

NuTone®

INSTALLATION INSTRUCTIONS

RADIO-INTERCOM SYSTEM

MODEL: IM-3003 Series Master Station

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

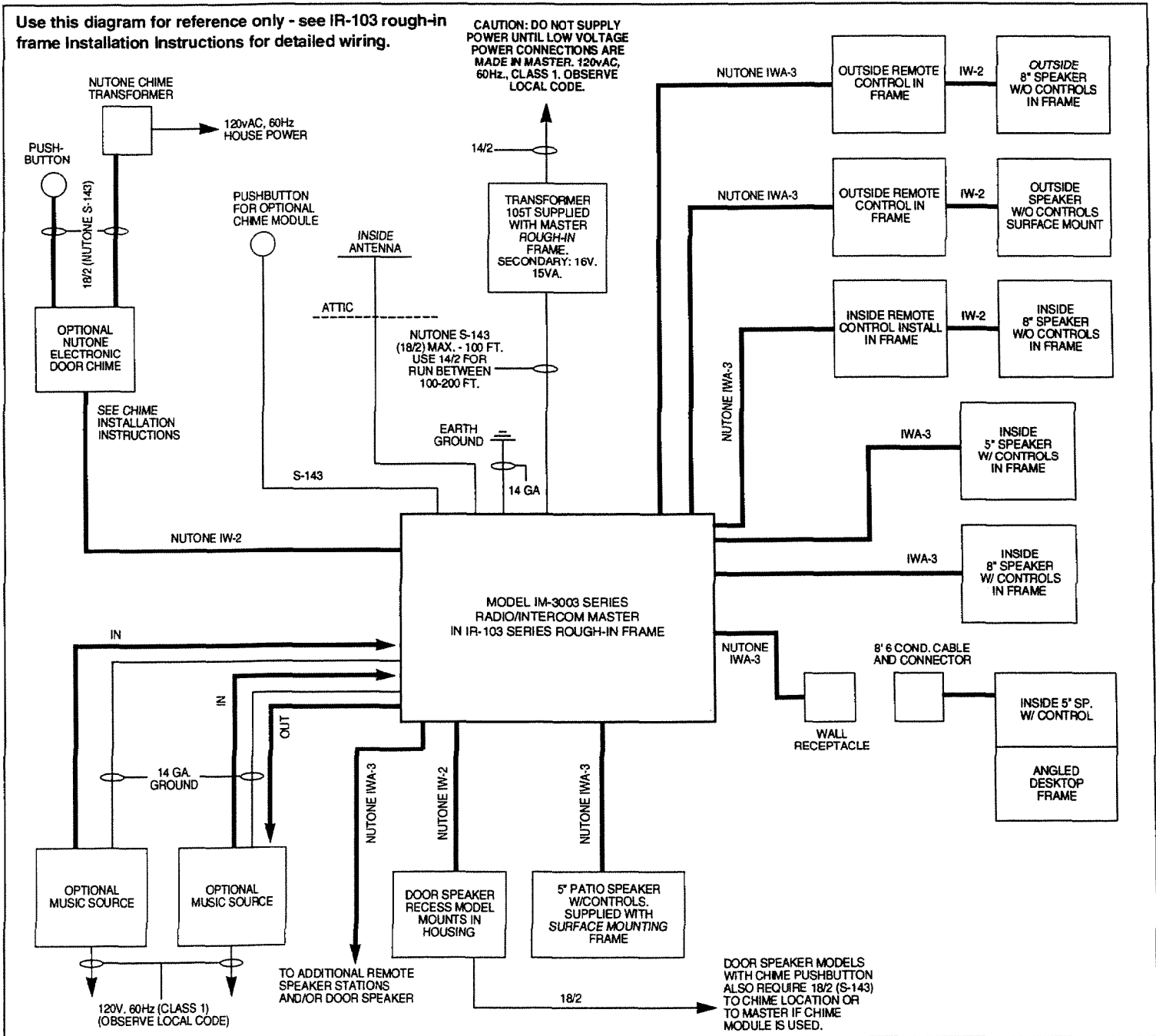
Refer to the installation instructions packaged with the rough-in frame for detailed wiring information. For more

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-3003 SERIES REPRESENTATIVE WIRING ILLUSTRATION

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

CAUTION: DO NOT SUPPLY POWER UNTIL LOW VOLTAGE POWER CONNECTIONS ARE MADE IN MASTER. 120VAC, 60Hz., CLASS 1. OBSERVE LOCAL CODE.



INSTALLATION

Wiring Specifications

NuTone IW-2: 22 GA. Twisted Pair.

NuTone IWA-3: Flat Ribbon Type 3-wire, 22 GA. cable.

NuTone S-143: 18 GA. 2-conductor insulated.

No. 14/2: 120v, 60Hz Power Cable: Class 1. U.L. Listed
(not supplied by NuTone).

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

Speaker Wiring

An individual 3-wire cable (IWA-3) must be connected from each remote speaker or remote control to the master unit's terminal board.

- Maximum speaker run: 300 feet.
- Maximum total of IWA-3 per system: 2000 feet.

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 wires and cables must be placed at least 12 inches from any A.C. power wiring.

Maximum Number of Speakers

The System will accommodate up to 13 speakers and up to 3 door speakers. If more than 9 speakers are connected, use only terminals 1, 2, 6 and 7 for double wiring connections.

Mounting the Terminal Board

1. Refer to Figure 1. Locate the terminal board in the right rear section of the rough-in frame.
2. Refer to Figure 1. Use four No. 6 x 3/8" screws to secure terminal board to rough-in frame.
3. Refer to Figure 1. Make certain that the upper left 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 mounting screw and terminal board.

