



20409 Prairie Street, Chatsworth, CA 91311 • (213) 996-5060

© Copyright 1982 by Novation, Inc.

NM281/0683

J-CAT™ MODEM

Novation
PART NUMBER 490533

INSTALLATION AND OPERATION MANUAL



J-CAT

300 BAUD DIRECT CONNECT AUTO ANSWER MODEM

This manual provides installation and operating instructions for the Novation **J-CAT** modem.

The **J-CAT** may be used with any EIA-RS232C compatible terminal or computer system to allow communication over standard telephone lines.

TABLE OF CONTENTS

SECTION	PAGE
1 INTRODUCTION.....	1
2 IMPORTANT NOTICE.....	1
3 INSTALLATION.....	3
4 CONTROLS AND INDICATORS.....	3
5 SELF-TEST.....	4
6 FEATURES.....	5
7 OPERATION.....	7
MANUAL ORIGINATE MODE.....	7
MANUAL ANSWER MODE.....	7
AUTO ANSWER MODE.....	7
8 TROUBLESHOOTING.....	8
9 FOR THE ADVANCED USER.....	11
AUTO-DIAL MODE.....	11
AUTO ANSWER MODE.....	17
10 TECHNICAL DATA.....	17
11 WARRANTY.....	23

INTRODUCTION

Congratulations! You have purchased the smallest, most versatile modem on the market today. The J-CAT is the latest development in a long line of state-of-the-art LSI (Large Scale Integration) modems designed by Novation, a leader in data communications technology.

The J-CAT is a Frequency Shift Keying (FSK) modem capable of transmitting and receiving data up to 300 baud. It is compatible with Bell 103 modems and operates in both answer and originate modes.

The Novation J-CAT is extremely easy to use yet offers a number of features not found on other modems. These include Auto Search (automatic mode selection), Auto Answer, Self-Test diagnostics, Audio Beeper, LED indicators, Keyboard Connect mode, Break key and an EIA-RS232C/TTL compatible serial interface. It even can dial telephone numbers for you provided you control the action from your computer. With its unique interface you can detect dial tones, busy and ringback signals.

The J-CAT gives you all of these features in a very small package (5" x 1.9" x 1.3") which can be mounted to the telephone or any other flat surface using the velcro strip provided. It is registered under FCC Part 68 for direct connection to the public telephone network, and it complies with the limits for a Class B computing device pursuant to FCC Rules Part 15, Subpart J.

IMPORTANT NOTICE

CAUTION: *The J-CAT modem may not be used on party lines or with coin operated telephones.*

In case of a malfunction of the modem or telephone line, disconnect the modem from the telephone line. If the modem is found to be inoperable, return the unit to Novation, Inc for repair. Do not attempt field repairs or modifications (except to the RS232C connector cable if necessary) as this violates FCC regulations and will void the warranty. (See Warranty Section).

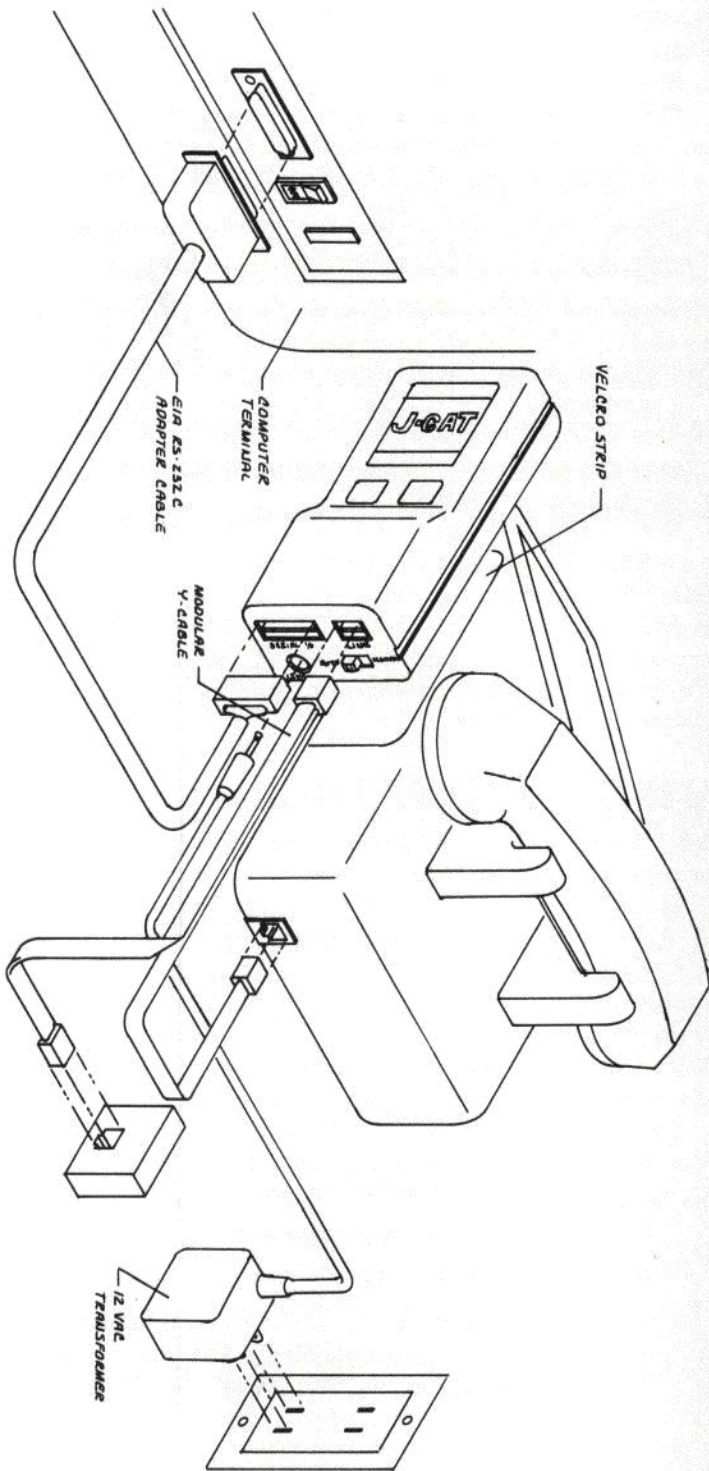
Before connecting the modem to your telephone line, call the local telephone company. State the following Federal Communications Commission required information:

FCC Registration Number: AU492X-70324-DM-R

Ringer Equivalence: 0.8B

Phone Line Interface: Direct-Connect. Modular plug mates with standard telephone modular jacks (USOC-RJ11C, RJ11W, RJ12C, RJ12W, RJ13C, RJ13W).

