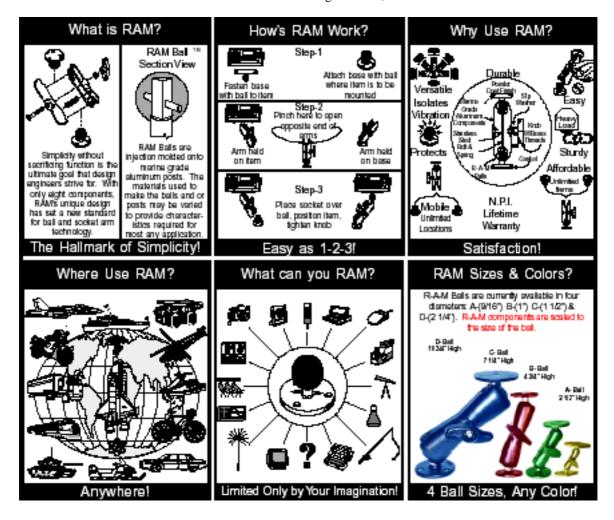
Awarded 99's Best Product of the Year under \$50.00 by Aviation Consumer
Best of Show at MED TRADE 99
Best of Show at PMA 97 & 2nd in 98



RAM® MOUNTING SYSTEMS®

RAM is the revolutionary universal ball and socket mounting system that allows you to mount practically anything anywhere. Unlike other mounts on the market, RAM allows you to mount items where you need them most. Our yoke mounting systems gives the pilot an option of positioning the arm over or under the yoke depending on your specific requirements. If yoke mounting is not desired then RAM also fits that demand by enabling the pilot to attach a base with ball in a more convenient location. Then by simply turning a knob, the hand held device can be positioned for the very best viewing angle. Whether its in an aircraft, automobile, boat, ATV, truck, snowmobile, farming vehicle, motorcycle, fork lift or any other situation, RAM's family of over 200 interchangeable accessories will offer you solutions to your most challenging mounting problems. If you need to mount a GPS, camera, light, computer, cellular phone, speaker, mirror, antenna, or just about anything else look no further. RAM mounts will help you make a professional job easy and affordable. It's unique design provides easy installation, mobility, strength, versatility, vibration protection and durability, all at a low cost. RAM is backed by NPI's renowned Lifetime Warranty which makes it the mounting system of choice. To provide light weight strength and corrosion resistance, RAM is made of marine grade aluminum with a powder coated finish, stainless steel hardware and rubber balls. Recognized and accepted by the U.S. Patent Office, RAM is the only universal ball-andsocket system that holds tremendous amounts of weight in high vibration applications for military, commercial and private use. Visit the RAM web site at: http://www.ram-mount.com to see the newest products and to learn more about this revolutionary mounting system that is quickly becoming the industry standard. Remember when faced with a difficult mounting situation, Just RAM It!



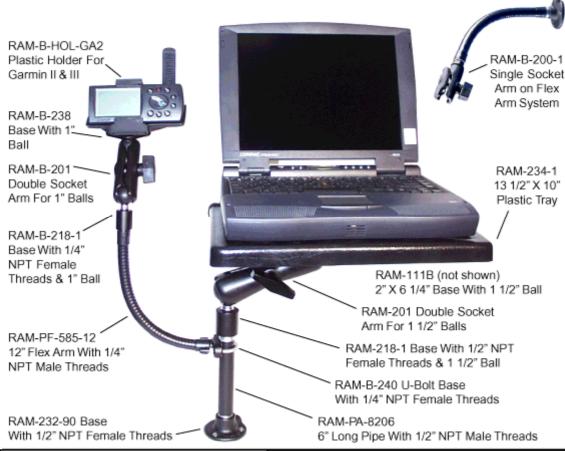
RAM® BALL SIZES

With more than 600 part numbers with four ball sizes it is important to first understand the RAM-?-XXX numbering system. To order RAM Systems or components one must first understand our numbering system. To help you understand our format we are providing the following examples. It is four different sizes of a basic RAM Mounting System and corresponding Base With Ball. RAM-D-101 & D-202 would have 2 1/4" balls, RAM-101 & 202 would have 1 1/2" balls, RAM-B-101 & B-202 would have 1" balls and the RAM-A-102 & A-238 would have 9/16" balls. Note that the C size balls don't require the letter C following the RAM- while all other sizes do require a letter. Be careful to make sure to have the letter in the proper location of the part number so as to order the correct size system or component.