Connecting the Transformer

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. Refer to Figure 2. Connect two low voltage wires (red and white) to the transformer's terminal screws.
3. Refer to Figure 2. Dress and secure with two screws.

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

FOR SYSTEMS USING
10-13 SPEAKERS,
MAKE DOUBLE
CONNECTIONS TO
ONLY TERMINALS
1, 2, 6, 7.

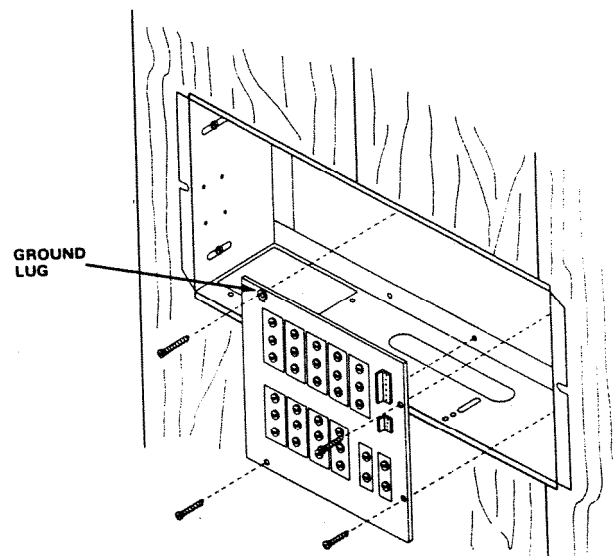
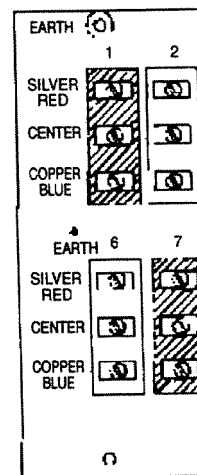


FIGURE 1

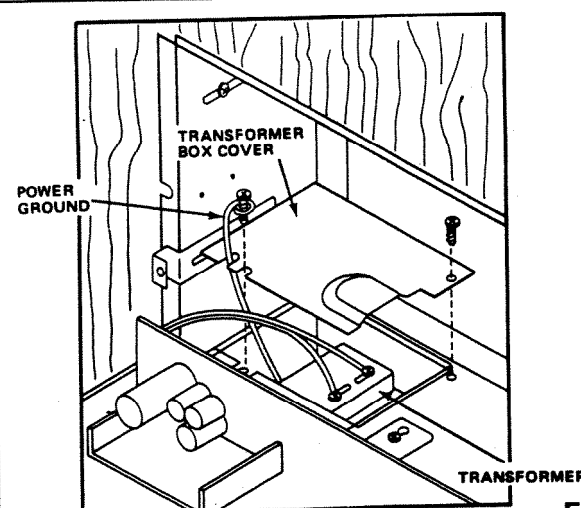


FIGURE 2

INSTALLATION (Continued)

Wire Matching Chart

NuTone has adopted the use of a 3-wire color-coded cable. If you are replacing an older model Radio-Intercom, use this chart to match the "copper/center/silver" designations of older wiring with the blue/grey/red-stripe color-coded wire.

OLD CABLE	NEW CABLE	
	Insulation	Wire
Copper	Blue	Copper
Center	Grey	Center
Silver	Red Stripe	Silver

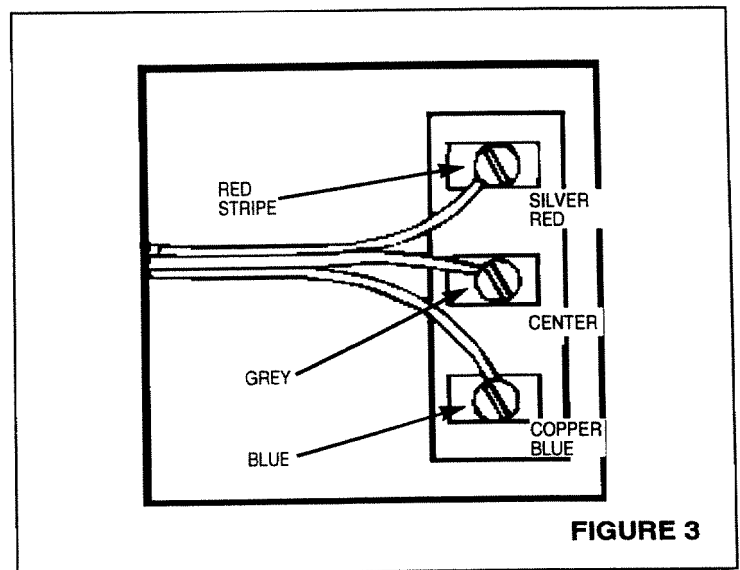
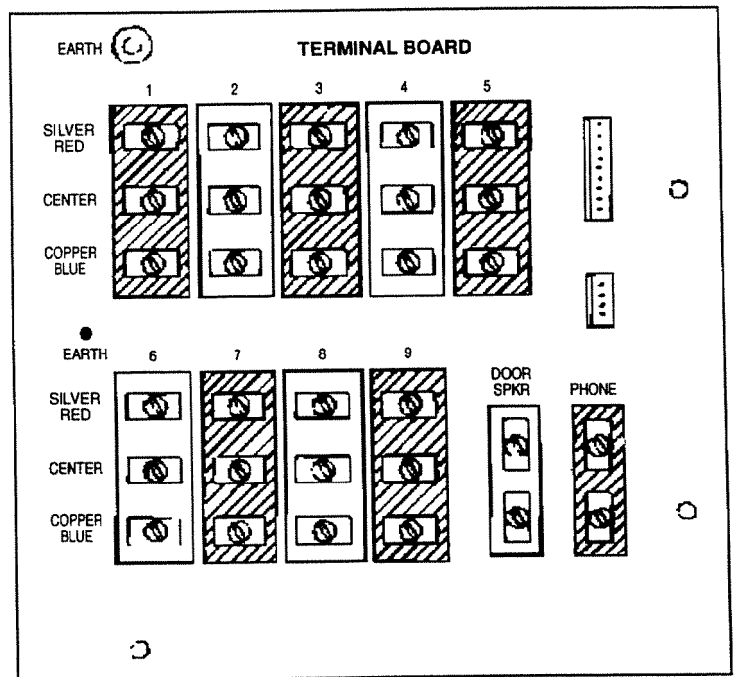
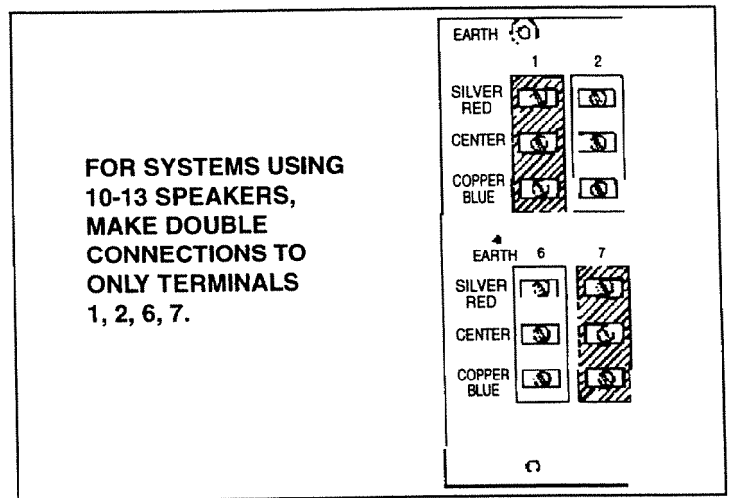
Connecting the Remote Speaker Wiring

