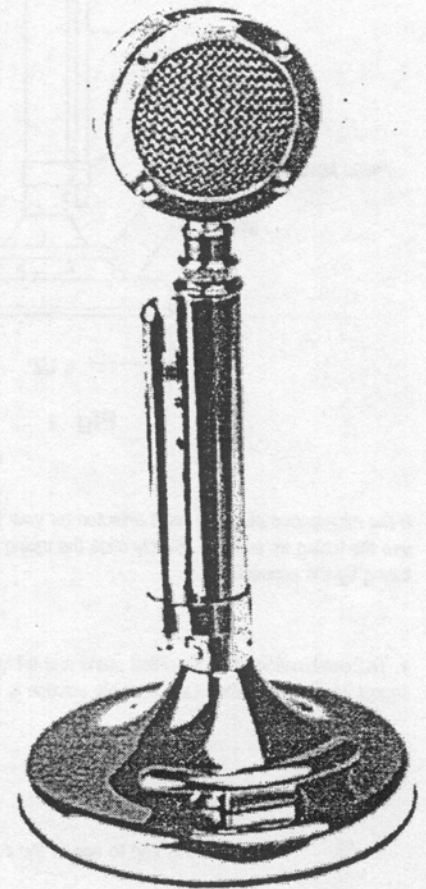
The T-UP9-D104 Series is a combination of the original super talk-power D104 microphone with a transistorized rugged, versatile T-UP9 Stand.

The unique ASTATIC "Plug-in" microphone design permits the use of any one of a series of available compatible model microphone cartridges.

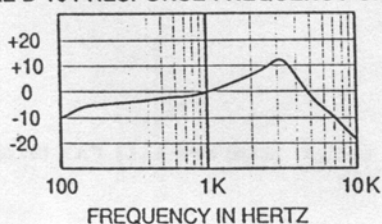
| Element | Microphone | Cartridge |
|---------|------------|-----------|
| Crystal | D-104 | MC-320 |
| Ceramic | --- | MC-321 |
| Dynamic | 10-DA | ---- |

FEATURES and SPECIFICATIONS

- D-104 MICROPHONE: High quality metal sealed type crystal.
- MICROPHONE RECEPTACLE: On top of stem, offers instant microphone change versatility.
- GRIP-TO-TALK BAR
- PRESS-TO-TALK BAR
- WEIGHT: 2lbs. 11 oz.
- FREQUENCY RESPONSE: T-UP9 essentially flat 200 Hz - 20K Hz.
T-UP9-D104, SILVER EAGLE, NIGHT EAGLE tailored.
- OUTPUT LEVEL: T-UP9-D104, SILVER EAGLE, NIGHT EAGLE at 1000 Hz.
1 Meg. Load= -20 db re 1V/microbar
5000 Load= -26 db re 1V/microbar
- POLAR PATTERN: Semi-directional
- OUTPUT IMPEDANCE: 5000 ohms max.
- AMPLIFIER VOLTAGE GAIN: 26 db.
- BATTERY TYPE: 9 Volt; Eveready 216, Burgess 2V6, Ray-O-Vac 1604, etc. (Not included).
- BATTERY DRAIN: 1.2 ma.
- TEMPERATURE RANGE: Approx. -30° C to +45° C (Limited by crystal).
- FINISH: T-UP9-D104 "SILVER EAGLE": Polished chrome head, stand, base, and switch bars.
"NIGHT EAGLE": Black Electro-deposited head, stand, and base. Polished brass plated switch bars, mic screen, and clamp.



TYPICAL D-104 RESPONSE FREQUENCY CHARACTERISTICS



NOTES:

1. Do not subject the crystals to temperatures over 45° C, permanent damage may result.
2. The D-104 is one of a group of "Plug-In" microphones compatible with the "G" series of stands. It plugs into the top of the mast and is locked on by means of the union nut (See Fig. 1).

ASTATIC T-UP9 SERIES MICROPHONES

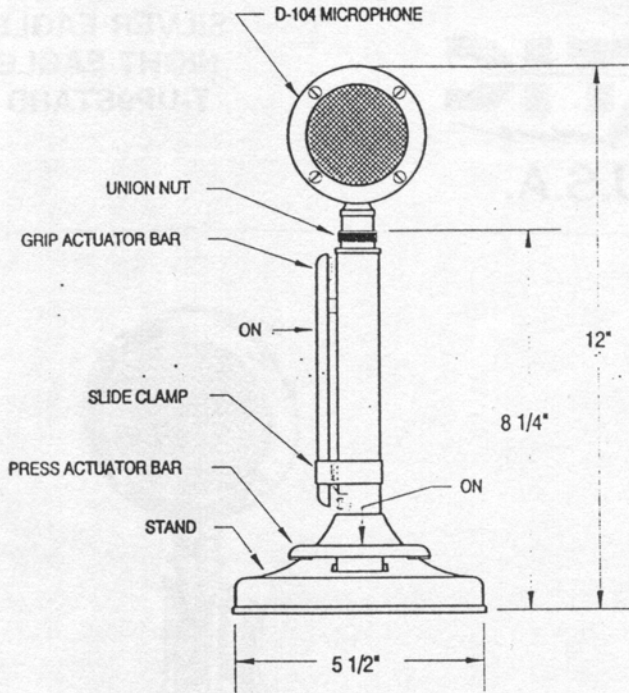
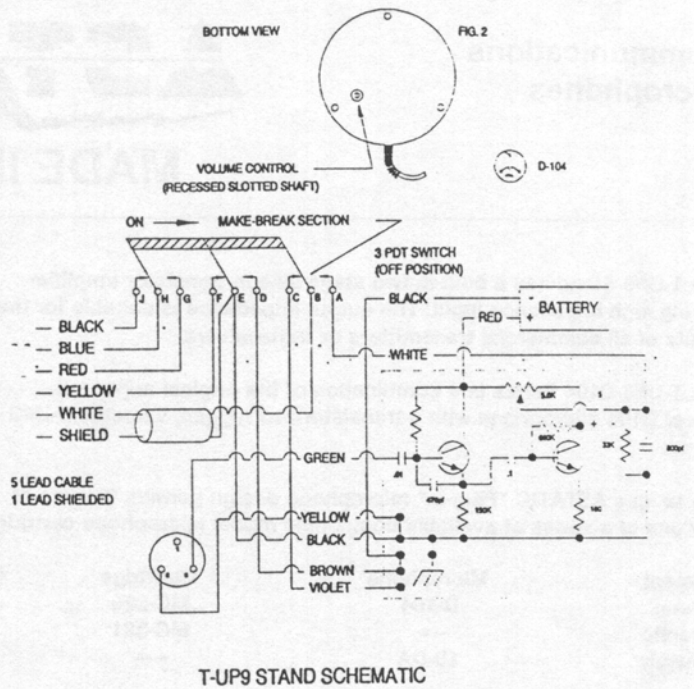


Fig. 1



T-UP9 STAND SCHEMATIC

CONNECTOR - CABLE CLAMPING

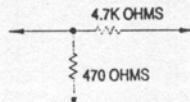
If the microphone plug you have selected for your hook-up requirements does not have a cable clamp suitable for this small diameter high quality microphone cable, use the tubing as supplied. Simply slide the tubing over the cable prior to soldering the leads to the connector. Position it to ensure proper clamping of the cable and tubing by the connector.

