

MITEY MITE  
OWNER'S INFORMATION

Bu

WINK START  
IMMEDIATE START  
JWIB PLUGGED IN 1ST 2 PINS LEFT  
JWIB PLUGGED IN 2ND 3 PINS RIGHT

**AmTELCO**



# CONTENTS

INTRODUCTION.....	1	MAINTENANCE TESTS.....	21
General.....	1	Environmental Conditions.....	21
Models.....	1	Power, Display, and	
Telco Requirements.....	2	Operator Alert.....	23
Bureau Service		Operator Circuit.....	24
requirements.....	2	Telco (DID) Circuit.....	25
Example Operation.....	2	Dial Pulsing and Line	
Functions.....	3	Supervision.....	26
General.....	3	Line Noise and Loss.....	27
Front Panel.....	3	CALL PROGRESS SIGNALS.....	29
Connectors.....	4	DID Protocols.....	29
Other Operational Information	6	Wink Start.....	29
Capacity.....	6	✓ Immediate Start.....	29
Maintenance.....	6	✓ Busy Signal.....	30
Power Options.....	6	Ringback.....	30
Alarm Option.....	6	Noise, 'False Digits'...	30
INSTALLATION PROCEDURES.....	7	PRODUCT IDENTIFICATION LABEL.....	31
In-Switchboard Installation...	7	OPTIONAL ALARM CABLES.....	33
Side-of-switchboard or other		SPECIFICATIONS.....	35
Vertical Installation.....	8	TELCO INTERFACE SPECIFICATIONS.....	37
Mitey Mite II (Horizontal)			
Installation.....	11		
Power & Grounding.....	13		
PRELIMINARY TESTS.....	15		
TROUBLESHOOTING TABLE.....	19		

104-5-5



# ILLUSTRATIONS

1.	Mitey Mite.....	1
2.	Mitey Mite II.....	1
3.	Mitey Mite Installed in a 557B Switchboard.....	2
4.	TEST, RESET Pushbuttons.....	3
5.	Decimal Point Indicators.....	3
6.	Mitey Mite Connectors.....	5
7.	Mitey Mite II Connectors.....	5
8.	Mitey Mite parts diagram.....	10
9.	Mitey Mite II parts diagram.	12
10.	Decimal Point Behavior.....	22
11.	Product Identification Label.....	31
12.	RJ31X Wiring Specifications.	38

**WARNING!**

Mitey Mite must be hooked up according to the instructions in the Installation Section of this manual. You may damage your equipment unless these installation instructions are followed.

Amtel Communications, Inc., does not assume any responsibility for damage to any equipment not installed according to AMTELCO Product Literature.



# INTRODUCTION

## GENERAL

Mitey Mite is a small microprocessor controlled unit designed to let TAS bureaus answer DID (Direct Inward Dial) calls at modest cost. It is easy to install, simple to use, and requires minimal Telco services. This section contains a general description of the unit, including functions and ordering options.

## MODELS

Mitey Mite is available in either of two models: "Mitey Mite" or "Mitey Mite II." **Mitey Mite** has a vertical display and is intended for installation in a 557B switchboard, vertical installation on the side of a switchboard, or on another suitable vertical surface. **Mitey Mite II** has a horizontal display and is intended for horizontal installation on a switchboard counter, top, desk top, or another suitable horizontal surface. Both models are identical except for packaging and have identical features.

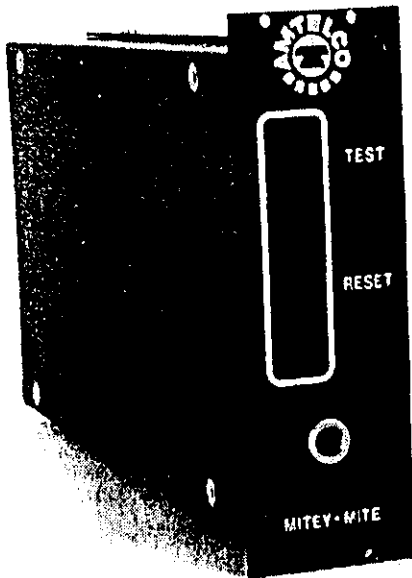


Figure 1. Mitey Mite

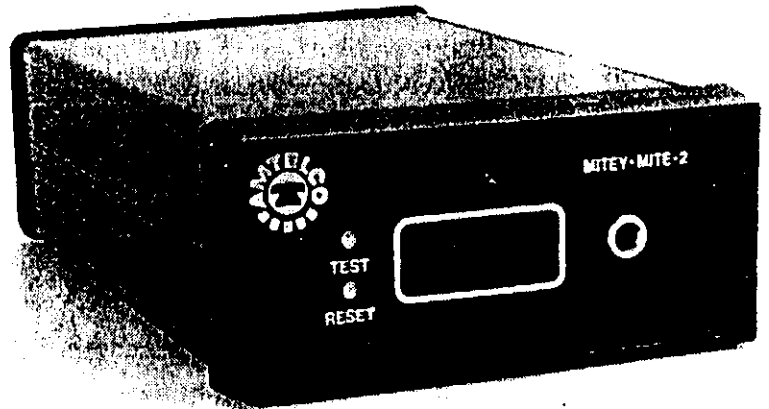


Figure 2. Mitey Mite II





## TELCO REQUIREMENTS

The TAS requires from Telco a block of DID telephone numbers and a DID access trunk from the serving central office to the Mitey Mite. Clients require from Telco call forwarding custom calling service for each phone number to be forwarded to the TAS.

## BUREAU SERVICE REQUIREMENTS

The TAS bureau assigns one of the DID telephone numbers to each client in any convenient way. The last three digits of the number form the account number which is displayed by Mitey Mite when a call comes in. For example, DID telephone number 266-1234 has account number 234. When a client wishes to activate/deactivate bureau service, he enables/disables Telco call forwarding service to the number.

## EXAMPLE OPERATION

1. When a call is addressed to Mitey Mite, Telco central office equipment pulses the last three digits of the DID number (account number) down the DID trunk. Mitey Mite decodes the pulses as they arrive and builds the corresponding digits in its display. When the display is complete, Mitey Mite sends "ringback" to the caller and actuates an operator alert in synchronization with the ringback.
2. An operator connects, disconnects, and holds in the usual way--by plugging in a switchboard cord and operating the switchboard, using a telephone, or both. The display clears on disconnect by the operator or the caller, and the unit is ready for another call.
3. If the DID trunk is in use when a call comes to the Telco central office, central office equipment returns a busy signal to the caller.

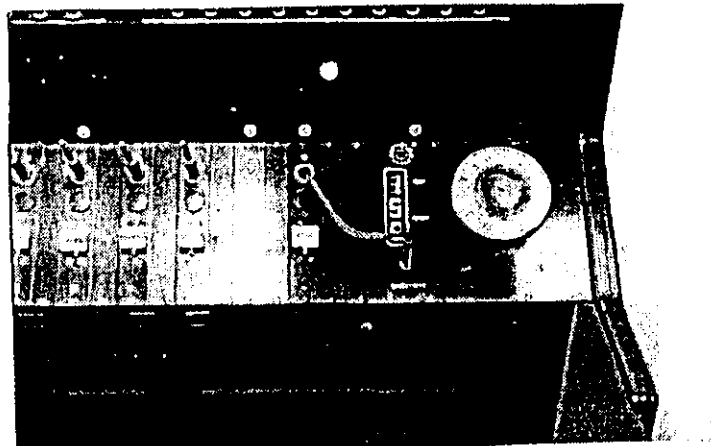


Figure 3. Mitey Mite Installed in a 557B Switchboard



GENERAL

**OPERATOR ALERTS.** Mitey Mite has an internal audible alert which sounds somewhat like a switchboard alert. If desired, you can install an additional alert device such as a sonalert or door buzzer by attaching it to wires provided in the optional cord assembly.

