



# WELCOME

## to Your 3M Drive – Thru Product Training!!

## What Do We Want to Accomplish?

- We hope to help you become more familiar with 3M drive-thru equipment by sharing the following...
  - Types, models & features of 3M intracom products
  - How site conditions may affect these systems
  - Ways to apply the above in diagnosing problems
  - Some anecdotes about our experiences

# Equipment Types & Models

- **Current Wireless Systems**
  - C-1060 (900MHz-2001)
  - XT-1 (2.4GHz-coming soon)
- **Current Wired Systems**
  - D-15 (version d = current model)
  - D-20 & D-20V
  - D-2400 (performance series)
  - C-5000 (signature series)
- **Legacy Wireless Systems**
  - 484 (VHF-1987)
  - 486 (UHF-1989)
  - C-760 (900MHz-1994)
  - C-960 (900MHz-1997)
  - C-1025 (belt-pack)
- **Legacy Wired Systems**
  - D-15 (versions a, b & c)
  - D-30/R-30
  - D-120 & D-120V
  - C-5000 (w/ old selector)

## Current Wireless Systems - C1060

### Some Features

- Simplex or Duplex Modes
- Hands free capability in Duplex
- Dual lane capability
- Lithium batteries



### Some Limits

- Single point communication
- Fixed operating frequency
- Mostly analog processing

## Future Wireless Systems - XT-1



- Some Features
- Fully Digital Platform
- Previous options built-in
- True Spread Spectrum
- AEC & AGC built-in
- Expands/improves many 1060 features
- Self diagnostic feature
- Ethernet capable

- Some Limits

- Requires programming & specific mic/spkr

## Current Wired Systems



- D15
- 20+ years of proven reliability
- Field serviceable
- Rugged construction
- Ease of use

- D-20 & D-20V
- 6 Channels
- Durability & flexibility
- VOX capability on V model
- Call hold feature



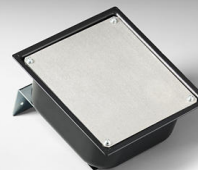
# Current Wired Systems

- **C-2400** (*Performance Series*) & **C-5000** (*Signature Series*)
- Flexibility
- Programmable LCD display
- Smaller selector size
- Input for music/messaging
- Two audio channels (C-5000)
- Wireless headset interface (C-5000)
- Interfaces w/ POS systems (C-5000)



# Current Wired Components

Noise Reduction Module



5" Deluxe  
Mic & Speaker  
Assembly



Horn Speaker



A-300 Audio Greeter



Call Station  
w/push button

# Current Wired Components

3.5" Duplex Mic w/ Foam Housing



5" Duplex  
Speaker w/Bracket



Interconnect Module  
(2nd gen.)

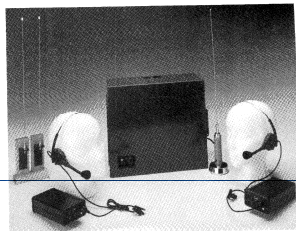


Cross Lane Control



3.5" Duplex  
Speaker w/Bracket

# Legacy Wireless Systems



**MODEL 484AA  
WIRELESS  
INTRACOM  
SYSTEM**

78-8911-2336-4

© 3M Co. 1987 August

Sound Products  
Broadcasting and Related Products/3M  
5441E 3M Center  
St. Paul, MN 55144



## 3M UHF Wireless Intracom Operating Guide Model 486BA



### Important

Before using the 3M Wireless Intracom System, please read these operating instructions carefully. The system is regulated by the FCC, and requires a license for operation.

### Introduction

The 3M brand Wireless Intracom System is precision built to provide dependable, high-quality communication for fast-food restaurants and other applications and can be easily used with existing Intracom systems.

### Installation

The wireless system should be installed by an authorized 3M Sound Products dealer representative.

### Dealer Service

A network of authorized 3M Sound Products dealers can provide service backed by 3M's technical staff.

For the name of your local dealer or technical assistance from 3M Company, contact:

Sound Products  
3M Center, St. Paul, MN 55144-1000  
Phone: 612/736-6223

# Legacy Wired Systems

## 3M Intracom Operating Guide



Model D-30  
Model R-30



### Introduction

The 3M Brand INTRACOM System is precision-built for reliable operation in continuous-duty applications. The Mainstation provides maximum voice clarity under various noise conditions.

**RECOMMENDATION:** The system should be installed by an authorized 3M Sound Products dealer representative for proper connection. Before using your Intracom system, please read these Instructions carefully.

## 3M Intracom Operating Guide Model D-120



• and D-120V



### Important

Read this operating guide completely before operating the unit.

### Introduction

The 3M Brand INTRACOM System is precision-built for reliable operation in continuous-duty applications. The Model D-120 provides maximum voice clarity under various noise conditions.

### Installation

The System should be installed by an authorized 3M Sound Products dealer representative for proper connection.