RAM® ARMS SIZES, STYLES & LENGHTS

Double Socket Arms, Single Socket Arms, Pedestal Bases and Flex Arm Systems are available in four ball sizes. Double Socket Arms also come in three different lengths for each size of ball size. RAM Arm Sizes, Styles & Lengths Double Socket Arms, Single Socket Arms, Pedestal Bases and Flex Arm Systems are available in four ball sizes. Double Socket Arms also come in three different lengths for each size of ball size.



A, B, C or D Size Double	R-A-M Double Socket Arm Chart					
Socket Arms	Ball Size	Short	Standard	Long	Center To Center Length	Overall Height
	A	RAM-A-201-AA	RAM-A-201	RAM-A-201-B	S- 1* STD 1 3/4* L- 3*	S- 2 3/8" STD,- 1 3/4" L- 4 3/8"
	В	RAM-B-201A	RAM-B-201	RAM-B-201-C	S- 1 3/4" STD 3" L- 5 1/4"	S- 3 3/4" STD 5" L- 7 1/14"
	O	RAM-201-B	RAM-201	RAM-201-D	S- 2 1/4" STD 4 5/8" L- 7 7/8"	S- 5 1/4" STD 7 3/8" L- 10 3/4"
Long Standard Short Variable	۵	RAM-D-201-C	RAM-D-201	RAM-D-201-E	S- 3 5/8" STD 6 7/8" L- 11 3/4"	S- 8 1/4" STD 11 1/2" L- 17.25"

RAM® SWING ARMS SYSTEM

RAM's modular compatibility and design provides easy assembly of: Single Swing Arms, Double Swing Arms (or more), Swing Arms with Balls, Swing Arms on Pedestal Bases or many other configurations.



Part Number	RAM-109H	RAM-109H-1	RAM-109H-2	RAM-109V	RAM-109V-1	RAM-109V-2	RAM-109-1A
Description	Single Swing Arm System For Horizontal Surfaces	Double Swing Arm System For Horizontal Surfaces	Single Swing Arm System With 1 1/2" Ball System For Horizontal Surfaces	Single Swing Arm System For Vertical Surfaces	Double Swing Arm System For Vertical Surfaces	Single Swing Arm System With 1 1/2" Ball System For Vertical Surfaces	Single 6" Extension Arm For Any Swing Arm System
Overall Dimensions Top Plate: 6.25" X 2"	Base: 3.25" Sq. Length: 8.5" Height: 5"	Base: 3.25" Sq. Length: 14.5" Height: 6"	Base: 3.25" Sq. Length: 8.5 Height: 6.5"	Base: 3.25" Wd 4" Ht. Length: 9.5" Height: 7"	Base: 3.25" Wd 4" Ht, Length: 15.5" Height: 9"	Base: 3.25" Wd 4" Ht, Length: 9.5" Height: 7.5"	Length: 6" On Center Height: 2"

LET NPI BUILD YOU A RAM® MOUNT







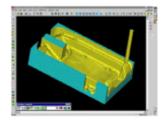
CAD Concept



Rapid Prototype Sample Part



Check Design



CAM Mold



Build Tooling



Mold Part

If you require a custom R-A-M System or component, depend on National Products Inc. to deliver. We will provide the necessary technology and expertise to assist you with your project in a professional expedient manner. Supply us with your CAD file or let our engineering department assist you with a design. Our qualified engineering, tooling, manufacturing and marketing staff will begin & complete your project with a top down bottom up approach. This method of production produces a part that will meet or exceed your requirements not only in design and function but from a sales standpoint. NPI sets the standards by remaining constantly on the cutting edge by using state of the art technology in our CAD, CAM and Rapid Prototype Systems. NPI's in-house tooling shop has highly skilled craftsmen that produce tools for sand casting, die casting, permanent mold casting, lost wax casting, plastic injection molding, vacuform molding, rubber injection molding and various other types of tools. Customer design requests can become reality within 4 to 10 weeks with test samples at 2 weeks. Contact our design department to see how simple and affordable it is to have a custom R-A-M Mounting System manufactured for your companies next mounting project.



RAM® CUSTOM CRADLES AND HOLDERS

Electronics manufactured by Lowrance, Allied Signal, Visteon, Kenwood, Garmin, Nokia, Magellan, Symbol Technologies, Intermec-Norand, JVC, Percon, EchoFlight and Icom are products we have custom mounts for. If you don't see what you want, contact us with the details.



