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IL603
SECTION B
Rev. 6 - 05/2004

Tek-COM® SM400

Multi-Master and Master/Remote Intercom Systems

Operation, Installation and Service Manual



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The Tek-COM® SM401, SM404, SM406 and SM411 intercoms provide for master-to-master, master-to-remote and intermixed operation suitable for offices, homes, warehouses and any areas where quick, convenient loudspeaking communication is needed. Multicolored signal lights, hands-free reply, privacy and monitoring are all standard features. Optional equipment is available to call all stations, distribute music, and control remote devices.

Operation, Installation and Service Manual

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Figure 1 — Master Station Controls and Functions

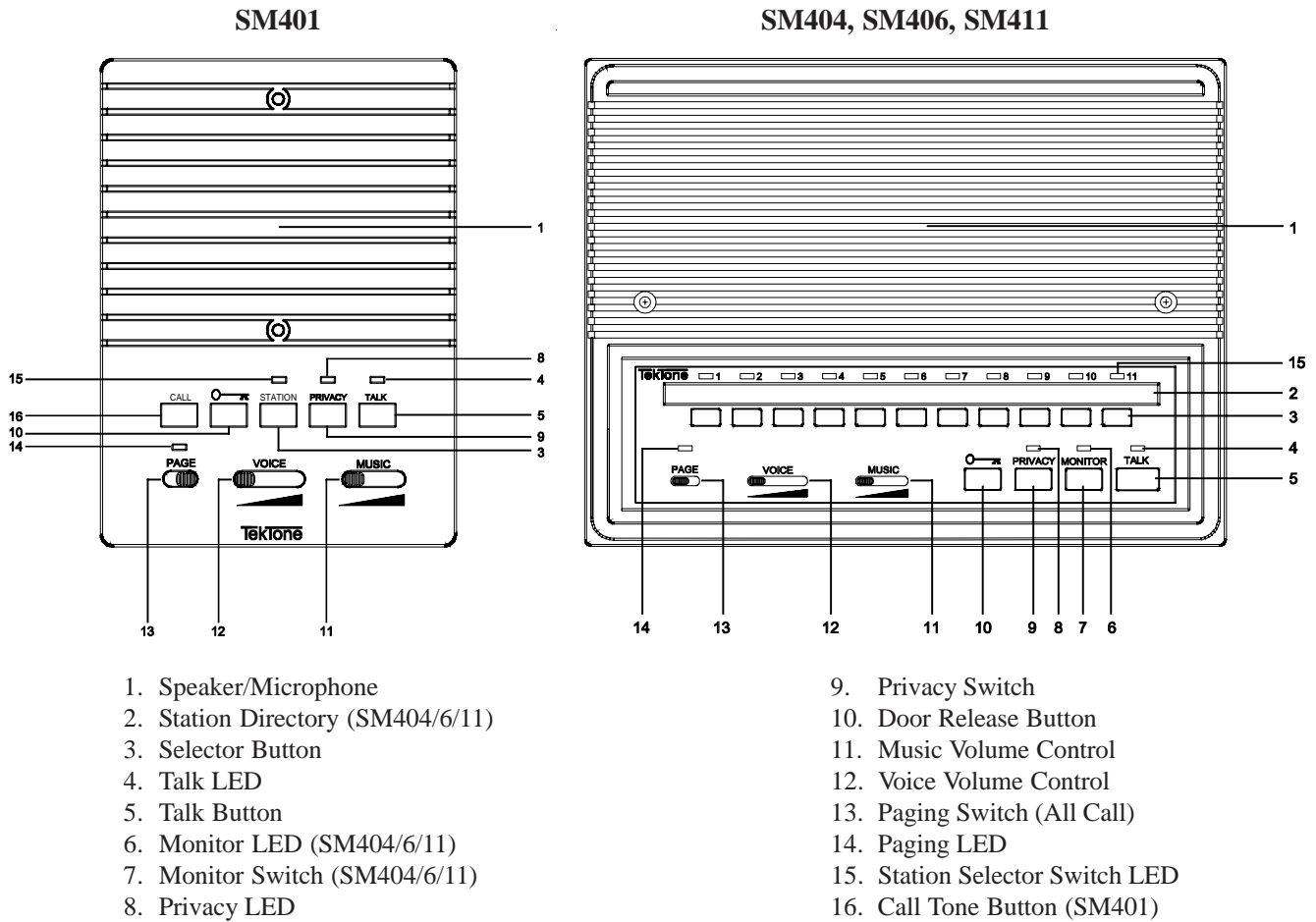


Figure 2 — System and Options

IR100B	Indoor remote with no call capability	PO001	Door strike
IR510B	Indoor remote with call button	RY400	Remote control relay, 3 outputs
IR141P	Indoor remote with call button and privacy switch	RY401	All-call relay for 12 stations
IR141U	Indoor remote with call button and in-use light (requires RY402 in-use adapter)	RY402	In-use adapter
IR143P	Indoor remote with 3 call buttons and privacy switch	SB205A	Paging horn (requires EC105 capacitor and transformer)
OR541U	Outdoor remote with call button and in-use light (requires RY402 in-use adapter)	SF400	Call button for use with paging horn
OR601	Outdoor remote with no call capability	SM401	Master 2 station with background music, slide volume, all-call, one LED
OR610	Outdoor remote with call button	SM404	Master 5 station, with background music, slide volume, all-call, four LEDs
OR642	Outdoor remote with illuminated call button (walnut finish)	SM406	Master 7 station, same as SM404 with 6 LEDs and selector switches
OR642W	Outdoor remote with illuminated call button (white finish)	SM411	Master 12 station, same as SM404 with 11 LEDs and selector switches
PK400	Power supply	SS106	Transformer

System Operating Instructions

Master Station

Call another station:

If the **TALK** light is not illuminated red, select the desired station by pressing its associated selector button. The following will occur:

- The **TALK** light will illuminate yellow.
- The selected station **CALL** light will illuminate red.
- If the called station is non-private, sound from the called station will be heard.
- Set volume as needed.
- Press the **TALK** button to speak, release to listen.
- When finished, press the selected station button again to extinguish the **CALL** and **TALK** lights.