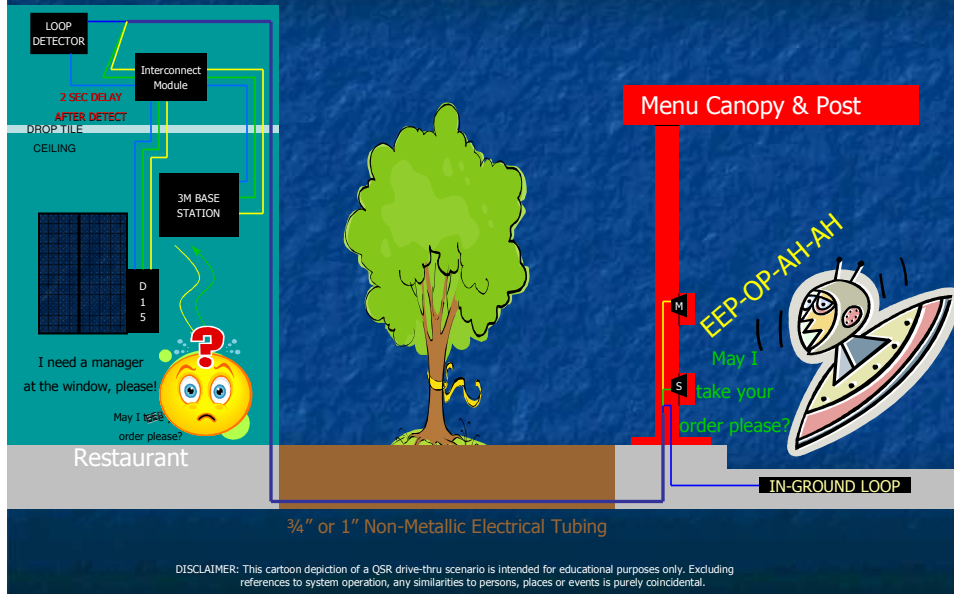
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Sound Products  
3M Center, St. Paul, MN 55144-0000  
Phone: 612/796-8223

## To understand how all of this fits together, we must...

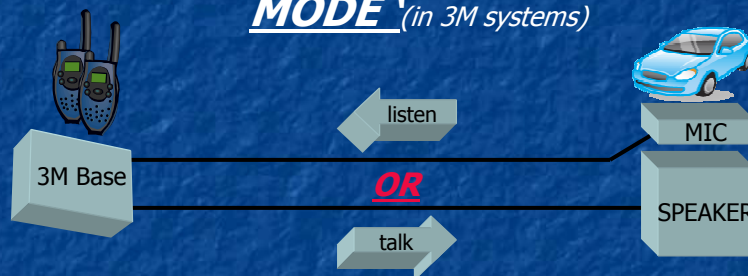
- Know customer needs *and* equipment features
- Understand the operating modes
- Consider menu microphone and speaker placement (specifically, microphone height above the driveway slab and setback from curb <use theory of 48<sup>2</sup>>)
- Assess the location of menu speaker post (look for nearby noise sources or barriers, possibility of skewed approaches to speaker post, etc.)
- Ensure the conduit meets requirements (a **dedicated pathway** of at least 3/4" diameter)
- Loop Placement (in relation to the menu post)
- Equipment location and power requirements

# Basic System Overview



# Primary Operation Modes

***Half Duplex a.k.a. SIMPLEX or 'STANDARD MODE' (in 3M systems)***



- One function at a time - talk OR listen
- Mic & speaker placement are not as critical
- Mic & speaker can be a combined unit (such as horn speaker)
- Wire type is not very critical (shielded pairs are still a must)

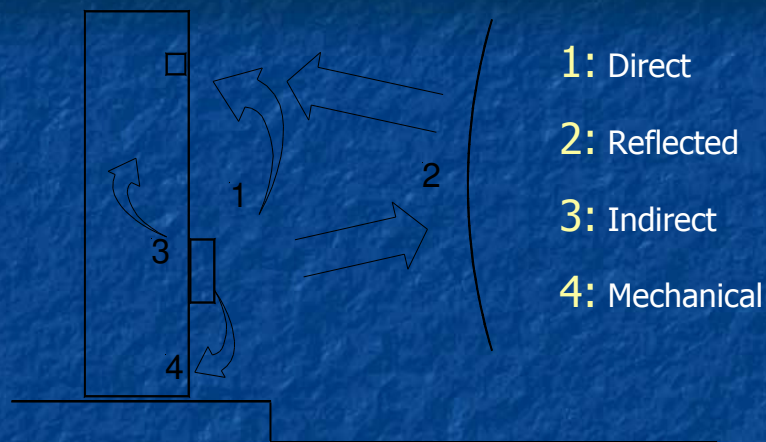
# Primary Operation Modes

## Full Duplex a.k.a. 'DUPLEX MODE'



- Both functions at the same time - talk AND listen
- Mic & speaker placement are VERY critical
- Mic & speaker must be separate devices
- Proper wire type and wiring methods are a must

## Feedback Paths At The Post



- A very simple way to describe audio feedback is 'resonance gone wild'.
- Almost everything has a resonant frequency



