Racal-Vadic

VA811 AUTOMATIC CALLING UNIT
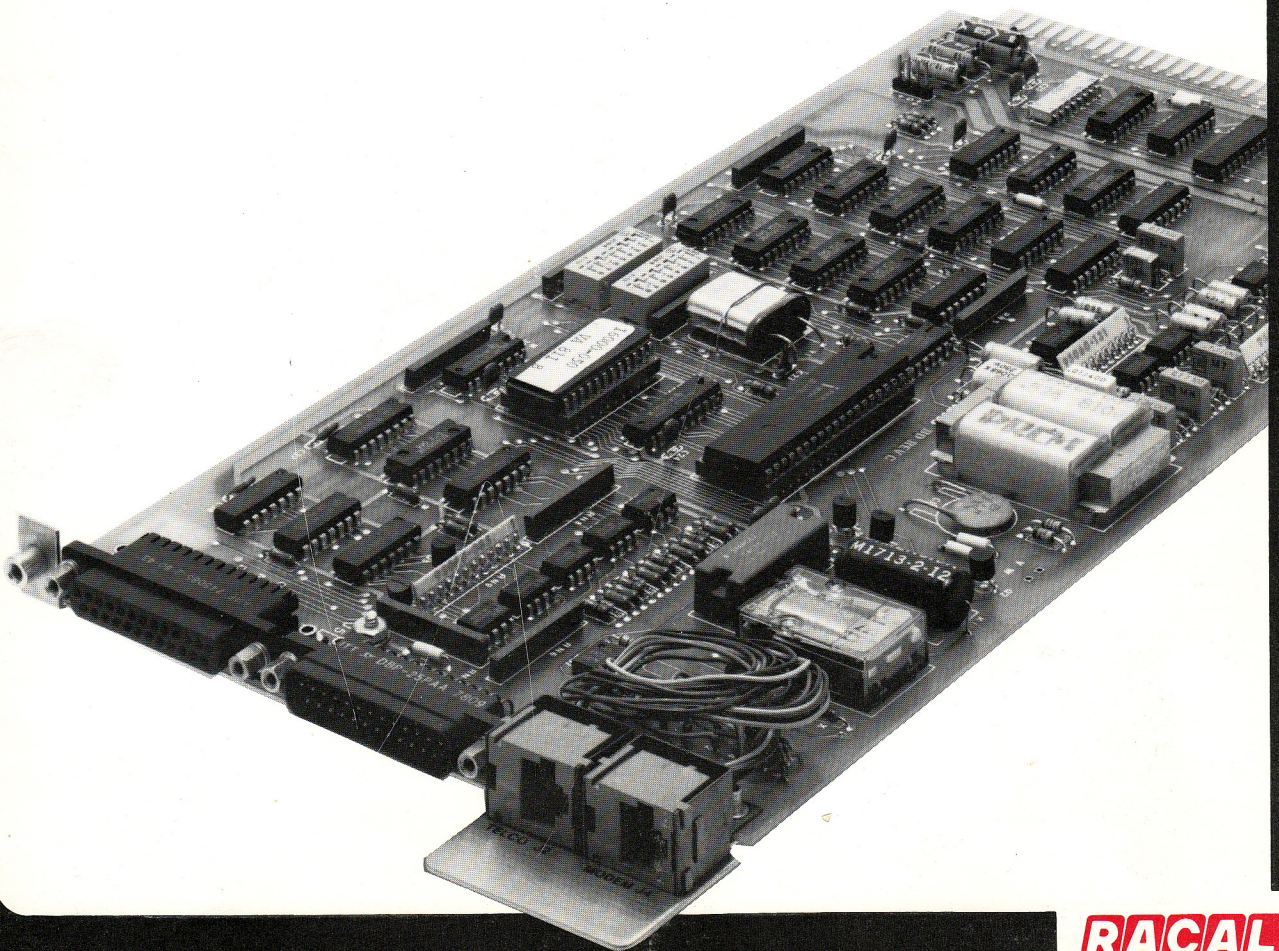
INSTALLATION/OPERATION MANUAL

RACAL
The Electronics Group

VA811 AUTOMATIC CALLING UNIT

INSTALLATION/OPERATION MANUAL

Racal-Vadic offers a free, call-in diagnostic service to assist in the operation and testing of all Racal-Vadic products. Racal-Vadic Diagnostic Center personnel are available to perform free, over-the-telephone diagnostic tests of malfunctioning equipment, to clarify options and test procedures outlined in this manual, and to describe the operation of the controls and indicators on Racal-Vadic products. Call the Racal-Vadic Diagnostic Center before shipping any equipment in for repair.

TOLL-FREE NUMBER   (800) 22-VADIC

or

(800) 228-2342

When using this product outside the continental U.S. or Canada, please call your local distributor regarding any problems.

The information in this manual has been carefully compiled and checked for technical accuracy. However, Racal-Vadic accepts no responsibility for inaccuracies which may occur. Comments or correspondence regarding this manual should be addressed to:

Racal-Vadic
Corporate Communications Department
1525 McCarthy Boulevard
Milpitas, California 95035   U.S.A.
Tel. (408) 946-2227
TWX: 4112-62782187

FCC REQUIREMENTS

Connection of terminal equipment to the public switched-telephone network is regulated by the Federal Communications Commission (FCC) as defined by FCC Rules and Regulations, Part 68. These regulations require the following:

1. Before connecting this equipment to the switched-telephone network,[1] notify the telephone company of the following information:

   Name of Manufacturer . . . . RACAL-VADIC
   Equipment Model Number VA811-PS/SS
   FCC Registration Number AJ496M-68137-DI-E
   Ringer Equivalence Number 0.0B

   If other devices are to be connected with this equipment, equivalent information must be provided for each device.

2. When trouble is experienced, disconnect this equipment from the telephone line to determine if it is malfunctioning. If this equipment is determined to be malfunctioning, discontinue use until the problem has been corrected.[2]

3. Where such action is reasonably required in the operation of its business, the telephone company may make changes in its communications facilities, equipment, operations, and procedures. If this occurs, you will be notifed by the telephone company in writing.

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[1] Connection of this equipment to party lines and coin telephone service is prohibited.

[2] Should this equipment cause harm to the telephone network, the telephone company may temporarily discontinue service until the problem has been corrected.

WARNING

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference; the user will be required to take whatever measures may be required at his own expense to correct the interference.

CANADIAN DEPARTMENT OF COMMUNICATIONS
REQUIREMENTS FOR END USERS

This equipment is certified by the Canadian Department of Communications, meeting telecommunications requirements for safety, operation, and telephone network protection. The Department does not guarantee satisfactory equipment operation. When installing this equipment:

1. Be sure your local telecommunications company allows you to connect your equipment to its lines.

2. Use approved connectors. Most companies prohibit using customer-supplied jacks. If using a single line, you may be able to use a telephone extension cord.

3. Electrical ground connections for the power utility lines, telephone lines, and internal metallic water pipes are connected together, particularly in rural areas. DO NOT ATTEMPT TO MAKE GROUND CONNECTIONS YOURSELF. Contact the appropriate electrical inspection authority or electrician.

4. Any equipment malfunctions, or repairs or alterations you make to this equipment, may cause the telecommunications company to ask you to disconnect the equipment. All repairs to this equipment should be made by an authorized Canadian maintenance facility designated by the suppliers.

NOTE: Compliance with the above conditions may not prevent degradation of services in some situations.

The Canadian Department of Communications requires the certification of all cables used to connect modems to the telephone line. The following cables are certified for use on the VA811 Automatic Calling Unit:

Cable Description	Racal-Vadic Part No.	Canadian DOC No.
7-foot permissive	15047-004	CA11A
7-foot programmable	15048-004	CA45A

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Section 1
GENERAL INFORMATION

INTRODUCTION

The VA811 Automatic Calling Unit is a single-line/multiline automatic dialer that allows a computer to initiate calls through an RS366 interface (or through a standard RS232C interface when the VA831 adapter is used). The VA811, available in three basic configurations listed below, replaces both Bell 801 and RACAL-VADIC VA821 ACUs:

● VA811-PS single-line version supplied with a P-type (permissive direct-connect) cable.

● VA811-SS single-line version supplied with an S-type (programmable direct-connect) cable.

● VA811-XM multiline version for use in the RACAL-VADIC Multiline Automatic Calling System (MACS).

FEATURES

The VA811 provides many standard and optional features that allow custom tailoring to fit the needs of a particular installation. Features available on this unit include:

● Switched-network (DDD) and teletype (TWX) compatible

● Automatic selection of pulse or tone dialing

● Positive dial tone, answer tone, and busy signal detection

● Tandem-dial and blind-dial capability

● Selectable automatic call and retry (ACR) control

● End-of-number and invalid-digit detect options

● Compatible with RACAL-VADIC direct-connect series modems, MACS, and single-line chassis

● Extensive user diagnostics capability

CABLE INFORMATION

The following cable has been certified for use with this dialer.

Racal-Vadic Part Number	15047-004
Government of Canada DOC Old Connector Code	H473185
DOC New Connector Code (Use this code and the part number for any communications or ordering information from Racal-Vadic.)	CA11A
Description:	7 ft (P type) 6 position modular (voice or data-perm) T, R

1-1

PHYSICAL DESCRIPTION

The VA811 dialer consists of a single-width printed circuit board (PCB) assembly that occupies one card slot in RACAL-VADIC VA1601-, VA1616-, or VA1680-series chassis. The dialer accepts dc power and interfaces to the chassis controls and indicators via the standard card-edge connector located at one end of the PCB. A 25-pin female connector mounted on the rear panel of the unit provides an EIA RS366 connection to the computer (data terminal equipment) and a corresponding 25-pin male connector provides buffered expansion capability (daisy-chain) for up to three additional dialers (in a MACS system). Two miniature 8-position telephone (TelCo) jacks provide line connection to the modem and to the switched-telephone network for single-line application.