Note: If a station button is pressed while the **TALK** light is red, the called station will not be connected. Press the selector button again to release it, and wait until the **TALK** light goes out. If the station is left selected, it will be connected when the system is free, but this may result in an undesirable howling noise if more than one master was waiting for the system to be free.

Answer a call from a remote at a master:

The incoming call will be announced by a chime or tone, and by a green **CALL** light. If the **TALK** light is not illuminated red, press the selector button associated with the illuminated **CALL** light. The following will occur:

- The **TALK** light will illuminate yellow.
- The selected station **CALL** light will change from green to red.
- If the called station is non-private, sound from the calling station will be heard.
- Press the **TALK** button to speak, release to listen.
- When finished, press the selected station button again to extinguish the **CALL** and **TALK** lights.

Note: If the station button is pressed while the **TALK** light is red, the selected station will not be connected. Press the selector button again to release it, and wait until the **TALK** light goes out.

Answer a call from a master at a master:

Calls from masters are not indicated by a light, but may be preceded by a short tone signal. Master calls are announced by voice.

To answer, if the **PRIVACY** light is illuminated, press the **PRIVACY** button to turn privacy off. It is not necessary to operate any other controls. Reply by voice.

Open the door (if installed):

Press the **DOOR** button (identified by a key).

Page all stations (if installed):

If the **TALK** light is not illuminated red, press the **PAGE** switch to the right. The following will occur:

- The **TALK** light will illuminate yellow.
- The **PAGE** light will illuminate yellow.
- If “talk back” is enabled, sounds from called stations will be heard.
- Press the **TALK** button to speak, release to listen.
- When finished, press the **PAGE** switch to the left to extinguish the **TALK** and **PAGE** lights.

Monitor a room:

If the **MONITOR** light is not illuminated red, press the **MONITOR** button, and then press the button associated with the desired station. The following will occur:

- The **MONITOR** light will illuminate yellow.
- The **MONITOR** light associated with the selected station will illuminate red.
- If the monitored station is non-private, sounds from that station will be heard.
- Set volume as needed.

When the intercom is in use by another station, the monitoring will be interrupted, but will return when the other station is finished. When finished monitoring, press the selected station button and the **MONITOR** button to extinguish the **MONITOR** and **CALL** lights.

Note: Do not attempt to use the **MONITOR** function if the **MONITOR** light is red. To do so may result in a loud noise from the intercom.

Remote Station

Call a master:

If only one **CALL** button is available, press the button. If there is more than one **CALL** button, press the button to call the desired master. If the remote has a **PRIVACY** switch, and if privacy is selected, press the **PRIVACY** button to turn the privacy off. Reply by voice when spoken to.

System Installation

Installation Procedure

1. Read instructions to determine equipment location and installation method.
2. Install housings and wiring.
3. Check and connect wiring.
4. Program masters and install stations.
5. Check operation.

Planning and Equipment Location

NOTE: Do not locate any intercom components or wiring within 3 feet (1 meter) of motors, transformers, fluorescent lights, dimmer switches, electrical wiring or other sources of electrical interference.

NOTE: It is recommended that special consideration be given to the system cabling if electromagnetic interference (EMI) or radio frequency interference (RFI) presents a potential interference problem at a jobsite. The system cabling should be shielded—or in extreme cases installed in metallic conduit—to provide protection from extraneous signals or noise. If EMI (AC hum, ESD, computer or telephone data noise, etc.) and RFI interference sources are in physical contact (for example, intercom cable is placed on top of AC wiring), then standard shielded cable protection may be negated.

NOTE: TekTone® is not responsible for interference resulting from improper installation.

Masters and Remotes:

Do not locate masters near any source of direct heat, extreme cold, or in areas exposed to dust, oil, chemicals or excess humidity. Locate stations where they will be convenient to use. If wall mounted, locate at convenient operating height.

Do not locate stations close to each other (separate rooms are preferred).

Do not locate flush mounted stations back to back on a common wall.

Power Supply and Relays:

Locate the power supply and other central equipment near the center of the master-to-master cable run and where convenient for service.

Do not locate units near any source of direct heat or extreme cold.

Transformer:

The transformer must be provided with 115 VAC electrical power. Locate the transformer within 50 feet (15 meters) of the power supply, and at least 3 feet (1 meter) from master stations, remote stations and intercom wiring.

Do not locate transformers near any source of heat.

Do not connect transformer to power source until wiring is complete. Observe all local and national electrical codes.

Music System:

Locate music system according to the instructions supplied with the system. If any area requires music without intercom, the music system may be located in that area.

System Housings

IH102	Flush mounting ring for indoor remotes
IH110R	Flush mounting ring for SM406 and SM411 masters
IH400A	Desk cabinet for SM401 and indoor remotes
IH401	Desk cabinet for SM404, SM406 and SM411

Wiring Installation

Master Stations:

Master stations may be loop wired.

Note: Due to common impedance coupling, tone signals may be amplified and heard by master stations monitoring other stations. With long wires, this interference may be quite loud. This effect may be reduced by using two conductors for the terminal C wire, by using the next larger size conductor (#20 instead of #22), or by wiring the system in a star pattern, so that all stations home run to the central equipment (power supply) location.

If all call relay is not used, limit length of cable as follows:

Wire Size	Maximum Total Cable Length
#22	500 feet (150 meters)
#20	800 feet (240 meters)
#18	1200 feet (360 meters)

If the all call relay is used, limit length of cable as follows:

Wire Size	Maximum Total Cable Length
#22	250 feet (75 meters)
#20	400 feet (120 meters)
#18	600 feet (180 meters)

Number of wires:

7 common + 1 per station*

SM401 Master Station = 8 wires

SM406 Master Station = up to 13 wires

SM411 Master Station = up to 18 wires

* If no door release operation is required, eliminate one common. A second common can be eliminated if no remotes with lighted push buttons are used.

Run cable from master-to-master and to central equipment location.

Note: Better performance may be obtained by running all wires to the central equipment (power supply) location.

All Call:

Add 2 wires to master-to-master cable.

Background Music:

Add 1 wire to master-to-master cable.

Run 2 wires #18 twisted from music system to central equipment location, 100 feet (30 meters) maximum.

Run 2 wires #18 twisted from music system to any background music-only speakers.

Door Release:

Add 1 wire to master-to-master cable.