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

1. Dress all speaker wiring through the oblong wiring holes in the rough-in frame. All wiring connections are made to the master unit's terminal board.
2. Refer to Figure 3. Connect the three-conductor wire (IWA-3) from each speaker to a set of terminal screws. The system will accommodate up to 13 speakers. If more than 9 speakers are connected, use only terminals 1, 2, 6 and 7 for double wiring connections.
3. Connect speaker wiring as follows:
RED STRIPE wire to terminal screw marked **SILVER RED**.
GREY wire to terminal screw marked **CENTER**.
BLUE wire to terminal screw marked **COPPER BLUE**.

NOTE: See "Wire Matching Chart" if you are retrofitting a system with the previously used Copper/Center/Silver wire.

4. Refer to installation instructions packaged with remote speakers or remote controls for wiring of the units.



INSTALLATION (Continued)

Connecting the Door Speaker Wiring

1. The door speaker connects to the terminal board with two conductor (IW-2) 22 gauge twisted pair wire.
2. Refer to Figure 4. Connect two wires from the door speaker to the two terminal screws marked **DOOR SPKR** on the terminal board.

Connecting Optional Electronic or Musical Chime

1. Connect two-conductor wires (IW-2) from the chime to the black and white wires as illustrated in Figure 5.
2. An optional Musical Chime Module may be plugged into the 4-pin connector located on the side of the board.
IMPORTANT: Observe polarity.
3. Refer to the Installation Instructions packaged with the chime for complete wiring details.

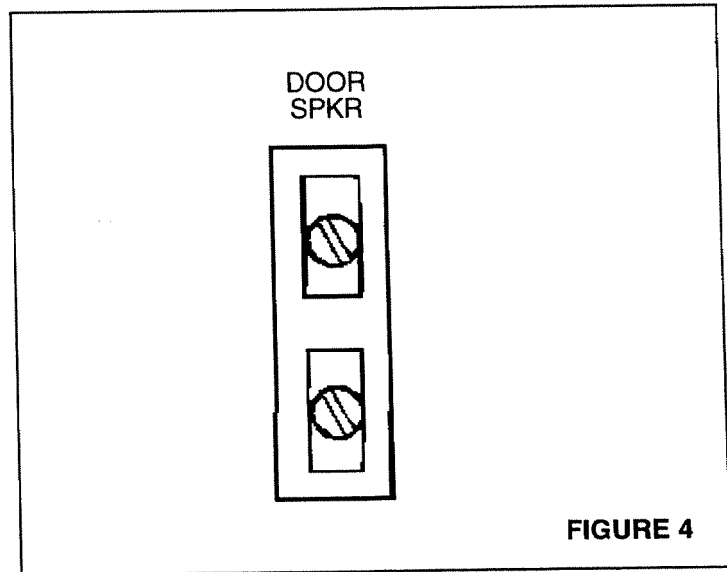


FIGURE 4

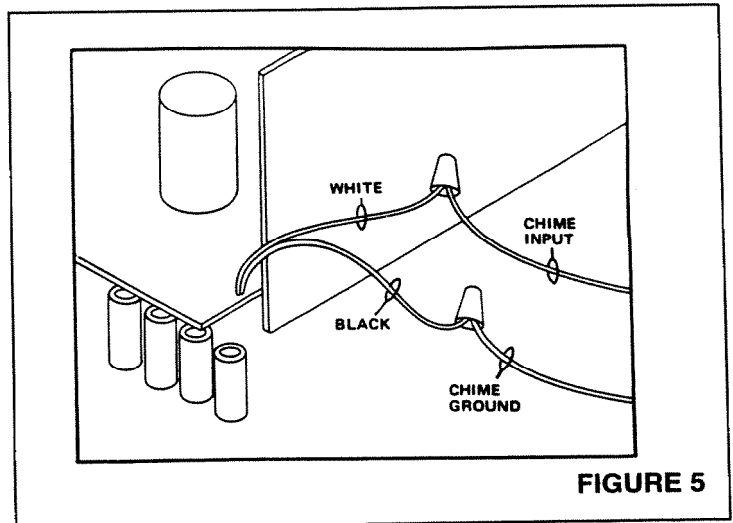


FIGURE 5

INSTALLATION (Continued)