## An Example of Resonance

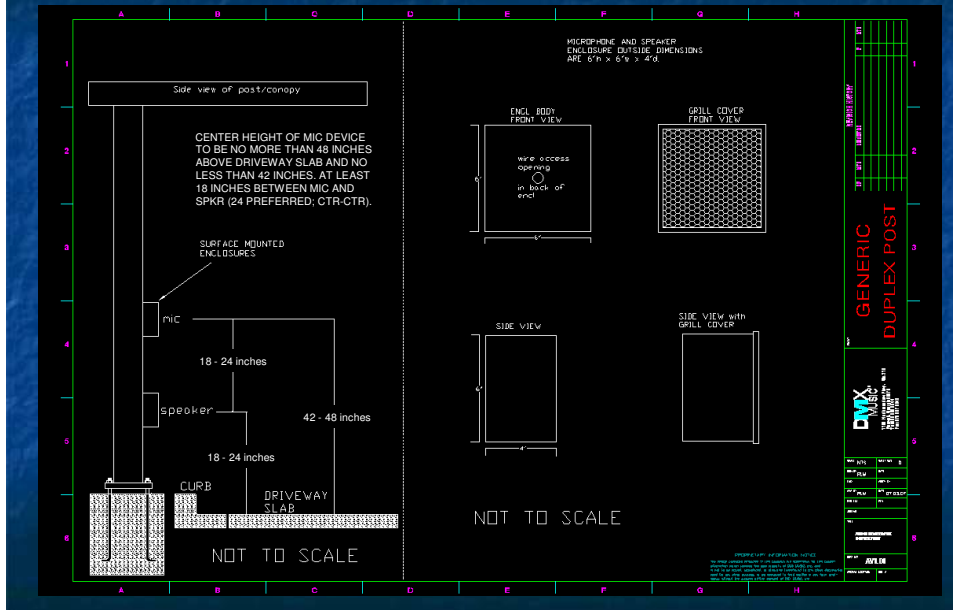
- The Tacoma Narrows Bridge – Nov 1940



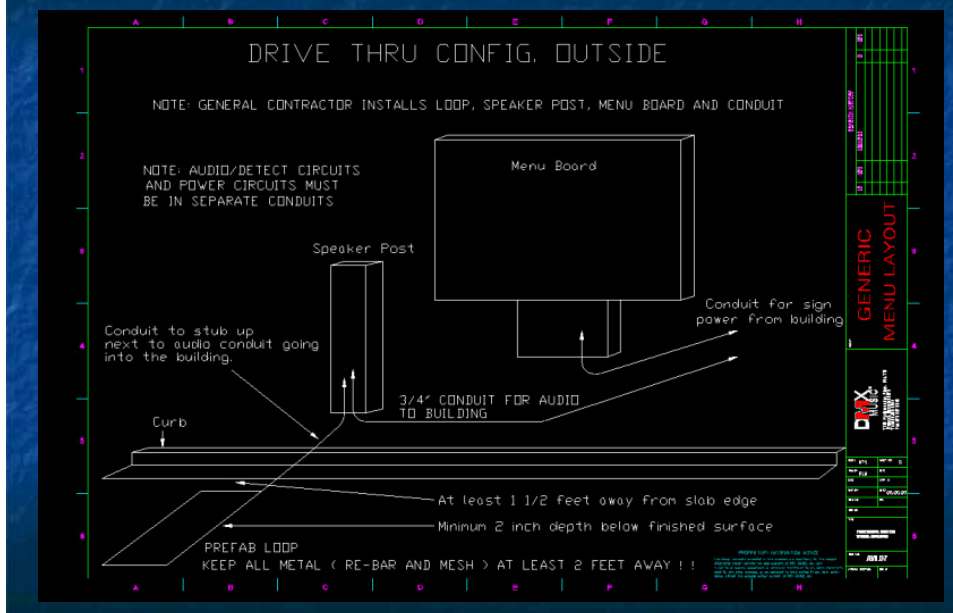
## Microphone & Speaker Placement

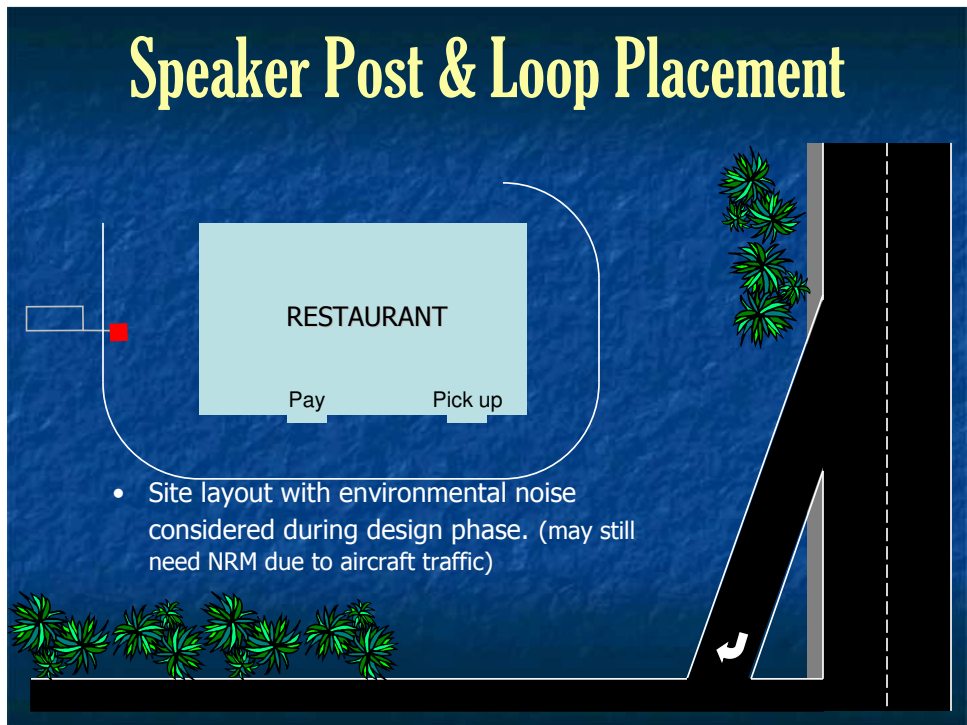
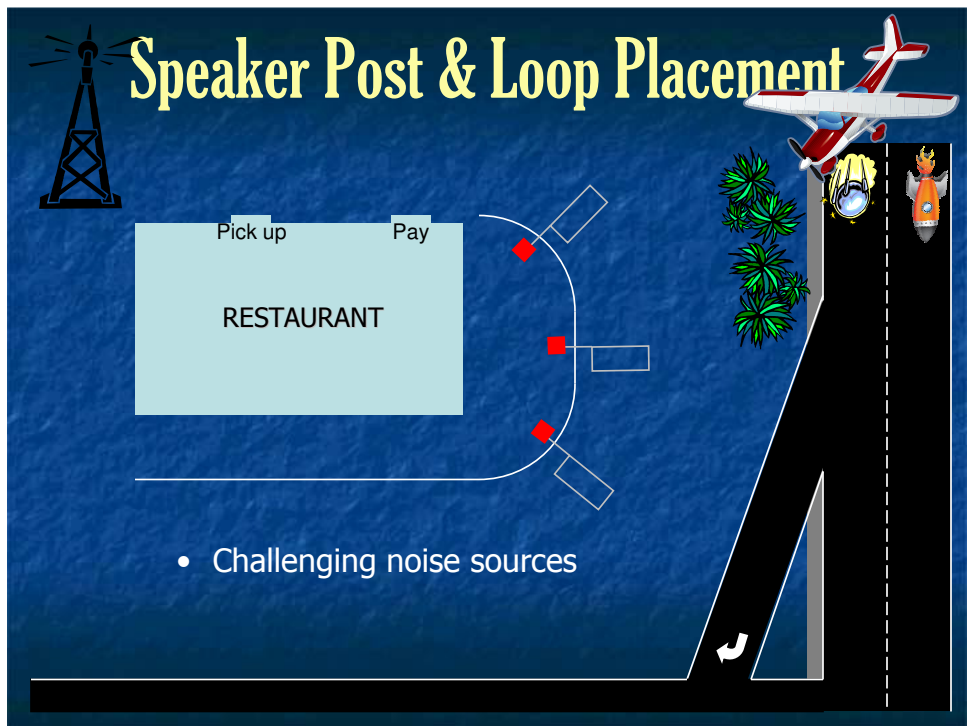
- **The Microphone:**
  - Should be as close to the source as possible
  - Should be at window level of a car (between 42" and 48" above the driveway slab)
  - Should point away from high noise sources
  - Should be at least 18" from the speaker for duplex operation (24" is preferred)
- **The Speaker:**
  - Should be mechanically isolated from the post
  - Should be at least 10" above grade
  - Must have a weather resistant cone
  - Should be at least 18" from the mic for duplex
  - May be aimed at 90° to left or right in difficult locations

