

44023

PABX/TRUNK

INTERFACE MODULE



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About this Practice:

- This document has been reformatted to meet ISO 9001 requirements.

Reissued Practices: Updated and new content can be identified by a banner in the right margin.

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UPDATED

CAUTION

- Install or remove modules from the shelf only when the power is off. If you install a module in the shelf with the power on, the internal circuitry may suffer damage and the product warranty will be void.
- Remove and install circuit boards only in a static-safe environment (use antistatic wrist straps, smocks, footwear, etc.).
- Keep circuit boards in their antistatic bags when they are not in use.
- Do not ship or store circuit boards near strong electrostatic, electromagnetic, magnetic, or radioactive fields.
- For more complete information on electrostatic discharge safety precautions, refer to Bellcore™ Technical Reference # TR-NWT-000870.

ORDERING INFORMATION

NOTE: This section lists the different options available for this product. To order any of the available options, contact Dantel Inside Sales through our toll-free number, **1-800-432-6835**.

OPTION NUMBER	FEATURES
A11-44023-00	PABX/Trunk Interface Module

GENERAL DESCRIPTION

The 44023 PABX/Trunk Interface Module (44023) provides:

- ◆ A four-wire trunk interface for a 440 Communications Management System (440 CMS).
- ◆ An two-wire line interface for a 44443 Four-Wire Termination Set.

The 44023 is a plug-in printed circuit module that fits into any 400-type or similar equipment housing. The 44023 does not accept subassemblies.

Strap options lets you:

- ◆ Select level range
- ◆ Configure E and M leads
- ◆ Select ground or loop start
- ◆ Select privacy and busy mode
- ◆ Select the conference delay feature

The 44023 functions in a 440 CMS trunk interface circuit with the following modules:

- ◆ 44020 DTMF Decoder Module
- ◆ 44021/49021 Address Decoder Module
- ◆ 49020 Tone Supply Subassembly

The 44023 converts any subscriber station to a trunk interface by directly replacing a 44022 Subscriber Line Interface Module in the 440 CMS Multi-Station Package. Convert the trunk interface to two-wire by installing a 44443 Four-Wire Termination Set to the right of the 44023.

The front panel includes:

- ◆ Operational status indicating LEDs
- ◆ Calibration test points
- ◆ Monitor jacks
- ◆ A test/reset switch

The 44023 operates on -21 to -56 VDC input power.

CIRCUIT DESCRIPTION

The PABX/Trunk Interface Module circuitry consists of three sections: audio, signaling/control and power regulator.

AUDIO SECTION

The audio section consists of a receive circuit and a transmit circuit. Refer to Fig. 1.

Here is a brief description of each of the functional parts of the circuit:

Receive Circuit

The receive circuit consists of:

- ◆ A line input (receive) transformer (T1)
- ◆ Input pad
- ◆ Summing circuit
- ◆ Mute FET
- ◆ Busy and alert tone FETs
- ◆ Level Control (R5)
- ◆ Amplifier
- ◆ Drop output (receive) transformer (T2)
- ◆ Drop receive/monitor jacks

LINE RCV signals (pins 2 and 4) feed through T1 to the pad. This pad provides 23 dB of attenuation which prevents overdriving the mute FET. You can strap the attenuation out in cases of low line levels (below -5 dBm). Use the summing inputs in the 440 CMS multi-station package.

External 49020 Tone Supply Subassembly busy and alert tones connect to pins 36 and 32 respectively. The circuit's signaling/control section operates control FETs for these tones and the mute. Set the amplifier gain with R5. The drop output feeds through T2 and the jacks to pins 13 and 7.

Transmit Circuit

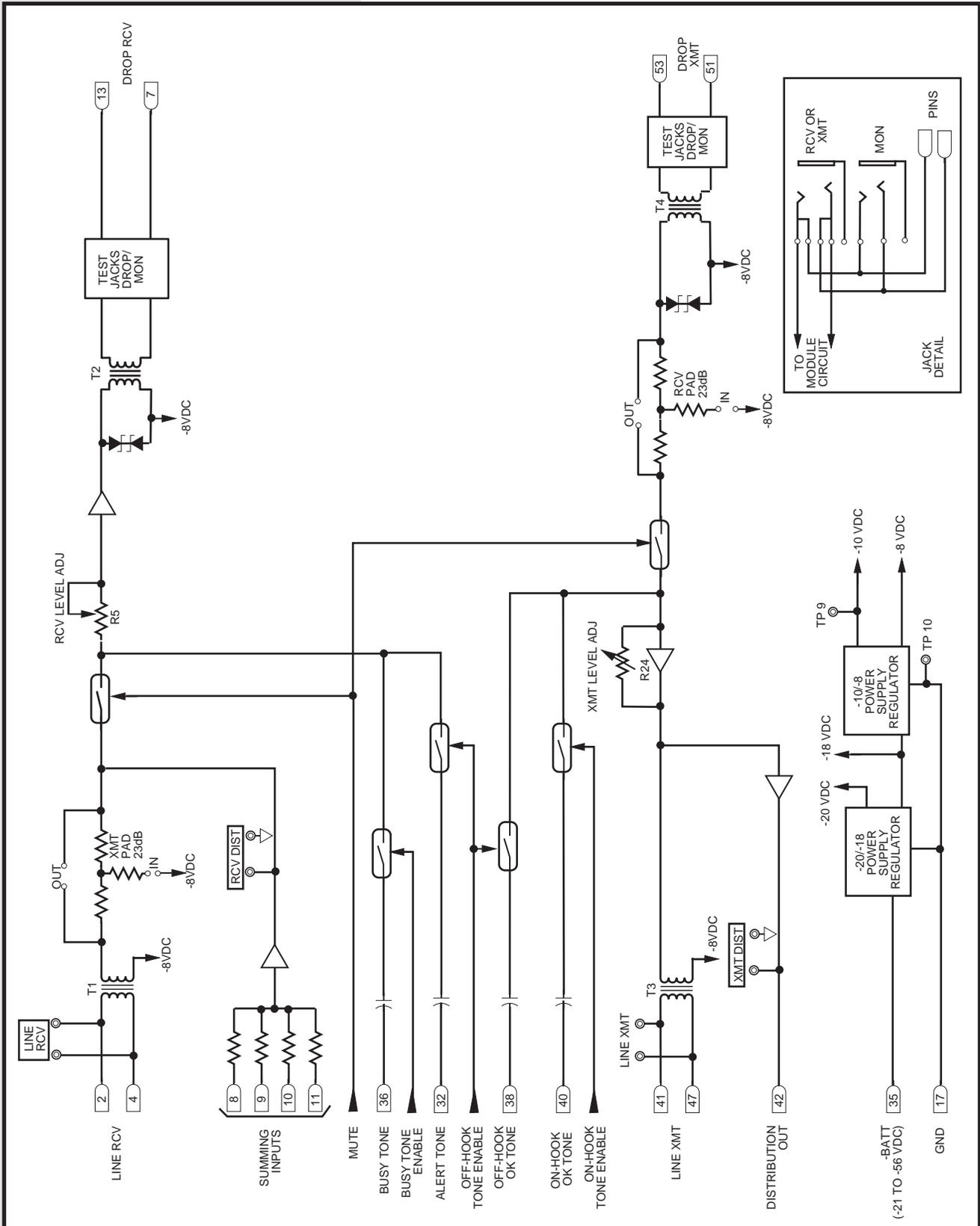
The transmit circuit consists of:

- ◆ Drop transmit/monitor jacks
- ◆ A drop input (transmit) transformer (T4)
- ◆ Transmit pad
- ◆ Mute FET
- ◆ Off-hook and on-hook tone FETs
- ◆ Level control (R24)

CONTINUED . . .