CONFIGURATIONS

The VA811 dialer will operate as either a single-line (SLD) or a multiline (MACS) dialer, depending on the internal option settings selected at the factory (per dialer type ordered). Typical SLD and MACS equipment configurations are discussed below.

Single-line

The minimum equipment configuration necessary for single-line operation is shown in Figure 1-1. As indicated in the figure, the dialer connects to the computer via an RS366 interface and connects directly to the telephone (TelCo) line with the supplied cable. The associated modem connects to the computer via an RS232C interface and connects to the TelCo line via the dialer. In this configuration, the dialer interrupts the modem line connection during the dial sequence, then transfers control to the modem via the telephone line.
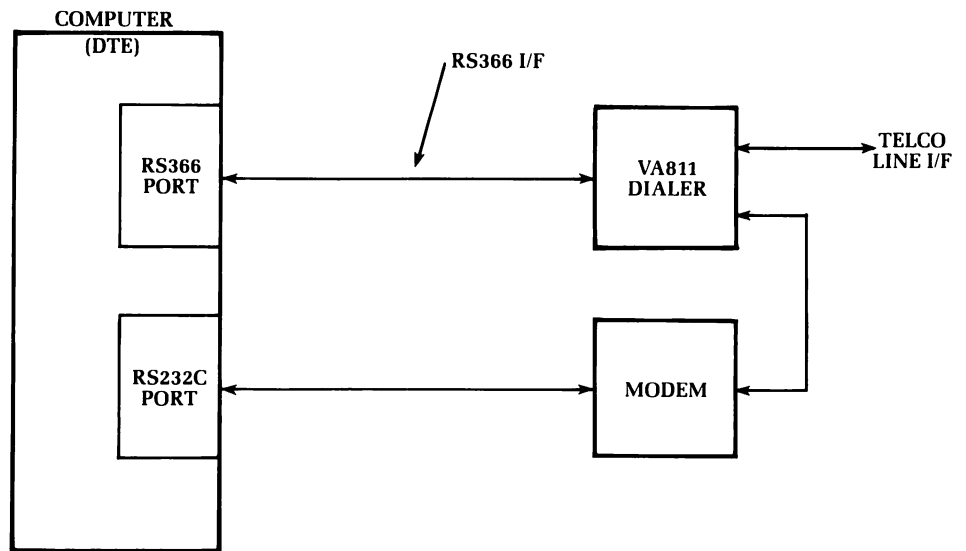
VA811-02

Figure 1-1. Basic Single-line Dialer Configuration

If an optional VA831 adapter is used, the dialer may be connected for either dual- or single-port operation as shown in Figure 1-2. Modem line connection is identical to that described above, but the VA831 adapter eliminates the need for an RS366 interface at the computer.
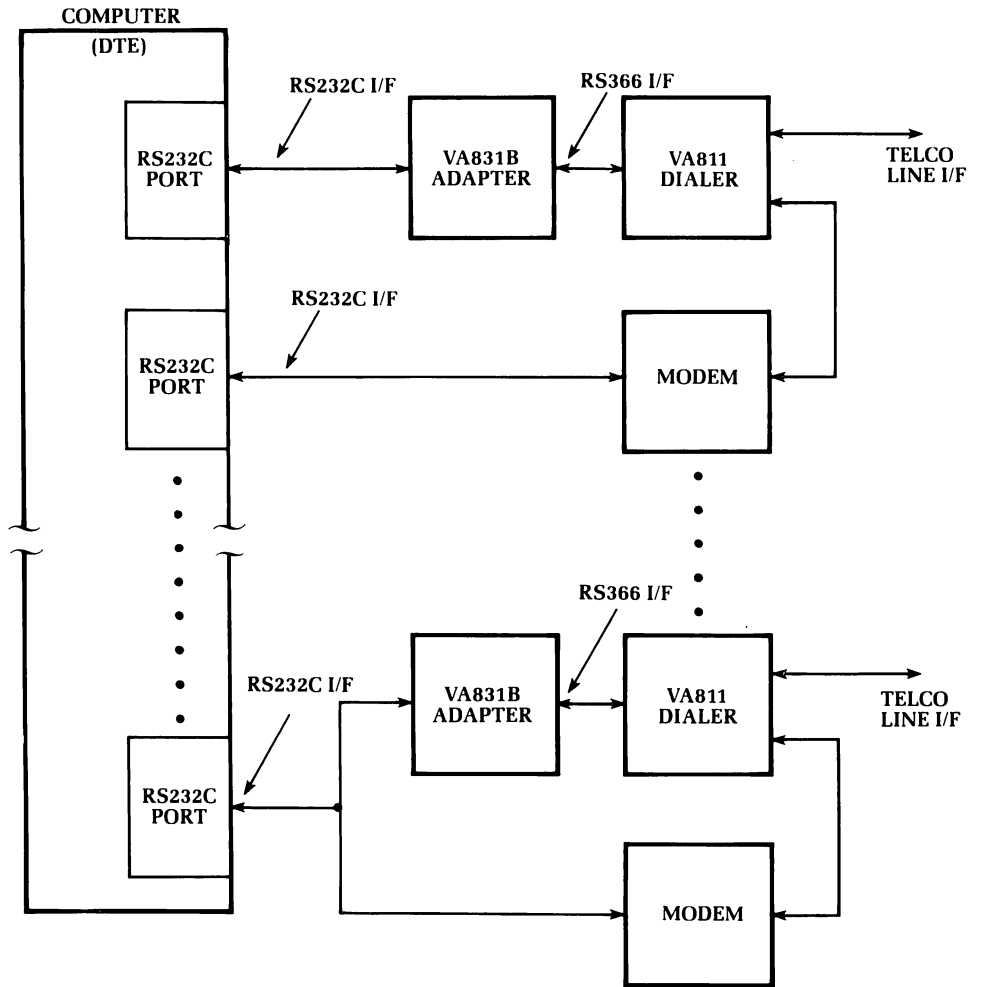
Figure 1-2. Single-line Dialer with VA831 Adapter

Multiline   For multiline dialer operation, the dialer and associated modems are normally connected as shown in Figure 1-3. As indicated in the figure, the dialer connects to the computer via the VA831 adapter (or directly to an RS366 port, if the adapter is not used) and controls up to 15[1] modems via the MACS chassis interface. Each modem connects to a separate RS232C port at the computer, and each modem connects directly to the telephone line. In this configuration, the dialer can address any of the modems via the chassis interface, inhibit the modem line connection, dial through the modem line interface, then transfer line control to the modem.
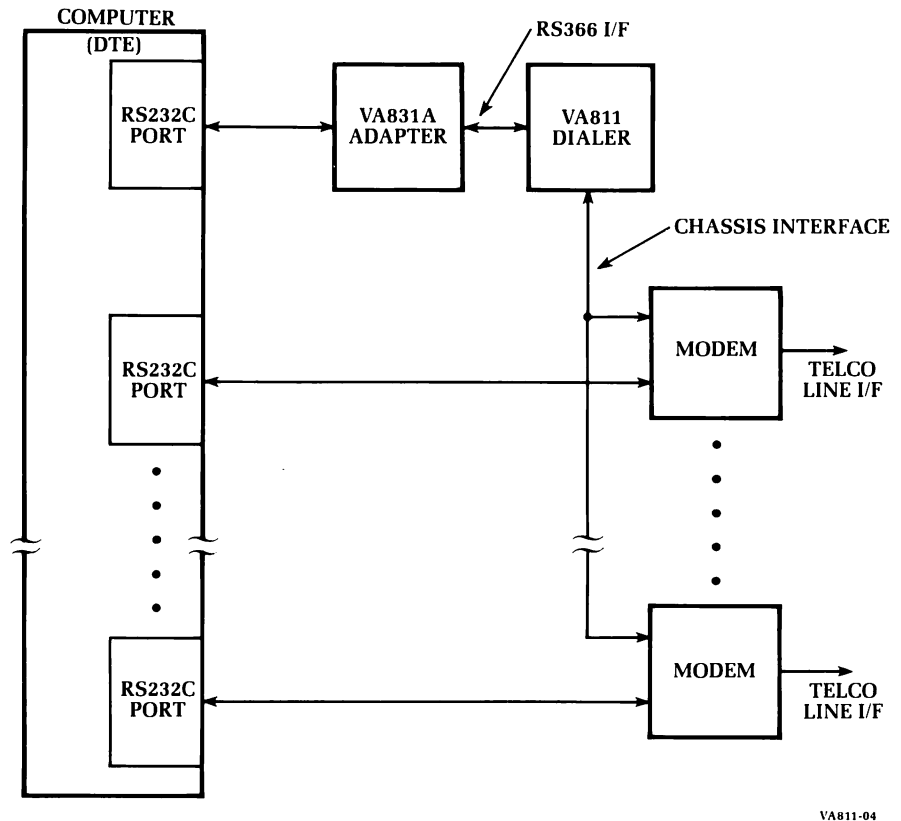
Figure 1-3. Multiline Dialer (MACS) Configuration

_____

[1] When the VA811 dialer and VA831 adapter are installed in the same chassis, only 14 slots are available for modems. Up to three additional dialers, each controlling up to 15 modems, may be daisy-chained via the RS366 expansion connector provided on the VA811.