Run 2 wires #18 from door release to central equipment, 100 feet (30 meters) maximum. Keep this wire away from all other intercom wires.

Remote to Master Cable:

Limit length of cable as follows:

Wire Size	Maximum Total Cable Length
#22	600 feet (180 meters)
#20	1000 feet (300 meters)

Number of wires:

IR143P Remote stations = 2 wires

For all other remote stations except IR141U, OR541U and OR642/OR642W, run cable to nearest master station, or to the central equipment location.

For the IR141U or OR541U remote stations, run cable to the RY402 in-use adapter.

For the OR642/OR642W remote station, run cable to the PK400 power supply location.

Paging Horn:

Limit length of cable as follows:

Wire Size	Maximum Total Cable Length
#22	100 feet (30 meters)
#20	200 feet (60 meters)

Notes:

1. A paging horn is a load equivalent to 6 remote stations, and should not be used with the RY401 All Call Relay unless the total number of master and remote stations is less than 6.
2. A paging horn requires the addition of either an EC105 Capacitor or an SF400 Call Button.

Connections

Make connections as shown on the appropriate wiring diagram. Do not connect any part of the system to AC power lines. Do not connect transformer to power source until wiring is complete.

Equipment Installation

Surface Mounting SM404, SM406 and SM411 Masters:

- Install IH401 cabinet on wall. Cabinet may be installed upside down to allow the front panel to slope upwards, if required.
- Connect wires and install SM400 Series Master on cabinet.

Flush Mounting SM404, SM406 and SM411 Masters:

- Install IH110R housing as needed.
- Connect wires and install panel on housing with screws supplied.

Name Directory for SM404, SM406 and SM411 Masters:

- Remove button identification cover.
- Write station names on paper identification strip.
- Fasten identification strip to master using transparent tape.
- Replace button identification cover.

SM401 Master and Remote Stations:

- Install ring, housing or desk cabinet as needed.
- Connect wires.
- Install panel on housing with screws supplied.

SM404, SM406 and SM411 Masters:

The power supply and relay units are surface mounted.

- Install with screws provided.
- Connect wires.

SM400 Series Installation Instructions

Programming each master to work as desired is accomplished by setting the dip switches on the back of the master. For most installations, these dip switches can remain at their factory settings. The function of these programming switches is as follows:

Dip Switch #	Name	Function
1	MUTE	Cancels call tone during intercom use
2	BACK	Cancels talk-back on “all call”
3	TIME	Cancels call lights timeout after 20 seconds
4	TONE	Cancels station calls’ pre-announce tone
5	BEEP	Cancels “all call” pre-announce tone
6	CHIME	Enables chime call tone
7	BUZZ	Enables buzz call tone

These switches may be set as needed; however, note the following points:

- The position of dip switches affects only the master station that the switches are located on.
- Normally, all master stations should be set the same, but it is possible to have different settings on each master if needed.
- Switches 6 and 7 (CHIME and BUZZ) should not be ON at the same time.
- Switch 2 (BACK) should not be OFF when other masters have Switch 1 (MUTE) OFF, since the call tone may be amplified twice, producing a disturbing noise should a remote call occur during all-call use.
- The dip switches are set at the factory as shown in Section 1.8.

Factory Dip Switch Settings

Dip Switch #	Name	Position	Function
1	MUTE	ON	Call tone during intercom disabled
2	BACK	OFF	Reply during “all call” enabled
3	TIME	OFF	Call light timeout enabled
4	TONE	ON	Station calls’ pre-announce tone disabled
5	BEEP	OFF	“All call” pre-announce tone enabled
6	CHIME	ON	Chime call tone enabled
7	BUZZ	OFF	Buzz call tone disabled

Call Tone Volume Adjustment:

The call tone volume control may be adjusted with a small screwdriver on the SM401. It is located on the back of the station. On the SM406 and SM411, the control is located behind the removable button identification cover.

Terminal Reference for Master

Terminals—what they do and when you need them.

Connector 1

Brown (N): This is the Negative of the power supply, and is necessary for system operation.

Red (B): This is used for the “all call” feature, and is necessary when the PK401 all call relay is installed.

Yellow (A): This is used for the “all call” feature, and is necessary when the PK401 all call relay is installed.

Green (P): This is the Positive of the power supply, and is necessary for system operation.

Blue (D): This line activates the door release on the PK400 power supply, and is also used when the RY400 remote control relay is installed.

Violet (F): When this line is shorted to the “N” connection through a dry contact, the master switches from listen to talk. (A selector button must be pushed in for this to work.)

Grey (R): This line is the input for background music from the PK400, and is only needed when a background music source is connected to the PK400.

White (C): This is the audio common, and is necessary for system operation.

Black (L): When a master is communicating with another master or remote, this line causes the **TALK** light to light red, indicating that the system is in use. This line also disables the amplifier on other masters until the master in communication is switched off again. This line is necessary for system operation.

Brown/White (M): This line is used for the **MONITOR** feature. If this feature will not be used, this line can be omitted.

Red/White (X): This line is the selector line for *this* master. This line is only used when there is more than one master on the system. Connect the “X” connection to the numbered terminal (1-11) on other master(s) that you want to use to call *this* master.

Example: You want to be able to push button 3 on master A or button 1 on master B to communicate with master C. To do this you would connect the “X” terminal on master C to Orange (3) on master A, and also connect it to Brown (1) on master B.