RAM® IN USE PICTURES

The RAM In Use Pictures are intended to aid in learning more about the systems and components. Here's how it works, find a picture that has an application similar to your needs, then look up the corresponding number on the RAM In Use Description page (page 11). If you require additional information after doing this, contact us with one of the methods listed on the back cover of this catalog.



RAM® IN USE PICTURES



RAM® IN USE PICTURES



RAM® In Use Pictures Descriptions

After finding an In Use Picture, look up the matching number below to learn what it is and what part numbers make it up.

- 1. RAM-111 Universal Mount with 1 1/2" dia. balls holding a sonar unit. Includes 1- RAM-202 base, 1-RAM-201 arm & 1-RAM-111B base.
- 2. RAM-134-90 Laptop computer tray on 12" pedestal system with 1 1/2" balls. Includes 1-RAM-232-90 base, 1-RAM-PA8206 pipe, 1-RAM-218-1 ball, 1-RAM-201 arm, 1-RAM-111B base & 1-RAM-234-1 tray.
- 3. RAM-B-127 Universal clamp mount with 1" balls for cameras, GPS, radios, radar detectors, etc. Works from 1/8" to 1" thick. Includes 1-RAM-B-127B clamp, 1-RAM-B-201 arm & 1-RAM-202A base.
- 4. RAM yoke mount with 1" balls for Garmin GPS II & III series. Shown with 1-RAM-B- 121B clamp, 1-RAM-B-201 arm, 1-RAM-B-238 base & 1-RAM-HOL-GA2 holder.
- 5. RAM mount with 1" balls for Palm Pilot III. Shown with a RAM-B-101 mount and a Revolve Design cradle. Cradle may be purchased from Revolve Design Co.
- RAM-B-102 Universal Mounting System with 1" balls. Shown using a RAM-202PSA double backed adhesive pad to attach the base to the CD player.
- 7. RAM Pedestal System with 1" double ball. Shown with 1-RAM-B-232-90 base, 1-RAM-PA5409 pipe, 1-RAM-B-217-1 base, 2-RAM-B-201 arms, & 2-RAM-B-237 bases.
- RAM-107 Mount with 1 1/2" balls for Humminbird and Apelco sonar units. Includes 1-RAM-202 base, 1-RAM-201 arm & 1-RAM-107B base.
- 9. RAM-B-141-1290 Flex arm mount with double socket arm for 1" balls. Includes 1-RAM-B-232-90 base, 1-RAM-PF-585-12 flex pipe, 1-RAM-B-218 base, 1-RAM-B-201 arm & 1-RAM-B-202 base.
- 10. RAM-D-101, RAM-101 & RAM-B-101 Shown on Bosch brand aluminum extruded structural rail.
- 11. RAM-109H-1 Double Swing Arm System for horizontal surfaces.
- 12. RAM-114-R R-A-M Rod Fishing Rod Holder System with rail mounting base.
- 13. Swing Arm Mounting System for Vertical surfaces with 13 1/2" X 10" Tray. Shown with 1-RAM-109V arm mount & 1-RAM-234-1 tray.