**IDENTITY.** Client identity consists of the last three digits of the client's DID number which are conspicuously displayed on the front panel when a call arrives.

**ANSWERING INSTRUMENTS.** An operator can answer calls by plugging a switchboard cord into the front panel of the unit, by using a telephone connected to a jack on the back panel of the Mitey Mite, or by using a telephone connected to the Telco-provided jack which is located where the DID line terminates.

**HOLDING.** Holding is accomplished on the switchboard or telephone in the usual way.

OTHER FUNCTIONS

**TEST, RESET.** TEST and RESET pushbuttons are recessed on the front panel where they are easily accessible but unlikely to be depressed accidentally. To depress, insert the point of a ball pen and push gently. The TEST function verifies that the display lamps and operator alert are working. The RESET function clears the display digits and resets the internal operation of the unit to correct starting conditions. (Note: the RESET button is not a disconnect function.) After a reset, a hyphen will appear in the middle display to indicate completion. The hyphen will be erased when a call comes in.

**CIRCUIT FUNCTION LAMPS.** "Decimal points" on the three displays monitor current flow in the operator and DID circuits and light when no current is present. These lamps verify normal operation of the circuits

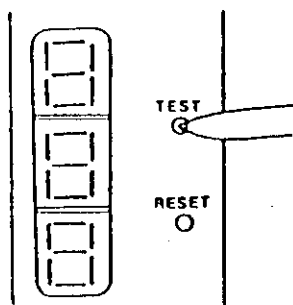


Figure 4. Test, Reset Pushbuttons

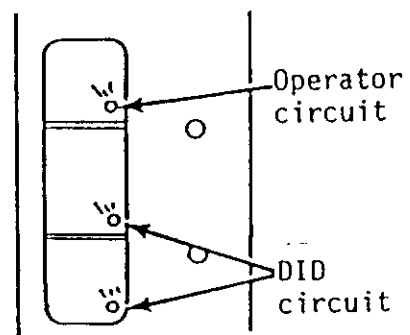


Figure 5. Decimal Point Indicators

358-3616



and are used for maintenance tests.

**OPERATOR CIRCUIT.** The decimal point for the 100's digit indicates current flow in the operator circuit. This lamp is normally lit when an operator is on hook, and extinguished when off hook.

**DID CIRCUIT.** The decimal points for the middle and 1's digits indicate current flow in different directions in the DID circuit. The middle point is extinguished to show current during ringback while Mitey Mite has not connected the operator to the caller; this point will blink rapidly or appear to dim while the central office is pulsing digits, and may or may not be lit when the circuit is idle (depending on central office equipment). The 1's lamp shows talk current and extinguishes while the operator is talking or holding.

**POWERFAIL/RESET INDICATION.** If a power failure occurs all decimal points extinguish and the optional external alert (if installed) is turned on. When power is restored (and after the RESET pushbutton is pressed) a dash appears in the middle digit of the display, so a dash indicates that either the RESET button was pressed or power failed (or both).

## CONNECTORS

The LN IN (Line In) connector is a standard RJ31X type jack for the DID line. A connecting cable is provided with the Mitey Mite.

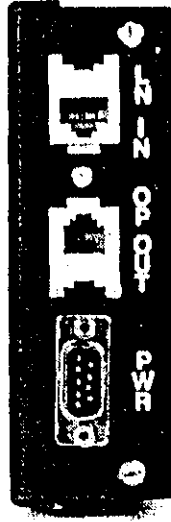
The OP OUT (Operator OUT) connector is a standard RJ11X jack for an optional telephone. This jack provides for non-switchboard answering and for answering at a remote location. A telephone may also be connected to the Telco-provided RJ31X jack where the DID line is terminated.

The PWR socket on Mitey Mite is for the provided power cable assembly. If the optional cable assembly is ordered, this socket connects the external alert device (60 watts maximum). Four other pins on this socket are used for factory testing and future extensions of Mitey Mite features.

The PWR socket on Mitey Mite II is for the provided power cable assembly. The AUX socket is for the optional external alert device (60 watts maximum) and for factory testing and future extensions of Mitey Mite features.

(See illustrations on next page.)





15100030 MIN  
ISI

DAN  
WISCONSIN

Figure 6. Mitey Mite Connectors

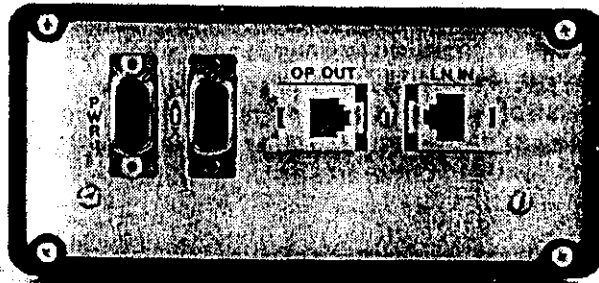


Figure 7. Mitey Mite II Connectors





## OTHER OPERATIONAL INFORMATION

### CAPACITY

Telephone number capacity of Mitey Mite is 1000 consecutive telephone numbers with the last three digits starting at 000. Each unit serves one DID trunk. Client capacity is self-limiting, depending on traffic. Typically one DID trunk provides satisfactory service for 25-60 clients.

Multiple Mitey Mites are configured in two ways: (1) two or more units each having a particular block of assigned telephone numbers for each DID trunk, or (2) two or more Mitey Mites sharing the same telephone numbers over all DID trunks. In the second case the telephone company automatically distributes calls over the available trunks. The first method is desirable if calls must be distributed to widely-separated operator locations; each operator station can have convenient access to messages, etc. for its block of clients. The second method is generally less expensive, requires less operator time, and provides greater client capacity.

### MAINTENANCE

Mitey Mite contains **no user-serviceable parts**. Maintenance consists of first checking for possible faults in the cabling, then applying relatively simple maintenance tests or troubleshooting tables. If it is conclusively determined that no fault is present in the Telco circuits, Mitey Mite should be replaced while it is serviced at the factory. Warrantee and service are performed according to the terms of the sales contract. AMTELCO maintains 24-hour service in case of unusual trouble.

### POWER OPTIONS

The standard power option requires a 2-wire 110Vac source; the power cable assembly contains a 36Vac step-down transformer. The optional power cable assembly requires 48dc and is intended for use in telephone-company installations, or where 48Vdc is available from another source such as might be provided from private interconnect equipment. Unless requested otherwise the unit is shipped with the standard (110Vac) power cord assembly.

### ALARM OPTION

Mitey Mite provides connections to relay contacts for actuating an external alarm when a call comes in and if power fails. For Mitey Mite the alarm connections are contained in an optional power cord assembly. For Mitey Mite II the connections are contained in a separate "AUX" cable.

1800 359 9148

1900 370 7788 AMTEL CO WISCONSIN

TALKED TO DAN



## INSTALLATION PROCEDURES

### A. IN-SWITCHBOARD INSTALLATION.

For installation of the Mitey Mite in a 557B Switchboard see the "557B Switchboard Installation Manual" included with the preinstallation materials.