CIRCUIT DESCRIPTION

Fig. 1 - FUNCTIONAL SCHEMATIC, 44023 PABX/TRUNK INTERFACE MODULE, AUDIO SECTION



CIRCUIT DESCRIPTION

- ◆ Amplifier
- ◆ Distribution circuit
- ◆ Line output (transmit) transformer (T3)

DROP XMT signals (pins 53 and 51) feed through T4 to the pad. This pad provides 23 dB of attenuation which prevents overdriving the mute FET. You can strap the attenuation out in cases of low line levels (below -5 dBm).

49020 Tone Supply Subassembly off-hook and on-hook tones connect to pins 38 and 40 respectively. The circuit's signaling/control section operates control FETs for these tones and the mute. Set the amplifier gain with R4. The output signal splits between the distribution circuit and the LINE XMT output.

The distribution circuit feeds the 440 CMS Multi-Station Package at pin 42. The line output feeds through T3 to pins 41 and 47.

SIGNALING/CONTROL SECTION

The signaling/control section processes incoming calls and outgoing calls. Refer to Fig. 2.

Incoming Calls

The 44023 processes incoming call signaling in one of two ways: with a two-wire outside facility or a four-wire E and M trunk.

When an incoming call initiates from a two-wire outside facility, the ring signal (66 Hz to 16 Hz) applies to the 44023 through two-wire tip and ring leads (pins 44 and 50) to the OC2 detector.

A "loop control" strap option determines whether the calling party or only the called party can terminate the call. A wink or ground removal on the tip terminates a call. Relay K1 closes the A-B lead contacts (pins 48 and 54) when the 44023 answers the call.

When an incoming call initiates from an E and M trunk, the E Lead ring signal applies to pin 1. A "E control" strap option determines whether the calling party or only the called party can terminate the call. The M lead output (pin 21) switches when the 44023 answers the call.

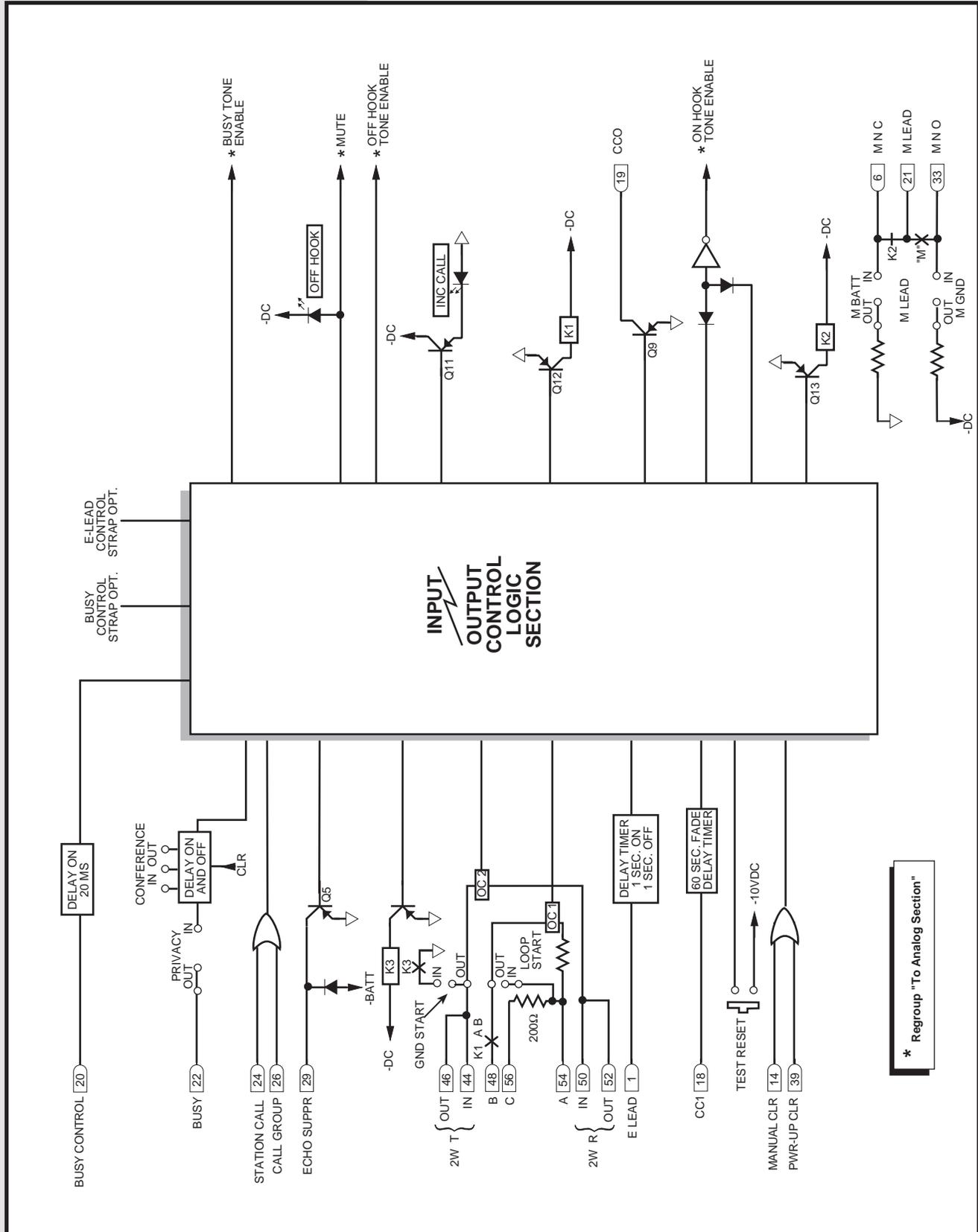
The OC2 outputs and the E lead circuit apply through a control timer to:

- ◆ A 10 to 80-second "no answer disconnect" timer.
- ◆ Through the line seize logic to relay K1, control transistor Q12, and M lead relay K2.