SPECIAL INSTRUCTION NOTES

1. The combination of an amplified stand and a high level microphone may result in over modulation (tinny or hollow sound), overly sensitive gain adjustment, or a squeal when transmitting. One possible solution is to add an "L PAD" as shown below using 1/4 or 1/2 watt resistors.

CUT WHITE WIRE FROM COIL CORD IN BASE,
SOLDER 4.7K OHM AND 470 OHM RESISTORS TO FREE
ENDS OF THIS WHITE WIRE AS SHOWN.

Connect this end to one of the cut wires.



Connect this end to the other cut wire.

Connect this to the ground or shield wire.

2. When wiring microphone cables and plugs to equipment, the color codes for the cable and for the equipment are not necessarily the same. Be careful to connect wires to the correct terminals.
3. Occasionally R.F. feedback presents a problem. The solution is basically good installation.
 - a. Antenna Feedline standing wave ratio must be low.
 - b. Good grounding eliminates a "hot" transmitter chassis condition which can couple R.F. into unwanted places. On base stations, all grounds should be as short as possible and connect to a common point.

Radios that have been modified by removal of limiter circuits, or have had unauthorized adjustments to increase output power are more likely to have R.F. feedback problems.
4. Some transceivers (such as Messenger 124) have the microphone ground at a D.C. potential differing from the outer case. With a metal housed microphone there is a possibility of shorts to the outer case, blowing fuses, or damaging equipment. When using equipment of this type, carefully remove the 4 screws holding the circuit board in place and turn over so the component side is up. Locate the bare jumper wire. Carefully remove and replace the wire with a 10 mfd. capacitor of adequate voltage rating. Carefully reinstall the circuit board.
5. On initial setup it is good practice to turn gain completely down. After turning on the transmitter, slowly turn the up until desired modulation level is reached. This procedure aids in getting gain properly set without going through periods of excessive distortion and over modulation.

ASTATIC 1104C

AMPLIFIED BASE STATION MICROPHONE

MODEL 1104C
BASE STATION MICROPHONE

CERAMIC MICROPHONE WITH EXTERNAL TONE & VOLUME CONTROLS

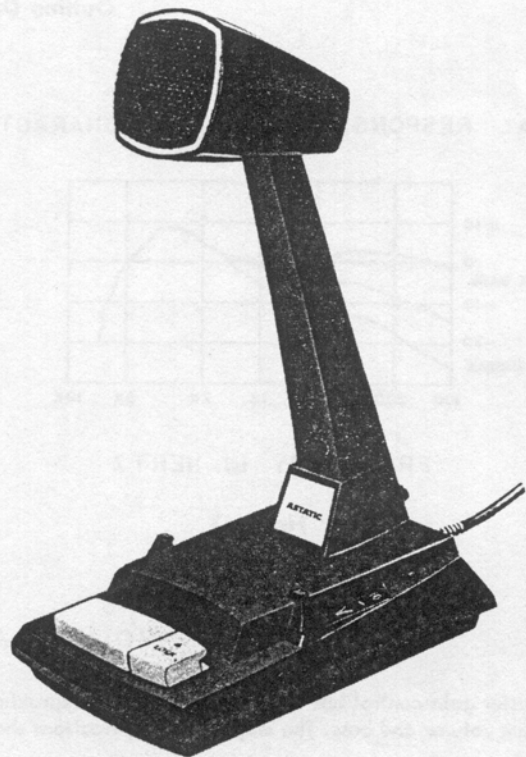
GENERAL DESCRIPTION

The new Astatic 1104C pre-amplified base station microphone offers the CB'er modern styling, modern features, along with the sound and "talk-power" made famous by the Astatic D104 for over 40 years.

An output impedance compatible with the inputs of all commercial transmitters/transceivers and adjustable high gain amplifier ensures desired modulation level. The amplifier has easily accessible slide controls for volume and tone adjustment so that the correct modulation level and tone quality can be set for each operators voice. A master gain control, accessible only thru the open battery replacement door, can be adjusted to prevent over-modulation and distortion. The amplifier is powered by a readily available, easily replaced, 9 volt battery. (Not supplied). Six wire coil cord allows for relay, electronic or virtually any type hookup with almost any transmitter/transceiver. The audio line is open on receive.

SPECIFICATIONS 1104C

- TYPE: Transistorized ceramic
- FREQUENCY RESPONSE: Adjustable (See Fig. No. 1)
- OUTPUT LEVEL: Adjustable, -25dB to -75dB below 1 V/microbar, open circuit, to set the correct modulation level.
- POLAR PATTERN: Semi-directional
- OUTPUT IMPEDANCE: 5000 ohms max.
- LOAD IMPEDANCE: 100 ohms min.
- SWITCH: Push-bar controlled with lock-on feature. Open audio line during receive.
- AMPLIFIER: Two-stage, low noise FET input, rugged silicon transistor output, gain easily adjustable with slide knob control.
- MASTER GAIN CONTROL: Used to adjust maximum output.
- EXTERNAL VOLUME CONTROL: For external gain adjustments desired after proper adjustment of maximum output.
- TONE CONTROL: Easily adjusted slide knob. (See Fig. No. 1)
- BATTERY TYPE: 9 volt; Everready 216, Burgess 2V6, Ray-O-Vac 1604, etc. Not supplied
- BATTERY DRAIN: 1.5 ma.
- BATTERY LIFE: Approximately 6 months (based on normal usage).
- TEMPERATURE RANGE: -30° C to +70° C
- HOUSING: Heavy die cast base, rugged plastic housing assembly.
- CABLE: Coiled cord, 6 wire.
- SIZE: See Fig. No. 2
- HOOK-UP: Same as T-UG9 stand.
- FINISH: Durable molded high impact plastic in black or metallic silver with die cast base.
- WEIGHT: 1½ lbs.

