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OPERATIONS MANUAL

64K RATE ADAPTER

AND

128K RATE ADAPTER

RA-64 / 128K

Supports SYNC and ASYNC RS-232

April 12, 2004

FOR TECHNICAL SUPPORT CALL:

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SAFETY WARNING

Always observe standard safety precautions during installation, operation and maintenance of this product.

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PUBLICATION NOTICE

This manual has been compiled and checked for accuracy. The information in this manual does not constitute a warranty of performance. E.C.D. reserves the right to revise this publication and make changes from time to time in the content thereof. E.C.D. assumes no liability for losses incurred as a result of out-of-date or incorrect information contained in this manual.

EMISSIONS REQUIREMENTS

FCC CLASS A

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WARNING: Charges of modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

CANADIAN EMISSIONS

This digital apparatus does not exceed the Class A limits for noise emissions from a digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la Class A prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

CHAPTER 1 - DESCRIPTION

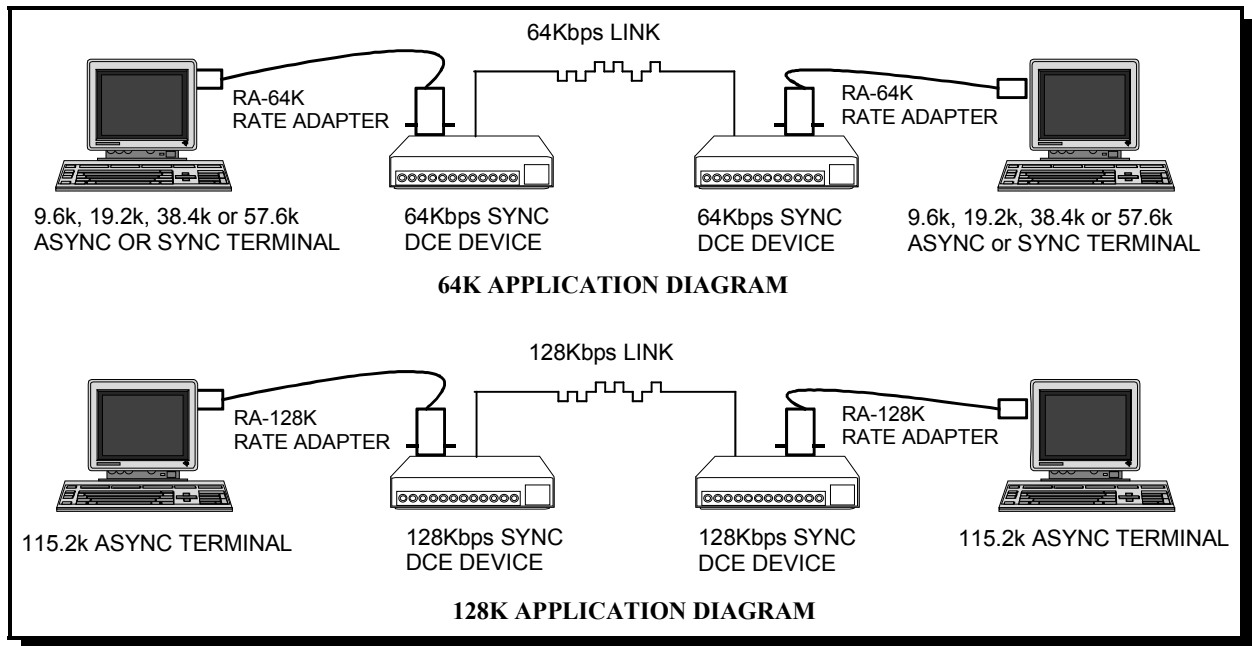
DESCRIPTION:

The RA-64/128k Rate Adapter allows low speed Async or Sync RS-232 DTE equipment operating at 9.6k, 19.2k, 38.4k and 57.6k to transmit over a 64K clear channel sync communications link. Additionally, the unit supports RS-232, 115.2k async over 128k sync data channels. The devices are used in pairs, one at each end of the communications link or in multiples as when used in a multi-point or broadcast communications link. The unit will support bi-directional or simplex data transmissions.