FIGURE 1
INSTALLATION AND HOOK UP



INSTALLATION

MOUNTING J-CAT TO THE TELEPHONE

Check that the right side of the telephone is dust-free and clean. Peel off the protective material from the velcro strip on the bottom of the J-CAT. Press the modem against the telephone base so that the LED indicators are toward the front and the connectors toward the rear (Figure 1). Make sure that the J-CAT housing clears the telephone handset. With the velcro strip it is easy to remove the J-CAT and remount it anywhere.

CONNECTING THE CABLES

Follow these simple steps to connect the cables to the J-CAT and the network:

1. Connect the modular plug cable (Y-adapter) to the J-CAT's 2-pin edge connector (marked "Line," Figure 1). Plug the short end of this cable into the modular jack at the back of the telephone and the long end into the telephone line modular wall jack.

NOTE: If you are planning to use your modem for auto answering only, a telephone set is not necessary. In this case, the short modular cord would not be connected to anything. It should be insulated with tape to prevent any accidental shorts on the telephone line.

2. Connect the Serial I/O (DB25P) cable to the 9-pin edge connector on the J-CAT (marked "Serial I/O," Figure 1). It is keyed and can only fit one way. Plug the other end of this cable into your computer or terminal EIA-RS232C port.

NOTE: If your computer or terminal requires a different type of cable, contact your dealer or Novation for further information.

3. Plug the AC Adapter into the J-CAT power jack (marked "12VAC," Figure 1). When the transformer is plugged into the wall jack, the modem OFF-HOOK LED will light and the beeper will sound for a few seconds, then go off.

CONTROLS AND INDICATORS

CONTROLS

The J-CAT has three controls (Figure 2):

AUTO/MAN (AUTOMATIC/MANUAL): This slide switch on the rear panel is used to control the answering operation of the modem and its KEYBOARD CONNECT and BREAK features.

CONN (CONNECT). This top-panel key sets the modem in the off-hook condition. It can also be used as a Break key (see BREAK feature description).

DISC/TEST (DISCONNECT/TEST). This top-panel key terminates the call or sets the modem in the test mode.

INDICATORS

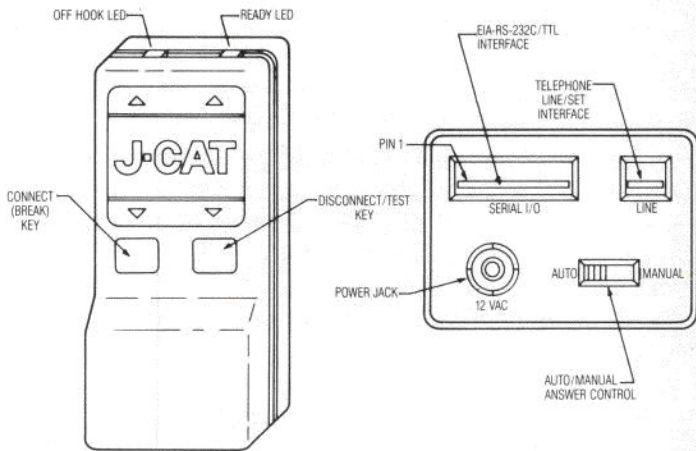
The J-CAT has three indicators that provide the status of the modem. Two are LED indicators (Figure 2):

OFF-HOOK. When this LED lights, the modem is in the off-hook condition.

READY. The READY LED indicates when the modem has detected a carrier and is ready to communicate.

In addition to the LED indicators, the J-CAT has an Audio Indicator. This indicator generates a low volume beep whenever there is an audio signal on the phone line or when there is a change in operating status. The beeper sounds when the modem goes on- or off-hook, detects or loses carrier, detects dial tone, busy, etc.

FIGURE 2
CONTROLS AND INDICATORS

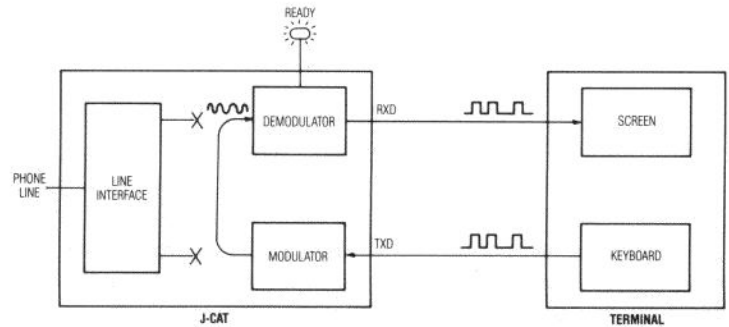


SELF-TEST

The Self-Test is a simple checkout procedure which you should perform before trying to operate your J-CAT. It will verify that you have properly connected the cables to the unit and the telephone line.

In this self-test mode the modem modulator is connected to the demodulator and the frequency bands are matched. In technical terms, this is known as analog loopback. All data from the terminal keyboard are looped through the J-CAT back to the terminal screen (Figure 3).

FIGURE 3
ANALOG LOOPBACK TEST



Test Procedure

To perform this test you must set the terminal in the full duplex mode so that only the characters received from the modem will be displayed on the screen. If it is set to half duplex, the screen will display two characters for each one you enter.

1. Set the AUTO/MAN switch to AUTO. Press CONN key.
OFF-HOOK light goes on
2-second beep indicates presence of dial tone*
2. Press DISC/TEST key and hold down until READY light goes on. Release key.
OFF-HOOK light goes off.
3. Type on the keyboard. Check that the characters displayed on the screen are correct.
4. To terminate the test, press DISC/TEST key.
READY light goes off.

*If you hear a short beep instead of the 2-second long beep, the telephone line is not connected properly. (Refer to the Troubleshooting section.)

FEATURES

KEYBOARD CONNECT

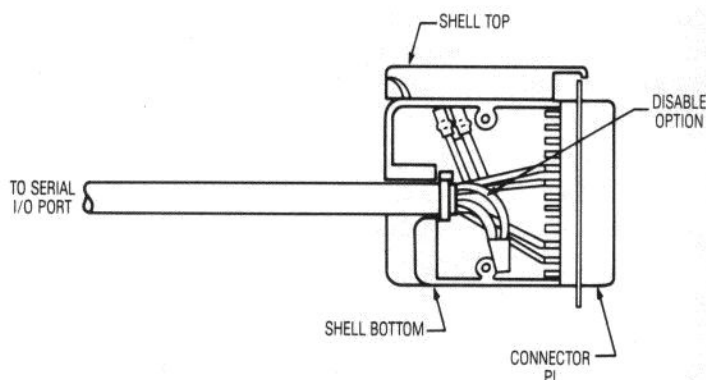
The KEYBOARD CONNECT feature adds the convenience of keyboard control to the J-CAT, which is useful if the J-CAT is mounted away from the telephone. It performs the same phone line control functions as the CONN key, which can still be used when the KEYBOARD CONNECT option is enabled.

