

DISNEYLAND, INC.

1313 Harbor Blvd.

Anaheim, California

Attention: Mr. Robert Matheison,  
Customer Relations Division

MOTOROLA



WORLD LEADER IN ELECTRONIC COMMUNICATION  
SYSTEMS FOR PUBLIC SERVICE AND INDUSTRY

*proposal for*

DISNEYLAND, INC.

1313 Harbor Blvd.

Anaheim, California

Attention: Mr. Robert Matheison,  
Customer Relations Division

*presented by*

**MOTOROLA COMMUNICATIONS AND ELECTRONICS INCORPORATED**

**WORLD LEADER IN ELECTRONIC COMMUNICATION  
SYSTEMS FOR  
PUBLIC SERVICE AND INDUSTRY**



**MOTOROLA COMMUNICATIONS AND ELECTRONICS INCORPORATED**

A SUBSIDIARY OF MOTOROLA INCORPORATED

EXECUTIVE OFFICES • 4501 AUGUSTA BOULEVARD • CHICAGO 51, ILLINOIS



September 12, 1960

Disneyland, Inc.

Page 2

EQUIPMENT

September 12, 1960

Each department would have an AC operated "Handie-Talkie" base station and may operate with its associated pocket transmitters, "Handie-Talkies" or vehicular units. These units can communicate with each other or to and from the base station on a push-to-talk basis.

Attention: Mr. Robert Matheison,  
Customer Relations Division

Subject: Proposal - Coordinated Radio Communications System

Gentlemen:

Pursuing further our meeting of September 7th, on the subject of radio communications consideration, it is the pleasure of Motorola Communications & Electronics, Inc. to submit herewith for your analysis, a coordinated radio system proposal which would provide communications for the Production Department, Security Department and the Monorail system.

These departments would share one radio frequency channel, however would be independent systems and would hear only the message traffic of its own department. The ability to separate the departmental traffic is based upon the use of Motorola's "Private Line" tone system.

"Private Line" provides a means of co-channel sharing without having to hear the traffic of other users sharing the channel by superimposing a sub-audible tone on the carrier, which will open only the receivers in one's own system. A different tone code being assigned to each co-channel user.

In our design for a coordinated system for the three departments mentioned, the same principle as outlined above would apply for each department. For example, while all departments would share the same R. F. channel, a different tone code would be assigned to each department and the department would hear only its own units. Means are provided, in "Private Line" equipment, for monitoring the channel before transmitting, to be sure the channel is clear as required by the F. C. C. rules.

(mercury batteries) 325.00  
Cotton  
9-cad batteries for receiver..... add ..... 15.95



September 12, 1960

Disneyland, Inc.

Page 2

EQUIPMENT

Each department would have an AC operated "Handie-Talkie" base station and desk microphone, and may operate with its associated pocket transmitter and receiver, "Handie-Talkies" or vehicular units. These units may communicate with each other or to and from the base station on a departmental system basis.

Base stations may be moved from point-to-point as required for any particular occasion, since all units licensed in low power industrial systems are considered as mobiles by the F. C. C. and in your instance may be used at any point in the Park.

Under emergency conditions, the "Private Line" feature may be turned off, and all departments may work together.

Base stations, "Handie-Talkies", pocket transmitters and vehicular units are available with "Private Line". Pocket receivers are standard squelch and will hear the traffic of all departments.

COSTS

Base stations - "Private Line"  
H-23AAC-3101BM "Handie-Talkie"  
117 volt AC power supply, dynamic  
desk microphone  
Total, each station

586.40

"Handie-Talkie" Radiophones - "Private Line"  
H23AAC-3101BM Extra duty battery  
power supply (portable use)

500.00

H23AAM-3101BM Ni-cad batteries  
6/12 volt operation (Monorail cars)

658.00

Pocket-Carried Equipment

H23NAC-3100B "Private Line"  
transmitter

267.00

HO3ANC-1100B Pocket Receiver  
(mercury batteries)

325.00

Optional

Ni-cad batteries for receiver..... add ..... 15.50

Sincerely yours,

MOTOROLA  
Communications & Electronics

Everett LaCotte,  
Zone Sales Manager



September 12, 1960



Page 3

Disneyland, Inc.

COSTS (Continued)

Motorized Industrial "dispatcher" Radiophone 71.00  
Wall mount charger for NI-cad receiver (charges 5 at one time) 10.00  
TOTAL RF POWER OUTPUT

Vehicular Units - "Private Line"  
D23AAT-3100B Dispatcher unit 680.80  
STATION WAGON

If desired, equipment may be leased at 2.1% per month of the total equipment value on a 5-year term.

Contract maintenance is available, which will allow Motorola to provide a complete packaged system, placing the entire functional responsibility with the manufacturer.

An example of costs on a 60-month lease basis, including maintenance, would be \$262.50 per month (.55¢ per day per unit), for the following equipment: 3 base stations, 4 "Handie-Talkies" (Monorail), 4 pocket transmitters and receivers (Production), 2 pocket transmitters and receivers (Security), 2 dispatchers (3 wheelers - Security), 1 dispatcher (station wagon - Security).

Prices quoted do not include California sales tax and are shipped f. o. b. Chicago on a 6 week delivery schedule.

You may exercise an option to purchase the equipment at 68% of the lease monies paid in at any point during the lease term. (This amounts to 14.32% of the new equipment value at the 60th month). Or, the equipment may be leased for an additional term of 60 months at the amortized value (approximately \$30.00 per month).

Motorola equipment is the finest produced in the art of mobile and portable communications. Reliability, quality and user satisfaction is our first consideration. More than 70% of such equipment used in the nation is Motorola.

We will be privileged to explore this matter further with you.

Sincerely yours,

MOTOROLA  
Communications & Electronics, Inc.



Everett LeGette,  
Zone Sales Manager

MOTOROLA  
COMMUNICATIONS AND ELECTRONICS, INC.  
CHICAGO, ILLINOIS  
CHICAGO, ILLINOIS  
CHICAGO, ILLINOIS

...constructed compact unit  
small enough to mount virtually anywhere  
on any vehicle. Transistorized circuitry  
and an optional electronic regulator pro-  
vide reliable operation at all vehic-  
le speeds.