# Typical Speaker Post



# Menu Loop & Post

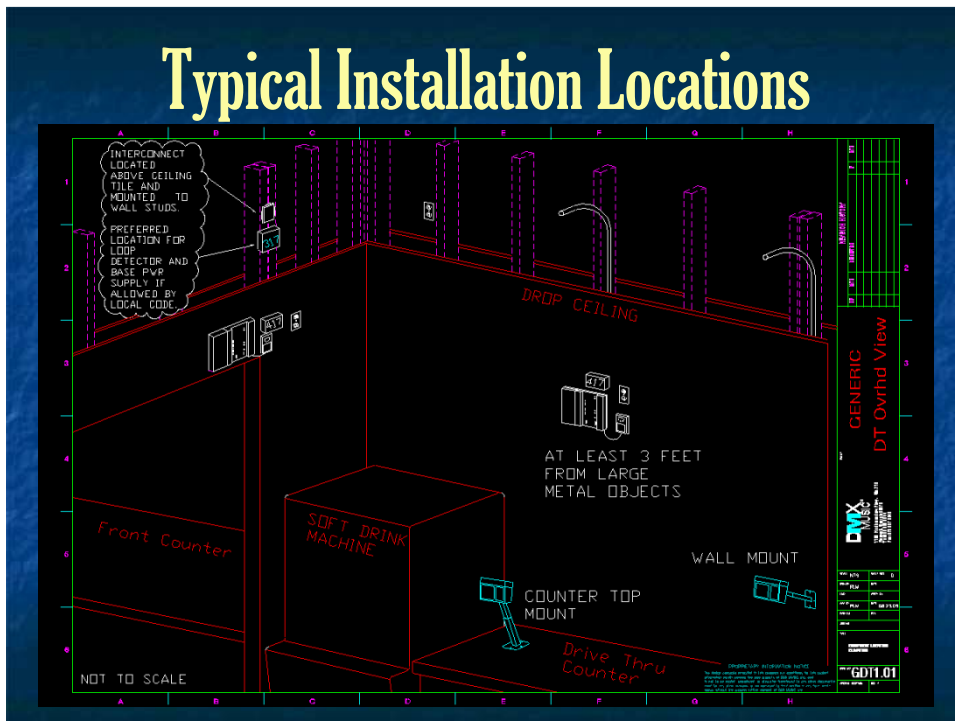




# Indoor Equipment Location

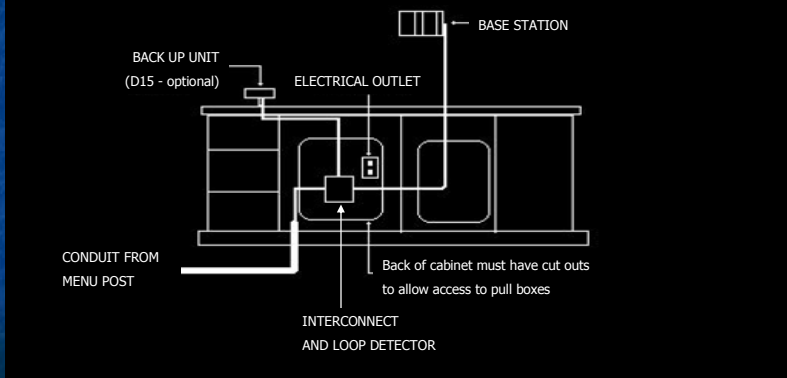
- Placed within easy reach of operators
- Power requirements of all equipment must be considered
- Must be away from sources of interference
- Must be protected from potential liquid or impact damage
- All wiring should be concealed
- Any exposed wiring must be neatly dressed

