

# RSD-20

## High Speed Digital Sharing Device Installation and Operation Manual

---

### Notice

This manual contains information that is proprietary to RAD Data Communications. No part of this publication may be reproduced in any form whatsoever without prior written approval by RAD Data Communications.

No representation or warranties for fitness for any purpose other than what is specifically mentioned in this manual is made either by RAD Data Communications or its agents.

For further information contact RAD Data Communications at the address below or contact your local distributor.

**RAD data communications  
Headquarters**

12 Hanechoshet Street  
Tel Aviv 69710 Israel  
Tel: 972-3-6458181  
Fax: 972-3-6498250  
E-mail: rad@radmail.rad.co.il

**RAD data communications  
US East**

900 Corporate Drive  
Mahwah, NJ 07430 USA  
Tel: (201) 529-1100  
Fax: (201) 529-5777  
E-mail: market@radusa.com

**RAD data communications  
US West**

3631 South Harbor  
Boulevard  
Suite 250  
Santa Ana, CA 92704  
Tel: (714) 850-0555  
Fax: (714) 850-1555

# Warranty

This RAD product is warranted against defects in material and workmanship for a period of one year from date of shipment. During the warranty period, RAD will, at its option, either repair or replace products which prove to be defective. For warranty service or repair, this product must be returned to a service facility designated by RAD. Buyer shall prepay shipping charges to RAD and RAD shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties and taxes for products returned to RAD from another country.

## Limitation of Warranty

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied firmware or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

## Exclusive Remedies

The remedies provided herein are the Buyer's sole and exclusive remedies. RAD shall not be liable for any direct, indirect special, incidental, or consequential damages, whether based on contract, tort, or any legal theory.

# Regulatory Information

## FCC-15 User Information

This equipment has been tested and found to comply with the limits of the Class A digital device, pursuant to Part 15 of the 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 the 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 per EN 55022

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

# Safety Warnings



The exclamation point within a triangle is intended to warn the operator or service personnel of operation and maintenance factors relating to the product and its operating environment which could pose a safety hazard.

Always observe standard safety precautions during installation, operation and maintenance of this product. Only a qualified and authorized service personnel should carry out adjustment, maintenance or repairs to this instrument. No adjustment, maintenance or repairs should be performed by either the operator or the user.

The safety status of the RSD-10 ports is SELV (safety extra low voltage).

# Declaration of Conformity

**Manufacturer's Name:** RAD Data Communications Ltd.

**Manufacturer's Address:** 12 Hanechoshet St.  
Tel Aviv 69710  
Israel

**declares that the product:**

**Product Name:** **RSD-10**

Conforms to the following standard(s) or other normative document(s):

**EMC:** EN 55022 (1994) Limits and methods of measurement of radio disturbance characteristics of information technology equipment.

EN 50082-1 (1992) Electromagnetic compatibility - Generic immunity standards for residential, commercial and light industry.

**Safety:** EN 60950 (1992/93) Safety of information technology equipment, including electrical business equipment.

## Supplementary Information:

The product herewith complies with the requirements of the EMC Directive 89/336/EEC and the Low Voltage Directive 73/23/EEC. The product was tested in a typical configuration.

Tel Aviv, October 7th, 1996



Haim Karshen  
VP Quality

**European Contact:** RAD Data Communications GmbH, Lyoner Strasse 14, 60528 Frankfurt am Main, Germany

# TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION</b>	
1.1	General . . . . .	1.1
1.2	Functional Description . . . . .	1.1
1.3	Specifications . . . . .	1.2
1.4	Ordering . . . . .	1.3
<b>2</b>	<b>INSTALLATION</b>	
2.1	General . . . . .	2.1
2.2	Site Preparation . . . . .	2.1
2.3	Physical Installation . . . . .	2.1
2.4	Electrical Installation . . . . .	2.1
2.5	System Synchronization and Clock Distribution . . . . .	2.5
<b>3</b>	<b>OPERATION</b>	
3.1	General . . . . .	3.1
3.2	Controls and Indicators . . . . .	3.1
3.3	Operating Procedure . . . . .	3.2
3.4	Operational Field Strapping Changes . . . . .	3.3
3.5	Fault Isolation Procedure . . . . .	3.3
<b>4</b>	<b>THEORY OF OPERATION AND APPLICATIONS</b>	
4.1	Introduction . . . . .	4.1
4.2	Contention . . . . .	4.1
4.3	Sub-channel Disable . . . . .	4.1
4.4	Control Signals . . . . .	4.2
4.5	Applications . . . . .	4.6
<b>APPENDIX A X.21 INTERFACE SIGNAL DESCRIPTION</b>		
<b>APPENDIX B X.35 INTERFACE SIGNAL DESCRIPTION</b>		
<b>FIGURES</b>		
Figure 2.1	Rear Panel . . . . .	2.2
Figure 2.2	SD-20/V.35 PC Board Layout . . . . .	2.4
Figure 2.3	RSD-20/X.21 PC Board Layout . . . . .	2.4
Figure 2.4	Synchronization on Main Channel Modem's Clock . . . . .	2.5
Figure 2.5	Synchronization on Internal Clock . . . . .	2.6
Figure 2.6	Synchronization on Sub-channel 1 . . . . .	2.7
Figure 3.1	Front Panel . . . . .	3.1
Figure 4.1	Main Channel DTE with Sub-channel DCE . . . . .	4.4
Figure 4.2	Main Channel DCE with Sub-channel DTE . . . . .	4.4
Figure 4.3	Main Channel DTE with Sub-channel DTE . . . . .	4.5
Figure 4.4	Main Channel DCE with Sub-channel DCE . . . . .	4.5
Figure 4.5	RSD-20 Operating Modes . . . . .	4.6
<b>TABLES</b>		
Table 2.1	PC Board Switch and Strap Selection . . . . .	2.3
Table 3.1	Control Functions . . . . .	3.2
Table 3.2	Indicator Functions . . . . .	3.2
Table A.1	X21 Interface Signal Description . . . . .	A.1
Table B.1	V.35 Interface Signal Description . . . . .	B.1

# 1

---

## **INTRODUCTION**

### **1.1 GENERAL**

The RSD-20, High Speed Digital Sharing Device, enables up to four high speed modems, terminals or controllers to share a master modem, a multiplexer or a computer port in a multipoint environment. The RSD-20 is compatible with synchronous equipment at data rates of 48, 56, or 64 kbps, with V.35 or X.21 interface.