CONTINUED . . .

CIRCUIT DESCRIPTION

FIG. 2 - FUNCTIONAL SCHEMATIC, 44023 PABX/TRUNK INTERFACE MODULE, SIGNALING/CONTROL SECTION



CIRCUIT DESCRIPTION

The radio controls are switched on with Q9 (open collector). A one-second delay network delays the radio control switch off. The control timer provides a transmission delay of the drop and line off-hook tones when you include radios or satellites in the 440 CMS. This delay turns on radios before you transmit the tones.

The control timer provides two delay periods. The first delay period (100 milliseconds) occurs at the end of a one-half second charge period. The output of the inverter switches to a logic zero (-10 VDC). Transistor Q12 switches on and starts the drop and line off-hook tone burst timer (100 milliseconds) charge periods. The on-hook tone burst timer also charges.

When Q12 switches on, relay K1 energizes. Contacts K1A close, which:

- ◆ Connects a 200 ohm load across the two-wire tip and ring inputs (through the A and B leads of a term set).
- ◆ Answers the call.
- ◆ Terminates the ring signal input to OC2.

When the ringing stops, the control timer tank circuit starts a 200 millisecond discharge delay period. At the end of the delay period, the output of the control timer inverter switches to a logic one (0 VDC). This causes the off-hook tone burst timers to discharge, closing off-hook and alert-tone FETs and applying a burst of tone to the LINE XMT and DROP RCV, respectively. The off-hook LED also comes on.

The duration of the alert tone burst (proceed-to-dial signal) to the drop is 0.12 seconds. This is to ensure that the system is normalized before additional DTMF tones (address codes) are sent. When the alert tone burst ceases, it indicates that the two- or three-digit code for the desired 440 system station can be dialed. The duration of the off-hook tone burst to the line is also 0.12 seconds. This is used to busy out the 440 system.

The “no answer disconnect” timer is also started when Q12 and Q13 are turned on. If the incoming call is not answered within the set time (10 to 80 seconds) the call is automatically disconnected. The timer activates an on-hook tone burst through the line seize logic to unbusy the 440 system.

When the incoming call is answered at the 440 system remote site, a ground is applied to the busy input (pin 22) from the 44021 Address Decoder in response to the off-hook tone. This off-hook tone is generated at the remote site by a 49020 Tone Supply Subassembly, activated through the remote 44022 Station Interface Module and applied to the 44021. The 44023 control circuit input (CCI) lead (pin 18) is grounded, either permanently or through a switch.

The receipt of the busy input and CCI lead ground puts the 44023 under the control of the 440 system site and disables the “no answer disconnect” timer. This allows the call to proceed indefinitely or until the 440 system site goes on hook.

CIRCUIT DESCRIPTION

When the 440 system site phone goes on hook, an on-hook tone is decoded by the 44021. This causes the ground at pin 22 to be removed, releasing the 44023 line seize logic to unbusy the 440 system. The 440 system is not busied by placing the outside facility telephone on hook, unless the 44023 is strapped for outside party control (Loop Control in)

The CCI circuit includes a 60-second “fade delay” timer. This timer prevents a call from being disconnected should the radio signal strength fade or a momentary interruption occur. The 44023 will disconnect from the outside call after one second if the E lead ground is removed.

If an incoming ring signal is applied to the 44023 when the 440 system is internally busy, the 44023 will answer the incoming call with a seven-second busy tone timer. The circuit will then automatically disconnect the incoming call. The 44023 INC CALL LED will come on for the duration of the seven-second busy tone.

The transmit and receive mute FETs are unmuted when Q9 and Q12 are switched on. This allows communications to proceed when the 440 system phone is answered.

Outgoing Calls

An outgoing call from a system facility is initiated when a 440 system station telephone is lifted off hook. This transmits an off-hook tone which causes the 44021 Address Decoder to ground pin 22. The CCI (pin 18) must also be ground.

When the 440 system station telephone is taken off hook, the 440 system is “busied out” and the 44023 CKT BUSY LED comes on. The calling party then dials the appropriate two- or three-digit code to access the 44023 for the desired outside line.

When the last digit is dialed, the 44021 Address Decoder grounds station call (pin 24) or group call (pin 26). The selected call input (pin 24 or 26) is applied through a 400ms line seize delay circuit. This delay prevents the last digit of the code dialed from being transmitted over the outside facility as the first digit of an outgoing number.

When the call input is processed through the line seize logic Q12 turns on. This closes relay K1 and seizes the line. A “ground start” strap option allows a momentary ground to be applied to the tip (pins 44 and 46) to originate a call. Relay K2 switches the M lead. The OFF HK LED comes on, the CKT BUSY LED goes off, and the calling party receives a dial tone from the outside facility. The calling party can now dial any desired outside number.

When the outside call is terminated, a 0.2 second on-hook tone burst from the 440 system is decoded by the 44021 Address Decoder. This removes the ground from pin 22, which releases the line seize logic and unbusies the 440 system.

CIRCUIT DESCRIPTION

For both incoming and outgoing calls, release of the CCO lead through Q9 is delayed one second by a “delay to release” timer. This makes sure the on-hook tone is transmitted before the CCO lead releases the radio transmitter.

Clear Circuit

The clear function occurs when:

- ◆ The phone hangs up.
- ◆ 90 seconds elapse during off-hook.
- ◆ The call terminates before the phone answers.

When the phone hangs up, a pulse at the reset output (pin 3) resets the 44020 DTMF Decoder Module and returns the circuit to its normal condition.

Terminate a call before the phone answers by applying a ground to the clear input (pin 16). Application of ground returns all functions to normal and outputs a reset pulse at pin 3. The tone decoder normally applies the clear input upon receipt of an on-hook tone.

You can use the front panel TEST/RST switch for card alignment. Pressing the button once causes an off-hook condition. Pressing the button again resets the 44022 SLIM.

POWER REGULATOR SECTION

The power regulator consists of two voltage regulators. One provides -20 VDC to the 44023 circuitry and -22 VDC to the next regulator. The second regulator provides -10 VDC and -8 VDC to the 44023 circuitry. Input power can range from -21 VDC to -56 VDC.

APPLICATION INFORMATION

The 44023's primary application is to interface a four-wire trunk or two-wire outside line to Dantel's 440 Communication Management System. The module also interfaces control functions between the outside facilities and the 440 system.

The 44023 can be used in custom package applications of the 440 System. Modules necessary to provide the signaling and control interface for the 44023 include:

- ◆ 44020 DTMF Decoder
- ◆ 49020 Tone Supply Subassembly
- ◆ 49018 Address Decoder (or 44021/49021 Address Decoder with subassemblies)

Fig. 3 shows an E and M trunk application diagram. Fig. 4 shows a two-wire line application diagram.