TRANSISTORIZED—reliability, miniaturization and low  
power consumption—the principle attributes of the transistor  
are fully and initially realized in all 453 kc IF and audio stages  
throughout the transmitter and receiver. Transistorized battery saving operation  
is available on all units.

100% transmitter  
operation in split-  
channel systems.

★ INSTALLATION FLEXIBILITY—the use of the heavy steel  
mounting bracket coupled with the equipment form factor  
type of industrial  
vehicle.

TRANSISTORIZED VOLTAGE REGULATOR—an optional,  
completely automatic unit to provide stable operating voltage  
in the presence of fluctuating battery volt-  
age. Maintains a constant 42 VDC.

Construction and  
roll shock and  
vibration protection for the "dispatcher" radio units.

SHOCK MOUNTING—optional vertical or horizontal shock  
mounts for "dispatcher" radios assures maximum protection  
against vibration and roll shock.

PERMANENTLY SEALED IF WAVE FILTER—optional  
channel width requirements.

"PERMAKAY" FILTER—a miniature duplicate of Motorola's  
famous plastic sealed IF Wave Filter permanently "seal in"  
the filter element.

"MATCHED SET" ACCESSORIES—speaker, controls, cables,  
antenna, microphone and all installation hardware are custom  
designed for and supplied with the basic radio set. No addi-  
tional equipment or adapters required.



# MOTOROLA

THE TRANSISTOR RESEARCH LINE



VOL. 1, SEC. 1.2  
INDUSTRIAL "DISPATCHER"  
RADIOPHONE  
E-216A

## Transistorized Industrial "dispatcher" Radiophone

144-174 mc; 0.8 TO 8 WATTS RF POWER OUTPUT

### STATION WAGON

"T" SERIES WITH  
SPEAKER CONTROL UNIT



AC DESK TOP  
UNIT



"D" SERIES IN  
SHOCK MOUNTING  
BRACKET



*A ruggedly constructed, compact unit small enough to mount virtually anywhere on any vehicle. Transistorized circuitry and an optional electronic regulator provide unprecedented low drain at all vehicular voltages.*

**TRANSISTORIZED**—reliability, miniaturization and low power consumption—the principle attributes of the transistor are fully and initially realized in all 455 kc IF and audio stages of this new equipment.

**LOW POWER DRAIN**—the use of transistors throughout the audio and 455 kc IF circuits result in battery saving operation from standard vehicular electrical systems.

**SPLIT-CHANNEL COMPATIBILITY**— $\pm .0005\%$  transmitter stability meets all FCC requirements for operation in split-channel systems.

**INSTALLATION FLEXIBILITY**—the use of the heavy steel mounting bracket coupled with the equipment form factor provide simple mounting on virtually every type of industrial vehicle.

**TRANSISTORIZED VOLTAGE REGULATOR**—an optional, completely automatic unit to provide stable operating voltage for the radio unit from any vehicular voltage source. Maintains unchanging radio performance from fluctuating battery voltages. Standard models available through 42 VDC.

**RUGGED CONSTRUCTION**—low mass construction and ruggedized reinforced housings establish the overall shock and vibration resistance of the Industrial "dispatcher" radio units.

**SHOCK MOUNTING**—optional vertical or horizontal shock mounts for "dispatcher" radios assures maximum protection from severe conditions of vibration and shock inherent in Industrial vehicle operation.

**"I.D.C."**—adjustable Instantaneous Deviation Control automatically limits transmitter deviation to any value dictated by channel width requirements.

**"PERMAKAY" FILTER**—a miniature duplicate of Motorola's famous plastic-sealed IF Wave Filter permanently "seal in" receiver selectivity.

**"MATCHED SET" ACCESSORIES**—speaker, controls, cables, antenna, microphone and all installation hardware are custom designed for, and supplied with the basic radio set. No additional equipment or adapters required.

**MOTOROLA**  
COMMUNICATIONS AND ELECTRONICS, INC.

A SUBSIDIARY OF MOTOROLA, INC.

4301 W. AUGUSTA BLVD., CHICAGO 51, ILL., SPAULDING 2-6500

TECHNICAL INFORMATION CENTER





## Guaranteed PERFORMANCE SPECIFICATIONS

### General

RADIO SET MODELS	Package	Overall Dimensions (Inches) Includes Mounting Rack	Approximate Weight (Lbs.)
T23 LOW POWER INDUSTRIAL MOBILE	two-unit	3 $\frac{3}{8}$ x 12 $\frac{1}{2}$ x 8 $\frac{5}{8}$	20
T33 INDUSTRIAL MOBILE	two-unit	3 $\frac{3}{8}$ x 12 $\frac{1}{2}$ x 10 $\frac{1}{8}$	22
D23 LOW POWER INDUSTRIAL MOBILE	single unit	3-11/16 x 12 $\frac{1}{2}$ x 10 $\frac{7}{8}$	17
D33 INDUSTRIAL MOBILE	single unit	3-11/16 x 12 $\frac{1}{2}$ x 12 $\frac{3}{8}$	19
D23 LOW POWER INDUSTRIAL STATION	single unit	3 $\frac{3}{4}$ x 12 x 14 $\frac{3}{8}$ *	18
D33 INDUSTRIAL STATION	single unit	3 $\frac{3}{4}$ x 12 x 14 $\frac{3}{8}$ *	18 $\frac{1}{2}$

\*no mounting rack used

add 3 $\frac{1}{2}$  lbs. for  
regulator, if used

### Primary Power Drain (amperes at E.I.A. standard test voltages)

SOURCE VOLTAGE	INDUSTRIAL			LOW POWER INDUSTRIAL		
	standby	receive	transmit	standby	receive	transmit
6 VDC	1.4	2.5	15.2	1.0	2.1	3.8
12 VDC	0.7	1.5	7.5	0.4	1.2	1.8
24 VDC	0.4	0.85	3.0	—	—	—
18-36 VDC*	—	—	—	0.7	1.5	2.1
24-42 VDC*	0.7	1.1	3.3	0.7	1.5	2.1
117 VAC "D" SERIES ONLY	0.2	0.4	1.0	0.1	0.2	0.3

\* transistor voltage regulators (NK181 or NK191-Low Power Industrial or NK182 or NK192-Industrial) in accessory group.  
Power figures given at maximum regulator input voltage.