Mounting the Master Panel

1. Refer to Figure 6. For rough-in frames which are recessed into the wall opening: Insert two No. 6 x 3/8" screws (provided) into the front two holes in the rough-in frame. Do not completely tighten screws.

For rough-in frames which are mounted flush with the wall: Insert two No. 6 x 3/8" screws (provided) into the back two holes in the rough-in frame. Do not completely tighten the screws.

2. Align master panel with rough-in frame.
3. Attach master panel to rough-in frame by placing keyhole slots in both mounting hinges over screw heads in rough-in frame.
4. Refer to Figure 7. Slide one hinge toward inside of rough-in frame as far as possible and securely tighten the screw. Position and secure the second hinge.
5. Refer to Figure 8. Attach support strap to rough-in by placing hook into hole in rear flange of rough-in frame.
6. Use two No. 6 x 3/8" screws to attach mounting brackets to rough-in frame. Make certain the brackets are flush to wall or rough-in.
7. Connect ground wire lug to pin marked EARTH on terminal board.
8. Place antenna plug onto two pins on tuner board.

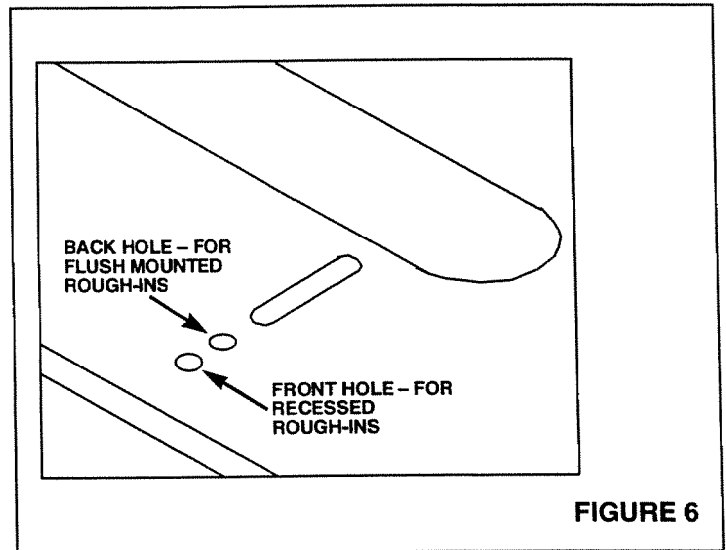


FIGURE 6

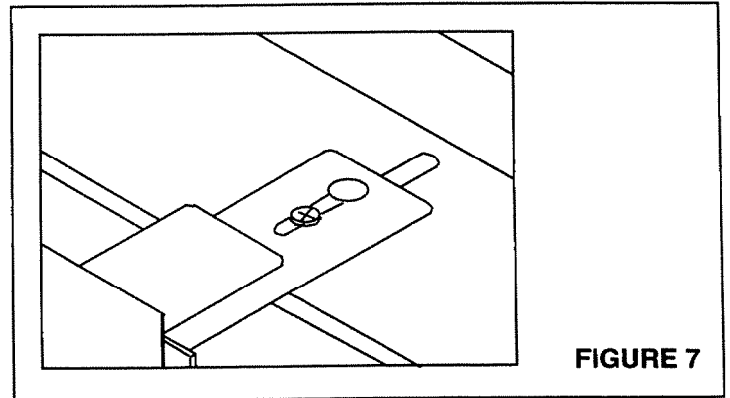


FIGURE 7

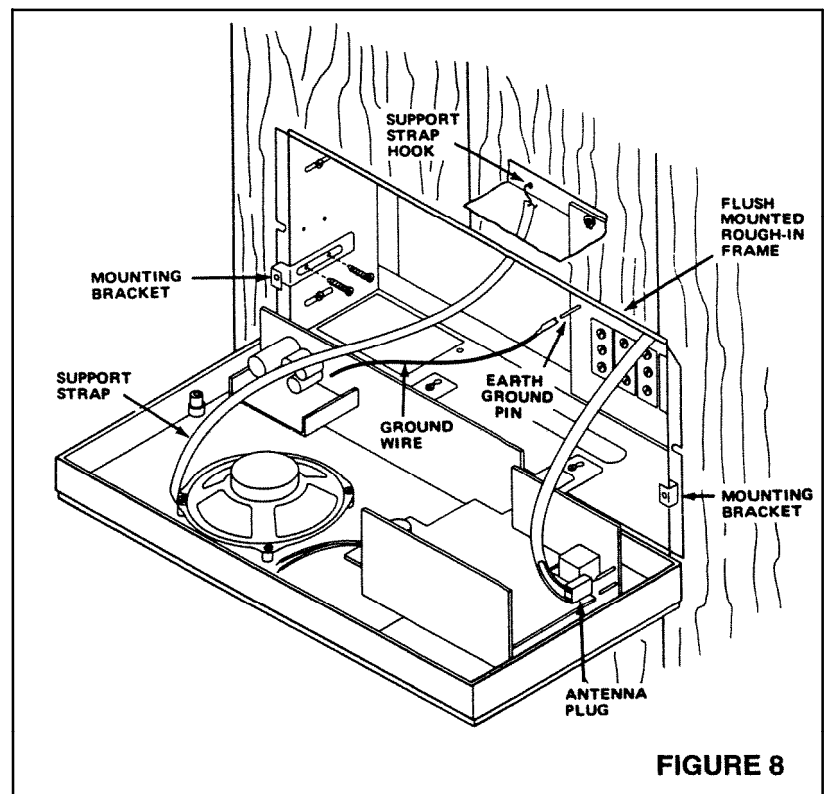


FIGURE 8

INSTALLATION (Continued)

Connecting the Master Panel to the Terminal Board

Refer to Figure 9.