Connector 2

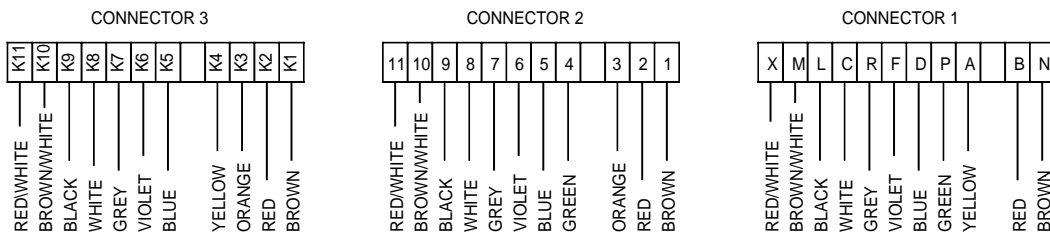
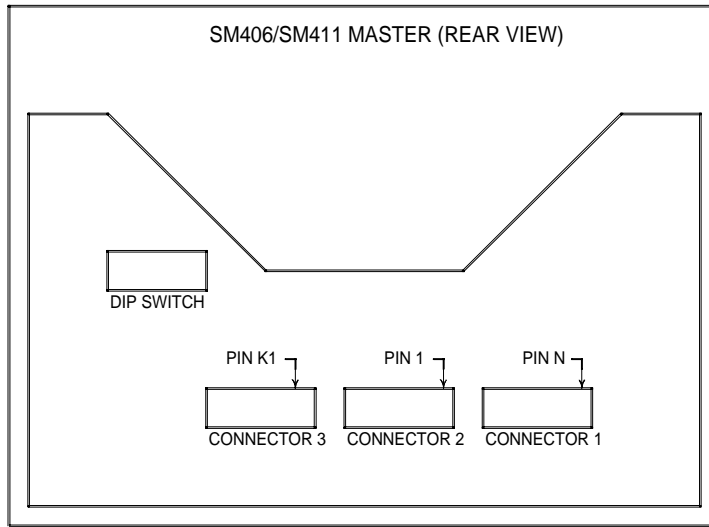
This connector is the selector button connection for the master, and is tied to the “X” terminals on other masters or on remote stations.

Connector 3

These are auxiliary outputs for the selector lines, and are used with the RY400 remote control relay and the RY402 in-use adapter. When a selector button is pushed, the corresponding “K” connection goes positive to select the correct relay output on the RY400, or to light the **IN-USE** light on remote stations so equipped.

Note: All master functions are controlled by the **TALK** light. If the **TALK** light is illuminated red, the selected function will not operate properly. Wait for the **TALK** light to go out before selecting any functions.

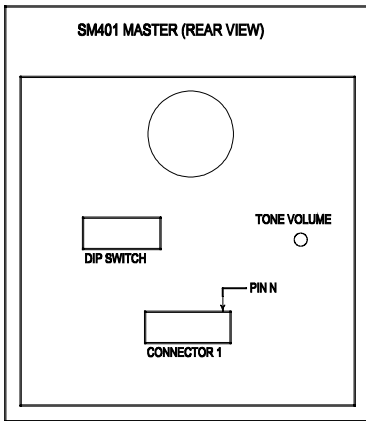
Figure 3 — SM406/SM411 Terminal IDs



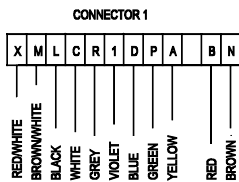
NOTES: 1. Connectors are keyed, and will fit properly in the right location only.
2. Dip switch is set as shown at factory.

IL603 SM406 SM411 Terminal IDs 111996 1

Figure 4 — SM401 Terminal IDs



IL603 SM401 Terminal IDs 111996 1



NOTES

1. Connector is keyed, and will fit properly in the right location only.
2. Dip switch is set as shown at factory.
3. Dip switch section 4 is not used.

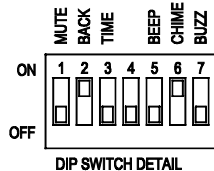
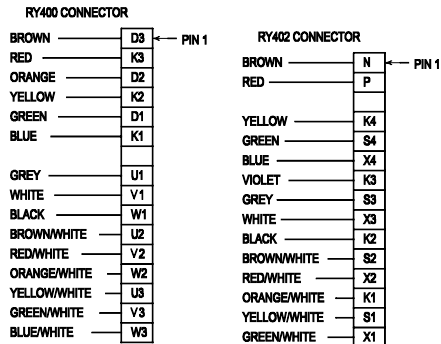
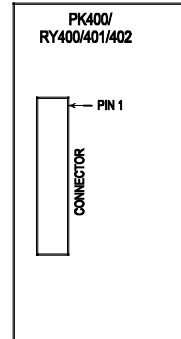
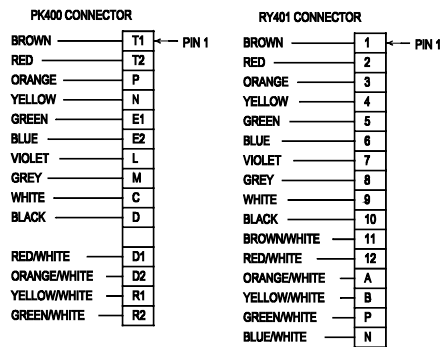
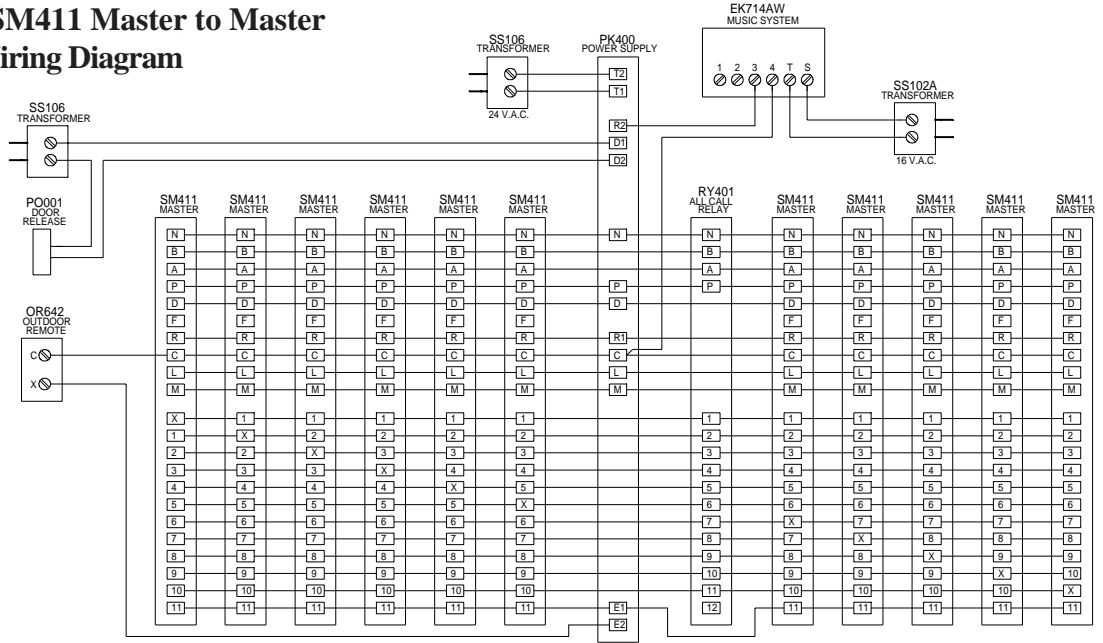