440 System Functions

For an outgoing call, the 44023:

- ◆ Seizes the trunk or line when a station or group call input is applied from a decoder,
- ◆ Sends an off-hook tone to the caller,
- ◆ Passes dial tone from the trunk to the caller, and
- ◆ Passes signaling tones from the caller to the trunk.

The call is terminated when the station call or group call input is removed by the decoding of an on-hook tone from the caller.

For an incoming call from the trunk or line, the 44023 answers the ring by seizing the line. It sends an:

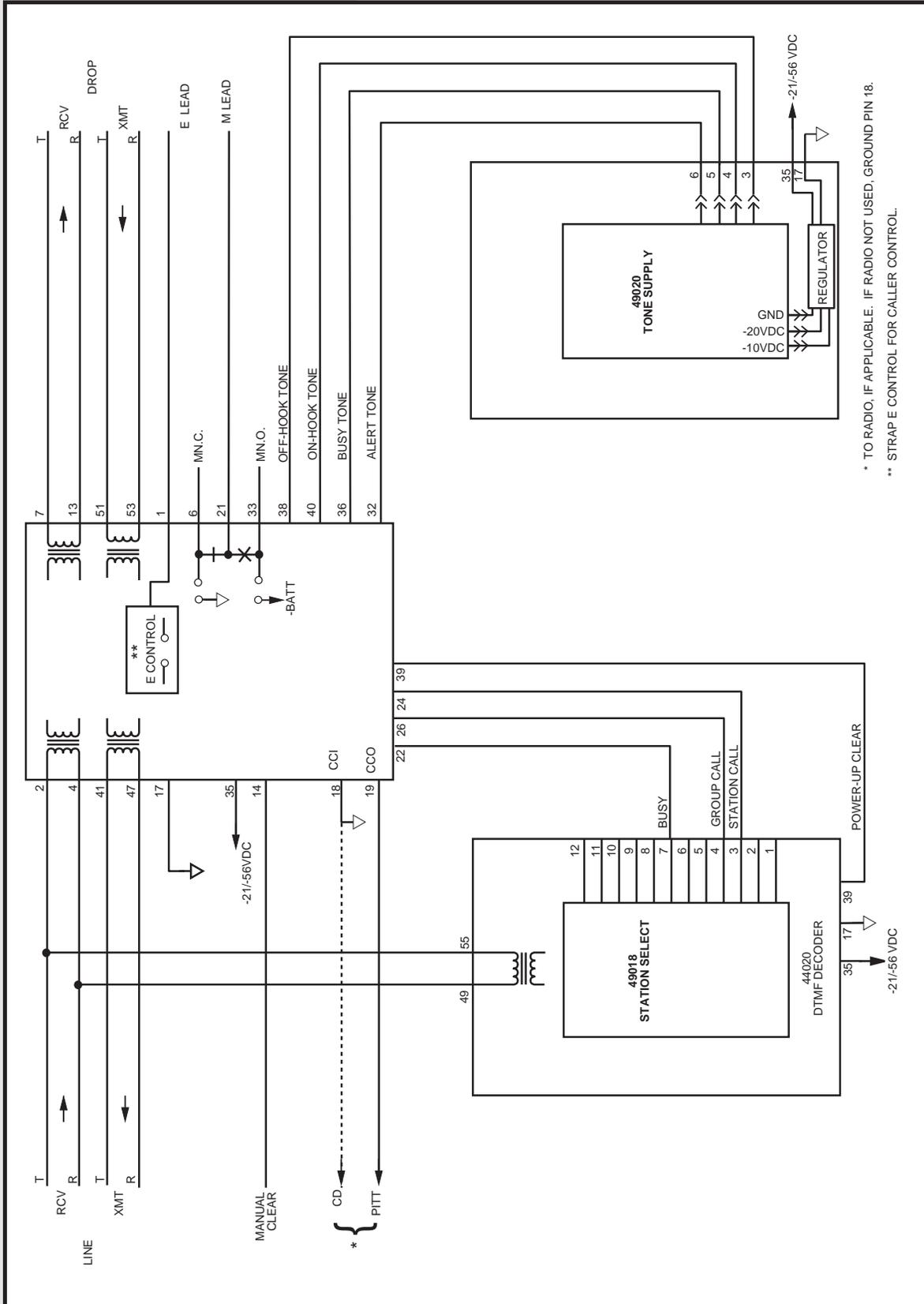
- ◆ Off-hook tone to the 440 system, and
- ◆ An alert tone to the trunk.

If the 44023 does not receive an off-hook tone from the 440 system within 10 to 80 seconds (adjustable), it will terminate the call (Loop Control in). If the 440 system is busy when the incoming call is placed, the 44023 will:

- ◆ Answer the call,
- ◆ Provide a seven second busy tone to the caller, and
- ◆ Terminate the call.