The RA-64/128k supports async character length of 8, 9, 10 and 11 bits, including the start and stop bit. The interface is RS-232 compliant and supports data rates of 9.6k, 19.2k, 38.4k, 57.6k or 115.2k. The synchronous data interface rate must be set at either 64k or 128k and will support data interfaces of X.21, RS-422, RS-530 or optional V.35.

The RA-64/128k will support V.35 by ordering the unit under part number 147000. The V.35 data interface will support both the old V.35 (+/-0.5 volts) or newer V.35 (ITU recommendation V.11) ground to +3.8 volts. A DB-25 male to V.35 male 6 foot adapter cable is required for V.35 termination and should be ordered under part number 712005.

The RA-64/128k derives its power through the async and sync data interfaces. The device utilizes leading edge technology for reliable, low power operation. The user should insure that the RA-64/128k has a minimum of three synchronous control signals available for proper operation.



CHAPTER 2 - SETUP AND INSTALLATION

BASIC OPERATION

The RA-64/128k operation requires that the user have a synchronous, clear channel 64k or 128k communication link. The RA-64/128k must be used in pairs, one at each end of the communication link. The unit has two modes of operation:

- 1) Allows RS-232 Async data rates of 9.6k, 19.2, 38.4k, 57.6k to be transmitted over a 64k sync clear channel communications link.
- 2) Allows RS-232 Async data rates of 115.2k to be transmitted over a 128k sync clear channel communications link.
- 3) Allows RS-232 Sync data rates of 9.6k, 19.2, 38.4k to be transmitted over a 64k sync clear channel communications link.

The RA-64/128k will not support 9.6k, 19.2k, 38.4k or 57.6k over a 128k link or conversely 115.2k over a 64k link.

POWER REQUIREMENTS

The RA-64/128k derives its own power from the attached DCE and/or DTE data interfaces. The V.11 and V.35 power requirements are different and the user should pay special attention to the following;

A) PT# 146000, Model RA-64/128k_V11

This model is powered primarily from the Clock Signals from the attached 64k or 128k Sync channel. The unit derives its power from the attached SYNC DCE interface using the A(+) and B(-) leads of RXC, TXC, RXD and IND for its power supply. The unit will typically operate with only the RXC clock leads, pins 9 and 22 on the SYNC DB-25 connector.

B) PT# 147000, Model RA-64/128k_V35

The V.35 data interface will support both the old V.35 (+/-0 .5 volts) or newer V.35 (ITU recommendation V.11) ground to +3.8 volts. Therefore, its power requirements are different than the V.11 version above. The unit derives its power from the attached SYNC DCE and ASYNC DTE control signals. The signals used are RTS, DTR, DSR, DCD and CTS. Two control signals will most often supply sufficient power to the unit. Typically, DCD and or CTS can be forced high on a V.35 modem and this will supply sufficient power.

****If the user has no control signals available then the unit must be powered from an external power source. The DC Input Pins are through the DB-25 connectors and only one side for external power is required. On the RS-232 interface, access is through PIN-13. On the V.35 DB-25 side, DC In may be accessed through PIN-9.**

