



**Applied Systems Engineering, Inc.**

# **D-Series Bell-202, Bell-202T, V.23 Modems**

## **Configuration and User's Guide**

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## **Features**

### **Power**

- 5 VDC or 12 to 160 VDC, draws less than 500 mw
- Power cable can be removed/inserted with power on
- "Hot Card Swap" on rack mount configuration

### **Timings**

- Carrier detect on delay: 2 to 30 msec.
- RTS/CTS delay: 0 to 252 msec. or Constant Carrier (constant RTS)

### **Levels**

- Transmit Level: 0 to -30 dB, switch selectable, 2dB increments
- Receiver Sensitivity: -35 or -41 dB, jumper selectable

### **Isolation**

- 1,500 VAC Telco
- 1,800 VAC Power Supply

### **LEDs**

- LEDs for transmit data (TD), receive data (RD), RTS, CTS, carrier detect (CD), and power

### **Connections**

- Analog side via 4-wire RJ-11
- Digital side via DB-25 RS-232

### **Other**

- 2-wire or 4-wire (2-wire with optional 156 msec. receiver squelch)
- Constant or switched carrier
- 900Hz soft carrier turn-off
- PTT (push to talk) output on Box modem (Model 5024)

## **Packaging**

The modem dimension is based on a VME form-factor PC card (100 x 160mm) that can be mounted in an optional metal box (Model 5024), inserted into a VME-style rack (Model 5025), or mounted in a customer enclosure (Model 5024) with 4 4-40 screws. The metal box dimensions are 7.35 x 4.14 x 1.42" (187 x 105 x 36 mm) and include flanges with 4 mounting holes. For the rack mount version, power is provided through the backplane connector. For the Model 5024, power connection is via a 5-position terminal block. 3 positions are for power. The other 2 provide a PTT contact closure.

### Switch Settings

- Settings Apply to Both Rack Mount (5025) and Box Mount (5024) Modem
- ***Bold Italics*** indicates factory settings

Switch	Usage	Notes	Position	Value if ON	
SW4	Loopback (TELCO)	SW4 is an external switch. If ON (up), data received on the analog (TELCO) side will be looped back to the transmitter. In this mode, the digital (RS-232) side is disabled	1	Loopback enabled	
SW3	Transmit level	<ul style="list-style-type: none"> <li>• 0 to -30 dB</li> <li>• Add values for all switches in the ON position</li> </ul>	1	-2 dB	
			2	-4 dB	
			3	-8 dB	
			4	-16 dB	
SW2	CD On Delay	<ul style="list-style-type: none"> <li>• Delay in setting RS-232 "CD" signal after carrier is detected, 2 to 30 milliseconds</li> <li>• Add values for all switches in the ON position</li> <li>• At least one switch must be ON</li> </ul>	1	2 msec	
			2	4 msec	
			<b>3</b>	<b>8 msec</b>	
			4	16 msec	
	Misc settings	Not Used	Squelch receiver when RTS is on and for 156 ms after turned off 900 Hz soft carrier during transmitter shutdown Bell-202 or V.23	5	Not Used
				6	Enabled
				<b>7</b>	<b>Enabled</b>
				8	V.23
SW1	RTS/CTS	<ul style="list-style-type: none"> <li>• Delay between requesting RTS and granting CTS, 0 to 252 milliseconds or constant</li> <li>• If switch 8 is OFF, add values for all switches (1 to 6) in ON position.</li> <li>• If switch 8 is ON, CTS is constantly enabled</li> </ul>	1	<b>4 msec</b>	
			2	8 msec	
			<b>3</b>	<b>16 msec</b>	
			4	32 msec	
			<b>5</b>	64 msec	
			6	128 msec	
			7	Not Used	
			8	Constant Carrier	

Note: Power must be removed and modem restarted for new switch settings to be applied

## Jumper Settings for Box Mount (5024) Modem (Rev 5)

- ***Bold Italics*** indicates factory settings

Jumper	Usage	Notes	Jumper	Meaning
JP1	Power Supply	Input power options are: <ul style="list-style-type: none"> <li>• Regulated 5 VDC</li> <li>• Unregulated 12 to 160 VDC</li> </ul>	1-3	5V
			2-4	
			<b>3-5</b>	<b><i>12-160 V</i></b>
			<b>4-6</b>	
JP2	Not Used	Reserved for expansion and test. All jumpers should be removed	1-2	Not used
			3-4	
			5-6	
			7-8	
JP3	Not Used	Reserved for expansion and test. Jumper should be removed	1-2	Not used
JP4	Receiver sensitivity	Controls receiver level sensitivity through optional amplifier	1-2	-41 dB
			<b>2-3</b>	<b><i>-35 dB</i></b>
JP5	2 wire / 4 wire	Selects 2-wire (half duplex) or 4-wire (full-duplex) operation. For 2-wire, please also see description of SW2, position 6	1-2	2-wire
			<b>2-3</b>	<b><i>4-wire</i></b>
JP6	Factory	Reserved for internal use	1-2	Not used
			2-3	
Note: Power must be removed and modem restarted for new jumper settings to be applied				

### **Power Connection**

View the end of the board with the RJ-11 connector at your left and the five-position power connector at your right. The power connector pins are as follows:

Location	Pin	Label	Description
Leftmost	1	+	Power Positive
	2	-	Power Negative (return)
Middle	3	S	Earth ground (not normally used)
	4	PTT	Push to Talk. Contact closed when CTS is On. Open when CTS is Off.
Rightmost	5		

### **RJ-11 Cabling**

The standard RJ-11 jack terminates in 4 spade lugs. The following table contains the cabling options for both 4-wire and 2-wire operation.