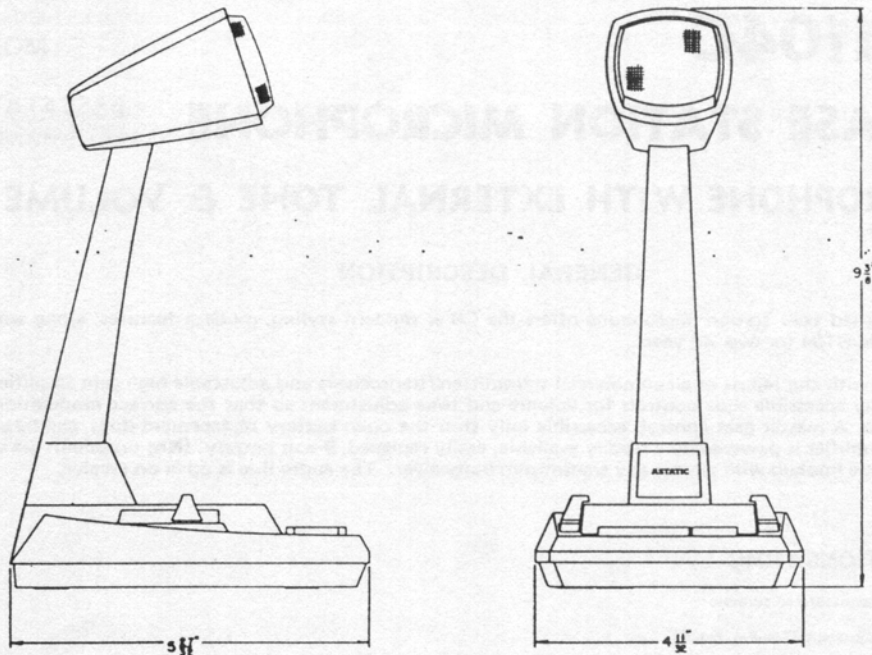


ASTATIC

● P.O. Box 120 ● Conneaut, Ohio 44030-0120 ● (216) 593-1111 ● FAX (216) 593-5395

SPECIFICATIONS

MODEL 1104C



Outline Drawing — Figure 2

TYPICAL RESPONSE - FREQUENCY CHARACTERISTICS

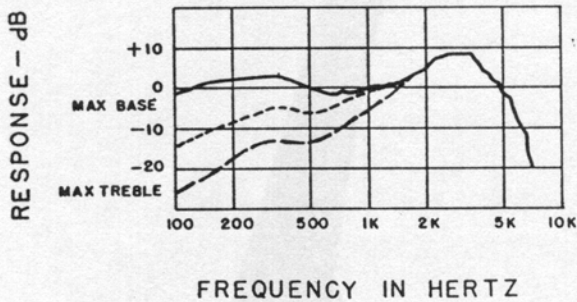
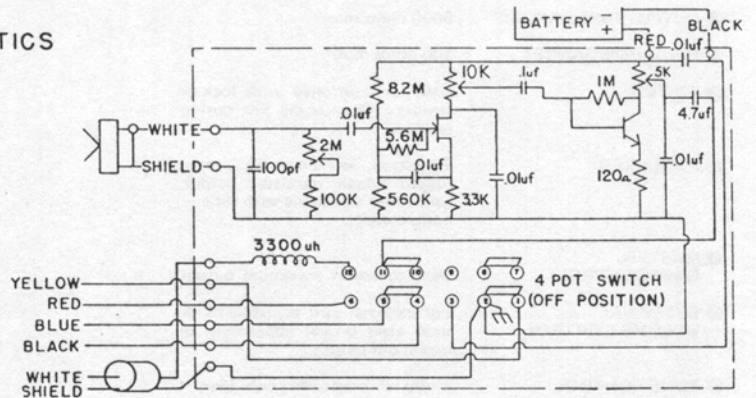


Figure 1



Wiring Schematic — Figure 3

VOLUME AND TONE ADJUSTMENTS

The master gain control has been preadjusted to approximately -50dB re: 1 volt/microbar with external volume and tone controls set at maximum volume and bass. The majority of applications should not require further adjustment of the master gain control for good modulation.

If additional gain is required or over-modulation is experienced, readjust the master gain control as follows. At a speaking distance of 18 inches, with the external slide volume and tone controls set in the center position, adjust the master gain control (thru the open battery replacement door) for 100% modulation. The external slide volume control may now be adjusted for proper modulation at varying distances and with different operators. The tone control should be adjusted for the most intelligible sound. Slide the tone control toward 0 for an increase in bass response and toward 10 for an increase in treble response.

BATTERY REPLACEMENT

To replace, open the battery replacement door by inserting a dime (or similar device) in the slot provided in the base. Carefully, remove battery and adaptor a short distance from base (1 to 2 inches). While holding the adaptor in your left hand, grab the bottom of the battery in your right hand and pivot upward. Snap new battery into the adaptor. Place slot, at rear of adaptor, into the edge provided on base and snap into place.

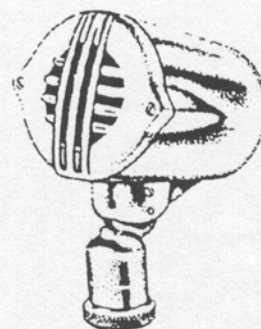
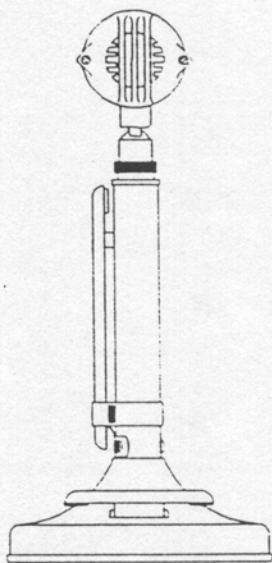
SILVER SIDEBANDER

TUP9-10DA

UNIVERSAL AMPLIFIED DYNAMIC DESK STAND MICROPHONE

- ◆ SPECIALLY DESIGNED FOR SINGLE SIDE BAND BUT CAPABLE OF EXCELLENT PERFORMANCE ON ALL COMMUNICATION EQUIPMENT.
- ◆ GRIP-TO-TALK AND PUSH-TO-TALK OPERATION.
- ◆ ATTRACTIVE HIGH POLISHED CHROME FINISH.

HIGH QUALITY
DYNAMIC
CARTRIDGE



10DAL HEAD CAPABLE OF
90° HEAD TILT WITH
ADJUSTABLE TENSION.

A TRADITION OF
EXCELLENCE
SINCE 1933.

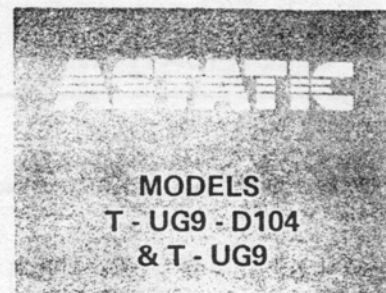
IMPORTANT: Carton has been factory inspected, sealed and contains one complete stand and microphone assembly.

ASTATIC

MADE IN U.S.A.

Model T-UG9 - D104 (Transistorized Desk Stand & D-104 Micro.)

Model T-UG9 (Transistorized Desk Stand) GRIP, PUSH, TOUCH OR LOCK ON-TO-TALK TYPE FOR C.B., HAM AND PROFESSIONAL USERS



The T-UG9 Stand has a built-in two stage silicon transistor amplifier having high impedance input. The output impedance is suitable for the inputs of all commercial transmitters or transceivers. The high gain available ensures desired modulation capability. The gain can be readily adjusted for the desired modulation. The control is recessed to avoid accidental changes.

The T-UG9-D104 is a combination of the original super talk-power D-104 microphone with a transistorized rugged, versatile T-UG9 Stand. The result is an ideal base station microphone for CB, Amateur or other communications applications. Its relatively low impedance output can be fed into any communication receiver or transmitter. The tailored response and high gain ensures excellent talk-power and intelligibility — and full modulation.

