

RADIO-INTERCOM SYSTEM

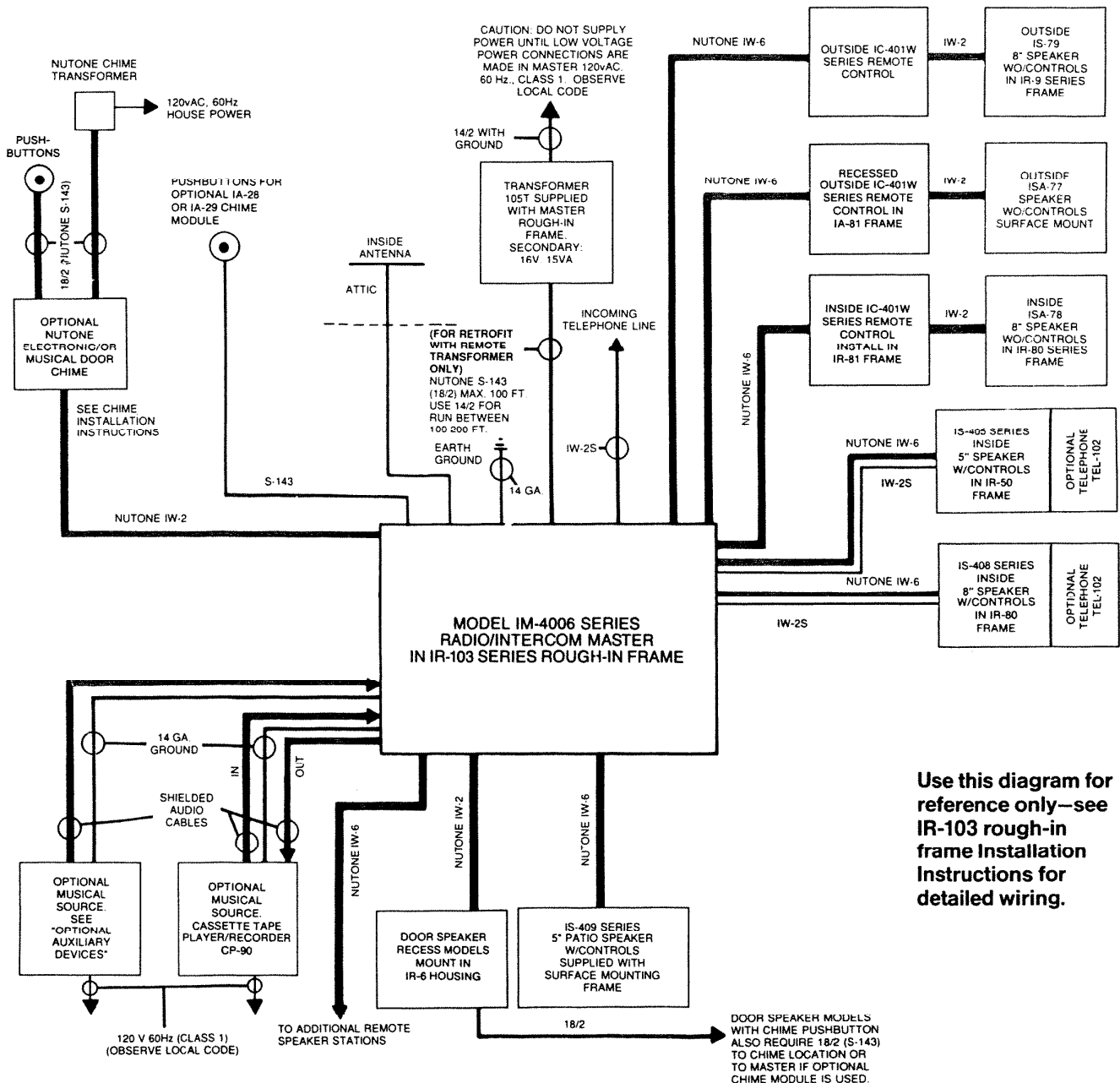
MODEL: IM-4006 SERIES MASTER STATION

This booklet contains information for installing the IM-4006 Series master station. All system wiring and rough-in frames should be installed before mounting and wiring the master station.

Refer to the installation instructions packaged with the

Model IR-103 Series rough-in frame for detailed wiring information. For more detailed information on wiring and mounting other system components (i.e., speakers, remote controls, etc.), refer to the installation instructions packaged with each separate component.

IM-4006 SERIES REPRESENTATIVE WIRING ILLUSTRATION



Use this diagram for reference only—see IR-103 rough-in frame Installation Instructions for detailed wiring.

PACKAGING

IMPORTANT: Before discarding carton, check for the following:

- (1) Display Transformer (packed in separate cardboard wrapper).
- (2) Terminal Board (packed in separate cardboard folder).
- (3) Hardware Bag and Cassette Tape (packed in foam end pad).

WIRING INSTALLATION GUIDELINES

Wiring Specifications

- NuTone IW-2: 22 GA. Twisted Pair.
- NuTone IW-2S: 22 GA. Shielded Twisted Pair. Used for phone wiring.
- NuTone IW-6: 3-twisted pair (6 wire) cable.
- NuTone S-143: 18 GA. 2-conductor Insulated.
- No. 14/2: 120v, 60Hz Power Cable: Class I. U.L. Listed

14 GA: Ground Wire (not supplied by NuTone).

Speaker Wiring

An individual 6-wire cable (IW-6) must be connected from each remote speaker or remote control to the master unit's terminal board.

- Maximum speaker run: 750 feet.
- Maximum total of IW-6 per system: 4000 feet.

Maximum Number of Speakers

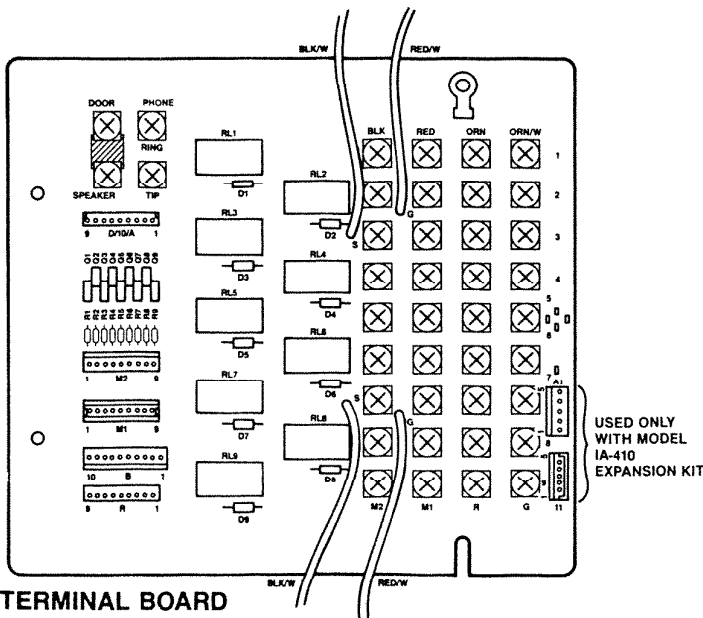
The IM-4006 Series Radio-Intercom system will accommodate up to nine (9) remote speakers and 3 door speakers. If more than 9 speakers are required, the use of optional Model IA-410 Expansion Kit will be required. This will allow up to an additional 10 remote speakers to be installed.