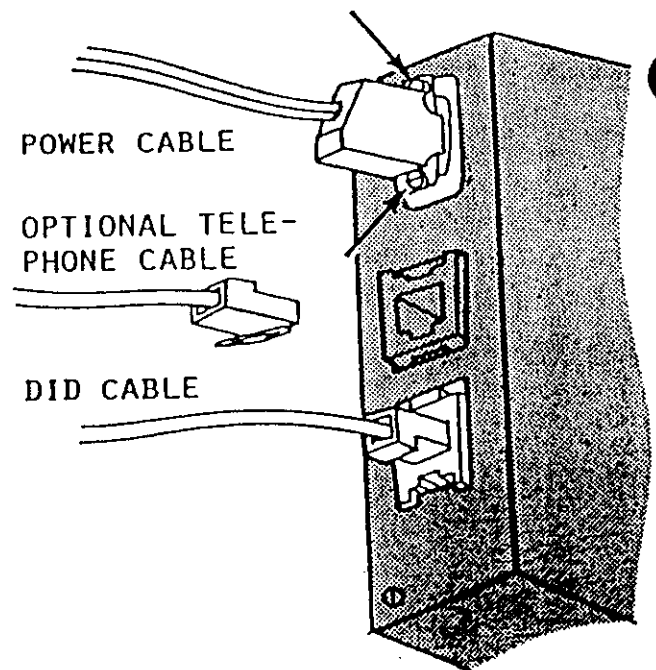
## B. SIDE-OF-SWITCHBOARD OR OTHER VERTICAL INSTALLATION.

This procedure applies to Mitey Mite units which are to be installed on either side of a switchboard, or on some other suitable, vertical mounting surface.

1. Find and identify all parts as illustrated (p. 10) for vertical mounting. In addition, find and identify 6 pair of adhesive-backed mounting feet.
2. Thoroughly clean the surface on which Mitey Mite is to be mounted, and thoroughly clean the corresponding side of Mitey Mite. Use a cleaner which will not leave a residue on the surfaces.
3. Mark locations for the six mounting feet lightly in pencil on the correct (mounting) side of Mitey Mite.
4. One at a time, remove the green protective papers from one side of each set of mounting feet and press firmly into place on Mitey Mite.
5. Remove the green papers from the feet which are now on Mitey Mite. Without touching the feet to the vertical surface, carefully align the unit; then press it firmly into place.

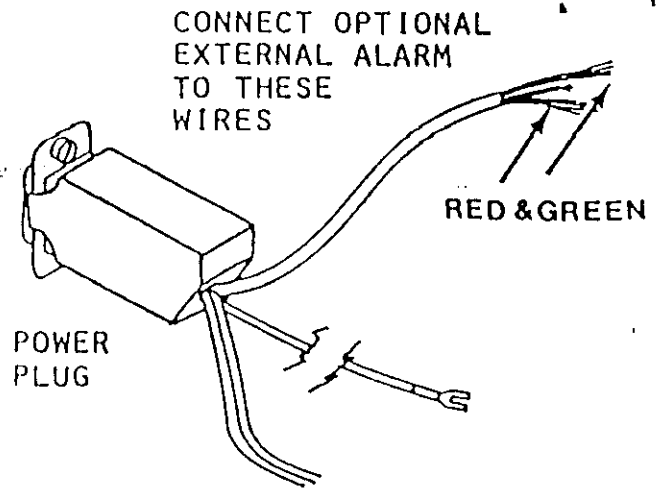
Mitey Mite may still be removed and replaced. If it is more convenient, pull off the Mitey Mite before connecting the cables in the next step.

6. Plug the power cable into the Mitey Mite and turn in the screws until snug.
7. Plug the DID cable into the Mitey Mite.
8. If you are going to install a telephone, plug it into Mitey Mite.





9. If you are installing an external alert, first check ratings to be sure they do not exceed 2 amps @ 30Vdc, 1/2 amps @ 125Vac, or 60 watts. Then connect the alarm. If necessary, refer to the description of the alarm cable in this manual (p. 33).
10. Plug the DID cable into the Telco-provided RJ31X jack.

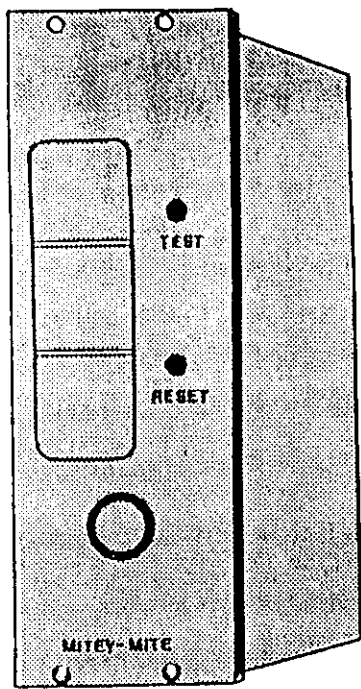


**Note:** If it becomes necessary to replace the Mitey Mite by another unit, first separate the new mounting feet and press them onto the halves which are already on the mounting surface. Clean the surface of the new Mitey Mite, remove the green tabs on the mounting surface, and press the new unit firmly into position.

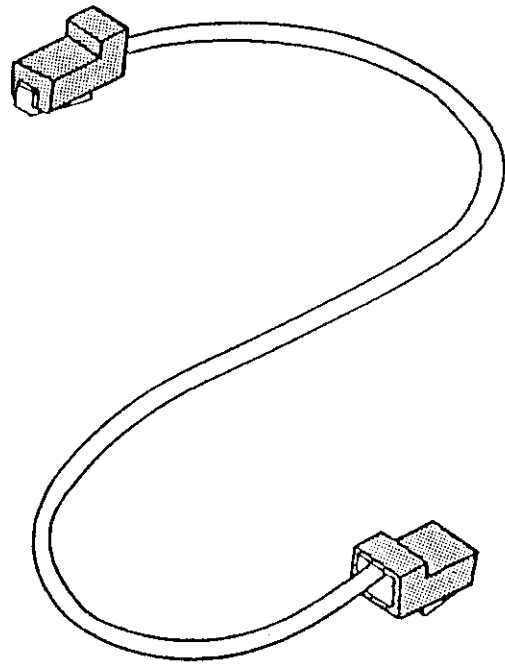
11. Please turn to the section on power and grounding (p. 13).



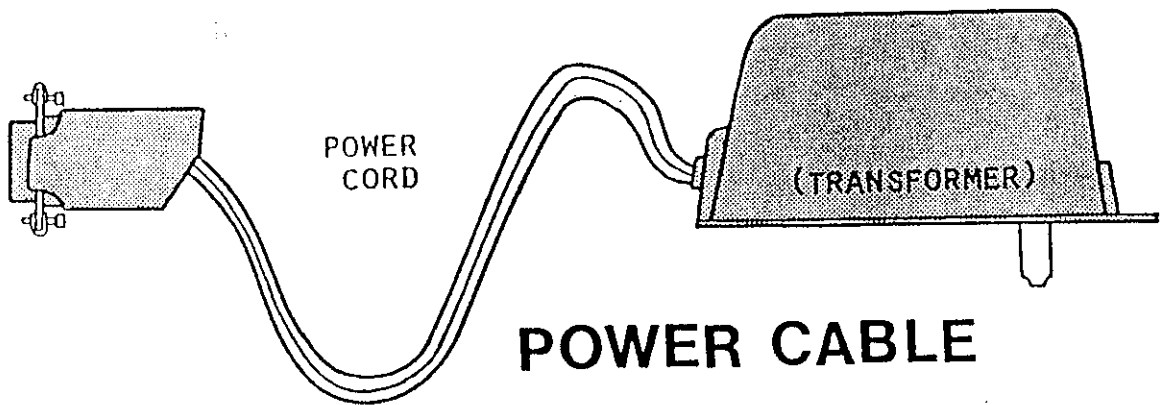




**MITEY  
MITE**



**DID  
CABLE**



Also included for side-mounted units, but not shown: 6 Hedlok (Trade Mark of 3-M Co.) mounting feet.