- 14. Universal flashlight holder with magnetic base and 1" balls. Shown with 1-RAM-210 mag base, 1-RAM-B-202 base, 1-RAM-B-201 arm & 1-RAM-B-108B base.
- 15. Universal camera mount with 11/2" balls. Shown with 1-RAM-202 base, 1-RAM-201 arm & 1-RAM-202A base with stud.
- RAM-A-101 Universal Mount with 9/16" balls shown with radio face plate. Includes 2-RAM-A-238 bases & 1-RAM-A-201 arm.
- 17. RAM-B-138-BC1 Universal Belt Clip Holder System with 1" balls. Includes 1-RAM-B- 202 base, 1-RAM-B-201 arm, 1-RAM-B-238 base & 1-RAM-HOL-BC1 belt clip holder.
- 18. RAM-B-148-GA2 Mount with 1" balls, suction cup and holder for Garmin GPS II & III series. Includes 1-RAM-B-224 cup, 1-RAM-B-201 arm, 1-RAM-B-238 base & 1-RAMHOL-GA2 holder.
- 19. RAM-B-111 Universal Mount with 1" balls holding a radio unit. Includes 1-RAM-B-202 base, 1-RAM-B-201 arm & 1-RAM-B-111B base.
- 20. RAM-109V Swing Arm System for vertical surfaces.
- 21. RAM-B-111 Universal Mount with 1" balls holding a sonar unit. Includes 1-RAM-B- 202 base, 1-RAM-B-201 arm & 1-RAM-B-111B base.
- 22. RAM-B-120 Universal Quick Release Holder with 1" balls shown with a hend-held GPS. Includes 1-RAM-B-202 base, 1-RAM-B-201 arm & 1-RAM-B-120B holder.
- 23. RAM-B-148-GA4 Mount with 1" balls, suction cup and holder for Garmin GPS E-Map series. Includes 1-RAM-B-224 cup, 1-RAM-B-201 arm, 1-RAM-B-238 base & 1-RAMHOL-GA4 holder.
- 24. RAM-101 Universal Mount with 1 1/2" balls & Gamber-Johnson computer tray. Includes 2-RAM-202 bases & 1-RAM-201 arm. Tray may be purchased from Gamber Johnson Co.
- Universal Mount on rail with 1" balls for Lowrance GPS. Shown with 1-RAM-B-233 rail adapter, 2-RAM-B-202 bases, 1-RAM-B-201 arm & 1-RAM-HOL-LO1 holder.
- 26. RAM-105-1 Universal Mount with 1 1/2" balls for Bottom Line sonar units. Shown with 1-RAM-202 base, 1-RAM-201 & 1-RAM-105-1B cone base.
- 27. Vertical Swing Arm System with 1 1/2" ball mount. Shown with 1-RAM-109V-2 arm system, 1-RAM-208 base, 1-RAM-201 arm & 1-RAM-111B base.
- 28. RAM-B-102 Universal Mount with 1" balls and generic phone holder. Includes 2-RAM-B-238 bases & 1-RAM-B-201 arm. Generic holder may be found at your local cellular phone store.
- 29. RAM-114-B R-A-M Rod Fishing Rod Holder System with bulkhead mounting base.
- 30. Universal Mount on rail with 1" balls for Magellan Blazer 12, 310, 315 & 320. Shown with 1-RAM-B-233 rail adapter, 1-RAM-B-202 base, 1-RAM-B-201 arm, 1-RAM-B-238 base & 1-RAM-HOL-MA1 holder.

