#### **CONGRATULATIONS!**

Your purchase of an M&S music and communications system is an investment that will provide years of enjoyment and service for your customer.

M&S audio products are backed with more than 40 years of experience in the design and manufacture of precision acoustical equipment for the home. To ensure that your customer receives the high-quality music and voice reproduction that the system is designed to deliver, it is important that each step of the installation be done carefully. If you follow the step-by-step illustrated instructions below, the result will be a successful professional-quality installation. In the event you need troubleshooting assistance, please call our technical staff at 1-800-366-9422.

# INSTALLATION INSTRUCTIONS MC702 SYSTEM

# PLEASE READ CAREFULLY

The MC702 is designed to be installed as a retrofit to existing 6. 7 and 8 conductor 'balanced' systems only. Although the MC702 can be installed in new construction applications, it is recommended to install the MC602 instead. The MC702 has similar features and performance characteristics as the MC602 but the MC602 can be installed at a lower cost, since it uses the 4-conductor MS4XSC cable. **NOTE: These instructions supersede the MC602 rough-in installation instructions.** 

These instructions do not contain detailed information of existing equipment, other than cable. However, detailed information is provided for the MC702 components. Therefore, it is the installer's responsibility to properly assess what drywall repair is necessary, if any. It is assumed that the installer is equipped with the appropriate tools and knowledge to install built-in equipment in existing construction applications. Furthermore, it is the installer's responsibility to use proper installation techniques to avoid property damage and compromised safety, such as, but not limited to, penetration of structures containing: electrical, plumbing, HVAC, vapor barriers, fixtures, roofing, load-bearing building components, etc.

NOTE: Information shown in BLACK pertains to the installation of this product in applications using Music and Sound MS6, MS7, MS7X and MS7XSC cable.

NOTE: Information shown in RED pertains to the installation of this product in applications using NuTone IW-6 3 twisted pair cable. (The NuTone 6-conductor FLAT cable is not compatible with the MC702)

NOTE: Information shown in BLUE pertains to the installation of this product in applications using Rittenhouse M7200 and M7201 7-conductor cable.

These instructions should be used as a guide to correct any deficiencies in the original installation. Problems caused by installation errors and/or bad cable must be corrected to ensure proper operation of the MC702 system.

It is the installer's responsibility to install this equipment in a manner consistent with local, state and national code requirements.

The following systems can be replaced by the MC702 using the original cable as installed as specified by the original equipment manufacturer:

Music and Sound/M&S	NuTone	Rittenhouse (Emerson)
Replaces: 4000, 40, 50, 60, 70, 78, 80, 88, 440, 443, 448, N440, MC500, N80, MC800	IM406, IM4006, IM4406	Replaces: M7000, M7001, M7002, M7050, M7030

1

## Inspection

The information contained herein should be used as a checklist to assure proper performance of the MC702 system. ANY INSTALLATION CHARACTERISTICS NOT CONFORMING TO THE FOLLOWING MUST BE CORRECTED BEFORE THE MC702 SYSTEM CAN BE INSTALLED, OPERATED and WARRANTED.

- Install the MC702 only in applications using the wire described in these instructions. Use of cable other than those listed in these instructions are not assured to work with the MC702. The IW6, MS6, MS7, M7200 and M7201 cables are designed for 6 conductor 'balanced' systems. These cables are designed and constructed with electrical characteristics necessary for proper audio performance. The warranty of the MC702 product applies only to installations conforming to these instructions. WARRANTY is VOID in applications where other cables are used.
- ➤ ENSURE NO MORE THAN 3 ROOM STATIONS ARE LOOPED TOGETHER. Run MS7XSC cables to room stations as needed to maintain no more than 3 room stations per home run cable.
- ➤ ENSURE CABLES ARE NOT BUNDLED. This causes signal crosstalk. Cables may be bundled if using shielded cable MS7XSC only. Remove any bundle ties if found.
- ENSURE CABLES ARE NOT STAPLED! Staples cause shorts. Replace stapled cables with MS7X5SC.
- ENSURE CABLES ARE NOT SPLICED. Splices are unreliable and defeat the signal isolation properties of the cable. Replace any spliced cables with the MS7XSC.
- ENSURE CABLES DO NOT EXCEED 350 FEET for any one run or 2000 FEET for the entire system.