Section 2
OPTIONS

INTRODUCTION

The VA811 dialer may be configured to meet the needs of a particular installation by selecting appropriate hardware options on the printed circuit board assembly. Options typically changed onsite are implemented with DIP switches A1-A8 and B1-B8; less commonly changed options are implemented with solder straps (jumpers) a-x. Figure 2-1 and Table 2-1 at the end of this section indicate the location and function of switches and straps, and a brief description of each option is presented below.

NOTE: The VA811 is configured for "standard" single-line or multiline operation when shipped from the factory, as indicated in Table 2-1. Before installing the unit, it would be prudent to read the option descriptions, mark Table 2-1 with the settings necessary for your installation, then verify the switch and strap settings selected on the board.

OPTION DESCRIPTIONS

The seemingly endless array of switches and straps used on the VA811 can be categorized by function into three basic groups:

● Those that configure the dialer for single-line (SLD) or multiline (MACS) operation.

● Those that relate to interconnecting the dialer to external equipment.

● Those that establish the operating protocol of the dialer.

Each group of options is described below.

Single-line/ Multiline Options

Dialer Type (A1, f, g, h, j, k, l, s, t, u, v, w)—This option selects either single-line or multiline operation as indicated in Table 2-1.

Dialer Address (B7, B8)—If more than one dialer is used on the same RS366 interface, these two switches provide a unique address for each dialer. When only one dialer is used, the switches should be off, selecting address 0.

Interconnect Options

Signal Ground Reference (p)—This option connects signal ground (RS366 interface, pin 7) to chassis ground within the dialer if required by the installation.

RS366A Interface (m, n)—This option configures the dialer for RS366A connections. If enabled, interface pins 18 and 19 (Receive Common, Send Common) are connected to signal ground, and pin 1 (Protective Ground) is isolated from chassis ground within the dialer. If disabled, standard RS366 connections are selected (i.e., pin 1 is connected to chassis ground within the dialer and pins 18 and 19 are not connected).

PC/MIC Jumper (r)—This option allows connection of PC (Programming Common) to MIC (Mode Indicator Common) in the TelCo line interface. This option is used in single-line dialer application where a single conductor is provided in the modem line interface cable for PC/MIC. Applies only to VA811S versions.

Operating Protocol Options

Dial Mode Select (A3, A4)—This option provides either manual or automatic selection of dial mode as follows:

● Pulse: Forces pulse dial only.

● Tone: Forces tone dial only.

● Automatic: If this position is selected, the dialer will tone dial the first digit and monitor dial tone. If dial tone disappears within .5 second, the dialer will tone dial the remaining digits; if dial tone is still present after .5 second, the dialer will pulse dial the entire number instead.

Blind Dial (A2)—The VA811 incorporates a positive dial-tone detector and normally inhibits the dial sequence until a dial tone has been detected. With this option enabled, blind dialing is initiated after CRQ (Call Request) is ON for 5 seconds, independent of dial tone.

Line Transfer Control (B5, B6)—This option determines when the dialer transfers control of the telephone line to the modem (single-line dialer version only). The three possibilities are:

● End-of-Number: If this setting is selected, the dialer transfers control to the modem immediately after the last digit is dialed. When this setting is used, the modem is responsible for detecting carrier and completing the line-connect protocol.

● Start-of-Answer Tone: If this option is selected, the dialer waits for answer tone from the remote modem and transfers control 1.5 seconds after the beginning of answer tone is detected. This setting is used for Bell 103- and 212-type protocols, where MARK is used in lieu of a separate answer-tone frequency.

● End-of-Answer Tone: If this setting is selected, the dialer waits for answer tone and transfers control after answer tone is complete. (Answer tone duration must be at least 1.5 seconds.) This setting is used for all other modems except the Bell 103 and 212.

DLO Control (A6)—DLO (Data Line Occupied), sent to the computer via interface pin 22, indicates that the communication channel is busy. If the local position is selected, DLO is turned ON when the dialer or the local modem is off hook (busy). If the remote position is selected, DLO is turned ON when the called number is busy (i.e., if a busy tone is detected by the dialer).

ACR Select (B1, B2, B3)—ACR (Abandon Call and Retry), sent to the computer via interface pin 3, suggests that the call attempt be aborted and retried at a later time. This option allows user selection of the conditions that generate ACR. Since the switches operate independently, the dialer may be commanded to turn on ACR under any or all of the following conditions:

● If an invalid digit is dialed

● If a busy tone is detected

● If the local modem is busy

ACR Timing (A7, A8)—To avoid inordinately long waiting periods on calls, the VA811 incorporates a timer that turns on ACR at the end of the selected delay period (see Table 2-1). The timer is started each time CRQ (Call Request) is turned ON and reset each time PND (Present Next Digit) is turned OFF.

DSC Inhibits ACR Timer (A5)—DSC[2] (Distant Station Connected), re-turned to the computer via interface pin 13, indicates that the dialer has completed the call and transferred control to the modem. If this option is enabled, the ACR timer is stopped when DSC is turned on. If disabled, the ACR timer will continue to run (and time out) after control has been transferred to the modem. (The latter setting is useful when the Line Transfer Control option is set to End of Number.)

Teletype Interface (B4)—This option allows the dialer to be used for teletype (TWX) operation. Must be disabled for switched-network (DDD) operation.

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[2] This signal is also identified as DDS (Data Set Status) or COS (Call Origination Status) in certain RS366 documents.
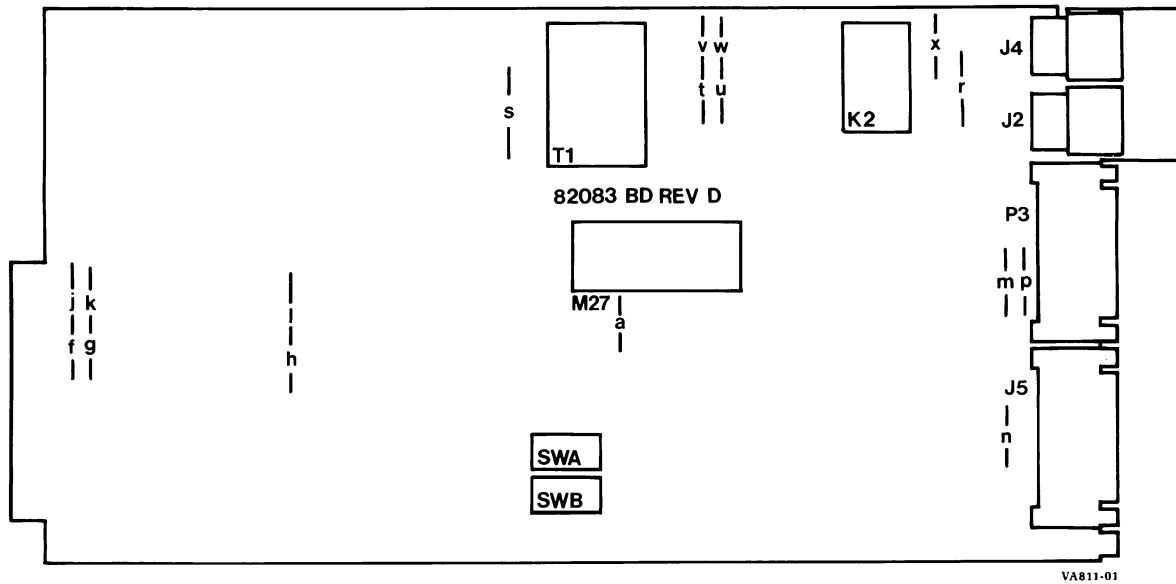
Figure 2-1. VA811 Switch and Strap Locations

Table 2-1. VA811 Options

Option Name	Switch/Strap Configuration	

Dialer Type
   Single-line Dialer (SLD)
   Multiline Dialer (MACS)
	A1 OFF; j, k, l, s, t, u IN; and f, g, h, v, w OUT
	A1 ON; j , k, l, s, t, u OUT; and f, g, h, v, w IN	

Blind Dial
   Enable
   Disable
	A2
	ON
	OFF(*)	

Dial Mode Select
   Pulse
   Tone
   Automatic
	A3
	OFF
	OFF
	ON
		A4
		OFF
		ON
		OFF(*)

DSC Inhibits ACR Timer
   DSC Inhibits ACR
   Disable
	A5
	ON(*)
	OFF	

DLO Control
   Local
   Remote
	A6
	ON (SLD)
	OFF (MACS)	

ACR Timing
   56 seconds
   42 seconds
   28 seconds
   14 seconds
	A7
	ON
	ON
	OFF
	OFF
		A8
		ON
		OFF(*)
		ON
		OFF

Table 2-1. VA811 Options (cont'd)

Option Name	Switch/Strap Configuration		
ACR Select	B1	B2	B3
ACR with Invalid Digit	ON	—	—(*)
ACR with Busy Tone	—	ON	—(*)
ACR with Local Modem Busy	—	—	ON(*)
Teletype Interface	B4		
Enabled (TWX)	ON		
Disabled (DDD)	OFF(*)		
Line-Transfer Control	B5	B6	
End of Number	ON	OFF	
Start of Answer Tone	OFF	ON (103/212)	
End of Answer Tone	OFF	OFF (non-103/212)	
Dialer Address	B7	B8	
Address 0	OFF	OFF(*)	
Address 1	OFF	ON	
Address 2	ON	OFF	
Address 3	ON	ON	
Mfg. Test/Internal Memory	a		
Test	IN		
Normal Operation	OUT(*)		
RS366A Interface	m	n	
Enable	OUT	IN	
Disable	IN	OUT(*)	
Signal Ground Reference	p		
Connected to Chassis Gnd	IN		
Isolated from Chassis Gnd	OUT(*)		
PC/MIC Jumper	r		
Connected	IN		
Isolated	OUT(*)		
Mfg. Test/Line-Current Detect	x		
Test (LCD Bypassed)	IN		
Normal Operation	OUT(*)		