Figure 5 — PK400/R400 Series Terminal IDs



IL603 PK400 RY400 series Terminal IDs 111996 1

**Figure 6 — SM411 Master to Master
Wiring Diagram**

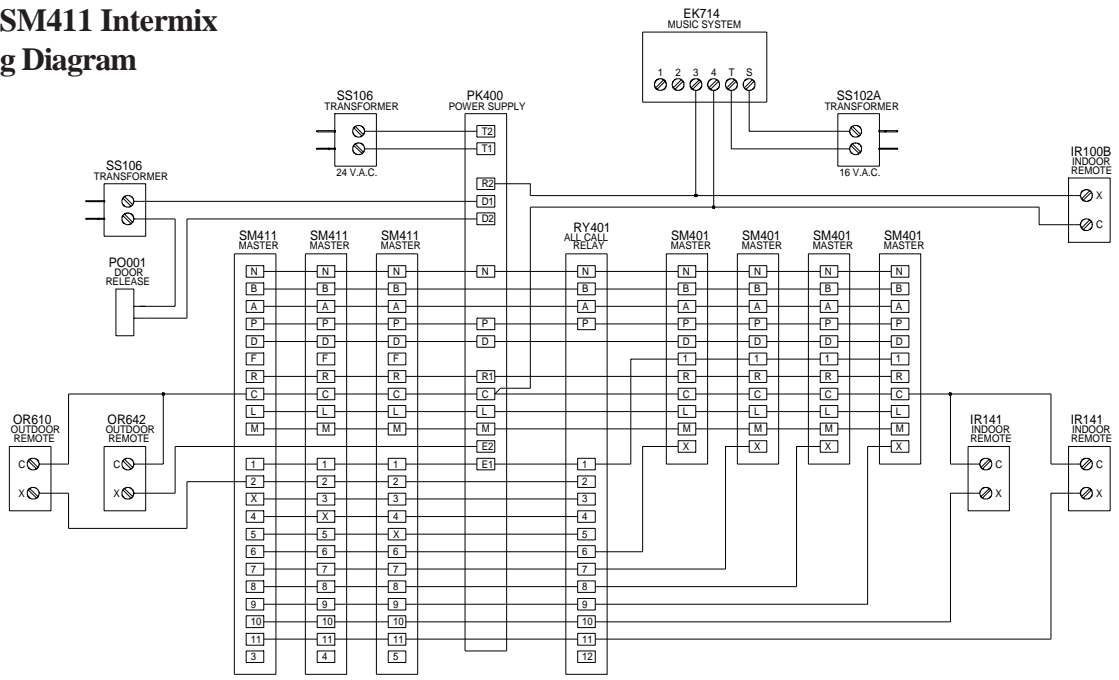


NOTES:

1. Actual terminal locations not shown. See terminal identification diagrams.
2. Connect power transformers to 115 V.A.C. in accord with local electrical codes.
3. For wire size and maximum length, see the installation instructions.
4. If the music system is not used, delete wires to terminals R, R1 and R2.
5. If the door release is not used, delete wires to terminals D, and D1.
6. If any station should not receive all call, do not connect the X terminal for that station to the RY401 all call relay (note OR641 remote, connected to terminal 11, in the above diagram).
7. If a lighted outdoor remote is not used, connect terminal X directly to the SM411 (terminal 11 in the above diagram), and do not use PK400 terminals E1 and E2.

IL603 SM411 Master to Master Wiring Diagram 062203 1

**Figure 7 — SM411 Intermix
Wiring Diagram**

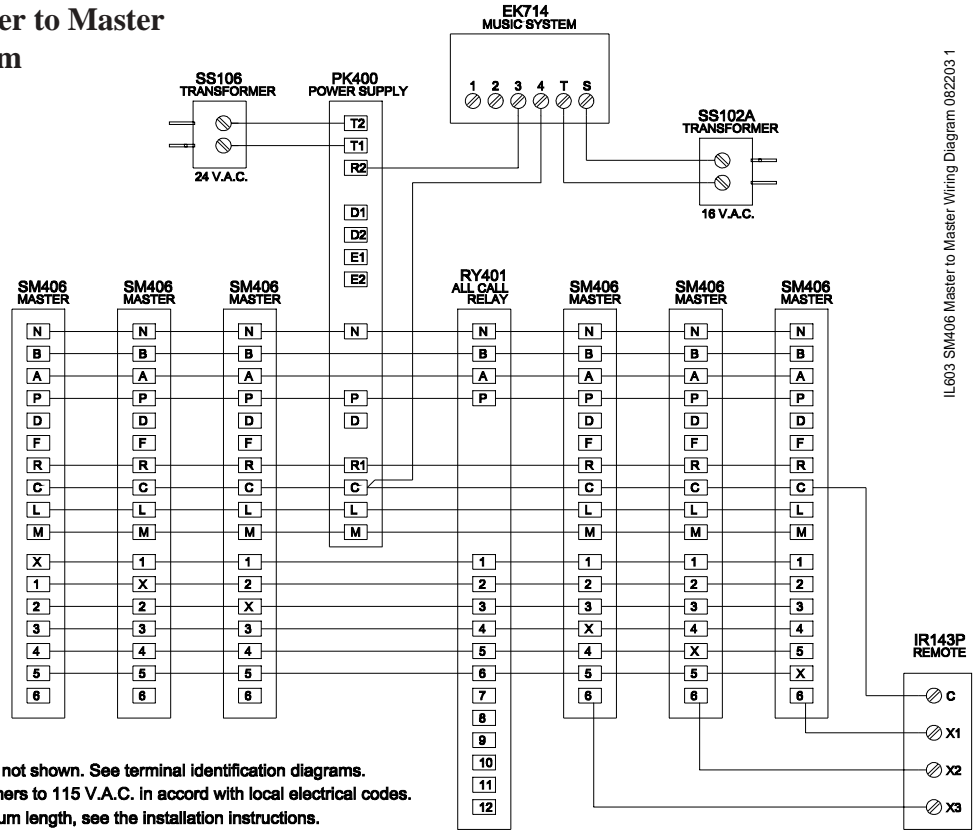


NOTES:

1. Actual terminal locations not shown. See terminal identification diagrams.
2. Connect power transformers to 115 V.A.C. in accord with local electrical codes.
3. For wire size and maximum length, see the installation instructions.
4. If lighted outdoor remotes are not used, terminals E1 and E2 do not need to be used.
5. If the music system is not used, delete wires to terminals R, R1 and R2.
6. If the door release is not used, delete wires to terminals D, and D1.
7. The IR100B station receives music but cannot make or receive intercom calls.