- ► ENSURE ALL CABLES ARE AT LEAST 18 INCHES FROM FLUORESCENT LIGHT FIXTURES, DIMMER CONTROLS, AND ALL OTHER WIRING. This includes AC wiring, security cable, and other control wires. These can cause a "hum" or "buzzing" sound in the intercom. Replace any affected cables with the MS7XSC. The MS7XSC cable will minimize these effects due to its shielding properties.
- ENSURE EXISTING CABLES ARE NOT RUN IN METAL CONDUITS. This can change the electrical characteristics of the cables. Replace affected cables with the MS7XSC. MS7XSC cable can be run in metal conduits NOT containing wiring rated above CLASS II.
- **☞** ENSURE EXISTING EQUIPMENT HAS NOT BEEN INSTALLED IN THE FOLLOWING:
  - return air ducts
  - outside walls (master unit only)
  - in the same wall stud cavity as household 120VAC wiring (except for master unit and/or peripheral equipment, such as, cassette tape players, CD players, phonographs, etc., which have power supplied by the 120VAC/60Hz in the same wall stud cavity.
  - within 18" of dimmers, fluorescent light fixtures, security wiring and other control wiring.
  - on common walls with other stations or the master unit. This will cause acoustical feedback.
  - in saunas. They will not withstand the extreme heat and moisture.
  - within 10 feet of other stations or master unit. This will cause acoustical feedback.
  - facing other stations or the master unit. This will cause acoustical feedback.

#### INSTALLING THE MASTER UNIT



Disconnect main power from the existing intercom system. The switch for the power should be located at the load center panel.



Remove the master unit from the wall housing or mounting fixture.



Measure the opening left by the original master unit to determine if drywall repair is required. On some NuTone models a wood frame ring may be used with the MC702 to cover the opening. Alternatively, installing a cassette tape player MCP or compact disc player MCD6 in a combination wall housing HC6X can cover large wall openings.



Disconnect any wiring that may be attached to the wall housing. Note: A qualified electrician should disconnect the 120VAC supply to the wall housing, if applicable. On some Music and Sound models, room station wiring is connected to a terminal board attached to the wall housing.



Inspect room speaker cabling to verify conformance to the following standards:

- Minimum 6 conductor
- Minimum 22 AWG
- Consist of 3 twisted pairs
- Each pair has a different lay (twist per foot)
- If cable is shielded, two or more conductor pairs cannot be contained within the same shield.

2



On some Rittenhouse model, cables may have terminations on them. Cut off the terminating connectors as close to the cable end as possible.



Many Nutone models use a remote mount power transformer for system power. If the transformer is not adjacent to the wall housing either a qualified electrician needs to install a 120VAC dedicated circuit to the H6X/HC6X wall housing or a remote power transformer kit RT55 needs to be installed.



Use the table below to substitute colors to conform to the MC702 system wiring requirements.

Table 1 - Original cable substitution diagram

Music&Sound MS7X	Music&Sound MS6	NuTone IW6	Rittenhouse 8-cond.	Rittenhouse M7200
BLUE	BLUE	ORANGE	GREEN	GREEN
YELLOW	YELLOW	ORGWHT	YELLOW	YELLOW
RED	RED	BLACK	RED	BLUE
BLACK	BLACK	BLKWHT	BLACK	BLACK
WHITE	WHITE	REDWHT	WHITE	WHITE
GREEN	GREEN	RED	BLUE	BROWN
VIOLET	-	-	ORANGE	
			GRAY	



Remove the existing wall housing or mounting ring. Have a qualified electrician remove the existing power transformer and install power for the H6X/HC6X wall housing. There are two options for meeting the power requirements of the H6X/HC6X wall housing:

Option 1: Install the H6X/HC6X and connect 120VAC/60Hz supply to the TE series transformers equipped with the H6X/HC6X.

Option 2:

Install the RT55 remote power transformer kit. The RT55 consist of (2) plug-in style power transformers. 16AWG 4-conductor cable with preterminated power plug (for the MC702) and cover plate for the hole left by the TE5B transformer. Since the RT55 requires two transformers two standard NEMA 5-15R receptacles are required. NOTE: the two receptacles for the RT55 transformers must not be from the same duplex. Two duplex receptacles are required due to the ground prong on each transformer. Furthermore, if the HC6X is to be used a remote transformer RT22 is used instead of the TE2D for the cassette or CD player. The RT22 requires its own separate 120Vac/60Hz receptacle.