NOTES: (*)   Standard setting, all models
          (SLD)   Standard setting, single-line dialer versions
          (MACS) Standard setting, multiline dialer versions
          —   Either position
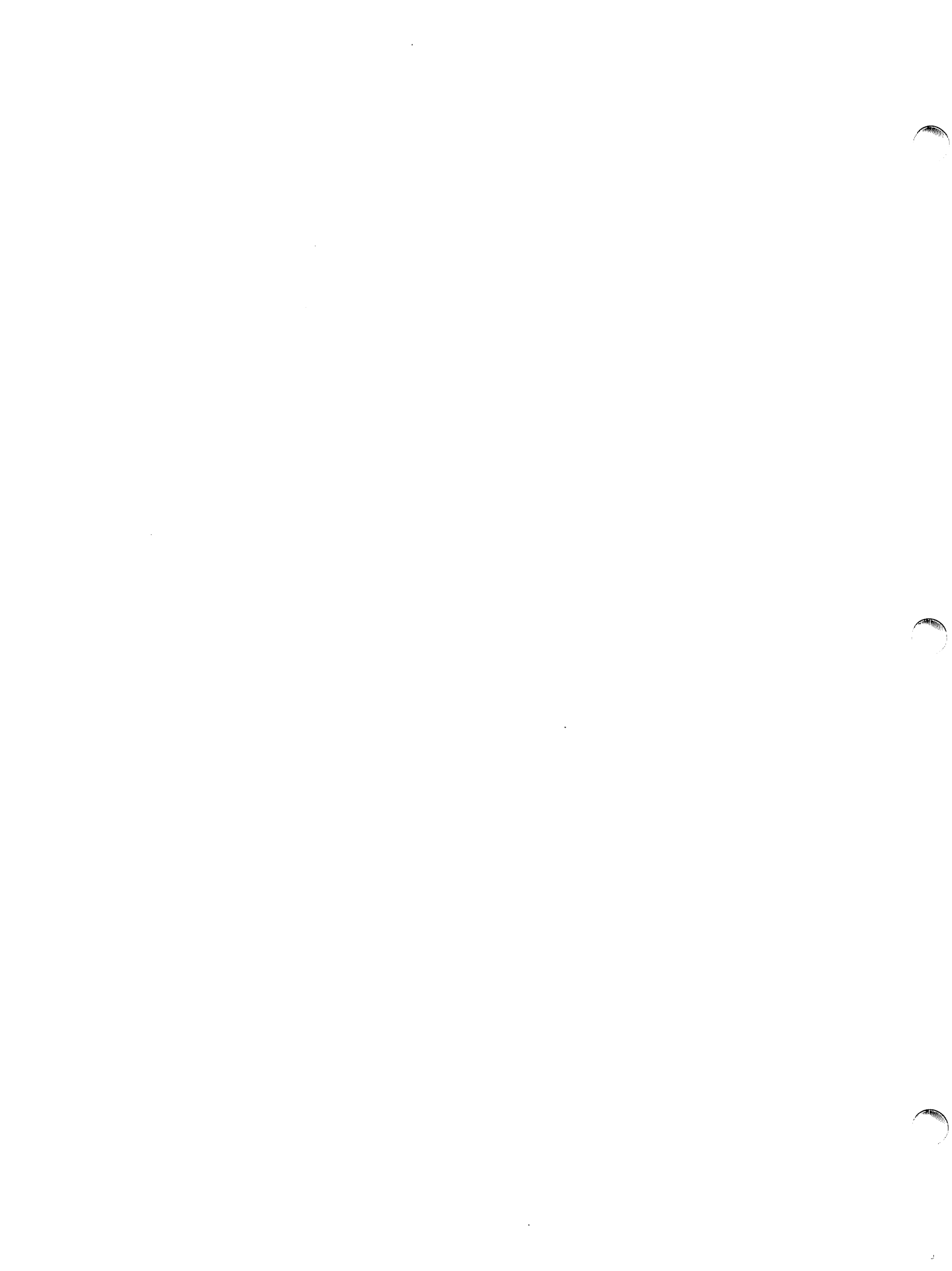
Section 3

INSTALLATION

INTRODUCTION

This section provides installation procedures for the VA811 dialer. In case of difficulty during any of the following procedures, contact the nearest RACAL-VADIC Regional Service Center listed at the front of this manual.

CAUTION
Procedures in this section should be performed in the sequence and manner prescribed. Any deviation may damage the equipment.

PRELIMINARY PROCEDURES

Unpacking And Inspection

Inspect the shipping carton immediately upon receipt. If the carton has been damaged, request that the carrier's agent be present during unpacking. Inspect contents for physical damage and/or missing parts. If the contents have been damaged or parts are missing, immediately notify the nearest RACAL-VADIC sales office.

Equipment Supplied

Table 3-1 lists the equipment supplied with the VA811.

Table 3-1. Equipment Supplied

Dialer	PCB Part No.	Cable Part No.
VA811-PS	82083-011	15036-xxx
VA811-SS	82083-011	15035-xxx
VA811-XM	82083-011	15000-093

NOTE: Cables ending in -xxx may be ordered in the following lengths:
—001 for 24 in.
—002 for 42 in.
—003 for 12 ft.
—004 for 7 ft.
—009 for customer specified

Additional Equipment Required

The VA811 is intended for use with a RACAL-VADIC chassis as specified in Table 3-2. Either an RS366 computer port or an RS232C port with a VA831 adapter is also required for installation.

Table 3-2. Additional Equipment Required

Dialer	Chassis
VA811-PS/SS	VA1601U, VA1616A/B, or VA1680A/B
VA811-XM	VA1616M or VA1680M

Preinstallation Checks

Prior to installation, check the following:

● Verify equipment configurations shown in Figures 1-1 and 1-2 (VA811-PS/SS) or Figure 1-3 (VA811-XM).

● Verify switch and strap options described in Section 2.

● Refer to Table 3-1 and verify that the proper cable has been supplied with dialer.

> **NOTE**
> Prior to connecting any device to the switched-telephone network, Federal Communications Commission (FCC) regulations specify that the customer must provide the telephone company with the name of the manufacturer, equipment model number, FCC registration number, and ringer equivalence number of the devices to be used. This information is listed at the front of this manual.

VA811-PS/SS INSTALLATION

The VA811-PS/SS single-line dialer can be installed in any available slot in the VA1601U, VA1616A/B, or VA1680A/B chassis. Install the unit as follows:

1. Turn off power to chassis.

2. Carefully insert dialer in desired slot. Be sure printed circuit board is properly seated in edge connector, then tighten thumbscrew on rear of board.

3. Connect TelCo interface cable supplied with dialer to connector labeled TELCO (J2) on rear panel of dialer (see Figure 3-1) and connect other end of cable to TelCo jack. (See Section 5 for a description of standard TelCo jacks.)

4. Connect TelCo interface cable from associated modem to dialer connector labeled MODEM (J4).

5. Connect RS366 interface cable (user-supplied) from computer port (or VA831B adapter) to 25-pin female connector (J5) on rear panel of dialer. (If VA831 adapter is used, refer to installation procedures in related manual.)

6. Turn on power and perform checkout procedures in Section 4.
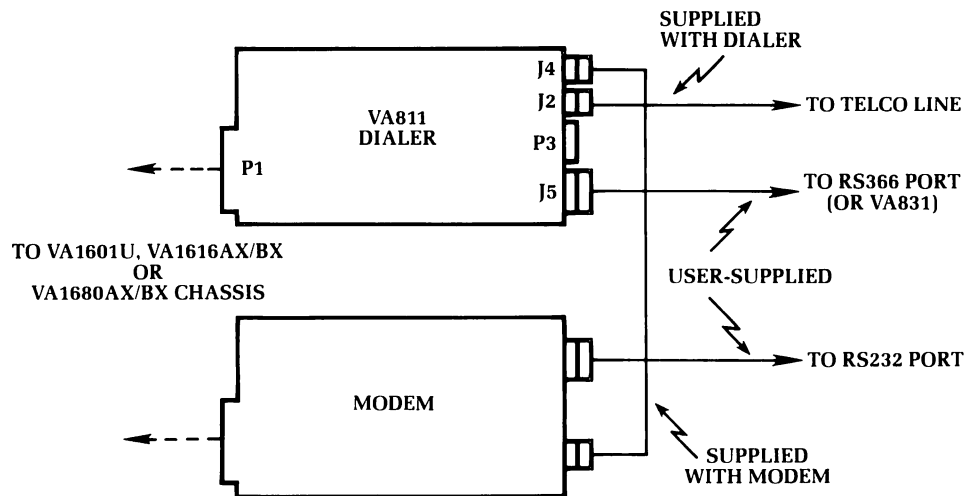
Figure 3-1. VA811-PS/SS (SLD) Connections

**VA811-XM
INSTALLATION**

The VA811-XM multiline (MACS) dialer must be installed in slot 16 of the VA1616/80M chassis for proper operation. (The optional VA831A adapter, if used in the same chassis, goes in slot 15.) Install the dialer as follows:

1. Turn off power to chassis.

2. Carefully insert dialer in slot 16. Be sure printed circuit board is properly seated in edge connector, then tighten thumbscrew on rear of unit.

3. Connect RS366 interface cable (user-supplied) from computer port (or VA831A adapter) to 25-pin female connector (J5) on rear panel of dialer (see Figure 3-2). If the VA831 adapter is used, refer to installation procedures in related manual for cable connections to that unit.