IMPORTANT: NuTone cannot be responsible for improper radio-intercom operation that results from interference generated by light dimmers, fluorescent lighting fixtures, and similar electrical products, such interference must be corrected at the source. As an aid to help reduce this interference, all remote speaker, door speaker, chime and security alarm cables must be placed at least 12 inches from any A.C. power wiring.

INSTALLATION

MOUNTING THE TERMINAL BOARD

1. Locate the terminal board in the left rear section of the rough-in frame. See Figure 1.
2. Use four No. 6 x 3/8" screws to secure terminal board to rough-in frame. See Figure 1.
3. Make certain that the upper right screw is secure and snug against the ground lug which covers mounting hole in terminal board. Do not bend ground lug—make sure it is positioned between screw and terminal board. See Figure 1.



TERMINAL BOARD

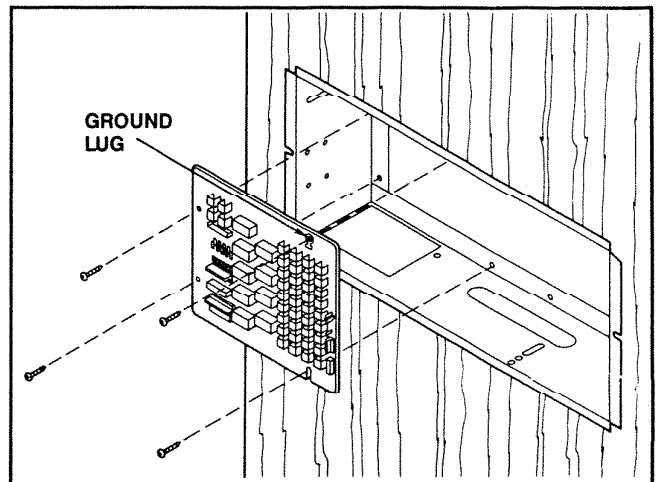


FIGURE 1

WIRING AT THE MASTER STATION

Connecting the Remote Speakers

NOTE: All speaker and door wiring must return directly to the master unit. Do not connect wiring from speaker to speaker.

1. Dress all speaker wiring through the oblong holes in the rough-in frame. All wiring connections are made to the master unit's terminal board.
2. Refer to Figures 2 and 3. As illustrated, connect the IW-6 for each remote speaker station to the appropriate set of terminal screws at the master station's terminal board.

Connect the wires to the terminal screws as follows: ORN/W wire to terminal screw marked ORN/W; ORN wire to terminal screw marked ORN; RED wire to terminal screw marked RED; BLK wire to terminal screw marked BLK.

As illustrated, using wire nuts (supplied), connect the RED/W wires for stations 1 thru 5 to the RED/W wire located in the upper center of the master unit's board. Connect the BLK/W wires for stations 1 thru 5 to the RED/W wire located in the upper center of the master unit's board.

Connect the RED/W wires for stations 6 thru 9 to the RED/W wire located in the lower center of the master unit's board. Connect the BLK/W wires for stations 6 thru 9 to the BLK/W wire located in the lower center of the master unit's board.

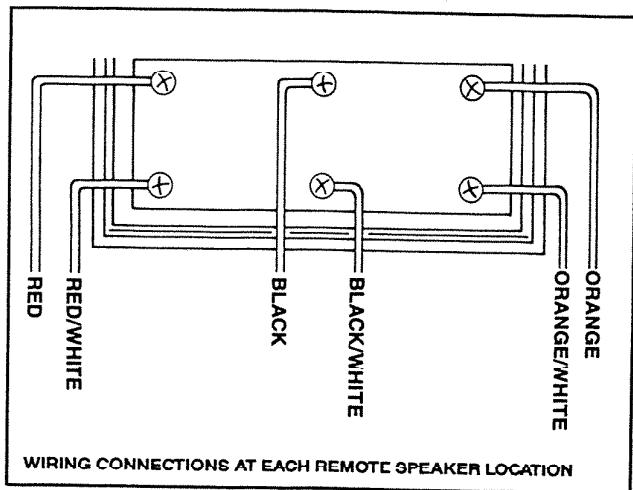


FIGURE 2

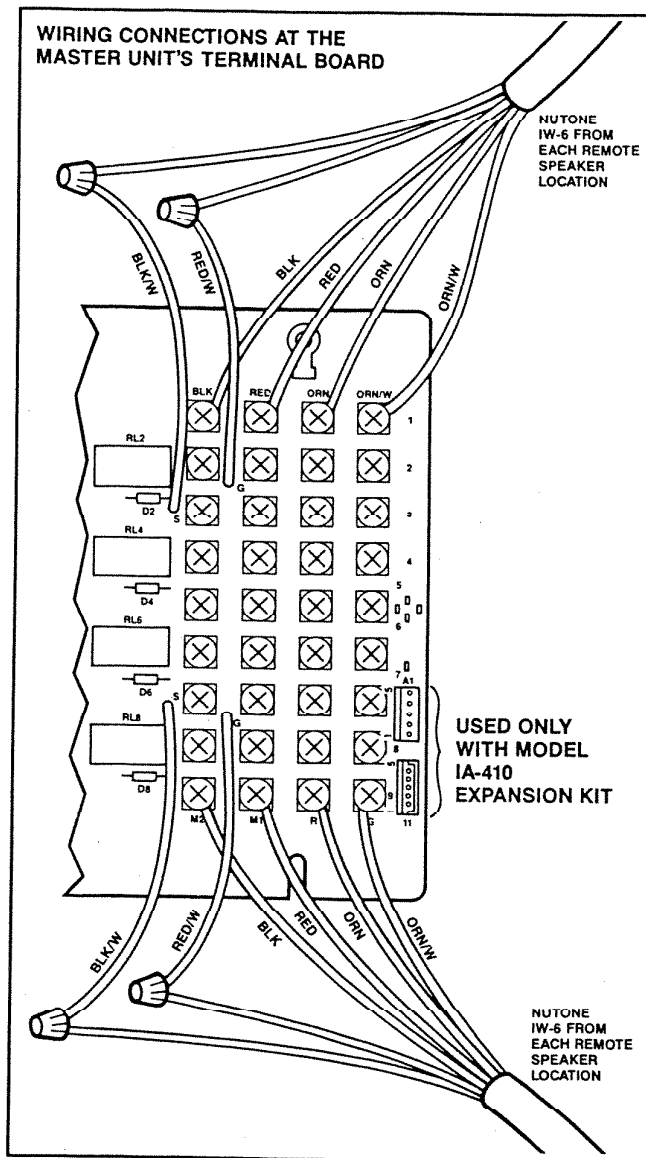
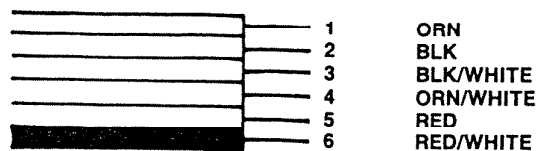