# Typical Installation Locations

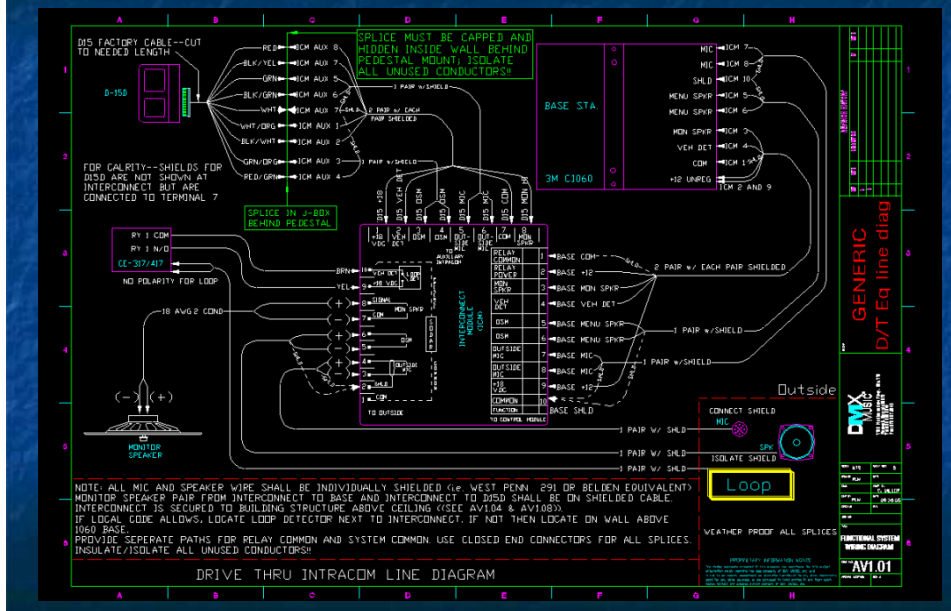


# Typical Floor Installation

This is an alternate layout if access to ceiling *is not possible*. The interconnect, loop detector and all power supplies can be placed under the counter.



# Basic System Wiring



## Combination Cables

- The cable on the left in each picture is the preferred type
  - DMX part number CSCYM48782225 (225 ft/roll)



- The cable on the right in each picture is a suitable alternative by 3M
  - 3M part number 78-8095-0180-8 (140 ft/roll)

## Equipment Features & Controls

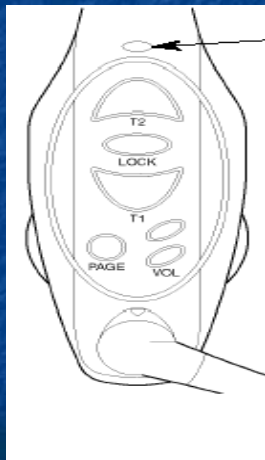
3M C-1060 Wireless  
Headset System



## C-1060 System Features

- Wireless operation=mobility=productivity
- Single and dual lane operation
- Simplex or Duplex capability
- Hands-Free operation using Talk-Lock Feature
- Easy integration with Drive Thru timers and Audio Greeters
- Easy to use and comfortable to wear

## C-1060 Headset Controls



**On/Off Button** – white or brown button above earpiece

**T1 (Lane 1 Talk)** – Primary button used for Push To Talk for Lane 1

**T2 (Lane 2 Talk)** – Push to Talk for Lane 2 (if dual lane, otherwise same as T1)

**Page** – Headset to headset communication

**Talk Lock** – Hands free mode

**Volume Up/Down** – raises the volume of audio heard in that headset only

## C-1060 Headset Programming

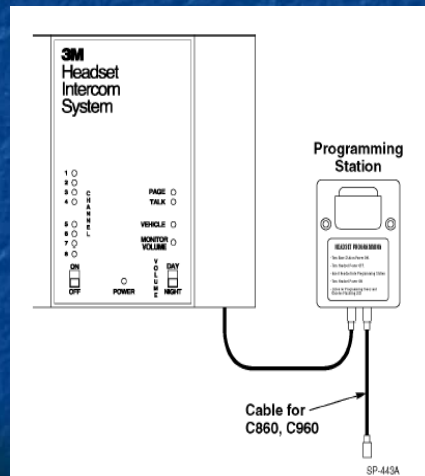
- The base station has 16 available operating frequencies and many option settings. Programming tells the headset how to communicate with the base and what options are active.
- *The most common causes of needing to reprogram are;*
  - 1: removing the battery without turning the unit off.
  - 2: allowing the battery to completely drain (generally considered to be < 10% of full charge voltage)
  - 3: any changes to base station option settings
  - 4: severe external interference

## C-1060 Headset Programming

- 1. Turn the headset off (make sure to insert a fresh battery!!)
- 2. Swing the microphone completely up & out of the way
- 3. Insert the unit into the programming station
- 4. Turn the unit on and look for the power light to blink & listen for hi/lo beep in the earpiece
- 5. Test the headset by observing the lights on the base station



# Programming older models



- Attach the C-960 programming cord to the parallel jack on the programming station.
- Follow the programming procedure except that you must connect a programming cable rather than inserting the headset into the programming station

# C-1060 Batteries

- Are 3.5v Lithium Ion cells
- Should last from 6-12 hours (mode dependant)
- Take < 3.5hrs hour to charge
- Auto Sense Charger completely drains battery before charging (must use 14vac power supply otherwise short <~20 min> battery life will result)
- Leave batteries in headset until discharged ('chirping' is heard in the earpiece)