- 31. RAM-B-101 Universal Mounting System with 1" balls. Shown using a RAM-202PSA double backed adhesive pad to attach the base to the Visteon GPS unit.
- 32. RAM-B-101 Universal Mounting System with 1" balls. Shown using a RAM-202PSA double backed adhesive pad to attach the base to the JVC Flat panel LCD screen.
- 33. RAM yoke mount with 1" balls for Lowrance GPS Air Map 100 series. Shown with 1-RAM-B-121B clamp, 1-RAM-B-201 arm, 1-RAM-B-125B base & 1-RAM-HOL-LO1 holder.
- 34. RAM-B-138-KE2 Universal Holder System with 1" balls for Kenwood VC-H1. Includes 2-RAM-B-238 bases, 1-RAM-B-201 arm & 1-RAM-HOL-KE2 holder.
- 35. RAM-B-126 Tournament water ski mirror (7" X 14") with 1" ball mount.
- 36. RAM-B-101A Universal camera mount with 1" balls. Includes 1-RAM-B-202 base, 1-RAM-B-201 arm & 1-RAM-B-202A base with 1/4"-20 stud.
- 37. Universal Double Arm Mount with 1 1/2" balls holding a sonar unit. Shown with 1-RAM-202 base 2-RAM-201 arms, 1-RAM-230 double ball & 1-RAM-111B base.
- 38. Pedestal & flex arm system with 4- 1" balls & 2- 1 1/2" balls. Shown with 1-RAM-232-90 base, 1-RAM-PA8206 pipe, 1-RAM-B-231 u-bolt base, 1-RAM-PF-585-12 flex arm, 1-RAM-B-217-1 base, 2-RAM-B-201 arms, 1-RAM-B-120B holder, 1-RAM-B-202 base, 1-RAM-218-1 base, 1-RAM-201 arm, 1-RAM-111b base, 1-RAM-234-1 tray & 1 holder from Revolve Design for Palm Pilot III.
- 39. RAM-B-145 Universal Holder System with 1" balls for Garmin Street Pilot series. Includes 1-RAM-B-202 base, 1-RAM-B-201 arm & 1-RAM-B-145B base.
- RAM-B-102 Universal Mount with 1" balls shown holding speaker. Includes 2-RAMB-238 bases & 1-RAM-B-201 arm.
- 41. Viking lighting system on folding tri-pod. Shown with 1-RAM-205 tri-pod, 1-RAM-201 arm & 1-Viking Light.
- 42. RAM-B-138-GA1Universal Holder System with 1" balls for Garmin 12 series GPS. Includes 1-RAM-B-202 base, 1-RAM-B-201 arm, 1-RAM-B-238 base & 1-RAM-HOLGA1holder.
- 43. Universal mount with 1" balls & mag base holding a hand-held meter & flashlight. Shown with 1-RAM-210 mag base, 1-RAM-B-217 base, 2-RAM-B-201 arms, 1-RAM-B-120B holder & 1-RAM-B-108B base.
- 44. RAM-114-F R-A-M Rod Fishing Rod Holder System with flush mounting base.
- 45. RAM-B-138-GA3Universal Holder System with 1" balls for Garmin 45, 48, 89, 90 & 92 series GPS. Includes 1-RAM-B-202 base, 1-RAM-B-201 arm, 1-RAM-B-238 base & 1-RAM-HOL-GA3 holder.
- 46. RAM-118 Universal mount with 1 1/2" balls holding a lantern. Includes 1-RAM-202 base, 1-RAM-201 arm & 1-RAM-118B saddle with adjustable stainless steel strap.
- 47. RAM-B-120-231Z Universal Quick Release Holder with 1" balls & u-bolt base shown with a hend-held GPS. Includes 1-RAM-B-231Z u-bolt base, 1-RAM-B-201 arm & 1-RAM-B-120B holder.
- 48. RAM-B-138-BC1 Universal Belt Clip Holder System with 1" balls. Includes 1-RAM-B-202 base, 1-RAM-B-201 arm, 1-RAM-B-238 base & 1-RAM-HOL-BC1 belt clip holder.
- 49. Universal spotlight, umbrella or pole mount with 1 1/2" balls. Shown with 1-RAM-202 base, 1-RAM-201 arm, & 1-RAM-226 holder
- Flex arm system with 6- 1" balls and 3 arms. Shown with 1-RAM-B-232-90 base, 1-RAM-PF585-12 flex arm, 1-RAM-B-217-1 base, 1-RAM-B-231 u-bolt base, 3-RAM-B-201 arms, 2-RAM-B-238 bases, 1-RAM-B-202 base, 1-RAM-HOL-KE1, 1-RAM-HOL-KE2 & 1-RAM-HOL-LO1 holders.
- 51. Universal mount with 13.5" X 10" plastic tray on Bosch aluminum extruded structural rail. Shown with 1-RAM-202 base, 1-RAM-201 arm, 1-RAM-111B base & 1-RAM-234-1 tray.
- 52. Picture shown with 2 qty. RAM-109V Swing Arm Systems holding various electronic equipment on a pedestal guard aboard a sailboat.
- 53. RAM-117 R-A-M Rod Fishing Rod Holder System with 1 1/2" balls. Includes 1-RAM-202 base, 1-RAM-201 arm & 1-RAM-117B rod holder.
- 54. R-A-M Tube Fishing Rod Holder System on rail. Shown with 1-RAM-119 R-A-M Tube Rod Holder & 1-RAM-233 rail mount adapter.
- 55. RAM-B-149-GA2 Universal Holder System with 1" balls & u-bolt base for Garmin II & III series GPS. Includes 1-RAM-B-231Z u-bolt base, 1-RAM-B-201 arm, 1-RAM-B-238 base & 1-RAM-HOL-GA3 holder.
- 56. RAM-109H Swing Arm System for horizontal surfaces.