NOTE: Optional power cord is not shown.

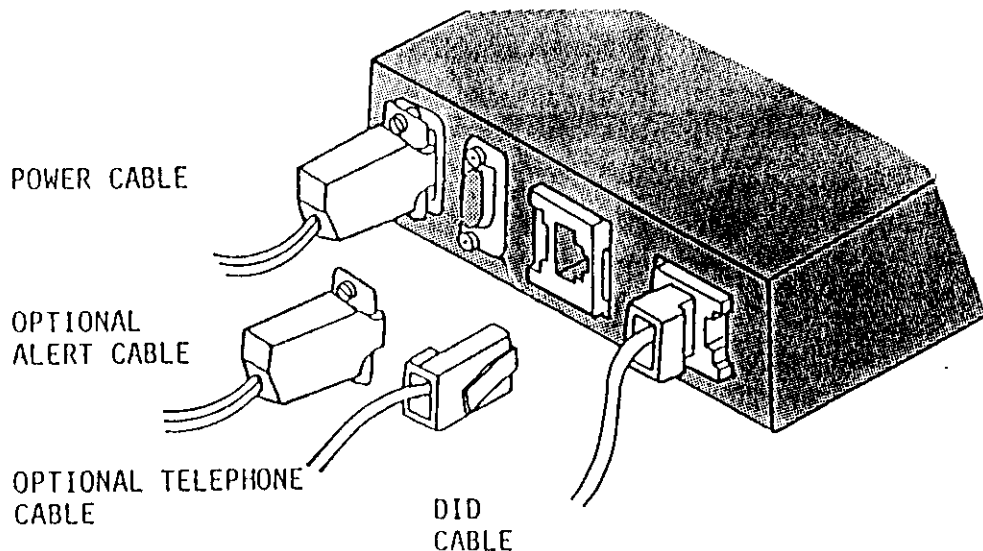
**Figure 8. Mitey Mite Parts Identification Diagram**



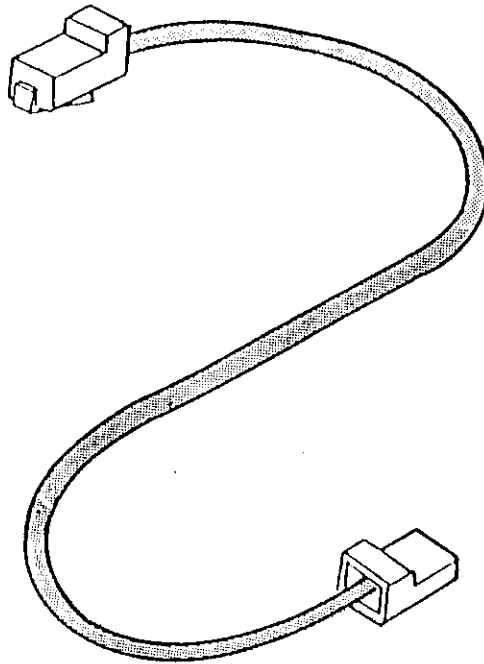
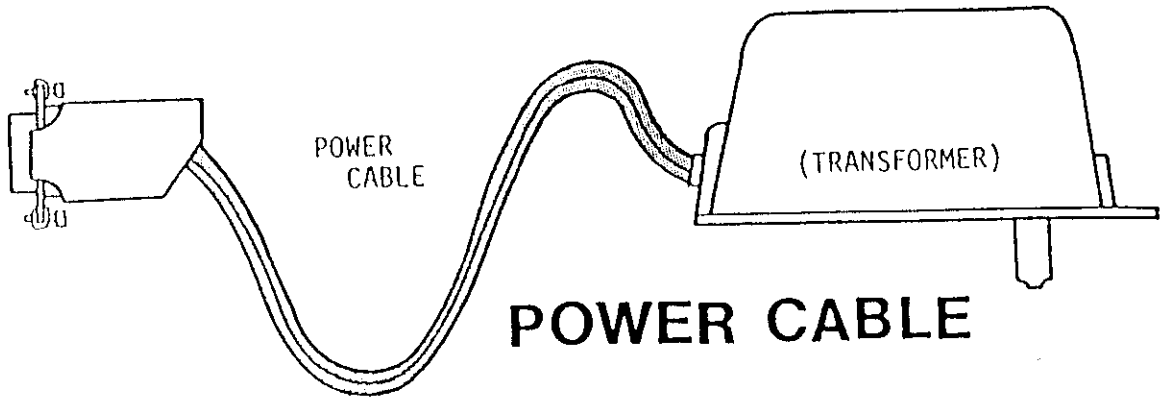
### C. MITEY MITE II (HORIZONTAL) INSTALLATION.

This installation procedure applies to Mitey Mite II, which is a stand-alone, shelf-mounted version of Mitey Mite.

1. Find and identify all parts, as shown on the next page. If you have ordered the cable for an optional external operator alert, please also find and identify this cable (not shown in the diagram).
2. Plug the power cable into Mitey Mite II and turn in the screws until snug.
3. Plug the DID cable into the LN IN (Line In) socket.
4. Plug the telephone, if any, into the OP OUT socket.
5. Plug the optional alert cable into the AUX socket and turn in the screws until snug. (Please refer to the section on vertical installation, page 4, for alarm considerations.)
6. Thoroughly clean the entire Mitey Mite II mounting surface, using a cleaner which does not leave a residue.
7. Peel off the green protective papers on the mounting feet of Mitey Mite. Without touching the surface, align Mitey Mite II in its desired position, then press the unit firmly into place.
8. Plug the DID cable into the Telco-provided RJ31X jack.
9. Please turn to the power and grounding information (p. 13).

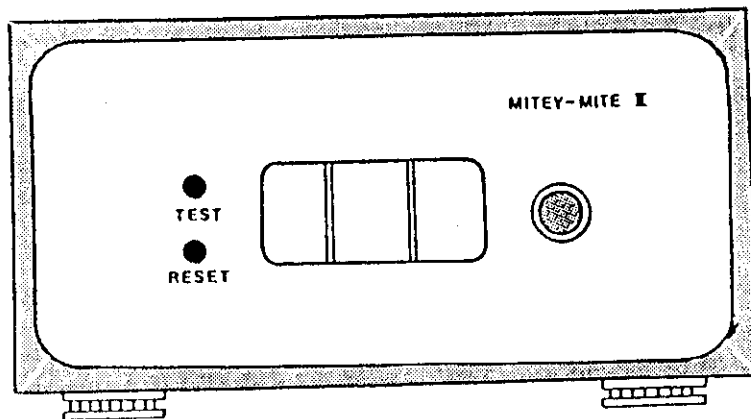






NOTE: Optional AUX cable is not shown.

