**DESCRIPTION:**
The RA-64/128K Rate Adapter allows low speed async RS-232 DTE equipment operating 1.2K to 115.2K transmit over a high speed 16K, 64K or 128K clear channel sync communications link. The RA-64/128K devices are used in pairs, one at each end of the communications link or in multiples as when used in a multi-point communications link. The RA-64/128K 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 asynchronous interface is RS-232 and supports data rates of 1.2K to 115.2Kbps. The synchronous data interface rate must be set at 16k, 64k or 128k and will support data interfaces of X.21, RS-422, RS-530 or optional V.35.

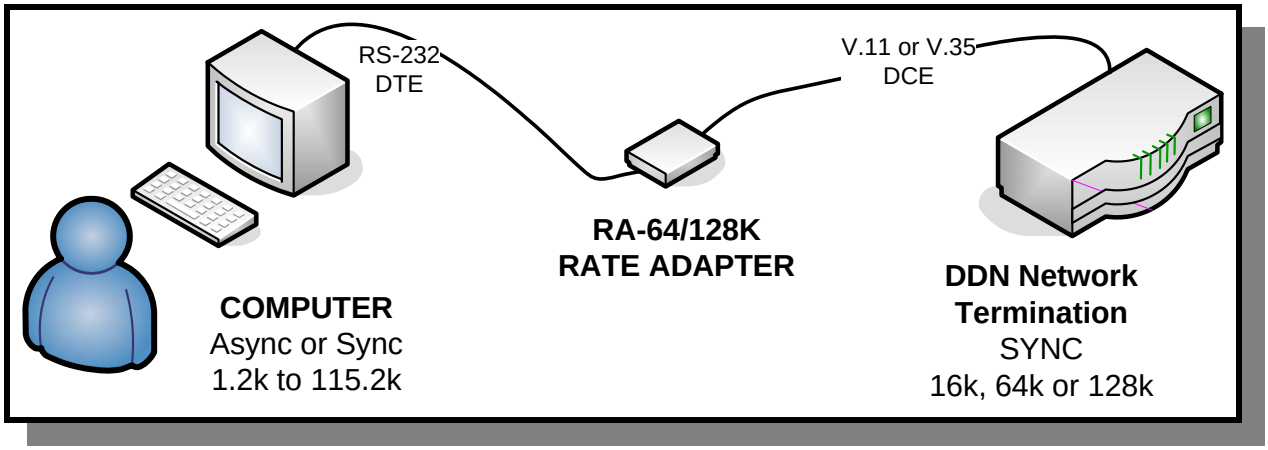
The RA-64/128K will support V.35 by ordering the unit under part number 147000. The RA-64/128K_V35 data interface will support both the old V.35 (+/-0 .5 volts) or newer V.35 (ITU recommendation V.11) ground to +3.8 volts. A DB-25 male to V.35 male 6 foot adapter cable is required for V.35 termination.

The RA-64/128K derives its power through the async and or 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 two synchronous control signals available for proper operation.

**CABLING:**
The users RS-232 data cables should be *straight through*, shielded and no longer than 20 feet.
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.

**SWITCH SETTINGS:**
Configuration of the RA-64/128K requires that all units must be set to the same baud rate, character length and 3-pin header jumper positions.

**POWER REQUIREMENTS**
The RA-64/128K derives its power from the data interfaces. The user must insure that the unit has a minimum of two(2) control signal present for proper operation. The typical control signals are RXC, RXD, DSR, TXC, CTS, DCD or IND(X.21).



**POWER CYCLE:**
The RA-64/128K Rate Adapter derives its internal power supply from the attached DCE and DTE devices. When moving ***Dip Switches( or Jumpers)*** the RA-64/128K ***MUST BE DISCONNECTED*** from the attached DCE or DTE devices. If the user does not remove the DCE and DTE cabling to change Dip Switches, the RA-64/128K will not function properly.

## DIP SWITCH SETTING GUIDE:

| DIP SWITCH SW1 | Pin1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 |
|---|---|---|---|---|---|---|
| **Data Rates, RS-232 Port to Sync V11** | | | | | | |
| 1.2k RS-232/16k Sync V11 | On | On | On | On | | |
| 2.4k RS-232/16k Sync V11 | OFF | On | On | On | | |
| 4.8k RS-232/16k Sync V11 | On | OFF | On | On | | |
| 9.6k RS-232/16k Sync V11 | OFF | OFF | On | On | | |
| | | | | | | |
| 1.2k RS-232/64k Sync V11 | On | On | OFF | On | | |
| 2.4k RS-232/64k Sync V11 | OFF | On | OFF | On | | |
| 4.8k RS-232/64k Sync V11 | On | Off | OFF | On | | |
| **9.6k RS-232/64k Sync V11** | **OFF** | **OFF** | **OFF** | **On** | | |
| 19.2k RS-232/64k Sync V11 | On | On | On | OFF | | |
| 38.4k RS-232/64k Sync V11 | OFF | On | On | OFF | | |
| 57.6k RS-232/64k Sync V11 | On | Off | On | OFF | | |
| | | | | | | |
| 115.2k RS-232/128k Sync V11 | OFF | OFF | On | OFF | | |
| | | | | | | |
| **Async Character Length** | | | | | | |
| 8 Bit Data | | | | | OFF | On |
| 9 Bit Data | | | | | On | On |
| **10 Bit Data(8, N, 1)** | | | | | **OFF** | **OFF** |
| 11 Bit Data | | | | | On | OFF |
| | | | | | | |
| **DIP SWITCH SW2** | **Pin 1** | **Pin 2** | **Pin 3** | **Pin 4** | **Pin 5** | **Pin 6** |
| **RS-232 Async/Sync Data Set-Up** | | | | | | |
| RS-232 Sync | OFF | | | | | |
| **RS-232 Async** | **On** | | | | | |
| | | | | | | |
| **RS-232 DCD Control Signal, SW2** | **Pin 1** | | | | | |
| DCD Follows Async DTR | | OFF | OFF | OFF | OFF | |
| **Follows V11 Indicate** | | **OFF** | **OFF** | **On** | **OFF** | |
| DCD Forced On | | OFF | OFF | OFF | On | |
| | | | | | | |
| **V.11 DCD Control Signal, SW2** | | | | | | |
| V11 DCD Follows V24 RTS | | OFF | OFF | OFF | OFF | |
| V11 DCD Follows V24 DTR | | On | OFF | OFF | OFF | |
| V11 Control and Indicate Forced High | | OFF | On | OFF | OFF | |

# IMPORTANT CONFIGURATION NOTICE

**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.

## CABLE PINOUT SPECIFICATION: V.11 Data Cable Pin Assignments
## PART NUMBER 146000, Model: RA-64/128K/V11

| 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+) | | |
| Note: | | | 23 (dtr-) | | 30 (dtr-) | | |
| 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-) | | | | | | | |

## CABLE PINOUT SPECIFICATION: V.35 to DB-25 Data Cable Pin Assignments
## Model NUMBER 147000, Model: RA-64/128K/V35

| 25-PIN CONNECTOR Pin Number | 34-PIN CONNECTOR Pin Number | CIRCUIT NAME |
|---|---|---|
| 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 |