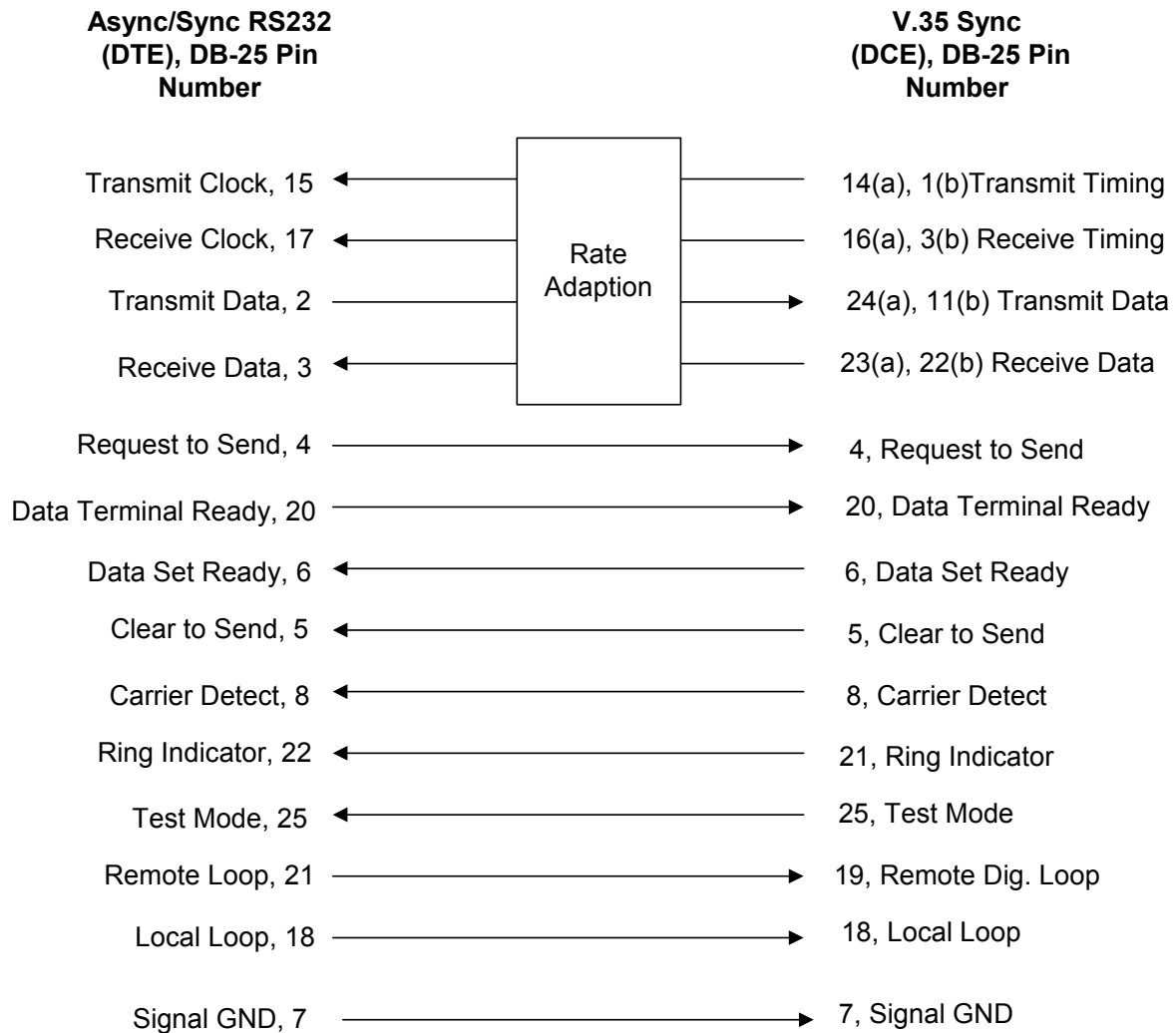
The unit has 3-Pin Headers located at JP3 & JP4. Reverse the headers to gain access to external DC power. The maximum DC voltage should be 12V DC.

If the user cannot force or raise any control signals the unit offers optional DC IN pins from the DB-25 connectors. On the ASYNC DB-25, DC IN is on PIN 13. On the SYNC DB-25 DC IN is on PIN 9. The voltage on these pins should not exceed 12 volts DC.