Install the plastic standoffs into the holes in the back of the wall housing as shown in figure 1. These standoffs must be installed prior to mounting the wall housing. They will be required to mount the modular chime during the finish-out phase of the installation.

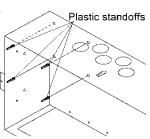


Figure 1 - Chime module mount standoffs



Locate wall housing H6X or HC6X (Combo). Position back side of wall housing flush with back of 2X4 stud approximately 52" high for H6X or 45" high for HC6X. The wall housing is designed to be supported by 16" on center(OC) studs. If stud spacing is greater than 16" OC, nail additional sections of wood to provide the necessary support.



Have a qualified electrician run a dedicated 120VAC/60Hz-line with ground connection from the power panel to the wall housing. The MC702 requires a dedicated power source to assure no interference from other equipment caused by looped power circuits. The ground is necessary for proper radio reception.

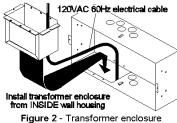


Figure 2 - Transformer enclosure installation

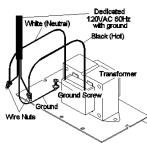
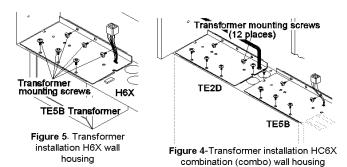


Figure 3 - Transformer wiring



Drop the transformer enclosure from inside the wall housing into the transformer enclosure opening at the bottom of the wall housing. For HC6X combo wall housing loop power wire from the TE5 transformer enclosure to the TE2D transformer enclosure following the same procedure as above.



3



The MC702 is designed to use a 300 Ohm twinlead dipole 'T' antenna for FM reception and a single 25 ft. copper wire for AM reception. Some earlier Music & Sound and NuTone models used a single antenna wire for both AM and FM. This type of antenna may be used for both AM and FM by jumpering one FM antenna terminal to the AM terminal. Note: If reception is insufficient on FM it will be necessary to install a separate FM dipole antenna such as the D360 omni-directional antenna

## ROOM STATIONS (INDOOR)



At each room station location, remove the speaker from the wall.



Measure the opening in the wall left by the room station. Based upon the wall opening dimension and desire for drywall repair, select the appropriate N75 or N78 series room station for retrofit. The N75 and N78 room station dimensions are shown in the table below. Optional wood frame rings are available also. Note: On some NuTone 8" room stations, it will be necessary to install a wood frame ring WF8 or repair drywall as the N78 will not cover the opening left by the Nutone room station.

Table 2 - station/trim dimensions

N75 series	6"W x 8"H
N78 series	9 3/4"W x 11 3/8"H
WF5 trim	8"W x 9 3/4"H
NWF8 trim	13 3/8"W x 13 5/8"H



Install the NMR5/RR5 mounting ring for the N75 series room speaker or MR8/RR8 mounting ring for the N78 speaker. room recommended to use the RR5/RR8 speaker mounting rings if the wall opening will not accommodate the NMR5/MR8 mounting rings. When using the RR5/RR8 refer to the ring for N75/ installation instructions included with them for assembly information.

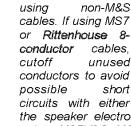


NMR5 mounting NRC75

If the wall speaker can be located adjacent to a stud, it may be easier to use a 🕅 metal enclosure such as the NME5 or NME8 instead of a mounting ring. Using the

NME5/NME8 allows easy attachment to a stud using drywall screws.

Figure 8 - MR8 mounting ring for N78 series



Connect

to the

terminals.

color

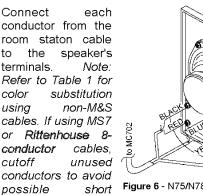


Figure 6 - N75/N78 series hookup

N75 series

the speaker electronics or other conductors. If using MS7XSC M&S shielded cable cutoff all drain (bare) wires at the jacket.



Mount the room station to corresponding its mounting ring using the screws provided with the room station. Note: If using a wood frame, place the wood frame over the opening before mounting the speaker. Once the screws are tightened, the wood frame will secure.

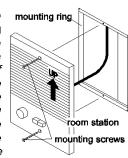


Figure 9 - Room station mounting

# REMOTE CONTROL STATIONS (INDOOR)



At each remote control station location, remove the control from the wall.