FIGURE 3

IMPORTANT - WHEN NUTONE MODEL IW-6R WIRING IS USED:

CONNECT TO SCREW ON PRINTED CIRCUIT BOARD MARKED:



Model ISA-77 and Model ISA-78 (without remote control)

If a Model ISA-77 or ISA-78 is to be used with the system, connect wires from ISA-77/78 to ORN and ORN/W terminal screws at the master unit as illustrated in Figure 4.

NOTE: Use the appropriate terminal screws as illustrated.

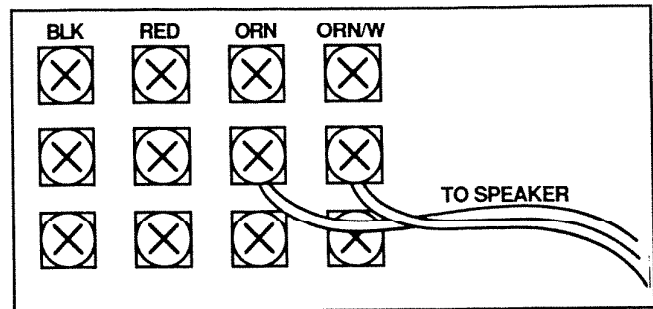


FIGURE 4

Connecting the Door Speaker Wiring

Refer to Figure 5.

1. The door speaker connects to the terminal board with two conductor (IW-2) 22 gauge twisted pair wire.
2. Connect two wires from the door speaker to the two terminal screws marked **DOOR SPKR** on the terminal board.

NOTE: When installing a door speaker with pushbutton, an additional (2) wires must be run from the speaker to terminal board.

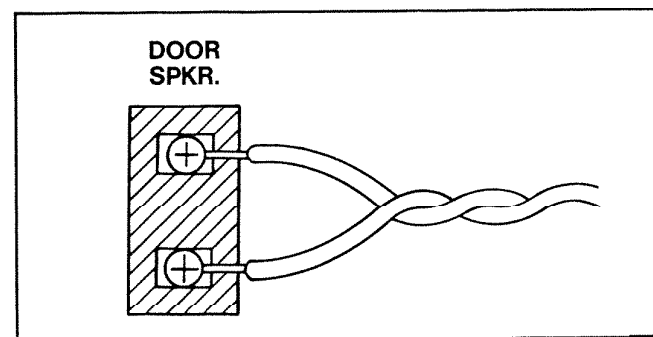


FIGURE 5

Connect Optional Phone Wiring

NOTE: Telephone does not interface with intercom system. Phone terminals are for phone wiring convenience only.

Refer to Figure 6.

1. See Installation Instructions provided with Model TEL-102-SD Intercom Telephone for complete installation and wiring information.
2. If the Intercom Telephone is used, the wiring from the phone demarcation block must be NuTone IW-2S two-conductor insulated cable (shielded twisted pair).
3. Connect phone wires and TEL-102-SD phone cradle wires to two terminal screws marked **PHONE** on the master panel's terminal board. See Figure 10.
4. Connect IW-2S ground wire to **EARTH** ground screw located at top of the terminal board.

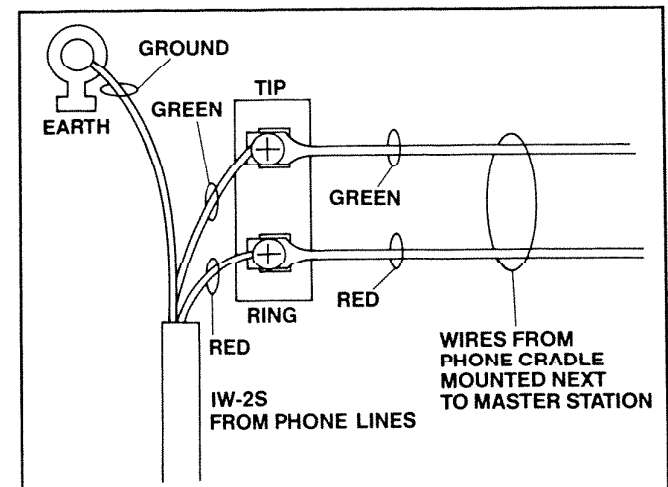


FIGURE 6

Installing Display Transformer

Clip the transformer to upper right hand corner of rough-in as illustrated.

