Council Meeting of
September 13, 2011

SUPPLEMENTAL MATERIAL #1

Honorable Mayor and Members
of the Torrance City Council
City Hall
Torrance, California

Members of the Council:

SUBJECT: Supplemental Material #1 to City Council Agenda Item 8M / 11A

The Subject and the Recommendation are hereby revised as follows:

SUBJECT: Fire and Communications & Information Technology – Accept bid and authorize a purchase order for P25 UHF and VHF mobile and portable radios and reject four bids as non-responsive.
Expenditure: Not to exceed $495,121.99.

RECOMMENDATION

Recommendation of the Fire Chief and the Information Technology Director that the City Council:

1) **Reject the bids from Williams USA Inc of Windsor, California, Relm Wireless Corporation of West Melbourne, Florida, Bassett Sales of Burbank, California, and 911 Vehicle of Chino, California as non-responsive; and**

2) **Accept the bid from and authorize a purchase order to Motorola Solutions, Inc. of San Diego, California, in the amount of $495,121.99 (including 8.75% sales tax) for the purchase of Project 25 compliant UHF and VHF mobile and portable radios for the Torrance Fire Department (B2011-32).**

A copy of the bid from Motorola Solutions of San Diego, California, is attached.

In addition, this item was inadvertently placed under Consent Calendar as 8M; it should be considered under Public Safety as 11A.

Respectfully submitted,

WILLIAM RACOWSCHI
Fire Chief

RICHARD SHIGAKI
Information Technology Director

CONCUR:

LeRoy J. Jackson
City Manager

Attachment: Bid from Motorola Solutions. Inc.

8M/11A

ATTACHMENT E

BID TO FURNISH UHF AND VHF MOBILE AND PORTABLE RADIOS FOR THE TORRANCE FIRE DEPARTMENT, B2011-32

COPY

CITY CLERK
CITY OF TORRANCE
3031 TORRANCE BLVD
TORRANCE, CA 90503

SUBMITTED BY:

MOTOROLA SOLUTIONS, INC.
ADVANCED ELECTRONICS, INC. – MANUFACTURERS REPRESENTATIVE
2601 MANHATTAN BEACH BLVD.
REDONDO BEACH, CA 90278
(310) 725-0410
CONTACT: DEE CONREY

SUBMISSION DATE: AUGUST 25, 2011 BEFORE 2:00 PM

Notice Inviting Bids Addendum #2

City of Torrance | 3031 Torrance Blvd, Torrance CA 90503 | www.TorranceCA.Gov

Bid No. B2011-32	**Bid to Furnish UHF and VHF Mobile and Portable Radios for the Torrance Fire Department**

BID SUBMITTAL INFORMATION

Bids may be mailed or hand delivered. No faxed bids will be accepted.
Late bids will not be accepted.

Location: Office of the City Clerk
3031 Torrance Blvd.
Torrance, CA 90503

Date: Thursday, August 25, 2011

Time Deadline: **2:00 P.M.**

Bids will be opened and publicly read aloud at 2:15 p.m. on the same date in the Council Chambers.

An original plus two (2) copies sealed in an envelope and marked with the bid number and title must be submitted by the deadline. Your bid submittal must include the following:

- Vendor's Response (Section III of this document) on the forms provided. If additional space is required, please attach additional pages.

Prior to the award of a Purchase Agreement (if applicable, see below) the following is to be submitted to the Purchasing Division:

- Proof of a City of Torrance Business License:

  You are required to have a City of Torrance Business License if your company is located in the City of Torrance; will physically be working in the City of Torrance; or will be using your own vehicles to deliver to the City of Torrance. For additional information and licensing requirements, please contact the City of Torrance Business License Office at (310) 618-5923.

Questions regarding this Notice Inviting Bids should be directed to:

Felice N. Fromm
Purchasing Manager
(310) 618-5820

Bid No. B2011-32	Bid to Furnish UHF and VHF Mobile and Portable Radios for the Torrance Fire Department

SECTION I BID INSTRUCTIONS AND INFORMATION

Notice is hereby given that sealed bids will be received in the office of the City Clerk, City Hall, 3031 Torrance Boulevard, Torrance, CA, until 2:00 p.m. on Thursday, August 18, 2011, and will be opened and publicly read aloud at 2:15 p.m. on the same date in the Council Chambers, Torrance City Hall. You are invited to be present at the opening of bids. An original and two copies of the bid price proposal pages must be submitted in a sealed envelope and clearly marked: "Bid to Furnish UHF and VHF Mobile and Portable Radios for the Torrance Fire Department, B2011-32".

Definitions:

The following meanings are attached to the following defined words when used in these specifications and the purchase agreement. The word "City" means the City of Torrance, California. The word "Bidder" or "Vendor" or "Contractor" means the person, firm, or corporation submitting a bid on these specifications or any part thereof.

The following meanings are attached to the following defined words when used in these specifications and purchase agreement. The word "purchase agreement", "contract", "purchase order", "blanket purchase order" means the contractual agreement between the vendor and the City of Torrance for the purchase of goods and/or services.

One Step means the ability to switch between features without having to drill down or navigate through menus. Example: A push of a button or the toggling a switch to activate a feature.

Bid Form:

The bid must be made on the form provided for that purpose, enclosed in a sealed envelope, and marked "Bid to Furnish UHF and VHF Mobile and Portable Radios for the Torrance Fire Department, B2011-32" and addressed to the City Clerk, City of Torrance, 3031 Torrance CA. 90503. If the bid is made by an individual, it must be signed by that individual, and an address, telephone (and fax number if available) must be given. If made by a business entity, it must be signed by the person(s) authorized to execute agreements and bind the entity to purchase orders. A full business address, telephone (and fax number if available) must be given. No telegraphic, fax or telephonic bid will be considered.

Blank spaces in the bid form must be filled in; using ink, indelible pencil, or typewriter, and the text of the bid form must not be changed. No additions to the form may be made. Any unauthorized conditions, limitations, or provisos attached to a bid will render it informal and may cause its rejection. Alterations by erasure or interlineations must be explained or noted in the bid form over the signature of the Bidder.

Reservation:

The City reserves the right to revise or amend these specifications prior to the date set for opening bids. Revisions and amendments, if any, will be announced by an addendum to this bid. If the revisions require additional time to enable bidders to respond, the City may postpone the opening

date accordingly. In such case, the addendum will include an announcement of the new opening date.

All addenda must be attached to the bid. Failure to attach any addendum may render the bid non-responsive and cause it to be rejected.

The City Council reserves the right to reject any and all bids received, to take all bids under advisement for a period not to exceed ninety (90) days after the date of the opening, to waive any informality on any bid, and to be the sole judge of the relative merits of the material and or service mentioned in the respective bids received. The City reserves the right to reject any bid not accompanied with all data or information required.

This bid does not commit the City to award a purchase order or to pay any cost incurred in the preparation of a bid. All responses to this bid become the property of the City of Torrance.

Affidavit:

An affidavit form is enclosed. It must be completed signifying that the bid is genuine and not collusive or made in the interest or on behalf of any person not named in the bid, that the Bidder has not directly or indirectly induced or solicited any other Bidder to put in a sham bid or any other person, firm, or corporation to refrain from proposing, and that the Bidder has not in any manner sought by collusion to secure for itself an advantage over any other Bidder. Any bid submitted without an affidavit or in violation of this requirement will be rejected.

Standards for Evaluation of Bids:

The City staff will use the following priorities, as well as pricing, in determining which bid best meets the needs of the City. The City will be the sole determiner of suitability to the City's needs.

Bids will be rated according to their completeness and understanding of the City's needs, conformance to the requirements of the specifications, prior experience with comparable bids, ability to meet the delivery requirement, and cost.

All bid awards shall take into consideration local Torrance vendor sales tax rebate of 1%.

Funding:

The City intends to use the Fiscal Year 08 Urban Area Security Initiative (UASI) Grant to fund this purchase.

Brand Names and Specification Appearance to a Certain Brand or Manufacturer:

Wherever brand, manufacturer, product name/numbers (or a specification that appear to be for a certain brand or manufacturer).are indicated in these specifications, they are included for the purpose of establishing a general type and quality of the product required, unless the description specifically says NO SUBSTITUTE. Bidder must bid a Manufacturer, manufacturer's model number and description along with a complete specification sheet for each item bid. Samples of alternative items being bid may be required. The City of Torrance will be the sole judge of the relative merits of comparative products bid.

Delivery:

Inside Delivery Required. It is the responsibility of the Bidder to provide all equipment and labor necessary to unload the shipment as directed by the City of Torrance. The City may refuse shipment if delivery does not comply with this requirement. Prices bid are to be FOB Destination.

Partial Bid:

No partial bids will be accepted.

Equipment Guarantee:

All equipment furnished will be guaranteed by the vendor for a minimum period of one year against defects in design, material and workmanship. The warranty period will begin with acceptance of the equipment. Warranty repairs to correct discrepancies identified during this period will include labor and materials at no cost to the City. Any faulty equipment that, in the judgment of the City, is not reasonably repairable will be replaced by the vendor as a warranty action.

Errors and Omissions:

The Bidder will not be allowed to take advantage of any errors and/or omissions in these specifications or in the Bidder's specifications submitted with its bid. Full instruction will always be given when errors or omissions are discovered.

Bidders Examination of Requirements:

The bidder is required to examine carefully the site, the instructions, information and specifications of this document, investigate the conditions to be encountered, the character, quality and quantities of work to be performed as required by this document. Submission of a bid proposal will be considered prima facie evidence that the bidder has made such examination.

The Purchase Agreement:

The bidder to whom the award is made will be issued a Purchase Order from the City of Torrance. By reference, a copy of the notice inviting Bids, these specifications and the terms and conditions, will be part of the purchase agreement. All materials or services supplied by the Vendor will conform to the applicable requirements of the City Charter, City Ordinances, and State or Federal Law covering Labor and Wages, as well as conforming to the specifications contained herein. In case of default by the Vendor, the City reserves the right to procure the articles or services from other sources and to hold the Vendor responsible for any excess cost incurred by the City hereby.

Torrance Unified School District:

Bid submittals shall constitute agreement by the Vendor that all pricing terms and conditions offered to the City of Torrance will be offered to the Torrance Unified School District (TUSD). The City of Torrance does not warrant any additional use of the contract by TUSD. Should TUSD choose to utilize the contract, orders will be placed and payment made directly to the vendor by TUSD.

Payments:

Complete payment on the contract price will be made in approximately thirty (30) days from date of delivery, or completion and acceptance, unless otherwise provided for in bidder's bid proposal or in these specifications. Payments will be made upon verification and acceptance by the City of contract services performed and upon the City's receipt of a correct invoice.

Patent Rights:

The Vendor agrees to save, keep, bear harmless, defend and fully indemnify the City and any of its officers or agency from all damages, costs, or expenses in law or equity that may at any time arise or to be set up for any infringement of the patent rights of any person or persons in consequence of the use by the City, or by any of its officers or agent, or articles supplied under this contract any of which the Vendor is not the patentee or assignee, or which the Vendor is not lawfully entitled to sell.

Contract Extension to Other Cities/Agencies:

Other Cities/Agencies may be interested in purchasing against an awarded contract, subject to the same price, terms and conditions offered to the City of Torrance. The City of Torrance does not warrant any additional use of the contract by such agencies. Other agencies utilizing the contract will place orders with, and make payments directly to, the successful bidder.

Notice:

Whenever it will be necessary for either party to serve notice on the other respecting the Agreement, such notice will be served by personal delivery or by certified mail to the following addresses, unless and until different addresses may be furnished in writing by either party or the other, and such notice will be deemed to have been served within seventy-two (72) hours after the same has been deposited in a United States Post Office by certified mail or has been delivered personally, and will be valid and sufficient service of notice for all purposes:

CITY: City Clerk
City of Torrance
3031 Torrance Boulevard
Torrance, CA 90503

VENDOR: Will be determined upon award of contract.

Terms and Conditions:

Definitions:

The following meanings are attached to the following defined words when used in these terms and conditions and the purchase order. The word "City" means the City of Torrance, California. The word "Vendor" or "Contractor" means the person, firm, or corporation providing goods or services to the City. The word "purchase order" means the contract, purchase order or blanket purchase order issued to the vendor by the City.

Goods:

The term "Goods" means the products, goods or other commodities purchased pursuant to the Purchase Order.

Description Of Goods: The Vendor must produce and deliver the Goods in accordance with the specifications and the shipping and quantity schedule set forth on the first page of the Purchase Order.

Substitution: No substitution of Goods ordered will be made unless authorized by the Purchasing Division.

Delivery Date:

The Goods must be shipped and must arrive at the destination specified by the CITY in strict compliance with the shipping and quantity schedule set forth on the first page of this Purchase Order. Any failure by the Vendor to meet the Required Delivery Date (set forth on the first page of this Purchase Order) will constitute a material default. The Vendor must notify the CITY immediately if the Vendor reasonably believes that the Vendor will not be able to meet the Required Delivery Date for any reason. In addition, the Vendor must promptly provide the CITY with a schedule that the Vendor reasonable believes it will be able to meet.

Cancellation:

The CITY reserves the right to cancel any portion of this order with respect to Goods not delivered on or before the Required Delivery Date.

Delivery Risk of Loss:

All orders will be F.O.B. destination if not otherwise specified. Risk of loss or damage to the Goods must remain with the Vendor until the Goods have been delivered to and accepted by the CITY. All Goods will be received by the CITY subject to its right of inspection, rejection, and revocation of acceptance under the Uniform Commercial Code. The CITY will be allowed a reasonable period of time to inspect the Goods and to notify the Vendor of any nonconformance with the terms and conditions of this purchase order. The CITY may reject any Goods that do not conform to the terms and conditions of this purchase order; any Goods rejected may be returned to the Vendor at the Vendor's risk and expense. Further, where the CITY rightfully revokes acceptance, the CITY may, to the extent of any deficiency in its effective insurance coverage, treat the risk of loss as having rested on the Vendor from the date of the Vendor's acceptance of this purchase order.

Invoices:

Two copies of the invoice must be mailed to the City of Torrance Finance Department not later than the day after shipment is made. Individual invoices must be issued for each shipment against each purchase order. Invoices must contain the purchase order number, description of Goods, unit price, quantities billed and extended totals. Payment will be made by the CITY in accordance with the terms specified on the first page of this Purchase Order.

To expedite payment, the BPO number must appear on all invoices, shipping documents and packages.

Payment(s) will be made upon verification and acceptance by the requesting department/division of items received or services performed and receipt of correct billing(s).

Packing And Shipping:

Deliveries must be made as specified without charge for boxing, crating, or storage unless otherwise specified, and Goods must be suitably packed to secure lowest transportation costs, and in

accordance with the requirements of common carriers, and in a manner to assure against damage from weather or transportation. The CITY's order numbers and symbols must be plainly marked on all invoices, packages, and shipping orders. Packing lists specifying the quantity, description and purchase order number must accompany each box or package shipment. The CITY's count or weight will be final and conclusive on shipments not accompanied by packing lists. Shipments for two or more destinations when so directed by the CITY will be shipped in separate boxes or containers for each destination, at no charge.

Acceptance of Purchase Agreement:

This purchase order constitutes the CITY's offer to the Vendor and becomes a binding contract upon acceptance by the Vendor by commencement of performance. Any terms or conditions (including price and delivery dates) proposed by the Vendor in accepting the CITY's offer, which are inconsistent with or in addition to the terms and conditions set forth in this purchase order, will be void and of no effect unless and to the extent expressly accepted by the CITY in writing.

Taxes:

The Vendor must separately state on all invoices any taxes imposed by the federal or state government applicable to furnishing of the Goods: provided, however where a tax exemption is available, the tax must be subtracted from the total price and identified. Municipalities are exempt from federal excise and transportation taxes. Total prices quoted are to exclude federal taxes. Exemption certificates will be furnished upon request. Unless otherwise indicated, prices quoted will be considered to exclude state and city sales or use tax, which is payable to the CITY.

Prices:

The Vendor represents that prices quoted to or paid by the CITY will not exceed current prices charged to any other customer or the Vendor for items that are the same or substantially similar to the Goods, taking into account the quality under consideration, and the Vendor will forthwith refund any amounts paid by the CITY in excess of the price.

Cash Discounts:

The date used as the basis for cash discounts calculation is the date the Goods are received or the date an acceptable invoice is received, whichever is later.

Warranty:

The Vendor warrants that all Goods will conform to applicable specifications, drawings, descriptions, and samples, and will be merchantable, of good workmanship in material, and free from defect. Unless manufactured pursuant to detailed design furnished by the CITY, the Vendor assumes design responsibility and warrants the Goods to be free from design defect and suitable for the purposes intended by the CITY. The Vendor's warranties, together with its service guarantees, must run to the CITY and its customers or users of the Goods and must not be deemed exclusive. The CITYs inspection, approval, acceptance, use of, or payment for all or any part of the Goods must in no way effect its warranty rights whether or not a breach of warranty had become evident at the time.

Changes:

The CITY has the right by written notice to change the quantity or specifications of the Goods ordered and the terms of, shipment or packaging of Goods. Upon receipt of any notice, the Vendor will proceed promptly to make the changes in accordance with the terms of the notice. If any change causes an increase or decrease in the cost or performance or in the time required for performance,

an equitable adjustment must be negotiated promptly and the contract modified in writing accordingly. The Vendor must deliver to the CITY as promptly as possible, and in any event within 30 days after receipt of change notice, a statement showing the effect of any change in the delivery dates and prices; the statement must be supplemented within 30 days by detailed specification of the amount of the price adjustment and supporting cost figures. The Vendor's failure to submit the statements within the time limits stated, will constitute its consent to perform the change without increase in price, without claim for material rendered obsolete and without change in delivery schedule.

Business License:

Prior to the award of a Purchase Order, you are required to have a City of Torrance Business License if your company is located in the City of Torrance; will physically be working in the City of Torrance; or will be using your own vehicles to deliver to the City of Torrance. For additional information and licensing requirements, please contact the City of Torrance Business License Office at (310) 618-5923.

Indemnity :

The Vendor assumes all responsibility for, and agrees to undertake, to protect, indemnify and hold the CITY, the City Council, each of its members, present and future and its officers, employees, and agents, harmless from any and all liabilities, losses, claims, suits, judgments and causes of action for damage, to property and injuries to persons, including death, and from any cost and expense, including recall expenses and attorneys fees, arising out of or related to any of the Goods resulting from the Vendors breach of the terms of the Purchase Order (including the warranties), the Vendor's negligence, or allegations that the Goods are defective in manufacture or design.

Conflict Of Interest:

No officer or employee of the CITY may have any financial interest, direct or indirect, in this Purchase Order, nor may any officer or employee participate in any decision relating to the Purchase Order that effects the officer or employee's financial interest or the financial interest of any corporation, partnership or association in which the officer or employee is, directly or indirectly interested, in violation of any law, rule or regulation.

No person may offer, give, or agree to give any officer or employee or former officer or employee, nor may any officer or employee solicit, demand, accept, or agree to accept from another person, a gratuity or an offer of employment in connection with any decision, approval, disapproval, recommendation, preparation or any part of a program requirement or a purchase request, influencing the content of any specification or procurement standard, rendering of advice, investigation, auditing, or in any other advisory capacity in any way pertaining to any program requirement, contract or subcontract, or to any solicitation or proposal.

Integration; Amendment:

This Purchase Order represents the entire understanding of the CITY and the Vendor as to those matters contained in it. No prior oral or written understanding will be of any force or effect with respect to the terms of this Purchase Order. The Purchase Order may not be modified or altered except in writing signed by both parties.

Interpretation:

The terms of this Purchase Order should be construed in accordance with the meaning of the language used and should not be construed for or against either party by reason of the authorship of this Purchase Order or any other rule of construction that might otherwise apply.

Severability:

If any part of this Purchase Order is found to be in conflict with applicable laws, that part will be inoperative, null and void insofar as it is in conflict with any applicable laws, but the remainder of the Purchase Order will remain in full force and effect.

Governing Law; Jurisdiction:

This Purchase Order will be administered and interpreted under the laws of the State of California. The parties consent to the jurisdiction of the state and federal courts located in Los Angeles County, California for the resolution of all disputes arising under this Purchase Order, and the parties agree that jurisdiction and venue for proceedings will lie exclusively with those courts. Service of process in any such proceeding (including service of process for the institution of any such proceeding) may be made by certified mail, return receipt requested, directed to the respective party.

Attorney's Fees:

In any dispute, litigation, arbitration, or other proceeding where one party either seeks to enforce its rights under this Purchase Order (whether in contract, tort or both) or seeks a declaration of any rights or obligations under this Purchase Order, the prevailing party will be awarded reasonable attorney's fees, together with any costs and expenses, to resolve the dispute and to enforce any judgment.

Bid No. B2011-32	Bid to Furnish UHF and VHF Mobile and Portable Radios for the Torrance Fire Department

SECTION II SPECIFICATIONS

Scope of Bid: Furnish UHF and VHF Mobile and Portable Radios as indicated in the product specification.

Bidders are to bid on mobile and portable radios that are manufactured by the same company and labeled with the same brand as one another. Bidders are to include a product specification sheet for each product bid.

Upon request, bidder must supply a test radio to the City to ensure compatibility with the City's communications system. Test radio must be the same make, brand and model as bid. Bidders are to include a product specification sheet for each product bid.

Product Specification:

Bid Item #	Qty	Description
1	17 each	VHF Mobile Radios

Required Function

- Frequency range from 136 – 174 MHz
- Radio power adjustable up to 110 Watts
- Analog/Conventional & Digital voice operation
- Must have 12.5 & 25 KHz channel spacing capabilities
- Radios must come with remote mount control head options with external speaker
- 1000 minimum channel capability with display
- Project 25 compliant
- Radio receiver adjacent channel rejection selectivity must be 75 dB (12.5 kHz) & 82 dB (25 kHz) or better
- Radio must meet -80dB Intermodulation or better

Bid Item #	Qty	Description
2	41 each	UHF Mobile Radios

Required Function

- Frequency range from 450-520 MHz
- Radio power adjustable up to 45 Watts
- Must have Analog/Conventional & Digital voice operation
- Must have 12.5 & 25 KHz channel spacing capabilities
- Radios must come with single remote mount control head option with external speaker
- 14 digit character display
- 1000 minimum channel capability with display
- Project 25 compliant
- MDC 1200 analog signaling feature with no limitations
- Radios must have a migration path for upgrading to a Digital Trunked System. Future migration will be accomplished with new software/firmware without replacing the original radios.
- Radio receiver adjacent channel rejection selectivity must be 75 dB (12.5 kHz) & 82 dB (25 kHz) or better
- Radio must meet -80dB Intermodulation or better

Bid Item #	Qty	Description
3	3 each	UHF Mobile Radios

Required Function

- Frequency range from 450-520 MHz
- Radio power adjustable up to 45 Watts
- Must have Analog/Conventional & Digital voice operation
- Must have 12.5 & 25 KHz channel spacing capabilities
- Radios must come with dual remote mount control heads with external speakers
- 14 digit character display
- 1000 minimum channel capability with display
- Project 25 compliant
- MDC 1200 signaling feature with no limitations
- Radios must have a migration path for upgrading to a Digital Trunked System. Future migration will be accomplished with new software/firmware without replacing the original radios.
- Radio receiver adjacent channel rejection selectivity must be 75 dB (12.5 kHz) & 82 dB (25 kHz) or better
- Radio must meet -80dB Intermodulation or better

Bid Item #	Qty	Description
4	30 each	VHF Portable Radios

Required Function

- Frequency range from 136 – 174 MHz
- Radio power adjustable up to 6 Watts
- Must have Analog/Conventional & Digital voice operation
- Must have full keypad option
- Must have 12.5 & 25 KHz channel spacing capabilities
- 1000 minimum channel capability with display
- Project 25 compliant
- Must support full feature Lapel microphone with a minimum of Speaker/Freq. Knob/Volume
- Radio must be Intrinsically safe
- Must have the ability in one step to switch between repeat mode to direct mode
- Must have the ability in one step to monitor the selected frequency in the open squelch/ PL mode
- Must have the ability in one step to turn on backlight for display
- Must have the ability in one step to activate the selected channel scan feature
- Must have the ability in one step to change radio zones
- Radio must have programmable scan feature that allows different scan list per channel.
- Radio must meet 1% audio distortion or better
- Radio must meet -78 dB Intermodulation or better
- FM Hum and Noise must meet -50dB (12.5 KHz) & -56 dB (25 kHz) or better

Bid Item #	Qty	Description
5	15 each	UHF Portable Radios

Required Function

- Frequency range from 450 - 512 MHz
- Radio power adjustable up to 5 Watts
- Must have Analog/Conventional & Digital voice operation
- Must have 12.5 & 25 KHz channel spacing capabilities
- 1000 minimum channel capability with display
- Must have full keypad option
- Project 25 compliant
- Must support full feature Lapel microphone with a minimum of Speaker/Freq. Knob/Volume
- Radio must be Intrinsically safe
- Radio must meet or exceed the submersible rating of 2m/6 feet for 30 minutes
- Radio must be in a yellow housing case
- Radios must have a migration path for upgrading to a Digital Trunked System. Future migration will be accomplished with new software/firmware without replacing the original radios.
- Must have the ability in one step for sending an emergency signal from the portable radio to the dispatch console
- Must have the ability in one step to switch between repeat mode to direct mode
- Must have the ability in one step to monitor the selected frequency in the open squelch/ PL mode
- Must have the ability in one step to turn on backlight for display
- Must have the ability in one step to activate the selected channel scan feature
- Must have the ability in one step to change radio zones
- Radio must have programmable scan feature that allows different scan list per channel.
  Radio must meet 1% audio distortion or better
- Radio must meet -77dB Intermodulation or better
- FM Hum and Noise must meet -45dB (12.5 KHz) & -53 dB (25 kHz) or better
- MDC 1200 analog signaling feature with no limitations

Bid Item #	Qty	Description
6	75 each	UHF Portable Radios

Required Function

- Frequency range from 450 - 512 MHz
- Radio power adjustable up to 5 Watts
- Must have Analog/Conventional & Digital voice operation
- Must have 12.5 & 25 KHz channel spacing capabilities
- 1000 minimum channel capability with display
- Must have limited keypad option with navigation buttons
- Project 25 compliant
- Must support full feature Lapel microphone with a minimum of Speaker/Freq. Knob/Volume
- Radio must be Intrinsically safe
- Radio must meet or exceed the submersible rating of 2m/6 feet for 30 minutes
- Radio must be in a yellow housing case
- Radios must have a migration path for upgrading to a Digital Trunked System. Future migration will be accomplished with new software/firmware without replacing the original radios.
- Radio receiver sensitivity must be 1% audio distortion on the receiver and -77 dB Inter-modulation and -45dB FM Hum and Noise (12.5kHz) or better
- Must have the ability in one step for sending an emergency signal from the portable radio to the dispatch console
- Must have the ability in one step to switch between repeat mode to direct mode
- Must have the ability in one step to monitor the selected frequency in the open squelch/ PL mode
- Must have the ability in one step to turn on backlight for display
- Must have the ability in one step to activate the selected channel scan feature
  Must have one step process to change radio zones
- Radio must have programmable scan feature that allows different scan list per channel.
- Radio must meet 1% audio distortion or better
- Radio must meet -77dB Intermodulation or better
- FM Hum and Noise must meet -45dB (12.5 KHz) & -53 dB (25 kHz) or better
- MDC 1200 analog signaling feature with no limitations

Bid Item #	Qty	Description
7	15 each	Multi Unit Charger
Required Function		
• Must have a minimum of 6 charging slots to support batteries for products listed in this Notice Inviting Bids.		

Bid Item #	Qty	Description
8	240 each	Extra Portable Batteries
Required Function		
• Batteries must be intrinsically safe and meet the minimum requirement for the portable radios listed in this Notice Inviting Bids. Batteries must have a minimum 8 hour duty cycle.		

Bid Item #	Qty	Description
9	12 each	Lapel Microphones (Full Featured)
Minimum Required Function		
• Speaker control • Frequency knob • Volume control		

Bid No. B2011-32	Bid to Furnish UHF and VHF Mobile and Portable Radios for the Torrance Fire Department

SECTION III BID PROPOSAL

FAILURE TO COMPLETE ALL ITEMS IN THIS SECTION MAY INVALIDATE BID.

In accordance with your "Invitation to Bid", the following bid proposal is submitted to the City of Torrance.

Bid Proposal Submitted By:

Motorola Solutions, Inc.
Name of Company

6450 Sequence Dr.
Address

San Diego, CA 92121
City/State/Zip Code

951-277-2125 / 951-277-2165
Telephone Number/Fax Number

Mark Schmidt / Vice President Motorola Solutions Sales + Services, Inc.
Printed Name/Title

Signature

8-22-2011
Date

Form of Business Organization:

Please indicate the following (check one);

☑ Corporation ☐ Partnership ☐ Sole Proprietorship ☐ Other: _____

Business History:

How long have you been in business under your current name and form of business? 83 years.

If less than three (3) years and your company was in business under a different name, what was that name?

_____

_____

Contact for Additional Information:

Please provide the name of the individual at your company to contact for any additional information

Dee Conrey/Michael Bravo
Name

Vice President, Sales and Marketing/Geographic Account Manager
Title

310-725-0410 x216 310-643-8167
Telephone Number/Fax Number

Addenda Received:

Please indicate addenda information you have received regarding this bid:

Addendum No. 1 Date Received: 8-8-2011
Addendum No. 2 Date Received: 8-16-2011
Addendum No. ____ Date Received: ____
Addendum No. ____ Date Received: ____

2 No Addenda received regarding this bid.

Payment Terms: The City of Torrance Payment term is Net 30. The City does not make pre-payments, or pay upon receipt.