Measure the opening in the wall left by the remote control station. Based upon the wall opening dimension and desire for drywall repair, select the appropriate NRC75 or NWRC75T series room station for retrofit. The NRC75 and NWRC75T remote control station dimensions are shown in the table below. An optional wood frame ring is available for the NRC75 series remote control. The NWRC75T will directly fit existing MRC mounting rings used with the NRC44. RCS44. NRC88, NSRC88, RCS88, SRCS88 remote controls.

Table 3 - station/trim dimensions

NRC75 series	6"W x 8"H
NWRC75T	7 1/8"W x 4 3/4"H
WF5 trim	8"W x 9 3/4"H



Install the NMR5/RR5 mounting ring for the NRC75 series remote control station or existing MRC mounting ring for the NWRC75T series remote control station.



Connect each conductor from the remote control staton cable to the speaker's BLUE (+) terminals. Note: Refer VIOLET(-) to Table 1 for color wire nuts substitution using non-M&S cables. If using MS7 or Rittenhouse 8conductor cables, cutoff unused conductors to avoid possible short circuits

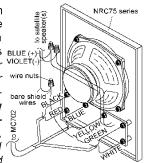


Figure 10 - NRC75 hookup

with either the speaker electronics or other conductors. If using MS7XSC M&S shielded cable cutoff all drain (bare) wires at the jacket.



Mount the room station to its corresponding mounting ring using the screws provided with the room station. Note: If using the NRC75 series remote control station with a wood frame, place the wood frame over the opening before mounting the speaker. Once the screws are tightened, the wood frame will be secure.

#### VOLUME CONTROLS .



Typically, volume controls use a standard single gang electrical box. Inspect the existing volume to to determine if this is true. If so, proceed with installation following the instructions is this VOLUME CONTROLS section, otherwise install the NRC75 or NWRC75T instead following the instructions in the previous REMOTE CONTROL section.



At each volume control station location, remove the existing control from the wall.



Connect each conductor from the conductor from the volume control cable to the volume control's terminals. Note: Refer to Table 1 for color substitution using non-M&S cables. Connect the M&S Figure 10 Reservables.

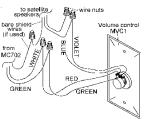


Figure 11 - MVC1 hookup

conductors only. Be sure these unused conductors do not get connected at the master unit or maulfunction will result. If using MS7XSC M&S shielded cable cutoff all drain (bare) wires at the jacket.



Connect the satellite speaker leads to the BLUE/VIOLET wires from the MVC1 volume control. Note: If there are to be two satellite speakers connected be sure they are connected in parallel and in phase. In phase means each positive(+) satellite speaker lead is connected together and each negative(-) lead is connected together. It is not critical that positive(+) or negative(-) correspond to BLUE/VIOLET on the

MVC1 as long as they are connected similarly throughout the application. If MS7XSC (shielded 7-conductor) and MS2SXSC (shielded 2-conductor) are connected to the MVC1, connect the shield (bare) wire from the 2 conductor to the shield (bare) wire surrounding all conductors on the MS7XSC. DO NOT connect the shield (bare) wire from the YELLOW/BLUE pair on the MS7XSC cable.



Mount the MVC1 volume control to the gang box using the screws provided with the MVC1.

#### SATELLITE SPEAKERS



The MC702 is designed to use 45 Ohm impedance speakers. Therefore, it is necessary to replace any satellite speakers that are not 45 Ohm. Inspect all satellite speakers and replace those which are not 45 Ohm.



Measure the opening left by the existing speaker and use the table below to select the speaker that will cover the hole left by the existing speaker.

Model	Rough-in	Finish-out
Wodel	dimension	dimension
MCS5 MCS5WH	6 1/2" dia. (MCS5MR)	7 1/2" dia.
MCS8 MCS8WH	10" dia. (MCS8MR)	11" dia
NR8P	9 5/8" dia. (NR8)	11" dia
NR8M FMC8	9 5/8" dia.	11" dia
FMS FMSM	7"W x 11"H (FMSMR or RR6)	8 1/4"W x 12 1/8"H
FMBM	9"W x 13 5/8"H (SAMB)	11"W x 15"H
S8200* with SBK or SWH grille	14" x 22" (SMB)	16" x 24"

<sup>\*</sup> Note: The S8200 speaker counts as 1.5 speakers each toward the MC702 total system limit of 15.