RJ-11 Cable	4-wire mode (full duplex)	2-wire mode (half duplex)
Red	Transmit	Transmit/Receive
Green		
Yellow	Receive	Unused
Black		

### **RS-232 Cabling**

The following table itemizes DB-25 RS-232 pins utilized. Pins not listed are not used.

Pin	Description
1	Frame Ground
2	Transmit Data (TD)
3	Receive Data (RD)
4	Request To Send (RTS)
5	Clear To Send (CTS)
7	Signal Ground
8	Carrier detect (CD)

## Common Problems and Solutions

Description of Problem	Recommended Solution
Messages sent by the ASE modem are not received at the other modem	Make sure that the RTS/CTS time (SW1) on the ASE modem is longer than the carrier detect time on the other modem.
Messages sent by another modem are not received at the ASE modem	Make sure that the RTS/CTS time on the other modem is longer than the "CD On Delay" time (SW2) on the ASE modem.

## Product Codes

Product codes are of the form **DM-FSK-B-P**. Please note that all modems support both Bell-202 and V.23 via switch selection.

**B** – Board type

- X - Rack-mount modem for use in ASE 16-channel modem rack
- I - Standalone modem

**P** – Packaging

- B - Board only
- V - With VME mounting bracket
- M - In metal box

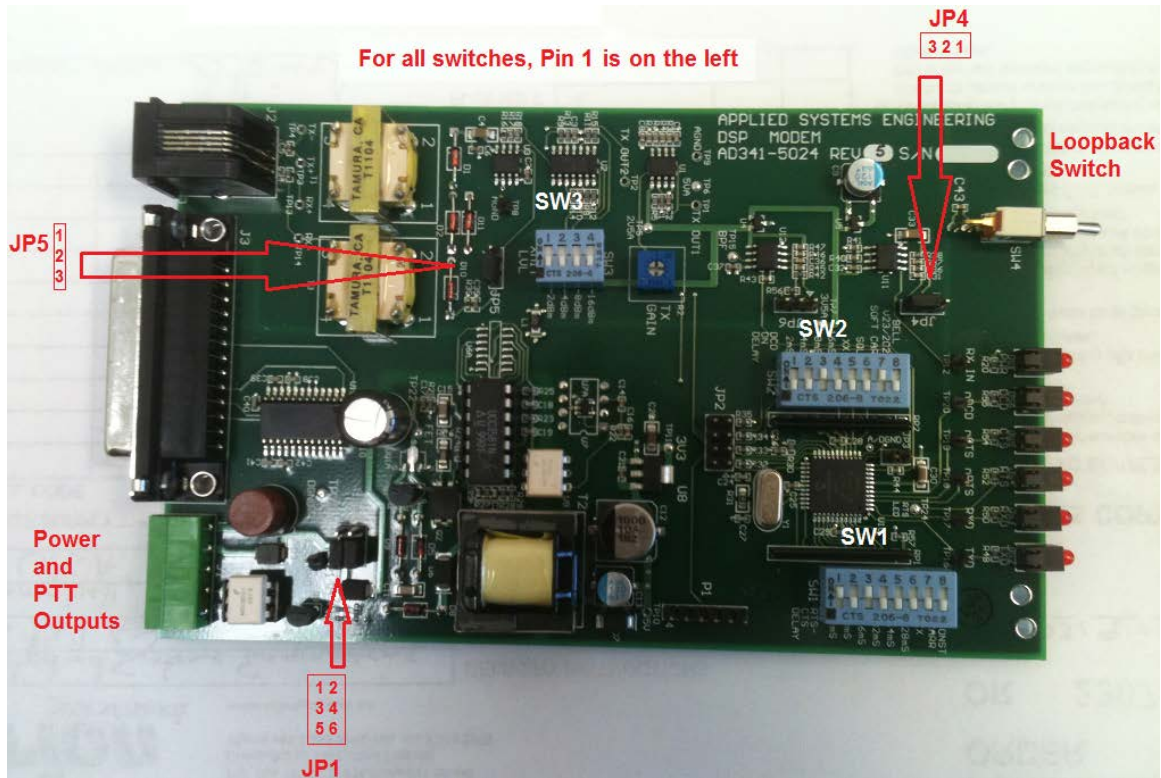
For example:

**DM-FSK-X-V** specifies a rack-mount modem with a VME mounting bracket.

**DM-FSK-I-M** specifies a standalone modem in a metal box



**Diagram: Standalone Modem Switch and Jumper Locations**



**Diagram: Rack Mount Enclosure Backplane**