4. Turn on power and perform checkout procedures in Section 4.
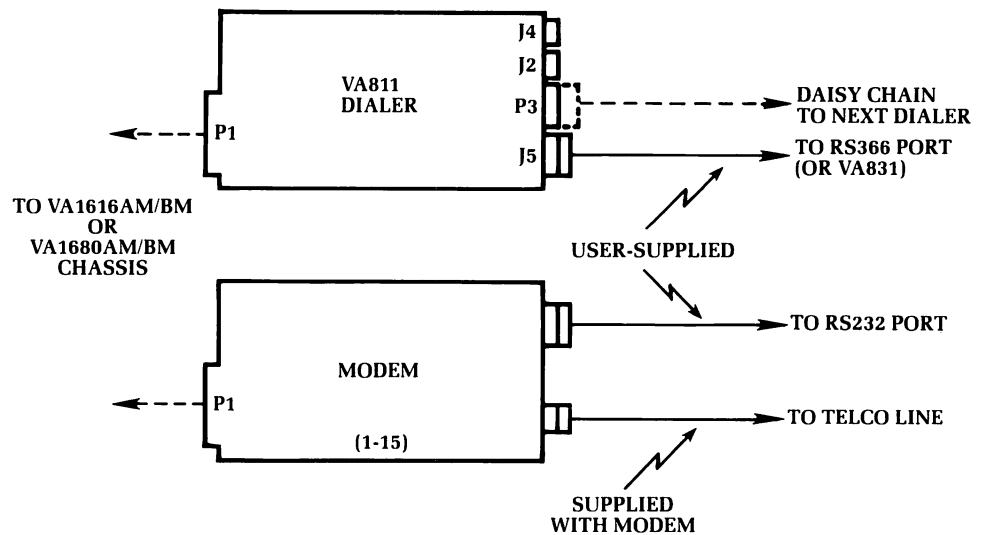
Figure 3-2. VA811-XM (MACS) Connections

Section 4
CHECKOUT AND OPERATION

INTRODUCTION

This section introduces the character set used by the VA811, describes the controls and indicators available on the associated chassis, and presents operational checkout procedures for the dialer. A basic knowledge of RS366 interface operation is assumed. Readers unfamiliar with this interface are encouraged to read Section 5 before proceeding.

CHARACTER SET   The VA811 accepts decimal-weighted binary digits from the four number bit lines (NB1–NB8) of the RS366 interface and generates either the pulse sequence or the tone pairs specified by each digit received. The dialer recognizes digits 0–9 as valid dial digits in all modes and digits 10(*) and 11(#) in tone dial mode (see Table 4-1). Digit 12 is recognized as an End-of-Number (EON) code and causes the dialer to immediately transfer control to the associated modem. Digits 13 and 14 are recognized as a Tandem Dial code that causes the dialer to wait for .5 second, then look for a second dial tone.

Table 4-1. Telephone Digits

Number Bit 8 4 2 1	Dial Digit Decimal	Hex	Function	
0 0 0 0	0	0	Telephone digit	0
0 0 0 1	1	1	Telephone digit	1
0 0 1 0	2	2	Telephone digit	2
0 0 1 1	3	3	Telephone digit	3
0 1 0 0	4	4	Telephone digit	4
0 1 0 1	5	5	Telephone digit	5
0 1 1 0	6	6	Telephone digit	6
0 1 1 1	7	7	Telephone digit	7
1 0 0 0	8	8	Telephone digit	8
1 0 0 1	9	9	Telephone digit	9
1 0 1 0	10	A	Telephone digit	*
1 0 1 1	11	B	Telephone digit	#
1 1 0 0	12	C	End-of-Number Code	
1 1 0 1	13	D	Tandem Dial Code	
1 1 1 0	14	E	Tandem Dial Code	
1 1 1 1	15	F	Not assigned	

When used in a MACS environment, the first two digits received by the VA811 are interpreted as dialer address/modem type and modem address digits. The first digit received (Address Digit #1) specifies dialer address 0 through 3 on NB1 and NB2, and either a 103-type or a non-103-type modem on NB4 (see Table 4-2). If only one dialer is used in a system, the dialer address should be set to 0.

Table 4-2. Dialer Address/Modem Type

Number Bit 8 4 2 1	Dial Digit Decimal	Dial Digit Hex	Function		
0 0 0 0	0	0	Dialer Address	0	non-103
0 0 0 1	1	1	Dialer Address	1	non-103
0 0 1 0	2	2	Dialer Address	2	non-103
0 0 1 1	3	3	Dialer Address	3	non-103
0 1 0 0	4	4	Dialer Address	0	103/212
0 1 0 1	5	5	Dialer Address	1	103/212
0 1 1 0	6	6	Dialer Address	2	103/212
0 1 1 1	7	7	Dialer Address	3	103/212

The second digit received (Address Digit #2) specifies the slot address (see Table 4-3) of the MACS modem that the call is to be placed through.

Table 4-3. Modem (Slot) Address

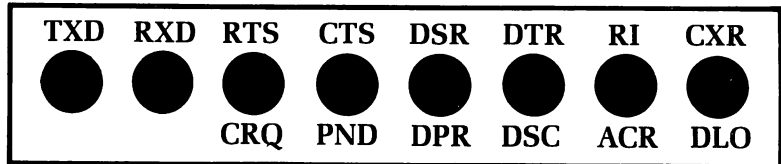| Number Bit 8 4 2 1	Dial Digit Decimal	Dial Digit Hex	Function	
0 0 0 0	0	0	Slot Address	0
0 0 0 1	1	1	Slot Address	1
0 0 1 0	2	2	Slot Address	2
0 0 1 1	3	3	Slot Address	3
0 1 0 0	4	4	Slot Address	4
0 1 0 1	5	5	Slot Address	5
0 1 1 0	6	6	Slot Address	6
0 1 1 1	7	7	Slot Address	7
1 0 0 0	8	8	Slot Address	8
1 0 0 1	9	9	Slot Address	9
1 0 1 0	10	A	Slot Address	10
1 0 1 1	11	B	Slot Address	11
1 1 0 0	12	C	Slot Address	12
1 1 0 1	13	D	Slot Address	13
1 1 1 0	14	E	Slot Address	14
1 1 1 1	15	F	Slot Address	15

EXAMPLE CALLS   The following hexidecimal digit strings represent calls to (408) 744-0810 under various conditions.

- Single-line dialer:
  - 4087440810
  - 4087440810C   Immediate transfer to modem (EON code)
  - 9D4087440810   Tandem dial through local (9-level) exchange

- MACS dialer:
  - 474087440810   Dialer address 0, 103-type modem, modem address 7
  - 474087440810C   Same as above with immediate transfer to modem (EON code)
  - 479D4087440810C   Same as above with tandem dial through local (9-level) exchange

CONTROLS AND INDICATORS   The VA811 interfaces to the chassis display and control bus through card-edge connector P1. When the dialer card slot is addressed from the front panel, the chassis diagnostic indicators display the significant interface signals used by the dialer. Figure 4-1 shows the diagnostic indicators used on RACAL-VADIC chassis. The upper legend in the figure shows the standard indicator functions as labeled on the front panel; the lower legend identifies the indicator functions displayed when the adapter is selected. Table 4-4 identifies the function of each control and indicator.

```
┌──────────────────────────────────────────────────┐
│  TXD  RXD  RTS   CTS   DSR   DTR   RI    CXR       │
│   ●    ●    ●     ●     ●     ●     ●     ●         │
│            CRQ   PND   DPR   DSC   ACR   DLO        │
└──────────────────────────────────────────────────┘
                                            VA811-07
```

Figure 4-1. Diagnostic Display Indicators

Table 4-4. Controls and Indicators

Indicator	Function (with VA811 selected)
TXD	Not used
RXD	Not used
RTS	CRQ (Call Request)
CTS	PND (Present Next Digit)
DSR	DPR (Digit Present)
DTR	DSC (Distant Station Connected)
RI	ACR (Abandon Call/Retry)
CXR	DLO (Data Line Occupied)
PWR	Power Supply Status
CHANNEL* STATUS	Channel Status
Switch	
CHANNEL SELECT	Selects card slot
ALB (Local Test)	Forces DLO (takes dialer off hook and busies out attached phone line)
DLB (Remote Test)	Forces slow dial test mode
TXR (Transmit Reversals)	Forces CRQ in test mode

* Flashes in test mode or if DPR remains off for more than 1.5 seconds after CRQ turns on; ON during dial sequence; OFF when CRQ is off and no test mode selected.

OPERATIONAL CHECKOUT

The following procedures verify the operational integrity of the VA811. The first set of procedures applies to single-line dialer (VA811-PS/SS) installations, the second set to MACS (VA811-XM) installations.

VA811-PS/SS

To check operation of the VA811 in a single-line environment, perform the following steps:

1. Select dialer (slot) address with CHANNEL SELECT switch on front of chassis.

2. Set ALB/OFF switch to ALB and verify that DLO(CXR) indicator illuminates. (This takes the dialer off hook and busies out the telephone line attached to the dialer.) Return ALB/OFF switch to OFF.

3. Set TXR/OFF switch to TXR and verify that CRQ(RTS) and DLO(CXR) indicators illuminate. Verify that PND(CTS) indicator illuminates after a brief delay, indicating that dial tone detector is operating properly. Return TXR/OFF switch to OFF.

4. Set TXR/OFF to TXR once again and monitor delay interval between CRQ(RTS) turn-on and ACR(RI) turn-on. Verify that delay corresponds to ACR timing selected in Table 2-1. Return TXR/OFF switch to OFF.