### Transmitter

CHASSIS MODEL	NTD6000/NU183 industrial series	NTD6000 low power industrial series
RF OUTPUT	8 watts —144-162-mc 7 watts —162-174 mc	0.8 watts
CRYSTAL MULTIPLICATION	24 times	24 times
SPURIOUS & HARMONIC EMISSIONS	more than 60 db below carrier	more than 50 db below carrier
TUNED CIRCUITS	14	11
FREQUENCY STABILITY	$\pm .0005\%$ from $-30^{\circ}\text{C}$ to $+60^{\circ}\text{C}$ ( $\pm 25^{\circ}\text{C}$ reference)	$\pm .0025\%$ from $-30^{\circ}\text{C}$ to $+60^{\circ}\text{C}$ ( $\pm 25^{\circ}\text{C}$ reference)
TUBE AND TRANSISTOR COMPLEMENT	1AD4 —oscillator 1AD4 —modulator 1AD4 —tripler 1AD4 —doubler	1AD4 —doubler 6397 —doubler (2) 6397 —driver/power amp (LPI) 2E24 —power amp (industrial only) 2N654 —"IDC" amp and clipper
MODULATION	40F3: $\pm 15$ kc for 100% at 1000 cps or 20F3: $\pm 5$ kc for 100% at 1000 cps	
FM NOISE	at least 45 db below $\pm 10$ kc deviation at 1000 cps at least 35 db below $\pm 3.3$ kc deviation at 1000 cps	
AUDIO RESPONSE	$\pm 1$ , $-3$ db of 6 db/octave pre-emphasis from 300 to 3000 cps	
AUDIO DISTORTION	less than 6% at 1000 cps, $\pm 10$ kc deviation less than 6% at 1000 cps, $\pm 3.3$ kc deviation	

### Receiver

CHASSIS MODEL	NRD6020 series	
CHANNEL SPACING	30 kc	60 kc
MODULATION ACCEPTANCE	$\pm 5$ kc	$\pm 15$ kc
SELECTIVITY	more than 80 db at $\pm 30$ kc	more than 80 db at $\pm 60$ kc
TUNED CIRCUITS	29 (6 plastic-sealed in miniature "Permakay" IF wave filter)	
SENSITIVITY	less than 1.0 uv for 20 db quieting; 50 ohms RF input impedance	
FREQUENCY STABILITY	$\pm .0025\%$ from $-30^{\circ}\text{C}$ to $+60^{\circ}\text{C}$ ( $\pm 25^{\circ}\text{C}$ reference)	
SPURIOUS & IMAGE REJECTION	more than 60 db down for all except ( $f_0 - 227.5$ kc) which is 50 db down	
SQUELCH SENSITIVITY	adjustable, will open at less than 0.5 uv	
TUBE AND TRANSISTOR COMPLEMENT	1N147A —1st mixer CK5672 —oscillator HD2236 —multiplier 1N147A —2nd mixer CK5678 —1st IF amp (1) CK5678 —1st IF amp (2) 2N218 —2nd IF amp (1) 2N218 —2nd IF amp (2) 2N218 —2nd IF amp (3)	2N218 —2nd IF amp (4) 2N218 —1st limiter 2N218 —2nd limiter 2N654 —squelch amp 2N654 —audio amp (2) MN52 —audio driver (2) MN22 —output amp (2) HD2149 —discriminator-rectifiers (2) HD2149 —squelch noise rectifiers
AUDIO OUTPUT	3 watts at less than 10% distortion (6.6 VDC) 5 watts at less than 10% distortion (13.8 VDC & higher)	

F.C.C. LICENSE DESIGNATION:  
CC3501—I33 and D33 Series  
CC3502—I23 and D23 Series

Specification subject to change without notice



# MOTOROLA

TRANSISTOR RESEARCH LINE



Vol. 1, Sec. 1.2  
MOTORCYCLE "DISPATCHER"  
RADIOPHONE  
E-181A

## Motorcycle "dispatcher" radiophone

144-174 mc; 7 to 8 watts RF output



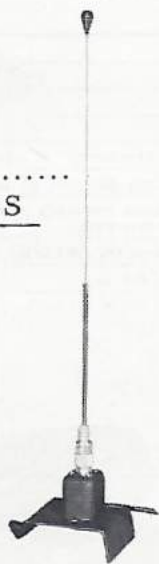
radio model for  
2-wheel installations



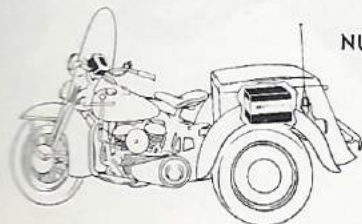
### THREE WHEELERS



radio model for  
3-wheel installations



NU180 series antenna



*Transistorized, compact, ruggedly constructed equipment specially designed to meet the rigorous demands of motorcycle operation.*

**TRANSISTORIZED**—reliability, miniaturization and low power consumption—the principle attributes of the transistor are fully and initially realized in 455 kc IF, power supply and all audio stages of this new motorcycle equipment.

**PRINTED CIRCUITRY**—incorporation of printed circuitry eliminates much of the space-consuming conventional wiring and achieves a new standard of reliability through rugged, low mass construction.

**SPLIT-CHANNEL COMPATIBILITY**— $\pm 0.0005\%$  stability in the transmitter meets all FCC requirements for operation in split-channel systems.

**RUGGED CONSTRUCTION**—low mass construction and ruggedized reinforced housings establish the overall shock and vibration resistance of Motorola Motorcycle "dispatcher" radio units.

**SHOCK MOUNTED**—shock mounting of "dispatcher" radio units for rear fender installations assures maximum unit protection from severe conditions of vibration and shock inherent in motorcycle operation.

**LOW POWER DRAIN**—the use of transistors throughout the audio, power supply and 455 kc IF circuits results in substantially lower primary power drain due to lower filament power requirements.