This feature is controlled by the AUTO/MAN switch. With the switch in the MANUAL position, you can press any key on your computer or terminal keyboard instead of the CONN key to set the modem off-hook. To disable the feature, which will prevent you from accidentally taking the phone off-hook, set the AUTO/MAN switch to AUTO.

Should you wish to disconnect the KEYBOARD CONNECT feature entirely, which would also disable the BREAK feature, you can cut the wire loop inside the EIA-RS232C connector shell (Figure 4). CAUTION: Make sure you will not want this feature enabled before you disconnect it. Once you have cut the loop, you cannot reconnect the feature except by repairing the wires.

Note: Some terminals and computer RS232 ports require that the Carrier Detect signal be present before it will output any data. Since the J-CAT does not set Carrier Detect ON until it is on-line, the KEYBOARD CONNECT feature will not function. Should your system require a specially wired cable, contact Novation for further information.

FIGURE 4
KEYBOARD CONNECT OPTION JUMPER



AUTO SEARCH

The AUTO SEARCH feature in the J-CAT is a substitute for having user-operated originate and answer controls. The modem automatically searches for the proper operating mode. It switches to ORIGINATE for two seconds, then to ANSWER for six seconds, back to ORIGINATE for two, and so forth until a carrier is detected. When the carrier is detected, the READY light goes on and the J-CAT remains in that operational mode.

BREAK

This feature of the J-CAT is useful with computers or terminals that do not have a Break key. It is operational only with the KEYBOARD CONNECT feature enabled and the AUTO/MAN switch in the MANUAL position.

When the J-CAT is on-line with a carrier (READY LED on), pressing the CONN key will cause a space to be transmitted as long as the key is held. To send a "Break" to the remote computer, such as to interrupt a data transmission without

losing carrier, press the CONN key for only a short moment. If you hold the key for longer than one second, it may cause the remote modem to disconnect the call. The J-CAT, however, will not disconnect when it receives a long space.

OPERATION

MANUAL ORIGINATE MODE

To manually originate a call, the AUTO/MAN switch may be in either position.

1. Lift the telephone handset and dial a remote computer.
2. Wait for an answer tone. When it is heard, press CONN key and release; or, if the AUTO/MAN switch is in MANUAL, press any key on the keyboard.

OFF-HOOK light goes on

3. Hang up the telephone. The J-CAT will do an Auto Search and establish the communicating mode. Since the J-CAT begins searching in originate, it hears the answer tone as soon as it goes off-hook. If the remote modem is in the Originate or Auto Search mode, it will take a few seconds to establish a handshake.

4. Proceed with the communication. If the remote computer hangs up, the J-CAT will automatically disconnect in 18 seconds.

5. To terminate the call quickly; instead of waiting for the abort timer, press the DISC/TEST key *twice*.

OFF-HOOK light goes off

Note: Do not lift the handset while in the data mode as noise picked up by the microphone will disrupt the data flow.

MANUAL ANSWER MODE

This mode is provided for users who wish to answer a voice call on a telephone that is connected to the same phone line as the modem. To operate in this mode, the AUTO/MAN switch must be in the MANUAL position.

1. When the phone rings, lift the handset and proceed with the voice call.
2. If you want to switch to the data mode after voice communication, press the CONN key and hang up the phone. Wait for the handshake to be completed.

OFF-HOOK and READY lights go on

3. To terminate the date call, press the DISC/TEST key *twice*.

OFF-HOOK and READY lights go off

AUTO ANSWER MODE

As in the Manual Answer mode, the AUTO/MAN switch controls the Auto Answer functions. The AUTO/MAN switch may be set in the AUTO position before, during or after an incoming ring is detected. However, if it remains in the

MANUAL position, the J-CAT will never answer the call, only beep for the duration of the ring.

The other controlling factor for operating in the Auto Answer mode is the Data Terminal Ready (DTR) pin. The DTR pin must be ON (high) or not connected at all for the J-CAT to be able to auto answer a call. If the DTR pin is OFF (low), the J-CAT will not auto answer. Instead, it will set the Phone Line Status (PLS) pin high so that the external computer can count the number of rings before setting DTR high. This is useful if you wish to delay the auto answering capability of the modem instead of having it auto answer in the middle of the first ring. (See the Advanced User section, Auto Answer mode.)

Procedure for Auto Answer Operation

1. When an incoming ring is heard, set the AUTO/MAN switch to AUTO if you have not already done so.

J-CAT answers in middle of ring

OFF-HOOK light goes on

J-CAT returns answer tone to remote caller

READY light goes on when carrier signal received

When the J-CAT auto answers it goes into the Auto Search mode, so that the calling party hears the answer tone for 6 seconds, silence for 2 seconds, tone for 6 seconds, etc. If carrier is not detected within 18 seconds, the J-CAT terminates the call and the OFF-HOOK light goes off.

2. Proceed with communication. If carrier is lost during transmission, the J-CAT disconnects in 18 seconds and the READY and OFF-HOOK lights go off. Before the 18-second time-out the J-CAT will Auto Search for carrier. If found, the modem will again be in the data mode and the timer reset.

3. To terminate a call, press the DISC/TEST key *twice*.

OFF-HOOK light goes off

Note: Do not lift the telephone handset, if one is connected, during data transmission as noise picked up by the microphone will disrupt the data flow.

TROUBLESHOOTING

The Self-Test procedure (Section 5) verifies proper installation of the unit. However, if you experience difficulty during that test or cannot establish communication for some reason, refer to the following table for assistance.

Problem	Possible Cause/Solution
MODEM DOES NOT RESPOND	1. Is the J-CAT power supply plugged into an operational AC outlet? 2. Is the power supply operational? (If the power supply mal-

GARBLED DISPLAY

functions, return it intact to Novation for a replacement unit. See Warranty Section).

1. Is the modem line that is connected to the telephone off-hook? If so, room noise is being picked up by the handset microphone. Hang up the telephone.

2. Is the baud rate correct? Both ends of the communications link must send and receive data at the same rate, which should be 110 or 300 baud.

3. Is the received signal weak or noisy? If additional tones, dialing pulses, static noise or voices are present, data may be garbled. Redial the call.

4. Is the terminal in half duplex? If the remote computer echoes back characters as they are typed and the terminal is set to half duplex, double characters will be displayed. Set the terminal to full duplex.