# C-1060 COVER VIEW

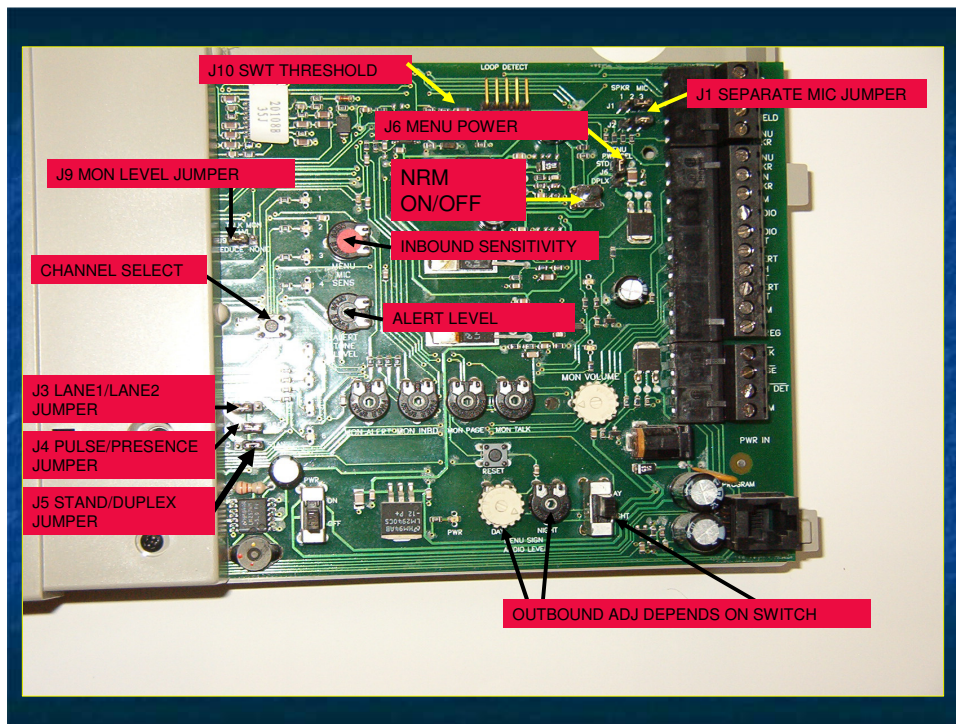
- **NRM** FLASHES (**RED**) EVERY 2-3 SECONDS (IF INSTALLED AND ON)
- **PAGE** COMES ON (**GREEN**) WHEN HEADSET PAGE IS PRESSED
- **TALK** COMES ON (**RED**) WHEN HEADSET TALK IS PRESSED
- **VEHICLE** COMES ON (**AMBER**) WHEN A CAR IS PRESENT AT MENU POST



## Available Options Settings

(Configured with jumpers on the base station board)

- J1 Speaker only or Microphone + Speaker
- J3 Lane selection (Lane 1 or Lane 2)
- J4 Detector Settings (presence/pulse)
- J5 Duplex or Standard Mode
- J6 Menu Power Selection
- J9 Kitchen Monitor Level (reduce or full)
- J10 SWT Setting (high or normal)
- Frequency (push button selection 1 - 8)
- Internal Noise Reduction Module (accessible on front cover)



## Important Do's & Don'ts

- Be sure to instruct the staff to...
- Turn all devices off when not in use
- Do not push battery to the side (damage to the battery contacts will occur)
- Do not bend the headset headband
- Do not try to pull the headband out of the case
- Do not expose to liquids or throw the unit

# Optional Equipment - Planning Ahead

- "Backup" System
- A-300 Audio Greeter
- Noise Reduction Module
- Monitor Speaker
- Drive Thru Timer

## D-15 "Backup Unit"

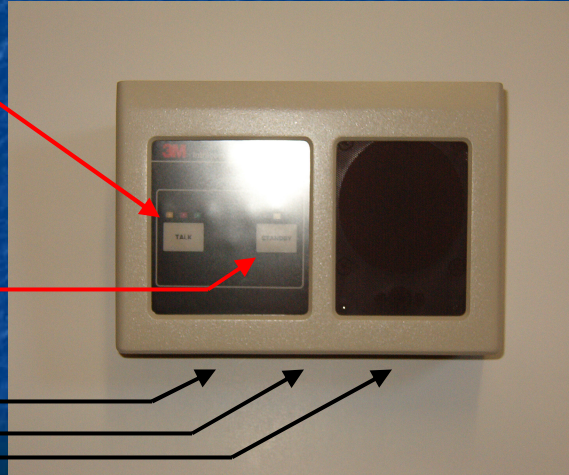


- Commonly used as an auxiliary intracom should the wireless base station or headsets become inoperative
- Originally designed for primary use as a stand alone system
- Multiple Master capability
- Can pass music/message content while in standby mode

# D-15 TOP VIEW

- PRESS TO TALK
- RED LIGHT = TALK
- GREEN = LISTEN
- YELLOW = CAR PRESENT

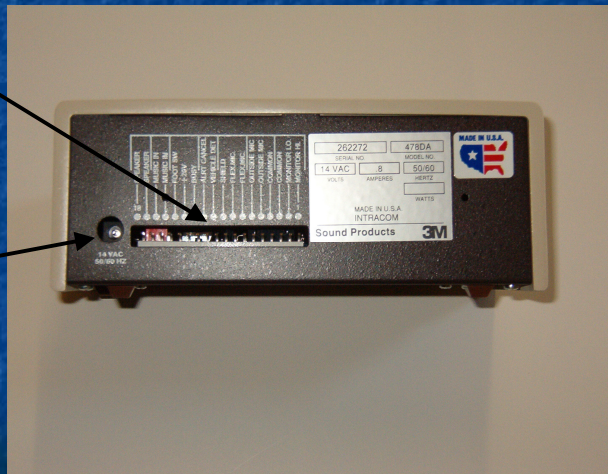
- PRESS STANDBY TO PUT UNIT IN STANDBY MODE (mutes inbound)
- LISTEN VOLUME (adjusts monitor volume too!)
- POWER L.E.D.
- POWER SWITCH