**DID  
CABLE**



**MITEY  
MITE  
II**

Figure 9. Mitey Mite II Parts Identification Diagram

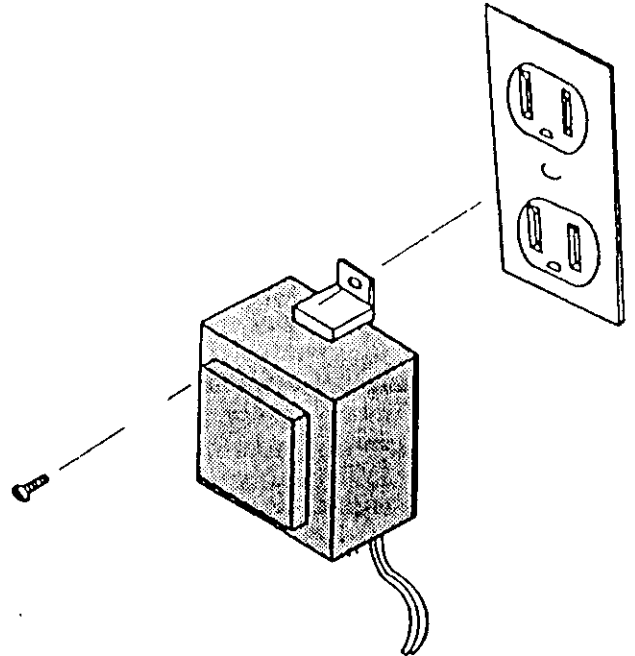


## D. POWER & GROUNDING INFORMATION

To insure that Mitey Mite works properly, careful attention must be given to power and grounding requirements.

### 1. POWER

Choose a power outlet for Mitey Mite which does not have motors, copiers or other major power equipment on the circuit. Remove the center grounding screw from the power outlet, plug the transformer into the socket and replace the grounding screw. If you have installed an optional external operator alert, also plug it in at this time.



### 2. GROUNDING

Connect the green ground wire to one of the following ground sources listed in order of decreasing quality:

1. Telephone Company Ground (if they will permit this).
2. Cold water pipe, located near the Telephone company ground clamp.
3. Electrical service conduit pipe.
4. The screw holding the cover plate.

It is important to use the best possible ground.





**Directions:** Check off each step as it is completed. If at any step you encounter a failure, go to the **Note** at the end of this section having the same number as the failed step. If at any time you wish to clear the display, press the RESET pushbutton.

OK            1. Using a ball-point pen, depress the TEST pushbutton and verify that the audible operator alert sounds, and that each display shows "8".

OK            2. With the operator's telephone (if any) on hook, and nothing plugged into the answering jack on the front panel, verify that all three decimal points on the display are lit. If the middle point is not lit, momentarily unplug the DID access trunk at the Telco jack, and verify that when you do the middle point lights.

3. If you are going to use a switchboard plug to connect, plug it into Mitey Mite, turn on the connect lever, and verify that the 100's digit decimal point extinguishes.

OK            4. If you are going to answer on a telephone connected to Mitey Mite, take the telephone off hook and verify that the 100's decimal point extinguishes.

OK            5. Notify the telephone company that you are ready to have your DID service activated. Wait until they activate the numbers and access trunk before proceeding to the next step.

**Please note.** If power is disrupted to the Mitey Mite, the central office may temporarily disqualify service. The symptom is that the line is always busy when called. To reinstate service after power is restored, call the telephone company repair service.

6. Call several of the DID numbers. Each time verify the following:

OK            a. the last three digits of the number appear on the display. Example: if you dial 266-6123, the display should show "123";

b. after the display is complete you hear ringback in the phone from which you are calling, and the operator alert sounds.

c. you can connect, converse, and hold in the usual way.



## NOTES

Each note number corresponds to a Preliminary Test step number. If the step is not "OK" after you follow the directions in the note, one or more of the following should be replaced: (a) the power cord assembly, (b) the DID cable assembly, or (c) the Mitey Mite.

**Note 1.** If nothing lights, check the 110v outlet, then check the power cable assembly for secure connections, shorts, or broken wires.

**Note 2.** First make sure the operator phone is on hook. Press the RESET pushbutton. Then go to Step 3 and continue, to further isolate the problem.

**Note 3.** (1) Unplug the switchboard cord. (2) Make sure the operator telephone, if any, is securely on hook. (3) Turn the connect lever to the off hook position. (3) Plug the switchboard cord into Mitey Mite, switch the connect lever to the on hook (connect) position, and verify that the decimal point for the 100's digit extinguishes. (4) Blow into the receiver and verify that the connection is not "dead". (5) Verify that as you move the connect lever to connect/disconnect, the 100's decimal point extinguishes/lights.

If the connection sounds "dead," try another switchboard cord. If the connection sounds live but the decimal point indication is incorrect, continue to the next steps to determine whether there is another problem.

**Note 4.** (1) Put the telephone on hook and verify that the 100's decimal point lights. (2) Take the telephone off hook and verify that the 100's digit extinguishes. (3) Blow into the receiver to verify that the connection sounds "live". (4) Verify that as you go on/off hook the 100's digit extinguishes/lights.

If the connection sounds "dead", verify that the telephone connections are secure and that the cable has no apparent shorts or breaks. Replace the telephone cord, then the telephone.

If the connection sounds "live" but the decimal point does not correctly extinguish/light, continue to the next steps to determine whether there is another problem.

**Note 5.** Technical information is given in the Telco Interface Specifications. For further information or clarification, contact AMTELCO Manager of Installations



Note 6. If you get a busy signal, the telephone company has not acknowledged that the Mitey Mite has put 48volts DC on the line. First verify that Mitey Mite has power (anything lit on the front panel indicates that power is present). When power is present and the middle decimal point is extinguished, Mitey Mite is detecting current in the DID loop: report this to the telephone company repair service. If the middle decimal point is lit, check the DID cable for secure connections and for broken wires. When the cable is secure and intact, report the problem to the telephone company repair service.

If you get a fast-busy signal, a telco message (such as "this number is not in service"), or another number, hang up and dial again, carefully. If the same thing happens, the telephone company has incorrectly assigned your DID telephone numbers. Report the problem to telephone company repair service.

If the call seems to go through to a dead end and no digits appear, report the problem to telephone company repair service. Most likely tip and ring are reversed somewhere in the DID loop, one side of the DID circuit is grounded, telco is using wink start supervision but should be using immediate start, or the DID service is otherwise not to specifications.

Technical information is contained in the Telco Interface Specifications. For further information or clarification, call AMTELCO Manager of Installations

Note 6a. If the number on the display is 100 less than the dialed number (example: you dial 266-6423 and the display shows 323), hang up and redial, carefully. If it happens again, report the problem to telephone company repair service. Most likely telco equipment is not sending the "start dial" signal or is improperly pulsing the digits.

If the digits are otherwise incorrect report the problem to telephone company repair service and refer them to the Telco Interface Specifications.

For answers to technical questions, call AMTELCO Manager of Installations

Note 6b. Contact AMTELCO Manager of Installations

Note 6c. Verify that shortly after you connect the 1's decimal point extinguishes and the 10's decimal point is lighted.

If the quality of conversation is poor (noise or poor volume in one or both directions), please turn to the Troubleshooting Table for the solution to the specific problem. Mitey Mite cannot noticeably affect voice quality.

For Service Call:  
(608) 838-3511



CALLS GO TO  
'DEAD END'

1. Please turn to Maintenance Test number 5.

OP CAN'T  
CONNECT

1. Please turn to Maintenance Test number 3.

WRONG  
DIGITS ON  
DISPLAY

1. Press the RESET pushbutton; verify that the display shows all "8", indicating that a display is not burned out.
2. Please turn to Maintenance Test number 5.