Do you offer any discounted invoice terms? None

Delivery Deadline:

The City intends to purchase these products using funding from the Fiscal Year 08 Urban Area Security Initiative (UASI) Grant, and as such, the City must have delivery and acceptance of products ordered, as well as invoices paid in time to submit a request for reimbursement (for the UASI Grant) no later than October 31, 2011.

What is the lead-time for delivery from receipt of a purchase order? 35 Calendar days

Inside Delivery Location:

Communications and Information Technology Department/Communications Division
20500 Madrona Avenue
Torrance, CA 90503

Successful Bidder is to contact Mr. Jerry Edwards of the Communications Division at 310-781-6969 to coordinate delivery.

References:

Please supply the names of companies/agencies for whom you recently supplied comparable goods as requested in this bid.

Name of Company/Agency	Address	Person to contact/Telephone No.
Vernon FD	4530 Bandini Blvd. Vernon, CA 90058	Capt. Craig Peltier 323-583-4821 x510
Redondo Beach FD	415 Diamond St. Redondo Beach, CA 90277	Chief Dan Madrigal 310-318-0663 x4337
West Covina FD	1444 W. Garvey Ave. S. West Covina, CA 91793	Tom Loveday 626-939-8776

Contract Extension to Other Cities/Agencies:

Please state, if requested by the City, if your company would agree to extend the same price, terms and conditions to other Cities/Agencies.

[X] Yes, we would agree to extend the same price, terms and conditions.

[ ] No, we would not agree to extend the same price, terms and conditions.

Maintenance/Warranty Service Information:

How many miles is your company's service department located from the requested delivery address? 4.24 miles.

What is the address of your company's service department?

Advanced Electronics, Inc, 2601 Manhattan Beach Blvd, Redondo Beach, CA 90278

Street Address City Zip Code

What is the standard warranty time period for the radio equipment? Our Warranty is one (1) year from shipment

When does the standard warranty go into effect?

[ ] At the time of acceptance by the City of Torrance
[ ] When radios are operational and in service by the Torrance Fire Department
[X] Other: please explain:
Our Warranty is one (1) year from shipment

Do you offer an extended warranty beyond the standard warranty? [X] Yes [ ] No

If yes, what is the time period of the extended warranty? See Page 17A attached

What is the additional cost of the extended warranty? See Page 17A attached

PAGE 17A

Time Period of the Extended Warranty	Additional Cost of the Extended Warranty
Portables	
2 year repair service advantage	$84 per unit, per year
3 year repair service advantage	$125 per unit, per year
Warranty on Mobiles	
2 year repair service advantage w/o encryption	$121 per unit, per year
3 year repair service advantage w/o encryption	$182 per unit, per year

Specification Acknowledgement and Price Proposal:

Vendor Name: Motorola Solutions, Inc.

Bid- Submittal Requirement and Acknowledgement
Bidders are required to place a check mark in Column A indicating that your bid is as per the specifications of this Notice Inviting Bids. Bidders are required to place a check mark in Column B indicating that your bid deviates from the specifications of this Notice Inviting Bids. If you are bidding anything other than what is specified, you must explain in detail how your bid differs by attaching additional pages to your bid submittal and indicating the page number in Column C. You may attach additional sheets (with page numbers indicated on each additional page) to your bid submittal describing in detail what it is that you are bidding. You must indicate the page number reference (of the additional sheets) in Column C.

Bid Item #1			
Description	**Column A**	**Column B**	**Column C**
Item/Service	Place a check mark in this column indicating that your bid is as per the specifications in this Notice Inviting Bids	Place a mark in this column if you are bidding something different then what is specified in this Notice Inviting Bids	You may attach additional sheets to your bid submittal describing in detail the service you are bidding. Please reference the page number of your attachment in the space below.
17 Each VHF Mobile Radios • Frequency range from 136 – 174 MHz • Radio power adjustable up to 110 Watts • Analog/Conventional & Digital voice operation • Must have 12.5 & 25 KHz channel spacing capabilities • Radios must come with remote mount control head options with external speaker • 1000 minimum channel capability with display • Project 25 compliant • Intermodulation or better • Radio receiver adjacent channel rejection selectivity must be 75 dB (12.5 kHz) & 82 dB (25 kHz) or better • Radio must meet -80dB Intermodulation or better	✓		

Continued on Next Page.....

Vendor Name: Motorola Solutions, Inc.

Bid- Submittal Requirement and Acknowledgement			
Bid Item #2			
Description	**Column A**	**Column B**	**Column C**
Item/Service	Place a check mark in this column indicating that your bid is as per the specifications in this Notice Inviting Bids	Place a mark in this column if you are bidding something different then what is specified in this Notice Inviting Bids	You may attach additional sheets to your bid submittal describing in detail the service you are bidding. Please reference the page number of your attachment in the space below.
41 Each UHF Mobile Radios • Frequency range from 450-520 MHz • Radio power adjustable up to 45 Watts • Must have Analog/Conventional & Digital voice operation • Must have 12.5 & 25 KHz channel spacing capabilities • Radios must come with single remote mount control head option with external speaker • 14 digit character display • 1000 minimum channel capability with display • Project 25 compliant • MDC 1200 analog signaling feature with no limitations • Radios must have a migration path for upgrading to a Digital Trunked System. Future migration will be accomplished with new software/firmware without replacing the original radios. • Radio receiver adjacent channel rejection selectivity must be 75 dB (12.5 kHz) & 82 dB (25 kHz) or better • Radio must meet -80dB Intermodulation or better			

Continued on Next Page.....

Vendor Name: Motorola Solutions, Inc.

Bid- Submittal Requirement and Acknowledgement			
Bid Item # 3			
Description	**Column A**	**Column B**	**Column C**
Item/Service	Place a check mark in this column indicating that your bid is as per the specifications in this Notice Inviting Bids	Place a mark in this column if you are bidding something different then what is specified in this Notice Inviting Bids	You may attach additional sheets to your bid submittal describing in detail the service you are bidding. Please reference the page number of your attachment in the space below.
3 Each UHF Mobile Radios • Frequency range from 450-520 MHz • Radio power adjustable up to 45 Watts • Must have Analog/Conventional & Digital voice operation • Must have 12.5 & 25 KHz channel spacing capabilities • Radios must come with dual remote mount control heads with external speakers • 14 digit character display • 1000 minimum channel capability with display Project 25 compliant • MDC 1200 signaling feature with no limitations • Radios must have a migration path for upgrading to a Digital Trunked System. Future migration will be accomplished with new software/firmware without replacing the original radios. • Radio receiver adjacent channel rejection selectivity must be 75 dB (12.5 kHz) & 82 dB (25 kHz) or better Radio must meet -80dB Intermodulation or better			

Continued on Next Page.....

Vendor Name: Motorola Solutions, Inc.

Bid- Submittal Requirement and Acknowledgement			
Bid Item #4			
Description	**Column A**	**Column B**	**Column C**
Item/Service	Place a check mark in this column indicating that your bid is as per the specifications in this Notice Inviting Bids	Place a mark in this column if you are bidding something different then what is specified in this Notice Inviting Bids	You may attach additional sheets to your bid submittal describing in detail the service you are bidding. Please reference the page number of your attachment in the space below.
30 Each VHF Portable Radios • Frequency range from 136 – 174 MHz • Radio power adjustable up to 6 Watts • Must have Analog/Conventional & Digital voice operation • Must have full keypad option • Must have 12.5 & 25 KHz channel spacing capabilities • 1000 minimum channel capability with display • Project 25 compliant • Must support full feature Lapel microphone with a minimum of Speaker/Freq. Knob/Volume • Radio must be Intrinsically safe • Must have the ability in one step to switch between repeat mode to direct mode • Must have the ability in one step to monitor the selected frequency in the open squelch/ PL mode • Must have the ability in one step to turn on backlight for display • Must have the ability in one step to activate the selected channel scan feature • Must have the ability in one step to change radio zones • Radio must have programmable scan feature that allows different scan list per channel. • Radio must meet 1% audio distortion or better • Radio must meet -78 dB Intermodulation or better • FM Hum and Noise must meet -50dB (12.5 KHz) & -56 dB (25 kHz) or better	✓		

Continued on Next Page.....

Vendor Name: Motorola Solutions, Inc.

Bid- Submittal Requirement and Acknowledgement			
Bid Item #5			
Description	**Column A**	**Column B**	**Column C**
Item/Service	Place a check mark in this column indicating that your bid is as per the specifications in this Notice Inviting Bids	Place a mark in this column if you are bidding something different then what is specified in this Notice Inviting Bids	You may attach additional sheets to your bid submittal describing in detail the service you are bidding. Please reference the page number of your attachment in the space below.
15 Each UHF Portable Radios • Frequency range from 450 - 512 MHz • Radio power adjustable up to 5 Watts • Must have Analog/Conventional & Digital voice operation • Must have 12.5 & 25 KHz channel spacing capabilities • 1000 minimum channel capability with display • Must have full keypad option • Project 25 compliant • Must support full feature Lapel microphone with a minimum of Speaker/Freq. Knob/Volume • Radio must be Intrinsically safe • Radio must meet or exceed the submersible rating of 2m/6 feet for 30 minutes - Radio must be in a yellow housing case • Radios must have a migration path for upgrading to a Digital Trunked System. Future migration will be accomplished with new software/firmware without replacing the original radios. • Must have the ability in one step for sending an emergency signal from the portable radio to the dispatch console • Must have the ability in one step to switch between repeat mode to direct mode • Must have the ability in one step to monitor the selected frequency in the open squelch/ PL mode • Must have the ability in one step to turn on backlight for display • Must have the ability in one step to activate the selected channel scan feature • Must have the ability in one step to change radio zones • Radio must have programmable scan feature that allows different scan list per channel. • Radio must meet 1% audio distortion or better • Radio must meet -77dB Intermodulation or better • FM Hum and Noise must meet -45dB (12.5 KHz) & -53 dB (25 kHz) or better • MDC 1200 analog signaling feature with no limitations			

Continued on Next Page.....

Vendor Name: Motorola Solutions, Inc.

Bid- Submittal Requirement and Acknowledgement			
Bid Item # 6			
Description	**Column A**	**Column B**	**Column C**
Item/Service	Place a check mark in this column indicating that your bid is as per the specifications in this Notice Inviting Bids	Place a mark in this column if you are bidding something different then what is specified in this Notice Inviting Bids	Attach additional sheets to your bid submittal describing in detail the service you are bidding. Please reference the page number of your attachment in the space below.
75 each UHF Portable Radios • Frequency range from 450 - 512 MHz • Radio power adjustable up to 5 Watts • Must have Analog/Conventional & Digital voice operation • Must have 12.5 & 25 KHz channel spacing capabilities • 1000 minimum channel capability with display • Must have limited keypad option with navigation buttons • Project 25 compliant • Must support full feature Lapel microphone with a minimum of Speaker/Freq. Knob/Volume • Radio must be Intrinsically safe • Radio must meet or exceed the submersible rating of 2m/6 feet for 30 minutes Radio must be in a yellow housing case • Radios must have a migration path for upgrading to a Digital Trunked System. Future migration will be accomplished with new software/firmware without replacing the original radios. • Radio receiver sensitivity must be 1% audio distortion on the receiver and -77 dB Inter-modulation and -45dB FM Hum and Noise (12.5kHz) or better • Must have the ability in one step for sending an emergency signal from the portable radio to the dispatch console • Must have the ability in one step to switch between repeat mode to direct mode • Must have the ability in one step to monitor the selected frequency in the open squelch/ PL mode • Must have the ability in one step to turn on backlight for display • Must have the ability in one step to activate the selected channel scan feature • Must have one step process to change radio zones • Radio must have programmable scan feature that allows different scan list per channel. • Radio must meet 1% audio distortion or better • Radio must meet -77dB Intermodulation or better FM Hum and Noise must meet -45dB (12.5 KHz) & -53 dB (25 kHz) or better MDC 1200 analog signaling feature with no limitations			

Continued on Next Page.....

Vendor Name: Motorola Solutions, Inc.

Bid- Submittal Requirement and Acknowledgement			
Bid Item # 7			
Description	**Column A**	**Column B**	**Column C**
Item/Service	Place a check mark in this column indicating that your bid is as per the specifications in this Notice Inviting Bids	Place a mark in this column if you are bidding something different then what is specified in this Notice Inviting Bids	You may attach additional sheets to your bid submittal describing in detail the service you are bidding. Please reference the page number of your attachment in the space below.
15 Each Multi Unit Charger • Must have a minimum of 6 charging slots to support batteries for products listed in this Notice Inviting Bids	✓		

Bid Item # 8			
Description	**Column A**	**Column B**	**Column C**
Item/Service	Place a check mark in this column indicating that your bid is as per the specifications in this Notice Inviting Bids	Place a mark in this column if you are bidding something different then what is specified in this Notice Inviting Bids	You may attach additional sheets to your bid submittal describing in detail the service you are bidding. Please reference the page number of your attachment in the space below.
240 Each Extra Portable Batteries • Batteries must be intrinsically safe and meet the minimum requirement for the portable radios listed in this Notice Inviting Bids. Batteries must have a minimum 8 hour duty cycle	✓		

Bid Item # 9			
Description	**Column A**	**Column B**	**Column C**
Item/Service	Place a check mark in this column indicating that your bid is as per the specifications in this Notice Inviting Bids	Place a mark in this column if you are bidding something different then what is specified in this Notice Inviting Bids	You may attach additional sheets to your bid submittal describing in detail the service you are bidding. Please reference the page number of your attachment in the space below.
12 Each Lapel Microphones (Full Featured) with a minimum of: • Speaker control • Frequency knob Volume control	✓		

Continued on Next Page.....

Vendor Name: MOTOROLA SOLUTIONS, INC.

ıd Item #	Description	You Must Indicate Brand and Model Number Bid	Unit Price	Extended Price
1	17 Ea VHF Mobile Radios	Brand: Motorola Model: M20KTS9PW1AN	$ 2,585.03	$ 43,945.58
2	41 Ea UHF Mobile Radios	Brand: Motorola Model M20SSS9PW1AN	$ 2,231.38	$ 91,486.70
3	3 Ea UHF Mobile Radios	Brand: Motorola Model M20SSS9PW1AN	$ 2,692.25	$ 8,076.74
4	30 Ea VHF Portable Radios	Brand: Motorola Model H18KEH9PW7AN	$ 2,333.98	$ 70,019.36
5	15 Ea UHF Portable Radios	Brand: Motorola Model H18SDH9PW7AN	$ 2,536.74	$ 38,051.04
6	75 Ea UHF Portable Radios	Brand: Motorola Model H18SDF9PW6AN	$ 2,297.85	$ 172,338.83
7	15 Ea Multi Unit Charger	Brand: Motorola Model WPLN4108BR	$ 636.7	$ 9,550.56
8	240 Ea Extra Portable Batteries	Brand: Motorola Model NNTN4436B	$ 84.84	$ 20,361.60
9	12 Ea Lapel Microphones	Brand: Motorola Model RMN5089B	$ 121.20	$ 1,454.40
			Sub Total	$ 455,284.81
			Sales Tax (8.75%	$ 39,442.99
			Total	$ 494,727.80

As required by this bid, we have submitted one (1) original and two (2) copies of this bid submittal to the City of Torrance	[x] Yes	[ ] No
As required by this bid, we have included a product specification sheet for each product bid.	[x] Yes	[ ] No

ATTACHMENT 1

STATE OF CALIFORNIA

BIDDER'S AFFIDAVIT

COUNTY OF LOS ANGELES

Mark Schmidl being first duly sworn, deposes and says:

1. That he/she is the MSSSI Vice President of Motorola Solutions, Inc.
(Title of Office) (Name of Company)

hereinafter called "Bidder", who has submitted to the City of Torrance a bid for

Bid to Furnish UHF and VHF Mobile and Portable Radios for the Torrance Fire Department;
(Title of BID)

2. That the bid is genuine; that the same is not sham; that all statements of fact in the bid are true;

3. That the bid was not made in the interest or behalf of any person, partnership, company, association, organization or corporation not named or disclosed;

4. That the Bidder did not, directly or indirectly, induce solicit or agree with anyone else to submit a false or sham bid, to refrain from proposing, or to withdraw his bid, to raise or fix the bid price of the Bidder or of anyone else, or to raise or fix any overhead, profit or cost element of the Bidder's price or the price of anyone else; and did not attempt to induce action prejudicial to the interest of the City of Torrance, or of any other Bidder, or anyone else interested in the proposed purchase order;

5. That the Bidder has not in any other manner sought by collusion to secure for itself an advantage over any other Bidder or to induce action prejudicial to the interests of the City of Torrance, or of any other Bidder or of anyone else interested in the proposed purchase order;

6. That the Bidder has not accepted any bid from any subpurchase order or materialman through any bid depository, the bylaws, rules or regulations of which prohibit or prevent the Bidder from considering any bid from any subpurchase order or materialman, which is not processed through that bid depository, or which prevent any subpurchase order or materialman from proposing to any purchase order or who does not use the facilities of or accept bids from or through such bid depository;

7. That the Bidder did not, directly or indirectly, submit the Bidder's bid price or any breakdown thereof, or the contents thereof, or divulge information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, or to any individual or group of individuals, except to the City of Torrance, or to any person or persons who have a partnership or other financial interest with said Bidder in its business.

8. That the Bidder has not been debarred from participation in any state, federal or public works project.

Dated this 22nd day of August, 2011.

(Bidder Signature)

Vice President Motorola Solutions Sales + Services, Inc.
(Title)

Customized Terms and Conditions of Sale

1. Scope. Motorola Solutions, Inc. ("Seller") will sell to the City of Torrance ("Customer") and other eligible purchasers indicated in the Notice Inviting Bids issued by Customer, referred to as "Bid No. B2011-32, Bid to Furnish UGHF and VHF Mobile and rtable Radios for the Torrance Fire Department, due August 18, 2011" the "Notice Inviting Bids") and Customer will purchase from Seller the equipment described in Seller's Proposal/Response to the Notice Inviting Bids dated August 18, 2011 (the "Proposal"). These terms and conditions, together with the Proposal and the terms and conditions included in the Notice Inviting Bids, comprise the "Agreement." Customer may indicate its acceptance of this Agreement by signing below or by issuing a purchase order that refers to either the Proposal or to a Customer solicitation to which the Proposal responds. Only these terms and conditions apply to the transaction, notwithstanding any inconsistent or additional terms and conditions contained in the purchase order. If there are inconsistencies between these Terms and Conditions and those in the Notice Inviting Bids, these prevail.

2. Price and Payment Terms. The Contract Price is shown in the Proposal, excluding applicable sales, use, or similar taxes. Seller will submit invoices to Customer for products when they are shipped and payment is due 30 days from the date of receipt of invoice. Title to equipment will pass to Customer upon shipment. Risk of loss will pass to Customer upon delivery but Customer has no duty to accept non-conforming goods or goods damaged in transit. Title to software will not pass to Customer at any time. Seller will pack and ship all equipment in accordance with good commercial practices.

3. Software. Any software owned by Seller ("Motorola Software") is licensed to Customer solely in accordance with Seller's standard Software License Agreement ("SLA"), which is available upon request and is incorporated herein by this reference. Any software owned by a third party ("Non-Motorola Software") is licensed to Customer in accordance with the standard license, terms, and restrictions of the copyright owner unless the owner has granted to Seller the right to sublicense its software pursuant to the SLA, in which case the SLA applies and the owner will have all rights and protections under the SLA as the Licensor. Seller makes no representations or warranties of any kind regarding Non-Motorola Software.

4. Express Limited Warranty and Warranty Disclaimer. Motorola Software is warranted in accordance with the SLA. For one year from the date of shipment, Seller warrants that the equipment and parts under normal use and service are free from material defects in material and workmanship. These warranties do not apply to (i) defects or damage resulting from: use of the equipment in other than its normal, customary, and authorized manner; accident, liquids, neglect, or acts of God; testing, maintenance, disassembly, repair, installation, alteration, modification, or adjustment not provided or authorized in writing by Seller; or Customer's failure to comply with all applicable industry and OSHA standards; (ii) breakage of or damage to antennas unless caused directly by defects in material workmanship; (iii) equipment that has had the serial number removed or made illegible; (iv) batteries (because they carry their own separate limited warranty) or consumables; (v) freight costs to ship equipment or parts to the repair depot; (vi) scratches or other cosmetic damage to equipment surfaces that does not affect the operation of the equipment; and (vii) normal or customary wear and tear. These express limited warranties are extended by Seller to the original user purchasing the products for commercial, industrial, or governmental use only, and are not assignable or transferable. If Customer gives notice of a valid warranty claim before the expiration of the warranty period, Seller will (at its option and at no additional charge to Customer) repair the defective product, replace it with the same or equivalent product, or refund the price of the defective product. This action will be the full extent of Seller's liability for a warranty claim. Repaired or replaced product is warranted for the balance of the original applicable Warranty Period. All replaced products or parts will become the property of Seller. THESE WARRANTIES ARE THE COMPLETE WARRANTIES AND ARE GIVEN IN LIEU OF ALL OTHER WARRANTIES. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

5. Delays and Disputes. Neither party will be liable for its non-performance or delayed performance if caused by an event, circumstance, or act of a third party that is beyond a party's reasonable control (a "Force Majeure"). Each party will notify the other if it becomes aware of a Force Majeure that will significantly delay performance. The parties will try to settle any dispute arising from this Agreement (except for a claim relating to intellectual property or breach of confidentiality) through good faith negotiations. If necessary, the parties will escalate the dispute to their appropriate higher-level managers. If negotiations fail, the parties will jointly select a mediator to mediate the dispute and will share equally the mediation costs. Neither party will assert a breach of this Agreement without first giving the other party written notice and a thirty (30) day period to cure the alleged breach.

6. **LIMITATION OF LIABILITY. Except for personal injury or death, Seller's total liability regardless of the theory of liability will be limited to the direct damages recoverable under law, but not to exceed the purchase price of the products for which losses or damages are claimed or $300,000, whichever is greater. SELLER WILL NOT BE LIABLE FOR LOST GRANT FUNDS OR ANY SPECIAL, INCIDENTAL, INDIRECT, OR CONSEQUENTIAL DAMAGES IN ANY WAY RELATED TO OR ARISING FROM THIS AGREEMENT OR THE SALE OR USE OF THE PRODUCTS. This limitation liability survives the expiration or termination of this Agreement.**

7. Confidential Information and Preservation of Proprietary Rights. The SLA governs software confidentiality. As to any other information marked "Confidential" and provided by one party to the other, the receiving party will maintain the confidentiality of the

information and not disclose it to any third party; take necessary and appropriate precautions to protect the information; and use the information only to further the performance of this Agreement. Confidential information is and will remain the property of the disclosing party, and no grant of proprietary rights in the confidential information is given or intended. Seller, any copyright owner of Non-Motorola Software, and any third party manufacturer own and retain all of their proprietary rights in the equipment, parts and ftware, and nothing herein is intended to restrict their proprietary rights,. Except as explicitly provided in the SLA, this Agreement does not grant any right, title or interest in Seller's proprietary rights, or a license under any Seller patent or patent application.

8. Miscellaneous: Each party will comply with all applicable laws, regulations and rules concerning the performance of this Agreement or use of the products. Customer will obtain and comply with all FCC licenses and authorizations required for the installation, operation and use of the products. This Agreement and the rights and duties of the parties will be governed by and interpreted in accordance with the laws of the State of California. This Agreement constitutes the entire agreement of the parties regarding this transaction, supersedes all previous agreements and proposals relating to this subject matter, and may be amended only by a written instrument executed by both parties. Seller is not making, and Customer is not relying upon, any representation or warranty except those expressed herein. There are no certifications or commitments binding Seller applicable to this transaction unless they are in writing and signed by an authorized signatory of Seller.

9. Point-by-Point Comments to Terms and Conditions Contained in Section I of the Notice Inviting Bids:

9.1. Definitions. *Acceptable*
9.2. Bid Form. *Acceptable*
9.3. Reservation. *Acceptable*
9.4 Affidavit. *Acceptable*
9.5. Standards for Evaluation of Bids. *Acceptable*
9.6. Funding. *Acceptable*
9.7. Brand Names. *Acceptable*
9.8. Delivery. *Acceptable*
9.9. Partial Bids. *Acceptable*
9.10. Equipment Guarantee. *Acceptable , **except** as this conflicts with Section 4 above (e.g., warranty commences upon shipment).*
9.11. Errors and Omissions. *Acceptable*
9.12. Bidder's Examination of Requirements. *Acceptable*
^ 13. The Purchase Agreement. *Acceptable but including these terms and conditions*
4. TUSD. *Acceptable*
9.15. Payments. *Acceptable subject to Section 2 above.*
9.16. Patent Rights. *Acceptable subject to Section 6 above.*
9.17. Contract Extension to Other Cities/Agencies. *Acceptable*
9.18. Notice. *Acceptable*
9.19. Terms and Conditions.
9.19.1. Definitions. *Acceptable*
9.19.2. Goods. *Acceptable*
9.19.3. Description of Goods. *Acceptable*
9.19.4. Substitution. *Acceptable*
9.19.5. Delivery Date. *Acceptable subject to Section 5 above.*
9.19.6. Cancellation. *Acceptable subject to Section 5 above*
9.19.7. Delivery Risk of Loss. *Acceptable **except** as otherwise stated in Section 2 above.*
9.19.8. Invoices. *Acceptable **except** as otherwise stated in Section 2 above.*
9.19.9. Packing and Shipping. *Acceptable*
9.19.10. Acceptance of Purchase Agreement. *Acceptable subject to Section 1 above.*
9.19.11. Taxes. *Acceptable , prices are exclusive of sales or use tax, if applicable.*
9.19.12. Prices. ***Exception.***
9.19.13. Cash Discounts. *None offered, inapplicable.*
9.19.14. Warranty. *Acceptable subject to Section 4 above.*
9.19.15. Changes. *Acceptable **except** as to the last sentence, and Motorola has no duty to provide product cost information which is confidential and trade secret information.*
9.19.16. Business License. *Inapplicable to this transaction; none of the conditions apply.*
9.19.17. Indemnity. *Acceptable subject to Section 6 above.*
9.19.18. Conflict of Interest. *Acceptable*
9.19.19. Integration; Amendment. *Acceptable subject to Section 1 above.*
9.19.20. Interpretation. *Acceptable*
9.19.21. Severability. *Acceptable*
9.19.22. Governing Law; Jurisdiction. *Acceptable subject to Section 5 above.*
9.19.23. Attorney's Fees. *Acceptable*

PRODUCT SPECIFICATION SHEETS

ASTRO XTL5000 DIGITAL MOBILE RADIO

ASTRO XTS5000 DIGITAL PORTABLE RADIO

IMPRES SMART ENGERY SYSTEMS

IMPRES BATTERY

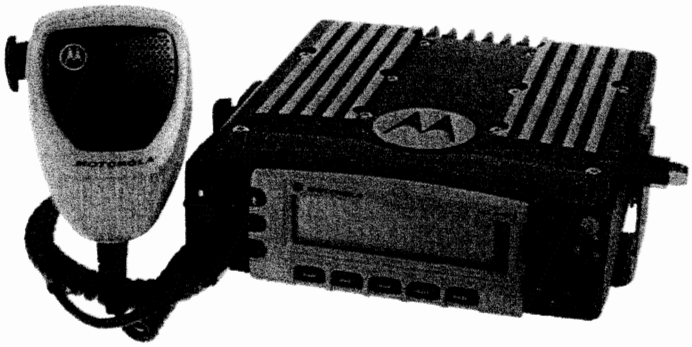
MOTOROLA TWO-WAY PORTABLE AND MOBILE RADIO ACCESSORY AND BATTERY CATALOG

SPECIFICATION SHEET

MOTOROLA

ASTRO® XTL™ 5000

Digital Mobile Radio



MODEL FEATURES

Frequency Bands
- 136-174 MHz
- 380-470 MHz
- 450-520 MHz
- 764-870 MHz

Power Levels
- 10-50 Watt (136-174 MHz)
- 10-40 Watt (380-470 MHz)
- 10-45 Watt (450-520 MHz)
- 10-35 Watt (764-870 MHz)
- 25-110 Watt (136-174 MHz)
- 25-110 Watt (380-470 MHz)

1000 Channels (Standard)

Dual mode operation (ASTRO Digital and Analog)

9600 and 3600 Baud capable

Project 25 capability on Conventional and Trunking systems

Type II Trunking Only

Project 25 compliance interoperable voice signaling features

Integrated voice and data or RS232 capable

Programming Over Project 25 (POP25)

Over the Air Re-key (OTAR)

Multiple Control Heads (up to 4)

Bandwidth Receiver
- 12.5/25/30 kHz (analog) – 136-174 MHz
- 12.5/25 kHz (analog) – 380-470 MHz and 450-520 MHz
- 12.5/20/25 kHz (analog) – 764-870 MHz

12.5 kHz bandwidth receiver (digital)

5 Programmable buttons x 4 deep in menu functions

4 line / 14 digit character display

Multiple Color Backlit LCD display

Emergency button

Multi level display dim button

Dash/Remote mount

Meets Military Specs 810 (C,D, E and F)

Utilizes Windows®-based customer programming software

Built in FLASHport™ support

Optional Keypad microphone

External Speaker

USB/RS232 connectivity

Optional Siren PA

Optional DEK

Upgradable

Encryption Capable:
- Type III (optional)
- Allows for MultiKey for single algorithms ONLY
- Algorithms supported:
  - DVI-XL
  - DVP-XL
  - DES
  - DES-XL
  - DES-OFB
  - AES
  - Advanced Digital Privacy (ADP)

Reuse of most ASTRO/MCS accessories

SPECIFICATION SHEET

ASTRO® XTL™ 5000
Digital Mobile Radio

GENERAL PERFORMANCE SPECIFICATIONS	
Frequency range	136-174 MHz 380-470 MHz 450-520 MHz 764-870 MHz
Modulation	C4FM of QPSK-C family (Compatible 4-Level Frequency Modulation and Compatible Quadrature Phase Shift Keying)
Protocol	
Project 25-CAI	4.4 kbps IMBE, 2.8 kbs Error Correction Coding, 2.4 kbps Embedded Signaling
Channel Bandwidth	
Analog	12.5/25/30 kHz (136-174 MHz) 12.5/25 kHz (380-470 MHz and 450-520 MHz); 12.5/20/25 kHz (764-870 MHz)
Digital	12.5 kHz

VOICE CODER	
Voice Coding Method IMBE (CAI)	Improved Multi Band Excitation (IMBE)
Voice Truncation	None
Frame Re-sync Interval	180 mSec (Clear Digital Mode)
Forward Error Correction	Golay code
Error Mitigation Project 25-CAI (IMBE) Dual Level	Level 1: Extrapolates and replaces 20 mSec voice frames that exceed the error correction algorithm tolerance. Level 2: Progressive muting of 20 mSec voice frames that are too severely damaged for Level 1 replacement.
Code Book Structure	APCO Project 25 (IMBE): No code book

SIGNALLING (ASTRO MODE)	
Signalling Rate	9.6 kbps
Digital ID Capacity	10,000,000 Conventional / 48,000 Trunking
Digital Network Access Codes	4,096 network site addresses
ASTRO Digital User Group Addresses	4,096 network site addresses
Project 25 – CAI Digital User Group Addresses	65,000 Conventional / 4,094 Trunking
Error Correction Techniques	Golay, BCH, Reed-Solomon codes
Data Access Control	Slotted CSMA: Utilizes infrastructure-sourced data status bits embedded in both voice and data transmissions.