NO DISPLAY

Is the terminal or computer connected properly? A major cause of modem malfunction is improper serial interface. The EIA-RS232C adapter cable provided with the J-CAT will work in most applications. However, in some instances, when interfacing to a serial computer port, problems occur due to data signal reversal. This standard cable outputs data to the computer on pin 3 and accepts data on pin 2. If the computer port is set up so that it also outputs data on pin 3 and accepts on pin 2, then it will not work. The signals must be reversed on the RS232 cable or a cross-over adapter cable, where pin 2 is connected to the computer port pin 3 and vice versa, is used.

IS THE PHONE LINE
CONNECTED
PROPERLY?

Note: The computer may also require other signals not provided by the standard J-CAT cable. If this is the case, contact Novation for further information.

To check that the J-CAT is properly connected, press the CONN key. You should hear a 2-second beep indicating a dial tone is present on the line. If you do not hear the long beep, the J-CAT is not connected to the phone line. Lift the handset and listen for the AUTO SEARCH modem high pitch tone (6 seconds on, 2 seconds off). If you do hear the modem tone, but not the dial tone, the J-CAT is connected to the telephone but not the phone line. Check that the modular cable is properly connected to the modular wall jack (see Installation section).

OFF-HOOK LED DOES
NOT LIGHT

If pressing the CONN key does not cause the OFF-HOOK LED to light, it may be that the DTR signal on the Serial I/O is held OFF by the computer. Unplug the Serial I/O cable and press the CONN key. If the OFF-HOOK light goes on, then the J-CAT is operating properly. (Refer to the Serial I/O Interface section).

READY LED DOES
NOT LIGHT

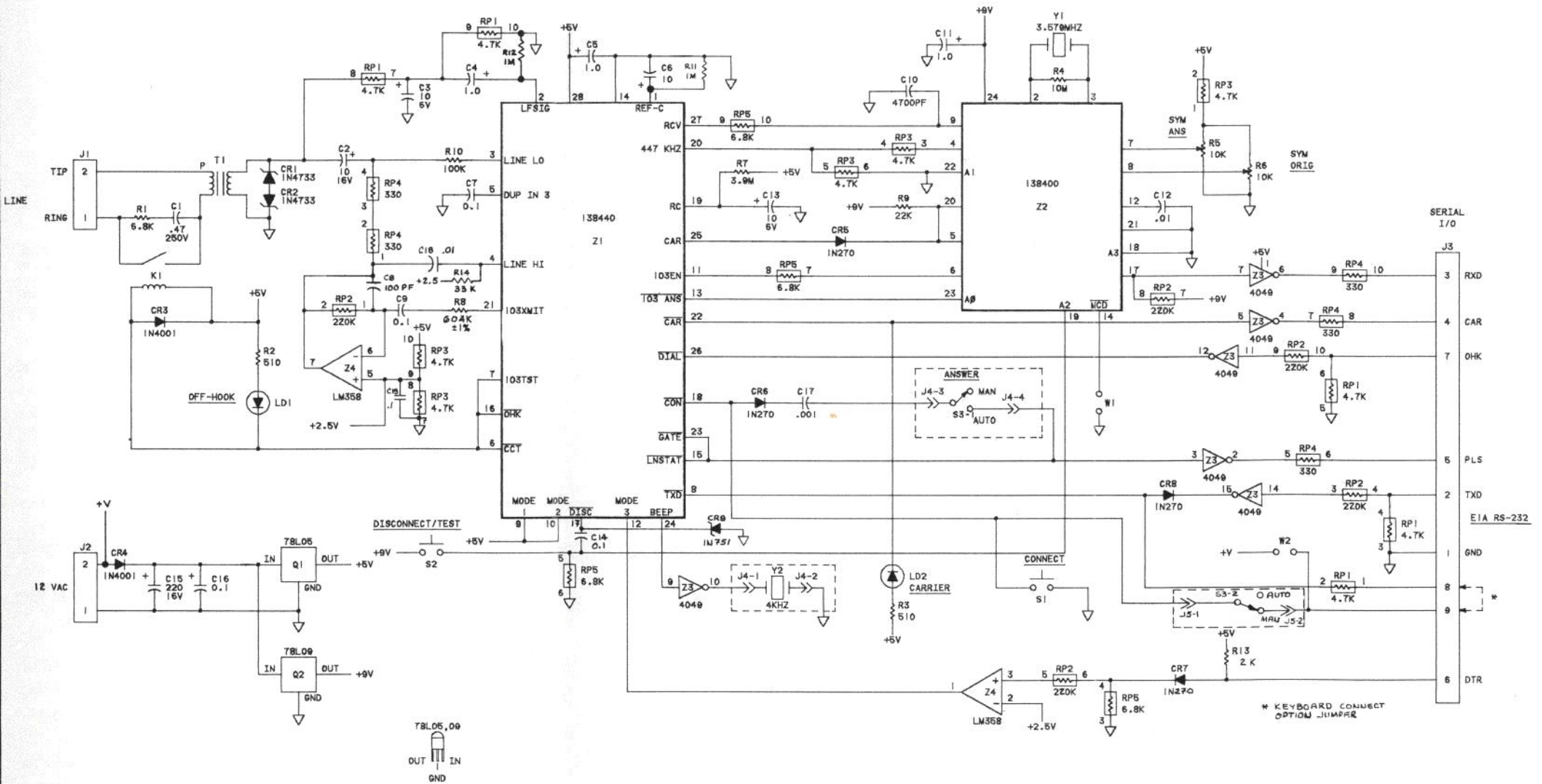
1. Try the Self-Test procedure.
2. Is DTR enabled on Serial I/O? Same as for OFF-HOOK LED problem.
3. Is the remote modem compatible? The J-CAT is compatible with Bell 103 type modems, and it will communicate with Bell 212A modems at low speed.

READY LED GLOWS
FAINTLY

Check to see that DTR on the Serial I/O is enabled. Same as for OFF-HOOK LED problem.