CONTROL SIGNALS

The function of control signals is handled differently between the RA-64/128k_V11 and RA-64/128k_V35 models. On the V.35 model, all control signals are passed through the device transparently.

V.35 Rate Adapter Flow of Data & Control Signals

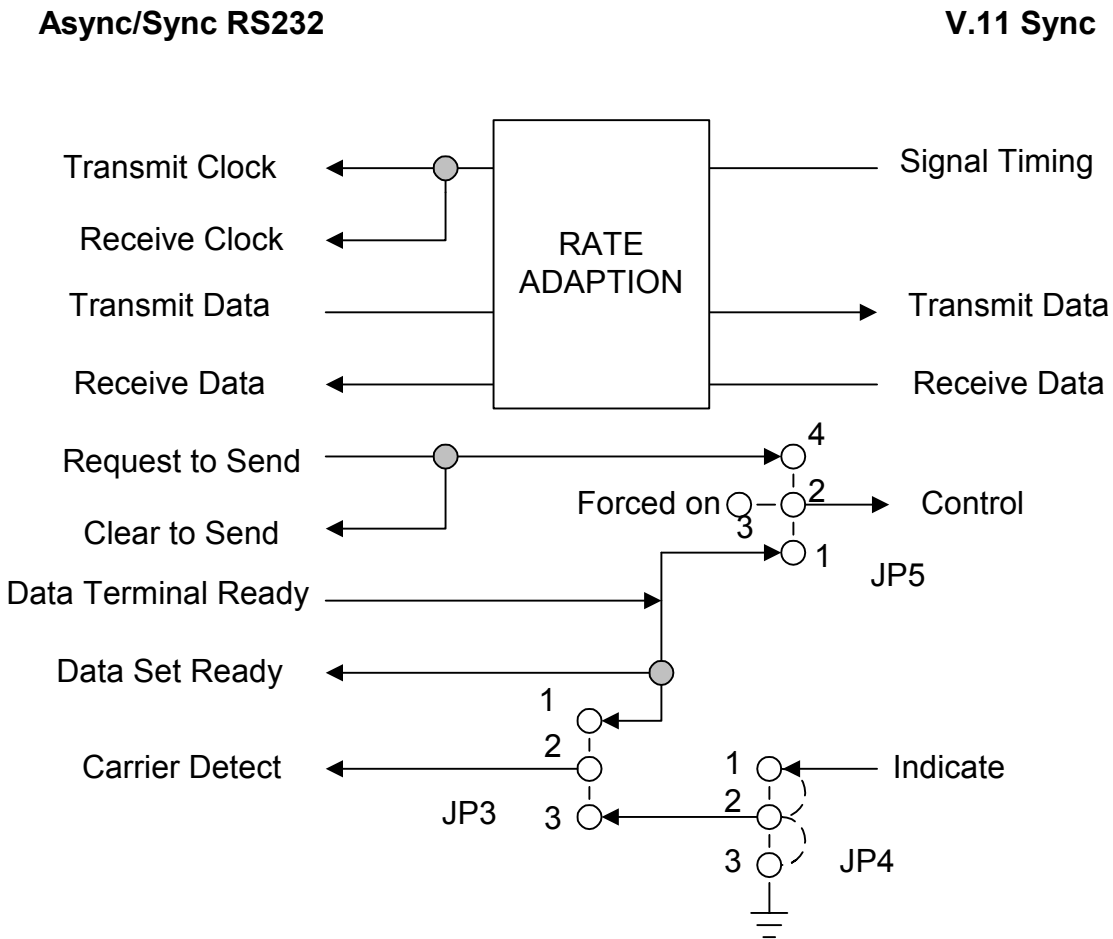


Reference the Adapter cable pt# 712005 for the conversion of SYNC DB-25 to V.35 Signals at the end of this manual

On the RA-64/128k_V11 model, the user has several jumper options for control signals. Data Carrier Detect(DCD) to the RS-232 Terminal comes from DTR (positions 1 to 2) of **JP3**, or from Indicate of the V.11 interface. (position 2 to 3) of **JP3**.