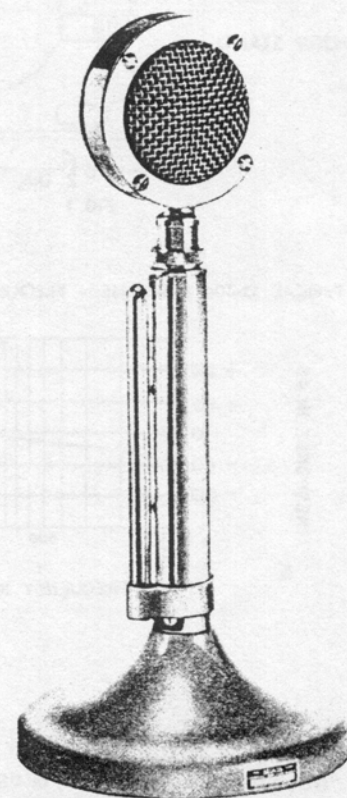
FEATURES and SPECIFICATIONS

- D-104 MICROPHONE: High quality metal sealed type crystal.
- MICROPHONE RECEPTACLE: On top of stem, offers instant microphone change versatility.
- SWITCH BAR FOR EASY CONTROL: Can be locked "ON" by moving "slide clamp" to top of stand.
- HEAVY, TIP-FREE BASE: Sturdy, die-cast zinc construction protects the microphone from "tip over" damage.
- ATTRACTIVE FINISH: Durable polished chrome mast with gray Hammerlin base.
- NOISE-FREE AND CLICK-FREE SWITCHING: Uses heavy duty 3 PDT leaf type switch with palladium contacts. Low contact resistance of 20 milliohms; will not oxidize and requires no cleaning.

High current capability for relay operation allows up to 3 amperes DC and non-inductive AC loads with complete safety. **

- HIGH GAIN, TWO TRANSISTOR AMPLIFIER.
- RECESSED VOLUME CONTROL TO AVOID ACCIDENTAL CHANGES.
- SIZE: See Fig. 1.
- WEIGHT: T-UG9 1 lb. 15½ oz. (with cable).
T-UG9-D104 2 lbs. 9½ oz. (with cable).

** Caution Note: Care should be exercised in exciting relays with AC because of induced hum fields.

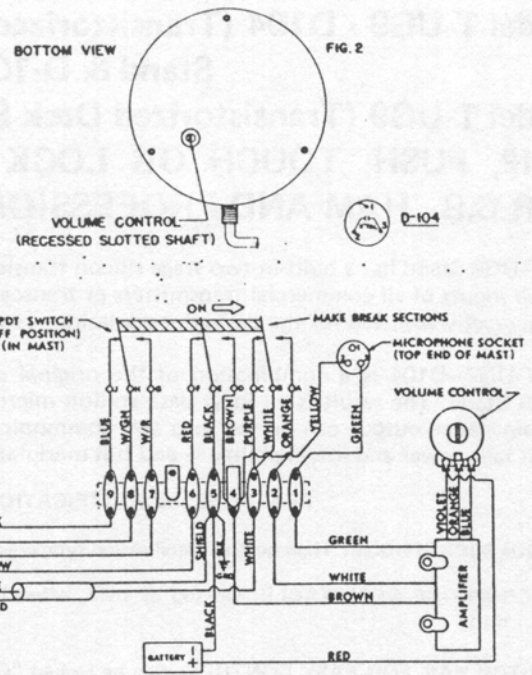
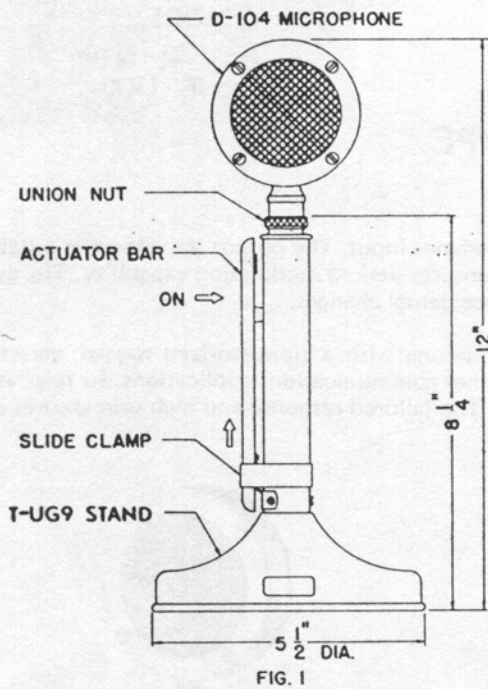


ELECTRONIC SPECIFICATIONS

- FREQUENCY RESPONSE: T-UG9 amplifier flat 200 Hz-20kHz.
T-UG9-D104 tailored; See Fig. 4.
- OUTPUT LEVEL: T-UG9-D104 @ 1000 Hz:
1 meg. Load = -20 dB re 1V/microbar.
5000 Load = -26 dB re 1V/microbar.
- POLAR PATTERN: Semidirectional.
- OUTPUT IMPEDANCE: 5000 ohms or less.
- AMPLIFIER VOLTAGE GAIN: 26 dB.
- BATTERY TYPE: 9 volt; Eveready 216, Burges 2V6,
Ray-O-Vac 1604, etc. (Not included).
- BATTERY DRAIN: 1.2 ma.
- BATTERY LIFE: Approx. 6 mo. (based on normal usage).
- TEMPERATURE RANGE: Approx. -30° C. to +45° C.
(Limited by crystal).
- "RELAY", "ELECTRONIC" or "SPECIAL CIRCUITS": By plug wiring.
- CABLE: Coiled cord; single conductor shielded plus four unshielded conductors.

SPECIFICATIONS

T-UG9-D104 & T-UG9



TYPICAL D-104 RESPONSE - FREQUENCY CHARACTERISTICS

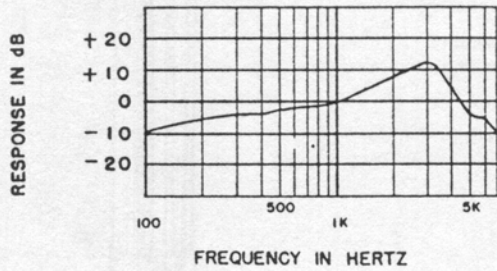


Fig. 4

FIG. 3

T-UG9 STAND SCHEMATIC

NOTES:

1. Do not subject the crystals to temperatures over 45° C.; permanent damage may result.
2. The D-104 is one of a group of "Plug-In" microphones compatible with the "G" series of stands. It plugs into the top of the mast and is locked on by means of the union nut (See Fig. 1).

"RELAY", "ELECTRONIC", or "SPECIAL" SWITCHING CONTROL: Most types of switching are possible by proper hookup wiring with no changes in the stand required. The stand is factory wired so that in the unoperated position the black wire is connected to the blue wire and the yellow wire is grounded to the shield. Depressing the actuator bar connects the red wire to the blue wire and ungrounds the yellow wire.

CABLE CONNECTOR WIRING: WHITE to audio input, SHIELD to ground, RED, BLACK, BLUE and YELLOW to control circuits.