IL603 SM411 Intermix Wiring Diagram 062203 1

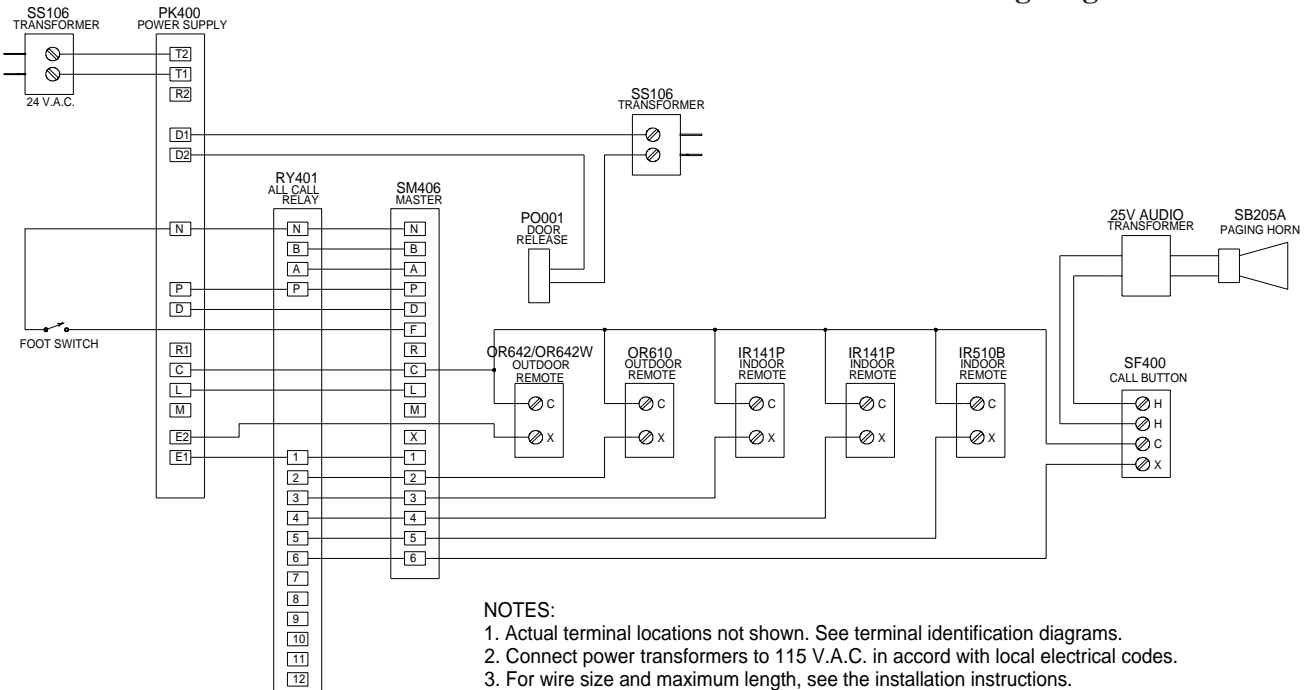
**Figure 8 — SM406 Master to Master
Wiring Diagram**



- NOTES:**
1. Actual terminal locations not shown. See terminal identification diagrams.
 2. Connect power transformers to 115 V.A.C. in accord with local electrical codes.
 3. For wire size and maximum length, see the installation instructions.
 4. If the music system is not used, delete connections to terminals R, R1 and R2.
 5. If all call is not used, delete the RY401 all call relay and connections to it.

IL603 SM406 Master to Master Wiring Diagram 082203 1

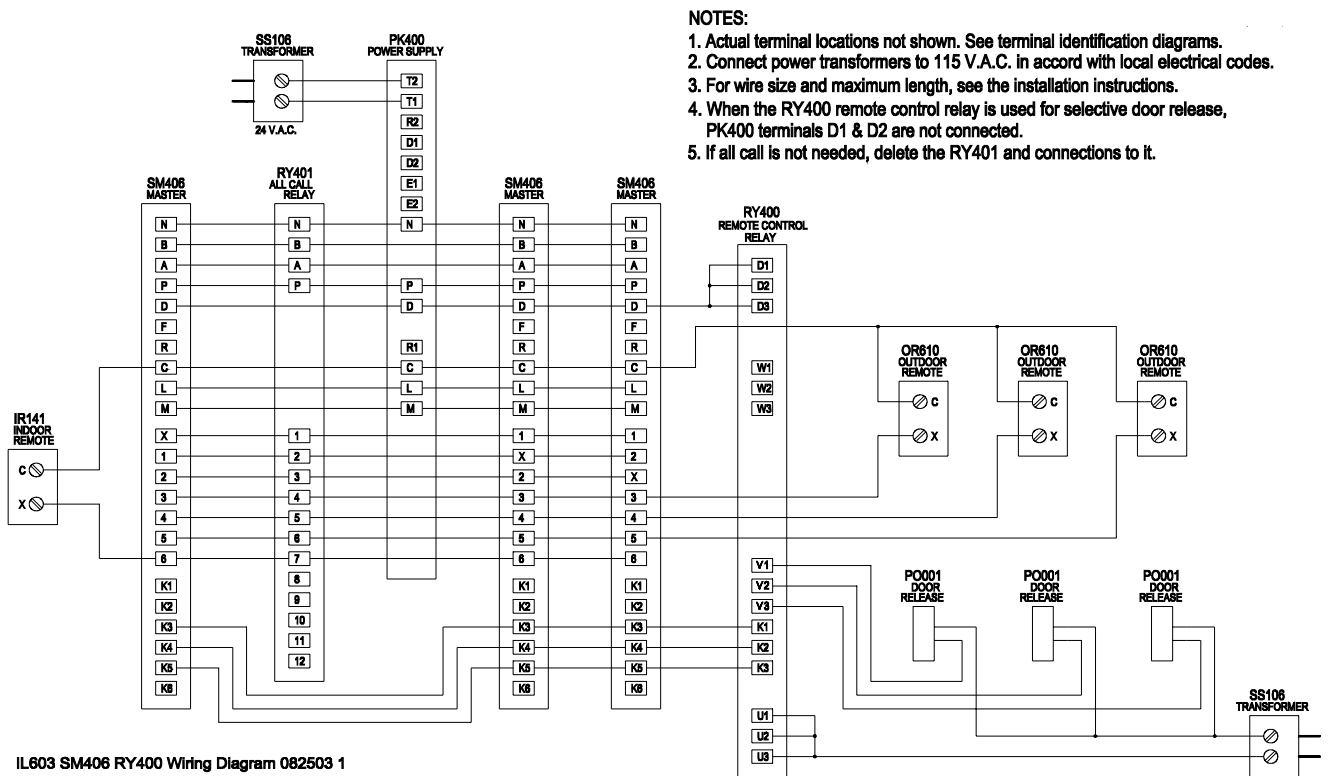
**Figure 9 — SM406 Master to Remote
Wiring Diagram**