1. Connect the 4-pin ribbon cable from the master panel to the 4-pin connector on the terminal board.
2. Connect the 9-pin ribbon cable from the master panel to the 9-pin connector on the terminal board.

Connecting the Optional Accessories

Refer to Figure 10.

1. To connect an optional Record Changer, Cassette Player/Recorder or CD, locate the **PHONE INPUT**, **TAPE INPUT**, and **RECORD OUTPUT** jacks on the master panel.
2. To play a phonograph over the intercom system, insert the accessory's output plug into the master panel's **PHONO INPUT** jack.
3. To play the Cassette Player/Recorder or CD 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/Recorder, insert the tape player's input plug into the master panel's **RECORD OUTPUT** jack.
5. **OPTIONAL HOOK-UP TO PROVIDED RADIO ONLY:** The radio and optional entertainment sources can be channeled through an auxiliary amplifier to provided uninterrupted music (no intercom) to separate 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 the Model IMA-516 Amplifier, which is used as the auxiliary amplifier in such an installation. Connect the IMA-516 to the master station's **RECORD OUTPUT JACK**. If IMA-516 is used, the system cannot also use the Cassette Player/Recorder's recording capability.

Securing the Master Panel

Refer to Figure 11.

1. Check all wiring connections to make sure they are complete and correct.
2. Check to make sure antenna connection is secure.
3. Dress all wiring away from master unit's speaker to avoid interference with speaker operation.
4. Position master panel over rough-in frame and align screw holes in master panel with mounting brackets.
5. Secure master panel to rough-in mounting brackets with two provided No. 6 x 3/4" screws.