CALLERS  
REACH  
WRONG  
NUMBER

1. Call the questionable number to verify that you do in fact reach the wrong number.
2. Verify that the called party has not call-forwarded to a wrong number.
3. Verify with telco marketing that the number has not been issued in recent past, i.e. that callers are not using a re-assigned number.
4. Verify with telephone company repair service that the correct telephone numbers are assigned to your DID trunk.

UNRELIABLE  
DID  
SERVICE

1. First perform Maintenance Test number 1.
2. If the problem persists, perform Maintenance Test numbers 4 and 5.
3. If the problem still persists, report it to telephone company repair.

FREQUENT  
RESTARTS

1. Please turn to Maintenance Test number 1.





## 5. MAINTENANCE TESTS

These tests explain and isolate maintenance problems. If a problem is still present after all checks are exhausted, replace the corresponding component: (1) power cable assembly, (2) DID cable, or (3) Mitey Mite.

The decimal points on the display usually indicate whether the problem is in the unit, or whether it is external. Normal decimal point behavior is shown on the next page.

Space is provided for notes which may expedite future maintenance.

**Test 1: Environmental Conditions.** Environmental conditions consist of static electricity, "dirty" power, atmospheric disturbances, etc. which may cause intermittent or temporary troubles. In each case the solution is to wait until the condition naturally goes away, or to remove the offending condition.

1. A storm can affect telco circuits and cause a variety of temporary symptoms.
2. Static electricity can cause transient 'glitches' including disconnects, bad digits, and resets. Spray the surrounding furniture, carpeting, and drapes etc. with an anti-static compound such as "D-Stat."
3. Motors, copiers, and other relatively heavy power equipment on the same electrical circuit as Mitey Mite can cause a variety of transient problems, including disconnects, resets, etc.
4. Intermittant power failures will cause resets, and may cause the telephone company equipment to disqualify the service. When the telephone company disqualifies service you will get a busy signal on every number (note: the only ways a caller can get a busy signal are (1) the DID trunk is actually busy, or (2) the service is disqualified). To restore service, call telephone company repair service after power is restored.
5. The unit is not resistant to liquids or condensation.
6. Recent activity, e.g. rewiring, movement of furniture, etc., may inadvertently cause a loose connection, broken wire, or other trouble. Often the site of such activity is a good first place to look for the cause of a problem.

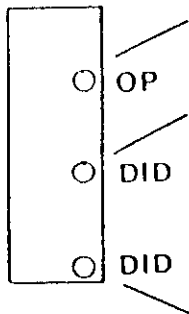
NOTES:  
TROUBLE

PROCEDURE WHICH CORRECTED THE TROUBLE



DECIMAL POINT INDICATORS

MITEY MITE

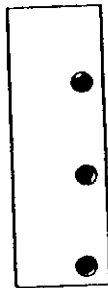
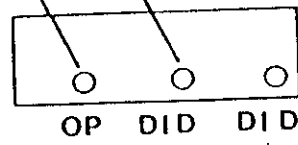


extinguishes when op goes off hook

blinks/dims during pulsing; on when caller connected to unit; may be on or off while idle

off while op and caller connected

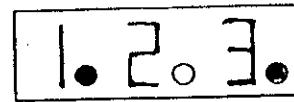
MITEY MITE II



All decimal points light to show no current when power is present, all circuits 'on hook.'



Middle point is extinguished when a call is registered, operator on hook.



100's and 1's points are extinguished when operator and caller are talking.

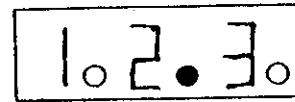


Figure 10. Decimal Point Behavior



**Test 2: Power, Display, and Operator Alert.** The power cable assembly consists of a transformer, the cable with ground wire, and 9-pin connector. Mitey Mite is not getting power whenever the front panel is completely dark. The display consists of three 7-segment LED's (Light Emitting Diodes). When you press the TEST pushbutton, the display should show all eights with all segments uniformly bright.

1. Check for power at the 110v socket (unplug Mitey Mite and plug a lamp, etc. into the same socket). Check for secure connection of transformer and ground at the socket.

2. Examine the power cable for possible breaks or shorts.

3. Check for secure connection of 9-pin connector at back of Mitey Mite.

4. Press the TEST pushbutton and verify that the display shows all eights, and that the operator alert sounds.

NOTES:  
TROUBLE

PROCEDURE WHICH CORRECTED THE TROUBLE



Power must be present for the following tests.

Test 3. Operator Circuit. The decimal point for the 100's digit of the display indicates whether Mitey Mite senses current in the operator line. This point should light when the operator is on hook, and extinguish when the operator is off hook. The operator circuit includes whatever instrument and cord is used to answer, e.g. telephone and/or switchboard cord.

1. Put all answering instruments securely on hook and verify that the decimal point on the 100's digit is lit.
2. Take one answering instrument off hook (or plug in the switchboard cord and turn the lever to connect) and verify that the 100's point extinguishes.
3. Blow into the receiver to determine whether the circuit sounds "live."
4. Repeat steps 1-3 for other answering instruments connected to Mitey Mite, if any.
5. If the decimal point correctly lights/extinguishes, check cable and connections to answering instrument. Replace cable; replace answering instrument if appropriate.

NOTES:

TROUBLE

PROCEDURE WHICH CORRECTED THE TROUBLE





Power must be present for the following test.

**Test 4. Telco (DID) Circuit.** The central office and Mitey Mite are connected by the DID trunk. The DID trunk is a pair of wires (or equivalent) which forms a loop between the central office and Mitey Mite. Mitey Mite supplies 48 volts of battery to the loop so that under normal conditions, current flows through the loop. When the line is idle the middle decimal point may or may not be extinguished; just before the digits are pulsed from the central office the middle digit should extinguish to indicate that current is flowing through the loop. During conversation, the 1's decimal point should be extinguished, to indicate that current is flowing through the loop, but in the opposite direction. Correct decimal point behavior is shown in the accompanying illustration.

1. Verify that when the system is idle the middle decimal is extinguished, or that the middle point extinguishes before the central office sends dial pulses. If not, (a) check the DID cable for breaks and secure connection; (b) call telephone company repair service.

2. Verify that during conversation, the 1's decimal point is extinguished. If not, go to Maintenance Test number 3, above.

**NOTES:**

TROUBLE

PROCEDURE WHICH CORRECTED THE TROUBLE



Power must be present for the following test.

**Test 5: Dial Pulsing and Line Supervision.**

Dial pulsing must be performed by the central office according to certain specifications (in particular, the last three digits should be pulsed at a rate of 10Hz with a minimum interdigit time of 600 milliseconds). If not correctly pulsed, wrong digits will appear in the display.

Line supervision refers to special signaling from both the central office and Mitey Mite, to indicate readiness to send or receive the next signaling or to indicate that the call is progressing normally. Errors in line supervision can cause (for example) no digits to appear, calls to reach a "dead end", wrong digits to appear, or loss of voice path.

1. Place a call to a DID number and carefully observe what happens on the display. Then report the problem to telephone company repair service. The main possibilities are:
  - a. wrong digits appear because dial pulses are too slow or too fast;
  - b. wrong digits appear because time between digits is insufficient;
  - c. wrong 100's digit appears because central office equipment is not sending a 'start dial' signal;
  - d. wrong digits appear because the central office has assigned the wrong digits to the DID trunk;
  - e. no digits appear because they are not being sent from the central office;
  - f. no digits appear because Mitey Mite is set for immediate start supervision while the central office is set for delay dial or wink start supervision.