OPERATION: ASTATIC "PLUG IN" MICROPHONE types are pre-wired for use with the T-UG9 Stand. Choose one of the compatible microphones from the listing shown on the front side. (For "CB" and "Communications" transmissions, many use the well known D-104 microphone.) Plug into and lock onto head of stand.

VOLUME CONTROL located in the base to eliminate accidental changes should be set at minimum gain - complete COUNTER CLOCKWISE position when viewed from bottom of stand. TURN "ON" the transmitter and squeeze the actuator bar in direction as noted in Fig. 1. Operating the actuator bar operates the transmit-receive circuits. While talking into the microphone at normal operating distance, slowly turn the volume control (Fig. 2) up until modulation is at desired level. Once properly set, the volume control should not require resetting under equivalent operating conditions.

For desired sensitive touch control - move slide clamp up in short steps to desired tension. For continuous or VOX operation - push slide clamp up to top.

To install the battery, remove the bottom cover by removing the three cover screws.

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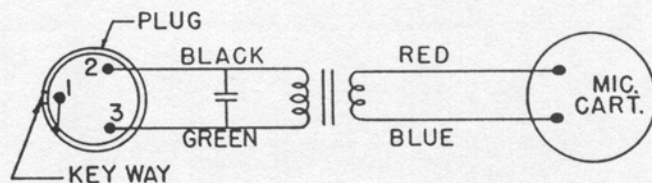
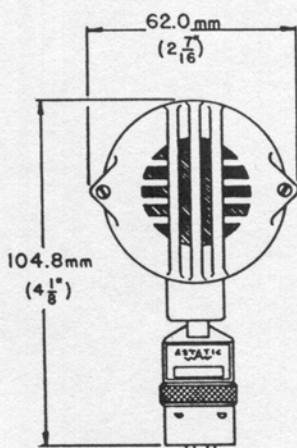
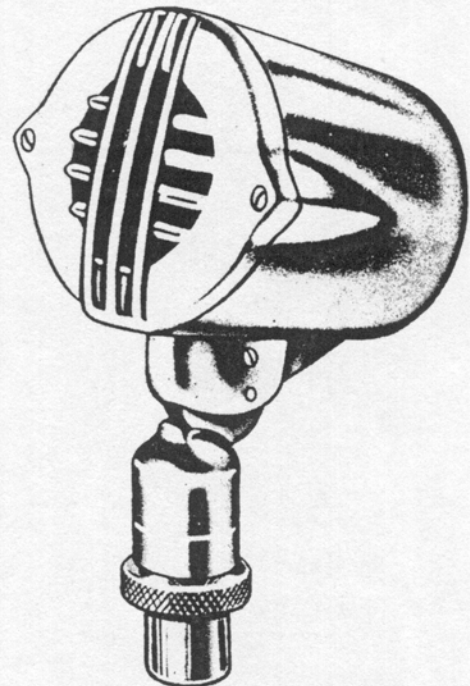
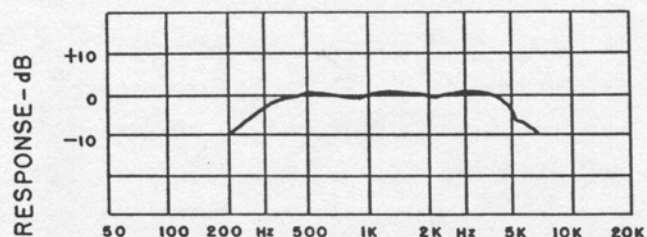
MODEL 10DA-L DYNAMIC MICROPHONE

**MODEL
10DA-L**

The Astatic Model 10DA-L is a dynamic microphone especially designed for SSB equipment but capable of excellent performance on all communication equipment. The 10DA-L is of rugged construction with bright, polished chrome finish, capable of up to 90° head tilt with adjustable tension, and threaded to mount on all Astatic stands having Astatic's unique "Plug-In" design. The Model 10DA-L is a high impedance microphone.

FEATURES and SPECIFICATIONS

- TYPE: Dynamic
- IMPEDANCE: 10DA-L : 40K ohms
- OUTPUT LEVEL: 10DA-L : -52dB (OdB = 1 volt/microbar)
- RECOMMENDED LOAD: 10DA-L : 40K ohms or greater
- FREQUENCY RESPONSE: 300 to 3000 Hz. See Fig. 1.
- FINISH: All metal construction with a bright polished chrome finish.
- RECOMMENDED USE: Use with any Astatic desk stand having "Plug-In" feature or with Astatic's F-11 adaptor.
- DIMENSIONS: 105mm (4") high; 63.5mm (2½") wide; 76.2mm (3") deep.
- WEIGHT: 383 grams (13½ oz.)

**10-DA MIC. HEAD****FREQUENCY IN HERTZ****ASTATIC**

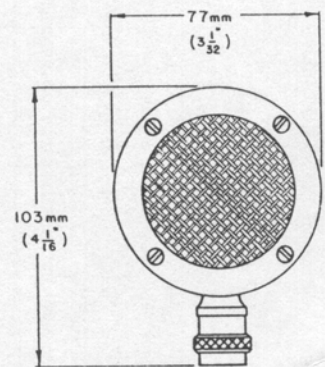
ASTATICMODEL
D104-L

MODEL D104 - L CRYSTAL MICROPHONE

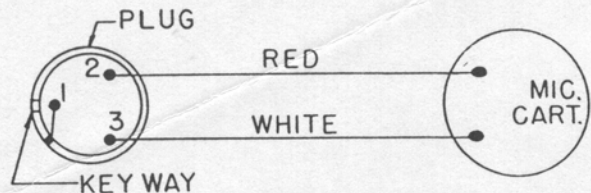
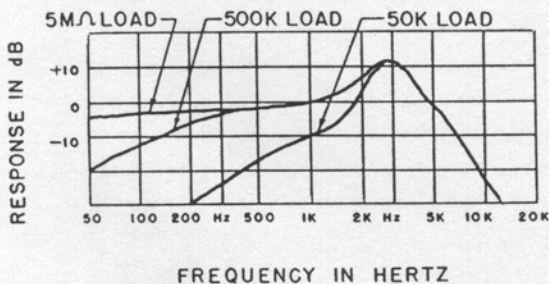
The Astatic Model D104-L is a crystal microphone designed over 50 years ago for Amateur Radio and continues today to be one of the most widely used microphones in Amateur Radio Communications. The original super talk power microphone, the D104-L, offers tailored response and high output to ensure a balanced response to accent human voice frequencies and full modulation. The D104-L is rugged all metal construction, has a bright polished chrome finish and is threaded to mount on all Astatic stands having Astatic's unique "Plug-In" design.