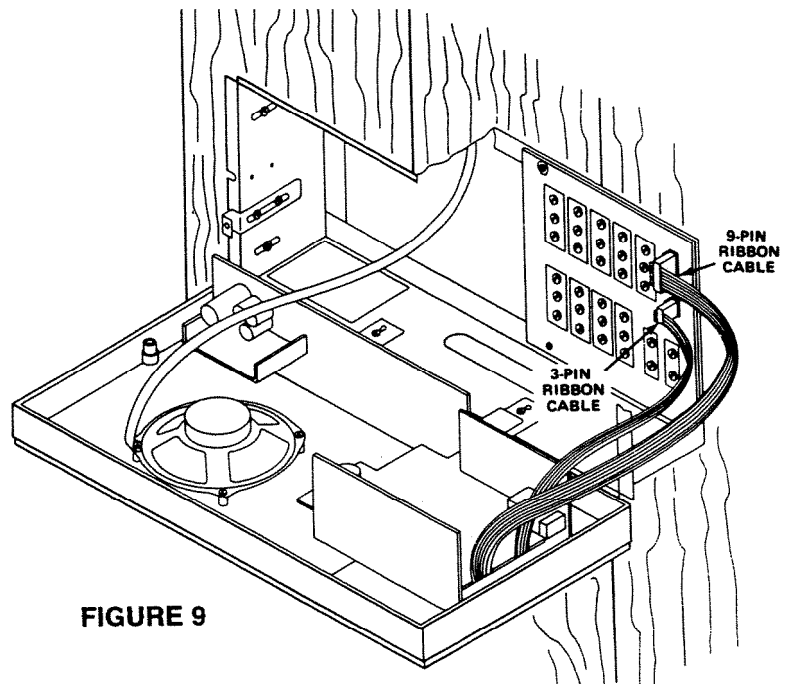


FIGURE 9

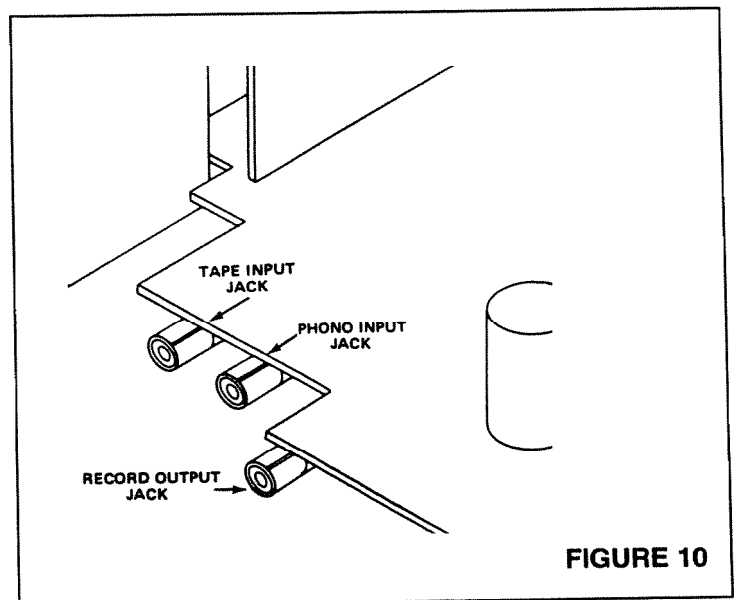


FIGURE 10

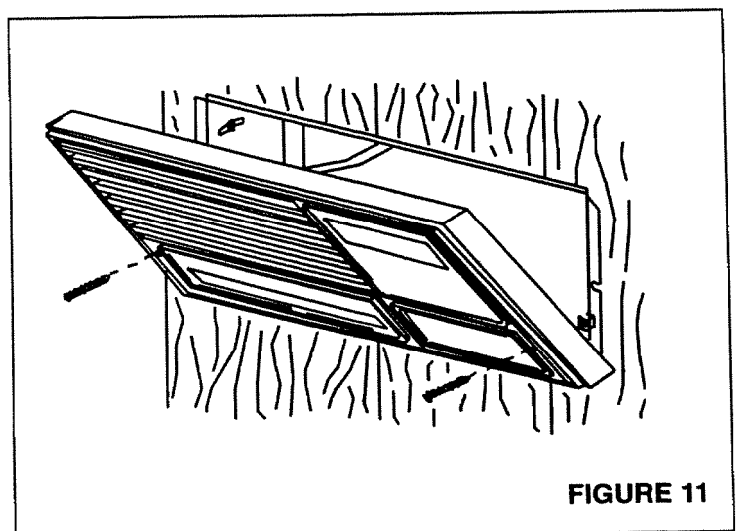


FIGURE 11

SYSTEM OPERATING CONTROLS

Radio and Program Controls

POWER ON/OFF PUSHBUTTON – Press the **POWER** button to the **ON** (⊥) position to supply power to the system and turn on the radio. The red **POWER INDICATOR LIGHT** will illuminate. Press and release the button to the **OFF** (⊥) position to turn off the program source. The **POWER** button must be in the **ON** (⊥) position to operate the intercom system and to play a program source.

PROGRAM SELECT SWITCH – Use this switch to select the program source: AM, FM, PHONO, TAPE. The indicator light will illuminate above the selected program source.

TIME/FREQUENCY SWITCH – Use this switch to set the function of the digital display. When tuning the radio, set the switch to the **FREQUENCY** position and the digital display will show you the radio frequencies as you tune the radio.

TUNING WHEEL – Turn the **TUNING WHEEL** to tune the radio.

DIGITAL AM/FM FREQUENCY DISPLAY – When the **TIME/FREQUENCY** switch is in the **FREQUENCY** position, the digital display shows you the **AM** or **FM** frequencies to which you have tuned the radio.

MASTER SPEAKER VOLUME CONTROL – Use this slide control to adjust the **MASTER SPEAKER VOLUME**. Slide the control from left to right to increase volume at the Master Station.

PROGRAM VOLUME – Use this slide control to set the **PROGRAM VOLUME** for all speakers in the system. Slide the control from left to right to increase volume level. This control governs the volume level for the entire system.

tone control – Turn the control clockwise to increase treble (high range); counterclockwise to decrease treble.

REMOTE SPEAKER STATUS - These switches set the function of individual remote stations. For a remote station to receive program material, the switch that controls that station must be set to **RADIO INTERCOM**. See "Remote Speaker Status Controls".

Intercom Controls

MASTER SPEAKER VOLUME – Slide this control from left to right to increase intercom volume at the master station .

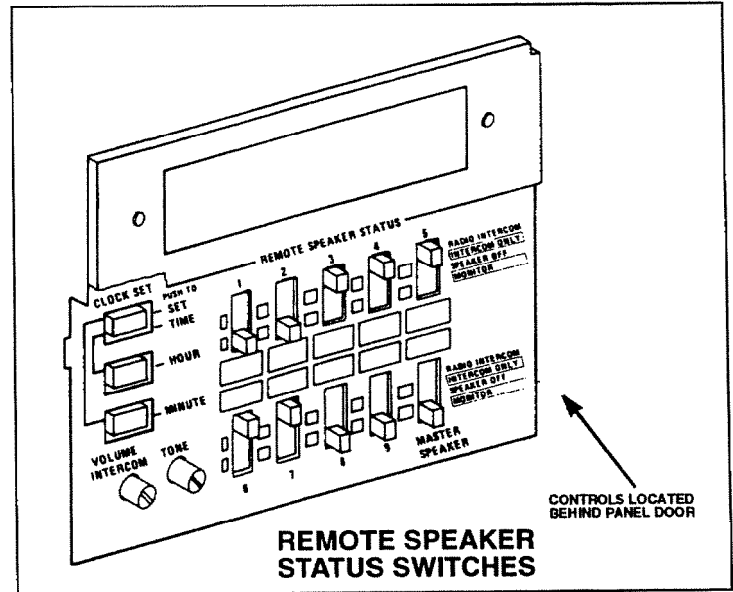
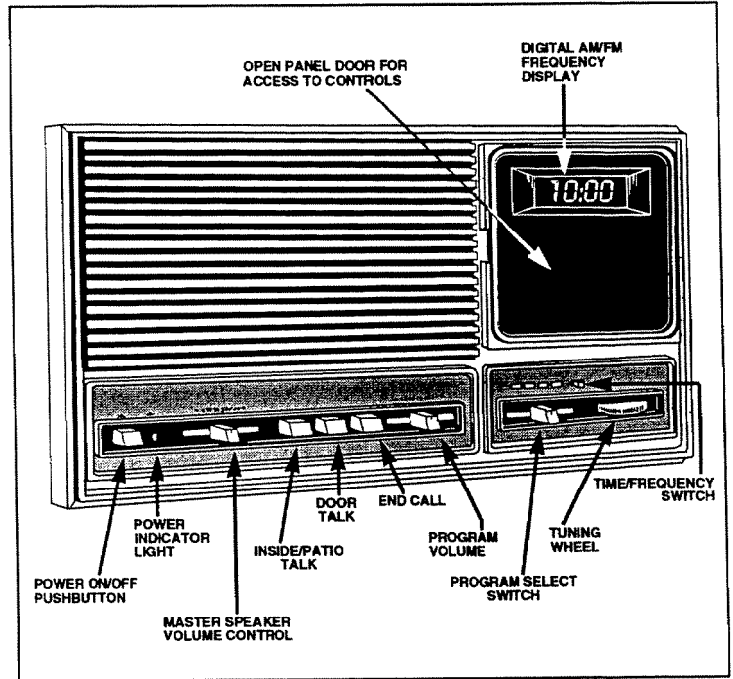
INSIDE/PATIO TALK – Press this button to make a call to other stations - except the door speakers. Release the button to hear the reply.