**NOTES:**  
TROUBLE

PROCEDURE WHICH CORRECTED THE TROUBLE



Power must be present for the following test.

**Test 6: Line Noise and Loss.** Mitey Mite cannot introduce noise, and causes no noticeable loss in volume. Therefore these problems are produced in the DID circuit or in the circuit from the caller and the central office. Report it to telephone company repair service. You can help isolate the problem as follows:

1. If noise, voice loss, or otherwise bad quality appears in one direction only, a telco repeater is bad.
2. Place a call directly to a DID number through a telephone circuit which is known to be good. If the problem is present, it is in the DID circuit.
3. Ask the customer to call-forward to a DID number. Call his number through a known good telephone circuit. If the problem is now present, it is in the customer's telephone circuit.

**NOTES:**  
TROUBLE

PROCEDURE WHICH CORRECTED THE TROUBLE



## CALL PROGRESS SIGNALS

### DID PROTOCOLS

"DID protocol" refers to a method of signaling on the DID trunk. Mitey Mite accommodates three protocols: immediate start, wink start, and delay dial. Each protocol prescribes call progress signals which begin when TELCO central office (CO) equipment is ready to outpulse the identifying digits on the DID access trunk.

**IMMEDIATE START.** In the immediate start protocol, CO equipment briefly interrupts current on the DID line (start dial signal) and then proceeds to pulse the identifying digits at 10Hz. Thus, the digits follow "immediately" after the start-dial signal.

**DELAY DIAL.** In the delay dial protocol, CO equipment briefly interrupts current on the DID line (start dial signal), then after a delay proceeds to pulse the identifying digits. Mitey Mite accommodates the delay dial protocol with the protocol jumper in the "wink" position.

**WINK START.** In the wink start protocol, CO equipment briefly interrupts current on the DID line (start dial signal), waits for Mitey Mite to briefly reverse battery (i.e. "wink" to signal readiness), then pulses the digits.

The start dial signal and pulsing are current interruptions on the DID circuit. Therefore, the middle decimal point will blink rapidly or appear to dim during any of the above sequences.

**TYPICAL OPERATING SEQUENCE.** A typical CO/Mitey Mite interaction is as follows:

1. CO equipment sends the start dial signal. If Mitey Mite is wink start, it briefly reverses battery on the DID trunk after receiving the start dial signal. CO equipment then outpulses the three identifying digits.
2. Mitey Mite displays the digits as each is received. When all three digits are received, the unit injects ringback tone into the DID circuit. The middle decimal point is extinguished and the 1's point is lit.

Note--immediate start Mitey Mite. When dialing into an immediate start Mitey Mite with a test set, the displayed 100's digit will be 1 less than the dialed digit because the first digit-pulse is interpreted as the CO start dial signal.





Note--wink start Mitey Mite. When dialing directly into a wink start Mitey Mite with a test set, the displayed 100's digit will be 2-4 less than the dialed digit because the first digit pulse is interpreted as the CO start dial signal and some succeeding pulses are not sensed during the "wink."

3. When an operator seizes the operator circuit, Mitey Mite reverses battery on the DID circuit. The 1's point extinguishes and the middle point lights.

4. If the operator hangs up first, Mitey Mite senses the current interruption on the operator circuit and returns battery to idle polarity; CO equipment detects this reversal and disconnects. If the caller hangs up first, CO equipment briefly interrupts current on the DID circuit; Mitey Mite senses the interruption and returns battery to idle polarity. Mitey Mite clears the display. Decimal points return to the normal idle condition.

#### OTHER CALL PROGRESS SIGNALS

**BUSY SIGNAL.** If the DID trunk is busy when a caller dials a DID number, the CO sends a busy signal to the caller. Mitey Mite does not inject a busy signal or any other audible signal other than the ringback tone.

**RINGBACK.** After the unit correctly registers the identifying digits, it injects a tone in the line to the caller which sounds like a ringing telephone. The ringback tone is a signal to the caller that he (she) has reached the Mitey Mite.

#### NOISE, 'FALSE' DIGITS

Mitey Mite will clear the display if it does not detect three valid address digits. If CO equipment does not pulse digits at 10 pulses per second with minimum 600ms interdigit time, Mitey Mite will display no digits or clear the display and return to idle. If the display is "stuck," the RESET button should be pressed to cause the unit to re-initialize timers, etc., and return to idle. Noise on the DID or operator circuits may be detected as call progress signals (start dial or disconnect), causing Mitey Mite to clear the display and return to idle.



MITEY MITE PRODUCT IDENTIFICATION  
Spec 207S755

All Mitey Mite units bear the product identification label shown below.  
Options on the label are as follows:

- (a) Mitey Mite or Mitey Mite II
- (b) Wink or Immed (wink start or immediate start)
- (c) A, B, or C:
  - A for 557A board or equivalent;
  - B for 557B board or equivalent;
  - C other

<b>AMTEL COMMUNICATIONS, INC. MADISON, WIS. U.S.A.</b>			
MODEL	(a)	(b)	(c)
SERIAL NUMBER			
COMPLIES WITH PART 68, FCC RULES			
FCC REGISTRATION NUMBER	AA199Y-69661-WP-N		
RINGER EQUIVALENC NO.	0.08		
REQUIRED CONNECTOR	USOC RJ31X		

Figure 11. Product Identification Label



ALARM CABLE SPECIFICATIONS, Mitey Mite AND Mitey Mite II  
Spec. 207S756

For Mitey Mite, the optional external alarm connects to wires in a 3-wire cable that is connected to the power (PWR) plug. For Mitey Mite II the optional alarm connects to wires in a separate AUX cable. The alarm ends of both cables are identical in function:

- green wire-- common
- black wire-- Mitey Mite relay contact that is normally open while power is applied to Mitey Mite;
- red wire -- Mitey Mite relay contact that is normally closed while power is applied to Mitey Mite.

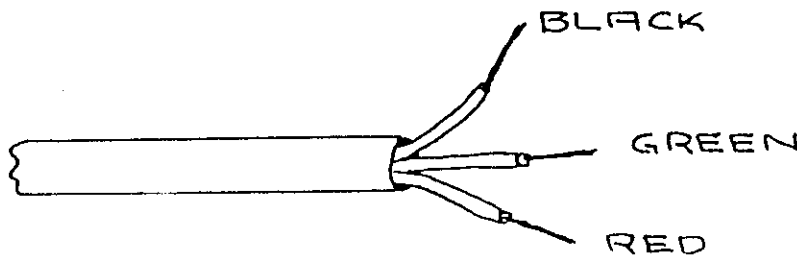
**Please Note:** Mitey Mites do not provide power for the alarm. When you purchase an alarm be sure to include any necessary power supply.

Most alarms (sonalert, door chime, etc.) connect to the green and black wires. When power is applied to Mitey Mite, the alarm circuit is open. When power fails, the circuit closes, causing the alarm to go off. When a call comes in, the circuit opens and closes, causing the alarm to go off in synchronization with the built-in audible operator alert.

Some alarms require current to be flowing for the alarm to be silent. Such an alarm should be connected to the green and red wires. Then when power is applied to Mitey Mite, the circuit closes, causing the alarm to be silent. When power fails, the circuit opens, causing the alarm to go off, and when a call comes in the circuit closes and opens, causing the alarm to go off in synchronization with the built-in alert.