# D-15 REAR VIEW

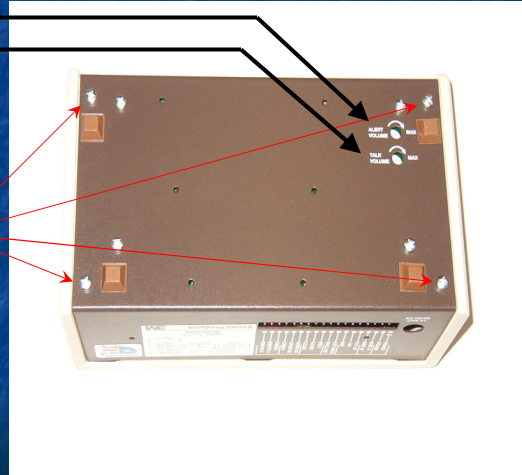
- 18 pin CABLE CONNECTOR

- 14 VAC POWER CONNECTOR



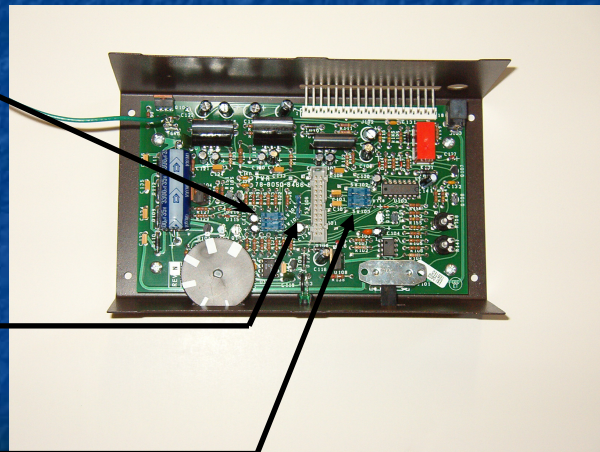
## D-15 BOTTOM VIEW

- ADJUSTMENTS
- 1. ALERT TONE
- 2. OUTBOUND LEVEL
- TO REMOVE COVER, REMOVE 4 OUTER-MOST SCREWS



## D-15 MAIN BOARD

- FOR OUTSIDE MIC SET BOTH SW104 & SW105 TOWARD REAR
- SW106 CLOSED FOR REPEAT ALERT / OPEN FOR SINGLE ALERT TONE
- IF USING INTERNAL MIC SET SW102 & SW103 TOWARDS FRONT OF UNIT



# Important Considerations

- Requires the addition of an Interconnect Module to allow proper connection
- More Wiring
- May be permanently mounted or set on counter top with a coiled cable connection
- If loose mounted on a counter, it must be kept available (not locked in an office)

## Connecting the Base Station to Components Using the Optional Interconnect Module

Connect the base station to the interconnect module as shown in Figure 6. Note that the connections are made to the "TO CONTROL MODULE" terminals on the interconnect module.

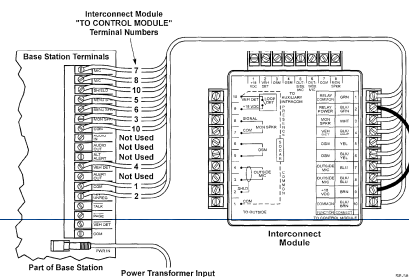


Figure 6. Base Station - Interconnect Module Connections

Connect the components (vehicle detector, speaker/microphone, and optional monitor speaker) to the interconnect module as shown in Figure 7. Note that the connections are made to the "TO OUTSIDE" terminals on the interconnect module.

### \*Note

If an optional back-up (auxiliary) intercom is connected to the "TO AUXILIARY INTERCOM" on the interconnect module, the base station must be turned off to enable operation/usage of the back-up intercom.

Use 18-20 gauge twisted-pair audio wire for all connections except the microphone. Use an 18-20 gauge shielded twisted-pair audio wire for the connection to the microphone.

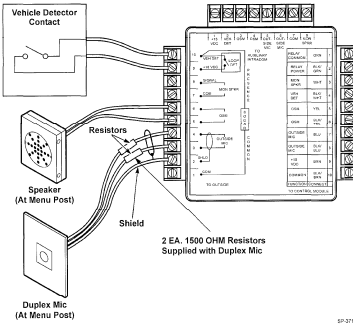


Figure 7. Connecting Components to the Interconnect Module

# WIRELESS + WIRED =

- INTERCONNECT MODULE

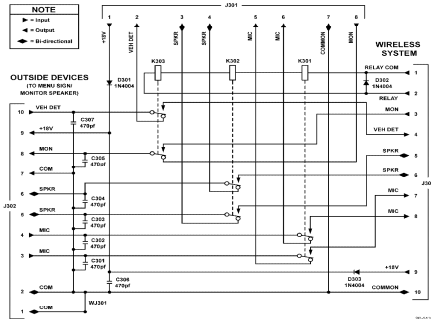
Wireless Intercom System Theory of Operation and Diagrams

## INTERCONNECT MODULE

(DOWN IN AUXILIARY SYSTEM MODE)

### AUXILIARY SYSTEM

(D-MODEL INTERCOM)





## A-300 Audio Greeter



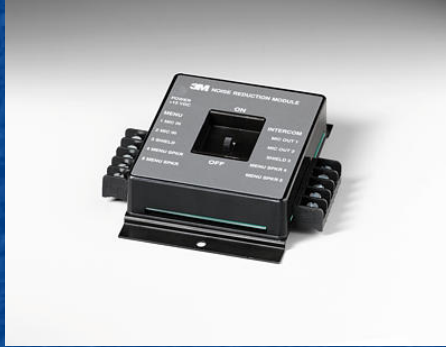
- Increases sales through up-selling
- Ensures that customers are informed of specials
- Can provide shift specific messages
- Easy to program and control

## A-300 Install Considerations

- Unit is wired between base station/ interconnect and speaker post (or NRM if present)
- More wiring & requires interruption
- Requires an additional outlet for power
- Unit should be located within easy access
- External Microphone is an option and is highly recommended

# Noise Reduction Module

(A-121 external version shown below)



- A/D-D/A architecture (unwanted audio is processed and removed digitally)
- Reduces low frequency noise and some feedback
- Solves some major inbound quality problems
- Internal and External versions
- Internal version can be turned on/off at the Base Station

## NRM Install Considerations

- Unit must be last device in system
- External version adds more wiring & requires interruption
- External version requires an additional outlet for power
- External unit should be located within easy reach
- Is a helpful tool, NOT a panacea