FEATURES and SPECIFICATIONS

- **TYPE:** Crystal; the crystal element epoxy coated and metal wrapped for maximum protection.
- **CAPACITY:** 1500pf at 80°F.
- **RECOMMENDED LOAD:** 500K minimum.
- **OUTPUT LEVEL:** -46dB (0 dB = 1 volt/microbar)
- **FREQUENCY RESPONSE:** Dependent upon load impedance. See curve.
- **DIMENSIONS:** 3" diameter; 1-1/8" deep.
- **WEIGHT:** 255 grams (9 oz.).
- **CONNECTOR:** Exclusive Astatic coupler utilizing an Amphenol MC3M type of 3 contact male connector with lock nut. Couples with Astatic stands having "Plug-In" design or Astatic's F-11 adaptor.
- **FINISH:** Bright polished chrome plate.
- **TEMPERATURE RANGE:** -30°C (-22°F) to +45°C (+113°F). Exceeding the upper temperature limit will result in permanent damage to the crystal element.



EFFECT OF RESISTIVE LOAD ON A D-104



D-104 MIC. HEAD

ASTATIC

CONNEAUT TECHNOLOGIES, INC. • P.O. Box 120 • Conneaut, Ohio 44030-0120 • (216) 593-1111 • FAX (216) 593-5395

TECH NOTE

USING VOX WITH ASTATIC MICROPHONES

Most Astatic communication microphones do not come configured to operate in VOX (Voice Operated Switching) mode. Operating in a VOX mode usually requires three things:

Your radio must be equipped to operate in VOX mode.

The microphone must be on at all times that the VOX mode is being used.

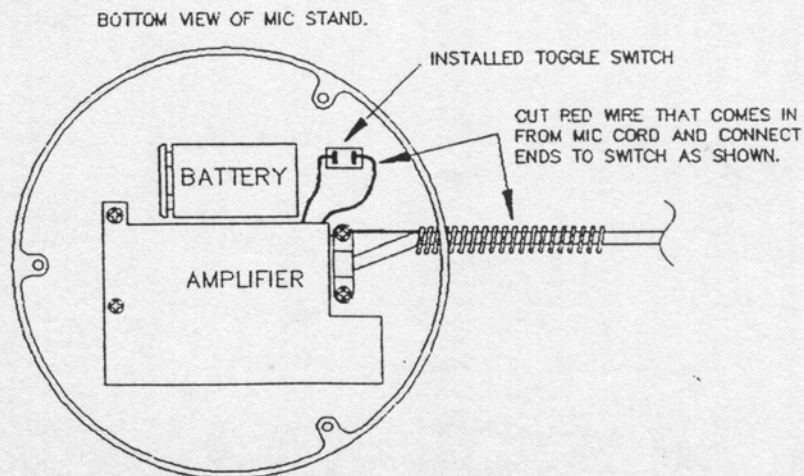
Turning on the microphone must not "key" the radio or cause the radio to transmit.

The following modification will allow any amplified Astatic microphone to work with VOX.

A small single pole single throw switch will have to be mounted on the base. This switch will be connected so that it disables the normal push-to-talk switching. A good choice for a switch would be Radio Shack part #275-612 subminiature toggle switch, but the exact type of switch is not critical. Carefully drill a small hole in the base at a spot that will not interfere with the amplifier board or 9 volt battery, and mount the switch in the drilled hole.

Connect the switch so that it is in series with the red wire that goes out to the mic connector. (See the diagram below) The easiest way to do this is to cut the wire in half, re-service the ends, and connect these to the two switch terminals. On stands such as the silver eagle and TUP9, you may have to remove the amplifier to gain access to the cable leads. If the wire will not reach, small jumper wires will have to be added. Make sure that any bare wire connections are properly insulated with electrical tape or shrink tubing. This completes the modification.

To use the mic in VOX mode first turn the small toggle switch off so that push-to-talk no longer operates. Then slide the clamp on the mast of the mic stand up so that the internal amplifier will be turned on. The mic gain on the bottom of the mic stand may have to be turned down so that background noise does not trigger the VOX circuit in the radio. When you are finished using the mic, make sure that you slide the clamp on the mast of the mic stand back down so that the amplifier is not left on.





MICROPHONE FACTS

FOR AMATEUR RADIO OPERATORS

The microphone, which is the first component in line in most communications systems, continues to be one of the most taken for granted and least understood items that most Radio Amateurs use. With this in mind the Astatic Corporation has prepared the following definitions of microphone terminology.

MICROPHONE: A transducer for converting sound energy to electrical energy.

SOUND ENERGY: Sound energy is sound waves which are small fluctuations of air pressure. The amplitude of the pressure variations is measured in microbars. One microbar represents one millionth of the pressure of the atmosphere that surrounds us. As a unit of sound pressure, a microbar is equal to a force of 1 dyne per square centimeter (.0000145 pounds per square inch). Some examples of the sound energy produced by common sources are given in the following table. Also included are some samples of the average output of a sample microphone, in this case an Astatic 10DA-L with a -52 dB sensitivity rating (0 dB = 1 volt/microbar). (See also following discussion of microphone sensitivity).

| <u>Sound Source</u> | <u>Microbars</u> | <u>Volts out of 10DA-L in mv</u> |
|-----------------------------|------------------|--------------------------------------|
| Quiet whisper at 5 feet | 0.002 | 0.005 |
| Average voice at 3 feet | 0.30 | 0.75 |
| Loud music | 2.00 | 5.00 |
| Riveting machine at 35 feet | 20.00 | 50.00 |
| Average voice at 1/2 inch | 100.00 | 250.00 |
| Jack hammer at 5 feet | 300.00 | 750.00 |

MICROPHONE SENSITIVITY: In order to compare the output levels of various microphones it is necessary to use some standard reference. There are a number of different standards used but the most common are a voltage reference and a power reference. The voltage reference is used primarily with high impedance microphones. It will be given as some number of dB below 1 volt/microbar. Since it will be less than 1 volt, it will be a negative number. An example is a microphone that has an output of .005 volts for an input of 1 microbar. Using the formula $dB = 20 \log (E_o / 1 \text{ volt})$, the sensitivity of our microphone is $dB = 20 \log (.005 \text{ volts} / 1 \text{ volt})$ or -46 dB. For low impedance microphones a power sensitivity rating is usually used. The reference in this case being 1 milliwatt per 10 microbars. The formula for these calculations would be $dB = 10 \log (\text{power out} / 1 \text{ milliwatt})$. For example a microphone that has a power output of .001 milliwatts with an input of 10 microbars would have a sensitivity rating of $dB = 10 \log (.001 \text{ milliwatts} / 1 \text{ milliwatt})$ or -30 dB.



ASTATIC CORP., Conneaut, Ohio 44030 (216)593-1111, Telex 980712

● CARTRIDGES ● NEEDLES ● PICKUPS ● MICROPHONES ● ACCESSORIES

NOISE CANCELLING MICROPHONES: Also referred to as close talking microphones because it is necessary to talk directly into the front of this type of microphone within a distance of $\frac{1}{2}$ inch. A noise cancelling microphone attenuates sounds arriving from any direction at a distance of $\frac{1}{2}$ inch or more. In areas of high ambient noise levels, a noise cancelling microphone is the only type of microphone that will allow the operator to be heard.