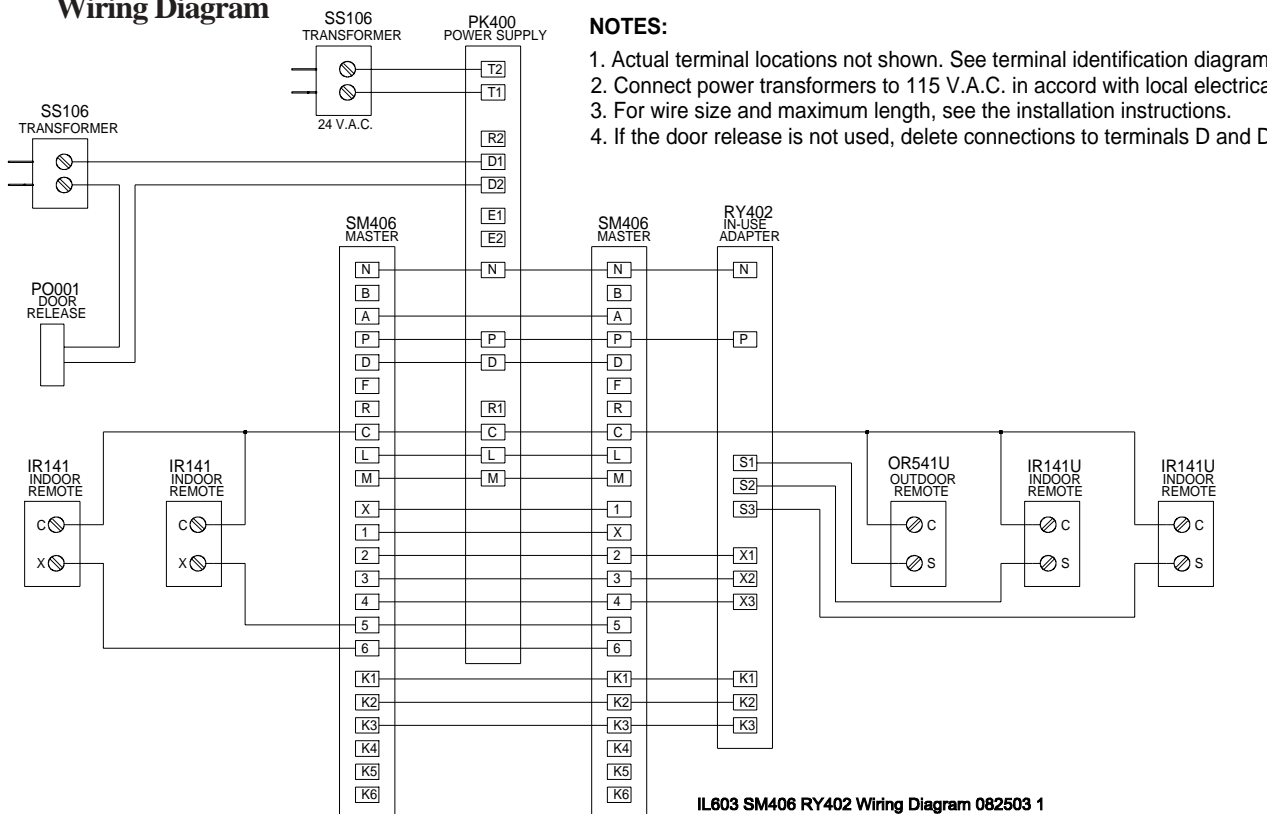
- NOTES:**
1. Actual terminal locations not shown. See terminal identification diagrams.
 2. Connect power transformers to 115 V.A.C. in accord with local electrical codes.
 3. For wire size and maximum length, see the installation instructions.
 4. If a lighted outdoor remote is not used, it is not necessary to use terminals E1 and E2.
 5. If the door release is not used, delete connection to terminals D, and D1.
 6. If the SF400 call button is not used, replace it with an EC105 capacitor in series.
 7. If the paging horn is not connected to the all call relay, the 25V audio transformer is not needed.