APPLICATION INFORMATION

FIG. 3 - E AND M TRUNK APPLICATION DIAGRAM

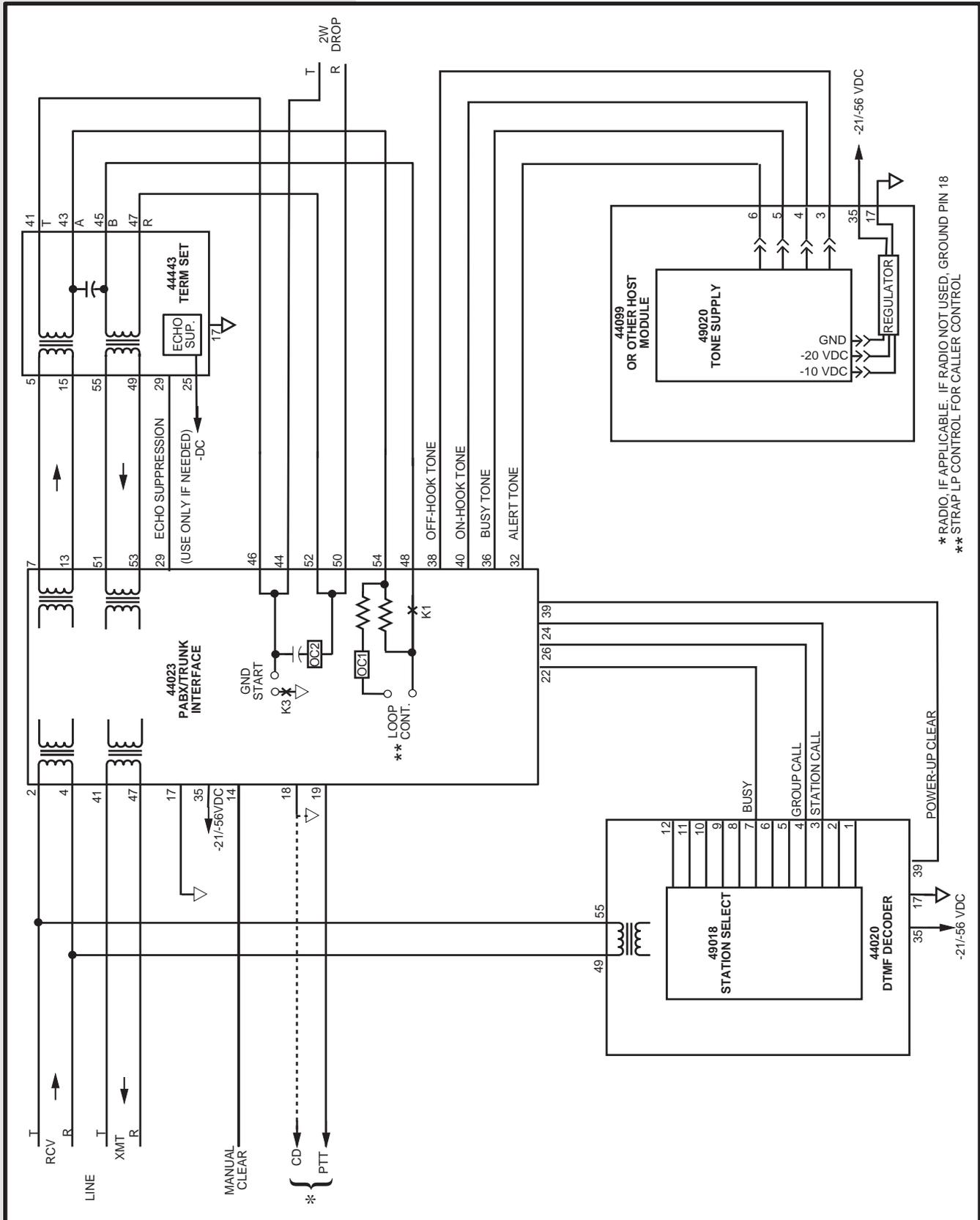


* TO RADIO, IF APPLICABLE. IF RADIO NOT USED, GROUND PIN 18.

** STRAP E CONTROL FOR CALLER CONTROL.

APPLICATION INFORMATION

FIG. 4 - TWO-WIRE LINE APPLICATION DIAGRAM



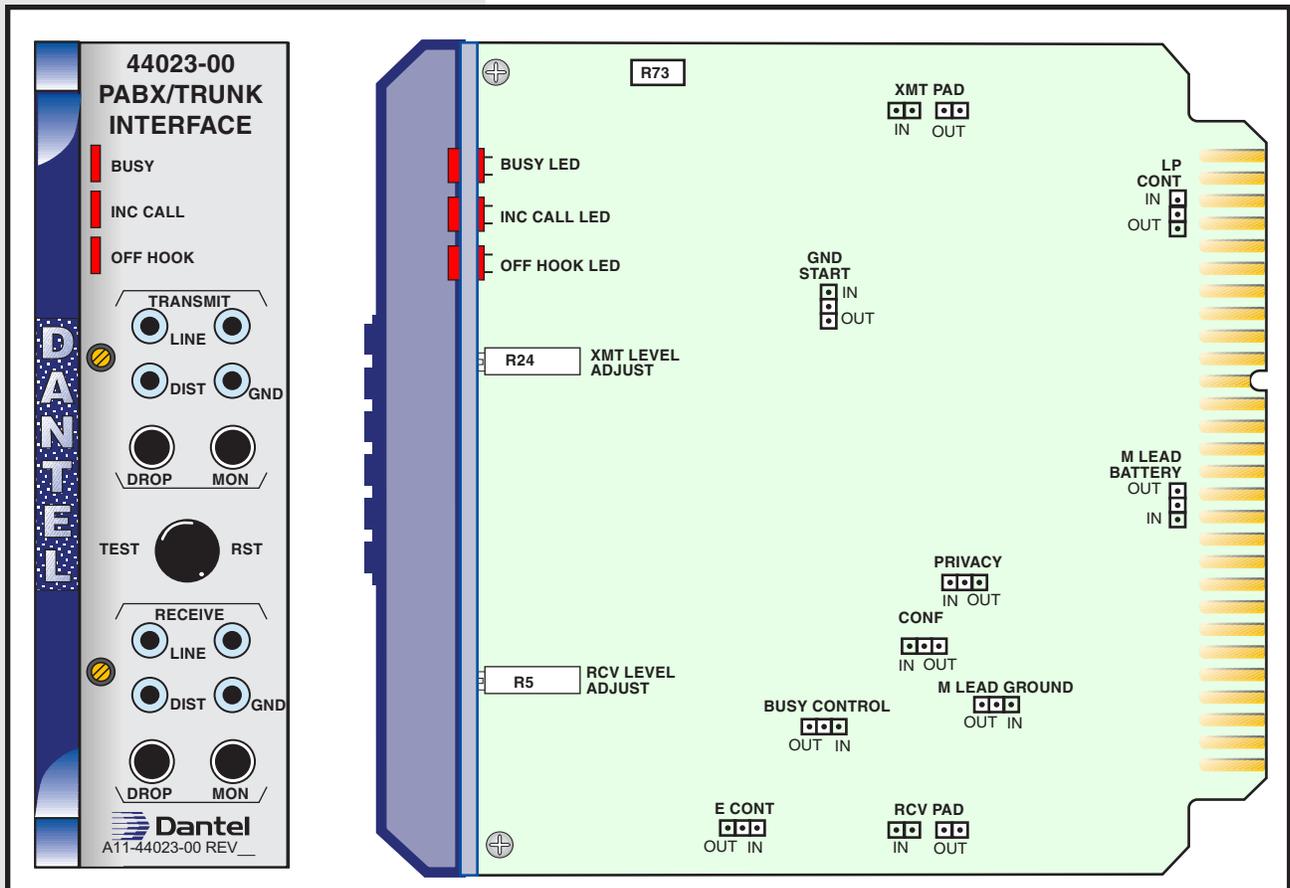
INSTALLATION

Installation consists of setting the straps, wiring the connector, mounting the module in the shelf and checking out the module.

1. INSTALL THE PROPER STRAP OPTIONS.

Refer to Fig. 5 and Table A

FIG. 5 - 44023 PABX/TRUNK INTERFACE MODULE STRAP OPTION LOCATIONS.



STRAP OPTIONS

Receiving and Transmit Pads

It is recommended that the pads be strapped in unless the calibration levels desired cannot be reached. Both pads attenuate the signal by 23 dB. A mini-jumper must be installed in either the "IN" or the "OUT" position for the module to function properly.