DOOR TALK – Press this button to make a call to the door speaker. To hear a reply, release the button. The call and reply will be heard at all stations.

END CALL – Press this button to end an intercom call. When you press **END CALL** the system will automatically return to playing the program source.

END CALL TIMEOUT – You can end a call and return the system to the program source in two ways:

- (1) Push the **END CALL** button.
- (2) Allow the **END CALL TIMEOUT** function to return the system to playing the program source. This timeout period - factory set at approximately 30 seconds - begins each time you release a **TALK** button .



VOLUME INTERCOM – Turn this control clockwise to increase intercom volume. Set **VOLUME INTERCOM** control at 3/4 to maximum for normal intercom use.

SYSTEM OPERATING CONTROLS (Continued)

Speaker Status Switches

The **REMOTE SPEAKER STATUS** switches set the operating mode of each speaker in the intercom system. The master station's operating mode is also controlled by a status switch. Locate these switches behind the master station's panel door.

SETTING THE STATUS SWITCHES – Each speaker may be set for one of the four following functions: **RADIO INTERCOM**, **INTERCOM ONLY**, **SPEAKER OFF**, **MONITOR**. For each remote speaker in the system, set the switch for the desired function. Also set the switch marked **MASTER SPEAKER**.

DETERMINING SPEAKER LOCATIONS – Each **SPEAKER STATUS SWITCH** is numbered and labeled. You will want to determine the location of each speaker in your home and write each location on the blank label above or below the switch that controls that speaker. To determine the speaker locations, set all the **REMOTE SPEAKER STATUS** switches to **SPEAKER OFF**. Set the **MASTER SPEAKER** switch to **RADIO INTERCOM**, turn in a radio station, and slide the **PROGRAM VOLUME** control to maximum (+). Slide the **MASTER SPEAKER VOLUME** control to minimum volume (—). Make sure each remote speaker's **VOLUME** control is turned completely clockwise for maximum volume.

Now, one at a time, set a **REMOTE SPEAKER STATUS** switch to **RADIO INTERCOM** and locate the speaker by sound. Write the speaker's location on its label. Repeat the procedure until you locate and label every speaker in your system.

Digital Clock Controls

TIME/FREQUENCY SWITCH – Use this switch to set the function of the digital display. Set the switch to the **TIME** position for using the display as a clock.

Setting the Digital Clock

1. Place the **TIME/FREQUENCY** switch in the **TIME** position.
2. Simultaneously depress and hold the **SET TIME** and **HOURLY** pushbuttons. After a two-second delay, the display will begin to step through the hours. Release both pushbuttons at the correct hour setting.
3. Simultaneously depress and hold the **SET TIME** and **MINUTE** pushbuttons. After a two-second delay, the display will begin to step through the minutes. Release both pushbuttons at correct minute setting.

OPERATIONAL CHECK OUT

If the Radio-Intercom does not operate according to the following instructions, refer to the **INSTALLER'S TROUBLESHOOTING GUIDE** in the back of this booklet.