5. Set DLB/OFF switch to DLB. Initiate call from computer and verify the following sequence with chassis display indicators:

   a. CRQ(RTS) turns ON (call request from computer).
   b. PND(CTS) turns ON (dial tone detected).
   c. DPR(DSR) turns ON (digit present from computer).
   d. PND(CTS) turns OFF after being on for 1 second.
   e. DPR(DSR) turns OFF also.
   f. PND(CTS) remains OFF for 1 second, then turns ON.
   g. Steps c, d, e, and f repeat until all digits have been dialed.

6. Set DLB/OFF switch to OFF to terminate test.

VA811-XM   To check operation of the VA811 in a multiline (MACS) installation, perform the following steps:

1. Select dialer (slot) address with CHANNEL SELECT switch on front of chassis.

2. Set TXR/OFF switch to TXR and verify that CRQ(RTS) and PND(CTS) indicators illuminate. Return TXR/OFF switch to OFF.

3. Set TXR/OFF to TXR once again and monitor delay interval between CRQ(RTS) turn-on and ACR(RI) turn-on. Verify that delay corresponds to ACR timing selected in Table 2-1. Return TXR/OFF switch to OFF.

4. Set ALB/OFF switch to ALB. Send dialer address/modem type and modem address digits to dialer and verify that DLO indicator illuminates. (If only one dialer is used in the system and a MACS modem is installed in the first card slot, the address digits can be 0, 0.) If this test fails, verify that dialer address/modem type digit corresponds to the Dialer Address selected in Table 2-1.

5. Set DLB/OFF switch to DLB. Initiate a call from the computer and verify the following sequence of events with the chassis display indicators.

   a. CRQ(RTS) turns ON (call request from computer).
   b. PND(CTS) turns ON (dial tone detected).
   c. DPR(DSR) turns ON (digit present from computer).
   d. PND(CTS) turns OFF after being on for 1 second.
   e. DPR (DSR) turns OFF also.
   f. PND(CTS) remains OFF for 1 second, then turns ON.
   g. Steps c, d, e, and f repeat until all digits have been dialed.

6. Set DLB/OFF switch to OFF to terminate test.
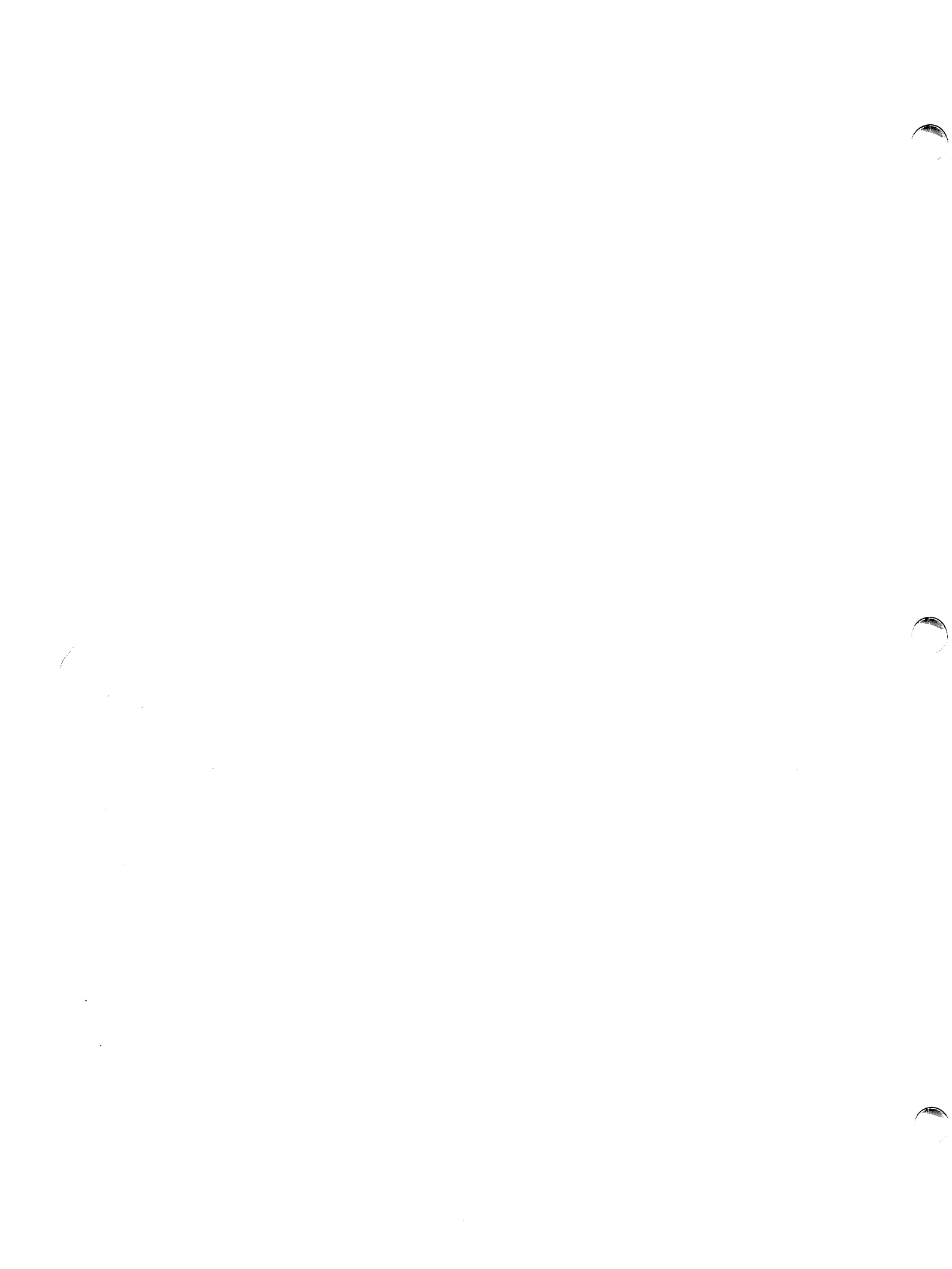
Section 5

SUPPLEMENTAL INFORMATION

INTRODUCTION

This section describes the hardware interfaces used by the VA811 and briefly discusses the operational characteristics of the dialer in both a single-line and multiline environment. Except where noted, the following information applies to both the VA811-PS/SS (single-line) and VA811-XM (multiline) dialer.

EQUIPMENT INTERFACES

The VA811 contains four connectors (J2, J4, J5, and P3) mounted on the rear panel of the unit and a card-edge connector (P1) at the opposite end of the printed circuit board (PCB). These connectors are used as follows:

J2—This 8-position miniature connector (labeled TELCO) provides direct connection to the TelCo line in single-line dialer (VA811-PS/SS) installations. The line interface cable supplied with the VA811-PS/SS connects between the TelCo-supplied jack and this connector. Not used for multiline (MACS) operation.

J4—This 8-position miniature connector (labeled MODEM) provides a loop-through connection to the TelCo line for the associated modem in single-line dialer installations. The line interface cable supplied with the modem connects to this jack. Not used for multiline (MACS) operation.

J5—This 25-pin female connector provides an RS366 interface to the computer equipment (or VA831 adapter, if used) in both single-line and multiline installations. When the VA831 is not used, the user-supplied cable from an RS366 port connects to this jack. When the VA831 is used, the RS366 cable from P3 on the adapter connects to this jack (see VA831 installation/operation manual).

P3—This 25-pin male connector provides buffered RS366 expansion capability (daisy-chain) for multiline dialer installations using two, three, or four dialers on the same RS366 interface. Where applicable, the expansion cable provided with the VA811-XM connects between this jack and J5 on the next dialer. Not used for single-line operation.

P1—This 36-pin (dual-sided 18-pin) edge connector provides an interface to the display and control bus used in RACAL-VADIC chassis.

LINE INTERFACE

Introduction   When ordered for single-line operation, the VA811 is supplied with a telephone interface cable terminated at both ends with miniature telephone connectors. One end of the cable connects to J2 on the dialer and the other end of the cable mates with standard jacks supplied by the telephone company. The cable establishes a permissive (VA811-PS) or a programmable (VA811-SS) direct connection to the switched-telephone network, as defined by Part 68 of the FCC Rules and Regulations.

The VA811-PS, supplied with a cable terminated in a 6-position miniature connector, is registered for permissive direct connection. This version of the dialer may be connected to a standard RJ11C voice jack (the type normally used by the telephone company for standard home or office phones). Optionally, the VA811-PS may be connected to either an RJ41S or RJ45S data jack.

The VA811-SS, supplied with a cable terminated in a 8-position miniature connector, is registered only for programmable direct connection. This version of the dialer requires an RJ41S or RJ45S data jack.

Tables 5-1 and 5-2 list pin assignments for the RJ11C, RJ41S, and RJ45S telephone jacks, and Table 5-3 defines the standard mnemonics used on the telephone interface.

Table 5-1. RJ11C Connector Pin Assignments

Pin	Mnemonic	Function
1	—	Not used
2	MI	Mode Indicator
3	R	Ring
4	T	Tip
5	MIC	Mode Indicator Common
6	—	Not used

Table 5-2. RJ41S,45S Connector Pin Assignments

Pin	Mnemonic	Function
1	—	*
2	—	*
3	MI	Mode Indicator
4	R	Ring
5	T	Tip
6	MIC	Mode Indicator Common
7	PR	Programming Resistor
8	PC	Programming Resistor Common

* Pins 1 and 2 are Ring and Tip for Fixed-Loss Loop (FLL) connections and are not used by RACAL-VADIC devices.