SCHEMATIC

B	RDC 2071	03 Nov 82	90
C	RDC 2076	11/23/82	RAH
D	RDC, 2082	11/23/82	RAH
E	RDC 2087	11/23/82	RAH
F	RDC 2095	01 Dec 82	72
G	RDC 2123	16 Mar 83	
H	RDC 2157	15 June 83	



REFERENCE DESIGNATION BLOCK	
LAST NO. USED	NO. NOT USED
C19	
CR9	
LD2	
R14	R11
RP5	
Z4	

INTEGRATED CIRCUIT VOLTAGE CHART			
REF DES	PART/TYPE NO.	VOLTAGE	PIN NO.
Z1	138440	+5V	5,10,28
		GND	14
Z2	138400	+9V	24
		GND	28
Z3	4049	+5V	1
		GND	8
Z4	LM358	+5V	8
		GND	4

QTY	QTY	QTY	ITEM	PART NUMBER	VENDOR	REF DESIG	DESCRIPTION
-----	-----	-----	------	-------------	--------	-----------	-------------

DRAWN: S. ALABAR 19 Aug 82
 CHECKED: [Signature] 11/1/82
 ENGINEERING: [Signature] 11/1/82
 UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:

490533	J-CAT	3 PLACE DEC	±.010
		2 PLACE DEC	±.03
		ANGLES	±1/2°
		SURFACE ROUGHNESS	✓

LIST OF MATERIALS			
QTY	QTY	QTY	ITEM
			3 PLACE DEC ±.010
			2 PLACE DEC ±.03
			ANGLES ±1/2°
			SURFACE ROUGHNESS ✓

J-CAT 103 MODEM SCHEMATIC

NOVATION, INC.
TARZANA, CALIF.

C	450533	REV	H
SHEET	OF		

NOTES: UNLESS OTHERWISE SPECIFIED

FREE DIAL-UP COMPUTER

With your new J-CAT, you can call Novation's 24-hour computer (300 baud) in Los Angeles. There is no cost except for telephone charges. Dial (213) 881-6880. When the message LOGON PLEASE appears on the screen, type in the word CAT and press RETURN. A selectable menu appears listing many information items. You can select a modem/printer test, descriptions of Novation products, general descriptions of data communications including a glossary, a list of many other free data banks you can call throughout the country, and more. You can also put your suggestions and comments in the computer or ask for technical help through our "electronic mail" feature.

Should you have difficulty connecting with the computer for any reason, try again at a later time; or, if you require customer service, you may call Novation toll free (outside California only) at 800-423-5419.

FOR THE ADVANCED USER

AUTO-DIAL MODE

The J-CAT is not a "smart" modem, but it is not a "dumb" one either. In communications jargon a "smart" modem is one which accepts serial commands from a computer or terminal keyboard and automatically dials the telephone number for you. Although the J-CAT does not have this ability, it does allow you to auto dial if you have the proper computer interface and software.

The interface is not complicated. All that is required, in addition to the normal serial data lines, is a single output bit to control the pulse dialing. If you wish to detect a dial tone before dialing, you also need an input bit, although dialing can be done without dial tone detection. Busy and ringback tones can also be detected with this input.

The output bit from the computer controls OHK (Off-Hook Control, pin 7), and the input bit reads PLS (Phone Line Status, pin 5). Both signals can be either EIA-RS232C or TTL compatible (see Technical section, Serial I/O Interface).

Auto-Dial Program

An automatic dialing program should follow this basic procedure:

1. Set OHK (pin 7) high (1).
2. Wait for dial tone. Check that PLS (pin 5) stays high (1) for one second; or, if PLS is not used, wait two seconds.
3. Pulse OHK to dial the number, according to the following specifications:

Pulse duration: 60 msec on-hook (OHK = 0)
Pulse interval: 40 msec off-hook (OHK = 1)
Digit interval: 700 msec off-hook (OHK = 1)

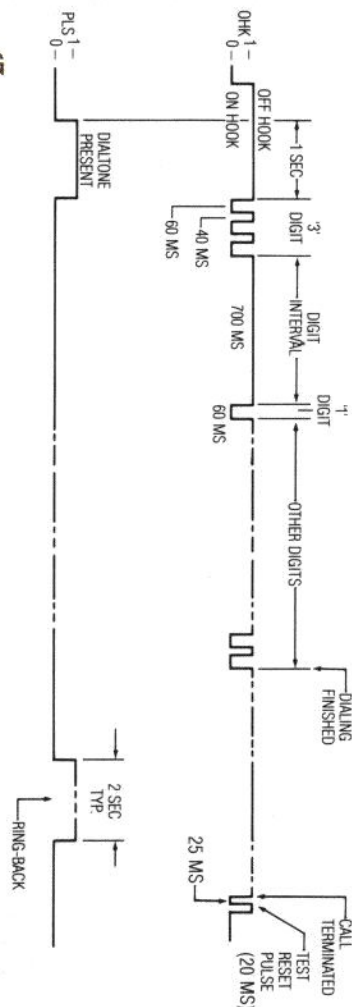
Digit 1 to 9: 1 to 9 pulses
 Digit 0: 10 pulses

To look for additional dial tones, such as for dialing through PBX systems, repeat Step 2 as required.

4. Set OHK high after dialing.
5. Look for carrier ON and/or enter data mode.
6. To terminate the call, set OHK low (0) for 25 msec, high (1) for 20 msec and back to 0. This pulse prevents the J-CAT from going into the test mode.
7. To redial the call leave the J-CAT on-hook (OHK = 0) for 3.5 seconds minimum before dialing.

The standard J-CAT RS232 cable includes the OHK and PLS signal pins, but they are not inserted into the DP25P shell. To put them into the shell, open the connector hood by removing two screws and insert the two pins into the appropriate holes (until they snap). Another way is to mate the pins to the external computer control cable.

FIGURE 5
AUTO DIAL TIMING



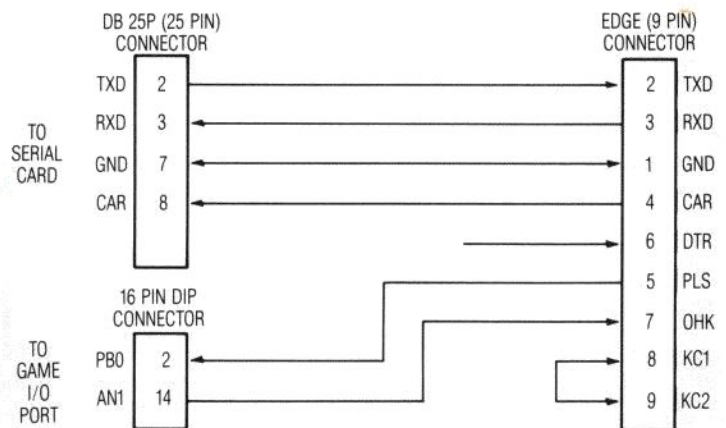
Implementation of Auto-Dial Mode

In this example the J-CAT is connected to an Apple II computer with 16K RAM, disk drive and Super Serial Card. It uses the serial card for data communications and the GAME I/O port for automatic dialing (see Figure 6 for RS232 cable wiring diagram). An Applesoft BASIC program, which includes pulse dialing with dial tone detection, dialing menu, directory dialing, and redialing, is listed below.