SPEAKER	
Dimensions	5.5" x 5.5" x 2.5" (139.7 x 139.7 x 63.5 mm) (Excluding mounting bracket)
Weight	1.5 lbs (0.68 kg)

MOBILE	
Dimensions	Mid Power Radio Transceiver 2" x 7" x 7.8" (50.8 x 177.8 x 198.1 mm) Control Head 2.0" x 7.1" x 2.5" (50.8 x 180.3 x 63.5 mm) Mid Power Radio Transceiver and Control Head–Dash Mount 2.0" x 7.1" x 9.1" (50.8 x 180.3 x 231.1 mm) High Power Transceiver 2.765" x 8.08" x 12.31" (70.2 x 205.2 x 312.7 mm)
Weight	Mid Power Radio Transceiver and Control Head 6.1 lbs (2.77 kg) (764-870 MHz and 136-174 MHz) 6.1 lbs (2.77 kg) (380-470 MHz and 450-520 MHz) High Power Radio Transceiver with Handle 8.8 lbs (3.99 kg) (136-174 MHz and 380-470 MHz)

SPECIFICATION SHEET

ASTRO® XTL™ 5000
Digital Mobile Radio

TRANSMITTER

Frequency	764-776 MHz 794-806 MHz 806-825 MHz 851-870 MHz		380-470 MHz (Range 1) and 450-520 MHz (Range 2)		136-174 MHz	
RF Power	10-30W (764-806 MHz) 10-35W (806-870 MHz)		10-45W (450-500 MHz) 10-40W (500-512 MHz) 10-25W (512-520 MHz)		10-50W or 25-110W	
Max Freq Separation	Full Bandsplit		Ref Above Bandsplit		Full Bandsplit	
Freq Stability Operating Freq Accuracy (–30°C to +60°C;+25°C Ref) - 700/800 & UHF (± 2 ppm (–30°C to +60°C) - VHF	1.5 ppm		2 ppm		2 ppm	
Modulation Limiting						
25/20 kHz, 25 kHz, 25/30 kHz channel	±5 kHz, +/-4 kHz (NPSPAC)		±5 kHz		±5 kHz	
12.5 kHz channel	±2.5 kHz		±2.5 kHz		±2.5 kHz	
Modulation Fidelity (C4FM) 12.5 kHz digital channel	±2.8 kHz		±2.8 kHz		±2.8 kHz	
Channel Spacing Analog	12.5/20/25 kHz		12.5/25 kHz		12.5/25/30 kHz	
FM Hum and Noise						
20/25 kHz, 25 kHz, 20/25 kHz	40 dB		45 dB		45 dB	
12.5 kHz	34 dB		40 dB		40 dB	
Emissions (GNSS=Global Navigation Satellite System)	Conducted –70 dBc –85 dBc (GNSS)	Radiated –20 dBm –40 dBm (GNSS)	Conducted –85 dBc	Radiated –20 dBm	Conducted –85 dBc	Radiated –20 dBm
Audio Response (6 dB/Octave Pre-emphasis from 300 to 3000 Hz)	+1, –3 dB (EIA)		+1, –3 dB (EIA)		+1, –3 dB (EIA)	
Audio Distortion per EIA	3%		3%		3%	

POWER AND BATTERY DRAIN

Model Type	136-174 MHz 380-470 MHz 450-520 MHz 764-870 MHz	
Minimum RF Power Output	10-50 Watt (136-174 MHz) 10-40 Watt (380-470 MHz) 10-45 Watt (450-520 MHz) 10-35 Watt (764-870 MHz) 25-110 Watt (136-174 MHz) 25-110 Watt (380-470 MHz)	
Operation	13.8V DC ±20% Negative Ground	
Standby at 13.8V		
136-174 MHz (10-50 Watt)	0.85A	
380-470 MHz (10-40 Watt)	0.85A	
450-520 MHz (10-45 Watt)	0.85A	
764-870 MHz (10-35 Watt)	0.85A	
136-174 MHz (25-110 Watt)	0.85A	
380-470 MHz (25-110 Watt)	0.85A	
Receive at Rate Audio at 13.8V		
136-174 MHz (10-50 Watt)	3.2A	
380-470 MHz (10-40 Watt)	3.2A	
450-520 MHz (10-45 Watt)	3.2A	
764-870 MHz (10-35 Watt)	3.2A	
136-174 MHz (25-110 Watt)	3.2A	
380-470 MHz (25-110 Watt)	3.2A	
Transmit Current (A) at Rated Power (W)		
136-174 MHz (10-50 Watt)	13A (50W),	8A (15W)
380-470 MHz (10-40 Watt)	11A (40W),	8A (15W)
450-520 MHz (10-45 Watt)	11A (45W),	8A (15W)
764-870 MHz (10-35 Watt)	12A (35W),	8A (15W)
136-174 MHz (25-110 Watt)	20A (100W)	
380-470 MHz (25-110 Watt)	24A (100W)	

FCC TYPE ACCEPTANCE ID

Band	Output Power	Transmitter Number
136-174 MHz	10-50 W	AZ492FT3806
380-470MHz	10-40 W	AZ492FT4862
450-520 MHz	10-45 W	AZ492FT4867
764-870 MHz	10-35 W	AZ492FT5823
136-174 MHz	25-110 W	AZ492FT3808
380-470 MHz	25-110 W	AZ492FT4870

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	–30°C / +60°C
Storage Temperature	–55°C / +85°C
International Protection	IP54 certified

SPECIFICATION SHEET

ASTRO® XTL™ 5000
Digital Mobile Radio

RECEIVER

Frequency	764-776 MHz 851-870 MHz	380-470 MHz (Range 1) and 450-520 MHz (Range 2)		136-174 MHz	
Channel Spacing	12.5 / 20 / 25 kHz	12.5 / 25 kHz		12.5 / 25 / 30 kHz	
Maximum Frequency Separation	Full Bandsplit	Full Bandsplit		Full Bandsplit	
Analog Sensitivity		Pre-amp	Standard	Pre-Amp	Standard
20 dB Quieting	.30 µV	0.25 µV	0.40 µV	0.25 µV	0.40 µV
12 dB SINAD per EIA	.25 µV	0.20 µV	0.30 µV	0.20 µV	0.30 µV
Digital Sensitivity					
1% BER (12.5 kHz channel)	.30 µV	0.25 µV	0.40 µV	0.25 µV	0.40 µV
5% BER (12.5 kHz channel)	.25 µV	0.20 µV	0.30 µV	0.20 µV	0.30 µV
Intermodulation Distortion	80 dB	80 dB	85 dB	80 dB	85 dB
Spurious Response Rejection	90 dB	90 dB	90 dB	90 dB	90 dB
Audio Output Power at 3% distortion (External/Internal Speaker)	7.5 W (8 Ω ext. speaker) 13 W (3.2 Ω ext. speaker)	7.5 W (8 Ω ext. speaker) 13 W (3.2 Ω ext. speaker)		7.5 W (8 Ω ext. speaker) 13 W (3.2 Ω ext. speaker)	
Adjacent Channel Rejection Selectivity (12.5 kHz/25 kHz)	65 dB / 80 dB	75 dB / 82 dB		75 dB / 82 dB	
Audio Response (6 dB/Octave De-emphasis from 300 to 3000 Hz)	+1, –3 dB (EIA)	+1, –3 dB (EIA)		+1, –3 dB (EIA)	

MILITARY STANDARDS 810 C, D, E, & F

	MIL-STD 810C		MIL-STD 810D		MIL-STD 810E		MIL-STD 810F	
	Method	Proc./Cat.	Method	Proc./Cat.	Method	Proc./Cat.	Method	Proc./Cat.
Low Pressure	500.1	I	500.2	II	500.3	II	500.4	II
High Temperature Storage	501.1	I	501.2	I/A1	501.3	I/A1	501.4	I/Hot
High Temperature Operational	501.1	II	501.2	II/A1	501.3	II/A1	501.4	I/Hot
Low Temperature Storage	502.1	I	502.2	I/C3	502.3	I/C3	502.4	I/C3
Low Temperature Operational	502.1	I	502.2	II/C1	502.3	II/C1	502.4	II/C1
Temperature Shock	503.1	-	503.2	I/A1-C3	503.3	I/A1-C3	503.4	I/Hot-C3
Solar Radiation	505.1	II	505.2	I	505.3	I	505.4	I
Rain Blowing	506.1	I	506.2	I	506.3	I	506.4	I
Rain Steady	506.1	II	506.2	II	506.3	II	506.4	III
Humidity	507.1	II	507.2	II	507.3	II	507.4	-
Salt Fog	509.1	-	509.2	-	509.3	-	509.4	-
Blowing Dust	510.1	I	510.2	I	510.3	I	510.4	I
Blowing Sand			510.2	II	510.3	II	510.4	II
Vibration Minimum Integrity	514.2	VIII/F, Curve-W	514.3	I/10	514.4	I/10	514.5	I/24
Vibration Loose Cargo			514.3	II/3	514.4	II/3	514.5	II/5
Shock Functional	516.2	I	516.3	I	516.4	I	516.5	I
Shock Crash Hazard	516.2	III	516.3	V	516.4	V	516.5	V
Shock Bench Handling	516.2	V	516.3	VI	516.4	VI	516.5	VI

MOTOROLA

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SPECIFICATION SHEET

MOTOROLA

ASTRO® XTS® 5000

Digital Portable Radio

MODEL I:

Large PTT button

Angled On/Off volume knob

Orange emergency button

Illuminated 16 position top mounted rotary knob

2 position concentric switch

3 position toggle switch

3 programmable side buttons

Transmit LED indicator

No keypad / No display

Up to 48 channels

MODEL II:

Same as XTS Model I features plus the following:

1000 channels

Dial from pre-stored lists

Programmable soft keys for easy access to radio menu

Backlit Keypad
- 3 soft keys
- 3 navigation keys

Full Bitmap Display
- 2 lines of icons
- 4 lines of text with 12 characters per line
- Status icons including battery and power indicator

MODEL III:

Same as XTS Model I features plus the following:

1000 channels

Dial from pre-stored lists or free-form entry

Programmable soft keys for easy access to radio menu

Backlit Keypad
- 3 soft keys
- 3 navigation keys
- 4 x 3 keypad

Full Bitmap Display
- 2 lines of icons
- 4 lines of text with 12 characters per line
- Status icons including battery and power indicator

The XTS 5000 Project 25 Digital Radio is the toughest and most interoperable radio Motorola makes. It assures seamless, high quality communication in a robust design that stands up to the most demanding environments.

Motorola's IP-enabled portable two-way performer offers a full array of sophisticated features and progressive technology. Designed specifically for law enforcement, firefighters, emergency medical, military and federal agencies, the XTS 5000 digital portable radio is the preferred tool of life-saving professionals.

SPECIFICATION SHEET

ASTRO® XTS® 5000
Digital Portable Radio

FEATURES AND BENEFITS

GPS enabled using GPS Radio Speaker Microphone

Available in the 700/800 MHz, VHF, UHF R1 and R2 bands

Trunking standards supported: clear or digital encrypted APCO P16 and APCO P25

Capable of SmartZone®, SmartZone Omnilink, SmartNet®, and Conventional System Configurations and ASTRO®25 Trunked Operation

Narrow and wide bandwidth digital receiver (12.5 kHz / 25 kHz)

Embedded digital signaling (ASTRO & ASTRO 25)

Enhanced audio features
- High quality, error corrected digital voice
- Noise Shield™ Enhanced Noise Reduction Software
- Audio Gain Control

Convenience Features
- Time / Date
- Digital Caller ID

Ruggedized housing option available in traditional black or public safety yellow

Enhanced encryption capability (optional)

Utilizes Windows®-based Customer Programming Software (CPS)
- Supports USB and RS-232 communications
- Built in FLASHport™ support

Meets Applicable Mil Specs 810C, D, E and F

XTS 5000 VHF is now approved for FCC Rule Part 80, Maritime Services

Compatible with most MTS and XTS accessories

Interchangeable display labels

TRANSMITTER – TYPICAL PERFORMANCE SPECIFICATIONS

	700/800 MHz	VHF	UHF R1	UHF R2
Frequency Range/Bandsplits	700 MHz: 764-777, 794-806, 800 MHz: 806-824, 851-870	136-174 MHz	380-470 MHz	450-512 MHz
Channel Spacing	12.5 / 20 / 25 kHz	12.5 / 25 kHz	12.5 / 25 kHz	12.5 / 25 KHz
Maximum Frequency Separation	Full Bandsplit	Full Bandsplit	Full Bandsplit	Full Bandsplit
Rated RF Output Power Adj*	764-806 MHz: 1 to 3 W 806-870 MHz: 1 to 3 W	1 to 6 W	1 to 5 W	1 to 5 W
Frequency Stability* (–30°C to +60°C; +25°C Ref.)	±0.00015%	±0.00020%	±0.00020%	±0.00020%
Modulation Limiting*:				
25 kHz channel	±5.0 kHz	±5.0 kHz	±5.0 kHz	±5.0 kHz
NPSPAC channel	±4.0 kHz	N/A	N/A	N/A
12.5 kHz channel	±2.5 kHz	±2.5 kHz	±2.5 kHz	±2.5 kHz
Emissions* (Conducted & Radiated)	–75 dBc	–75 dBc	–70 dBc	–75 dBc
Audio Response* (6 dB/Octave Pre-emphasis from 300 to 3000 Hz)	+1, –3 dB	+1, –3 dB	+1, –3 dB	+1, –3 dB
FM Hum & Noise Radio*				
25 kHz	–45 dB	–48 dB	–45 dB	–45 dB
12.5 kHz	–40 dB	–42 dB	–40 dB	–40 dB
Audio Distortion*	1.50%	1%	1.50%	1.50%

VOICE CODER

Voice Coding Method IMBE (CAI)	Improved Multi Band Excitation (IMBE) (4.4 Kbps IMBE, 2.8 Kbs Error Correction Coding 2.4 Kbps Embedded Signaling)
Voice Truncation	None
Frame Re-sync Interval	180 mSec (Clear Digital Mode)
Forward Error Correction	Golay code
Error Mitigation Project 25-CAI (IMBE) Dual Level	Level 1: Extrapolates and replaces 20 mSec voice frames that exceed the error correction algorithm tolerance. Level 2: Progressive muting of 20 mSec voice frames that are too severely damaged for Level 1 replacement.
Code Book Structure	APCO Project 25 (IMBE): No code book

** Measured in the analog mode per TIA / EIA 603 under nominal conditions*
**Measured in digital mode per TIA/EIA IS 102.CAAA under nominal conditions*
Specifications subject to change without notice

SPECIFICATION SHEET

ASTRO® XTS® 5000
Digital Portable Radio

RECEIVER – TYPICAL PERFORMANCE SPECIFICATIONS

		700/800 MHz	VH1	UHF R1	UHF R2
Frequency Range/Bandsplits		700 MHz: 764-777 800 MHz: 851-870	136-174 MHz	380-470 MHz	450-512 MHz
Channel Spacing		12.5 / 25 kHz	12.5 / 25 kHz	12.5 / 25 kHz	12.5 / 25 KHz
Maximum Frequency Separation		Full Bandsplit	Full Bandsplit	Full Bandsplit	Full Bandsplit
Audio Output Power at Rated*		500 mW	500 mW	500 mW	500 mW
Frequency Stability* (–30°C to +60°C; 25°C Ref.)		±0.00015%	±0.00020%	±0.00020%	±0.00020%
Analog Sensitivity*	12 dB SINAD	.25 µV	.20 µV	.25 µV	.20 µV
Digital Sensitivity**	1% BER	.40 µV	.25 µV	.40 µV	.25 µV
	5% BER	.25 µV	.20 µV	.25 µV	.20 µV
Selectivity*	25 kHz channel	–72 dB	–80 dB	–78 dB	–79 dB
	12.5 kHz channel	–63 dB	–63 dB	–63 dB	–65 dB
Intermodulation*		–75 dB	–78 dB	–75 dB	–77 dB
Spurious Rejection*		–75 dB	–80 dB	–80 dB	–85 dB
FM Hum and Noise*	25 kHz	–48 dB	–56 dB	–54 dB	–53 dB
	12.5 kHz	–40 dB	–50 dB	–45 dB	–45 dB
Audio Distortion*		1.5%	1%	1%	1%

RADIO MODELS

	Display	Keypad	Channel Capacity	FLASHport Memory	700/800 MHz Band (764-870 MHz)	VHF (136-174 MHz)	UHF R1 Band (380-470 MHz)	UHF R2 Band (450-520 MHz)
Model I	none	none	16/48	8MB	H18UCC9PW5_N	H18KEC9PW5_N	H18QDC9PW5_N	H18SDC9PW5_N
Model II	2 lines of icons 4 lines 12 characters per line LCD	3x2	1000	8MB	H18UCF9PW6_N	H18KEF9PW6_N	H18QDF9PW6_N	H18SDF9PW6_N
Model III	2 lines of icons 4 lines 12 characters per line LCD	3x6	1000	8MB	H18UCH9PW7_N	H18KEH9PW7_N	H18QDH9PW7_N	H18SDH9PW7_N
FCC Designation					AZ489FT5806	AZ489FT3804	AZ489FT4855	AZ489FT4864
FCC Emissions Designators	8K10F1E, 20K0F1E, 16K0F3E, 8K10F1D, 11K0F3E							
Power Supply	700/800 MHz: One rechargeable nickel-cadmium, or one optional nickel-metal hydride of lithium ion battery VHF/UHF R1&2: One rechargeable nickel-metal hydride, or one optional nickel cadmium or lithium ion battery							
Dimensions without battery (HxWxL)	6.58" x 2.44" x 1.83"							
Weight without battery	12.5 oz							

BATTERIES FOR ASTRO DIGITAL XTS 5000

Battery Capacity /Type	Dimensions (HxWxD)	Weight	Battery Part Numbers	Smart Battery	Battery Capacity
High Capacity NiCD	6.15" x 2.3" x .92"	11.10 oz	HNN9031	Y	1525 mAH
High Capacity NiCD FM	6.15" x 2.3" x .92"	11.10 oz	HNN9032	Y	1525 mAH
High Capacity NiCD Rugged FM	6.15" x 2.3" x .92"	11.10 oz	NTN8297	N	1525 mAH
High Capacity NiMH	6.15" x 2.3" x .92"	9.53 oz	NNTN4435	Y	1800 mAH
High Capacity NiMH FM	6.15" x 2.3" x .92"	9.53 oz	NNTN4436	Y	1750 mAH
High Capacity NiMH Rugged FM	6.15" x 2.3" x .92"	9.53 oz	NNTN4437	Y	1750 mAH
Ultra High Capacity NiMH	6.15" x 2.3" x .92"	13.18 oz	RNN4006	N	3000 mAH
Ultra High Capacity NiMH FM	6.15" x 2.3" x .92"	13.18 oz	RNN4007	N	3000 mAH
High Capacity Lithium Ion	6.15" x 2.3" x .60"	6.98 oz	NTN8810	N	1650 mAH
High Capacity Lithium Ion	6.15" x 2.3" x .60"	6.98 oz	NTN9862	Y	2000 mAH

SPECIFICATION SHEET

ASTRO® XTS® 5000
Digital Portable Radio

PORTABLE MILITARY STANDARDS 810 C, D, E & F

	MIL-STD 810C		MIL-STD 810D		MIL-STD 810E		MIL-STD 810F	
	Method	Proc./Cat.	Method	Proc./Cat.	Method	Proc./Cat.	Method	Proc./Cat.
Low Pressure	500.1	I	500.2	II	500.3	II	500.4	II
High temperature	501.1	I, II	501.2	I/A1, II/A1	501.3	I/A1, II/A1	501.4	I/Hot, II/Hot
Low Temperature	502.1	I	502.2	I/C3, II/C1	502.3	I/C3, II/C1	502.4	I/C3, II/C1
Temperature Shock	503.1	*	503.2	I/A1C3	503.3	I/A1C3	503.4	I
Solar Radiation	505.1	II	505.2	I	505.3	I	505.4	I
Rain	506.1	I, II	506.2	I, II	506.3	I, II	506.4	I, III
Humidity	507.1	II	507.2	II	507.3	II	507.4	–
Salt Fog	509.1	I	509.2	I	509.3	I	509.4	**
Blowing Dust	510.1	I	510.2	I	510.3	I	510.4	**
Immersion*	512.1	I	512.2	I	512.3	I	512.4	I
Vibration	514.2	VIII/F, Curve-W, XI	514.3	I/10, II/3	514.4	I/10, II/3	514.5	I/24
Mechanical Shock	516.2	I, II	516.3	I, IV	516.4	I/IV	516.5	I, IV

ENCRYPTION

Supported Encryption Algorithms	ADP, AES, DES, DES-XL and DES-OFB, DVP-XL, DVI-XL
Encryption Algorithm Capacity	8
Encryption Keys per Radio	Module capable of storing 1024 keys. Programmable for 48 common Key Reference (CKR) or 16 Physical Identifier (PID)
Encryption Frame Re-sync Interval	P25 CAI 360 mSec
Encryption Keying	Key Loader
Synchronization	CFB – Cipher Feedback XL - Counter Addressing OFB - Output Feedback
Vector Generator	National Institute of Standards and Technology (NIST) approved random number generator
Encryption Type	Digital and 12 k-bit Analog Conventional
Key Storage	Tamper protected volatile or non volatile memory
Key Erasure	Keyboard command and tamper detection
Standards	• FIPS 46-2 • FIPS 140-2 • FIPS 197

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	–30°C / +60°C
Storage Temperature	–40°C / +85°C
Humidity	Per MIL-STD
ESD	IEC 801-2KV
Water & Dust Intrusion	IP54, IPX7*, MIL-STD

RUGGED OPTION SPECIFICATIONS

Leakage (immersion)	MIL-STD-810 C, D, E, F Method 512.X Procedure I: IPX7*

** For rugged models only.*
*** Only single procedure defined.*
Specifications subject to change without notice

MOTOROLA

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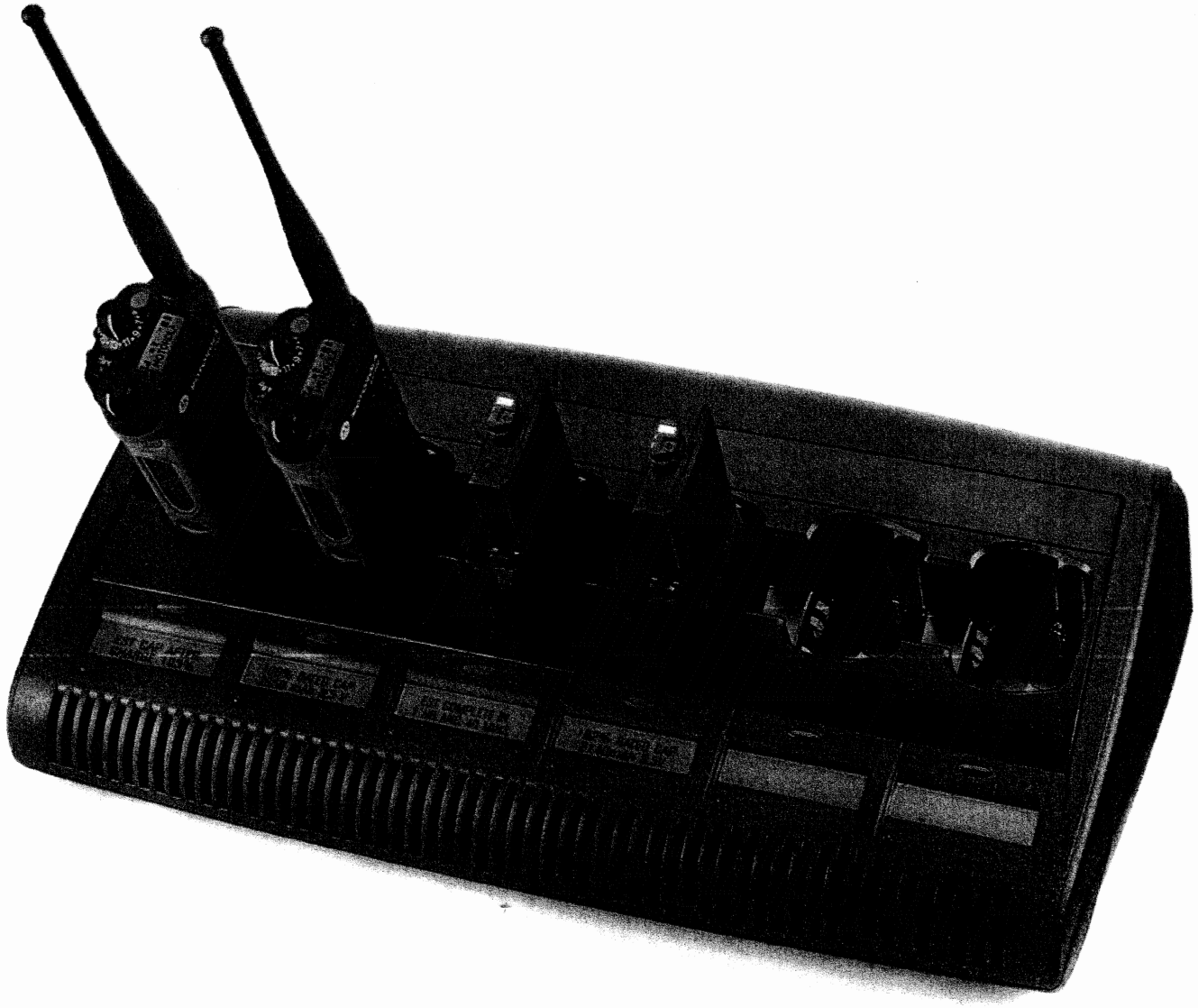
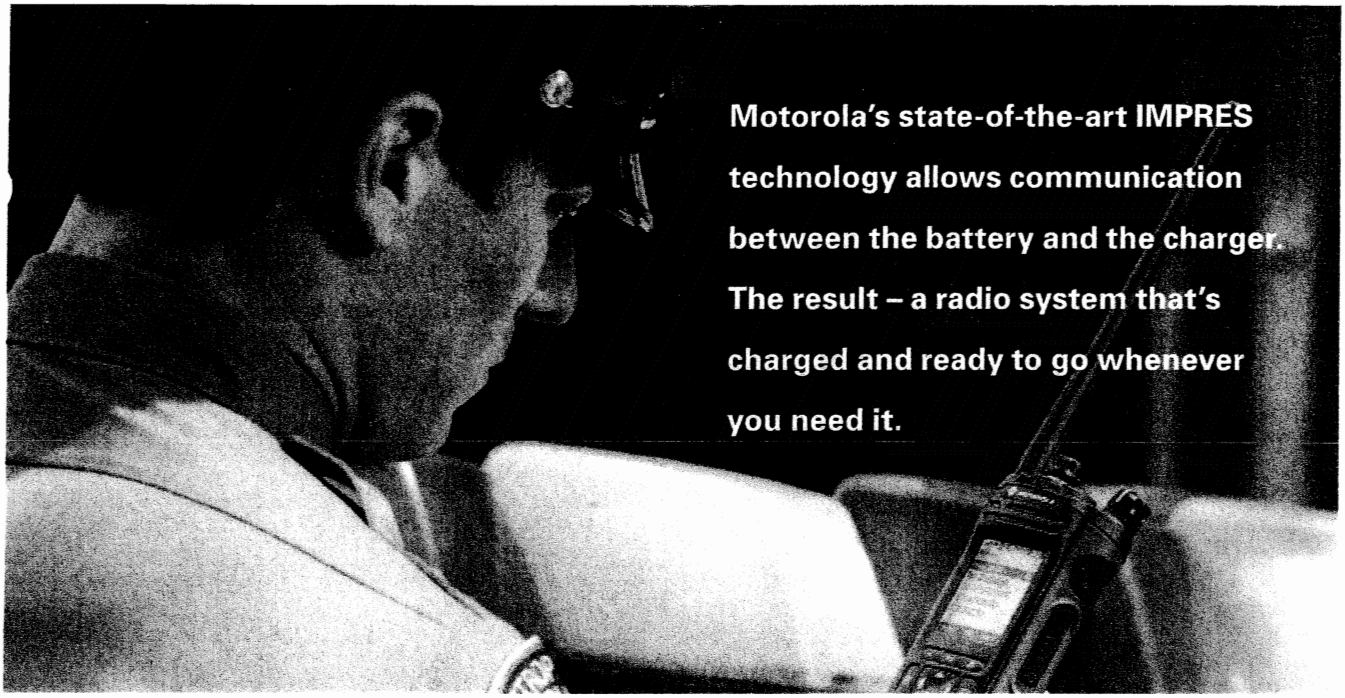
MOTOROLA

IMPRES™

Smart Energy Systems





Unique Battery Charging and Reconditioning Solution

Automated battery maintenance
Manual tracking and recording of battery use are a thing of the past. IMPRES uses a unique communications protocol to facilitate adaptive reconditioning – the charger evaluates the details of the battery's usage pattern to determine the optimal reconditioning interval. This automated process works to diminish memory effect and optimize the cycle life of the battery and maximize talk time.