If you chose Indicate from the V.11 interface to go to DCD, then you now have two choices for Indicate. Utilizing **JP4**, Position 1 to 2 (you get Indicate) or position 2 to 3. (you force indicate to DCD, therefore forcing DCD high).

V.11 Rate Adapter



Definitions:

Control = The Control on the V.11 side is driven by either RTS from the RS232 side, or it is driven by DTR from the RS232 side or it may be forced on.

Carrier Detect = The Carrier Detect signal on the RS232 side is driven from the DTR signal on the RS232 side, or it is driven from the Indicate signal on the V.11 side, or it is forced on.

CABLING

The users data cables should be straight through, shielded and no longer than 20 feet. Standard RS-232 cabling may be used on the RS-232 interface. It is recommended that the synch X.21, RS-422 and RS-530 cabling be shielded, twisted pair cabling. The twisted pairs should consist of Data +/- and Clock +/- and all cabling must have the grounds properly terminated.

DIP SWITCH SETTINGS

S1-1	S1-2	S1-3	S1-4	BAUD RATE
ON	OFF	OFF	OFF	115.2k
OFF	ON	OFF	OFF	57.6k
OFF	ON	OFF	OFF	38.4K
OFF	OFF	ON	OFF	19.2k
OFF	OFF	OFF	ON	9.6k

S2-1	S2-2	S2-3	DESCRIPTION
ON	OFF	ON	Async ** 8 bit data
ON	ON	ON	Async ** 9 bit data
ON	OFF	OFF	Async ** 10 bit data
ON	ON	OFF	Async ** 11 bit data
ON	N/A	N/A	RS-232 ASYNC Data
OFF	N/A	N/A	RS-232 SYNC Data

** INCLUDES START AND STOP BITS

Note: S2-1 = ON for ASYNC or OFF for SYNC

S2-4	S2-5	S2-6	BAUD RATE
OFF	OFF	ON	115.2
ON	ON	OFF	57.6k
ON	OFF	OFF	38.4K
OFF	ON	OFF	19.2k
OFF	OFF	OFF	9.6k

NOTE: 115.2K FOR 128K SYNC ONLY

SWITCH SETTINGS

Configuration of the RA-64/128k requires that **all units** must be set to the same baud rate, SYNC or ASYNC, character length and 3-pin header jumper positions(JP1 and JP2 as shown).

Example of Typical Settings

RS-232 to V.35 SETTINGS

RA-64 / 128k

SETTINGS FOR 57.6 k
10 BIT DATA(8,N,1)

**** MOVE JP1 AND JP2 AS SHOWN ABOVE FOR ALL 57.6K OR 115.2K DATA AND ANY CHARACTOR LENGTH**

RA-64 / 128k

SETTINGS FOR 19.2 k
10 BIT DATA(8,N,1)

**** MOVE JP1 AND JP2 AS SHOWN ABOVE FOR ALL 9.6K, 19.2K OR 38.4K DATA AND ANY CHARACTOR LENGTH**

JP3 & JP4 ARE FOR OPTIONAL EXTERNAL POWER
REVERSE THE PINS(1&2) POSITIONS TO ENABLE
EXTERNAL POWER OPTION. DC INPUT, 12V MAX

RS-232 to V.11 SETTINGS

RA-64 / 128k

SETTINGS FOR 57.6 k
10 BIT DATA(8,N,1)

**** MOVE JP1 AND JP2 AS SHOWN ABOVE FOR ALL 57.6K OR 115.2K DATA AND ANY CHARACTOR LENGTH**

RA-64 / 128k

SETTINGS FOR 19.2 k
10 BIT DATA(8,N,1)