The software configuration for this program is:

1. Serial card in slot 2 (line 110).
2. Names and numbers in lines 211 to 299.
3. Super Serial card dependent lines:
 20050 enter Terminal mode
 30030 exit Terminal mode
4. To exit Terminal mode from keyboard, type:
 (CTRL-A) (Q) (RETURN)

FIGURE 6
J-CAT TO APPLE II
SSC CARD & GAME I/O INTERFACE



Auto-Dial Software Program J-CAT AUTO-DIALER

```

1 REM *****
2 REM * J-CAT *
3 REM * AUTO-DIALER *
4 REM * *
5 REM * *
6 REM * 11/07/82 *
7 REM * (C) 1982 *
8 REM * NOVATION, INC. *
9 REM *****
100 REM
101 REM INITIALIZATION
102 REM
110 SLOT = 2
120 NP = 1
200 REM
201 REM NAMES & NUMBERS
202 REM
203 REM VALID DIGITS 0-9,@,+
204 REM @ = 2 SECOND PAUSE
205 REM + = PAUSE UNTIL DIAL TONE
206 REM
210 DATA NOVATION,9816880
300 REM
301 REM READ IN NAMES & NUMBERS
302 REM
310 ONERR GOTO 350
320 I = 1
330 READ NAME*(I): READ PHN*(I)
340 I = I + 1: GOTO 330
350 POKE 216,0
360 NUM = I - 1
1000 REM
1010 REM PRINT MENU, GET CHOICE
1020 REM
1030 TEXT : HOME
1040 VTAB 1: PRINT "J-CAT AUTO-DIALER"
1050 VTAB 4: PRINT "<D> DIAL A NUMBER"
1060 VTAB 6: PRINT "<R> RE-DIAL LAST NUMBER"
1070 VTAB 8: PRINT "<L> DIAL NUMBER FROM LIST"
1080 VTAB 10: PRINT "<ESC> QUIT"
1090 IF NP THEN 1110
1100 VTAB 13: HTAB 1: PRINT "LAST NUMBER DIALED:";PNUM#
1110 VTAB 15: HTAB 1: PRINT "CHOICE:"; VTAB 15: HTAB 8: GET CHOICE#
1120 IF CHOICE# < > "D" AND CHOICE# < > "R" AND CHOICE# < > "L" AND CHOICE#
< > CHR# (27) THEN PRINT CHR# (7); GOTO 1110
1130 IF CHOICE# = CHR# (27) THEN 63999
1140 IF CHOICE# = "D" THEN 2000
1150 IF CHOICE# = "R" THEN 3000
1160 GOTO 5000
2000 REM
2010 REM DIAL
2020 REM
2030 HOME
2040 VTAB 1: PRINT "DIAL A NUMBER"
2050 VTAB 3: PRINT "<0-9> VALID DIGITS TO DIAL"
2060 VTAB 4: PRINT "<@> 2 SECOND PAUSE"
2070 VTAB 5: PRINT "<+> PAUSE UNTIL DIAL TONE"
2080 VTAB 7: INPUT "ENTER NUMBER:";NUM#
2090 NAME# = ""
2100 GOTO 9900
3000 REM
3010 REM RE-DIAL
3020 REM
3030 HOME
3040 IF NP THEN PRINT "NO NUMBER PREVIOUSLY DIALED": FOR I = 1 TO 3000: NEXT :
GOTO 1000
3050 VTAB 1: PRINT "RE-DIAL LAST NUMBER"
3060 NUM# = PNUM#
3070 GOTO 9900
5000 REM
5010 REM PRINT CHOICES
5020 REM
5030 HOME
5040 VTAB 1: PRINT "DIAL NUMBER FROM LIST"
5050 PRINT
5060 FOR I = 1 TO NUM
5070 HTAB 1: PRINT I; ".": HTAB 5: PRINT MID# (NAME*(I),1,16); HTAB 23: PRINT
MID# (PHN*(I),1,16)
5080 NEXT
5090 PRINT NUM + 1; ".": HTAB 5: PRINT "QUIT"
6000 REM
6010 REM GET CHOICE
6020 REM
6030 PRINT : INPUT "ENTER YOUR CHOICE:";CHOICE#
6040 CHOICE# = VAL (CHOICE#): IF CHOICE# = 0 THEN 6030
6050 IF CHOICE# > NUM + 1 THEN 6030
6060 IF CHOICE# = NUM + 1 THEN 1000
6065 NAME# = NAME*(CHOICE)
6070 NUM# = PHN*(CHOICE)
9900 REM
9910 REM VALIDATE NUMBER
9920 REM
9930 IF NUM# = "" THEN 1000
9940 FOR I = 1 TO LEN (NUM#)
9950 DIGIT# = MID# (NUM#,I,1)
9960 IF DIGIT# < > "@" AND DIGIT# < > "+" AND (DIGIT# < "0" OR DIGIT# < "9")
THEN PRINT "NUMBER INCORRECT FORMAT": FOR J = 1 TO 3000: NEXT : GOTO 1000
9970 NEXT
10000 REM
10010 REM DIAL NUMBER
10020 REM
10030 PNUM# = NUM#:NP = 0
10040 PRINT : PRINT "CALLING:";NAME#
10050 PRINT : PRINT "DIALING:";

```

```

10060 POKE - 16294,0: FOR T = 1 TO 3000: NEXT T: REM ON HOOK FOR 3.5 SEC
10070 POKE - 16293,0: REM OFF HOOK
10080 BOBUB 10500: REM DIAL TONE DETECT
10090 FOR DIGIT# = 1 TO LEN (NUM#)
10100 DIGIT# = MID# (NUM#,DIGIT#,1)
10110 PRINT DIGIT#;
10115 IF DIGIT# = "+" THEN BOBUB 10500: GOTO 10150: REM DIAL TONE DETECT
10120 IF DIGIT# = "@" THEN FOR T = 1 TO 1406: NEXT T: GOTO 10150
10130 IF DIGIT# = "0" THEN DIGIT# = "10"
10140 FOR PULSE# = 1 TO VAL (DIGIT#): POKE - 16294,0: FOR T = 1 TO 36: NEXT T:
POKE - 16293,0: FOR T = 1 TO 24: NEXT T: NEXT PULSE#: FOR T = 1 TO 413: NEXT T
10150 NEXT DIGIT#
10490 GOTO 20000
10500 REM
10510 REM DIAL TONE DETECT RTN
10520 REM
10530 IF PEEK ( - 16287) < 128 THEN 10530
10540 FOR T = 1 TO 100
10550 IF PEEK ( - 16287) < 128 THEN 10540
10560 NEXT T
10570 RETURN
20000 REM
20010 REM ENTER TERMINAL MODE
20020 REM
20030 PRINT : PRINT : PRINT "--TERMINAL MODE--"
20040 PRINT : PRINT CHR# (4);"PR#";SLOT
20050 PRINT CHR# (1);"T"
29000 REM *****
29010 REM * AT THIS POINT COMMENCE WITH INTERACTIVE SESSION AND *
29020 REM * TERMINATE WITH <CTRL-A> <Q> <RETURN> *
29030 REM *****
30000 REM
30010 REM EXIT TERMINAL MODE
30020 REM
30030 PRINT CHR# (1);"R"
30040 POKE - 16294,0: REM ON HOOK
30050 FOR T = 1 TO 10: NEXT T
30060 POKE - 16293,0: REM OFF HOOK
30070 FOR T = 1 TO 4: NEXT T
30080 POKE - 16294,0: REM ON HOOK
30090 GOTO 1000
63000 REM
63010 REM E N D
63020 REM
63999 HOME : END