Chargers that communicate
IMPRES multi-unit chargers are available with a two-line display module. Your customers have access to valuable information such as:

- Battery capacity (in mAh and percent of minimum rated capacity) and voltage while charging and at completion of charge
- Time remaining to complete rapid charging (NiCd and NiMH only)
- Current battery charge status
- The battery's unique serial number, part number and chemistry Knowledge is power. Now you can make informed decisions on battery replacement and asset management.

Environmentally Friendly
IMPRES chargers have technology that avoids overcharging and our single-unit IMPRES chargers with external power supplies consume 40 percent less energy in standby mode than required by the U.S. Energy Independence and Security Act of 2007.

Long-term safe charging
IMPRES batteries may be left in IMPRES chargers for extended periods without heat damage due to the charger and will be monitored so that they are charged and ready to go whenever they are needed.

Support for mixed battery inventories
IMPRES chargers are compatible with non-IMPRES Motorola batteries, making the migration to all IMPRES much easier. However, automatic reconditioning and all other IMPRES features are realized only when using Motorola IMPRES batteries and chargers.

Extended warranty
When used exclusively with IMPRES chargers, IMPRES batteries carry extended capacity warranties that continue six months longer than Motorola Premium battery warranties.

Proven Tough
IMPRES batteries are subjected to the same rigorous testing and held to the same high standards as all Motorola Premium batteries. Actual results of Drop, Vibration and ESD (Electrostatic Discharge) tests prove that Motorola batteries outperform the competition.

Facts:

1. **IMPRES products are smarter because they "talk" to each other**
   Motorola's industry-exclusive IMPRES technology allows communication between the charger and the battery, which enables automated battery reconditioning, display of critical charging information and other key benefits. IMPRES batteries have a memory chip that stores all usage information, which can then be accessed and evaluated by any IMPRES charger. IMPRES chargers have built-in reconditioning capability that is automatically utilized any time an IMPRES battery requiring maintenance is inserted.

2. **IMPRES chargers perform adaptive reconditioning**
   Before the availability of IMPRES chargers with automatic, adaptive reconditioning, battery maintenance technicians had to guess at the correct reconditioning intervals. Reconditioning too often wasted battery cycles; not reconditioning often enough resulted in diminished battery performance. IMPRES has changed all that. IMPRES chargers evaluate the actual usage pattern of every battery to establish the optimal reconditioning interval.

3. **IMPRES offers long-term safe charging**
   Most conventional chargers transition to a maintenance charge mode at the completion of a charge cycle. Maintenance charge is constant power applied to a battery in an effort to keep it charged over time. This results in long-term heating that can damage a battery, resulting in lost capacity. IMPRES chargers automatically turn off at the end of a charge cycle yet continue to electronically monitor IMPRES batteries every 5 minutes to determine when more energy should be applied to the battery. This process assures that the battery maintains a very high state of charge without sustaining heat damage due to the charger.

4. **Fully charged doesn't mean full battery capacity**
   Most conventional chargers have an LED to indicate charge status. Red indicates charging and green indicates charge complete. But what does charge complete really mean? The charger is saying that it did the best it could given the condition of the battery and it is done. However, the resulting battery capacity could be far less than the original stated capacity for an old or defective battery, yet the user has no way of knowing that with only an LED indication. IMPRES chargers with displays provide the actual charge capacity of the battery, so you'll know exactly how much usage you will get from each battery.

5. **IMPRES charger LED indicators give additional information**
   IMPRES chargers have additional LED indication capability to supply you with even more information during a charge cycle. The alternating red/green LED indicates batteries have fallen below a certain capacity threshold (typically less than 60% of rated minimum capacity). An IMPRES battery exhibiting a red/green indication is not defective – it has simply reached a capacity level that may limit its usage.

Myth:

Competitive batteries are IMPRES compatible

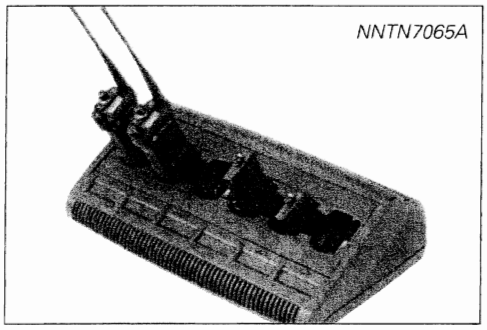
Competitive battery manufacturers often claim to be "IMPRES compatible." While it may be true that some competitive batteries can be charged in IMPRES chargers, there are still significant limitations and concerns. The communication between an IMPRES battery and IMPRES charger that enables automatic reconditioning, display of IMPRES data on display chargers and other IMPRES features is a Motorola exclusive technology and will only occur with the combination of IMPRES batteries and IMPRES chargers. Motorola does not test the charge compatibility or safety of competitive batteries in IMPRES chargers.

APX™ Quick Reference Guide

IMPRES Battery and Charger Guide by Radio Series

APX Batteries

Battery Part Number	Chemistry	Capacity†	Special Features
NNTN7037A	NiMH	2100mAh	Ruggedized
NNTN7573A	NiMH	2100mAh	Ruggedized PLUS
NNTN7036A	NiMH	2000mAh	Intrinsically safe*, Ruggedized
NNTN7035A	NiMH	2000mAh	Intrinsically safe*, Ruggedized PLUS
NNTN7038A	Li-ion	2900mAh	Ruggedized
NNTN7034A	Li-ion	4200mAh	Ruggedized
NNTN7033A	Li-ion	4100mAh	Intrinsically safe*, Ruggedized

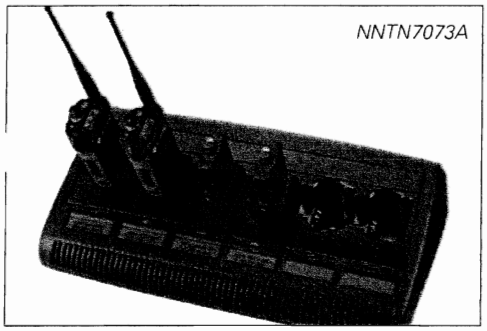


NNTN7065A

The batteries listed above are designed for use with the following chargers:

NNTN7080A – IMPRES Single-Unit Charger
NNTN7586A – IMPRES Dual-Unit Charger
NNTN7593A – IMPRES Dual-Unit Charger with Display Modules
NNTN7065A – IMPRES Multi-Unit Charger
NNTN7073A – IMPRES Multi-Unit Charger with Display Modules
NNTN7624A – IMPRES Compatible Vehicular Charger

RLN5382A – Individual IMPRES Display Module for NNTN7065A



NNTN7073A

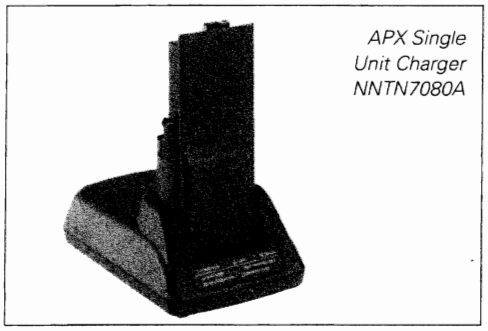
Inserts for Single Charger

These inserts allow APX batteries to be charged in the following chargers.

NNTN7687A – Insert for WPLN4111AR XTS Single-Unit Charger
NNTN7686A – Insert for WPLN4108BR/4130A XTS Multi-Unit Charger

Next Generation IMPRES Dual-Unit Chargers

The new APX IMPRES Dual-Unit Chargers provide public safety personnel the convenience of a spare battery that is charged and ready to be used at all times. This dual pocket design allows simultaneous charging of primary and secondary batteries. This Next Generation IMPRES charger provides advanced features, including the ability to turn on/off reconditioning, reduced reconditioning time and improved energy efficiency.

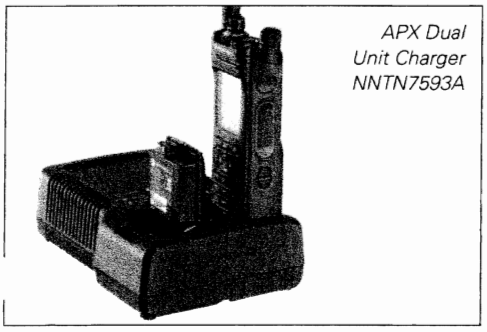


APX Single Unit Charger NNTN7080A

IMPRES Compatible Vehicular Charger

The APX IMPRES compatible vehicular charger has full IMPRES charger to battery communication capability. This ensures continuity of IMPRES battery charge data logging in a vehicular environment, so the IMPRES battery will receive adaptive, automatic reconditioning and will qualify for the 6-month capacity warranty extension.

NOTE: The IMPRES compatible vehicular charger will not recondition IMPRES batteries while in a vehicle, but it will provide an indication when reconditioning is required in an IMPRES desktop charger.



APX Dual Unit Charger NNTN7593A

Introducing Ruggedized PLUS Batteries

Motorola manufactures batteries that meet industry standards (IPx7) for submersibility. These batteries can be submerged in 1 meter of fresh water for 30 minutes, where the battery and water are at the same temperature. Batteries that meet this standard Motorola refers to as Ruggedized.

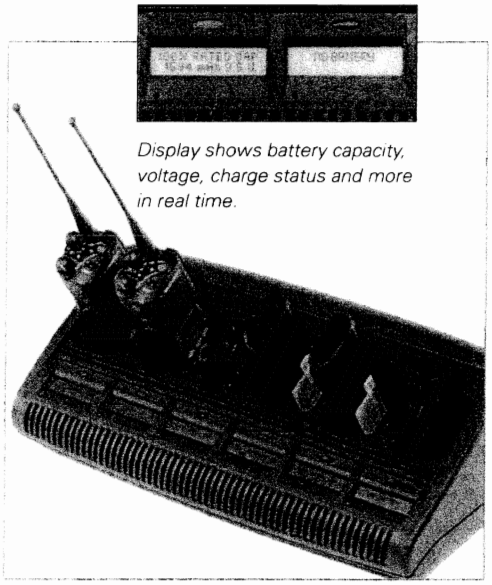
Motorola now makes batteries to an even more stringent military standard for customers who require a higher level of submersibility protection – MIL-STD-810E Method 512.3 Immersion. Batteries that meet this standard are referred to as Ruggedized PLUS and meet the incremental submersibility requirements below:

- Product is subjected to a temperature shock from -40°C to +85°C, six times.
- Product is dropped on all six surfaces from 4 feet onto concrete.
- Product is heated to 50°C and then submerged in 1 meter of fresh water at 23°C for 2 hours.

  The 27°C temperature difference between the battery and the water effectively increases the submersion depth to approximately 2 meters.

† Indicates minimum rated battery capacity.
** When used with an FM approved intrinsically safe radio unit.*

ASTRO® Quick Reference Guide
IMPRES Battery and Charger Guide by Radio Series



Display shows battery capacity, voltage, charge status and more in real time.

WPLN4130A – With Display Modules (shown)
WPLN4108BR – Without Display Modules

For ASTRO Digital XTS® 3000, XTS 3500 and XTS 5000

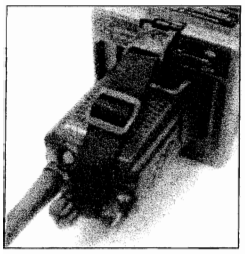
Battery Part Number	Chemistry	Capacity†	Special Features
HNN9031B	NiCd	1525mAh	
HNN9032B	NiCd	1525mAh	Intrinsically Safe*
NNTN4435B	NiMH	1800mAh	
NNTN4436B	NiMH	1700mAh	Intrinsically Safe*
NNTN4437B	NiMH	1700mAh	Intrinsically Safe*, Ruggedized PLUS
PMNN4093A	NiMH	3000mAh	
NTN9862C	Li-ion	2750mAh	
NNTN6034A	Li-ion	4150mAh	
NNTN7453A	Li-ion	3950mAh	Intrinsically Safe*, Ruggedized PLUS

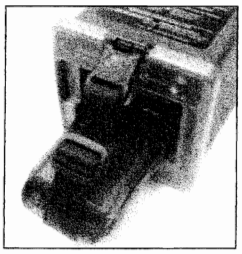
For ASTRO Digital XTS 1500, XTS 2500, MT 1500 and PR1500

Battery Part Number	Chemistry	Capacity†	Special Features
NTN9858C	NiMH	2100mAh	
NTN9857C	NiMH	2000mAh	Intrinsically Safe*
NNTN6263A	NiMH	2000mAh	Intrinsically Safe*, Ruggedized
NNTN7554A	Li-ion	2050mAh	
NNTN7335A	Li-ion	2700mAh	Ruggedized

The batteries listed above are designed for use with the following chargers:
WPLN4111AR – IMPRES Single-Unit Charger
WPLN4108BR – IMPRES Multi-Unit Charger
WPLN4130A – IMPRES Multi-Unit Charger with Display Modules
WPLN4208B – IMPRES Compatible Vehicular Charger

RLN5382A – Individual IMPRES Display Module for WPLN4108BR (Software Version 1.3 or later)





WPLN4208B – Charge the battery attached to the radio or alone.

IMPRES Compatible Vehicular Charger

The IMPRES compatible vehicular charger has full IMPRES charger to battery communication capability. This ensures continuity of IMPRES battery charge data logging in a vehicular environment, so the IMPRES battery will receive adaptive, automatic reconditioning and will qualify for the 6-month capacity warranty extension.

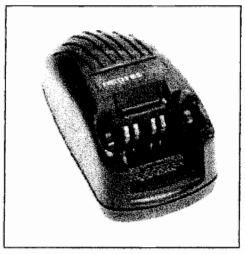
NOTE: The IMPRES compatible vehicular charger will not recondition IMPRES batteries while in a vehicle, but it will provide an indication when reconditioning is required in an IMPRES desktop charger.

For HT1000™, MT2000™, MTS2000™, JT1000™, MTX8000™ and MTX9000™

Battery Part Number	Chemistry	Capacity†	Special Features
HNN9028AR	NiCd	1500mAh	
HNN9029AR	NiCd	1500mAh	Intrinsically Safe*

For Saber and ASTRO Saber

Battery Part Number	Chemistry	Capacity†	Special Features
HNN9033B	NiCd	2000mAh	
HNN9034B	NiCd	2000mAh	Intrinsically Safe*



WPLN4111AR

The batteries listed above are designed for use with the following chargers:
WPLN4111AR – IMPRES Single-Unit Charger
WPLN4108BR – IMPRES Multi-Unit Charger
WPLN4130A – IMPRES Multi-Unit Charger with Display Modules

RLN5382A – Individual IMPRES Display Module for WPLN4108BR (Software Version 1.3 or later)

† Indicates minimum rated battery capacity.
** When used with an FM approved intrinsically safe radio unit.*

MOTOTRBO™ and Professional Series Quick Reference Guide

IMPRES Battery and Charger Guide by Radio Series

WPLN4232A

For MOTOTRBO

Battery Part Number	Chemistry	Capacity†	Special Features
PMNN4066A	Li-ion	1500mAh	Ruggedized
PMNN4069A	Li-ion	1400mAh	Intrinsically Safe*, Ruggedized
PMNN4077A	Li-ion	2150mAh	Ruggedized

The batteries listed above are designed for use with the following chargers:
WPLN4232A – IMPRES Single-Unit Charger
WPLN4212A – IMPRES Multi-Unit Charger
WPLN4219A – IMPRES Multi-Unit Charger with Display Modules
NNTN7616A – *NEW* IMPRES Compatible Vehicular Charger

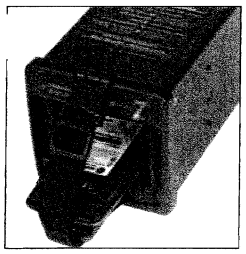
RLN5382A – Individual IMPRES Display Module for WPLN4212A

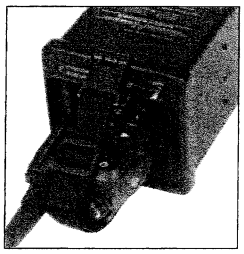
For HT750™, HT1250™, HT1250.LS™, HT1550.XLS™, MTX850™, MTX8250™, MTX8250.LS™, MTX950™, MTX9250™, PR860™

Battery Part Number	Chemistry	Capacity†	Special Features
HNN4001A	NiMH	1800mAh	
HNN4002A	NiMH	1690mAh	Intrinsically Safe*
HNN4003A	Li-ion	2000mAh	

The batteries listed above are designed for use with the following chargers:
WPLN4182A – IMPRES Single-Unit Charger
WPLN4187A – IMPRES Multi-Unit Charger
WPLN4192A – IMPRES Multi-Unit Charger with Display Modules
NNTN7618A – *NEW* IMPRES Compatible Vehicular Charger

RLN5382A – Individual IMPRES Display Module for WPLN4187A



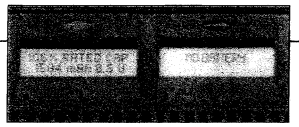


NNTN7616A – Charge the battery attached to the radio or alone. IMPRES Compatible Vehicular Charger

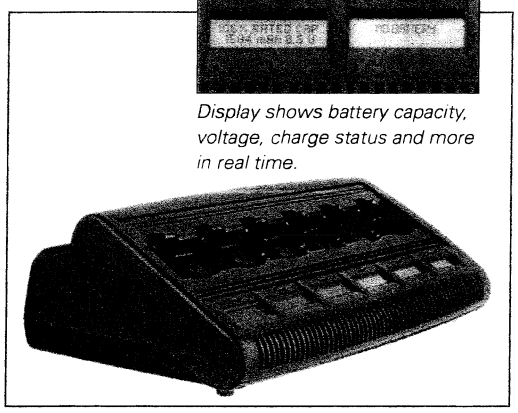
NEWEST ADDITION
IMPRES Compatible Vehicular Charger

Now available for MOTOTRBO and Professional Series portables, this IMPRES compatible vehicular charger has full IMPRES charger to battery communication capability. This ensures continuity of IMPRES battery charge data logging in a vehicular environment, so the IMPRES battery will receive adaptive, automatic reconditioning and will qualify for the 6-month capacity warranty extension.

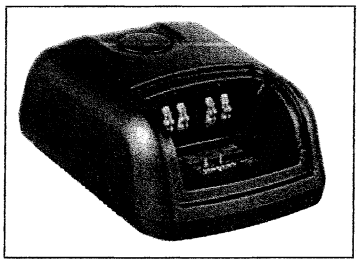
NOTE: The IMPRES compatible vehicular charger will not recondition IMPRES batteries while in a vehicle, but it will provide an indication when reconditioning is required in an IMPRES desktop charger.



Display shows battery capacity, voltage, charge status and more in real time.

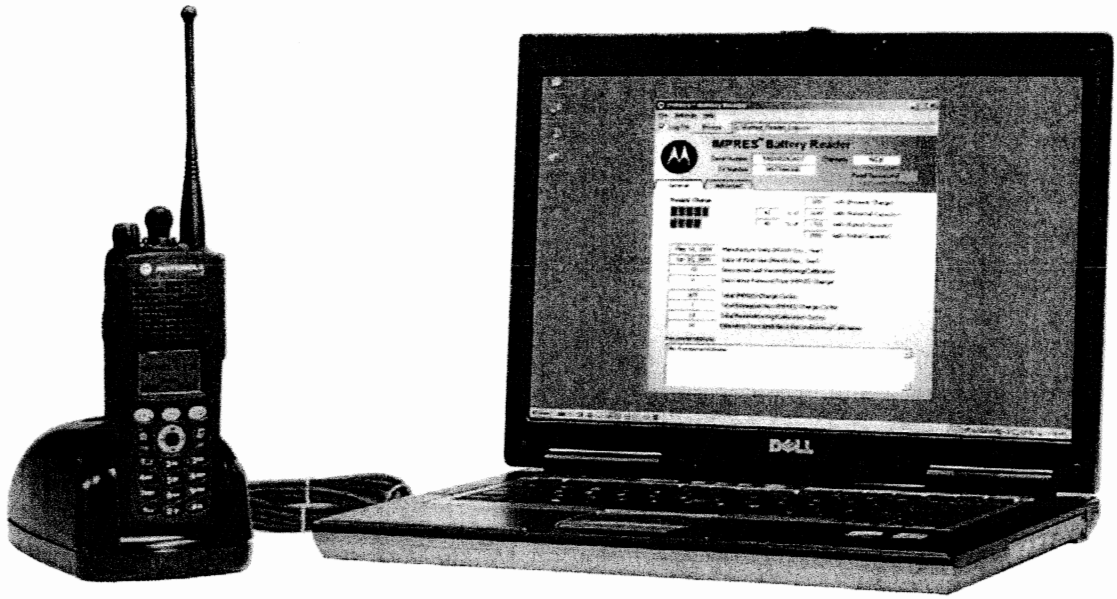


WPLN4192A – With Display Modules
WPLN4187A – Without Display Modules (shown)



WPLN4182A

† Indicates minimum rated battery capacity.
** When used with an FM approved intrinsically safe radio unit.*



*PC not included.

IMPRES Battery Reader

The industry exclusive IMPRES Battery Reader provides IMPRES battery users the ability to access charging, reconditioning and key usage data that can affect overall battery performance. By keeping batteries in peak condition, talk time and cycle life are optimized, reducing battery replacement.

Utilize the benefits of Motorola's exclusive IMPRES technology by downloading key usage data from your IMPRES batteries.

Installs quickly and easily. Simply attach the Reader to a PC via the USB port. No additional power required.

Supports all IMPRES batteries.

Get clear and quick insight into the status of your IMPRES battery.

- Present, Initial and Rated capacity provides a quick view of the battery's ability to hold a charge
- Battery Manufactured Date and Date of First Use provides accurate insight into the age of the battery
- Total Charge Cycles gives insight into the battery's overall use
- Total Recondition Cycles gives an additional performance indication
- Total Estimated non-IMPRES Charge Cycles helps track warranty claims and provides additional insight into potential battery problems
- Recommendation box helps to quickly identify actions to optimize battery life
- Histograms help quickly identify the appropriate battery capacity to meet your needs
- Export the data easily to Excel® for archiving and easy future access

Battery Reader Standard Package (NNTN7392):

IMPRES Battery Reader
USB Cord
HT Professional Series Adapter Insert
MOTOTRBO Adapter Insert
APX Adapter Insert
System Software CD

SPECIFICATIONS

Model Numbers:	NNTN7080A	WPLN4111AR	WPLN4232A	WPLN4182A
Dimensions (H x W x D)	2.4 x 3.8 x 6.4"	3.23 x 3.82 x 7.88"	2.4 x 3.8 x 6.4"	2.2 x 3.8 x 5.8"
Input Voltage:	100-240 VAC	90-265 VAC	100-240 VAC	100-132 VAC
	50-60 Hz	50-60 Hz	50-60Hz	50-60Hz
Charging Current: (maximum)	1.25 A	1.5 A	1.25 A	1.25 A
Warranty:	2 Years	2 Years	2 Years	2 Years
Operating Temperature:	41° to 104° F	41° to 104° F	41° to 104° F	41° to 104° F
Charging Method: All Chargers	CCDT / Negative Pulse (NiCd / NiMH) and CCCV (Li-ion)			

Model Number:	NNTN7586A/7593A
Dimensions (H x W x D)	8.2 x 5.6 x 2.5"
Input Voltage:	100-240 VAC, 47-63 Hz
Charging Current: (maximum)	1.5 A
Warranty:	2 Years / 1 Year
Operating Temperature:	41° to 104° F
Charging Method: All Chargers	CCDT / Negative Pulse (NiCd / NiMH) and CCCV (Li-ion)

Model Numbers:	NNTN7065A/7073A	WPLN4108BR/4130A	WPLN4212A/4219A	WPLN4187A/4192A
Dimensions (H x W x D)	6 x 17.5 x 11.5"	6 x 17.5 x 11.5"	6 x 17.5 x 11.5"	6 x 17.5 x 11.5"
Input Voltage:	90-265 VAC	90-265 VAC	90-265 VAC	90-265 VAC
	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz
Charging Current: (maximum)	1.5 A	1.5 A	1.5 A	1.5 A
Warranty:	2 Years / 1 Year	2 Years / 1 Year	2 Years / 1 Year	2 Years / 1 Year
Operating Temperature:	41° to 104° F	41° to 104° F	41° to 104° F	41° to 104° F
Charging Method: All Chargers	CCDT / Negative Pulse (NiCd / NiMH) and CCCV (Li-ion)			

Model Number:	NNTN7624A	WPLN4208B	NNTN7616A	NNTN7618A
Dimensions (H x W x D)	3.23 x 3.82 x 7.88"	3.23 x 3.82 x 7.88"	3.23 x 3.82 x 7.88"	3.23 x 3.82 x 7.88"
Input Voltage:	10.8-16.6 VDC	10.8-16.6 VDC	10.8-16.6 VDC	10.8-16.6 VDC
Charging Current: (maximum)	1.25 A	1.25 A	1.25 A	1.25 A
Warranty:	1 Year	1 Year	1 Year	1 Year
Operating Temperature:	5° to 122° F – Charge rate decreased at extreme temperatures.			
Charging Method: All Chargers	CCDT (NiCd / NiMH) and CCCV (Li-ion)			

Channel Partner Logo

24 months against any defects in manufacturing or workmanship. Nickel-Cadmium batteries are warranted to maintain 80% rated capacity for 18 months. Nickel-Metal Hydride and Lithium-ion batteries are warranted to maintain 80% rated capacity (70% rated capacity for PMNN4093A) for 12 months. IMPRES batteries charged exclusively in IMPRES chargers carry an additional 6 months of capacity warranty.

MOTOROLA

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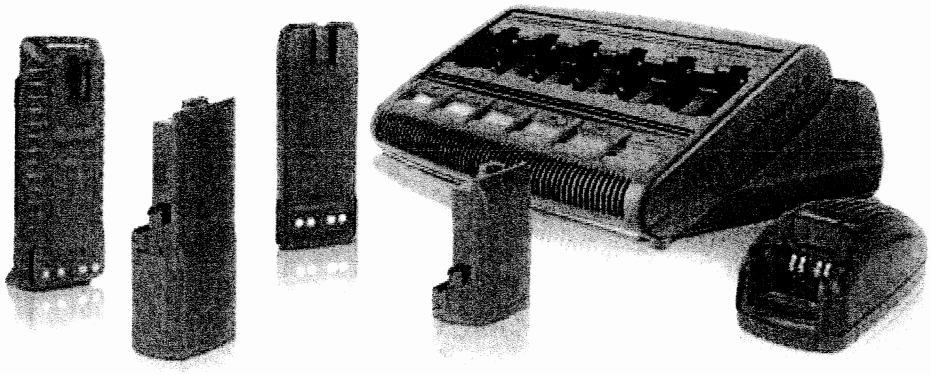
RC-3-1003 POD 4/09

FACT SHEET
IMPRES TECHNOLOGY



THE INTELLIGENT WAY TO COMMUNICATE.

TALK LONGER. WORK SMARTER WITH IMPRES™ TECHNOLOGY.

We created our patented IMPRES technology as an integral part of our two-way radio batteries, and chargers. Users who rely on IMPRES call it innovative and indispensable. We call IMPRES the intelligent way to communicate – offering enhanced performance and exceptional capabilities for your radio, your battery and its charger, your workforce and workplace.

IMPRES SMART ENERGY SYSTEM

For the line worker on a long shift or the public works officer laboring overtime to restore power, the job stops when their radio stops operating. Our innovative IMPRES battery charging and reconditioning system streamlines and automates battery maintenance. It draws on our exclusive technology that enables communication between your battery and charger to help lengthen battery life and extend talk time.

AUTOMATES BATTERY MAINTENANCE

You want to be sure you get the most out of every battery by maximizing its life. With IMPRES you can, because it automates battery reconditioning, adapting the intervals to each battery's usage pattern. IMPRES batteries and chargers have the capability to exchange data. This allows the IMPRES charger to evaluate the usage pattern of an IMPRES battery and determine the optimum reconditioning interval, thus optimizing battery life.

ELIMINATES OVERCHARGING

IMPRES batteries can be left in their IMPRES chargers for extended periods without heat damage from the charger. If radios are accidentally left in the charger – overnight, over a weekend or longer – there shouldn't be any worry about shortening your battery's life. Because the IMPRES charger automatically monitors battery capacity, batteries are safely charged to the right capacity and always ready to go.