Measure the existing hole to ensure that the replacement satellite speaker will cover the existing opening. Place the replacement mounting ring over the opening to ensure adequate structural mounting integrity. Note: 2-Way speakers require the attachement to a framing stud or joist . Warning: Failure to properly secure the speaker may lead to the speaker falling resulting in serius personal injury!



Connect the satellite speaker leads to the wires from the MVC1 volume control. Note: If there are to be two satellite speakers connected be sure they are connected in parallel and in phase. In phase means each positive(+) satellite speaker lead is connected together and each negative(-) lead is connected together. It is not critical that positive(+) or negative(-) correspond to BLUE/VIOLET on the MVC1 as long as they are connected similarly throughout the application. IFf MS2SXSC is used, cut off the sheild (bare) wire at the speaker end.



Install the selected speaker. Follow installation instructions supplied with the satellite speaker. Use the mounting screws supplied with the satelite speaker.

#### PATIO SPEAKERS



At each patio station location, remove the speaker from the wall.



Measure the opening in the & wall left by the patio station. Based upon the wall opening. dimension and desire for wall 2 surface repair, select the appropriate NW75 or NW78 Figure 19 - NME5



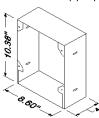


Figure 20 - NME8 recessed enclosure

series patio station recessed enclosure for retrofit. The NW75 and NW78 patio station dimensions are shown in the table below. Optional wood frame rings are available also. Note: On some NuTone 8" room stations, it will be necessary to install a wood frame ring રૂઝWF8 or repair drywall as the NW78 will not cover the opening left by the Nutone patio station. Note: Suface mount enclosures are available to minimize

labor required to install recessed mounting enslosures.

Table 2 - station/trim dimensions

NW75 series	6"W x 8"H
NW78 series	9 3/4"W x 11 3/8"H
WF5 trim	8"W x 9 3/4"H
NVVF8 trim	13 3/8"W x 13 5/8"H



Install the NME5 mounting enclosure for the NW75 series patio station or NME8 mounting enclosure for the NW78 series patio station.



Connect each conductor from the patio staton cable to the speaker's terminals Note: Refer to Table 1 for color substitution non-M&S usina cables. If using MS7 or Rittenhouse 8conductor cables. cutoff unused

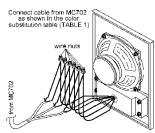


Figure 21 - NW75/NW78 series patio station hookup

conductors to avoid possible short circuits with either the speaker electronics or other conductors. If using MS7XSC M&S shielded cable cutoff all drain (bare) wires at the jacket.



Mount the patio station to corresponding mounting enclosure using the screws provided with the patio station. Note: If using a wood frame, place the wood frame over the opening before mounting the speaker. Once the screws are tightened, the wood frame will be secure.

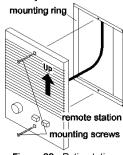


Figure 22 - Patio station mounting

#### Door Stations



At each patio station location, remove the door station from the wall.



Inspect the wiring as it was connected to the existing door station. Mark wires as necessary to determine which conductors were used for the bell button and which conductors were used for the communications.



Measure the opening in the wall left by the door station. Based upon the wall opening dimension and desire for wall surface repair, select the appropriate mounting enslosure for the door station. Note: Some NuTone door mounting rings can be used by drilling 2 new mounting holes (109"dia.), 3/16" above the top hole and 3/16" below the bottom hole to mount the M&S door station.



Figure 23 - SMP3 surface mount enclosure



enclosure for all door stations



Figure 24 - SME3D surface mount enclosure



Connect each conductor from the door station as shown. Note: Keep a record of which c o n d u c t o r s connected to the door station's bell button and

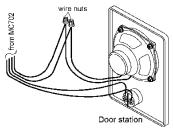


Figure 26 - Door station hookup

speaker. If using MS4DCXSC M&S shielded cable cutoff all drain (bare) wires at the jacket.



Mount the door station to its corresponding mounting enclosure using the screws provided with the door station.

#### MC702 MASTER UNIT



Inspect wiring to insure all speakers and stations are properly connected. Note: DO NOT connect wiring to the MC702 terminal board if it is not terminated at the speaker end.



Install the terminal board in the wall housing using the screws provided with the terminal board. The terminal board should be located in the top center of the wall housing as shown.