## Monitor Speaker



- Allows staff not wearing headsets to hear customer orders
- Allows management to monitor communication
- During slow periods, staff may work in other areas and listen for customers if 'MON ALERT' is active

## Monitor Speaker Considerations

- An excellent feature with low cost
- Base & D15 are limited to 2ea 8ohm speakers in parallel (ceiling and/or wall mounted)
- Requires minimal wiring
- May increase potential for feedback in systems using Duplex Mode

## Fast Track 2+2 - 386

- A system used to track productivity as an aid in setting goals for speed of service

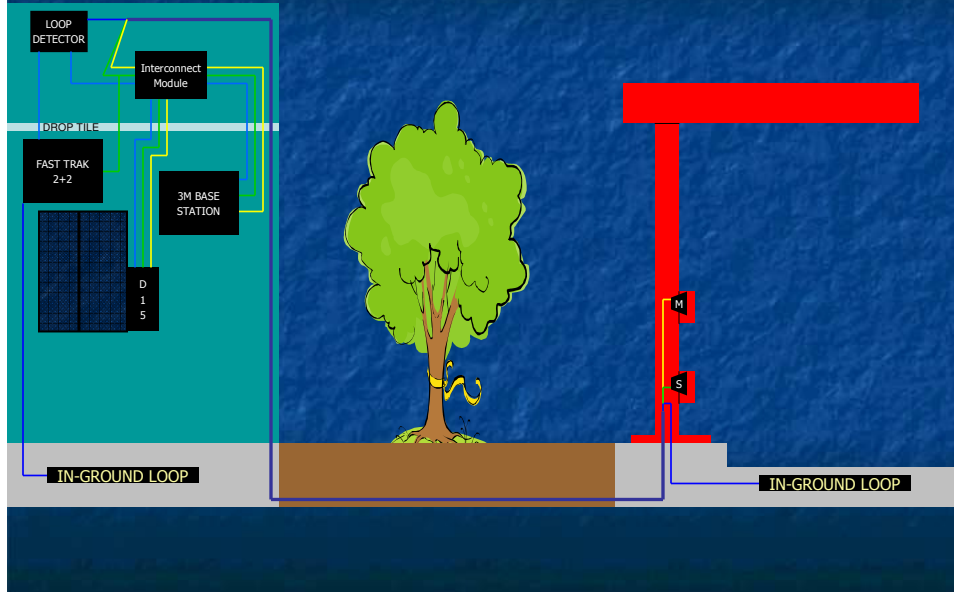


- Tracks the queue time from customer arrival to departure
- Identifies bottlenecks
- Generates tracking reports
- Allows manager to track productivity even when not at the site
- Comparison of Timer data with POS data can be used as a deterrent to theft

## Additional Considerations

- Remote displays can provide immediate audio/visual info to team members
- Requires a second in-ground loop to be installed at the presentation window
- Additional wiring & interfacing required
- Requires more intensive training to allow customer to set up and modify parameters
- Requires initial programming setup by installer using values determined by the customer and sales person in advance (at time of sale)
- Unit is usually mounted in the manager's office and requires 1 outlet space
- Requires the use of a 2 relay loop detector for the menu detect

# System Overview w/Timer



# Event Definitions & Sequence

- EVENT START
- EVENT STOP

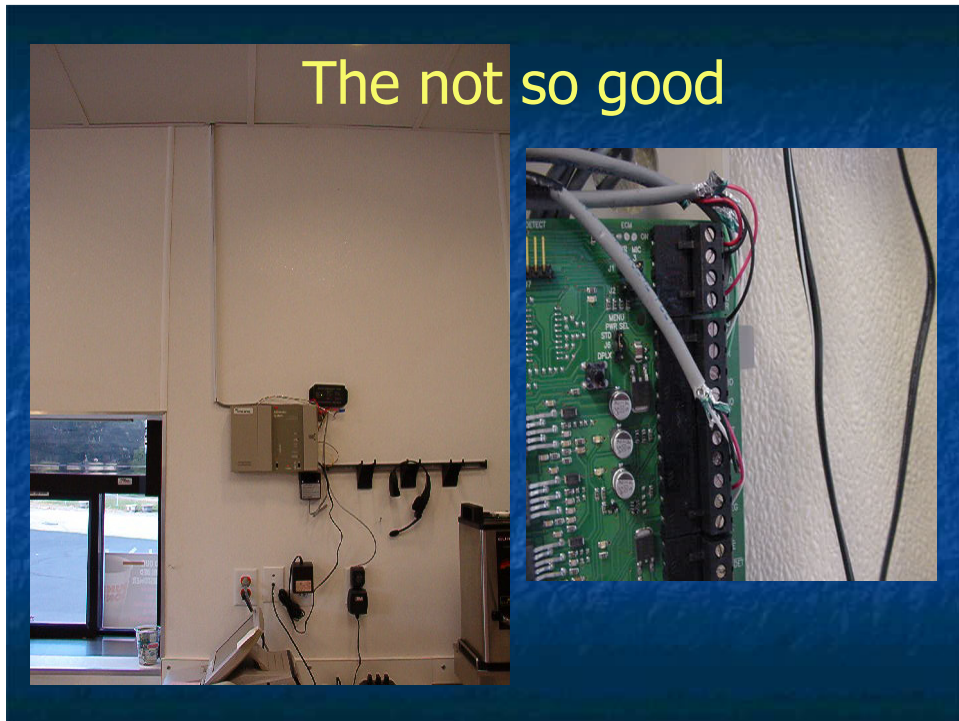
TOTAL LINE  
TIME

- MENU DETECT L1
- GREET TIME L2
- MENU TIME
- LINE TIME (menu to win1/2)  
<excessive time causes 'slow poke'>
- WINDOW 1 L3 (if applicable)
- WINDOW 2 L4

## Some Real World Visual Aids

- Following this slide are photos of the right and the wrong, the good and the bad.





The really, really  
not so good