**"IDC"**—adjustable Instantaneous Deviation Control automatically limits transmitter deviation to any value dictated by channel width requirements.

**"PERMAKAY" FILTER**—a miniature duplicate of Motorola's famous plastic-sealed IF Wave Filter permanently "seals-in" receiver selectivity.

**"MATCHED SET" ACCESSORIES**—speaker, controls, cables, antenna, microphone and all installation hardware are custom designed for and supplied with the basic radio set. No additional motorcycle modifications required.

## MOTOROLA

COMMUNICATIONS AND ELECTRONICS, INC.

A SUBSIDIARY OF MOTOROLA, INC.

3121 N. AUGUSTA BLVD., CHICAGO 51, ILL., SPAULDING 2-6500

TECHNICAL INFORMATION CENTER





## Guaranteed PERFORMANCE SPECIFICATIONS

### GENERAL

RADIO SET MODEL	MOUNTING	OVERALL DIMENSIONS	APPROX. WT. INCLUD. ACCESSORIES	POWER SUPPLY	MAX. BATT. DRAIN AT 6 VDC (in amps)
T33AAT Series	2-wheel models—over rear fender (1958 only)* 3-wheel models—trunk compartment	12-1/2" wide x 3-5/8" deep x 10-1/8" high	20 lbs**	transistorized	standby: 1.4 transmit: 15.2

\* 1957 & earlier 2-wheel models accommodate the radio unit on handle-bars. \*\* add 20 lbs for 2-wheel rear fender mounting kit

### TRANSMITTER

CHASSIS MODEL	NTD6000/NU183 series	
RF OUTPUT	8 watts—144-162 mc; 7 watts—162-174 mc	
CRYSTAL MULTIPLICATION	24 times	
SPURIOUS & HARMONIC EMISSIONS	more than 60 db below carrier	
TUBE & TRANSISTOR COMPLEMENT	1AD4 — oscillator 1AD4 — modulator 1AD4 — tripler 1AD4 — doubler	1AD4 — doubler 6397 — doubler (2) 6397 — driver 2E24 — power amp 2N654 — "IDC" amp and clipper
FREQUENCY STABILITY	Crystal maintains carrier within $\pm .0005\%$ of assigned center frequency from $-30^{\circ}\text{C}$ to $+60^{\circ}\text{C}$ ( $+25^{\circ}\text{C}$ reference).	
AUDIO RESPONSE	$+1, -3$ db of 6 db/octave pre-emphasis from 300 to 3000 cps	
MODULATION	20F3: $\pm 5$ kc for 100% at 1000 cps	40F3: $\pm 15$ kc for 100% at 1000 cps
FM NOISE	at least 35 db below $\pm 3.3$ kc deviation at 1000 cps	at least 45 db below $\pm 10$ kc deviation at 1000 cps
AUDIO DISTORTION	less than 6% at 1000 cps: $\pm 3.3$ kc deviation	less than 6% at 1000 cps: $\pm 10$ kc deviation

### RECEIVER

CHASSIS MODEL	NRD6020 series	
CHANNEL SPACING	30 kc	60 kc
MODULATION ACCEPTANCE	$\pm 5$ kc	$\pm 15$ kc
SELECTIVITY	more than 80 db at $\pm 30$ kc	more than 80 db at $\pm 60$ kc
TUNED CIRCUITS	29 (6 plastic-sealed in miniature "Permakay" IF wave filter)	
SENSITIVITY	less than 1.0 uv for 20 db quieting; 50 ohms RF input impedance	
FREQUENCY STABILITY	Crystal controlled oscillator maintains frequency within $\pm .0025\%$ of reference frequency from $-30^{\circ}\text{C}$ to $+60^{\circ}\text{C}$ ( $+25^{\circ}\text{C}$ reference).	
SPURIOUS & IMAGE REJECTION	more than 60 db down for all except ( $f_0 - 227.5$ kc) which is 50 db down	
SQUELCH SENSITIVITY	adjustable, will open at less than 0.5 uv	
TUBE AND TRANSISTOR COMPLEMENT	1N147A — 1st mixer CK5672 — oscillator HD2236 — multiplier 1N147A — 2nd mixer CK5678 — 1st IF amp (1) CK5678 — 1st IF amp (2) 2N218 — 2nd IF amp (1) 2N218 — 2nd IF amp (2) 2N218 — 2nd IF amp (3)	2N218 — 2nd IF amp (4) 2N218 — 1st limiter 2N218 — 2nd limiter 2N654 — squelch amp 2N654 — audio amp (2) MN52 — audio driver (2) MN22 — output amp (2) HD2149 — discriminator-rectifiers (2) HD2149 — squelch noise rectifiers
AUDIO OUTPUT	3 watts at less than 10% distortion	

Specifications Subject to Change Without Notice

F.C.C. LICENSE DESIGNATION: 3500



MOTORCYCLES  
DISPATCH  
RADIOPHONE

# MOTOROLA

TRANSISTOR RESEARCH LINE



Vol. 1, Sec. 2.4  
TRANSISTORIZED  
DYNAMIC MICROPHONES  
E-213A

## Base Station Desk and Handset Microphones

### BASE STATION MICROPHONE



DESK  
STAND

### HANG-UP HANDSET



DESK SET

## Featuring...

*A complete line of transistorized dynamic microphones for any base station installation—high output models with built-in transistor amplifier for stations without microphone preamplifier, and low level model for stations with preamplifier.*

**BUILT-IN TRANSISTOR AMPLIFIER**—boost microphone output to normal transmitter input level. Transistor amplifier draws its power from standard "talking current" supply.

**CLEARER, CRISPER VOICE REPRODUCTION**—dynamic element provides unprecedented voice clarity to all radio transmissions. Improvement in message intelligibility increases communications range . . . assures accurate reception of all messages.

**ATTRACTIVE DESK STAND MICROPHONE SERIES**—with die cast housing—finished in glossy grey baked enamel. Press-to-talk bar base mounted—optional split bar provides both press-to-talk and monitor-before-transmit operations with Private-Line radiophone base stations.

**TU560 HANG-UP HANDSET**—provides hang-up switch speaker muting when handset is in use for "personal" conversation facilities. Matching cable kits available in 8 and 25 foot lengths with terminations for all Motorola base station equipment.