BETTER DATA FOR BETTER DECISIONS

IMPRES batteries store critical usage information so you don't have to. Each two-line IMPRES charger display presents data at a glance, so you can make informed decisions about battery replacement. Data includes key information such as: battery capacity, time remaining to complete charging, and each battery's unique serial number. If you're operating a large fleet of batteries, IMPRES Battery Data Reader is a valuable diagnostic tool to evaluate individual IMPRES batteries. Furthermore, IMPRES Battery Fleet Management collects and consolidates that data automatically, so you can quickly and easily identify when batteries need to replaced.

EXTENDED WARRANTY

When you use IMPRES batteries exclusively with IMPRES chargers, you can count on a 6-month extension to your capacity warranty coverage over Motorola standard batteries.

TESTED TOUGH AND PROVEN TOUGH

All Motorola IMPRES batteries are Proven Tough. Time after time, in lab test after test – for Drop, Vibration and ESD (Electrostatic Discharge) – they withstand shocks, knocks, drops and shakes and outperform the leading brands. If your radio gets banged on a ride, rattled by heavy equipment or shocked by static electricity, you can depend on IMPRES batteries to stay true and stand tough.

FACT SHEET
IMPRES TECHNOLOGY

RADIO MODELS AND COMPATIBLE IMPRES™ BATTERIES

APX™ 7000, APX 6000, APX 7000XE

Battery Part Number	Battery Description	Special Features
NNTN7037	2100 mAh NiMH	IP67[1]
NNTN7573	2100 mAh NiMH	Rugged[2]
NNTN7036	2000 mAh NiMH	IP67, Intrinsically Safe[3]
NNTN7035	2000 mAh NiMH	Rugged, Intrinsically Safe
PMNN4403	2150 mAh Li-Ion slim	IP67
NNTN8092	2300 mAh Li-Ion	Rugged, Intrinsically Safe
NNTN7038	2900 mAh Li-Ion	IP67
NNTN7034	4200 mAh Li-Ion high capacity	IP67
NNTN7033	4100 mAh Li-Ion high capacity	IP67, Intrinsically Safe

The batteries listed above can be used with the following IMPRES chargers
WPLN7080 – IMPRES Single-User Charger
NNTN7586 – IMPRES Dual-Unit Charger
NNTN7593 – IMPRES Dual-Unit Charger with Displays
NNTN7065 – IMPRES Multi-Unit Charger
NNTN7073 – IMPRES Multi-Unit Charger with Displays
NNTN7624 – IMPRES Vehicular Charger
RLN5382 – Individual IMPRES Display Module for NNTN7065

ASTRO® DIGITAL XTS™ 5000, XTS 3500, XTS 3000

Battery Part Number	Battery Description	Special Features
NNTN4435	1800 mAh NiMH	
NNTN4436	1700 mAh NiMH	Intrinsically Safe
NNTN4437	1700 mAh NiMH	IP57, Intrinsically Safe
NTN9862	2750 mAh Li-Ion	
PMNN4093	3000 mAh high capacity NiMH	
NNTN6034	4150 mAh high capacity Li-Ion	
NNTN7453	3950 mAh high capacity Li-Ion	Rugged, Intrinsically Safe
HNN9031	1525 mAh NiCD	
HNN9032	1525 mAh NiCD	Intrinsically Safe

ASTRO DIGITAL XTS 2500, XTS 1500, MT 1500™, PR1500

Battery Part Number	Battery Description	Special Features
NTN9858	2100 mAh NiMH	
NTN9857	2000 mAh NiMH	Intrinsically Safe
NNTN6263	2000 mAH NiMH	IP67, Intrinsically Safe
NNTN7554	2050 mAh Li-Ion slim	
NNTN7335	2700 mAh Li-Ion	IP67

The batteries listed above can be used with the following IMPRES chargers
WPLN4111 – IMPRES Single-User Charger
WPLN4108 – IMPRES Multi-Unit Charger
WPLN4130 – IMPRES Multi-Unit Charger with Displays
WPLN4208 – IMPRES Vehicular Charger
(XTS radios, MT1500 and PR1500 only)
RLN5382 – Individual IMPRES Display Module for WPLN4108

MOTOTRBO™ (XPR™ 6500, XPR 6550, XPR 6580, XPR 6300, XPR 6350, XPR 6380)

Battery Part Number	Battery Description	Special Features
PMNN4066	1500 mAh Li-Ion	IP57
PMNN4069	1400 mAh Li-Ion	IP57, Intrinsically Safe
PMNN4077	2150 mAh Li-Ion	IP57

The batteries listed above can be used with the following IMPRES chargers
WPLN4232 – IMPRES Single-User Charger
WPLN4212 – IMPRES Multi-Unit Charger
WPLN4219 – IMPRES Multi-Unit Charger with Displays
NNTN7616 – IMPRES Vehicular Charger
RLN5382 – Individual IMPRES Display Module for WPLN4212

PROFESSIONAL SERIES (HT1250, HT1250LS, HT1250LS+, HT1550XLS, MTX850, MTX850LS, MTX8250, MTX950, MTX9250, PR860)

Battery Part Number	Battery Description	Special Features
HNN4001	1800 mAh NiMH	
HNN4002	1690 mAh NiMH	Intrinsically Safe
HNN4003	2000 mAh Li-Ion	

The batteries listed above can be used with the following IMPRES chargers
WPLN4182 – IMPRES Single-User Charger
WPLN4187 – IMPRES Multi-Unit Charger
WPLN4192 – IMPRES Multi-Unit Charger with Displays
NNTN7618 – IMPRES Vehicular Charger
RLN5382 – Individual IMPRES Display Module for WPLN4187

THE FOLLOWING HARDWARE AND SOFTWARE APPLICATIONS SUPPORT ALL IMPRES BATTERIES LISTED ABOVE

IMPRES Battery Fleet Management
NNTN7676 IMPRES Battery Fleet Management Software
HKVN4036 IMPRES Battery Fleet Management Entitlement Key
NNTN7677 Multi-Unit Charger Interface Unit (CIU)
NNTN8045 Single-Unit Charger Interface Unit (CIU) – not compatible with WPLN4108 (XTS Single Unit Charger)

IMPRES Battery Reader
NNTN7392 IMPRES Battery Reader Package – includes battery reader hardware, system software, USB cord, adapter inserts for MOTOTRBO, HT-series and APX.

[1] International Protection (IP) is a global standard for rating dust and water protection. The first digit IP5x or IP6x represents increased levels of dust protection, while the second digit, IPx7 represents withstanding submersion in 1 meter of fresh water for 30 minutes.

[2] Rugged batteries exceed industry standards (IPx7) for submergibility and provide a higher level of water protection – MIL-STD-810E, Method 512.3 (Immersion). These batteries meet the incremental requirement of submersion in 1 meter of fresh water that is 27C colder than the product for 2 hours.

[3] Intrinsically Safe: Motorola approved batteries are a critical part of the specific radio and accessory system certified by a recognized testing organization as intrinsically safe. Use of non-Motorola approved batteries could result in equipment that is unapproved or unsafe in a hazardous environment.

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MOTOROLA

PRODUCT SPECIFICATIONS

	PMMN4038	PMMN4045	PMMN4051	RMN5038
MICROPHONE ACOUSTICS				
Microphone Type:	Omni-directional	Directional	Omni-directional	Omni-directional
Sensitivity:	-44dBV typical	-47dBV typical	-44dBV typical	-44dBV typical
SPEAKER ACOUSTICS				
Diameter:	45mm	45mm	45mm	45mm
Output power:	0.5W at rated audio	0.5W at rated audio	0.5W at rated audio	0.5W at rated audio
Output Level:	90dB SPL typical	90dB SPL typical	90dB SPL typical	86dB minimum
Maximum Output Level:	≤ 120dB SPL at max volume	≤ 120dB SPL at max volume	≤ 120dB SPL at max volume	N/A
Frequency Response:	300Hz – 3200Hz	300Hz – 3200Hz	300Hz – 3200Hz	300Hz – 3500Hz
Distortion (THD):	<15% (RX)	<15% (RX)	<15% (RX)	<15% (RX)
AUDIO JACK				
Audio Jack Type:	None	3.5mm unthreaded jack	3.5mm unthreaded jack	3.5mm unthreaded jack
Compatible Earpieces:	N/A	AARLN4885, WADN4190, PMLN4620, RLN4941	AARLN4885, WADN4190, PMLN4620, RLN4941	AARLN4885, WADN4190, PMLN4620, RLN4941
Maximum Output Level:	N/A	≤ 118dB	≤ 118dB	< 118dB
BODY				
Dimensions (W x L x D):	60mm x 78mm x 28mm (without clip)	60mm x 78mm x 28mm (without clip)	60mm x 78mm x 28mm (without clip)	60mm x 85mm x 42mm (with clip)
Weight:	220 grams	220 grams	220 grams	229 grams
POWER				
Power Source:	Radio battery	Radio battery	Radio battery	Radio battery
CABLE				
Flex Life:	50,000 cycles	50,000 cycles	50,000 cycles	50,000 cycles
Pull Strength:	40lbs, minimum tensile, in-line	40lbs, minimum tensile, in-line	40lbs, minimum tensile, in-line	40lbs, minimum tensile, in-line
CONTROLS				
Emergency:	None	None	None	Orange Button
Volume:	None	None	None	Up/Down buttons on face of RSM
Side Button:	None	None	None	None
ENVIRONMENTAL SPECIFICATIONS				
Operating Temp:	-30 C to +60 C	-30 C to +60 C	-30 C to +60 C	-30 C to +60 C
Storage Temp:	-55 C to +85 C	-55 C to +85 C	-55 C to +85 C	-55 C to +85 C
Humidity:	90-95% relative humidity at +50 C for 8 hours	90-95% relative humidity at +50 C for 8 hours	90-95% relative humidity at +50 C for 8 hours	90-95% relative humidity at +50 C for 8 hours
Rain:	MIL810F Method 506.4	MIL810F Method 506.4	MIL810F Method 506.4	MIL810F Method 506.4
Salt/Fog:	MIL810F Method 509.4, Procedure 1	MIL810F Method 509.4, Procedure 1	MIL810F Method 509.4, Procedure 1	MIL810F Method 509.4, Procedure 1
Dust:	MIL810F Method 510.4, Procedure 1	MIL810F Method 510.4, Procedure 1	MIL810F Method 510.4, Procedure 1	MIL810F Method 510.4, Procedure 1
Vibration:	MIL810F Method 514.5, Procedure 1, Category 24	MIL810F Method 514.5, Procedure 1, Category 24	MIL810F Method 514.5, Procedure 1, Category 24	MIL810F Method 514.5, Procedure 1, Category 1
Mechanical Shock:	MIL810F, Method 516.5, Procedure 1	MIL810F, Method 516.5, Procedure 1	MIL810F, Method 516.5, Procedure 1	MIL810F, Method 516.5, Procedure 1
ESD:	IEC/EN61000-4-2	IEC/EN61000-4-2	IEC/EN61000-4-2	IEC/EN61000-4-2
IP Rating*:	IP57	IP54	IP55	IP54

*IP54 – 4 stands for protection against water sprayed from all directions
IP55 – 5 stands for protection against driving rain
IP57 – 7 stands for submersibility tested at 1 meter for 30 minutes

MOTOROLA

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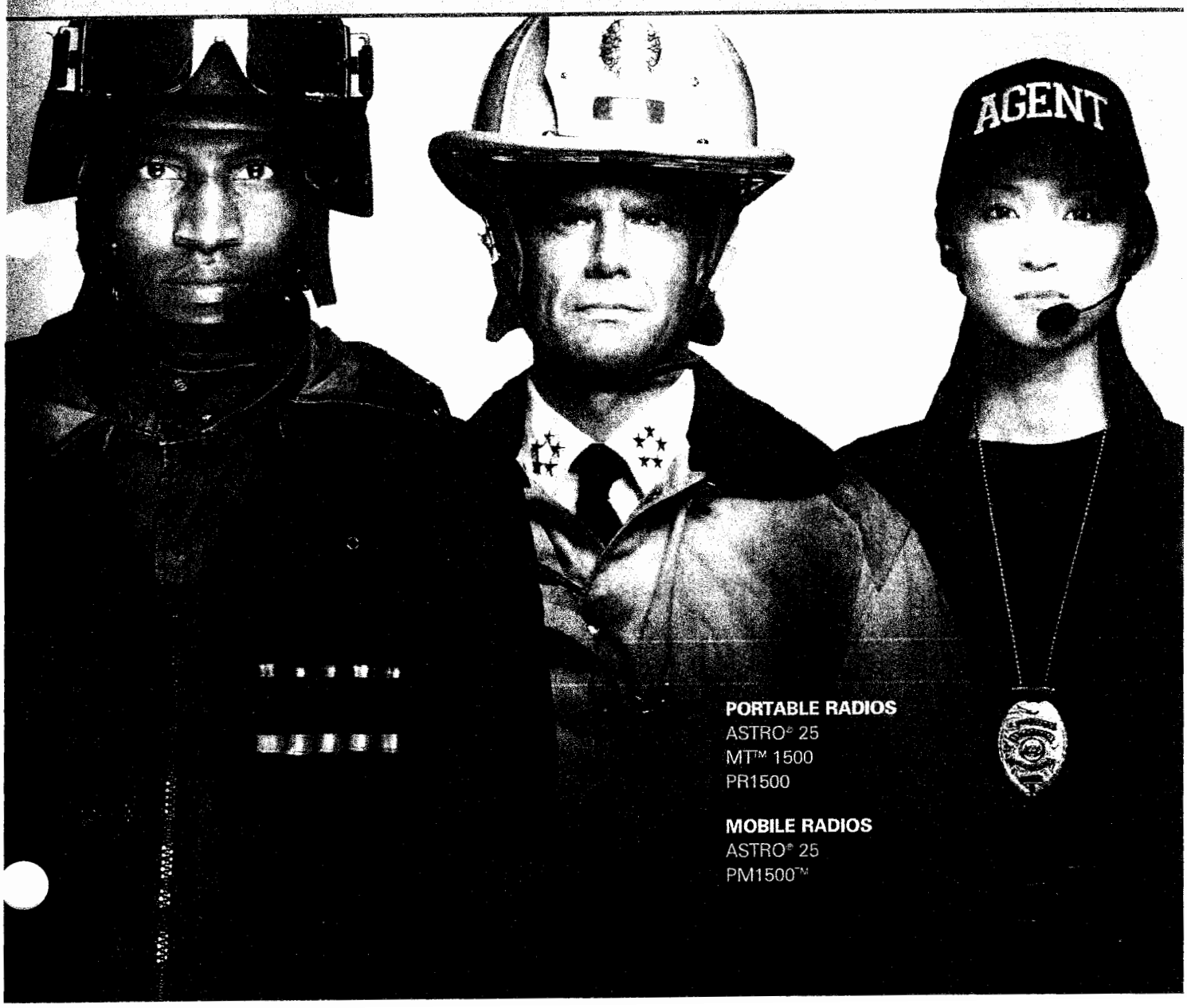


PORTABLE RADIOS
ASTRO® 25
MT™ 1500
PR1500

MOBILE RADIOS
ASTRO® 25
PM1500™

ional dependability

You already depend on Motorola two-way radios for mission critical communications.

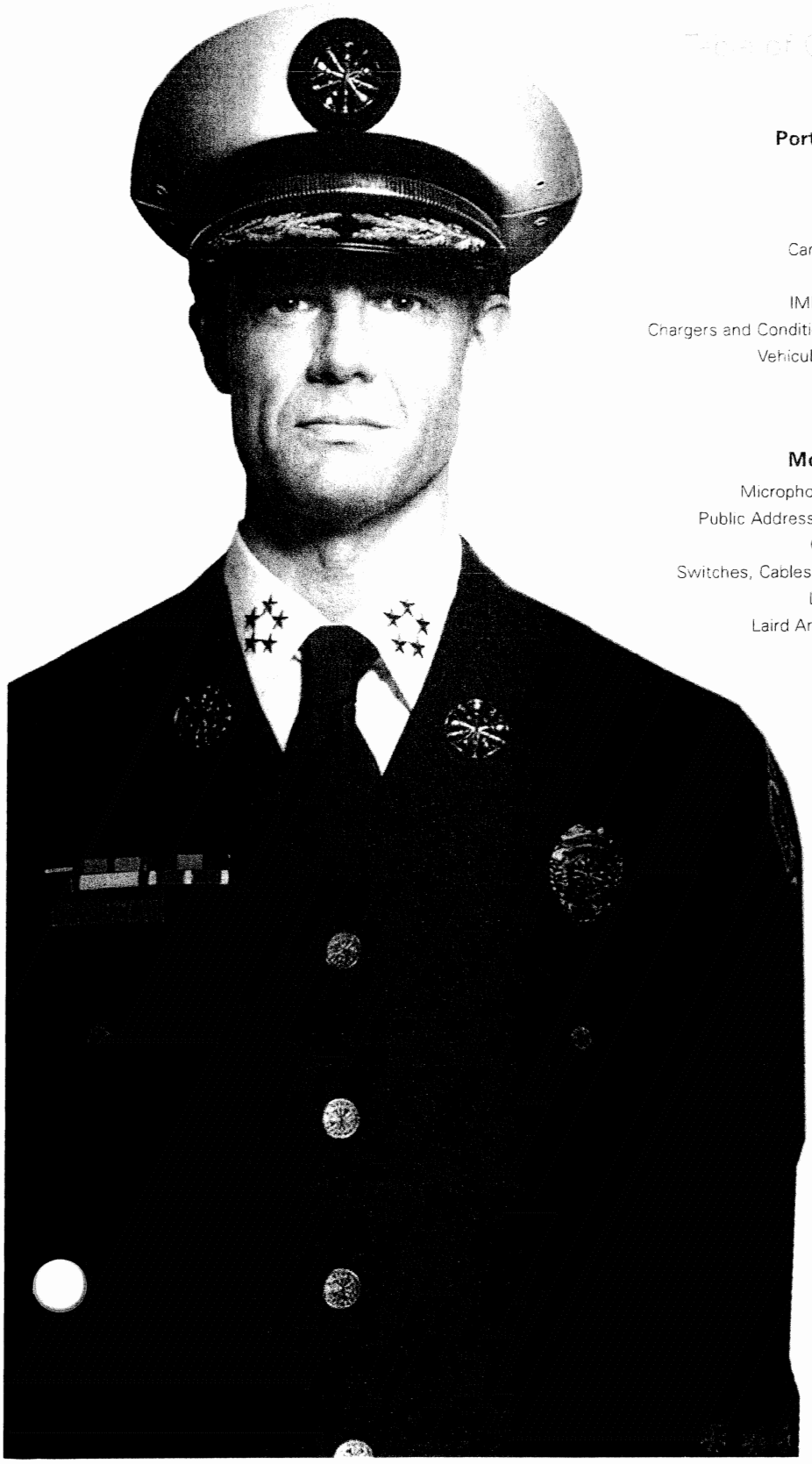
Now rely on Motorola Original® accessories to provide custom radio solutions.

You likely chose your Motorola two-way radios for their ease of use and exceptional reliability — certainly a sound decision. Choosing Motorola Original® accessories for your radios is also the right call to make.

For starters, every Motorola Original® accessory is performance-matched for Motorola radios — designed, built and rigorously tested to the same quality standards. So you can be sure that every product in this catalog will perfectly complement your radio's performance.

What's more, insisting on Motorola Original® accessories can help increase productivity. That's because you can count on every accessory to do its job time after time. If you take a chance on a mismatched antenna, or an inferior microphone, your radio may not perform at the moment you have to use it.

We offer a full collection of proven Motorola Original® accessories for your important and critical communication needs. You'll find remote speaker microphones for more convenient control. Carrying cases for ease when on the move. Earpieces to ensure privacy. Headsets for hands-free operation. High-capacity batteries to extend communication time, and more. They're all ready to help ensure you perform with greater authority and confidence.



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Law Enforcement

Motorola Original accessories combine men with existing radios and are perfectly suited to the demands of police work.

Fire Departments

Motorola Original accessories that are customized to fire fighting needs can help provide freedom in the heat of action.

EMS Personnel

Emergency personnel require accessories for communicating exact position and immediate condition. Motorola Original accessories deliver.

Government Agencies

From border patrols to military operations, Motorola Original accessories help ensure that your agency will get the mission accomplished.

dio: audio

XTS 3000, XTS 3500, XTS 5000, XTS 1500, XTS 2500, MT 1500, and PR1500

HMN4080A

GPS Remote Speaker Microphone

The Global Positioning System (GPS) Remote Speaker Microphone allows ASTRO Digital XTS 2500 and 5000 portable two-way radio users in outdoor locations to be automatically tracked by satellite throughout North America. For optimal GPS coverage, a clear view of sky with no obstructions is required. GPS Coverage may be limited in buildings, parking garages and areas with heavy tree coverage. Both models have a channel selector, programmable button, volume control and emergency button.

ASTRO Digital XTS 2500/5000

HMN4080A*†	GPS Remote Speaker Microphone, Submersible (Delta-T)
HMN4084A*†	GPS Remote Speaker Microphone with 3.5mm audio jack

†For XTS 2500: Models I, 1.5, II, III and Ruggedized. XTS 2500 radios must have Tanapa version B hardware and a radio host code of R10.00.00.

For XTS 5000: Models I, II, III and Ruggedized. Radios must have a radio host code of R06.01.00 or later.

Remote Speaker Microphones (RSM)

This Remote Speaker Microphone is water-resistant and has a 6-foot coiled cord assembly, 3.5mm audio jack on the head of the microphone, swivel clip and quick disconnect latch.

ASTRO Digital XTS 3000/3500/5000/1500/2500, MT 1500 and PR1500

PMMN4045A*	Noise-Cancelling Remote Speaker Microphone
0104026J83	Replacement Coil Cord Assembly for PMMN4045A

PMMN4038A

Windporting Remote Speaker Microphones (RSM)

These Remote Speaker Microphones have a 6-foot coiled cord assembly, swivel clip and quick disconnect latch.The windporting feature dramatically lessens background noise from high winds and other severe weather conditions. IP57 Submersible model tested at 1 meter for 30 minutes.

PMMN4038A*	Windporting Remote Speaker Microphone, IP57 Submersible
PMMN4051A*	Windporting Remote Speaker Microphone with 3.5mm audio jack
0104023J42	Replacement Coil Cord Assembly for PMMN4038A
0104028J67	Replacement Coil Cord Assembly for PMMN4051A

RMN5066A

Remote Speaker Microphones – Commander™ II Series

The Commander II Remote Speaker Microphone features an emergency button, volume control, and 2 programmable buttons. These microphones feature windporting technology and are ideal for firefighters and police. Delta-T submersible model tested at 1 meter of water for 2 hours using a Remote Speaker Microphone at a temperature 27°C hotter than the water.

ASTRO Digital XTS 3000/5000

RMN5066A*	Remote Speaker Microphone, Submersible (Delta-T)
RMN5067A*	Remote Speaker Microphone with 3.5mm audio jack
RMN5088A*	Remote Speaker Microphone with Channel Selector, Submersible (Delta-T)
RMN5089A*	Remote Speaker Microphone with Channel Selector and 3.5mm audio jack

For a completely submersible radio/microphone system use with XTS 3000R and XTS 5000R portable radios.

RMN5089A

*Intrinsically Safe

portable radio: audio

XTS 3000, XTS 3500, XTS 5000, XTS 1500, XTS 2500, MT 1500, and PR1500

Remote Speaker Microphone with Emergency Button

The orange button on the microphone head can be used to signal that the operator needs help. This microphone offers high/low volume control and has a 3.5mm audio jack on the microphone head. Emergency activation from the RSM is delayed until programmed Mandown Pre-alert and Post-alert delays elapse. Depending on radio model, factory defaults or previous programming could set the delay times for as long as 8 to 120 seconds.

ASTRO Digital XTS 3000/3500/5000/1500/2500, MT 1500 and PR1500

RMN5038A*	Remote Speaker Microphone with Emergency Button

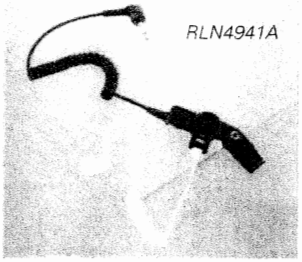
RMN5038A

Remote Speaker Microphone Audio Accessories

The following earpieces are compatible with all Remote Speaker Microphones with a 3.5 mm audio jack on the head of the microphone.

ASTRO Digital XTS 3000/3500/5000/1500/2500, MT 1500 and PR1500

RLN4941A*	Receive-Only Earpiece with Translucent Tube and Rubber Eartip
AARLN4885B*	Receive-Only Covered Earbud
WADN4190B*	Receive-Only Flexible Earpiece
PMLN4620A	Receive-Only D-Shell Earpiece


RLN4941A

Public Safety Microphones (PSM)

Public Safety Microphones include straight cord assembly, swivel clip, quick disconnect latch, high/low volume toggle switch and a 3.5mm audio jack. Use with radio's antenna, sold separately.

ASTRO Digital XTS 3000/3500/5000

3.5mm threaded audio jack is located at the radio connector

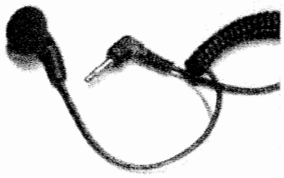
NMN6247A*	UHF Public Safety Microphone with 30 inch Straight Cord. Require RF adapter.
NMN6250A*	UHF Public Safety Microphone with 24 inch Straight Cord. Require RF adapter.
NMN6251A*	UHF Public Safety Microphone with 18 inch Straight Cord. Require RF adapter.
NTN8327B*	RF Adapter. Required for use with all UHF Public Safety Microphones.
6685046F01	RF Adapter Tool

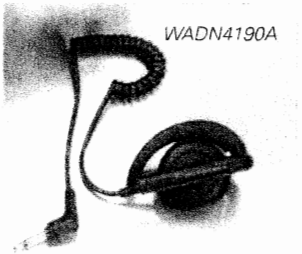
ASTRO Digital XTS 1500/2500, MT 1500 and PR1500

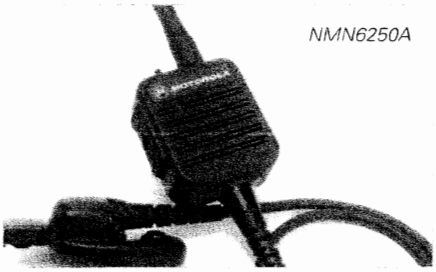
3.5mm non-threaded audio jack is located on the microphone head. Not for VHF use

RMN5072A*	Public Safety Microphone with 30 inch Straight Cord. RF adapter included.
RMN5073A*	Public Safety Microphone with 24 inch Straight Cord. RF adapter included.
RMN5074A*	Public Safety Microphone with 18 inch Straight Cord. RF adapter included.
RLN5918A*	Replacement RF Adapter

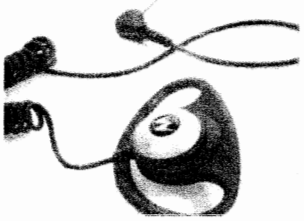
AARLN4885B




WADN4190A


NMN6250A

RMN5073A

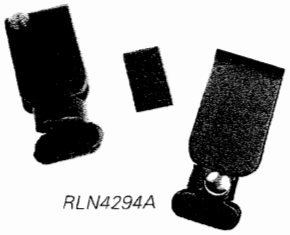

PMLN4620A

Epaulet Straps

Black leather Epaulet Strap secures Remote Speaker Microphone to epaulet on shirt or jacket and accommodates back clip in leather cut-outs. Snap closure secures cord to allow reliable communications in hostile environments.

ASTRO Digital XTS 3000/3500/5000/1500/2500, MT 1500 and PR1500

RLN4294A	Epaulet Strap, Velcro
RLN4295A	Epaulet Strap, with Clip


RLN4294A

RLN4295A

*Intrinsically Safe

Surveillance Kits

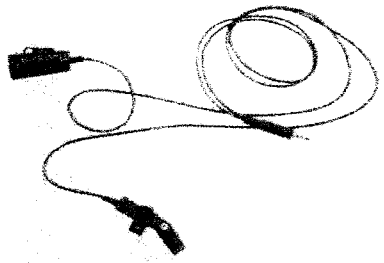
Surveillance accessories allow the user to receive messages privately through the earpiece – ideal when discreet communication is required. The following surveillance accessories require the 3.5mm threaded adapter jack BDN6676D that attaches to the radio, unless being used with XTS 3000/3500/5000 UHF Public Safety Microphones.

BDN6664A*	Receive-Only Earpiece with Standard Earphone (1-Wire), Beige
BDN6665A*†	Extra Loud Receive-Only Earpiece with Standard Earphone (1-Wire), Beige
BDN6726A*	Receive-Only Earpiece with Standard Earphone (1-Wire), Black
BDN6727A*†	Extra Loud Receive-Only Earpiece with Standard Earphone (1-Wire), Black
BDN6666A*	Receive-Only Earpiece with Volume Control and Earloop (1-Wire), Beige For XTS 1500/2500, MT 1500 and PR1500 only.
BDN6728A*	Receive-Only Earpiece with Volume Control and Earloop (1-Wire), Black For XTS 1500/2500, MT 1500 and PR1500 only.