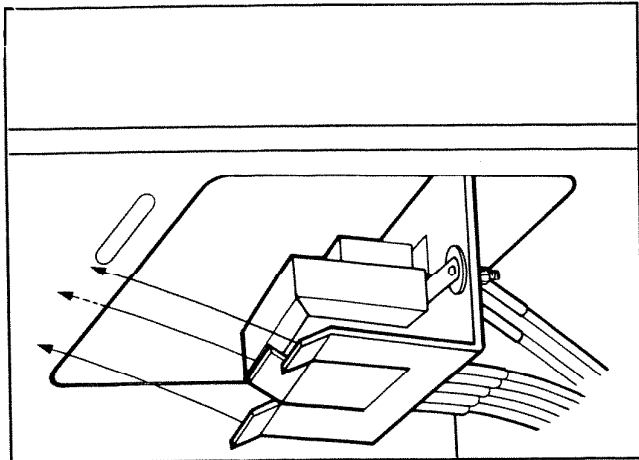


FIGURE 7A

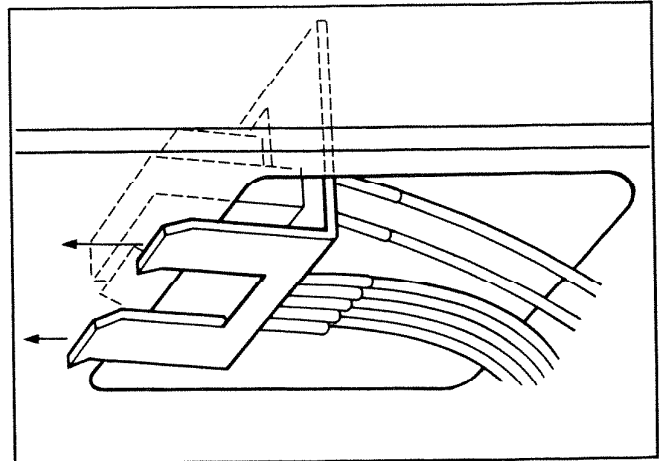


FIGURE 7B

MOUNTING THE MASTER PANEL

Attaching the Master Panel to Rough-In

1. Refer to Figure 8. Use two No. 6 x $\frac{3}{8}$ " screws to attach mounting brackets to rough-in frame. Using bottom set of holes, make sure brackets are flush to wall or rough-in. **NOTE: If Extension Frame is to be used, the mounting brackets must be extended $\frac{1}{2}$ " from wall or rough-in as illustrated in Figure 8.**
2. For rough-in frames which are recessed into the wall opening. Insert two shoulder screws (provided) into the front two holes in the rough-in frame. See Figure 9 & 10.
For rough-in frames which are mounted flush with the wall. Insert two shoulder screws (provided) into the back two holes in the rough-in frame. See Figure 9 & 10.
3. Attach master panel to rough-in frame by placing keyhole slots in both mounting hinges over screw heads in rough-in frame. See Figure 11.
4. Slide master panel to the right, then forward until panel is flush with the wall. See Figure 12.
5. Attach support strap to rough-in by placing hook into hole in rear flange of rough-in frame. See Figure 8.

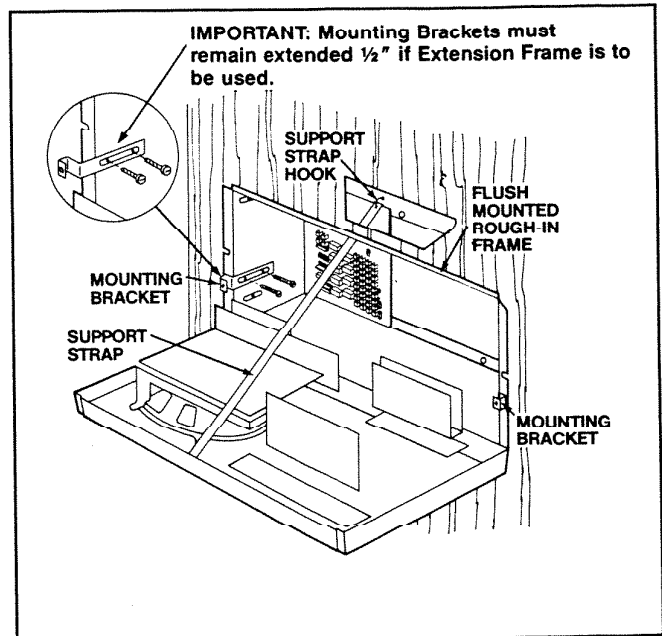


FIGURE 8

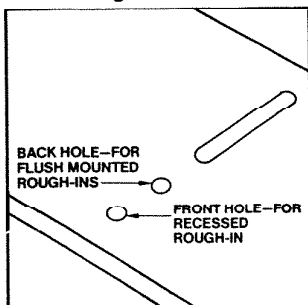


FIGURE 9

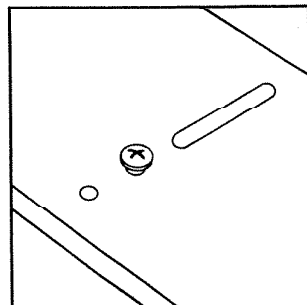


FIGURE 10

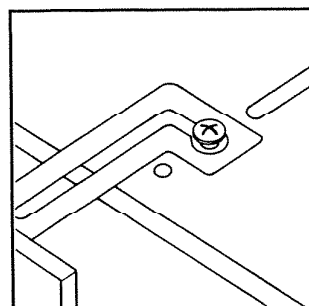


FIGURE 11

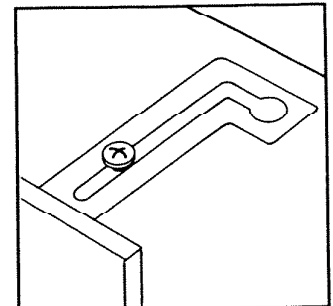


FIGURE 12

Connecting Optional Electronic or Musical Chime

Refer to Figure 13.

1. Connect NuTone IW-2 cable from the chime to the black and white wire
2. See Installation Instructions packaged with chime for complete wiring details.

IMPORTANT: FAILURE TO USE IW-2 CABLE WILL CAUSE THE SYSTEM TO HUM AT ALL TIMES.

NOTE: If Optional Electronic Chime Module is used (Model IA-28 or IA-29) refer to installation instructions packaged with the Chime Module.

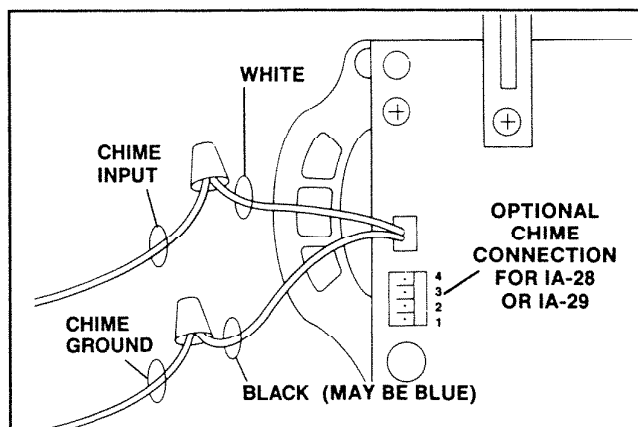


FIGURE 13

Connecting the Power Transformer

Refer to Figure 14.

Before connecting any wiring to the terminal board, turn off power to the transformer.

1. The transformer's primary leads should already be connected to the 120vAC house supply wiring.
2. Connect two low voltage wires (red and white) to the transformer's terminal screws.
3. Dress wires through raised section of transformer box cover and secure box cover with two screws.

CAUTION: DO NOT SHORT TRANSFORMER TERMINALS—TRANSFORMER DAMAGE MAY OCCUR.

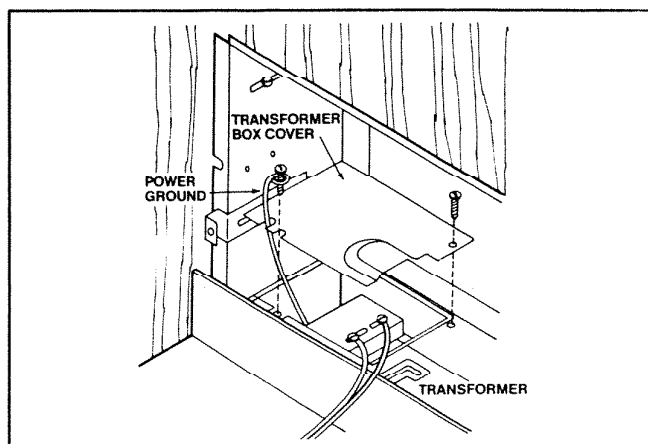


FIGURE 14

Backup Battery Connection

Connect backup battery for clock and 10 station radio memory as shown in Figure 15.