**** MOVE JP1 AND JP2 AS SHOWN ABOVE FOR ALL 9.6K, 19.2K OR 38.4K DATA AND ANY CHARACTOR LENGTH**

JP3, JP4 & JP5 ARE FOR CONTROL SIGNAL MANIPULATION, SEE PAGE 4

TROUBLE SHOOTING

POWER CYCLE:

The RA-64/128k Rate Adapter derives its internal power supply from the attached DCE and DTE devices. When moving **Dip Switches** and jumpers **JP1 and JP2** the RA-64/128k **MUST BE DISCONNECTED** from the attached DCE and DTE devices. If the user does not remove the DCE and DTE cabling to change Dip Switches, JP1 and JP2, the RA-64/128k may not function properly.

TESTING PC'S IN HYPERTERMINAL:

Due to the difference in PC serial communications ports made by different manufacturers UARTS and depending on the software revision level of HyperTerminal, the user may experience difficulty in establishing communications. When testing the RA-64/128k units with standard

PC's using HyperTerminal the following procedure should be followed:

- A)** Test the 64k sync clear channel link using synchronous test equipment.
- B)** Set the RA-64/128k units to your desired data rate and character length
- C)** Plug the units into the DCE and DTE data cables
- D)** Change the Hyperterminal settings to match the RA-64/128k Async settings at both ends of the communication link. We suggest TTY as the terminal emulation mode. Save the settings and exit HyperTerminal on both PC's. Restart HyperTerminal and normal communications should be established. If the PC's monitor displays corrupted characters, either the RA-64/128k units or the PC's may have the wrong data rate or character length settings.
- E)** Each time you change the RA-64/128k units data rate or character length you must also change HyperTerminals settings to match the RA-64/128k. *You must also exit and reenter HyperTerminal each time the settings are changed.*

Trouble Shooting communication problems:

To help pinpoint the communication problem, the user should confirm the following:

- A)** Data Cables: If you are using you own data cables, confirm the pinouts to the Cable Pinout Chart in this documentation.
- B)** Sync DCE 64k communications link is working error free end to end.
- C)** Async DTE communications are set to match the RA-64/128k units settings on both ends of the link.
- D)** If possible, direct connect the two Async DTE devices together using a crossover cable between the devices to confirm that the Async devices are indeed working.
- E)** Single sided operation using one PC, one RA-64/128k and one DCE device: Set the PC and RA-64/128k data rate and character length to the same rates and character length, such as 19.2k and 8,N,1(10 bit data). Set the Sync DCE at 64k and put the DCE(modem) into Local Loop back. Plug in the data cables. Now exit and restart HyperTerminal. Single sided communications should now work. If the user can establish single sided communications on each side of the Sync communications link, in all probability there is a sync communications problem between the two 64k sync devices.

TECHNICAL SPECIFICATIONS

Application

Interconnection of a low speed ASYNC DTE device operating at 9.6k, 19.2k, 38.4k and 57.6k over a 64k sync DCE clear channel

OR

Async 115.2k over a 128k Sync clear channel

OR

SYNC DTE device operating at 9.6k, 19.2k, 38.4k over a 64k sync DCE clear channel

Capacity

One RS-232 Port for DTE connection

One RS-422, RS-530, X.21 or V.35 sync port for 64k or 128k connection

Interface

EIA RS-232, Async or Sync

Balanced V.11 for RS-422, RS-530 or X.21

V.35 (+/-0.5 volts) or newer V.35 (ITU recommendation V.11) ground to +3.8 volts.