```

AUTO ANSWER MODE

In the normal auto answer mode the J-CAT goes off-hook in the middle of the first ring. To delay auto answer from a computer program, DTR must be controlled. The AUTO/MAN switch must be in the AUTO position. Follow this basic procedure:

1. Set DTR OFF (0).
2. Wait for a ring. When the ring occurs, J-CAT will set PLS to 1 then back to 0 at the end of the ring.
3. Count the desired number of rings.
4. Set DTR ON (1).
5. J-CAT auto answers the call.
6. Set DTR OFF to disconnect the call.

TECHNICAL DATA

SERIAL I/O INTERFACE

The J-CAT provides a serial interface that is compatible with EIA-RS232C and TTL logic. Its outputs do not have a negative voltage swing as specified by the EIA-RS232C, however they are compatible with most terminals and computer interfaces. The negative voltage aspects of the specifications is seldom used by serial input devices.

J-CAT inputs can accept standard EIA-RS232C signals with negative voltage levels as well as positive-only signals, such as TTL logic outputs with pull-up resistors (10K to +5V typical). The following table shows the signals used by the J-CAT.

TABLE 1
J-CAT SIGNALS

INPUTS	Mark	(OFF):	+ .7V to -15V
	Space	(ON):	+4V to +15V
OUTPUTS	Mark	(OFF):	0V
	Space	(ON):	+5V

The J-CAT provides a single-sided printed circuit board edge connector with nine fingers on .100-inch centers. An adapter cable with the standard EIA-RS232C male connector (DB25P) is provided (See Figure 7). Three signal pins (DTR, PLS and OHK) are not connected at the RS232C cable end to prevent interface problems and to allow for special applications (See Advanced User section).

Note: If your computer or terminal requires a different type of cable, contact Novation for further information.

FIGURE 7
EIA-RS232C ADAPTER CABLE

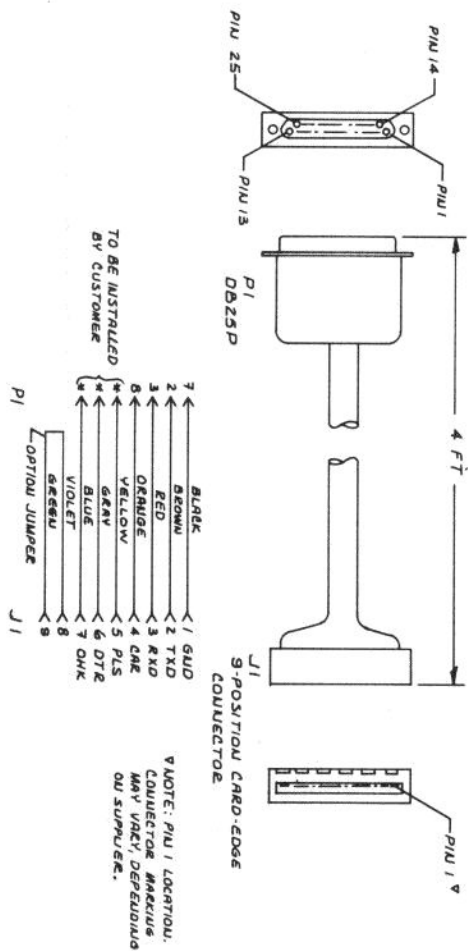


TABLE 2
PIN CONNECTIONS FOR J-CAT SERIAL I/O CONNECTOR
Edge Conn.

Pin #	Name	Description	Signal Direction
1	GND	Signal Ground	Common
2	TXD	Transmit Data	Input to modem
3	RXD	Receive Data	Output from modem
4	CAR	Carrier Detect. On when J-CAT in data mode and READY light on.	Output from modem
5	PLS	Phone Line Status. ON with phone line rings, dial tone, busy, etc.	Output from modem
6	DTR	Data Terminal Ready. (Internally pulled up to +5V). Must be ON or disconnected for normal modem operation.	Input to modem
7	OHK	Off-Hook Control. Used for auto pulse dialing by computer. ON (1): Off-Hook: Connected to phone line. OFF (0): On-Hook: Disconnected from phone line.	Input to modem
8, 9	KCI, 2	Keyboard Connect/Break Features. Jumper 8 to 9 to enable.	NA