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INSTALLATION

TABLE A - 44023 PABX/TRUNK INTERFACE MODULE STRAP OPTIONS

OPTION	INSTALL STRAP
LINE RCV LEVEL	
-3 dBm to +7 dBm	RCV PAD IN
-16 dBm to -3 dBm	RCV PAD OUT
DROP XMT LEVEL	
-3 dBm to +7 dBm	XMT PAD OUT
-16 dBm to -3 dBm	XMT PAD IN
PRIVACY	
Automatic or Manual Privacy	PVT IN
No Privacy	PVT OUT
M LEAD	
Dry Contact	M BATT OUT M GND OUT
Ground Normal; -Batt. Operated	M BATT IN M GND IN
Ground Normal; Open Operated	M BATT OUT M GND IN
Open Normal; -Batt. Operated	M BATT IN M GND OUT
E LEAD	
Interfacing E & M Trunk	E CONT IN
Other Interfaces	E CONT OUT
LOOP START	
PABX under own control (wink off)	LP CONT IN
Other	LP CONT OUT
GROUND START	
PABX using ground start	GND ST IN
Other	GND ST OUT
CONFERENCE CALLING 10 SEC. DELAY	
When using automatic privacy	CONF IN
No delay	CONF OUT
BUSY CONTROL	
Common decoder for subscriber module and PABX module	B CONT IN
Dedicated decoder	B CONT OUT

INSTALLATION

Privacy

This strap option allows the normal privacy function to be defeated so that a caller will not receive a busy signal when the system is in use. Incoming calls will be announced by an off-hook tone and the caller will be connected to the system immediately.

Busy Control

Place this strap "IN" when the 44023 is used in a 440 System multi-station package.

Conference

Place this strap "IN" when off-net conferencing will be used.

E Lead Control

Place this strap "IN" when the outside trunk uses E and M signaling, and when it is desired to allow the calling party to have control.

Ground Start

Place this strap "IN" when the outside line uses ground start. Even if the loop control strap is "OUT", this strap must be "IN" to allow seizing the line in a ground start situation.

M Lead

Two straps are provided for the M Lead. One is used to connect the normally closed side of the relay to ground. The other is used to connect the normally open side of the relay to battery. Both straps have 4700 ohms in series (1 watt).

Normal relay position is when no call is in progress (module on-hook). The M Lead contacts are also accessible at pins 6 (N/C) and 33 (N/O).

Timer

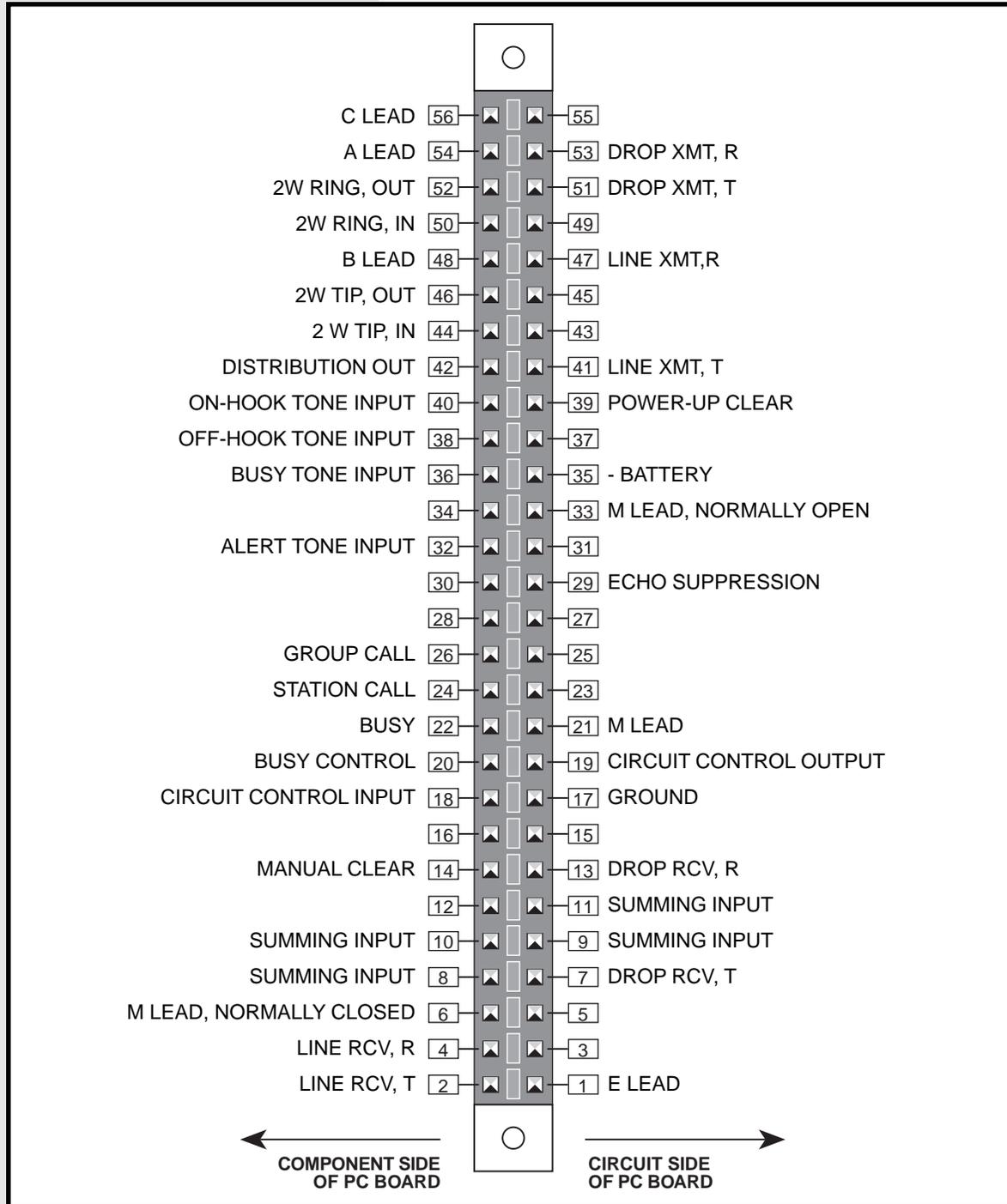
The no answer disconnect timer can be adjusted with R73. Turn clockwise to increase timer. Refer to Fig. 5.

2. WIRE THE CONNECTOR.

If you wire the connector, refer to Fig. 6 for the module connector pin wiring assignments.

INSTALLATION

FIG. 6 - 44023 PABX/TRUNK INTERFACE PIN DESIGNATIONS



INSTALLATION

3. MOUNT THE MODULE IN THE EQUIPMENT SHELF.

Slide the module along the guide slots then firmly seat the edge connector in its receptacle.

4. CHECK OUT THE MODULE.

NOTE:

The 44023 drop side always interfaces to the outside world, central office or PABX trunk. The line side interfaces the 440 CMS or other private network.