BDN6668A

BDN6667A*	Earpiece with Microphone and Push-to-Talk Combined (2-Wire), Beige
BDN6669A*†	Extra Loud Earpiece with Microphone and Push-to-Talk Combined (2-Wire), Beige
BDN6729A*	Earpiece with Microphone and Push-to-Talk Combined (2-Wire), Black
BDN6731A*†	Extra Loud Earpiece with Microphone and Push-to-Talk Combined (2-Wire), Black

RLN5312A



BDN6668A*	Earpiece with Microphone and Push-to-Talk Separate (3-Wire), Beige
BDN6670A*†	Extra Loud Earpiece with Microphone and Push-to-Talk Separate (3-Wire), Beige
BDN6730A*	Earpiece with Microphone and Push-to-Talk Separate (3-Wire), Black
BDN6732A*†	Extra Loud Earpiece with Microphone and Push-to-Talk Separate (3-Wire), Black

Surveillance Kits - With Extended Wear Comfort Earpiece

These kits include an extended-wear comfort earpiece with rubber eartip and Quick Disconnect clear, comfortable acoustic tube. Users hear transmissions clearly, and the clear tube provides a discreet appearance.

RLN5314A	Comfort Earpiece, Receive-Only, Beige
RLN5313A	Comfort Earpiece, Receive-Only, Black
RLN5311A	Earpiece with Microphone and PTT Combined (2-Wire), Beige
RLN5312A	Earpiece with Microphone and PTT Combined (2-Wire), Black

Quick Disconnect Noise Kits

Extreme Noise Kits provide extra comfort and/or noise protection for users wearing surveillance accessories. Lightweight, translucent tube attaches to Motorola surveillance accessories to provide flexibility and comfort, which now includes a new quick disconnect adapter. The Quick Disconnect Adapter allows users, especially those in multiple shift operations, to easily remove or alternate acoustic tubes. Clothing clip prevents accessory from being pulled from the ear due to body movement or head rotation. For optimal performance, Extra Loud Earphones are recommended.

RLN6230A

RLN6230A	Extreme Noise Kit. Includes 2 foam earplugs. For high-noise environments. Noise reduction = 24dB. Can be used with Clear Comfortable Earpieces, Black
RLN6231A	Extreme Noise Kit. Includes 2 foam earplugs. For high-noise environments. Noise reduction = 24dB. Can be used with Clear Comfortable Earpieces, Beige
RLN6232A	Low Noise Kit - Clear Acoustic Tube Assembly. Includes 1 clear rubber eartip. For low-noise environments, does not provide hearing protection, Black
RLN6241A	Low Noise Kit - Clear Acoustic Tube Assembly. Includes 1 clear rubber eartip. For low-noise environments, does not provide hearing protection, Beige
5080369E39†	Extra Loud Earphone, Beige
5080370E91†	Extra Loud Earphone, Black

RLN6241A

BDN6676D

RLN6242A	Quick Disconnect Acoustic Tube Replacement
5080384F72	Replacement Foam Plugs. Noise reduction = 24dB. Pack of 50. For RLN6230A and RLN6231A.
5080370E97	Replacement Standard Clear Rubber Eartips. Pack of 25. For RLN6232A and RLN6241A.
BDN6676D	3.5 mm Threaded adapter jack with Quick Disconnect Latch

*Intrinsically Safe

†Extra Loud Earphone (exceeds OSHA limits)

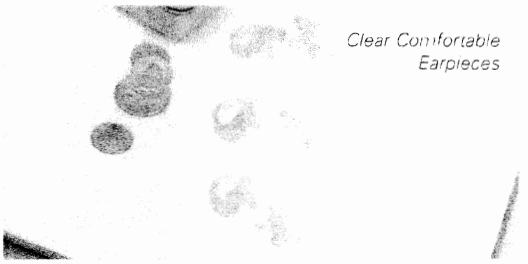
portable radio: audio

XTS 3000, XTS 3500, XTS 5000, XTS 1500, XTS 2500, MT 1500, and PR1500

Clear Comfortable Earpieces

The Clear Comfortable Earpiece forms to the inside of the ear and is perfect for low noise environments. It's made of easy-to-clean, chemically-inert hypo-allergenic material.

RLN4760A	Small Custom Earpiece - Right Ear
RLN4761A	Medium Custom Earpiece - Right Ear
RLN4762A	Large Custom Earpiece - Right Ear
RLN4763A	Small Custom Earpiece - Left Ear
RLN4764A	Medium Custom Earpiece - Left Ear
RLN4765A	Large Custom Earpiece - Left Ear



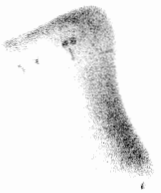
Clear Comfortable Earpieces

Completely Discreet Wireless Earpiece Kit

Enables users to communicate with ease, in full privacy, without visible equipment. This miniaturized receiver is discreetly hidden in the ear, where it can be worn comfortably for long periods of time. Small as it is, it offers a full range of audio functions including automatic squelch, automatic gain control and noise filtering. Average battery life is approximately 100 hours and includes an end-of-life warning signal when the battery needs to be changed. Kit includes wireless receiver, inductive neckloop, 6 spare batteries and 5 spare earguards. For use with any standard 2 or 3-Wire Motorola Surveillance Kit. Simply Remove the earpiece from any standard 2 or 3-Wire Surveillance Kit and plug in the neckloop, which is easily hidden under clothing.

RLN4922A	Completely Discreet Earpiece Kit
RLN4919A	Replacement Earguards. 5 per pack.
RNN4005A	Replacement 1.4 Volt Batteries. 6 per pack.

RLN4922A

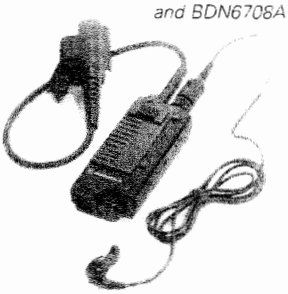


Completely Discreet Earpiece

Ear Microphone Systems (EMS)

This compact, lightweight unit picks up sound through bone vibrations in the ear canal. The miniature earpiece leaves the hands-free and face unobscured, good for rescue and emergency personnel that must retain the ability to help, hear and speak directly to others... those not on the communication system. EMS may be worn with protective masks without reduction in clarity of sound. It's ideal for high-noise environments. Available in PTT or Voice-Activated (VOX). Interface Module is required and sold separately.

BDN6677A*	EMS, Black. For standard noise levels (up to 95dB).
BDN6678A*	EMS, Beige. For standard noise levels p to 95dB).
BDN6641A*	EMS, Grey. For high-noise levels (up to 105dB).
BDN6708B*	Push-to-Talk Only Interface Module
BDN6671B*	Push-to-Talk and Voice-Activated Interface Module



BDN6677A and BDN6708A

OPTIONAL ACCESSORIES FOR THE EMS

0180300E25	Earguard with Adjustable Loop
0180358B38*	Remote Push-to-Talk Ring Switch
0180300E83*	Remote Push-to-Talk Body Switch
0180358B32	Earholder. Black, size small. Secures Ear Microphone in ear.
0180358B33	Earholder. Black, size medium. Secures Ear Microphone in ear.
0180358B34	Earholder. Black, size large. Secures Ear Microphone in ear.
0180358B35	Earholder. Clear, size small. Secures Ear Microphone in ear.
0180358B36	Earholder. Clear, size medium. Secures Ear Microphone in ear.
0180358B37	Earholder. Clear, size large. Secures Ear Microphone in ear.
4280369E44	Replacement Belt Clip with Screws
5080358B28	Eartips. Black, size medium. Pack of 10.
5080358B29	Eartips. Black, size large. Pack of 10.
5080358B30	Eartips. Beige, size medium. Pack of 10.
5080358B31	Eartips. Beige, size large. Pack of 10.
0180305J46	Training CD-ROM. For Ear Microphone System and Temple Transducer.

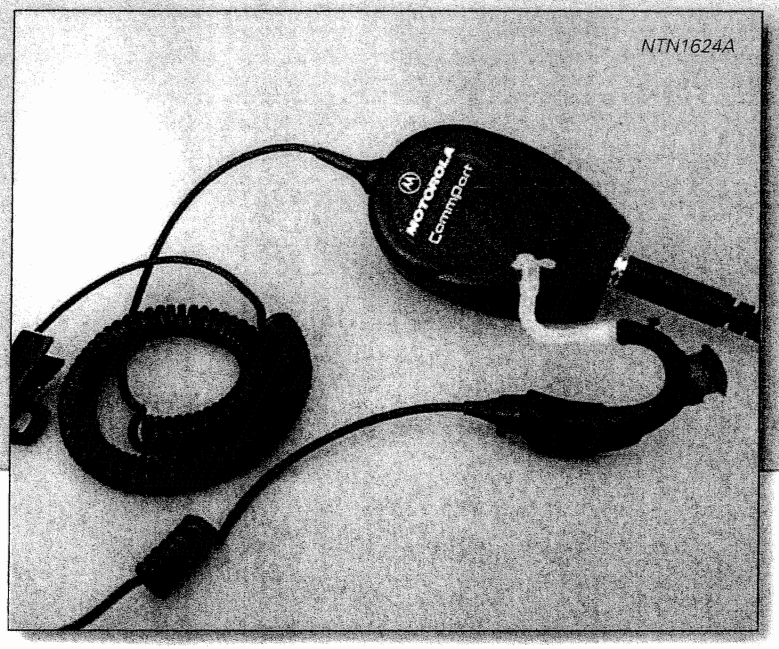
0180300E83

0180300E25

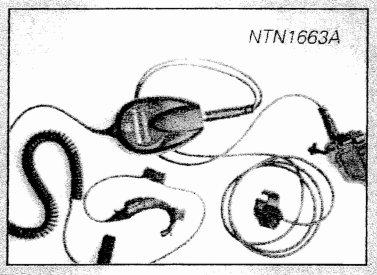
*Intrinsically Safe

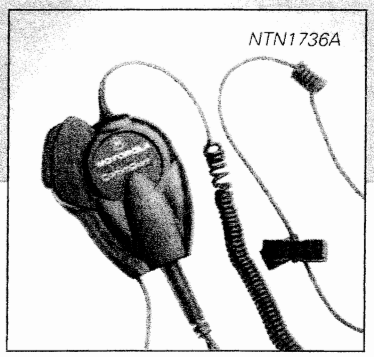
portable radio: audio systems and headsets

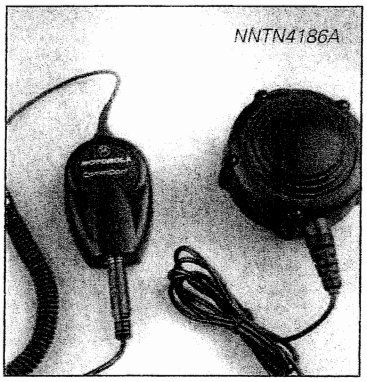
XTS 3000, XTS 3500, XTS 5000, XTS 1500, XTS 2500, MT 1500, and PR1500

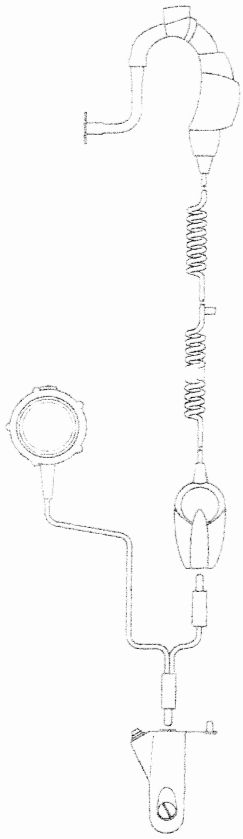


NTN1624A


NTN1663A


NTN1736A


NNTN4186A



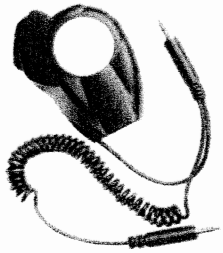
CommPort: Integrated Microphone/Receiver System

The CommPort™ System's advanced, self-adjusting microphone and miniature receiver connect to a two-way radio and make it possible to communicate under the most adverse conditions. A variety of Push-to-Talk options allow the user to customize the CommPort system for many applications.

NTN1624A*	Integrated Ear Microphone/Receiver System with Palm PTT Includes 3.5mm adapter BDN6676D.
NTN1625A*	Integrated Ear Microphone/Receiver System with PTT on Radio Adapter. Includes 3.5mm adapter BDN6676D.
NTN1663A*	Integrated Ear Microphone/Receiver System with Ring PTT. Includes 3.5mm adapter BDN6676D.
NTN1736A*	Integrated Ear Microphone/Receiver System with Snap-On-Side PTT. Includes 3.5mm adapter BDN6676D.
NNTN4186A*	Integrated Ear Microphone/Receiver System with Body PTT. Includes 3.5mm adapter BDN6676D.

OPTIONAL ACCESSORIES FOR COMMPORT

NKN6510A	Replacement Palm PTT Cable for NTN1624A
NKN6512A	Replacement Ring PTT Cable for NTN1663A
NKN6525A	Replacement Snap-On-Side PTT Cable for NTN1736A
NNTN4188A	Replacement Remote PTT Body Switch for NNTN4186A
NKN6508A	Replacement Cable for NTN1625A
NTN8819B*	Ear Microphone Assembly
NTN8821A	CommPort Maintenance Kit. Includes 10 replacement ear tubes, 10 microphone seal strips and 2 windscreens.
NTN8986A	Adhesive Pads. For secure attachment to ear. Pack of 90.
NTN8988A	Ear Straps. For secure attachment to ear. Pack of 10.
RLN5037A	Replacement Ear Tubes. Pack of 10.
4285838B01	Replacement Collar Clip
4202006A01	Replacement Back Cover Clip
BDN6676D	3.5mm jack adapter with Quick Disconnect Latch


NKN6525A

BDN6676D

*Intrinsically Safe

portable radio: headsets

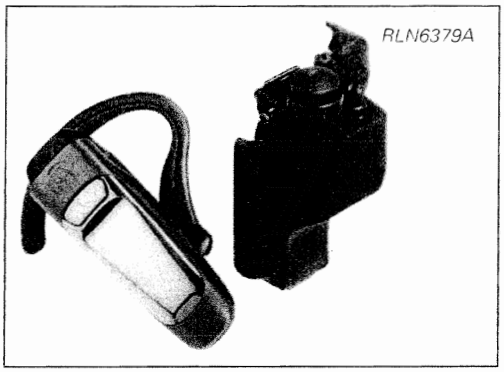
XTS 3000, XTS 3500, XTS 5000, XTS 1500, XTS 2500, MT 1500, and PR1500

Bluetooth® Wireless Headset

Bluetooth Wireless technology takes the wires away so you're free to do more, from almost anywhere. Users can quickly and easily connect to the compatible Motorola Bluetooth headset. Bluetooth headset and adapter sold separately or as a kit. Not recommended for Mission Critical applications.

ASTRO Digital XTS 5000/1500/2500 and PR1500

RLN6379A	Bluetooth Kit. Includes Bluetooth headset and adapter for radios.
98682H	H300 Bluetooth Headset
RMN5104A	Bluetooth adapter for radios


RLN6379A

Flexible Ear Receiver

This receive-only earpiece contains a flexible earloop and speaker which rests external to the ear. Black, without volume control. It plugs directly into adapter BDN6676D or the audio jack on XTS 3000/3500/5000 UHF Public Safety Microphones.

BDN6719A	Flexible Ear Receiver with 3.5mm Threaded Plug
BDN6676D	3.5mm jack adapter with Quick Disconnect Latch
7580372E11	Replacement Foam Ear Cushion

BDN6719A

Pellet-Style Earpieces

Pellet-style earpieces allow users to receive communication discreetly and are comfortable for extended-wear use.

BDN6780A*	Earbud with Microphone and Push-to-Talk Requires adapter BDN6676D.
BDN6781A*	Earbud, receive-only Requires adapter BDN6676D.
BDN6676D*	3.5mm jack adapter with Quick Disconnect Latch
7580372E70	Replacement Foam Cushion for Pellet Earpieces

BDN6780A

Temple Transducer

This headset allows the user to receive audio without covering the ear. It features an In-line PTT and noise-cancelling boom microphone.The Temple Transducer enhances communication and safety by not impairing the user's hearing of the external sound environment, such as machinery and equipment, warning and fire alarms, the intercom, traffic and even casual conversations.

RMN4049A*	Temple Transducer
0180305J46	Training CD-ROM. For Ear Microphone System and Temple Transducer.

Rugged Temple Transducer

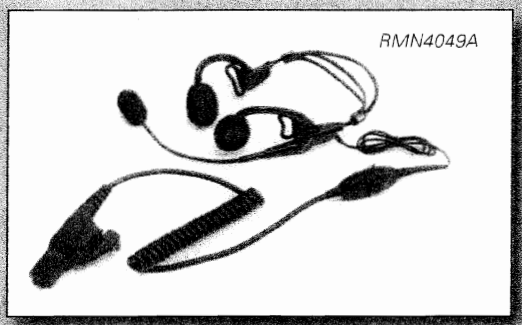
The larger Rugged Temple Transducer comes equipped with all the features of the basic model. It sports a bigger Push-to-Talk button and a larger noise-cancelling boom microphone.. It is fully adjustable for different head sizes, making it comfortable for extended-wear. Over-the-head band allows users to wear helmets, hardhats and other head gear – and it really stays in place. Water-resistant boom microphone is ideal for use in blowing rain and the secure cap on PTT prevents accidental activation in mission critical situations.

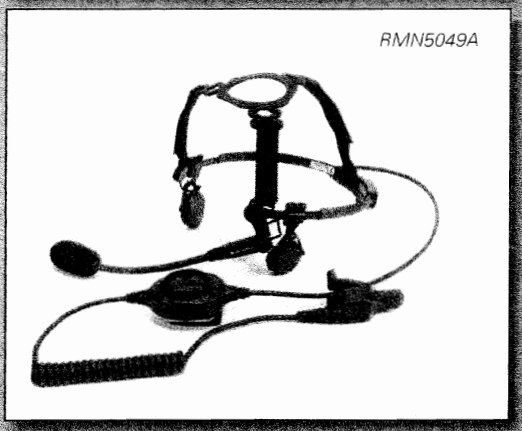
RMN5049A*	Rugged Temple Transducer

*Intrinsically Safe

Temple Transducers

The receiver portion of this accessory rests on the temples and is capable of conveying the received audio from a two-way radio into sound vibration. The sound vibration is transmitted through the surrounding human tissue and bone directly into the inner ear while it is received by the user.


RMN4049A

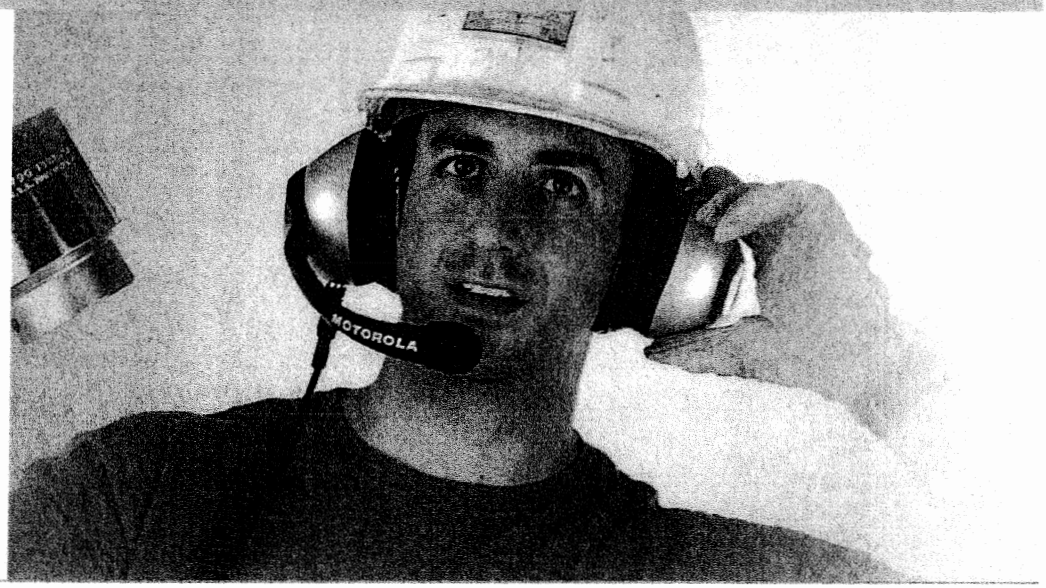

RMN5049A

portable radio: headsets

XTS 3000, XTS 3500, XTS 5000, XTS 1500, XTS 2500, MT 1500, and PR1500

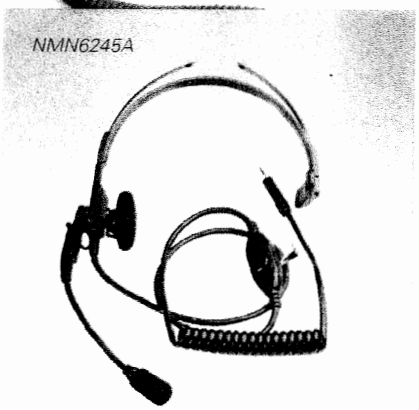
Winning Quality

The same winning quality and dependability you see at professional football stadiums and speedways can be yours with Motorola headsets.



RMN5015A

NMN6245A



Racing Headset

This heavy-duty headset can be worn with most hard hats. Ideal for high-noise environments; racing teams like CART® use it in the pits for dependable communication. Adapter Cable required.

RMN5015A	Racing Headset with Noise-Cancelling Swivel Boom Microphone Behind-the-Head style. Noise reduction rating = 24dB.
BDN6673B	Adapter Cable for RMN5015A

Receive-Only Headsets

Receive-Only Headsets are the right choice for high-noise environments where users must hear information clearly, but seldom need to transmit. Dual-Muff headsets feature easily replaceable earseals filled with a liquid and foam combination to provide excellent protection from outside noise as well as comfort. They can be plugged directly into the radio when used with BDN6676D.

ASTRO Digital XTS 3000/3500/5000

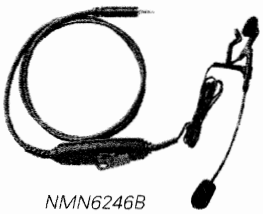
RMN4056B	Receive-Only Dual-Muff Headband Style Headset. For use with 3.5mm threaded jack. Can be plugged directly into radio with 3.5mm adapter BDN6676D. Noise reduction = 24dB.
RMN4057B	Receive-Only, Dual-Muff, Hardhat Headset. Mounts easily to hard hats with slots. Can be plugged directly into radio with 3.5mm adapter BDN6676D.
BDN6676D	3.5mm jack adapter with Quick Disconnect Latch

Lightweight Headsets

Lightweight headsets provide high-clarity, hands-free, discreet two-way communication, while maintaining the comfort necessary for extended-wear in moderate noise environments. Audio adapter BDN6676D required.

ASTRO Digital XTS 3000/3500/5000

NMN6245A	Single-Muff Lightweight Headset with In-Line PTT Switch Requires audio adapter BDN6676D.
NMN6246B	Ultra-Light Headset with Boom Microphone, In-Line PTT Switch. Earbud style receiver. Requires audio adapter BDN6676D.
NKN6498A	Headset Adapter Cable. For use with NMN1020A
BDN6676D	3.5mm jack adapter with Quick Disconnect Latch



NMN6246B

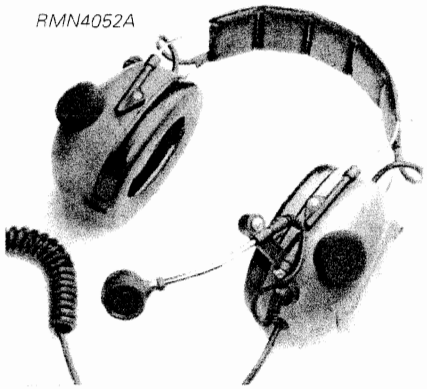
portable radio: headsets

XTS 3000, XTS 3500, XTS 5000, XTS 1500, XTS 2500, MT 1500, and PR1500

Noise-Cancelling Headsets with Boom Microphone

Ideal for two-way communication in extremely noisy environments. Dual-Muff, tactical headsets include 2 microphones on outside of earcups which reproduce ambient sound back into headset. Harmful sounds are suppressed to safe levels and low sounds are amplified up to 5 times original level, but never more than 82dB. Has on/off volume control on earcups. Easily replaceable ear seals are filled with a liquid and foam combination to provide excellent sealing and comfort. 3-foot coiled cord assembly included. Adapter Cable RKN4095A required.

RMN4052A	Tactical Headband Style Headset. Grey, Noise reduction = 24dB.
RMN4053A	Tactical Hardhat Mount Headset. Grey, Noise reduction = 22dB.
RKN4095A	Adapter Cable with In-Line Push-to-Talk For use with RMN4051B/RMN4052A/RMN4053A.
	REPLACEMENT EARSEALS
RLN4923B	Replacement Earseals for RMN4051B/RMN4052A/RMN4053A Includes 2 snap-in earseals.

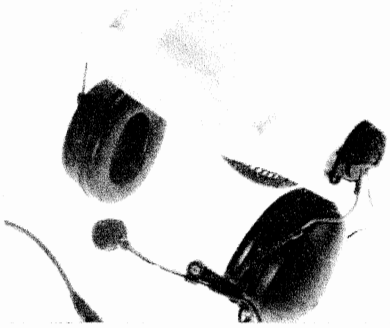


RMN4052A

Hardhat Mount Headset With Noise-Cancelling Boom Microphone

Ideal for two-way communication in high-noise environments, this headset mounts easily to hard-hats with slots, or can be worn alone. Easily replaceable ear seals are filled with a liquid and foam combination to provide excellent sealing and comfort. 3-foot coiled cord assembly included. Noise reduction of 22dB. Separate In-line PTT Adapter Cable RKN4095A required. Hardhat not included.

RMN4051B*	Two-way, Hardhat Mount Headset with Noise-Cancelling Boom Microphone. Black.
RKN4095A	Adapter cable with In-Line PTT. For use with RMN4051B/RMN4052A/RMN4053A.



RMN4051B

Medium Weight Headsets

Medium weight headsets offer high-clarity sound, with the additional hearing protection necessary to provide consistent, clear, two-way radio communication in harsh, noisy environments or situations.

NMN6258A*	Medium Weight, Dual-Muff, Over-the-Head Style Headset with In-line PTT. Noise reduction rating = 24dB.
NMN6259A*	Medium Weight, Dual-Muff, Behind-the-Head Style Headset Can be worn with hardhat. Noise reduction rating = 24dB.

NMN6258A

Heavy-Duty Headsets

Heavy-duty headsets include noise-cancelling boom microphones and can be worn with or without a hardhat. The Push-to-Talk switch is located on the earcup. On voice-activated models, the VOX module is contained within the headset. Headsets are for use in noise levels up to 125dB. Heavy-duty headsets require radio adapter cable BDN6673B, sold separately.

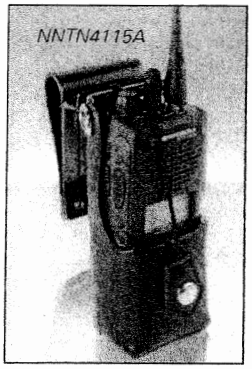
BDN6645A*	Push-to-Talk Headset with Boom Microphone Requires adapter cable BDN6673B. Noise reduction rating = 24dB.
BDN6635C	Voice-Activated (VOX) Headset with Boom Microphone Requires adapter cable BDN6673B. Noise reduction rating = 24dB.
BDN6636C*	Voice-Activated (VOX) Headset with Throat Microphone Requires adapter cable BDN6673B. Noise reduction rating = 24dB.
BDN6673B*	Radio Adapter Cable

BDN6645A

*Intrinsically Safe (FM)

portable radio: carry accessories

XTS 3000, XTS 3500, XTS 5000, XTS 1500, XTS 2500, MT 1500, and PR1500


NNTN4115A

NTN8725A

NTN7247A

Radios sold separately.

Leather and Nylon Carrying Cases

Motorola carry cases were developed to meet the demands of public safety and other users who operate in the most rigorous of environments.

A variety of carrying accessories are available for comfort and convenience. The carrying cases are available in sizes designed to fit radios with a battery and permit audio to be heard clearly. Leather cases are constructed of top grain, 8 ounce leather and all stainless steel hardware.

High-activity cases have a swivel D-ring button and belt loop. To remove case from belt loop, rotate case 180 degrees and slide case upward, out of the holder. Case stays on belt more securely in high-activity applications while allowing the radio to swing freely with body movements.

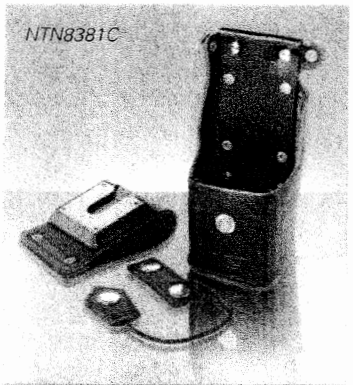
ASTRO Digital XTS 3000/3500/5000

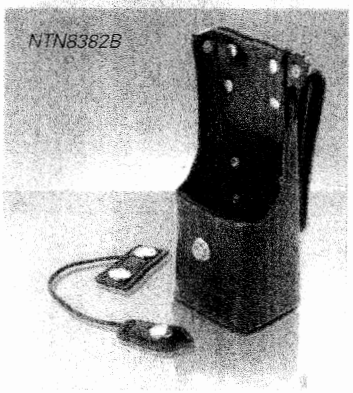
MODEL I RADIOS ONLY

NTN8387A	Leather Carry Case with Belt Loop, D-rings and T-strap
NTN8385B	High-Activity Swivel Leather Case Features 2.5 inch swivel belt loop, D-rings and T-strap.
NTN8386B	High-Activity Swivel Leather Case Features 3 inch swivel belt loop, D-rings and T-strap.
NTN8725A	High-Activity Nylon Case with Belt Loop and T-strap

MODEL II & III RADIOS ONLY

NTN8382B	Leather Case with Belt Loop, D-rings and T-strap
NTN8380C	High-Activity Swivel Leather Case Features 2.5 inch swivel belt loop, D-rings and T-strap.
NTN8381C	High-Activity Swivel Leather Case Features 3 inch swivel belt loop, D-rings and T-strap.
NTN8725A	High-Activity Nylon Case with Belt Loop and T-strap
NTN9184A	Leather Case with Belt Loop. For Clamshell batteries only.