NOTE: This backup battery retains correct time and radio station memory for approximately 40 hours. If you plan to have 120vAC power off for a longer period of time, the battery should be disconnected.

Battery Specifications: 4.8 Volt, 250 MA, Rechargeable Nickel Cadmium. (Parts Dept. # 8568A-000)

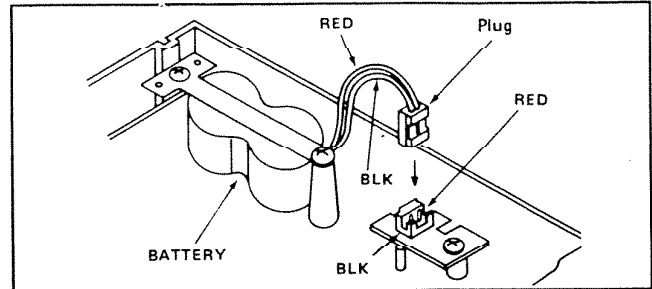


FIGURE 15

CONNECTING THE MASTER PANEL TO THE TERMINAL BOARD

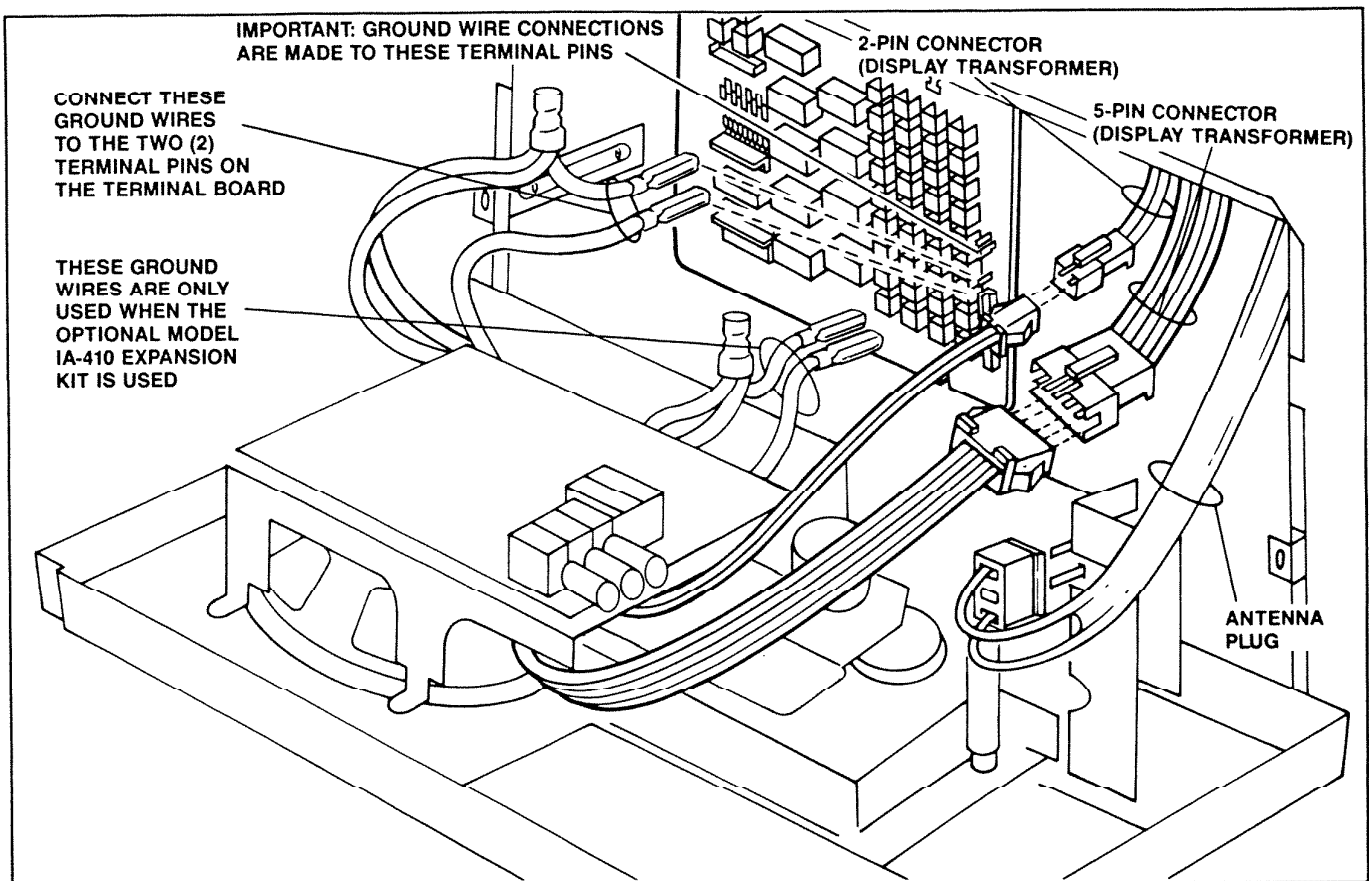


FIGURE 16

Connecting Display Transformer

Refer to Figure 16.
Connect the 2-pin and 5-pin connectors from the display transformer that had been previously installed in the upper section of rough-in to the appropriate connectors on the master panel. **NOTE:** The 5-pin connector should be connected first.