Table 5-3. TelCo Interface Signal Definitions

Mnemonic	Signal Name	Function
R	Ring	Connection to one side of telephone line.
T	Tip	Connection to other side of telephone line.
MI	Mode Indicator	At the end of the dial sequence, MI is momentarily shorted to MIC within the dialer to take the associated modem off hook (see Line Transfer Control option in Section 2).
PR	Programming Resistor	Connection to resistor in TelCo data jack (through the dialer) that sets modem gain for programmable connection.
MIC/PC	MI/PR Common	Common return for Mode Indicator and Programming Resistor signals.

RS366 INTERFACE

Introduction

The primary RS366 interface signals shown in Figure 5-1 are described on the following pages. Table 5-4, following the signal descriptions, lists pin assignments for interface connector J5.
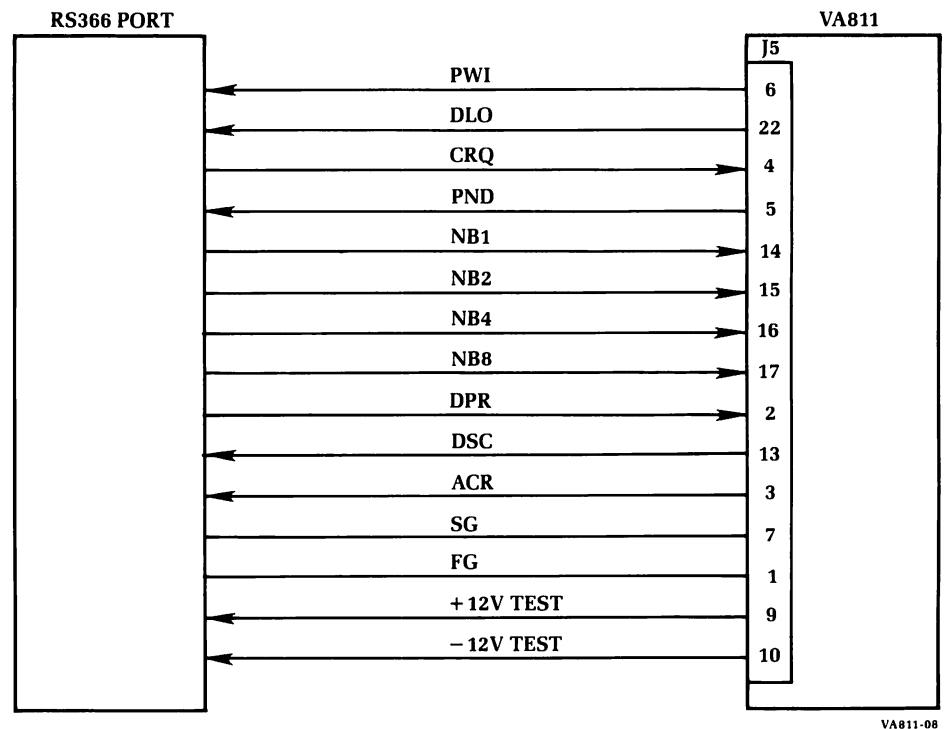

Figure 5-1. RS366 Interface Signals

RS366 Signal Descriptions

Refer to Figure 5-1 while reading the following signal descriptions:

PWI (Power Indication)—Signal from dialer to computer indicating power status of the dialer. The ON condition indicates that power is present in the dialer. The OFF condition, indicating that the dialer is inoperative, represents an impedance to signal ground greater than 300 ohms.

DLO (Data Line Occupied)—Signal from dialer to computer indicating that communication channel is busy. The conditions that assert DLO are selected by DLO Control option, Section 2.

CRQ (Call Request)—Signal from computer to dialer that initiates dial sequence. After CRQ comes ON, the dialer waits 1.5 seconds before going off hook to separate successive calls long enough for exchange clear down. CRQ must remain ON during the entire call origination period (i.e., until DSC comes ON) in order to hold the dialer off hook. CRQ must be turned OFF between calls or call attempts and must not be turned ON unless DLO is OFF.

PND (Present Next Digit)—Signal from dialer to computer requesting a new digit. PND is initially turned ON after the dial tone signal has been detected and remains ON until DPR (from the computer) is turned ON. When DPR is turned ON, the dialer reads and dials the digit presented on NB1–NB8, then turns PND OFF. PND does not come ON again until DPR has been turned OFF. This sequence is repeated until all digits have been dialed, then PND will come ON and remain ON.

NB1–NB8 (Number Bits)—Parallel 4-bit binary signal (active LOW) from the computer to the dialer representing the digit to be dialed. (Also used to send Tandem Dial and End-of-Number codes and MACS addresses, as described in Section 4.) These lines must be held stable while DPR is ON.

DPR (Digit Present)—Signal from computer to dialer indicating that information on number leads (NB1–NB8) is valid. PND (from dialer) must be ON before DPR is turned ON, and PND must be OFF before DPR is turned OFF. After the dialer has accepted the last digit of the called number (including EON when used) and has turned PND OFF, DPR must be turned OFF and held in the OFF condition even though PND may come ON again.

DSC (Distant Station Connected)—Signal from dialer to computer indicating that the dialer has completed the call and line control has been transferred to modem. At this point, the computer may release CRQ without causing a disconnect.

ACR (Abandon Call and Retry)—Signal from dialer to computer suggesting that the call be aborted and retried later. The conditions that turn ACR ON are user-selectable options and are described in Section 2.

SG (Signal Ground)—Common ground reference point for all interface circuits. May be connected to chassis ground by user options (see Section 2).

FG (Chassis [Protective] Ground)—Common return to ac power ground.

+ 12 V and − 12 V (Test)—These signals provide test points to verify the presence of power in the modem. This is supplied through 1.5 kohm resistors and is not intended as a source of power for peripheral equipment.

Table 5-4. RS366 Interface Connector (J5)

Pin	Mnemonic	Function	Signal Type*
1	FG	Frame Ground	—
2	DPR	Digit Present	PL
3	ACR	Abandon Call and Retry	PL
4	CRQ	Call Request	PL
5	PND	Present Next Digit	PL
6	PWI	Power Indication	PL
7	SG	Signal Common	—
8	—	Not used	—
9	+V	+ 12 V Test	—
10	−V	− 12 V Test	—
11	—	Not used	—
12	—	Not used	—
13	DSS	Data Set Status	PL
14	NB1	Number Bit 1	NL
15	NB2	Number Bit 2	NL
16	NB4	Number Bit 4	NL
17	NB8	Number Bit 8	NL
18	RC**	Receive Common	—
19	SC**	Send Common	—
20	—	Not used	—
21	—	Not used	—
22	DLO	Data Line Occupied	PL
23–25	—	Not connected	—

* PL = Positive TRUE logic
  NL = Negative TRUE logic
  — = Either state
  ** = RS366A option enabled (see Section 2)

RS366 Protocol   Basic single-line dialer operating protocol for the RS366 interface is summarized in Table 5-5. As indicated in the table, a call is initiated from the computer by asserting CRQ on the RS366 interface. (It is advisable to test PWI and DLO before asserting CRQ.) When CRQ is turned ON, the dialer starts the ACR timer, waits 1.5 seconds (to ensure TelCo exchange has cleared down between calls), then goes off hook and waits for dial tone. When dial tone is detected, the dialer asserts PND to the computer. (DLO will also be turned on if the local DLO option is selected—see Section 2.) At this point, the computer sets the first dial digit on NB1–NB8, then asserts DPR. When the dialer senses DPR ON, it reads NB1–NB8, dials the digit specified, then turns PND OFF. (If pulse dial mode has been selected, the dialer inserts a 750 ms interdigit delay before turning PND OFF.) At this point, the ACR timer is reset within the dialer and DPR is turned OFF by the computer. When the dialer senses DPR OFF, it asserts PND once again, requesting a new digit. This handshaking cycle repeats until all digits have been transferred to the dialer. When the last digit has been dialed, the dialer transfers line control to the modem and asserts DSC. (See Section 2 for line-transfer options.) With the modem now connected to line, the computer turns CRQ OFF, releasing the dialer, and the dialer turns PND OFF.

Table 5-5. RS366 Interface Dial Sequence

Event No.	RS366 Port	VA811 Dialer	Notes
1	Turn CRQ ON		ACR timer starts
2		Wait 1.5 seconds Detect dial tone Turn PND ON	Clear-down delay DLO ON (user option)
3	Set dial digit Turn DPR ON		NB1–NB8
4		Read digit and dial If pulse dial, wait interdigit delay Turn PND OFF	ACR timer recycles
5	Turn DPR OFF		
6		Turn PND ON	
	REPEAT 3 THROUGH 6 UNTIL ALL DIGITS HAVE BEEN DIALED		
7		Detect Answer Tone Transfer control to modem Turn DSC ON	Line-transfer control set by user option (see Section 2)
8	Turn CRQ OFF		
9		Turn PND OFF	

Multiline (MACS) operating protocol is identical to the single-line protocol described previously except that the dialer and modem must be addressed before starting the dial sequence. As indicated in Table 5-6, the computer initiates a call in the same fashion, but the dialer asserts PND immediately, requesting a dialer address/modem-type digit. (Telephone and address digits are defined in Section 4.) At this point, the computer sets address digit #1 on the interface and asserts DPR. The dialer reads and compares the address with that selected (see Dialer Address option, Section 2), and turns PND OFF if the digit is recognized. When the computer turns DPR OFF, the dialer asserts PND once again, requesting a modem address. The computer places the desired modem address on the interface and sets DPR. The dialer reads the address, selects the specified modem via the MACS chassis bus, and turns PND OFF. The computer turns DPR OFF, and the dialer, after waiting the 1.5-second clear-down delay, connects to the telephone line via the modem line interface and looks for dial tone. From this point the sequence of events is identical to the single-line dialer protocol described previously.