**TU473 DESK SET**—includes built-in 4" speaker, self-retracting coiled cord to handset and built-in handset volume control.

**MATCHED IMPEDANCE**—output impedance is precisely matched to Motorola transmitter input impedance to produce the optimum balance required for high quality voice reproduction.



**MOTOROLA**  
COMMUNICATIONS AND ELECTRONICS, INC.

A SUBSIDIARY OF MOTOROLA, INC.

31 W. AUGUSTA BLVD., CHICAGO 51, ILL., SPAULDING 2-6500

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MAX. BATT. DRAIN  
6 VDC (in amps)

standby: 1.4  
transmit: 15.2

per  
to  
cps  
deviation  
kc deviation

ncy

Without Notice.



## Guaranteed PERFORMANCE SPECIFICATIONS

### SPECIFICATIONS

MODEL AND DESCRIPTION	TU532A, TU533A—Desk Stand Dynamic Microphone	TU535, TU536 — Desk Stand Dynamic Microphone	TU473 Desk Set	TU560 Hang-up Handset
APPLICATION	all Motorola locally controlled base stations with pre-amplifier. The T1200, TA270, and FSC series remote control consoles.	all Motorola locally controlled base stations <u>without</u> pre-amplifiers.	all Motorola locally controlled base stations <u>without</u> pre-amplifiers. All Motorola remote control consoles.	
CORD AND TERMINATION	7 ft., 4 cond., shielded, 6 prong conn. (TU533A has an additional 4 cond. shielded cable with spade lugs for Private-Line squelch disable.)	7 ft., 4 cond., shielded, 4 prong conn. (TU536 has an additional 4 cond. shielded cable with spade lugs for Private-Line squelch disable.)	TK492—25 ft., 5 cond., shielded with spade lug TK493—8 ft., 5 cond., shielded with spade lug TK494—8 ft., 5 cond., shielded with 6 prong conn. TK495—8 ft., 5 cond., shielded with 4 prong conn.	
PRE-AMPLIFIER	Included in station equipment	transistor pre-amplifier in microphone head or telephone handset		
OUTPUT IMPEDANCE (nominal)	5000 ohms	500 ohms	500 ohms	500 ohms
OUTPUT VOLTAGE	0.01 volts with maximum voice input	0.25 volts with maximum voice input		
INPUT POWER REQUIRED	none	7 ma at 4 VDC (same as carbon microphone)		
MICROPHONE ELEMENT	dynamic (moving coil)			
RECEIVER ELEMENT	none	none	magnetic Type	
CONTROL	push-to-talk switch base mounted. (optional monitor-before-transmit button on TU533A and TU536)		push-to-talk switch mounted on handset	
DIMENSIONS	9½" high x 5¾" deep x 5" wide installed		5" high x 9¼" deep x 6" wide installed	9½" high x 5¼" deep x 3½" wide installed
WEIGHT	2½ lbs. without interconnecting cable		5 lbs. without interconnecting cable	3½ lbs. without interconnecting cable

Specifications Subject to Change Without Notice





## Transistorized HANDIE-TALKIE pocket receiver

25-54 mc and 144-174 mc

### PRODUCTION & SECURITY



A fully transistorized, pocket size, communications receiver compatible in any FM Two-way Radio system for individualized voice communications.

**UNEQUALED SENSITIVITY**—chassis sensitivity of .5 microvolt in the 25-54 mc band and 1.0 microvolt in the 144-174 mc band compares favorably to conventional mobile receivers.

**HIGH AUDIO OUTPUT**—a full 100 milliwatts of audio into the efficient dynamic speaker provides reliable voice communications even in noisy locations.

**EXTENDED BATTERY LIFE**—operates from either a rechargeable, miniaturized nickel-cadmium battery or inexpensive mercury cells. Nickel-cadmium battery provides up to 20 hours of operation with each charge. Mercury cells last up to 200 working hours.

**FULLY TRANSISTORIZED**—reliability, miniaturization, light-weight, and reduced power consumption—the principle attributes of the transistor are fully realized in this new miniature radio receiver.

**MAXIMUM RANGE**—unexcelled sensitivity, crystal controlled frequency stability, and fixed-tuned, sealed selectivity assures maximum communications range.

**COMPLETELY SELF-CONTAINED**—includes a sensitive built-in antenna, a compact 1 $\frac{3}{4}$ " high performance dynamic speaker, and a readily accessible battery compartment.

**COMPATIBLE OPERATION**—designed for operation with any VHF two-way communications system. Messages can be received from both base station and mobile transmitters.

**OPTIONAL "MATCHED SET" ACCESSORIES**—receiver includes a jack for inserting an optional lapel speaker or earpiece and a provision for connecting an external antenna to effectively extend the normal communication range . . . also available is a leather carrying case and belt for further protection of the Handie-Talkie pocket receiver.

**RUGGED AND RELIABLE**—designed to withstand the rough treatment inherent in portable operation. Transistorization, reliable printed circuitry, and shock mounting in a high-impact plastic housing are integrated with proven electrical and mechanical design by Motorola's extensive experience in developing and producing superior portable communications equipment.

**FEATHER WEIGHT**—weighs a mere 11 ounces fully equipped with the rechargeable battery or 12 ounces with the long life mercury batteries.

**MICRO-MEASUREMENTS**—slim design conveniently fits a shirt or jacket pocket in addition to clipping on belt. Measures but 5 $\frac{3}{4}$  x 2 $\frac{1}{2}$  x 1-5/32 inches.