Connecting Ground Wires

Connect the two ground wires that are located on the left side of the panel to the ground lugs on terminal board. **(NOTE: The ground wires located on the right are only used when the IA-410 expansion kit is used.)**

Connecting Antenna

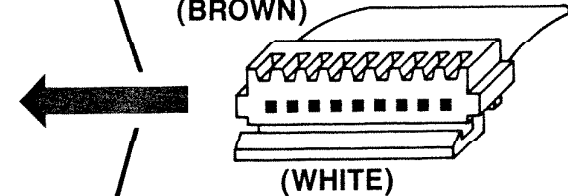
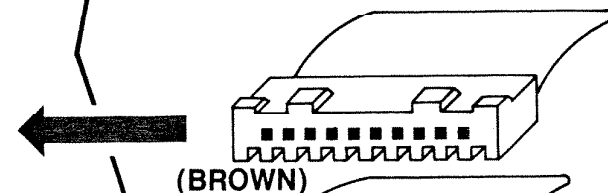
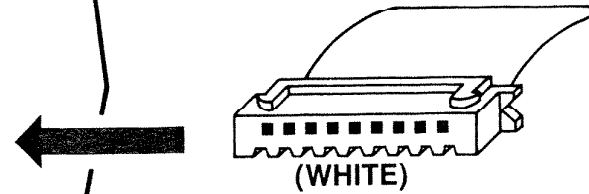
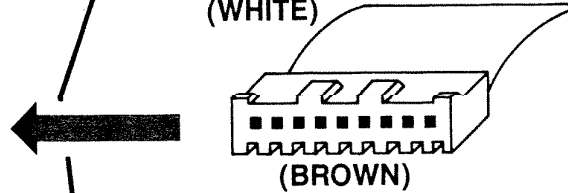
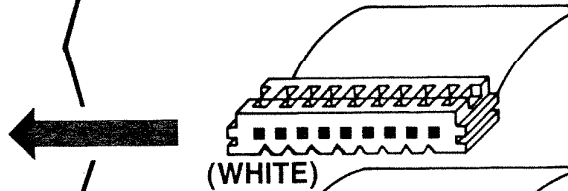
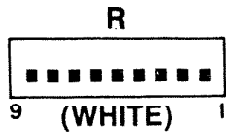
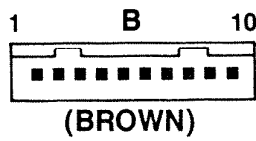
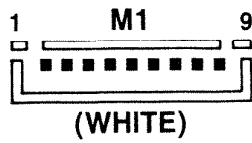
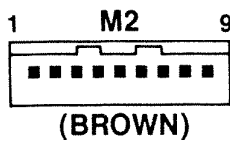
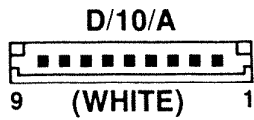
Connect antenna plug to master panel on right side.

**CABLE LOCATION GUIDE
IM-4006
TERMINAL BOARD**

**Connecting Ribbon Cables
to Terminal Board**

Connect the five remaining ribbon cables to terminal board. See Figure 21.

IMPORTANT: Start at the bottom and work up.



BOTTOM OF BOARD

FIGURE 17

CONNECTING OPTIONAL ACCESSORIES

Refer to Figure 18.

1. To connect an optional Record Changer or Cassette Player/Recorder, locate the **PHONO INPUT**, **TAPE INPUT**, and **RECORD OUTPUT** jacks on the master panel.
2. To play the phonograph over the intercom system, insert the accessory's output plug into the master panel's **PHONE OUTPUT** jack.
3. To play the cassette player over the intercom system, insert the accessory's output plug into the master panel's **TAPE INPUT** jack.
4. To use the radio as a program source for recording on the cassette player, insert the tape player's input plug into the master panel's **RECORD OUTPUT** jack.
5. **OPTIONAL HOOK-UP TO PROVIDE RADIO ONLY:**
The radio and optional entertainment sources can be channelled through an auxiliary amplifier to provide uninterrupted music (no intercom) to separate amplifier and speakers. This type of installation can be used for a doctor's office, where intercom and music are desired in the office area, but music only is desired in the waiting room. Refer to the instructions with Model IM-516 or IMA-516 Amplifier, which is used as the auxiliary amplifier in such an installation. Connect the IMA-516 to the

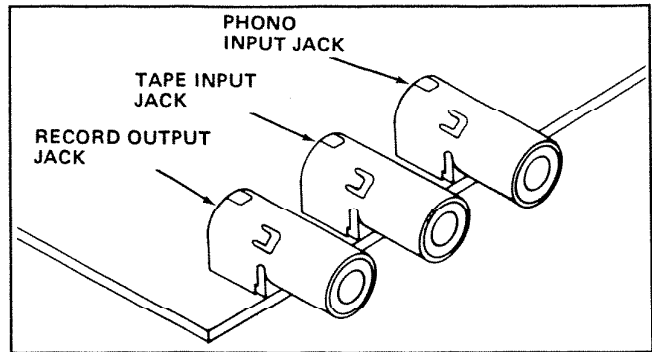


FIGURE 18

master station's **RECORD OUTPUT JACK**. If IMA-516 is used, the system cannot also use the Cassette Player/Recorder's recording capability, unless a "Y-connector" adaptor is used. (Use shielded cable, not supplied by NuTone.)

NOTE: Phono input jack will accept levels from a "ceramic" type cartridge. Turntables with "magnetic" cartridges will require an interface amplifier (not supplied by NuTone).

SECURING THE MASTER PANEL

Refer to Figures 20 and 21.

1. Check all wiring connections to make sure they are complete and correct.
2. Check to make sure antenna connection is secure.
3. Dress the ribbon cables flat down the back of unit to prevent panel from bending or not fitting flush with wall.
4. **NOTE: If the Extension Frame that is packaged with the Master Panel is to be used:**
 - (a) Assemble the four (4) pieces of the Extension Frame as illustrated in Figure 23.
 - (b) While supporting the Master Panel, place Extension Frame around the Master Panel.
5. Position Master Panel over rough-in frame and align screw holes in master panel with mounting brackets.
6. Secure master panel to rough-in mounting brackets with two provided No. 6 x 3/4" screws.