NTN8381C


NTN8382B

ASTRO Digital XTS 1500/2500, MT 1500 and PR1500

NNTN4115A	Leather Case with High-Activity Swivel Features 3 inch swivel belt loop, D-rings and T-strap.
NNTN4116A	Leather Case with High-Activity Swivel Features 2.5 inch swivel belt loop, D-rings and T-strap.
NNTN4117A	Leather Case with Belt Loop Features 3 inch belt loop, D-rings and T-strap.
NTN7247A	Nylon Case with Snap Belt Loop and T-strap

Carrying Accessories

T-STRAPS

NTN8383A	Leather T-strap, Plain Action Snap
NTN8384A	Leather T-strap, Hard Action Snap Provides additional strength at the snap.

HIGH-ACTIVITY BELT LOOPS

NTN8039B	2.5 inch Leather Swivel Belt Loop
NTN8040B	3 inch Leather Swivel Belt Loop

CARRYING STRAP

NTN5243A	Adjustable, Black Nylon Carrying Strap Attaches to D-ring on cases.

BELT CLIPS

ASTRO Digital XTS 3000/3500/5000

NTN8266B	Standard Removable 2.25 inch Belt Clip Attachment
NTN8460A	Public Safety 3 inch Belt Clip Attachment

ASTRO Digital XTS 1500/2500, MT 1500 and PR1500

HLN6853A	2.25 inch Spring Action Belt Clip
HLN9844A	2 inch Removable Belt Clip Attachment

NTN8040B
NTN8039B

NTN5243A

HLN9844A

NTN8460A

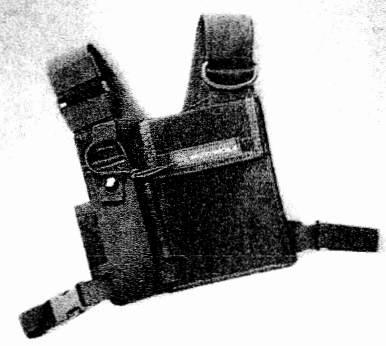
portable radio: carry accessories

XTS 3000, XTS 3500, XTS 5000, XTS 1500, XTS 2500, MT 1500, and PR1500

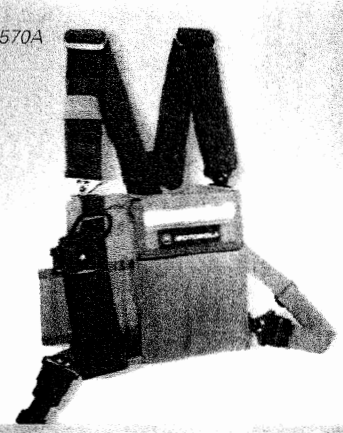
Chest Packs and RadioPAk

These versatile carry accessories fit virtually any radio. Lightweight and comfortable, each of these packs make an ideal companion for two-way radios.

HLN6602A



RLN4570A



RLN4815A

Chest Pack

Motorola Original® Universal Chest Pack protects the radio and provides the freedom from holding it during standby communication mode. Universal Chest Pack fits virtually any radio.

HLN6602A	Universal Chest Pack with Radio Holder, Pen Holder and Velcro Secured Pouch
1505596Z02	Replacement Strap for HLN6602A/RLN4570A

Break-A-Way Chest Pack

All the features of the original Universal Chest Pack (HLN6602A) plus break-a-way tabs that allow the entire pack to be pulled off with approximately 10 lbs. of pressure.

RLN4570A	Break-a-Way Chest Pack with Radio Holder, Pen Holder and Velcro Secured Pouch.
1505596Z02	Replacement Strap for HLN6602A/RLN4570A

Universal RadioPAk™

The RadioPAk is lightweight and comfortable. Worn around the waist, it keeps radios/phones at hand. It features a separate 6 x 8 inch zippered pouch for other on-the-job necessities. Adjustable woven nylon belt fits both men and women.

RLN4815A	RadioPAk Radio/Utility Case
4280384F89	RadioPAk Extension Belt For waists larger than 40 inches.

Waterproof Bag

HLN9985B	Waterproof Bag with Large Strap

Portable Radio Hangers

Portable Radio Hangers slide over and hangs from the vehicle door panel allowing convenient, easy mounting. Radio belt clip required.

TDN9327A	Portable Radio Hanger for door panels up to 2.75 inches.
TDN9373A	Portable Radio Hanger for door panels 2.75 to 3.25 inches.

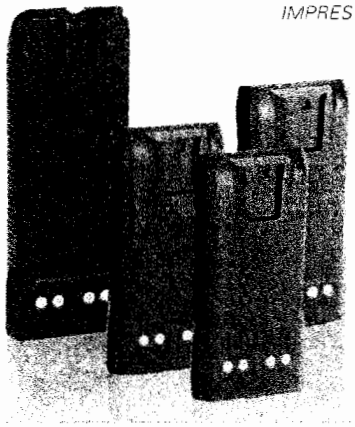
TDN9327A

TDN9373A

[illegible]

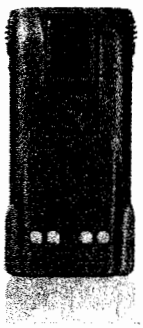
An ideal companion for [illegible] radios as well as [illegible] phones.

Battery Characteristics



IMPRES Batteries

NTN8299BR



NTN9815B

IMPRES™ Batteries

IMPRES batteries, when used with an IMPRES charger, provide automatic, adaptive reconditioning, end-of-life display and other advanced features. Data is stored in the battery and communicated to the charger via a unique IMPRES communication protocol which is designed to maximize talk-time and optimize battery cycle life – all automatically.

	ASTRO Digital XTS 3000/3500/5000
HNN9031B	NiCd, 1525 mAh
HNN9032B	NiCd, 1525 mAh. Intrinsically Safe.
NNTN4435B	NiMH, 1800 mAh
NNTN4436B	NiMH, 1700 mAh. Intrinsically Safe.
NNTN4437B	NiMH, 1700 mAh. Intrinsically Safe, Ruggedized.
NTN9862C	Li-ion, 2750 mAh
NNTN6034A	Li-ion, 4150 mAh
	ASTRO Digital XTS 1500/2500, MT 1500 and PR 400
NTN9858C	NiMH, 2100 mAh
NTN9857C	NiMH, 2000 mAh. Intrinsically Safe.
NNTN6263A	NiMH, 2000 mAh. Intrinsically Safe, Ruggedized.
NNTN7335A	Li-ion, 2700 mAh. Ruggedized.

Batteries

	[illegible]
	ASTRO Digital XTS 3000/3500/5000
NTN8294BR	NiCd, 1525 mAh
NTN8295AR	NiCd, 1525 mAh. Intrinsically Safe.
NTN8297AR	NiCd, 1525 mAh. Intrinsically Safe, Ruggedized.
	ASTRO Digital XTS 1500/2500, MT 1500 and PR 400
NTN9815B	NiCd, 1525 mAh
NTN9816B	NiCd, 1525 mAh. Intrinsically Safe.
	[illegible]
	ASTRO Digital XTS 3000/3500/5000
NTN8299BR	NiMH, 1700 mAh. Intrinsically Safe.
NTN8923AR	NiMH, 1800 mAh
RNN4006B	NiMH, 3500 mAh
RNN4007AR	NiMH, 3500 mAh. Intrinsically Safe.
	[illegible]
	ASTRO Digital XTS 3000/3500/5000
NTN9177A	Clamshell – Black. Twelve AA Alkaline batteries required, sold separately.
NTN9183A	Clamshell – Orange. Twelve AA Alkaline batteries required, sold separately.
	ASTRO Digital XTS 1500/2500, MT 1500 and PR1500
NNTN6686A	Clamshell – Black. Twelve AA Alkaline batteries required, sold separately.

portable radio: IMPRES systems and chargers

XTS 3000, XTS 3500, XTS 5000, XTS 1500, XTS 2500, MT 1500, and PR1500

IMPRES™ Smart Energy Systems

Through the use of its advanced charging algorithm and automatic reconditioning features, the IMPRES Smart Energy System ensures maximum talk-time and optimized battery cycle life. This smart energy system automatically reconditions IMPRES batteries based on actual usage, keeping them in peak condition. Talk-time and cycle life are optimized and the need for manual maintenance programs is eliminated. Its advanced conditioning features allow batteries to be safely left on the charger for extended periods of time without incurring damaging heat build-up which can decrease battery cycle life. In addition, batteries left in the charger are kept fully charged so they are always ready when needed. This rapid-rate, tri-chemistry charging system will also charge compatible non-IMPRES batteries and supports multiple radio platforms including SABER, XTS and HT 1000 Series portables.

IMPRES Single-Unit Chargers

WPLN4111AR	IMPRES Single-Unit Charger, 110 Volt, US Plug
WPLN4112BR	IMPRES Single-Unit Charger, 220 Volt, Euro Plug
WPLN4113ARA	IMPRES Single-Unit Charger, 240 Volt, UK Plug

WPLN4111AR

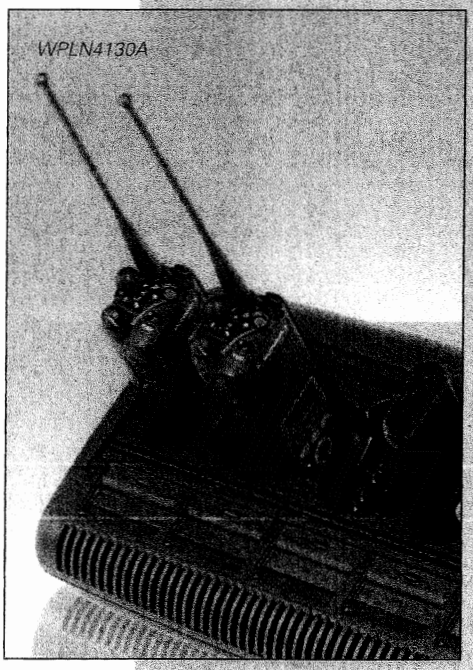
IMPRES Multi-Unit Chargers

WPLN4108BR	IMPRES Multi-Unit Charger, 110 Volt, US Plug
WPLN4109BR	IMPRES Multi-Unit Charger, 220 Volt, Euro Plug
WPLN4110BR	IMPRES Multi-Unit Charger, 240 Volt, UK Plug
NLN7967A	Wall Mount for Multi-Unit Chargers

IMPRES Multi-Unit Chargers with Display Modules

Charger Display Modules provide powerful, "real time" analyzing information for IMPRES batteries, including current charge status, battery mAh, percent rated capacity and battery voltage. Readout displays battery kit number, serial number and chemistry and the time remaining to complete the charge for NiCd and NiMH batteries.

WPLN4130A	IMPRES Multi-Unit Charger with Display Modules, 110 Volt, US Plug
WPLN4131AR	IMPRES Multi-Unit Charger with Display Modules, 220 Volt, Euro Plug
WPLN4132AR	IMPRES Multi-Unit Charger with Display Modules, 240 Volt, UK Plug
NLN7967A	Wall Mount for Multi-Unit Charger



WPLN4130A

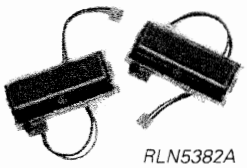
IMPRES Individual Charger Display Module

This module is compatible with the standard IMPRES™ Multi-Unit Charger WPLN4108BR, WPLN4109BR and WPLN4110BR. Up to 6 modules can be used per charger, one for each charging pocket. Includes detailed installation instructions.

RLN5382A — Charger Display Module for IMPRES Multi-Unit Charger with Software Version 1.3 or Later.

Note: Display Modules compatible with Multi-Unit Charger with Software version 1.2 or earlier require a software flash update.

Version number is located on label on the bottom of the IMPRES™ Multi-Unit charger. If no version is shown, it is earlier than version 1.2. Version 1.2 will appear as V1.20, 1.3 will appear as V1.30, etc.



RLN5382A

IMPRES CD

This CD provides an interactive guide to the IMPRES Charging System. It outlines the benefits and gives examples of application usage.

0180305J70 — IMPRES CD

portable radio: chargers

XTS 3000, XTS 3500, XTS 5000, XTS 1500, XTS 2500, MT 1500, and PR1500

Single-Unit, Rapid-Rate, Universal Charger

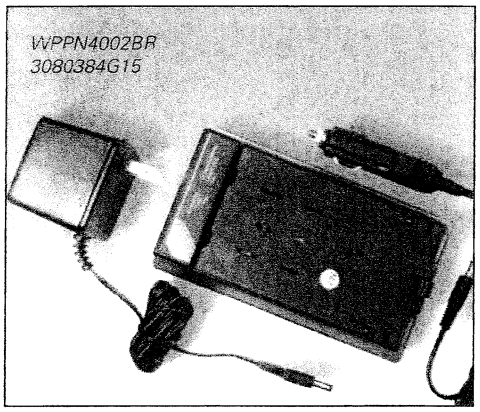
These tri-chemistry chargers support Nickel Cadmium, Nickel Metal Hydride and Lithium-ion batteries. They will rapid charge most batteries to 90% capacity in one to two hours and employ trickle and maintenance modes that ensure batteries are safely charged to full-capacity.

NTN1667A	Universal Charger, 110 Volt, US Plug
NTN1668B	Universal Charger, 220 Volt, Euro Plug
NTN1669B	Universal Charger, 230 Volt, UK Plug
RPX4749B	Charger Base with Transformer, 230 Volt, UK Plug

NTN1667A

Motorola Conditioning Charger (MCC)

The MCC features Instant Fault Detection technology that detects faulty batteries in seconds. You'll know right away when a battery won't operate at peak performance - saving you time and trouble. Each unit rapidly charges NiCd and NiMH batteries and optimizes battery performance. It's patented negative pulse charging process minimizes overheating and overcharging, extending useful battery life. Batteries can be left on the charger for extended periods of time, without worry of heat build-up. Optional accessories are available that allow the MCC to be used in both AC and DC environments.



WPPN4002BR
3080384G15

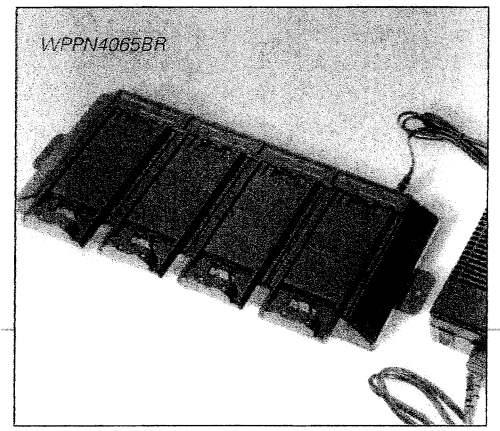
ASTRO Digital XTS 3000/3500/5000

WPLN4086CR	Charger Kit, 110 Volt AC. Includes single-unit base and 7 Volt adapter plate.
WPLN4087CR	Charger Kit, 220 Volt AC. Includes single-unit base and 7 Volt adapter plate.
WPPN4002BR	110 Volt AC Single-Unit Base Charger Only. Adapter plates sold separately.
WPPN4006AR	220 Volt AC Single-Unit Base Charger Only. Adapter plates sold separately.
WPPN4021CR	7 Volt Adapter Plate
WPPN4065BR	Multi-Unit Conditioning Charger, 4-Station Base, 110 Volt. Adapter plates sold separately.

ASTRO Digital XTS 1500/2500, MT 1500 and PR1500

WPPN4002BR	Base Charge Unit, 110 Volt AC. Adapter plates sold separately.
WPLN4168AR	MCC Kit, 110 Volt AC. Includes single-unit base and adapter plate
WPPN4098AR	Adapter plate only
WPPN4065BR	Multi-Unit Conditioning Charger, 4-Station Base,110 Volt. Adapter plates sold separately.

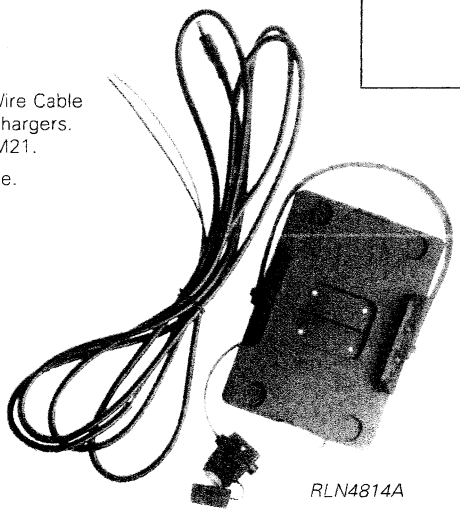
Motorola Conditioning Chargers not compatible with NiMH batteries RNN4006B/RNN4007AR or any Li-ion batteries.



WPPN4065BR

Vehicular Mounting

RLN4814A	Vehicular Mounting Bracket and Hard Wire Cable For Single-Unit Motorola Conditioning Chargers. Includes DC Hard Wire Cable 3080384M21.
3080384M21	DC Hard Wire Cable with 3 A In-line fuse.



RLN4814A

portable radio: maintenance systems

XTS 3000, XTS 3500, XTS 5000, XTS 1500, XTS 2500, MT 1500, and PR1500

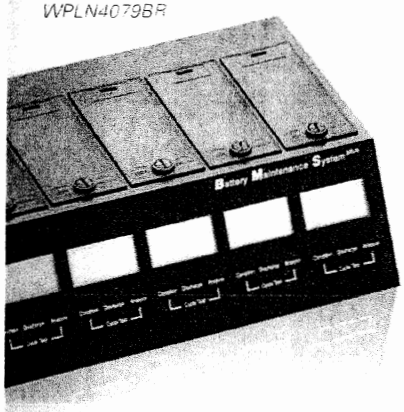
Battery Maintenance System^{PLUS} (BMS^{PLUS})

Increase the useful life of your batteries. Using interchangeable battery adapters (sold separately), the BMS^{PLUS} is capable of charging and discharging, analyzing, conditioning and cycle testing batteries. It supports NiCd, NiMH and Li-ion battery chemistries (Li-ion 6-station units only) and tracks better voltage and capacity (mAh). Its easy-to-use design supports hundreds of two-way, cellular and camcorder batteries. The BMS^{PLUS} offers a 3-year warranty and includes serial printer* port (RS-232).

WPLN4079BR	6-Station BMS^{PLUS}, 110 Volt AC, 50/60 Hz, US Plug
WPLN4080BR	6-Station BMS^{PLUS}, 230 Volt AC, 50/60 Hz, Euro Plug
WPLN4081BR	6-Station BMS^{PLUS}, 230 Volt AC, 50/60 Hz, UK Plug
WPPN4085BR	BMS^{PLUS} Li-ion Field Upgrade Kit. Upgrades WPLN4079AR, WPLN4080AR, WPLN4081AR. Allows units to support Li-ion batteries.
NDN4005B	3-Station BMS, 110 Volt AC, 50/60 Hz. Does not support Li-ion or 3-cell batteries.
NDN4006B	3-Station BMS, 230 Volt AC, 50/60 Hz. Does not support Li-ion or 3-cell batteries.

*Compatible with STAR Micronics SP200 series and printers with STAR printer emulation. STAR Micronics printers available at STAR Micronics distributors.

WPLN4079BR



Battery Maintenance System^{PLUS} (BMS^{PLUS}) Adapters

ASTRO Digital XTS 3000/3500/5000

WPPN4019AR	Adapter. Compatible with NiCd batteries only.
WPPN4022AR	Adapter. Compatible with both NiCd and NiMH batteries.
WPPN4086AR	Adapter. Compatible with NiCd, NiMH and Li-ion batteries.

ASTRO Digital XTS 1500/2500, MT 1500 and PR1500

WPPN4097BR	NiCd and NiMH Adapter
PMLN5423A	Li-ion Adapter

NDN4005B

Battery Optimizing System II (BOS II)

No other battery analyzer matches the speed, accuracy, versatility and ease-of-use of the BOS II in providing powerful analyzing capabilities. Users can select from 12 pre-programmed service programs making it quick and easy to get up and running. Because the BOS II is programmable, users can create custom programs to perform a wide variety of tasks specific to individual needs. New enhancements include new navigation keys and an improved, more intuitive menu system. Regular use of the BOS II can optimize battery performance and help extend battery life, helping reduce battery replacement costs.

ASTRO Digital XTS 3000/3500/5000

WPLN4124BR	BOS II, 4-Station, 90-264 Volt AC, US Plug. Adapter Plates Required.
WPLN4125BR	BOS II, 4-Station, 90-264 Volt AC, Euro/UK Plug. Adapter Plates Required.
RL75765	BOS II Battery Adapter. For use with ASTRO XTS 3000/3500/5000 radios.

ASTRO Digital XTS 1500/2500, MT 1500 and PR1500

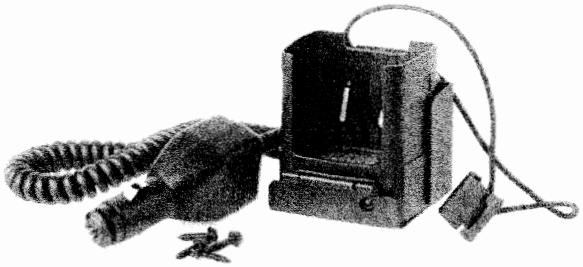
WPLN4124BR	BOS II, 4-Station, 90-264 Volt AC, US Plug. Adapter Plates Required.
WPLN4125BR	BOS II, 4-Station, 90-264 Volt AC, Euro/UK Plug. Adapter Plates Required.
RL76341	Standard Battery Adapter. For use with XTS 2500 radios.
PMLN5416A	Tri-Chemistry Adapter (Li-ion, NiCD, NiMH). For use with XTS 2500 radios.

- Quicktest™ diagnostic feature measures a battery's state of health in approximately 2 to 5 minutes
- Supports NiCd, NiMH, Li-ion and SLA batteries
- Increased power-programmable from 100 mAh to 4 amps per station
- Programmable adapters allow customization of maintenance routines
- Proprietary reduction cycle restores NiCd and NiMH batteries
- Printer output for reports and labels with computer interface, includes both 9-pin serial and 25-pin parallel ports
- 100W Universal Power Supply (110-240 VAC) provides up to 4 amps of power per station
- Interchangeable adapter plates accommodate nearly all Motorola two-way batteries and other major brands

WPLN4124BR

portable radio: vehicular accessories

XTS 3000, XTS 3500, XTS 5000, XTS 1500, XTS 2500, MT 1500, and PR1500



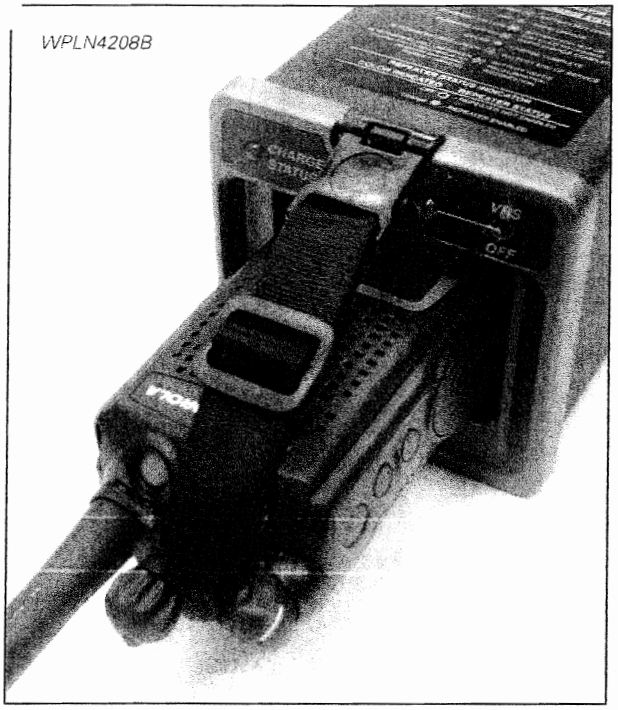
Vehicular Travel Charger

A great traveling companion that ensures constant communication while on the road. Its small compact design allows the radio to be used while rapid charging in the charger base. Unit includes a voltage regulated vehicular charger adapter, custom charger base, mounting bracket and coil cord.

RLN4884B	Vehicular Travel Charger
RLN5914A	Universal Mounting Bracket for RLN4884B. Includes screws and nylon strap cord.

TRAVEL CHARGER TRANSFORMERS

2580600E05	Transformer, 120 Volt, US
2580600E06	Transformer, 230 Volt, European
2580600E07	Transformer, 230 Volt, UK
2580600E08	Transformer, 220 Volt, Argentina

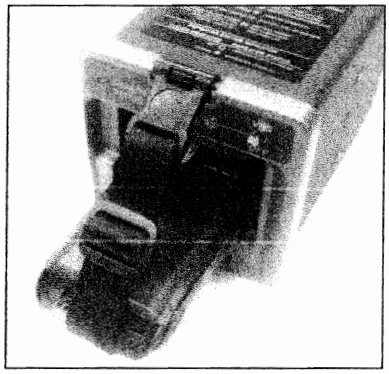


WPLN4208B

IMPRES Compatible Vehicular Charger

The IMPRES compatible vehicular charger has full IMPRES charger to battery communication capability. This ensures continuity of IMPRES battery charge data logging in a vehicular environment, so the IMPRES battery will receive adaptive, automatic reconditioning and will qualify for the 6-month capacity warranty extension. It is important to note that the IMPRES compatible vehicular charger will not recondition IMPRES batteries due to the operational demands in a vehicle, but it will provide an indication when the reconditioning is required in an IMPRES desktop charger.

WPLN4208B	IMPRES Compatible Vehicular Charger



This compact vehicular charger allows users to charge the battery while it's attached to the radio or alone.

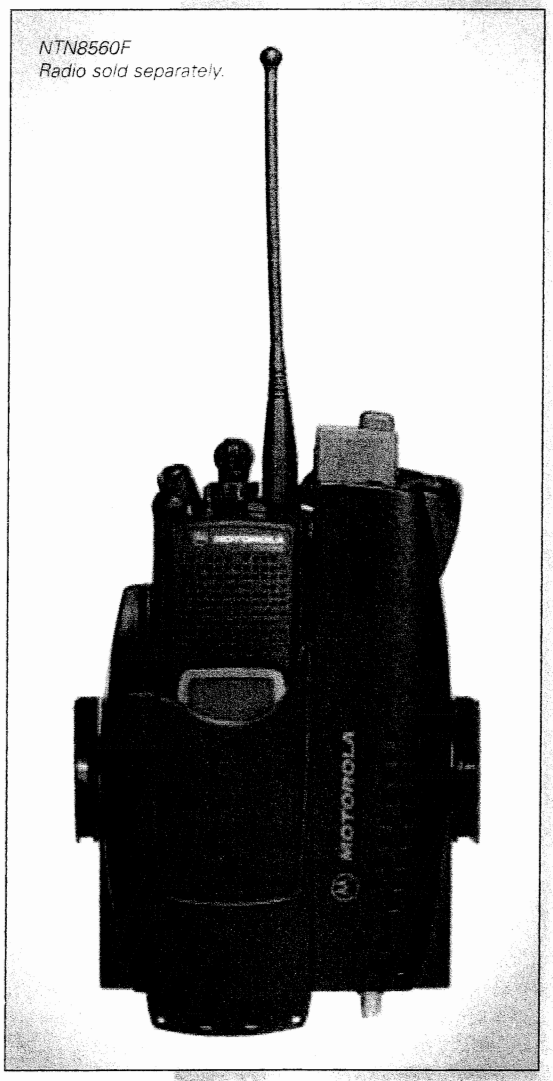
portable radio: vehicular adapters

XTS 3000, XTS 3500, XTS 5000, XTS 1500, XTS 2500, MT 1500, and PR1500

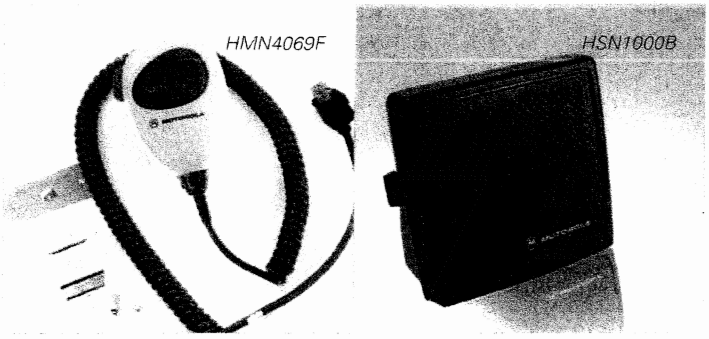
Vehicular Adapters

Allow users to adapt XTS 5000 portable radio for mobile operation. Providing in-vehicle rapid and trickle charging for NiCd, NiMH and Li-ion batteries, these units offer quick radio release, dead battery operation, and are powered by attaching the radio supply cable to the 12V battery located inside police cars, utility trucks or other vehicles. Connectors are provided for the vehicle's external antenna, mobile microphone and optional amplified loudspeaker HSN1000B – all required to allow operation of the portable radio in a way that is similar to that of a mobile. Also included is a general interface connector for additional accessories. A colored LED indicates battery recharge status. For XTVA operation, a microphone and RF Switch NTN8327A are required.