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1400 N. AUGUSTA BLVD., CHICAGO 51, ILL., SPAULDING 2-6500

TECHNICAL INFORMATION CENTER



# MOTOROLA

HANDIE-T  
POCKET

## Guaranteed PERFORMANCE SPECIFICATIONS

FREQUENCY	25-54 mc		144-174 mc	
MODEL	HO1ANC series		HO3ANC series	
MODULATION ACCEPTANCE	±5 kc	±15 kc	±5 kc	±15 kc
CHANNEL SPACING	20 kc	40 kc	30 kc	60 kc
SELECTIVITY	more than 30 db at ± 20 kc	more than 40 db at ± 40 kc	more than 40 db at ± 30 kc	more than 45 db at ± 60 kc
TUNED CIRCUITS	14 (4 fixed tuned, sealed in plastic)		17 (4 fixed tuned, sealed in plastic)	
CHASSIS SENSITIVITY	less than 0.5 microvolt for 20 db quieting; 50 ohms RF input impedance.		less than 1.0 microvolt for 20 db quieting; 50 ohms RF input impedance.	
SQUELCH	noise-compensated type, adjustable sensitivity, threshold sensitivity of 0.25 microvolt.		noise-compensated type, adjustable sensitivity, threshold sensitivity of 0.5 microvolt	
NUMBER OF TRANSISTORS AND DIODES	16 transistors 6 diodes		16 transistors 7 diodes	
POWER CONSUMPTION	6.0 ma (squelched)		5.0 ma (squelched)	
	35.0 ma (100 mw audio output—carrier modulated with 1000 cps. tone)			
SPURIOUS AND IMAGE REJECTION	More than 45 db			
FREQUENCY STABILITY	crystal controlled oscillator maintains frequency within ±.0025% of reference frequency —30°C to +50°C ambient (+25°C reference).			
AUDIO OUTPUT	100 milliwatts to a 600 ohm load at less than 10% distortion.			
POWER SUPPLY	9.6 volt Nickel-Cadmium battery (rechargeable) or (2) 4.0 volt; TR-133R mercury cells and (1) 2.5 volt; TR-132R mercury cell			
SIZE	5¾" x 2½" x 1-5/32" (not including clip)			
WEIGHT	11.0 oz. with Nickel-Cadmium battery 12.0 oz. with Mercury battery		(without external accessories)	
BATTERY LIFE	<u>Nickel-Cadmium</u> up to 16 hours with each charge <u>Mercury Cells</u> up to 160 hours continuous operation		<u>Nickel-Cadmium</u> up to 20 hours with each charge <u>Mercury Cells</u> up to 200 hours continuous operation	

Specifications Subject to Change Without Notice





## Guaranteed PERFORMANCE SPECIFICATIONS

MODEL	H21NAC Series	H23NAC Series
TRANSMITTER CHASSIS MODEL	NU102 Series (Standard carrier models) NTB6000 Series (tone-coded carrier models)	NTD6000 Series (Standard carrier and tone-coded carrier models)
FREQUENCY	25-50mc	150-174mc
RF OUTPUT	1.5 watts at 135 volts 1.25 watts at 120 volts	1.0 watts at 135 volts 0.8 watts at 120 volts
CRYSTAL MULTIPLICATION	16 times	24 times
TUBE, TRANSISTOR & DIODE COMPLEMENT	1AD4-oscillator 1AD4-modulator 1AD4-quadrupler 1AD4-doubler *2N655—Tone Osc. *2N654—Tone Ampl. *(2)HD6265—Tone Mod.	1AD4-doubler 3B4 power ampl. 2N654-"IDC" ampl. and clipper 1AD4-oscillator 1AD4-modulator 1AD4-tripler 1AD4-doubler *2N655—Tone Osc. *HD6265—Tone Mod.
BATTERY DRAIN (TRANSMITTER "ON")	52 ma at 120 volts; 850 ma at 1.3 volts (add 2.5 ma for "Private-Line" models)	56 ma at 120 volts; 875 ma at 1.3 volts (add 2 ma for "Private-Line" models)
SPURIOUS AND HARMONICS	more than 50 db below carrier	
FREQUENCY STABILITY	$\pm .0025\%$ from $-30^{\circ}\text{C}$ to $+60^{\circ}\text{C}$ ( $+25^{\circ}\text{C}$ reference)	
AUDIO RESPONSE	$\pm 1, -3$ of 6 db/octave pre-emphasis characteristic from 300 to 3000 cps.	
MODULATION	20F3: $\pm 5$ kc for 100% at 1000 cps.	or 40F3: $\pm 15$ kc for 100% at 1000 cps. (Standard carrier only)
FM NOISE	at least 35 db below $\pm 3.3$ kc deviation at 1000 cps.	or at least 45 db below $\pm 10$ kc deviation at 1000 cps. (Standard carrier only)
AUDIO DISTORTION	less than 6% at 1000 cps: $\pm 3.3$ kc deviation.	or less than 6% at 1000 cps: $\pm 10$ kc deviation. (Standard carrier only)
BATTERY LIFE	1- $\frac{1}{2}$ 8-hour days on a 10% transmit duty cycle	
BATTERY COMPLEMENT	B battery: 5 Eveready #413 (30 volt) or equivalent Filament battery: 1 Eveready #1050 or Ray-O-Vac #3LP (1.5 volt) Industrial heavy duty	
DIMENSIONS	8" x 4- $\frac{1}{4}$ " x 1- $\frac{11}{16}$ " (not including pocket clip)	
WEIGHT	50 ounces including microphone (54 ounces "Private-Line" models)	

\* "Private-Line" models only.

Specifications Subject to Change Without Notice

F.C.C. LICENSE DESIGNATION: 25-50mc—CC1501  
150-174mc—CC3502



# MOTOROLA

TRANSISTOR RESEARCH LINE



Vol. 1, Sec. 3  
"HANDIE-TALKIE"  
FM Radiophone  
E-140A

## Transistorized HANDIE-TALKIE Portable FM Radiophone

144-174 mc .8 to 5 watts RF output

\* TRANSISTORIZED

\* LOWEST OPERATING COST

\* HIGHEST RF POWER

BASE STATIONS & MONORAIL



"S" Series with Handset  
and Standard Dry Battery Power Pack



"H" Series with Speaker and  
Mic. and Extra Duty Dry Battery Power Pack



"P" Series with Speaker and Microphone and Re-chargeable Nickel-Cadmium, 6/12 Volt, Power Pack



"Snap-On" Power Packs:  
Standard & Extra-Duty Dry Cell,  
Rechargeable Nickel-Cadmium-6/12 Volt, Wet Cell,  
12/24 Volt, 117 Volts AC, 60 Cycles

## MOTOROLA

COMMUNICATIONS AND ELECTRONICS, INC.