ADVANTAGES OF A PREAMPLIFIED MICROPHONE FOR THE AMATEUR RADIO OPERATOR

A common misconception among many Amateur Radio Operators is that a microphone with a built in preamplifier is not needed and never should be used. However, there are situations when a preamplifier should be used with a microphone that will result in improved performance. One example is when using a crystal or ceramic microphone with a radio that has an input impedance of less than 500,000 ohms. This condition is a result of the fact that a crystal or ceramic microphone is a capacitive device. The equivalent circuit for a crystal or ceramic microphone is shown in Fig. A. The capacitor "C" usually has a value of 500pf to 2000pf. R_L in the case of a microphone would be the input impedance of the transmitter or amplifier.

CRYSTAL MICROPHONE EQUIVALENT CIRCUIT

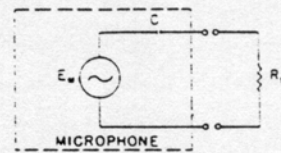


FIG. A

As a specific example, the Astatic D-104-L crystal microphone has a capacity of 1500pf. Using the formula $f = \frac{1}{\pi RC}$ to determine the RC rolloff point for various loads shows that into a 5 megohm load the breakpoint is 21.2 Hz. Below this frequency the output drops off at 6dB per octave. If the D-104-L is used with a load of 500,000 ohms, the breakpoint is 212 Hz which is just below the 300 Hz cutoff of most communications transmitters. Now if the D-104-L is operated into a load of 50,000 ohms, the breakpoint is 2,120 Hz and, since the output at all frequencies below 2,120 Hz is rolled off at 6dB/octave, the result is a very weak tinny sound. See Fig. 3 for results of the various loads on a D-104-L.

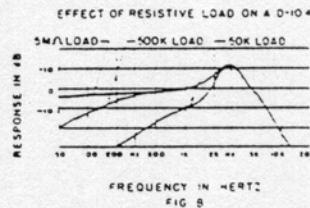


FIG. B

From this it can be seen that transmitters having input impedances of less than 500,000 ohms will require a preamplifier when crystal or ceramic microphones are used in order to preserve the proper sound quality of the microphone. Many of the radios currently on the market are made to work with high impedance dynamic microphones and have input impedances on the order of 50,000 ohms. It is when an operator desires to use a D-104-L or another crystal or ceramic microphone with these transmitters, or transmitters having lower input impedances, that a preamplifier is required. For example, in the case of the Astatic TGP-D104 stand-microphone combination, it may be used into transmitters having input impedances from 100 ohms up to an open circuit. The only result is that at the very low impedances a loss of level will result, but the extra gain of the preamplifier will more than make up for this loss.

A preamplifier can also be used to provide the boost in level needed in order to use a low impedance microphone into a high input impedance transmitter. Since low impedance microphones are typically low output level and transmitters for use with a high impedance microphone require a high microphone level, the preamplifier can boost the level of the low impedance microphone to a level comparable with high impedance microphones.

From the above discussion it should be clear that the preamplifier built into Astatic stands and microphones can be considered as a universal impedance and level matching device. It frees the operator from concerns about level and impedance since it will allow operation into any impedance from 100 ohms up to open circuit and with the level adjustable over at least a 40dB range, nearly all input level requirements can be matched by one simple adjustment.

DIRECTIVITY: There are three types of directivity as follows: (1) A non-directional microphone whose frequency response is independent of the angle of incidence of the incoming sound over the frequency range of the microphone. The popular term for this type is "Omnidirectional". (2) A semi-directional microphone whose frequency response is dependent upon the angle of incidence of incoming sound over part of the frequency range of the microphone and substantially independent of the angle of incidence over the rest. (3) Unidirectional microphone that is sensitive to sound primarily in one direction and relatively insensitive to sounds from other directions. A common type of unidirectional microphone is a cardioid microphone.

CRYSTAL MICROPHONE: Crystal microphones operate upon the principle of the piezoelectric effect. This effect is exhibited by certain crystalline substances, particularly Rochelle Salts which has the strongest piezoelectric effect of any material. A crystal microphone produces an output voltage by the bending or twisting of the piezoelectric element and since the electrical output is quite large compared to other elements, these microphones are extremely sensitive. The crystal microphone is a very high impedance device, has a frequency response ideally suited for voice communications, is mechanically rugged but cannot operate in a temperature environment above 120°F. for more than a few minutes without permanent damage.

CERAMIC MICROPHONE: Ceramic microphones operate on the principle of the piezoelectric effect. Commonly used materials are barium titanate and lead zirconate-lead titanate. A ceramic microphone produces an output voltage by bending the piezoelectric element. The ceramic microphone may be used interchangeably with a crystal microphone, but it will be slightly less sensitive. Ceramic elements are naturally resistant to high temperatures. The ceramic microphone is a very high impedance device, is mechanically rugged, light weight and is particularly suited for voice communications.

DYNAMIC MICROPHONE: Dynamic microphones operate on the principle of a wire moving in a magnetic field. Sound pressure variations move a lightweight coil of very fine wire attached to a diaphragm in the field of a permanent magnet, inducing a current flow in the coil and therefore an output voltage. Dynamic microphones are low impedance devices, usually less than 1,000 ohms and use a transformer for high impedance applications. Dynamic microphones are extremely reliable, very rugged, stable, have a uniform frequency response and are virtually immune to the effects of temperature, humidity and physical shocks.

ELECTRET MICROPHONE: The operation of an electret microphone depends for its action on the ability of certain dielectric materials to store an electrical charge in somewhat the same way a permanent magnet maintains a magnetic field. Sound pressure variations on the diaphragm, which is one plate of a capacitor, force the diaphragm to move in relationship to a back plate, which is the other plate of a capacitor. Since varying the thickness of the dielectric between the plates of a capacitor varies the capacitance and the charge stored on the diaphragm is constant, an output voltage is generated. The electret is a very high impedance device where even a very short cable would cause serious loading effects. Therefore, an FET amplifier is built into the electret cartridge as an impedance matching device to give an output impedance of approximately 1,000 ohms. Because of the FET amplifier, a small DC voltage is necessary for operation, usually between 1.5 and 10 volts. The electret microphone is very small and lightweight, has high output sensitivity for its size and a very wide frequency response.

CARBON MICROPHONE: A carbon microphone works on the principle of variable resistance. Carbon granules are placed between a thin metal diaphragm and another conductive plate. Sound energy causes the diaphragm to vibrate and this in turn varies the pressure on the carbon granules. This variation in pressure varies the resistance of the carbon. If a current is passed through the carbon, it will be varied in proportion to the varying pressure and thus in proportion to the sound energy. The carbon microphone has a high output at low impedance. It does require power from the radio and due to the nature of its generating mechanism, it has an inherently high noise level.

CARBON MICROPHONE REPLACEMENT: In order to overcome the shortcomings of a carbon microphone, various other types of microphones have been made. These microphones use dynamic, ceramic or electret cartridges, plus a preamplifier for impedance and level matching. Since a carbon microphone requires a D.C. current to operate, these replacement microphones are made to be powered from the same source as the carbon microphones and therefore may be used as direct replacements.



I PUT A POWER MIC ON MY RADIO AND NOW IT SQUEALS!!!