Table 5-6. RS366 Interface Address Sequence (MACS only)

Event No.	RS366 Port	VA811 Dialer	Notes
1	Turn CRQ ON		ACR timer starts
2		Turn PND ON	
3	Set Address 1 Turn DPR ON		NB1–NB8
4		Read, Compare with Dialer Address Turn PND OFF	User-selected (see Section 2) ACR timer recycles
5	Turn DPR OFF		
6		Turn PND ON	
7	Set Address 2 Turn DPR ON		NB1–NB8
8		Read, select modem via chassis bus Turn PND OFF	ACR timer recycles
9	Turn DPR OFF		
See Table 5-5, Events 2-9			

CHASSIS INTERFACE   As mentioned previously, the dialer interfaces to the standard controls and indicators used on RACAL-VADIC chassis through the 36-pin card-edge connector (P1) located at one end of the PC board. When configured for MACS operation, the dialer also uses this chassis interface to communicate with MACS modems. Pin assignments for the edge connector are listed in Table 5-7. Further information on these signals can be found in the associated chassis manual.

Table 5-7. Edge Connector Pin Assignments (P1)

Pin	Mnemonic	Function	Signal Type*
A	FDLO	Force Data Line Occupied (ALB switch)	NL
1	SI	Status Display	NL
B	—	Not used	—
2	—	Not used	—
C	DCRQ	Display Call Request	NL
3	DPND	Display Present Next Digit	NL
D	DDPR	Display Digit Present	NL
4	DDSC	Display Distant Station Connected	NL
E	DACR	Display Abandon Call and Retry	NL
5	DDLO	Display Data Line Occupied	NL
F	SLDL	Slow Dial (DLB switch)	NL
6	FCRQ	Force Call Request (TXR switch)	NL
H	FSH	Flash Input (2 Hz)	NL
7	DOH	Dialer Off Hook	PL
J	DDA	Dialer Data Access	PL
8	XFER	Dialer Transfer	PL
K	MDR	Modem Data Ring (to modem)	A
9	MDT	Modem Data Tip (to modem)	A
L	—	Not used	—
10	A8	Address Bit 8	NL
M	A4	Address Bit 4	NL
11	A2	Address Bit 2	NL
N	A1	Address Bit 1	NL
12	STRB	Dialer Strobe	NL
P	C8	Compare Bit 8	PL
13	C4	Compare Bit 4	PL
R	C2	Compare Bit 2	PL
14	C1	Compare Bit 1	PL
S	—	Signal Common	—
15	—	Signal Common	—
T	—	+5 V Power	—
16	—	+5 V Power	—
U	—	+12 V Power	—
17	—	+12 V Power	—
V	—	−12 V Power	—
18	—	−12 V Power	—

* PL = Positive TRUE logic   A = Analog signal
  NL = Negative TRUE logic   — = Don't care

SPECIFICATIONS

OPERATING CHARACTERISTICS		
Operating Modes	Tone dial, pulse dial, or automatic dial mode selection	
Pulse Dial Mode	Pulse Rate: Duty Cycle: Interdigit Delay:	10 pulses per second ± 10% 61% ± 3% (percent break) 750 ± 50 ms
Tone Dial Mode	Tone Duration: Intertone Delay: Transmit Level:	70 ± 5 ms 70 ± 5 ms −1.5 ± 2.5 dBm of continuous tone pair power (less than 0 dBm averaged over a 3-second interval during normal dialing)

Frequencies:

BCD	Digit	Tone Pairs	
0001	1	697	1209 Hz
0010	2	697	1336 Hz
0011	3	697	1477 Hz
0100	4	770	1209 Hz
0101	5	770	1336 Hz
0110	6	770	1477 Hz
0111	7	852	1209 Hz
1000	8	852	1336 Hz
1001	9	852	1477 Hz
0000	0	941	1336 Hz
1010	*	941	1209 Hz
1011	#	941	1477 Hz

Dial Tone Detection (DDD & TWX)	Frequency: Stopband: ON Delay: Threshold:	350 to 600 Hz 1950 to 2300 Hz, up to −10 dBm 0.5 ± .2 second ON @ −32 dBm; OFF @ −38 dBm
Busy Tone Detection	Frequency: Rate: ON Delay: Threshold:	DDD—350 to 600 Hz TWX—1990 to 2260 Hz DDD—Greater than 20 IPM TWX—Greater than 20 IPM 1.5 seconds ± .1 second for 60 IPM or greater 4 seconds for less than 60 IPM DDD—ON @ −32 dBm; OFF @ −38 dBm TWX—ON @ −45 dBm; OFF @ −52 dBm
Answer Tone Detection	Frequency: ON Delay: Threshold:	1990 Hz to 2260 Hz 1.5 seconds ± .1 second ON @ −45 dBm; OFF @ −52 dBm

LINE-CONTROL FUNCTIONS		
Transfer Control	Start or end of answer tone or end of number, switch selectable	
Tandem Dialing	Digit 1101 or 1110 (SEP character) resets dial tone detector; denotes "Delay .5 second then looks for new dial tone"	
Blind Dialing	Raises PND 5 seconds after CRQ, switch selectable	
End of Number Code	Binary 1100 causes immediate line transfer to modem	
Modem Busy Indication	DLO and/or ACR, local or remote busy, switch selectable	
Data Line Occupied	ON with CRQ, or when local modem is busy, or with remote busy, switch selectable	
Line-Current Status Indicator	ACU issues DLO and/or ACR, depending upon option selected	
Abandon Call and Retry	Clamp OFF:	With distant station connected (DSC)
	Force ON:	With invalid digit, busy signal detect, modem busy, or ACR time out
	Delay:	14, 28, 42, 56 seconds
	Start:	With call request (CRQ)
	Restart:	With present next digit (PND) going OFF
Double Ring Back	Compatible with CCITT V.25 ring-back signal	

INTERFACES		
To Computer (DTE Interface)	Per EIA RS366 (RS366A user option)	
To TelCo (Line Interface)	VA811-PS:	permissive direct-connect per FCC Rules, Part 68
	VA811-SS:	programmable direct-connect per FCC Rules, Part 68

POWER REQUIREMENTS	
	Maximum rating +12 Vdc @ 125 mA
	−12 Vdc @ 125 mA
	+5 Vdc @ 270 mA

ENVIRONMENTAL REQUIREMENTS		
Temperature	Operating:	0° to 60° C
	Nonoperating:	−20° to 70° C
Humidity	Up to 90% relative humidity, without condensation	

PHYSICAL CHARACTERISTICS	
Height	0.50 in. (1.3 cm)
Width	6.4 in. (16.3 cm)
Depth	12.75 in. (32.4 cm)
Weight	0.875 lb. (1.925 kg)
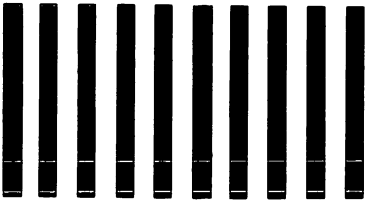
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Readability of text .... ☐ Very Clear ☐ Adequate ☐ Difficult

Usefulness of format .... ☐ Helpful ☐ Adequate ☐ Inconvenient

Any errors? .... ☐ Yes ☐ No

If so, identify _____

_____

_____

_____

Anything missing that should be added? ...... ☐ Yes ☐ No

If so, describe _____

_____

_____

_____

Any additional comments? _____

_____

_____

Do you have other modem requirements? ...... ☐ Yes ☐ No

Would you like service/repair information? .... ☐ Yes ☐ No

Would you like the latest catalog? .... ☐ Yes ☐ No

Name: _____ Job Title: _____

Address: _____ Company: _____

_____

No. of Racal-Vadic modems being used? _____   18008-049

WARRANTY, LIMITATION OF LIABILITY AND SERVICE INFORMATION

RACAL-VADIC warrants that its products will perform in accordance with RACAL-VADIC's published specifications (or the specification agreed to, in writing, by Buyer and RACAL-VADIC, and made a part of the sales contract), for a period of 12 months from date of original shipment.

During this warranty period RACAL-VADIC will, at no cost, promptly repair or replace any defective equipment returned to RACAL-VADIC, transportation charges prepaid by Buyer, and will return such equipment, transportation charges prepaid via the same or like method as received, except where special handling or shipment is requested by Buyer, in which case Buyer shall pay all such charges.

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Any action by Buyer for any alleged breach of the warranty set forth herein shall be brought to the attention of RACAL-VADIC by Buyer within the warranty period, but not later than 30 days after the alleged Breach.

THIS STATEMENT OF WARRANTY AND LIMITATION OF LIABILITY IS A COMPLETE AND EXCLUSIVE STATEMENT OF ALL WARRANTY AND LIABILITY REPRESENTATIONS OF RACAL-VADIC. It may not be varied, supplemented, qualified or interpreted by any prior dealings between the parties or by any usage of the trade or upon the face or reverse of any form to which this is attached or a part of, nor may it be modified by any agent, employee or representative of RACAL-VADIC unless such modification or representation is made in writing and signed by a duly authorized officer of RACAL-VADIC.

Repairs and/or replacement under the terms of this warranty SHALL NOT EXTEND THE WARRANTY LIFE OF THE ORIGINAL EQUIPMENT SUPPLIED.

Equipment returned to the factory should be accompanied by the following information: the reason for return, with a comprehensive description of the malfunction; shipping instructions; and the name and telephone number of a contact in the event of problems. Further inquiries may be directed to RACAL-VADIC's Diagnostic Center at (800) 22-VADIC or (800) 228-2342.

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