A SUBSIDIARY OF MOTOROLA, INC.

51 W. AUGUSTA BLVD., CHICAGO 51, ILL., SPAULDING 2-6500

TECHNICAL INFORMATION CENTER



# Talkie®

# RADIOPHONE

## FULL "SPLIT-CHANNEL" PERFORMANCE

- Easier Serviceability
- Longer Battery Life
- Transistorized Circuitry
- Models for Every Service
- Automatic "off" Control
- Higher Transmitter Power
- Compact Light-Weight Design
- "Permakay" Filter and "I.D.C."
- Nickel-Cadmium Transistorized Power Pack

**TRANSISTORIZED**—reliability, miniaturization and low power consumption—the principle attributes of the transistor are fully and initially realized in all I.F. and audio stages of this new portable equipment.

**HIGHER POWER**—transmitter RF output ratings never before achieved in portables. Increased receiver audio output for better communication.

**PRINTED CIRCUITRY**—Motorola's printed circuitry eliminates much of the space-consuming conventional wiring and achieves a new standard of reliability.

**MODULAR CONSTRUCTION**—miniaturized RF, IF, and audio units, complete and self-contained, permit instant replacement for maintenance, modification or special applications.

**CONTROL FEATURES**—all models feature external adjustable volume and squelch controls and handset or microphone actuated automatic "OFF"—manual "ON" switch.

**LONG-LIFE POWER PACKS**—wide selection of quick-interchange, "snap-on" power packs—replaceable dry cell packs; combination rechargeable wet cell—6/12 volt transistorized pack; and, 117 volt AC pack. Unprecedented extension of useful life in a smaller, lighter package.

**"I.D.C."**—adjustable Instantaneous Deviation Control automatically limits transmitter deviation to any value dictated by channel width requirements.

**"PERMAKAY" FILTER**—a miniature duplicate of Motorola's famous plastic-sealed IF Wave Filter permanently "seals in" receiver selectivity and allows easy transition to any operating channel width.

**COMPONENT RELIABILITY**—every component, tube and transistor conservatively operated for long-lasting, peak performance. Designed-in reserve gain for sustained reliability.

**SIMPLIFIED SERVICING**—convenient swing-out sub-assemblies place all components at the finger tips for easier adjustment and maintenance.

**COMPLETE LINE**—handset and speaker-microphone models, 2-frequency and 2-transmitter models, optional accessories including power packs, 12/24 volt transistorized pack, antennas, wet cell battery charger, back-pack carrying harness, aircraft type headset and test equipment.

Nickel-Cadmium—6/12 Volt rechargeable Nickel-Cadmium wet cell, 6 volt—(2) 4 ampere-hour batteries
117/8" x 4 7/8" x 137/8"
117/8" x 4 7/8" x 165/8"
17 lbs., 2 ozs.
19 lbs., 2 ozs.
2.7 watts receiver standby 3.6 watts receiver operate 48.0 watts transmit

and clipper
5°C reference)
emphasis from 300 to 3000 cps
20F3: ±5 kc for 100% at 1000 cps
at least 30 db below ±3.3 kc deviation
at 1000 cps
on less than 6% at 1000 cps: ±3.3 kc deviation

30 kc	
± 5 kc	
more than 80 db at ±30 kc	
"Permakay" filter)	
0 ohms RF input impedance	
C reference)	
—227.5 kc) which is 50 db down	
2N218	—2nd limiter
2N654	—squelch amp
2N654	—driver amp
(2) 2N651	—output amp
(2) 2700-A	—discriminator-rectifiers
(2) 2700-A	—squelch noise rectifiers

Specifications Subject to Change Without Notice

HANDIE-TALKIE and PERMAKAY  
Registered U. S. Pat. Office.



DISNEYLAND  
A Division of Walt Disney Productions

*fta*

INTER-OFFICE COMMUNICATION

D-102

To Tommy Walker

DATE September 11, 1964

FROM Bob Matheison *RKM*

SUBJECT Federal Communications Laws

For your information, the Federal Communications Laws state that for low power industrial radio operation, "The base station must be within 25' of the center radiating portion of the antenna". We fall into this category.

In relation to the move of our division to any other facility, this would dictate our offices being on the top floor in order to comply with the federal laws covering our radio operation. Obviously, this would also apply to Security and Operations.

It would seem that the top floor of a central administration building would ~~not~~ necessarily be crowded because of this aforementioned regulation.

RKM:s

cc: Chuck Corson  
Ben Harris



BH

D I S N E Y L A N D  
INTER-OFFICE COMMUNICATION

To: Production Staff BH                      Date: July 18, 1964  
From: Bob Matheison RKM                      Subject: Radio Unit Distribution

Due to the difficulty in keeping track of the individuals using a specific radio unit, please be advised of the following, effective this date. Each person on the Production Staff will have a permanent individual number. The following is a list of the number assignments:

Production Unit 1 - Ben Harris  
2 - Bob Matheison  
3 - Marvin Marker  
4 - Chris Hibler  
5 - John Deichman  
6 - Bill Gills  
7 - Vic Guder  
8 - John Hilliard  
9 - Chuck Corson  
10 - Bob Norie

Please become familiar with everyone's assigned number. Future transmissions should read as follows: As an example, if Ben is calling John Deichman, it would be, "Production Unit 1 to Production Unit 5".

When checking out a unit, you still check it out according to the unit number written on the radio itself, but when broadcasting a transmission, you will use the unit number assigned to the individual.

Attached you will find a 3" x 5" card with the number assignments to carry with you while you are becoming familiar with these assigned numbers.

RKM:s



DISNEYLAND  
A Division of Walt Disney Productions

INTER-OFFICE COMMUNICATION

D-101

TO Production Staff <sup>BH</sup>  
FROM Bob Matheson

DATE August 7, 1964  
SUBJECT Procedure for Checking  
Out Radio Units

Everyone please be reminded of the following procedures regarding the checking out of radio units:

1. If a unit is taken out, it is to be logged out. This is a federal law. A unit should be logged out even if it is given to people in Maintenance or to repairmen.
2. In logging time, please use the twenty-four hour system, as we do with our time cards.
3. Please be sure that you return all equipment to its proper place. As soon as we receive our shelving from Maintenance, it will be much easier to keep the cases and ear pieces. In the meantime, please bear with the situation.