Astatic power mics are designed to work with as many different radios as possible, without having to make any modifications to the mic or the radio. However, whenever a stock mic on a radio is replaced with a power mic, there exists the potential for some compatibility problems. Most of the time, all that is required to hook up the power mic is to choose the correct mic connector and wire the connector for your particular radio. Sometimes, either due to the design of the radio or the conditions that exist where the radio is located, extra modifications may need to be made to get the best performance.

The most common complaint that we hear is that the radio squeals. A squeal in a radio can be caused by several different things.

- 1- Wiring or switching problems.
- 2- RF feedback.
- 3- With older Astatic "4-wire" mics there can be compatibility problems.

In order to correct the problem, it is important to identify which type of problem you have. Read the three sections below and see if you can identify which problem you have:

1- With wiring and switching problems, the squeal can be heard coming from the speaker in the radio. Sometimes it only occurs during receive, sometimes only during transmit. The squeal is usually fairly loud, and sometimes can be changed by the setting of the receive volume control. With this type of squeal, it may or may not be heard by the person who is listening on another radio.

2- RF feedback problems only occur when the radio is transmitting. The squeal may only be heard by the receiving station, or sometimes it can also be heard coming faintly from inside the radio. (not from the speaker!). Often, changing the mic gain, or the physical location of the mic will cause the squeal tone or intensity to change, or it may even go away temporarily.

3- If you have an old 4-wire Astatic mic, (such as a TUG-8-D104, or a D104-M.) a number of radios that were produced after the mid 70's had a compatibility problem with these mics. For this reason, Astatic no longer manufactures these mics. This squeal problem always occurred when the radio was in receive. Sometimes adding an external speaker to the radio would aggravate the situation.

The fixes-

Now that you have identified what type of squeal problem you have, here are some suggestions on how to eliminate the problem:

1- If you have a wiring or switching problem, the first thing to do is to check the plug wiring. Make sure that the correct color wires are going to the correct numbered pins. Some connectors such as the popular "DIN" style connectors do not number their pins in sequence. (1,2,3,4,etc) If your not sure how the pins are numbered and you can't read the numbers on the connector body, check with the store where you bought the connector to see if they can give you the correct pin numbers for that connector. Also be sure to look for any small strands of wire that may be shorting two pins together or shorting to the connector shell. There are some radios that have a small switch located in the radios' mic connector. When your trying a new mic, make sure that you put connector completely together before you try it. The possibility also exists that the radio manufacturer has made changes in the radio that require a different mic hook-up. This is unusual, but it has happened. If this is the case, you may need to send, or fax a copy of the radio schematic to our factory to get the correct plug wiring. The other possibility is that there is a switching problem in the mic itself. If it is an older mic or one that was purchased used, look inside the mic for any obvious signs of tampering. Also look for any loose wires or anything that could possible cause a short to the mic switch or amplifier board. In severe cases the mic may need to be returned to the factory for service.

2- RF feedback problems are caused by the mic picking up stray RF energy and coupling it back ("feeding it back") to the input of the radio. Because power mics have amplifiers in them, it takes a lot less of this stray RF to cause a problem then it does with a stock mic. This stray RF is always present around a transmitter, but there are things you can and should do to reduce it.

A- Check the SWR (standing wave ratio). A bad SWR or "match" as it is called will create a lot of stray RF around the radio. Use a good quality SWR meter and make sure that your SWR is at least 1.5 to 1 or better.

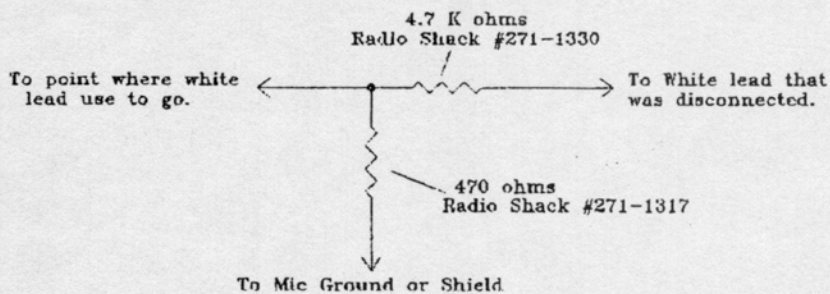
B- Make sure you have a good ground on the radio. With a base station this means a separate ground wire from the chassis of the radio to either a cold water pipe or an outside grounding rod. This wire should be heavy gauge and as short as possible. In a mobile installation this means a good heavy wire from the radio chassis to the vehicle frame.

C- All modern radios have limiter circuits to prevent over-modulation. Many people have these circuits modified or removed completely to increase "talk-power". Any modification that allows modulation over 100% is not only illegal, but is asking (make that begging!) for RF feedback problems. Over-modulation creates distortion that leads to RF being generated on adjacent channels, and also at total different frequencies that can be picked up by devices such as telephones, TV's, stereos, etc. Since the radio antenna is not designed to broadcast all these different frequencies, this extra RF energy winds up being radiated by the radio chassis and the feedline! Of course, this also makes it much easier for the power mic to pick up some of this RF and feed it back into the radio input.

If all else fails, there are things that can be done to the mic itself to help reduce RF feedback. The first thing to look at is mic gain or "volume". Does turning the mic gain down eliminate the feedback? If you can eliminate the squeal just by turning the mic down some, that's

probably what you should do. Power mics have much higher output than the stock mic that comes with the radio. On some radios, you may find that the gain control on the mic seems to be very sensitive. A slight adjustment of the mic gain control may cause the modulation to go from 0% to over 100%. If this happens the best cure is to add a pair of resistors to the mic to reduce its gain. The circuit shown below is what is known as a 20db "L" pad. The values shown will usually cure this problem. If your not handy with a soldering iron, this is best done by a technician.

Inside the mic, disconnect the white lead that comes out of the coil cord. Then add these two resistors has shown. Make sure to carefully insulate all of the connections with electrical tape or heat shrink tubing.



Another possibility is shielding problems. On D104 style stand mics, use a voltmeter or continuity checker to make sure that there is a good connection between the mic shield and the metal mic housing. On mics that have plastic housings, the inside of the housing is coated with special paint that has metal particles mixed in. This coating is usually connected to the shield wire by either physical contact with a portion of the amplifier board, or with some type of metal clip. With hand-held mics, the rear housings' paint coating usually makes contact with the front housings' coating by means of the round plastic bosses that touch when the mic is put together. Again, with a voltmeter or continuity checker, you should measure a low resistance from the shield to one or more of the tops of the round plastic bosses that touch when the front and rear housings are put together. If turns out that something has happened to this coating, it is usually best to return it to the factory for repair.

In the most extreme cases, sometimes adding a bypass a capacitor between the shield and the white wire form the coil cord inside the mic can help. A ceramic capacitor with a value of .01 microfarads is a good choice. (Radio Shack #272-131)

If you have an old 4-wire mic that squeals as soon as it is plugged into the radio, you will most likely have to add a resistor in series with white lead in the mic coil cord. You also might not be able to use an external speaker even if you add the resistor. The value that usually works is 47K ohms (Radio Shack #271-1342). Some radios may require a different value. If you have problems, contact the factory.