RAM® Systems

With more than 600 R-A-M Compatible Components, the possibility of different configurations is limitless. We have assembled some basic mounts based on past customer requests. They are shown below with their corresponding part and frame number. If you find a picture that is similar to your design, then look up the corresponding frame number on the R-A-M Systems Description page. If you require a variation of a mount that you see, or have a new concept, contact us with one of the method found on the back cover of this catalog and let NPI assist you with your mounting solution.



RAM® Systems



RAM® Systems

37.	38.	39.	40.
41.	42.	43.	44.
45.	46.	47.	48.
49.	50.	51.	52.
53.	54.	55.	56.

RAM® COMPUTER SYSTEMS

NEW FOR 2002 RAM VEHICLE MOUNTS FOR ELECTRONICS

Here are some of the many new RAM Vehicle Mounting Systems we are releasing for 2002. They include Seat Rail, Bi-Pod, Tri-Pod & Flange bases, available in 1 ½" and 2 1/4" ball diameters. Both single and multiple swing arms with the famous RAM ball and socket non slip vibration absorbing joint and the basic pedestal with double ball and socket arm. The possible mounting solutions are endless and affordable. They're all backed by the NPI Lifetime Warranty. The standard finish is black powder coating over aluminum castings.

Patented Non-Slip Rubber Ball & Socket Feature — Absorbs vibration to protect valuable electronics while providing perfect viewing and operating angles

6" Long Aluminum Swing Arm With Single Ball Socket Adjust position or remove with the twist of a knob

6" Long Stacking Aluminum Swing Arm Add arms to get desired length or function

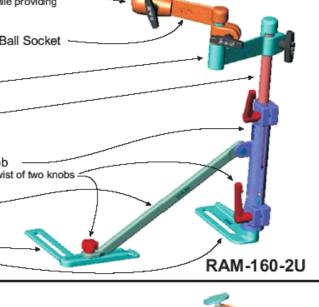
Telescoping Aluminum Pedestal

Raise or lower arms for perfect functional height

Pedestal Housing With Quick Release Knob
Remove system in less than 10 seconds with the twist of two knobs

Stabilizer Arm With Quick Release Knob Sliding removable arm secures pedestal housing

Versatile Seat Rail Brackets
Use Existing Bolts On Passenger Side Seat
Install brackets in less than 5 minutes





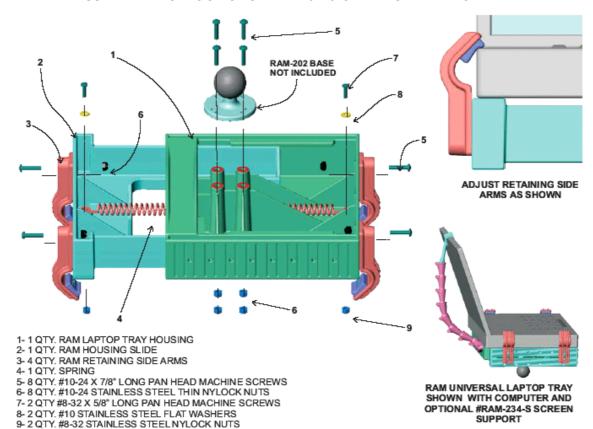
#1 RAM Pedestal mount on 90 degree flange with Tri-Pod connectors, adjustable legs, & double ball and socket system.

#2 RAM-161-2U RAM Bi-Pod base with RAM-161BLU Tri-Pod Leg & double swing arm and single ball and socket joint. #3 RAM-D-164-BU RAM Pedestal base with double ball and socket joint.

#4 RAM-161-BU RAM Bi-Pod base with double ball and socket joint. #5 RAM-160-BU RAM Seat rail system with double ball and socket joint. #6 RAM-161-1U RAM Bi-Pod base with single swing arm and single ball and socket joint.

RAM® COMPUTER SYSTEMS

ASSEMBLY INSTRUCTIONS RAM 234-3 UNIVERSAL LAPTOP TRAY



RAM is the revolutionary universal mounting system that allows you to mount practically anything anywhere. Whether its in a boat, aircraft, automobile, ATV, motorcycle or any other situation, RAM's family of over 800 interchangeable accessories will offer you solutions to your most challenging mounting problems. If you need to mount a radar, sonar, GPS, computer, cellular phone, antenna, or just about anything else look no further. RAM mounts will help you make a professional job easy and affordable. They will allow you to reposition or remove your electronics for perfect viewing or safe keeping. It's unique design provides easy installation, mobility, strength, versatility, vibration protection and durability, all at a low cost. RAM is backed by NPI's renowned Lifetime Warranty which makes it the mounting system of choice. To provide light weight strength and corrosion resistance, RAM is made of marine grade aluminum with a powder coated finish, stainless steel hardware and rubber balls. Visit the RAM web site at: www.ram-mount.com to see the newest products and to learn more about this revolutionary mounting system.

RAM-234-3 UNIVERSAL LAPTOP
TRAY SHOWN WITH COMPUTER
AND OPTIONAL #RAM-109V
SWING ARM MOUNT WITH
VERTICAL BASE

RAM-234-3 UNIVERSAL LAPTOP TRAY SHOWN
WITH COMPUTER AND OPTIONAL #RAM-101
DOUBLE BALL AND SOCKET MOUNT

NATIONAL PRODUCTS INC. 1205 S ORR ST. SEATTLE, WA 98108 206-763-8361 FAX: 206-763-9615

PART #RMRINS2343