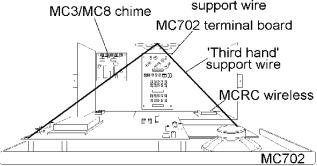


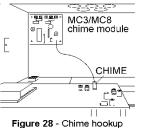
Figure 27 - MC702 hookup



Connect all room, patio, remote control, volume control and door station cabling to the terminal board. Note: Use table 1 for the correct color substitution for hookup. Note: On remote/volume control cabling only connect the GREEN/WHITE equivalent wires to the terminal board.

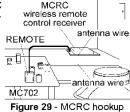


Install the MC3/MC8 chime module on the plastic standoff located on the left side of the wall housing. Connect the wire harness from the chime to the CHIME connector on the MC702.



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Install the MCRC wireless remote control receiver module on the lower right side of the wall housing.



o <del>| \</del>

Connect the antennas the to tuner module TM2 shown. Note: Some NuTone models and models. only provide single antenna In lead.

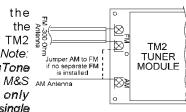


Figure 30 - Tuner module

these installations connect the antenna to the AM lead and jumper the AM to one of the FM leads. If this arangement does not provide adequate radio reception a separate FM dipole must be installed such as the D360.



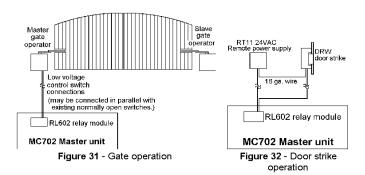
Install and connect any line level music source inputs such as tape players, record changers, CD players, etc. These devices will connect to TAPE and/or AUX inputs on the back of the MC702.

#### Door Release Options

The door release option is a momentary, normally open, dry contact closure provided by the master with the installed relay option (RL602). This dry contact is rated 24V at 4 Amps.

If you are replacing an existing NuTone or Rittenhouse system that has the door release feature providing a powered output for door strike operation, it is necessary to install a power supply meeting the power requirements of the existing door strike.

The diagrams below represent typical applications using either a powered door strike or gate release. Refer to the technical information for the gate system or gate system installer for proper connection and demarcation location.





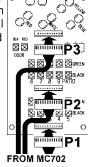
Install the RL602 door release relay on the back of the MC702 master as shown below. Take Care not to bend the pins on either the relay or the relay socket.



Figure 33 - RL602 installation



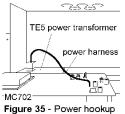
Connect the P1, P2 and P3 cable h a r n e s s e s f r o m the MC702 into the terminal board's corresponding P1, P2 and P3 connectors, respectively.



FROM MC702
Figure 34 Terminal board
hookup



Connect the power plug harness from the master unit into the TE5 transformer. On combination wall housings, connect the TE2 power cable into the MCD6 or MCP.



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Mount the MC702 face panel assembly to the wall housing using the screws provided. On combination wall housings (HC6X) a WT2 wood trim frame is required to mount the MC702 with a MCD6 or MCP tape player.

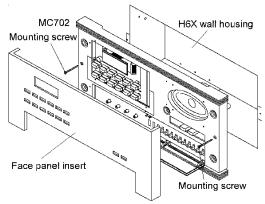


Figure 36 - Master unit installation

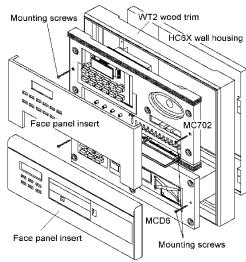


Figure 37 - Combination mounting



After securing the master equipment to the wall housing, install the face panel insert(s).



Program the MC702 for operation with up to four MCTX wireless remote control transmitters. Follow the procedures included with the MCTX/MCRC. Note: Test mode is initiated on the MC702 by momentarily pressing the VOLUME UP and SOURCE buttons at the same time. When finished programming, momentarily press VOLUME UP and POWER at the same time to reset the system.



Verify system operation. *Note:* Use the Owner's manual included with the MC702 master for specific details on operation. If any difficulties are encountered, recheck all connections. If after reviewing these instructions you are unable to resolve any problems, contact technical support at 1-800-366-9422. ■

#### M&S SYSTEMS 2-YEAR "NO FAULT" LIMITED WARRANTY

M&S Systems, Inc. warrants for two years (2) all products to be free of factory-caused defects in material and workmanship. M&S Systems, Inc. will repair or replace, at its option, parts and materials at no charge, regardless of the problem. This warranty extends to the original purchaser of the product and to each subsequent owner of the product during the term of this warranty. This NO FAULT warranty covers only the liability described above, and does not include liability for incidental or consequential damages. NOTE: Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.





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