Thank you for your help in this matter.

RKM:s



# DISNEYLAND

A Division of Walt Disney Productions

BA

## INTER-OFFICE COMMUNICATION

D-101

TO Production Staff  
FROM John Hilliard

DATE January 27, 1965  
SUBJECT Radio Unit Distribution

Due to the difficulty of keeping track of the individual use of a basic radio unit and because of assignment changes in the Production Staff, please be advised of the following revisions effective this date. Every person on the Production Staff will have a permanent individual number. The following is a list of the number assignments:

Production Unit No.	1	-	Ben Harris
	2	-	John Hilliard
	3	-	Marvin Marker
	4	-	Wayne Van DeWalker
	5	-	Chuck Dargen
	6	-	Chuck Gerson
	7	-	Vic Guder
	8	-	Les Van Dyke
	9	-	Bill Gills
	10	-	Johnny Deichman
	11	-	Bob Morie

Please become familiar with everyone's assigned number. Future transmissions should read as follows; as an example, if Ben Harris is to call Johnny Deichman it would be "Production unit no. 1 to Production unit no. 10".

When checking out a unit, you still check it out according to the unit number written on the radio itself, but when broadcasting a transmission you will use the unit number assigned to the individual. The clearing of a transmission, i.e. "KG 7032 clear" is the responsibility of the originator of the message. Attached you will find a 3" x 5" card with the number assignments to carry with you while you become familiar with these newly assigned numbers.

Everyone please be reminded of the following procedure regarding the checking out of radio units:

1. If a unit is taken out, it is to be logged out. This is a federal law. A unit should be logged out even if it is given to people in maintenance or to a repair man.
2. In logging time, please use the 24 hour system as we do with our time cards.
3. Please be sure that you return all equipment to its proper place in the sound room and make sure the units are turned off when they are placed in the re-charging rack and that the switch on the re-charging rack indicated trickle. Also be careful with messages used on the radio, remember that the base station in the maintenance office monitors everything we say. If the message is of a sensitive or personal nature, it would be better to use the telephone. I would suggest this especially regarding clearances, in all cases, discretion is the by-word.

JH:pl



# DISNEYLAND

A Division of Walt Disney Productions

## INTER-OFFICE COMMUNICATION

D-101

TO TOMMY WALKER  
FROM JOHN HILLIARD *JWH*

DATE DECEMBER 1, 1965  
SUBJECT MOTOROLA MAINTENANCE AGREEMENT *Radio*

During the past year it has come to my attention that the yearly cost of upkeep and maintenance on our radio units will amount to approximately \$300.00 per year. Through Motorola, I have investigated the possibility of obtaining a maintenance agreement. I have discovered that it is possible to contract one where we would be fully covered maintenance wise, both parts and labor, for \$5.50 a month (\$66.00 a year) on a 30-day contract payable 30 days in advance or yearly whichever we prefer. The contract could be cancelled by both parties on 30-day notice.

In my opinion, it would be wise for us to think seriously about obtaining this maintenance insurance policy. Please let me know how you feel on the subject and what you advise.

Thank you.

JH:cf

cc: Chuck Corson  
Ben Harris



# DISNEYLAND

A Division of Walt Disney Productions

## INTER-OFFICE COMMUNICATION

D-101

TO Tommy Walker  
FROM John Hilliard

DATE January 7, 1966  
SUBJECT Radio Communications

It has become evident that the present five unit two-way radio communication system in the Production Department is inadequate from an efficiency standpoint.

In order to keep the show running smoothly and establish proper cues, additional two-way units are necessary.

When the five unit system was adapted in the Production Department, approximately a year and a half ago, we had a much smaller staff and less out-of-park and in-park activities than at the present time. We have grown in stature personnel-wise in order to keep up with the park wide expansion and increase in special events and out-of-park activities.

The insufficiency of proper communication made itself particularly evident during the Christmas and New Year season of 1965 when the Production Department had twelve men in the field and only five units available. We did manage to borrow two units from the Maintenance Division but even this did not alleviate the shortage. Although borrowing the two units did help in some instances, it did not solve the problem because the units borrowed were continually changing hands between the Production personnel and Maintenance Supervisors causing considerable inconvenience and loss of efficiency.

It is my belief that if we could purchase three (3) additional units, making a total of 8, that we could perform at peak efficiency during the many occasions that this type of efficiency manifest itself in a job well done.

The following is what would be required:

On 42.98 M.C. Transmit and Receive

	Each	Total
3 - H21DCN-3100 A/w Handi Talki	\$ 612.00	\$ 1836.00
3 - NAB 1050A	\$ 12.00	\$ 36.00
	<hr/>	<hr/>
Grand Total	\$ 624.00	\$ 1872.00

JH/llw

cc: Chuck Corson  
Ben Harris ✓



# DISNEYLAND

A Division of Walt Disney Productions

## INTER-OFFICE COMMUNICATION

D-102

TO PRODUCTION STAFF

DATE DECEMBER 14, 1965

FROM CHUCK CORSON

SUBJECT RADIO UNITS

Effective this date it is mandatory, for the better efficiency of the Production Department, that each staff member sign out and carry a radio with him whenever he is to be absent from the office for any period of time.

CC:mg

cc: Marvin Marker, Ron Swartz, Chuck Burnes, Sonny Anderson  
✓ Ben Harris, John Hilliard, Wayne Van De Walker,  
John Deichman, Bill Gills, Vic Guder, Les Van Dyke

# DISNEYLAND

A Division of Walt Disney Productions

## INTER-OFFICE COMMUNICATION

D-102

To Production Department

DATE August 7, 1964

FROM Bob Matheison

SUBJECT Use of Radio Communications

Please remember to be careful with messages used on the radios. Remember that the base station in the Maintenance office monitors everything we say. If the message is of a sensitive or personal nature, it would be more proper to use the telephone. I would suggest this especially regarding clearances. In all cases, discretion is the by-word.

RKM:s

BH