Data Rates

Async: 9.6k, 19.2k, 38.4k, 57.6k and 115.2k

Sync: 64k or 128k *Clear Channel*

Data Format

Data transparent at all data rates

Port Connections

RS-232: DB-25 female or male connectors

V.11 or V.35: Male or Female connectors

Power Source

Line powered from data interfaces

Requires minimum of 2 or 3 control signals

Environmental

Operating Temperature....32° to 122° F (0° to 50° C)

Relative Humidity.....5 to 95%

Non-Condensing

Altitude.....0 to 10,000 feet

Dimensions

Height 0.50 inches (1.27 cm)

Width 1.75 inches (4.44 cm)

Length 3.90 inches (9.91 cm)

Weight

1/2 pound (0.225 Kg)

Approvals

CE Approved

Warranty

Three Years, Return To Factory

ORDERING INFORMATION

Part Number: 146000

Model: RA-64k / V11

Description: RS-232 Async(9.6k, 19.2k, 38.4k & 57.6k to V.11 Sync Rate Adapter

Part Number: 147000

Model: RA-64k / V35

Description: RS-232 Async(9.6k, 19.2k, 38.4k & 57.6k to V.35 Sync Rate Adapter

REQUIRED OPTION CABLES

PT# 712014

Desc: 6 foot, DB-25 to X.21 Adapter Cable

PT# 712015

Desc: 6 foot, DB-25 to RS-422 Adapter Cable

Part Number: 147000

Model: RA-64 / 128k / V35

Description: RS-232 Async(9.6k, 19.2k, 38.4k, 57.6k & 115.2k to V.35 64k or 128k Sync Rate Adapter

REQUIRED CABLE

PT# 712005

Desc: 6 foot, DB-25 to V.35 Adapter Cable

ADAPTER CABLE PINOUT SPECIFICATION

PART NUMBER 147000, Model: RA-64 / 128k / V35
Connects to V.35 side on circuit card
V.35 to DB-25 Data Cable Pin Assignments

25-PIN CONNECTOR	34-PIN CONNECTOR	CIRCUIT NAME
Pin Number	Pin Number	
7	B	Signal Ground
4	C	Request-to-Send (RTS)
5	D	Clear-to-Send (CTS)
6	E	Data Set Ready (DSR)
8	F	Received Line Signal Detect (LSD)
20	H	Data Terminal Ready (DTR)
21	J	Ring Indicator (RI)
18	L	Local Loopback (LL)
19	N	Remote Digital Loopback (RL)
24+, 11-	P+, S-	Transmit Data (TXD)
23+, 22-	R+, T-	Received Data (RXD)
15+, 2-	U+, W-	Transmitter Signal Element Timing - DTE Source
16+, 3-	V+, X-	Receiver Signal Element Timing - DCE Source
14+, 1-	Y+, AA-	Transmitter Signal Element Timing - DCE Source
25	NN	Test Mode (TM)
13	A	Earth Ground

ADAPTER CABLE PINOUT SPECIFICATION
PART NUMBER 146000, Model: RA-64k / V11
Connects to V.11 side on circuit card
Data Cable Pin Assignments

Name	Pin# RA-64k/V11	Pin# RS-530	RS-449	X21
Transmit Data (a)	25	2	4	2
Transmit Data (b)	12	14	22	9
Transmit Clock (a)	23	15	5	6
Transmit Clock (b)	10	12	23	13
Receive Data (a)	24	3	6	4
Receive Data (b)	11	16	24	11
Receive Clock (a)	22	17	8	6
Receive Clock (b)	9	9	26	13
Control In (a)	20	8 (cd+)	13 (cd+)	5
Control In (b)	7	10 (cd-)	31 (cd-)	12
Control Out (a)	21	4 (rts+)	7 (rts+)	3
Control Out (b)	8	19 (rts-)	25 (rts-)	10
Ground	13	7	19	8
		6 (dsr+)	11 (dsr+)	
		22 (dsr-)	29 (dsr-)	
		20 (dtr+)	12 (dtr+)	
		23 (dtr-)	30 (dtr-)	
Note:				
For RS-530 cable, tie pins 6(dsr+) to 20(dtr+) and 22(dsr-) to 23(dtr-)				
For RS-449 cable, tie pins 11(dsr+) to 12(dtr+) and 29(dsr-) to 30(dtr-)				