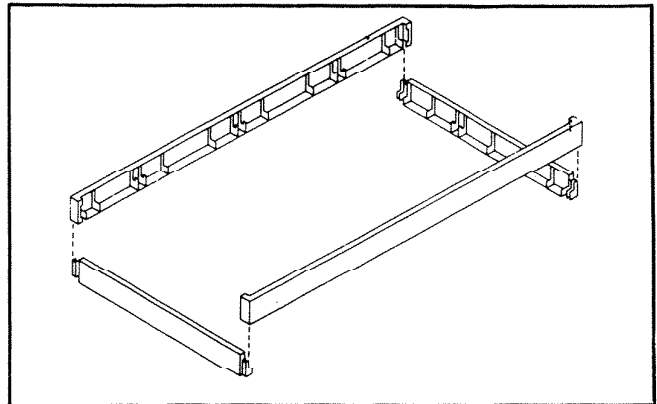


FIGURE 20

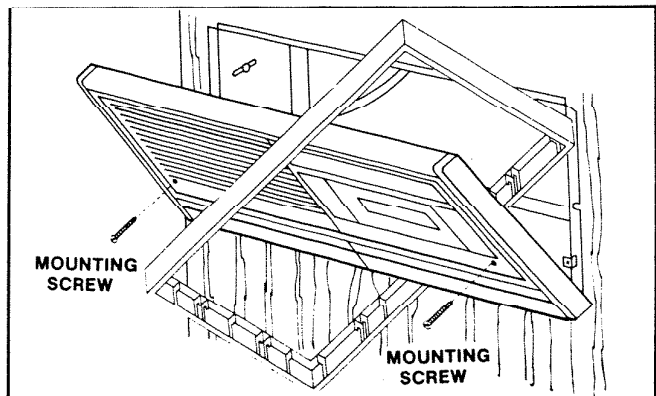
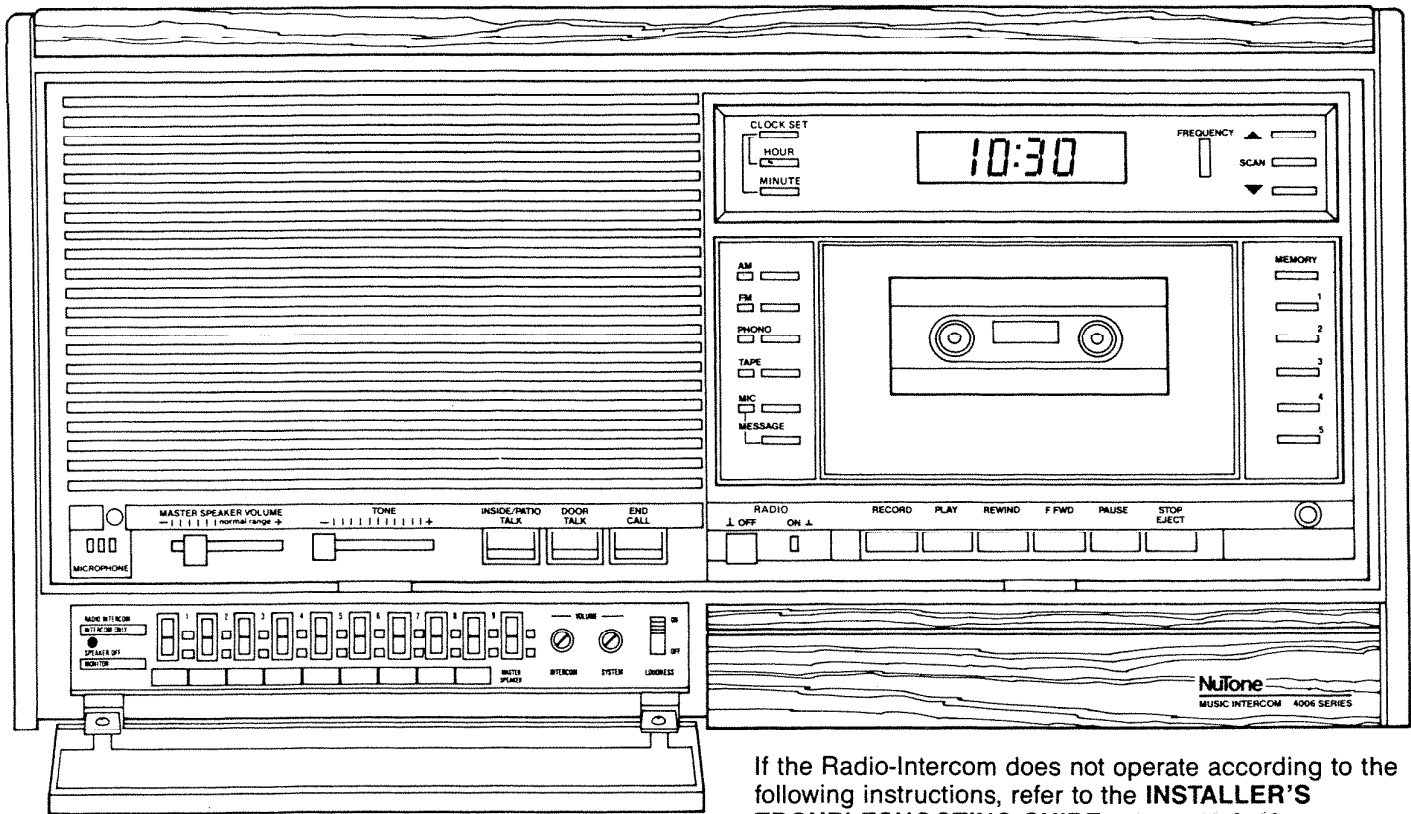


FIGURE 21

OPERATIONAL CHECKOUT



If the Radio-Intercom does not operate according to the following instructions, refer to the **INSTALLER'S TROUBLESHOOTING GUIDE**, pages 11 & 12.

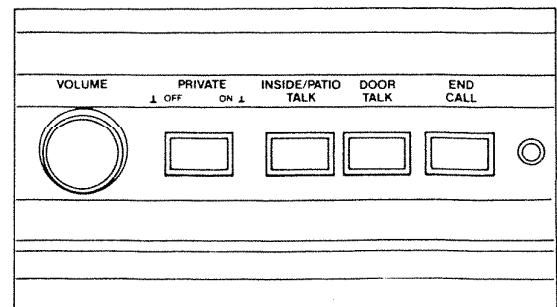
Setting Volume and Tuning Radio

1. At each remote station, turn the **VOLUME** control completely clockwise to maximum volume.
2. At the master station, set all **REMOTE SPEAKER STATUS** switches to the **RADIO INTERCOM** position. Set **MASTER STATION** switch to **RADIO INTERCOM**.
3. Latch the master station's **RADIO** switch to **ON (⊥)** position.
4. Slide the **MASTER SPEAKER VOLUME** control to maximum (+) volume.
5. Turn the **SYSTEM VOLUME** control on the master station to approximately 1/3 volume.
6. Set the master station's **PROGRAM SELECT** pushbutton to **AM** or **FM**.
7. Tune in a radio station with a strong, clear signal using the following procedure: Depress and hold either of the arrowhead pushbuttons, **UP ▲** or **DOWN ▼** until you reach the station you want then release the pushbutton.
8. Readjust the master station's **SYSTEM VOLUME** control until you have enough volume at the remote station that requires the highest volume (i.e. a large living room or family room, a basement, etc.)
9. Adjust each remote station's **VOLUME** control to the volume level you desire. Do not set remote station's volume controls below the **NORMAL RANGE** setting.

NOTE: The radio on-off control affects only the radio portion. All other features are operable.

Intercom Controls and Operation

NOTE: (A) All remote speakers are equipped with a **PRIVATE** pushbutton. When this pushbutton is pushed in to the **ON** position (⊥), it insures no one can hear you. **IF YOU RECEIVE A CALL OR IF YOU MAKE A CALL, THIS PUSHBUTTON WILL NEED TO BE PUSHED AND RELEASED TO THE OFF POSITION (⊥) BEFORE YOU CAN TALK.** (B) This system has **HANDS-FREE** answering at all **REMOTE SPEAKERS, DOOR SPEAKERS** and **MASTER STATION**. When you receive a call, make your reply without touching any of the controls. The entire intercom conversation is controlled from the station that initiated the call.