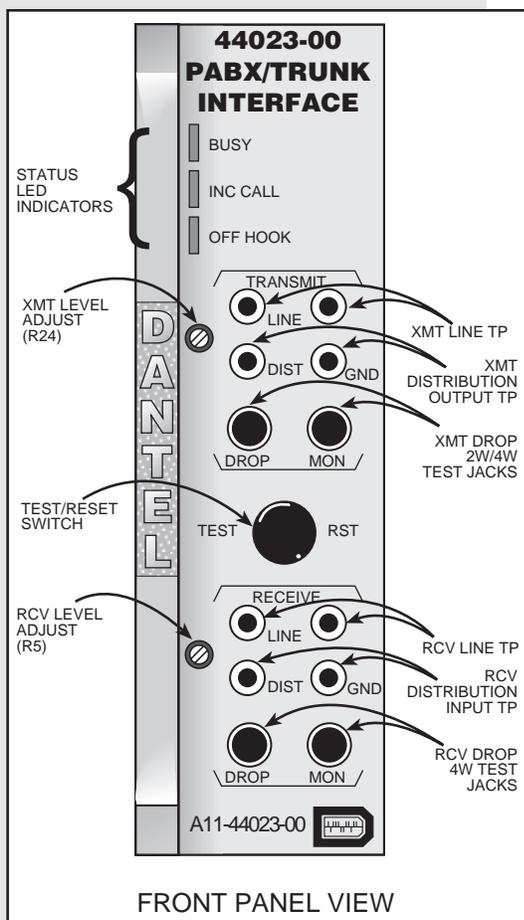
Refer to Table B for checkout procedures. Refer to Fig. 7 for a front panel view.

Use the following test equipment for module checkout:

- ◆ Level Meter (Weston Model 666, Hewlett-Packard 440EL or similar equipment, or you can use a Dantel 8002 Test Set)
- ◆ Test oscillator (Dantel 8002 Test Set or any 600 ohm audio oscillator)

NOTE: You only need a test oscillator when you test the 44023 in an assembly that does not have a 44011 Line Interface Module. You can normally use the test oscillator built into the 44011 Line Interface Module.

Fig. 7 - 44023 PABX/TRUNK INTERFACE FRONT PANEL VIEW



If you install the 44023 in a 440 CMS Multi-Station Package, check out the 44010/11, 49020, 44020, 44021 and 49018 modules before checking out the 44023.

Test the following outputs with the appropriate equipment:

- ◆ Monitor output
- ◆ Buzzer lead
- ◆ Lamp lead
- ◆ Busy-circuit light output

The system test procedure tests the all-call and group-call functions.

INSTALLATION

TABLE B - 44023 PABX/TRUNK INTERFACE CHECK-OUT PROCEDURE

STEP	ACTION	RESULTS
1	<ul style="list-style-type: none"> Remove power from module receptacle. Plug in 44023 module. Apply power 	No LEDs should light. If OFF HOOK LED is on, reset it by pressing the TEST/RST switch once or twice.
2	<ul style="list-style-type: none"> For 440 system single-station packages and other applications: Insert a test tone at the 4W RCV input (pins 2 and 4) or at the LINE RECEIVE test points. Insert bridged level meter at the LINE RECEIVE test points. <p><i>Note: Any source device that loads the input will have to be disconnected.</i></p> <ul style="list-style-type: none"> For Multi-station packages: At the 44011 patch from the EXT OSC jack to the LINE RCV jack (on the 44011). Insert a bridged level meter at the RECEIVE DIST and GND test points on the 44023 to be tested. 	<p>Set frequency to approximately 1 KHz. Set level to system test-tone level (0dBmO)</p> <p>Set level to -10 dBm by adjusting the EXT ADJ knob on the 44011 front panel.</p>
3	<ul style="list-style-type: none"> Move level meter (600 ohm terminated) to the RCV DROP jack. Press TEST/RST switch. 	<p>Read no signal.</p> <p>OFF HOOK LED comes on. Read system test-tone level (0 dBmO). Adjust RECEIVE level control as required. Strap out the input pad only if necessary to obtain level (has no effect in multi-station packages).</p>
4	Remove meter and oscillator connections.	
5	<ul style="list-style-type: none"> Insert test oscillator at the TRANSMIT DROP jack Connect bridged level meter across generator terminals. 	<p>OFF HOOK LED remains on,</p> <p>Set level for system test-tone level. (0dBmO).</p>
6	<ul style="list-style-type: none"> For 440 system single-station package and other applications: Move terminated level meter to the LINE TRANSMIT test points. <p><i>Note: Any source device that loads the input will have to be disconnected.</i></p> <ul style="list-style-type: none"> For multi-station packages: Move the bridged level meter to the TRANSMIT DIST and GND test points on the 44023 under test. 	<p>Read system test-tone level (0 dBmO). Adjust TRANSMIT level control as required. Strap the output pad in or out as needed to reach required level.</p> <p>Read -10 dBm. Adjust TRANSMIT level control as required.</p>

CONTINUED . . .

INSTALLATION

TABLE B (CONTINUED) - 44023 PABX/TRUNK INTERFACE CHECK-OUT PROCEDURE

STEP	ACTION	RESULTS
7	Remove meter and oscillator connections.	
8	Press TEST/RST switch.	OFF HOOK LED goes off.
9	Restore outside system connections.	
	<i>Note: For the remainder of this procedure, the 44023 module will have to be able to communicate between the outside line and another site in the 440 system. That site must be equipped with a 44022 station module. If the 44023 is installed in a 440 system multi-station package, any 44022 station module in the same package may be used as a test signal source, providing it has been checked out.</i>	
10	Place a call to the 44023 from an outside phone.	<ul style="list-style-type: none"> • K1 operates, seizing the line. • OFF HOOK LED comes on. • Caller hears "alert" tone.
11	From the outside phone, dial the code for the 440 system station.	<ul style="list-style-type: none"> • Caller hears ring-back tone. • Station phone rings.
12	Answer station phone.	<ul style="list-style-type: none"> • Caller hears off-hook tone. • Parties converse.
13	Hang up station phone.	<ul style="list-style-type: none"> • Caller hears on-hook tone. • Caller is disconnected and hears dial tone. (if appropriate)
14	Lift receiver on station phone.	BUSY LED on 44023 comes on.
15	Dial code for 44023 off-net line.	<ul style="list-style-type: none"> • Hear off-hook tone. • BUSY LED on 44023 goes off. • OFF HOOK LED on 44023 comes on. • Hear dial tone from outside line.
16	Dial number for an off-net phone.	Hear ring-back from outside facility.
17	Answer off-net phone.	<ul style="list-style-type: none"> • Ring-back stops. • Parties converse.
18	Hang up outside phone.	<ul style="list-style-type: none"> • If the module is strapped for calling party control, an off-hook tone is heard and the OFF HOOK LED goes off. • If the module is not strapped for calling party control, the 44023 remains in the off-hook mode until the station phone hangs up.
19	Hang up station phone.	440 system unbusies.
20	Lift receiver on station phone.	BUSY LED on 44023 comes on. (440 System busied.)