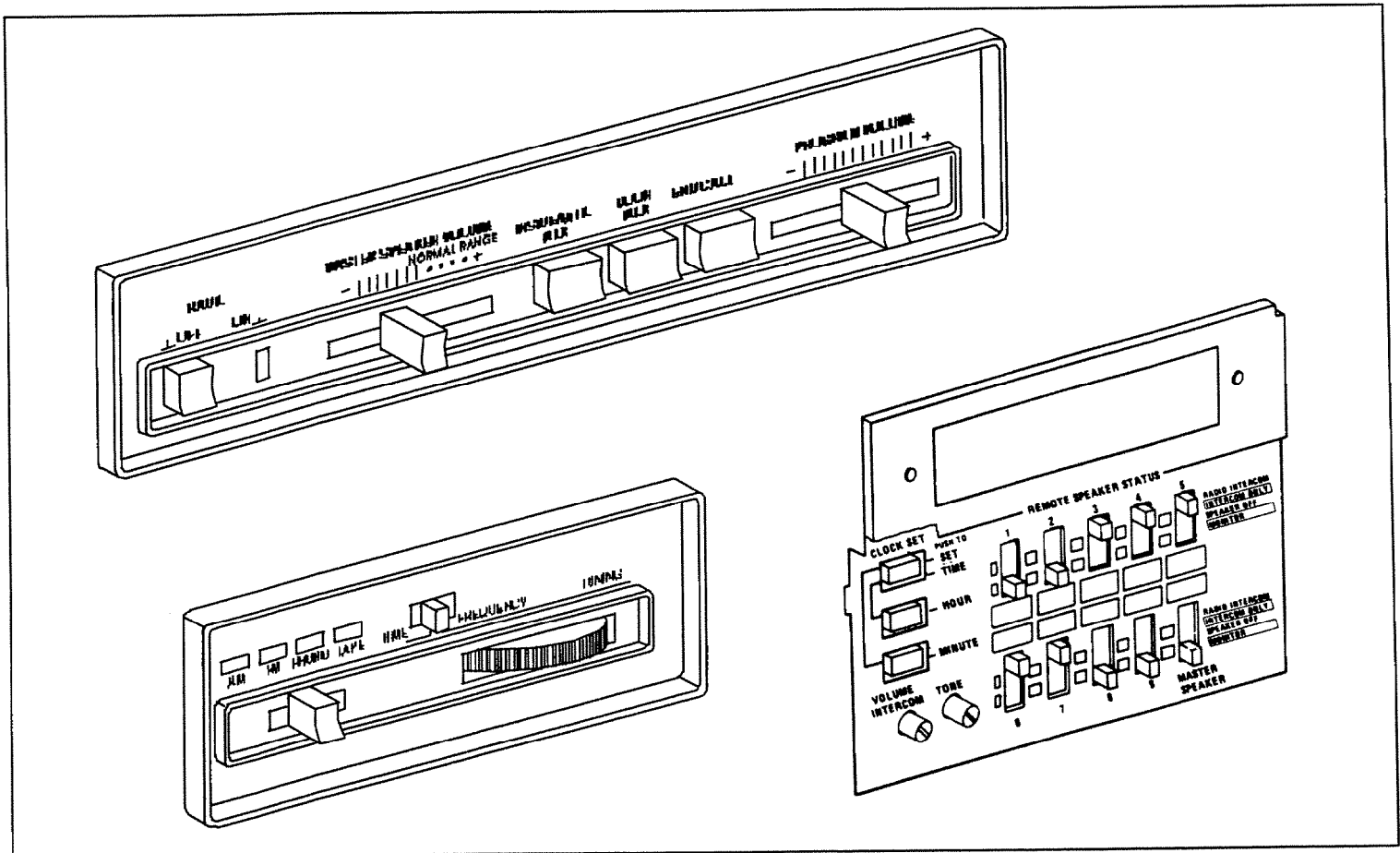
Setting Volume

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 **POWER** switch to **ON** (┘) position.
4. Slide the **MASTER SPEAKER VOLUME** control to maximum (+) volume.
5. Slide the **PROGRAM VOLUME** control on the master station to approximately 1/3 volume.
6. Set the master station's **PROGRAM SELECT** switch to **AM** or **FM**. Tune in a radio station with a strong, clear signal.
7. Adjust the master station's **PROGRAM 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.).
8. Adjust each remote station's **VOLUME** control to the volume level you desire. Do not set the remote station's volume controls below the **NORMAL RANGE** setting.

Intercom Controls

1. Make intercom calls from the master and all remote stations. See "System Operating Controls".
2. **NOTE:** "Hands-Free" Operation – If a call is initiated from the master station, the person answering from a remote station does not have to use any controls. The entire intercom conversation is controlled from the master station.
3. Test intercom operation to the door speaker(s). Door answering is controlled from the master or remote stations - door speakers in this system have "hands-free" operation.
4. See all **REMOTE SPEAKER STATUS** switches to **MONITOR**. With the radio playing, have someone speak or make a 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 **VOLUME INTERCOM** switch as required.

Refer to the Operator's Manual for a more detailed explanation of the Radio Intercom system's operation.



INSTALLER'S TROUBLESHOOTING GUIDE

TROUBLE	POSSIBLE CAUSE	POSSIBLE REMEDY
1. No radio, no intercom. (Power light off).	1a. No electrical power.	1a. Be sure there is 120vAC, 60Hz 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. (Power light on).	2a. Faulty Master Station.	2a. Isolate Master Station from installation by removing two ribbon cables from terminal board and wait one minute for timeout. With power on, radio should be playing at Master. If no radio, Master is probably faulty. If radio plays, reconnect ribbon cables.
	2b. Installation problem.	2b. Check terminal board for shorted terminals or miswired cables. Remove one 3-wire cable at a time to locate faulty line. When radio comes on, check speaker connections and run continuity check of speaker wiring. Also check for water-damaged patio remote control.
	2c. Antenna problem.	2c. 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 remote speaker set for MONITOR has its volume control set in NORMAL RANGE and receiving speakers have volume controls set in NORMAL RANGE. Follow "SETTING VOLUME" instructions in Operation Checkout.
	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. Set master to tape or phono position. 3. Adjust volume control for each remote speaker and speaker in master station to the middle of the normal range. 4. Set master to AM or FM and tune to a strong AM or FM station. 5. Adjust program volume control for a desired listening level. 6. Increase Intercom volume control setting. Adjust clockwise to desired monitor volume.
5. System squeals when using intercom.	5a. Shorted wire on master or remote terminal board.	5a. Check for short between terminals or loose wire.
	5b. Two or more Remote Stations on same wire run to Master.	5b. Make separate cable (IWA-3) runs from each Remote Station to the Master.
	5c. Speakers in adjacent rooms mounted on common wall, or mounted back to back.	5c. 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.
	5d. Improper wire used in installation.	5d. NuTone Model IWA-3-conductor, flat-ribbon cable must be used.

INSTALLER'S TROUBLESHOOTING GUIDE

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 No.: 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 may cause interference. For dimmer and fluorescent lighting interference, use filters (G.E. 89G635 or equivalent; NuTone Part No.: 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 speaker and switch controls. Substitute 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. Be sure radio-intercom system is on. 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.