SPEAKER INTERCOM CONTROLS

Check the Intercom Operation Using the Following Procedure:

1. Make intercom calls from the **MASTER STATION** and all **REMOTE STATIONS**.
 - (A) Depress the **INSIDE/PATIO TALK** button and hold the button down while you speak. (The radio will be muted.) Your voices will be heard at all speakers except for the door speaker.
 - (B) Release the **INSIDE/PATIO TALK** button to hear the reply.
 - (C) Continue depressing the button to speak and releasing it to listen.
 - (D) Press **END CALL** to end the intercom conversation and return the system to playing the program source. If you do not press **END CALL**, the system will automatically return to playing the program source approximately 20 seconds after you have released the **INSIDE/PATIO TALK** button.
2. Test intercom operation to the door speaker(s).
 - (A) Depress the **DOOR TALK** button and hold it down while you speak.
 - (B) Release the **DOOR TALK** button to hear the door caller's reply.
 - (C) Press **END CALL** to end the call.

NOTE: Both your call and the door caller's reply will be heard at all intercom stations.
3. Set all **REMOTE SPEAKER STATUS** switches to **MONITOR**. With the radio playing, have someone speak or make noise near the remote speaker (not directly into the speaker). The voice or noise should be heard over the radio at the master station. Test each speaker for this function. Adjust the **INTERCOM VOLUME** as required.

SEE THE MODEL IM-4006 SERIES HOMEOWNER'S MANUAL FOR MORE DETAILED EXPLANATION OF THE RADIO-INTERCOM SYSTEM'S OPERATION.

INSTALLER'S TROUBLESHOOTING GUIDE

TROUBLE	POSSIBLE CAUSE	POSSIBLE REMEDY
1. No radio, no intercom. (Radio light off).	1a. No electrical power.	1a. Be sure there is 120vAC, 60 Hz power to transformer primary. Next, check 16vAC to intercom Master from transformer secondary. Check continuity of wiring from transformer.
	1b. Defective transformer.	1b. Replace transformer.
2. No radio, intercom working. (Radio light on).	2a. Antenna problem.	2a. Check for shorted antenna connection. Remove antenna connector from tuner board and touch each pin with metallic object. If radio plays, antenna is not functioning; be sure it is installed properly. In weak signal areas, an outside antenna may be necessary.
3. Low or distorted radio volume.	3. Incorrect volume setting.	3. Follow "Setting Volume" instructions under OPERATIONAL CHECKOUT.
4. Low or no intercom volume from remote speaker in MONITOR mode.	4a. Improper operation.	4a. Be sure receiving speakers have volume controls set in NORMAL RANGE. Follow "SETTING VOLUME" instructions in Operational Checkout. Be sure speaker to be monitored is not in PRIVATE MODE.
	4b. Program and Intercom Volume Control adjustment.	4b. Follow these instructions whenever the radio tends to overpower transmissions from a remote speaker in the MONITOR mode. These instructions will help you get the proper balance between the radio and the monitored speaker. <ol style="list-style-type: none"> 1. Set system volume control to midpoint. 2. Adjust volume control to each remote speaker and speaker in master station to the middle of the normal range. 3. Set master to AM or FM and tune to a strong AM or FM station. 4. Adjust system volume control for a desired listening level. 5. Increase Intercom volume control setting. Adjust clockwise to desired monitor volume.
5. System squeals when using intercom.	5a. Speakers in adjacent rooms mounted on common walls, or mounted back to back.	5a. If speakers are mounted directly back to back, one speaker will have to be relocated. If speakers are in a common wall, try placing fiberglass insulation behind each speaker, or isolate the speakers from the wall by placing rubber washers or weather stripping between speaker and wall.
	5b. Improper wire used in installation.	5b. NuTone Model IW-6 6-conductor cable must be used.

CONTINUED ON BACK COVER

INSTALLER'S TROUBLESHOOTING GUIDE CONTINUED

TROUBLE	POSSIBLE CAUSE	POSSIBLE REMEDY
6. Hum in speakers.	6a. Intercom wiring run too close to household AC power wiring.	6a. Keep intercom wiring as far as practical from household AC power wiring. Do not run intercom wiring parallel to AC power wiring.
	6b. Shorted intercom power wiring or power wiring shorted to ground.	6b. Check power connections to Master and connections to transformer.
	6c. Interference from household electrical fixtures.	6c. A dimmer may cause interference. For dimmer and fluorescent lighting interference, use filters (G.E. 89G635 or equivalent). NuTone Part # 1559A-000
7. Static.	7a. Loose ground connection.	7a. Check ground connection to Master and connection to earth ground source.
	7b. Interference from household electrical fixtures.	7b. A dimmer switch may cause interference. For dimmer and fluorescent lighting interference, use filters (G.E. 89G635 or equivalent). NuTone Part # 1559A-000
	7c. Interference from household electrical appliances.	7c. Correct interference at the source: fish tank, heater, hand tool, coffee pot, etc.
8. Remote Station not working.	8a. Wire installation.	8a. Check terminal board for broken wire or loose connection. Check continuity of wire.
	8b. Speaker.	8b. Check continuity of speaker. Clean switch controls. Check with speaker known to be in working order.
9. No door communication.	9a. Wire installation.	9a. Check continuity of wiring. Check connections at speaker and Master.
	9b. Speaker.	9b. Check with a speaker known to be in working order.
10. Optional electronic chime does not work through intercom, or low volume.	10a. Wire installation.	10a. Be sure chime is wired to proper terminals on Master board and connections are good.
	10b. Improper operation.	10b. Be sure chime is electronic model. Check control settings and system volume control on Master station. Chime will be heard only through speakers set for RADIO/INTERCOM.
	10c. Chime.	10c. Increase volume control on chime. Check electronic pickups and continuity of chime input wiring.
11. Cannot receive radio station which is received by another radio in home.	11. Faulty antenna connection.	11. Antenna should be located in attic and connected to tuner in Master. Check antenna connector to be sure it is connected to header on tuner board.
12. Telephone is inoperative.	12. Wiring installation error.	12. Check all wiring for shorts and opens. If some phones work and others don't, problem may be loose connections or broken wires.
13. No display	13. Transformer not plugged in on unit.	13. Check to make sure transformer plugs are connected in unit.

Please refer to IM-4006 Series Homeowner's Manual for Warranty Information. If Homeowner's Manual has been misplaced, write to NuTone, Madison and Red Bank Roads, Cincinnati, Ohio 45227. Attention: Department of National Service.

Product specifications subject to change without notice.

NuTone

Madison and Red Bank Roads, Cincinnati, Ohio 45227
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