CONTINUED . . .

INSTALLATION

TABLE B (CONTINUED) - 44023 PABX/TRUNK INTERFACE CHECK-OUT PROCEDURE

STEP	ACTION	RESULTS
21	Place a call to the 44023 from an outside phone.	<ul style="list-style-type: none"> • INC CALL LED comes on. • Caller hears busy tone. • Seven seconds pass. • Caller disconnected. • INC CALL LED goes off.
22	Hang up station phone.	
23	Repeat steps 10 and 11, but do not answer station phone.	After 10 to 80 seconds, the call is automatically terminated.
24	If the 44023 is wired for group call, dial the group call code from a station phone.	<ul style="list-style-type: none"> • OFF HOOK LED comes on. • Caller hears off-hook tone, dial tone and ringback tones from other stations in group call.
25	Hang up station station phone.	440 system normalized.
26	If a UHF or VHF radio is interfaced to the 44023, the fade delay feature should be tested as follows: <ul style="list-style-type: none"> • Establish a call from outside phone, as in steps 10 through 12. • Disconnect line from radio carrier detect (CD) to pin 18 (CCI). • Wait approximately 60 seconds. 	<ul style="list-style-type: none"> • Parties converse • Call not interrupted. • Call automatically terminated.
27	Test procedure complete.	

OPERATION

The 44023 PABX/Trunk Interface Module operates when you apply power. Operation of the unit consists of observing the front panel LEDs:

- ◆ The BUSY LED indicates the system is busy.
- ◆ The INC CALL LED indicates an incoming call. The LED pulsates with the ringing signal.
- ◆ The OFF HOOK LED lights up when the subscriber phone is off hook.

The front panel TEST/RST switch tests and aligns the 44023. Clear the off-hook condition by pressing the TEST/RST switch. The OFF HOOK LED goes dark.

Refer to Fig. 7 for a front panel view.

Refer to the 440 CMS documentation for operating the 44023 in a 440 CMS.

TECHNICAL SPECIFICATIONS

44023 PABX/TRUNK INTERFACE MODULE TECHNICAL SPECIFICATIONS

DESCRIPTION	TABLE HEAD
Frequency Response	300 Hz to 3400 Hz \pm 0.5 dB
Return Loss (Line and Drop)	20 dB
Signal Levels	
Line Receive	-16 dBm to +7 dBm
Line Transmit	-16 dBm to +7 dBm
Summing Inputs	-10 dBm
Summing Outputs	-10 dBm
Drop Receive	-16 dBm to +7 dBm
Drop Transmit	-16 dBm to +7 dBm
E Lead	Ground to operate, -56 VDC maximum input
M Lead	
Normally Closed Contact	On-hook: closed; Off-hook: open. Can be strapped to ground through 4.7K ohm resistor
Normally Open Contact	On-hook: open; Off-hook: closed. Can be strapped to -Battery through 4.7K ohm resistor
Tone Input Levels (Composite)	
Busy	-24 dBm
Off-hook (#)	-13 dBm
On-hook (*)	-13 dBm
Alert	-10 dBm
Clear Inputs (Manual Clear, Power-up Clear)	Ground to Clear
Call Inputs (Station Call, Group Call)	Ground to Call
Busy, Busy Control Input	Ground to Busy
<i>Note: All above control inputs have "pull down" resistors to -10 VDC</i>	
Circuit Control Input	Normally grounded. Open to operate. Diode protected to -56 VDC.
Circuit Control Output (CCO) and 3 second Echo Suppression Output	Open collector transistor switching to ground. Max. 50mA @ -56 VDC
Input Voltage Range	-21 VDC to -56 VDC
Input Power Requirements	
Idle	19mA @ -56 VDC
Full Load	65mA @ -56 VDC
Heat Dissipation	
Idle	3.63 BTU/Hr.
Full Load	12.42 BTU/Hr.
Physical Dimensions	1.4" x 6.0" x 5.6"
Weight	9 oz.
Operating Temperature Range	0° to 60° C.

WARRANTY

LIMITED WARRANTY

The Seller warrants that the standard hardware products sold will be free from defects in material and workmanship and perform to the Seller's applicable published specifications for a period of 18 months for hardware, and 3 months for software, from the date of the original invoice. The liability of the Seller hereunder shall be limited to replacing or repairing, at its option, any defective products which are returned F.O.B. to the Seller's plant, (or, at the Seller's option, refunding the purchase price of such products). In no case are products to be returned without first obtaining permission and a customer return authorization number from the Seller. In no event shall the Seller be liable for any consequential or incidental damages.

Equipment or parts which have been subject to abuse, misuse, accident, alteration, neglect, unauthorized repair or installation are not covered by warranty. The Seller shall make the final determination as to the existence and cause of any alleged defect. No warranty is made with respect to custom equipment or products produced to the Buyer's specifications except as specifically stated in writing by the Seller in the contract for such custom equipment.

This warranty is the only warranty made by the Seller with respect to the goods delivered hereunder, and may be modified or amended only by a written instrument signed by a duly authorized officer of the Seller and accepted by the Buyer.

Warranty and remedies on products not manufactured by the Seller are in accordance with warranty of the respective manufacturer. **THE SELLER MAKES NO OTHER WARRANTY OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED; AND ALL IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEEDS THE AFORESAID OBLIGATIONS IS HEREBY DISCLAIMED BY THE SELLER.**

IN CASE OF DIFFICULTY

If you experience difficulty with this equipment, check the following, as appropriate:

- 1. Switch settings**
- 2. Signal levels**
- 3. Software configuration**
- 4. Connections between Dantel's equipment and your equipment.**

If there is still a problem, substitute equipment that is known to be good. For additional assistance, call Dantel's Technical Field Service Department weekdays, 6 A.M. to 5 P.M. pacific time:

1-800-4DANTEL (1-800-432-6835).

If a thorough checkout shows a piece of equipment has malfunctioned, you may return it to the factory. For repairs and emergency replacements, obtain a Return Material Authorization (RMA) number from the Customer Service Representative at **1-800-4DANTEL (1-800-432-6835)**.

To ensure expedient processing of your order, provide a purchase order number and shipping and billing information when requesting an RMA number. Also, when the units are returned to Dantel, include a description of the failure symptoms for each unit returned. Send defective equipment to:

Dantel, Inc. • 2991 North Argyle Avenue • Fresno, California 93727-1388