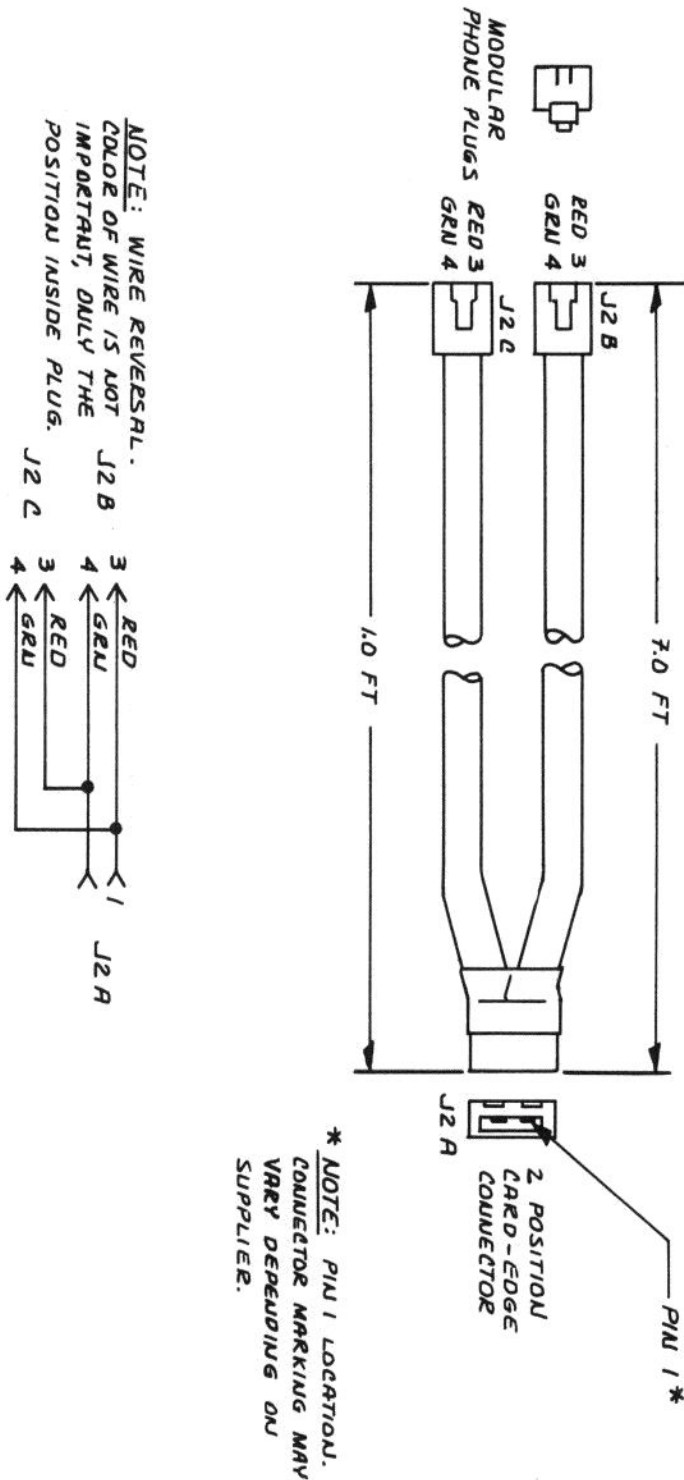
Note: CAR, PLS, DTR and OHK signals are not required for basic modem operation. The only signals required are GND, TXD and RXD. For details on the other signals, see Advanced User and Troubleshooting sections.

PHONE LINE INTERFACE

J-CAT provides a 2-pin printed circuit board edge connector for telephone line interface. A unique adapter cable with two modular plugs compatible with RJ11C and RJ11W jacks is also provided (See Figure 8). The following chart and diagram show the phone line connections:

Pin #	Name
1	Tip
2	Ring

FIGURE 8
MODULAR Y-CABLE



SPECIFICATIONS

DATA RATE

0-300 Bits per second (bps) asynchronous

COMPATIBILITY

Bell 103

DATA FORMAT

Serial, binary, asynchronous

COMMUNICATION MODE

Full duplex

OPERATING MODES

Auto Originate, Auto Answer, Manual Originate,
Manual Answer, Self-Test

CONTROLS

Auto/Manual, Connect, Disconnect/Test

INDICATORS

Off-Hook, Ready, Audio Beeper

TRANSMIT FREQUENCIES

All frequencies are crystal controlled and
accurate to within $\pm 0.1\%$.

Originate: Mark: 1270 Hz

Space: 1070 Hz

Answer: Mark: 2225 Hz

Space: 2025 Hz

TRANSMIT LEVEL

-10 dBm

RECEIVE FREQUENCIES

Originate: Mark: 2225 Hz

Space: 2025 Hz

Answer: Mark: 1270 Hz

Space: 1070 Hz

RECEIVER SENSITIVITY

-42 dBm

INTERFACE

Serial I/O, compatible with EIA-RS232C and TTL
logic levels

SWITCHED NETWORK INTERFACE

Direct Connect (Per FCC Part 68)

FCC Registration #: AU492X-70324-DM-R

Ringer Equivalence: 0.8B

Phone Line Interface: Direct connect to RJ11C, RJ11W,
RJ12C, RJ12W, RJ13C, RJ13W
jacks

CARRIER DETECT

On Delay: 150 msec

Off Delay: 50 msec

DISCONNECT TIMERS

No carrier detected will cause disconnect in 18 seconds. Loss of DTR will cause instantaneous disconnect.

POWER SUPPLY

UL listed low-voltage AC wall mount transformer with 6' cord

Transformer input: 115VAC, 60Hz

Transformer output: 12VAC, 3VA (typical AC draw of 70mA)

TEMPERATURE

Operating environment:

32 to 122°F (0 to 50°C)

Storage: -40 to 140°F (-40 to 60°C)

HUMIDITY

Operating environment:

10% to 90% relative (no condensation)

Storage: 5% to 95% (no condensation)

SIZE

5.0" L x 1.9" W x 1.3" H

WEIGHT

4.2 oz.

WARRANTY

NOVATION warrants to the distributor and customer that all modems sold under this Agreement are fit for the ordinary purposes for which such goods are used. If such modems through no fault or modification of distributor or customer fail to perform in such manner during the one (1) year from date of purchase by customer of modem, J-CAT (Novation P/N 490533), and for one (1) year from date of purchase by customer of all other products, NOVATION's liability shall be limited in damages to the repayment of the purchase price hereunder or the repair or replacement as above described each of which is at NOVATION's option and NOVATION shall not be liable for incidental or consequential damages (UCC 2-715 and 2-719). THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, WHICH EXTEND BEYOND THOSE STATED HEREIN. NOVATION shall not be deemed to make any warranty of merchantability (UCC 2-314), or fitness for a particular purpose (UCC 2-315). The Distributor may offer the same warranty to his customer as NOVATION does for the same quantity and customer type. No action shall be brought on any claim of breach of warranty or otherwise under this Agreement after one (1) year from date of purchase by customer. NOVATION may require proof of customer's date of purchase.

IMPORTANT: This equipment contains circuitry registered with the FCC for direct connection to the public telephone network. According to Part 68 of the FCC Rules and Regulations, customers are not authorized to repair or modify this equipment. Any repair or modification will void the FCC registration of the device and the warranty.

NOVATION operates a Service Center at 20409 Prairie Street, Chatsworth, California 91311 (Phone 213-996-5060). Modems which are returned by the customer to NOVATION will be repaired and returned as directed by the customer. Service and shipping charges will be billed to the customer.

NOTE: Novation, Inc reserves the right to make improvements to the product described herein at any time and without notice. With regard to this document, we would appreciate hearing from you if you have any suggestions for improvement or find any errors. Please send your comments to our Customer Service Department.