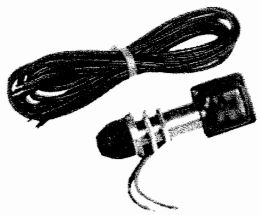
	ASTRO Digital XTS 5000
NTN8561F	Closed Face with Limited Keypad Access, Mini-UHF Connector
NTN8560F	Open Face with Limited Keypad Access, Mini-UHF Connector
NTN1607F	Closed Face, BNC Connector
NTN1606F	Open Face with Limited Keypad Access, BNC Connector
	ADAPTER KITS FOR ACCESSORIES
NTN8941A	XTVA Data Cable Kit. Required for additional accessories.
NTN8943A	XTVA Accessory Adapter Kit. Required for additional accessories.
	REQUIRED ACCESSORIES FOR VEHICULAR ADAPTERS
NTN8940B	Trunnion. Required for operation.
NTN8270A	Tool Wrench for RF Switch. Required for operation.
NTN8327B	RF Switch. Required for operation.
	OPTIONAL ACCESSORIES FOR VEHICULAR ADAPTERS
HMN4069F	Standard White Palm Microphone
PLN7737B	Hand Held Control Head
HSN1000B	External Speaker, Amplified, 6-Watt
HLN9330B	Emergency Foot Switch
GLN7280A	Emergency Push Button
NKN6455A	MTVA PA/Speaker Cable



NTN8560F
Radio sold separately.



HMN4069F *HSN1000B*



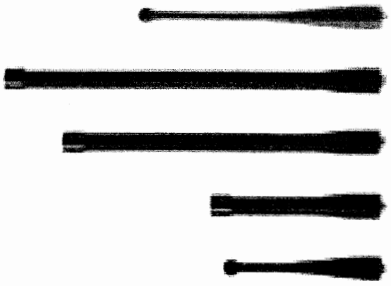
HLN9330B

portable radio: antennas

XTS 3000, XTS 3500, XTS 5000, XTS 1500, XTS 2500, MT 1500, and PR1500

Antenna Characteristics

Helflex antennas are engineered for maximum output and coverage. Stubby antennas are non-obtrusive, ideal for wearing the radio on a belt. Whip antennas are one-piece with a steel core for optimal radiation.



Flexible Whip

Flexible whip antennas have a one-piece finish and steel core for optimal radiation characteristics. They provide more comfort when radio is worn on the belt.

	ASTRO Digital XTS 3000/3500/5000
8505241U05	6 inch Flexible Whip Antenna, 403-520 MHz
8505241U03	7 inch Flexible Whip Antenna, 806-870 MHz
8505241U11	7 inch Flexible Whip, Dual Band Antenna, 764-870 MHz
	ASTRO Digital XTS 1500/2500, MT 1500 and PR1500
NAE6549AR	7 inch Flexible Whip Antenna, 380-520 MHz
8505241U03	7 inch Flexible Whip Antenna, 806-870 MHz
8505241U11	7 inch Flexible Whip Dual Band Antenna, 764-870 MHz

Helical

Helical antennas are sturdy and dependable. Each antenna is designed and built to quality standards. The skirt at the base of the connector helps to seal out damaging elements.The connector is made of plated brass material for long life.

	ASTRO Digital XTS 3000/3500/5000
8505644V01	7.5 inch Helical Antenna, 136-151 MHz
8505644V02	7 inch Helical Antenna, 151-162 MHz
8505644V03	6.5 inch Helical Antenna, 162-174 MHz
8505644V04	3.5 inch Helical Antenna, 403-435 MHz
8505644V05	3 inch Helical Antenna, 435-470 MHz
8505644V06	3 inch Helical Antenna, 470-520 MHz
	ASTRO Digital XTS 1500/2500, MT 1500 and PR1500
8505644V01	7.5 inch Helical Antenna, 136-151 MHz
8505644V02	7 inch Helical Antenna, 151-162 MHz
8505644V03	6.5 inch Helical Antenna, 162-174 MHz
NAE6546AR	3 inch Helical Antenna, 403-435 MHz
NAE6547AR	3 inch Helical Antenna, 435-470 MHz
NAE6548AR	3 inch Helical Antenna, 470-520 MHz

Wideband

Wideband antennas are ideal when the radio is used in different frequencies since one antenna will cover all ranges.

	ASTRO Digital XTS 3000/3500/5000
8505518V01	8 inch Wideband Antenna, 136-174 MHz

Stubby

This quarterwave stubby antenna is ideal when the radio is worn on a belt because the short antenna is non-obtrusive. This broad band antenna can be used for both 800 and 900 MHz applications.

	ASTRO Digital XTS 3000/3500/5000/1500/2500, MT 1500 and PR1500
8505241U06	4 inch Stubby Antenna, 806-941 MHz

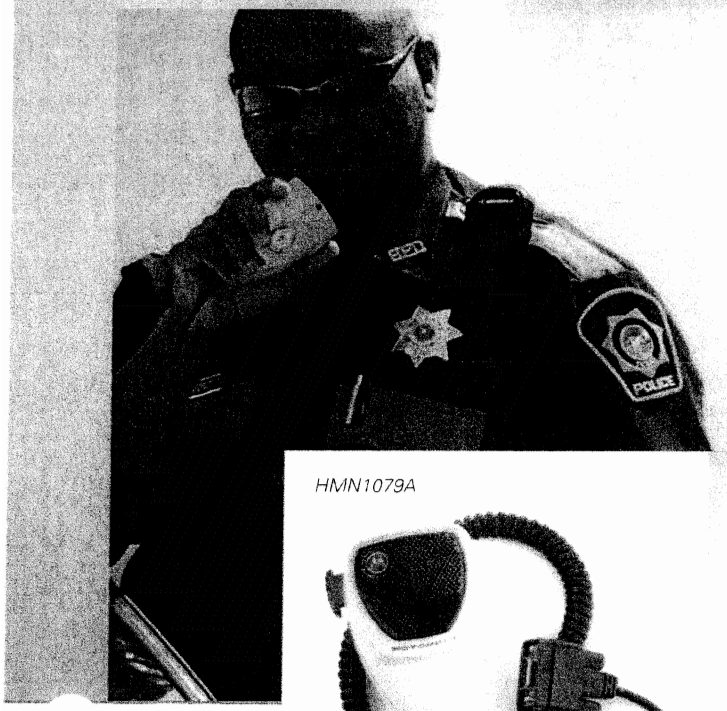
Dipole

Dipole antennas are injection molded in lasting polyurethane. The wide skirt at the bottom of the connector protects against damaging environmental elements. The dipole antenna is ideal when strong and solid signal clarity is demanded.

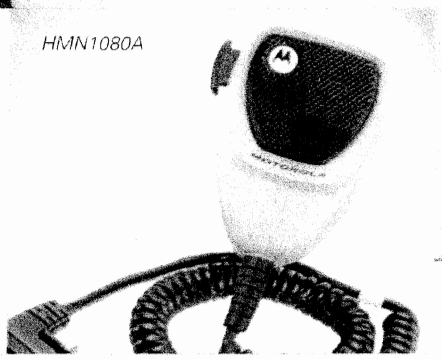
	ASTRO Digital XTS 1500/2500, MT 1500 and PR1500
NAF5039A	8 inch Dipole Antenna 806-870 MHz

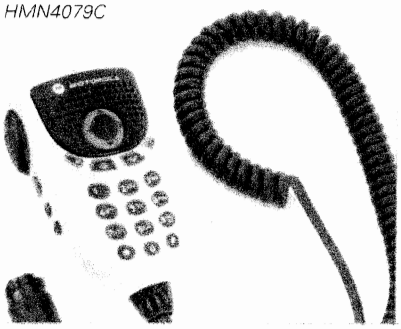
mobile radio: public address and speakers

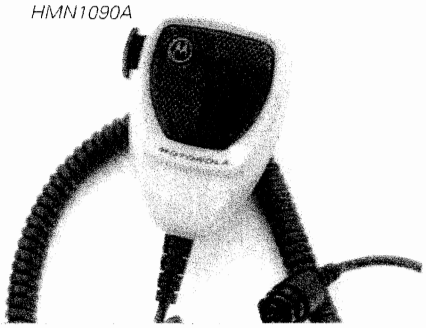
XTL 5000 – ASTRO Control Heads, XTL 1500/2500/5000 05, and PM1500



HMN1079A


HMN1080A


HMN4079C


HMN1090A

Mobile Microphones and Accessories

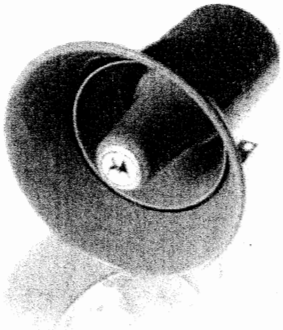
	XTL 5000 – ASTRO Control Heads
HMN1081A	Palm Microphone. For use with W9 Control Head.
HMN1079A	Water-Resistant Motorcycle Palm Microphone
HMN1080A	Standard Palm Microphone
	ASTRO XTL 1500/2500/5000 05 Control Head, PM1500
HMN4079C	Keypad Microphone
HMN1090A	Standard Palm Microphone
HMN1087A	Gooseneck Push-to-Talk. Attaches to vehicle steering column. For use with Visor Microphone.
HMN4089A	Visor Microphone, Remote Mount
HMN1089A	Modified GCAI Palm Microphone. Water-resistant.
HMN4097A	Telephone Style Handset with Keypad
HKN1018A	Hang Up Handset with Normal Armored Cable (Old-style)
HLN1457A	Handset with Hang Up Cup (Old-style)

mobile radio: public address and speakers

XTL 5000 – ASTRO Control Heads, XTL 1500/2500/5000 05, and PM1500

TDN6253A

TDN6254A



HSN4018C

Speakers for Siren and Public Address Kits

XTL 5000 – ASTRO Control Heads

TDN6251A	Siren Speaker. Round with Chrome Finish
TDN6252A	Siren Speaker. Rectangular with Chrome Finish
TDN6253A	Siren Speaker. Under hood with Grey Finish
TDN6254A	Siren Speaker. Round with Grey Finish

Sirens/DEK

XTL 5000 – ASTRO Control Heads

H1336B	Mobile Siren/PA (Includes DEK)
H1500B	Siren PA (Does not include DEK)
H1338A	8 Status/Message Message buttons included, only applicable for Systems 3.X and Earlier.

External Speaker

Provides audio for high ambient noise environments.

XTL 5000 – ASTRO Control Heads

HSN4018C	External Speaker

ASTRO XTL 1500/2500/5000 05 Control Head, PM1500

HSN4038A	External 7.5 Watt Speaker
HSN4032B	External 13 Watt Speaker

Motorcycle Speaker

ASTRO XTL 1500/2500/5000 05 Control Head, PM1500

HSN6003C	Motorcycle Speaker. Weather-resistant.

Control Station Accessories

XTL 5000 – ASTRO Control Heads

RMN5083A	Desktop Microphone
HPN4007C	Control Station Power Supply, High Power
HKN4139A	Power Cable
HLN6042A	Control Station Tray

ASTRO XTL 1500/2500/5000 05 Control Head, PM1500

RMN5070A	Desk Microphone
HLN6042A	Desk Tray with Speaker
HLN6925A	Control Station Mount
HPN4007C	Power Supply, 25-60 Watt Rated.

RMN5070A

HPN4007C

HSN4038A

mobile radio: switches, cables and trunnions

XTL 5000 – ASTRO Control Heads, XTL 1500/2500/5000 05, and PM1500

Emergency Switches

Enables user to send emergency messages to desktop consoles where signalling unit ID number is displayed, and alarm is sounded.

	XTL 5000 – ASTRO Control Heads
HLN5113B	Emergency Foot Switch
	ASTRO XTL 1500/2500/5000 05 Control Head, PM1500
HLN5113B	Emergency Foot Switch
HLN5131C	Emergency Push Button
GLN7278B	Foot Switch Push-to-Talk

Key Lock Mounts

	XTL 5000 – ASTRO Control Heads
HLN6025A	Key Lock Mount
	ASTRO XTL 1500/2500/5000 05 Control Head, PM1500
HLN6372A	Key Lock Mount

Adapter Cables

Allows mobile radio users to convert existing ASTRO Digital SPECTRA and ASTRO Digital SPECTRA Plus accessory cables for use with the XTL 5000 (ASTRO Control Heads).

	XTL 5000 – ASTRO Control Heads
HKN6158A	Audio Cable Adapter
HKN6159A	Adapter Cable Data Power Cables
HKN4191B	10-Foot Low-Mid Power Cable
HKN4192B	20-Foot Low-Mid Power Cable

Extension Cables

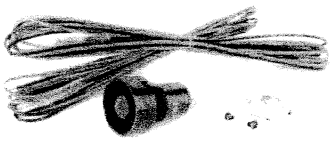
Allows user to extend microphone cord length. Compatible with HMN1089A and HMN1090A only.

	ASTRO XTL 1500/2500/5000 05, PM1500
PMKN4033A	Microphone Extension Cable - 10 Foot
PMKN4034A	Microphone Extension Cable - 20 Foot

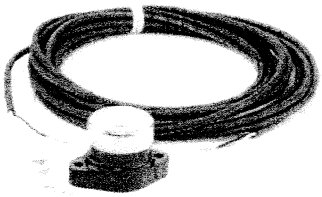
Remote Mount Cables

	XTL 5000 – ASTRO Control Heads
YKN4261A	10-Foot Front Control Head Cable
YKN4246A	30-Foot Front Control Head Cable
YKN4248A	50-Foot Front Control Head Cable
YKN4249A	75-Foot Front Control Head Cable
YKN4255A	115-Foot Front Control Head Cable
YKN4256A	150-Foot Front Control Head Cable
	ASTRO XTL 1500/2500/5000 05 Control Head, PM1500
HKN6164A	131-Foot Remote Mount Cable – 40 meters
HKN6165A	115-Foot Remote Mount Cable – 35 meters
HKN6166A	75-Foot Remote Mount Cable – 23 meters
HKN6167A	50-Foot Remote Mount Cable – 15 meters
HKN6168A	30-Foot Remote Mount Cable – 10 meters
HKN6169A	17-Foot Remote Mount Cable – 5 meters
HKN6170A	10-Foot Remote Mount Cable – 3 meters

HLN5113B



GLN7278B



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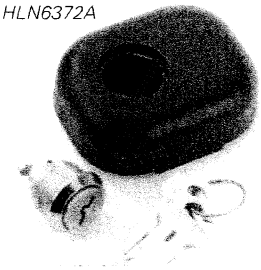

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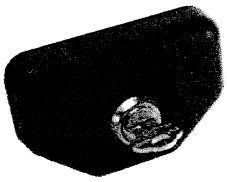


Power Cables

	ASTRO XTL 1500/2500/5000 05 Control Head, PM1500
HKN4191B	10-Foot Power Cable
HKN4192B	20-Foot Power Cable
HKN6032A	Motorcycle Power Cable
HKN6110B	100-Watt Power Cable

Miscellaneous Cables

	ASTRO XTL 1500/2500/5000 05 Control Head, PM1500
GKN6271A	Ignition Sense Cable
HKN6182A	Cable Keyloading Adapter - GCAI

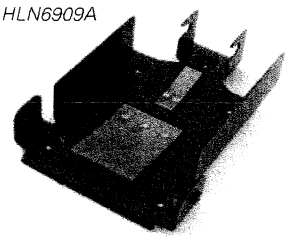
Remote Mount Kits

	XTL 5000 – ASTRO Control Heads
H1803A	Remote to Dash Mounting Kit
H1804A	Dash to Remote Mounting Kit
HKN6161A	20-Foot Dash Mount Data Cable Kit - IV&D
HKN6160A	6-Foot Dash Mount Data Cable Kit - IV&D

Trunnion Kits

	ASTRO XTL 1500/2500/5000 05 Control Head, PM1500
HKN6186A	Control Head Remote Mount Trunnion Kit
HLN6909A	Quick Release, High Power Trunnion Kit
HLN6910A	High Power Trunnion Kit. For XTL 5000 05 only.
HLN6861B	Standard Installation Trunnion Kit

HLN6909A

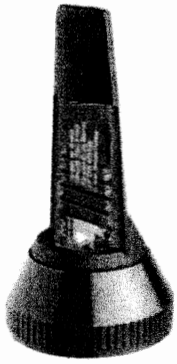


mobile radio: antennas

XTL 5000 – ASTRO Control Heads, XTL 1500/2500/5000 05, and PM1500

Laird Technologies

Laird Technologies designs and manufactures antennas to exacting electrical and mechanical specifications for critical applications in Defense, Public Safety, Transportation, Satellite, and Medical communications. These top quality mobile, portable and base antenna products utilize the latest patented technologies, lean manufacturing techniques, custom automation and vertical integration. These antennas are commonly used with wireless voice and data, asset tracking, and two-way radios, they are widely employed throughout the security, military, public safety, and other mission critical industries. Many of the Laird patented technologies offer solutions unavailable from other antenna manufacturers.



RDE5798A

Phantom Elite®

This exclusive low-profile, stealth antenna with Patented Field Diversity™ technology etched on a circuit board is for use with VHF, UHF, Dual Band and 2.4 GHz applications. Includes antenna only and attaches to the standard NMO ¾ inch mount – sold separately.

RDD5423A	150-155 MHz Unity Gain Phantom Elite, White
RDD5424A	150-155 MHz Unity Gain Phantom Elite, Black
RDE5797A	450-470 MHz 3dB Phantom Elite, White
RDE5798A	450-470 MHz 3dB Phantom Elite, Black
RDF5723A	806-866 MHz 3dB Phantom Elite, White
RDF5724A	806-866 MHz 3dB Phantom Elite, Black

Phantom®

Phantom true field diversity design ensures uninterrupted video and data transmissions in urban canyons and rural drop off areas 3dB MEG gain outperforms a 3dB whip in many applications. For mobile and fixed applications with NMO or permanent N female mount – sold separately.

Dual Band Antennas

RDG4479A	821-869/1850-1990 MHz 3dB Dual Band Phantom, White
RDG4480A	821-869/1850-1990 MHz 3dB Dual Band Phantom, Black

Single-Band Antennas

RAD4209A	142-160 MHz Tunable Phantom NMO mtg 60W, Black
RAD4210A	142-160 MHz Tunable Phantom NMO mtg 60W, White
RAD4207A	150-168 MHz Tunable Phantom NMO mtg 60W, White
RAE4167A	450-470 MHz 3dB Phantom NMO ¾ Mount, White
RAE4168A	450-470 MHz 3dB Phantom NMO ¾ Mount, Black
RDE5514A	450-470 MHz 3dB Phantom with ⅝ stud permanent mount N female, White
RAF4220A	806-866 MHz 3dB Phantom NMO ¾ Mount, White
RAF4217A	821-896 MHz 3dB Phantom NMO ¾ Mount, White

RAE4167A

RDE5514A

mobile radio: antennas

XTL 5000 – ASTRO Control Heads, XTL 1500/2500/5000 05, and PM1500

A-Base

Gold-plated push-pin contact provides the most corrosion resistance and power transfer over time. Longer tuning ferrule allows for greater freedom in frequency adjustment without trimming. Includes antenna only and attaches to the standard NMO ¾ inch mount – sold separately.

RDD5410A	150-174 MHz ¼ Wave Chrome Center Tunable A-Base Whip
RDD5408A	150-174 MHz ¼ Wave Chrome Center Tunable A-Base Whip with Spring
RDF5433A	806-896 MHz 3dB Chrome Open Collinear A-Base
RDD5553A	118-896 MHz ¼ Wave Chrome Tunable A-Base

Quarterwave Antennas

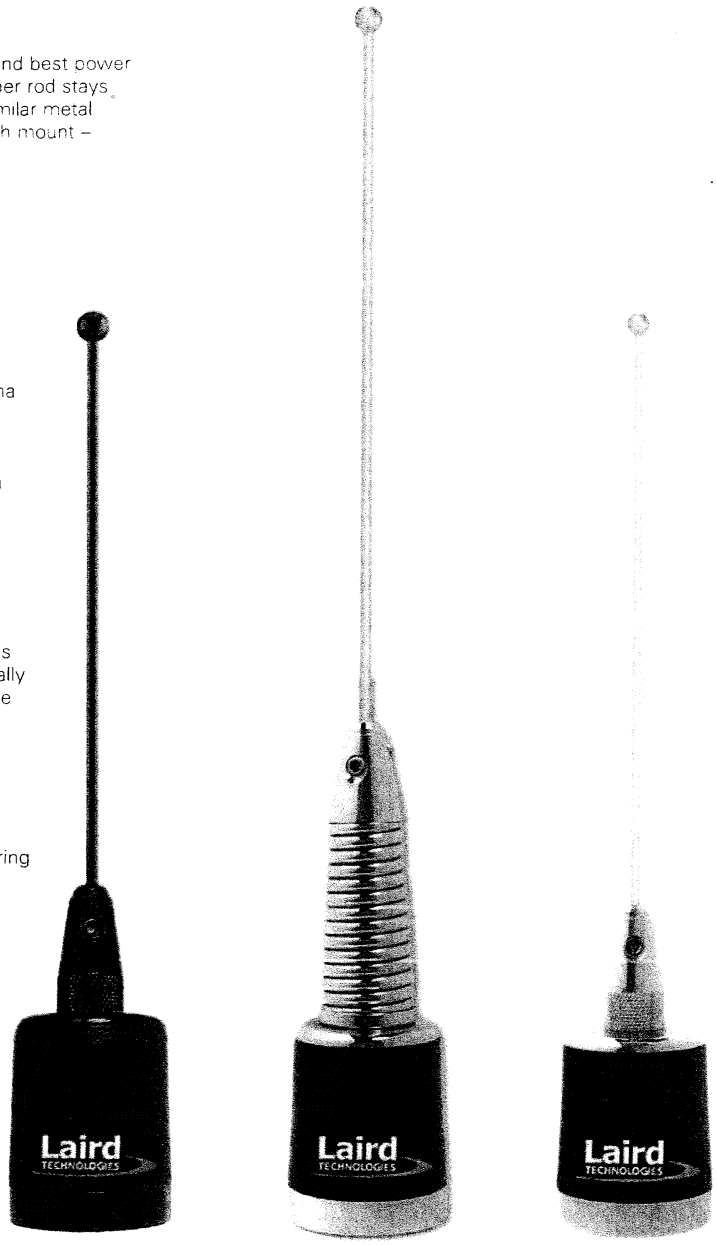
Quarterwaves are built with gold plated contacts for corrosion resistance and best power transfer. Stand up™ grommet will not degrade over time. High spring temper rod stays straighter longer. Stainless steel corona ball stays on the rod without dissimilar metal interaction. Includes antenna only and attaches to the standard NMO ¾ inch mount – sold separately.

RAD4229A	162-174 MHz ¼ Wave Stainless Antenna
RDD5227A	152-162 MHz ¼ Wave Stainless Antenna
RDD5228A	152-162 MHz ¼ Wave Black Antenna
RDE5485A	450-470 MHZ ¼ Wave Stainless Antenna
RDE5486A	450-470 MHz ¼ Wave Black Antenna
RDF5436A	806-896 MHz ¼ Wave Stainless Antenna
RDF5439A	806-866 MHz 3dB Stainless Open Coil Flexible Antenna
RDF5437A	806-896 MHz ¼ Wave Black Antenna
RDF5438A	806-866 MHz 3dB Black Open Coil Flexible Antenna
RDF5617A	118-970 MHz ¼ Wave Stainless Field Tunable Antenna
RDF5657A	118-970 MHz ¼ Wave Black Field Tunable Antenna
RDB4497A	27-54 MHz ¼ Wave Stainless Antenna

Mobile Load Coil

Low loss coil form adds dimensional and frequency stability. ABS material is injection molded around solid brass inserts to create a housing that is virtually leak proof. All silver solder joints ensure electrically and mechanically secure connections. All NMO mountable. Includes antenna and attaches to the standard NMO ¾ inch mount – sold separately.

RDD5229A	132-525 MHz VHF Broadband ¼ Wave with spring
RDD5230A	144-174 MHz ½ Wave No ground Plane 2.4dB
RDD5413A	144-174 MHz ½ Wave No ground Plane 2.4dB with spring
RDD5231A	144-174 MHz 3dB Base Loaded ⅝ Wave
RDD5414A	144-174 MHz 3dB Base Loaded ⅝ Wave with spring
RDE5487A	450-470 MHz 3dB Base Loaded ⅝ Wave
RDE5488A	450-470 MHz 5dB ⅝ Wave Closed Collinear
RDE5785A	450-470 MHz 5dB Closed Collinear with spring
RDF5440A	806-866 MHz 3dB Base Loaded ⅝ Wave
RDB4499A	42-48 MHz Base Loaded Wideband



RDD5414A RDD5231A

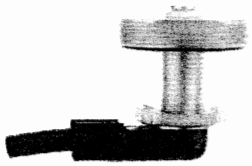
mobile radio: antennas

XTL 5000 – ASTRO Control Heads, XTL 1500/2500/5000 05, and PM1500

Laird TECHNOLOGIES

Laird Technologies

Laird Technologies land mobile radio antennas are the industry standard for public safety agencies, fleet and transportation networks. From 27 MHz to 5.8 GHz, Laird Technologies designs and manufactures a wide variety of mobile antennas with a multitude of mounting options. Multiple cable options, connectors, mounts and bracket products provide a complete antenna system.



RRDN6798A

Mobile Mounting Equipment

All brass construction and gold plated contact design ensure the most corrosion resistance and best power transfer available. Silver soldered ground lug and contact virtually eliminate RF noise or static.

RRDN4927A	¾ inch Hole brass NMO Mount with 17' RG58A/U cable, no connector
3080384M48	¾ inch Hole brass NMO Mount with 17' RG58U cable, mini-UHF connector (not attached)
RRDN5461A	¾ inch Hole brass NMO Mount with 17' RG58A/U cable, mini-UHF connector (not attached)
RRDN5628A	¾ inch Hole brass NMO Mount with 17' Teflex – no connector
RRDN6063A	¾ inch Hole brass NMO Mount with 17' RG58A/U cable, PL259 connector (not attached)
RRDN6945A	¾ inch Hole brass NMO Mount with 17' RG58U cable, PL259 connector (not attached)
RRDN6946A	¾ inch Hole brass NMO Mount with 17' RG58U cable, no connector
RRDN6798A	¾ inch or ⅜ inch Hole (up to ½ inch thick) plate mount with 17' RG58A/U cable, no connector
RRDN6847A	Mobile-to-Base converter for VHF and UHF, N terminated
RRDN6848A	Quarterwave Chrome Rain Cap for NMO Mount
RRDN6849A	Quarterwave Black Rain Cap for NMO Mount
RRDN7132A	Chrome Quarterwave Nut
RAN4049A	¾ inch Hole Mount O-ring 6-pack
RAN4052A	⅜ inch Hole Brass Mount. For use with RG58 size cable (not included) no connector

mobile radio: antennas

XTL 5000 – ASTRO Control Heads, XTL 1500/2500/5000 05, and PM1500

MOTOROLA ORIGINAL

Through-hole Mount Antennas

	VHF ANTENNAS
HAD4006A	136-144 MHz ¼ Wave
HAD4007A	144-152 MHz ¼ Wave
HAD4008A	152-162 MHz ¼ Wave
HAD4009A	162-174 MHz ¼ Wave
HAD4017A	146-174 MHz ¼ Wave
RAD4010ARB	136-174 MHz 3.0dB Wave
	UHF ANTENNAS
HAE6012A	380-433 MHz ¼ Wave
HAE4003A	450-470 MHz ¼ Wave
HAE6010A	380-433 MHz 3.5dB Gain
HAE4012A	470-494 MHz 3.5dB Gain
HAE4011A	450-470 MHz 3.5dB Gain
HAE6011A	380-433 MHz 5.0dB Gain
RAE4014A	450-470 MHz 5.0dB Gain
HAE6013A	380-470 MHz Wideband 2.0dB
HAE4004A	470-512 MHz ¼ Wave
HAE4013A	494-512 MHZ 3.5dB Gain
RAE4016ARB	494-512 MHz 5.0dB Gain
	700-800 MHz ANTENNAS
HAF4013A	762-870 MHz 3dB Gain Low Profile
HAF4014A	762-870 MHz 3dB Gain Elevated Feed
HAF4016A	762-870 MHz ¼ Wave Through-hole Mount
HAF4017A	762-870 MHz 3dB Gain Collinear Through-hole Mount
HAF4015A	762-870 MHz 3dB Gain Motorcycle
HAF4018A	762-870 MHz Low Profile Motorcycle

Mobile Antennas

A communication system is only as good as the mobile antenna used to transmit and receive — so whenever lines are on the line Motorola Original accessories should be the go-to choice.

HAD4006A

HAE4003A

STREAMLINED SOLUTIONS FOR A SINGLE RADIO OR ENTIRE FLEET

Every Motorola two-way radio can be customized to suit your current and future communication needs. All Motorola Original® accessories are built to the highest standards of quality, and are specially engineered to perfect complement your radio's performance. So don't wait any longer to increase your productivity with optimum two-way radio performance.

MOTOROLA

Motorola, Inc.
1301 East Algonquin Road
Schaumburg, IL 60196

www.motorola.com

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Specifications subject to change without notice.

R3-9-2011 10/08

THIS BUSINESS LICENSE MUST BE DISPLAYED AT PLACE OF BUSINESS

READ REVERSE SIDE

BUSINESS LICENSE

CITY OF TORRANCE

Exp. Date: **12/31/2011**

LICENSE NO	CATEGORY		AMOUNT PAID	ISSUE DATE
Lic-SC- 111984	2030	Contrs. C-7 Low Voltage Systems	$221	**4/18/2011**

ISSUED TO:

ADVANCED ELECTRONICS, INC
2601 MANHATTAN BEACH BLVD

REDONDO BEACH, CA 90278

Annual business tax is due and payable January 1st each year, and is delinquent if not paid on or before the last day of January each year.

ISSUED BY FINANCE DEPARTMENT

ASSISTANT FINANCE DIRECTOR

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