If, after you connect the alarm to one pair of wires, it works in reverse of the way you expect, connect it to the other pair.

**IMPORTANT:** contact ratings of the Mitey Mite relay must be observed if the alert is to have a reasonable lifetime. The power rating of the alarm unit should not exceed any of the following: (a) 60 watts; (b) 0.5 amps at 115 VAC; (b) 2 amps at 30 volts or 24 volts; (c) 1.25 amps at 48 volts.





**MITEY MITE SPECIFICATIONS**  
Spec 207S754

**Registration**

Mitey Mite bears FCC registration number AAI99Y-69661-WP-N and has ringer equivalence 0.08.

**Standard Cable Lengths**

Power and external alert: 15 feet.  
DID cable: 7 feet.

**Telco Interface Requirement-- 1 DID access trunk**  
Mitey Mite provides -48Vdc to the DID line. The line must not be strapped for "battery-ground" signaling.

**Loop current:** 26 - 80 mA.  
Loop resistance contribution of Mitey Mite is 600 ohms.

**Maximum line loss:** 5 db.

**Signaling protocol:** Wink start (preferred), or delay-dial/immediate start. Manufacturer must be apprised of this protocol prior to shipment.

**Outpulsing:** the last three digits of the DID number should be pulsed at 10 pulses/sec.

**Termination:** USOC (Universal Service Order Code) RJ31X, located within 7 feet (as measured by cable length) of Mitey Mite. The RJ31X wiring diagram is given in the Telco Interface Specifications.

**Operator Interface**

Standard switchboard jack, located on front panel of the Mitey Mite, or, optional standard telephone or key system cable equipped with RJ11 miniature modular connector, or both of the above.

**Physical dimensions**

Size Mitey Mite: 5"H x 1-3/4"W x 9-1/2"D  
Mitey Mite II: 3"H x 5-3/4"W x 9-1/2"D.

Weight Mitey Mite: 2 pounds  
Mitey Mite II: 2-1/2 pounds.

**Environmental Requirements**

Temperature 0-40 deg. C (32-104 deg. F)  
Relative Humidity 5-95%, no condensation





## Electrical Requirements

- Operating voltage: 110Vac to external modular 36Vac power supply (or 48Vdc without external supply).
- Operating current: less than 120mA from 110Vac source (less than 250mA from 48Vdc source).
- Peak power consumption: 15 watts.
- Quality: motors, copiers, and other relatively high-power equipment should not be on the same circuit.

## Operator Alert Relay

An external operator alert may be provided by the customer. The relay contacts for the alert are rated at 60 watts total resistive load: 2 amps at 30Vdc or 0.5 amps at 125Vac. The external alert device must not exceed this rating.

## Sockets and Connections

- LN IN (Line IN): USOC type RJ31X, for DID access line.
- OP OUT: USOC type RJ11, for optional operator phone.
- Operator jack: 1/4" telephone jack.

POWER, Mitey Mite: 9-pin Amphenol 205204-1 (male).

PIN	CONNECTION	PIN	CONNECTION
1	48Vdc/36Vac power	6	48Vdc/36Vac power
2	common	7	common
3	relay common	8	relay NC*
4	relay NO*	9	modified RS-232C**
5	modified RS-232C**		output

POWER, Mitey Mite II: 9-pin Amphenol 205204-1 (male).

PIN	CONNECTION	PIN	CONNECTION
1	48Vdc/36Vac power	6	48Vdc/36Vac power
2	common	7	common
3	none	8	none
4	none	9	none
5	none		

AUX, Mitey Mite II: 9-pin amphenol 205204-1 (female)

PIN	CONNECTION	PIN	CONNECTION
1	none	6	none
2	common	7	common
3	relay common	8	relay NC*
4	relay NO*	9	modified RS-232C
5	modified RS-232C		input**
	output**		

\*while energized. An optional external operator alert would normally be connected between pins 3 and 8.

\*\*for engineering diagnostic purposes. These pins are reserved for future features.



TELCO INTERFACE SPECIFICATIONS  
Spec 207S753  
MITEY MITE AND MITEY MITE II

REGISTRATION

Mitey Mite and Mitey Mite II bear FCC registration number AAI99Y-69661-WP-N and have ringer equivalence  $\emptyset.08$ .

TELCO REQUIREMENT: 1 DID access trunk.

Mitey Mite provides -48Vdc to this trunk. The line should not be tied to ground and must not be strapped for battery-ground signaling.

Loop current: 26-80mA. Loop resistance contribution of Mitey Mite is 600 ohms.

Maximum allowable line loss: 5db. Mitey Mite introduces negligible voice level loss.

Signaling protocol: Wink Start preferred; delay dial or immediate start optional. If wink start is not provided, manufacturer must be apprised of the protocol type before shipment.

Outpulsing: last three digits of a DID number should be outpulsed at 10 pulses/sec. with a minimum interdigit time of 600ms.

Termination: USOC RJ31X located within 7 feet of Mitey Mite as measured by cable run. The USOC RJ31X termination standard is described on the next page.

Termination of optional telephone or key system: USOC RJ11.



## USOC (Universal Service Order Code) RJ31X REGISTRATION INTERFACE

[Reference 1.]

Communication Certification Laboratory Interconnection standard 50-768-01.

Technical Standard: (b) series configurations; (1) Series T/R ahead of all station equipment; 8 position series jack.

Electrical Network Connection: Series tip and ring ahead of all station equipment. Conductors 2, 3, 6 and 7 are reserved for telephone company use.

Mechanical arrangement: Miniature 8 position series jack.

[Reference 2.]

USOC RJ31X is wired so that when the CPE is plugged into the 635-type connecting block, the CPE is placed in series with the tip and ring of the line (see figure below). When the CPE plug is removed, tip and ring are cut through to station equipment. The 635-type connecting block must be wired in the circuit, ahead of ALL station equipment, to prevent false operation of the registered device and to cut off ALL station equipment from the line.

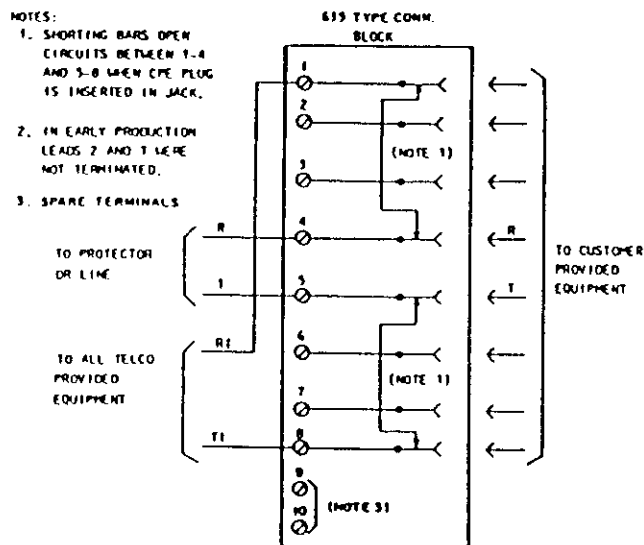


Figure 12. RJ31X Wiring Specification

### References:

1. Technical Standard 50-768-01, FCC Rule 68. Communication Certification Laboratory, Issued 25 Aug 1976, Effective 25 Aug 1976.

2. Bell System Practices, Section 463-400-130. Section 2.02, Issue 2, January 1979.