IL603 SM406 Master to Remote Wiring Diagram 082203 1

**Figure 10 — SM406/R400
Wiring Diagram**



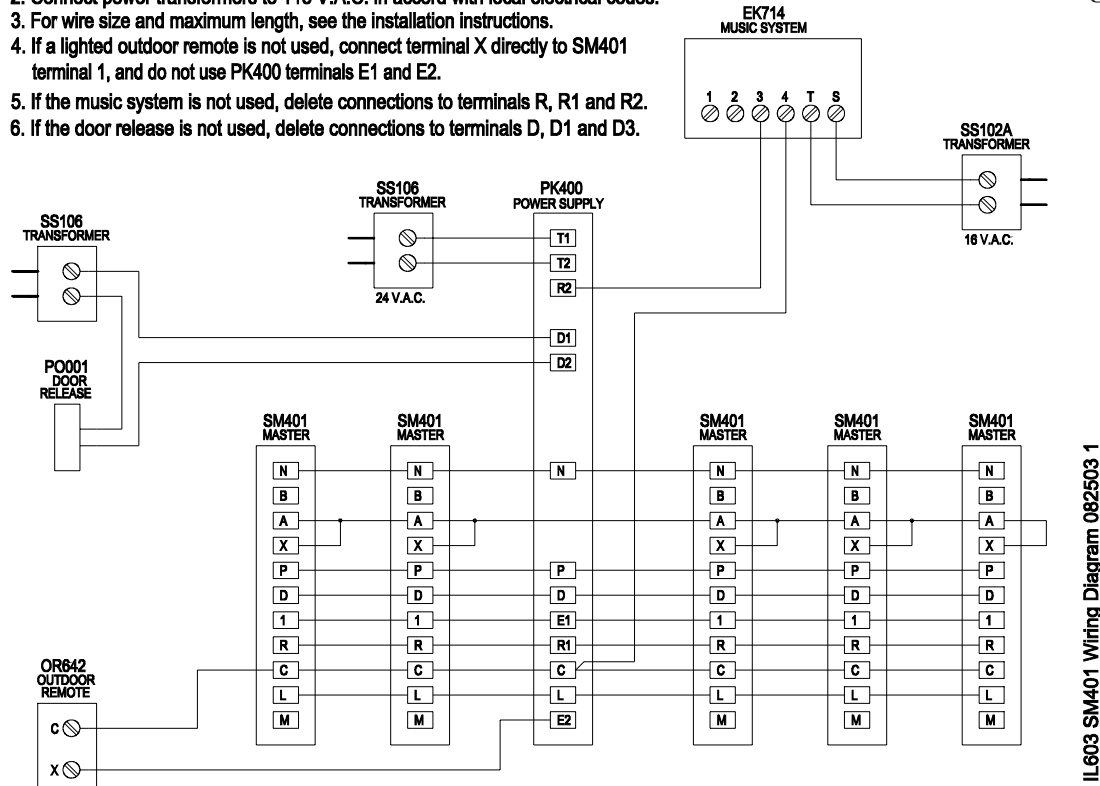
**Figure 11 — SM406/R402
Wiring Diagram**



NOTES:

1. Actual terminal locations not shown. See terminal identification diagrams.
2. Connect power transformers to 115 V.A.C. in accord with local electrical codes.
3. For wire size and maximum length, see the installation instructions.
4. If a lighted outdoor remote is not used, connect terminal X directly to SM401 terminal 1, and do not use PK400 terminals E1 and E2.
5. If the music system is not used, delete connections to terminals R, R1 and R2.
6. If the door release is not used, delete connections to terminals D, D1 and D3.

**Figure 12 — SM401
Wiring Diagram**

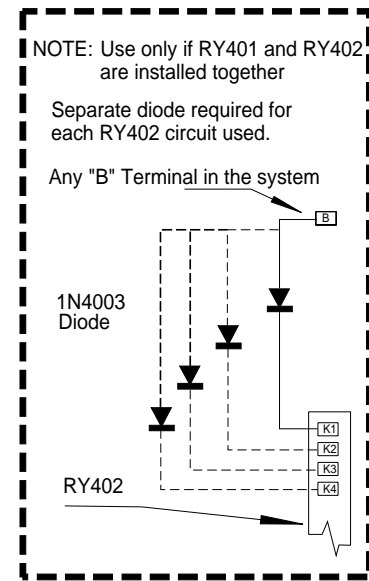
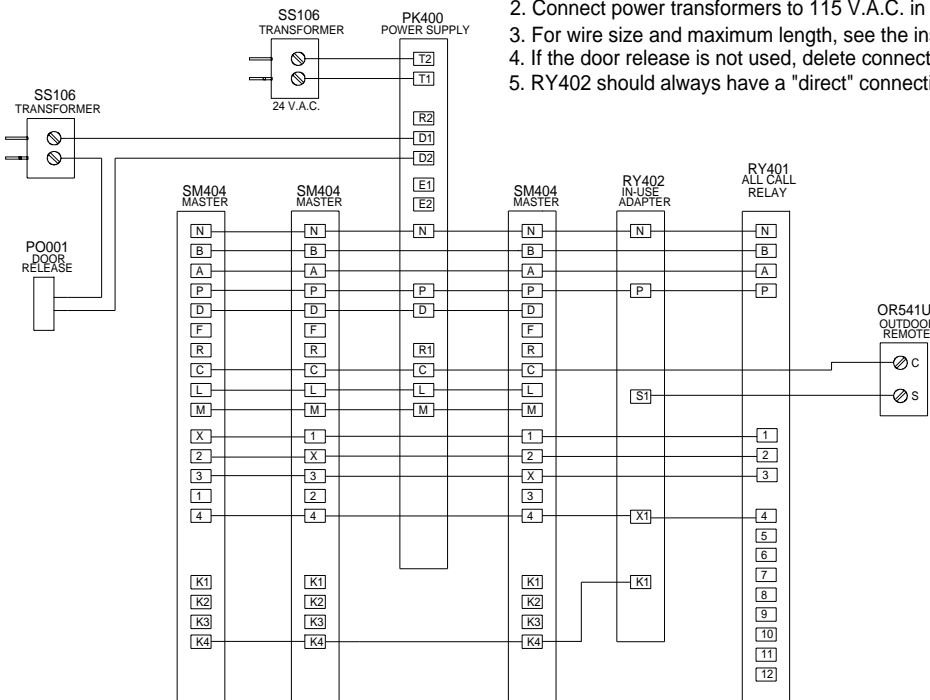


IL603 SM401 Wiring Diagram 082503 1

**Figure 13 — RY401 and RY402
application with SM404 Master**

NOTES:

1. Actual terminal locations not shown. See terminal identification diagrams.
2. Connect power transformers to 115 V.A.C. in accord with local electrical codes.
3. For wire size and maximum length, see the installation instructions.
4. If the door release is not used, delete connections to terminals D and D1.
5. RY402 should always have a "direct" connection to the PK400's "N" terminal.



IL603 RY401 RY402 with SM404 Wiring Diagram 082503 1

NOTE: Above is needed only at one master on the system