### **1.2 FUNCTIONAL DESCRIPTION**

The main channel transmits information to all sub-channels in parallel. Sub-channels contend to transmit to the main channel by activating RTS/DCE (V.35), CONT/IND (X.21), or by data transition (strap-selectable). If the control signal or sub-channel data is active, the transmit data and control signals of the sub-channels are connected to the main channel. When the control signal drops or data transmission stops, the control circuitry is switched to monitor other sub-channels. A sub-channel is disconnected immediately after it drops the control signal or transmits 16 idle bits.

A sub-channel can be automatically disabled if it stays active for longer than a preset time, blocking all other sub-channels (streaming). The automatic disable resets itself as soon as the sub-channel control signal drops, or transmits 16 idle bits. An indicator on the front panel will light for each sub-channel which is disabled by automatic circuitry. Manual disabling of a sub-channel is also possible via a front panel push button.

Three clock modes are supported:

- 1) Internal
- 2) External from the main channel
- 3) External from sub-channel 1

A built-in buffer overcomes phase differences between the clocks of modems connected to the sub-channels and the RSD main channel transmit clock.

An additional buffer option is available for V.35 interface only. This buffer is required when the equipment connected to more than one sub-channel must provide a clock and is unable to accept an external clock. Examples are D.D.S. in the U.S., any digital service in other countries, or modems that cannot be set to an external clock. This buffer compensates for phase differences between the clocks of the modems connected to the sub-channel and the clock of the RSD-20.

Installation and configuration of the RSD-20 is simple. Minimal strapping adjustments allow for easy installation and operation. A DCE/DTE switch for the main channel and each sub-channel eliminates the need for crossover cables. Only straight-through cables are used to connect the modems or terminals to the RSD-20.

The RSD-20 is a desk-top unit, with special hardware available for mounting it onto a 19" rack.

## 1.3 SPECIFICATIONS

### ■ **Number of Sub-channels**

Four

### ■ **Channel Configuration**

Lowest priority: Sub-channel 1

Highest priority: Sub-channel 4

### ■ **Sub-channel Selection**

Strap-selectable to:

Control signal RTS/DCD (V.35) or CONT/IND (X.21) ON

Data transitions

### ■ **Sub-channel Deselection**

RTS/DCD (V.35) or CONT/IND (X.21) OFF (in control contention)

16 bits of idle data (in data contention)

### ■ **Sub-channel Disabling**

Manual: Via front panel switches

Automatic: If sub-channel stays connected for more than a pre-set time period  
(32.4, 4, 0.5 sec for 64 or 48 kbps; 36.8, 4.7 or 0.6 for 56 kbps)

### ■ **Transmit Clock Source**

- Internal
- External derived from main channel
- External derived from sub-channel 1

### ■ **Data Rates**

Synchronous:

Internal Clock:

- Selectable 48, 64 kbps for 64 kbps option
- 56 kbps

External Clock:

- Derived from main channel (modem in internal mode)
- Derived from sub-channel 1 (up to 128 kbps)

### ■ **Input and Output Interface**

V.35 or X.21

### ■ **Connectors**

- Five 34-pin V.35, female,
- Five DB-15 X.21, female

### ■ **Controls**

Four manual sub-channel DISABLE switches, one per sub-channel;  
Push-button switches

**■ Indicators**

**DATA:** Display data broadcast from main channel to sub-channels  
**ACTIVITY:** 4 LEDs indicate which sub-channel has gained access to main channel  
**DISABLE:** 4 LEDs indicate if sub-channel has been disabled automatically  
**ON:** RSD power is on

**■ Power**

115/230 VAC switchable;  
(10%; 47-63 Hz; 10 W)

**■ Physical**

Height: 44 mm / 1.7 in (1U)  
Width: 431 mm / 17.0 in  
Depth: 208 mm / 8.2 in  
Weight: 2 kg / 4.4 lb

**■ Environment**

Temperature: 0-50°C/32-122°F  
Humidity: Up to 90%, non-condensing

**1.4 ORDERING****RSD-20/+/\*/#**

Digital Sharing Device

+ Specify:

**64** for 64/48 kbps (selectable)  
**56** for 56 kbps

\* Specify interface:

**V.35** for V.35 interface  
**X.21** for X.21 interface



# 2

---

## **INSTALLATION**

Access inside the equipment is only permitted to authorized service personnel.

### **2.1 GENERAL**

This chapter provides information on performing the mechanical and electrical installation of the RSD-20. After installation has been completed, refer to Chapter 3 for operating information and system checkout to assure normal operation.

### **2.2 SITE PREPARATION**

The RSD-20 must be installed within 1.5 m (5 feet) of a grounded AC outlet, and within 15 m (50 feet) of the associated data terminals or modems.

Allow at least 90 cm (36 in) of frontal clearance for operating and maintenance accessibility. Ensure that there is a minimum of 10 cm (4 in) clearance at the end of the unit for power and interface cables.

### **2.3 PHYSICAL INSTALLATION**

The RSD-20 is designed for placement on a table-top, or for mounting onto a 19" rack. It is equipped with special brackets already assembled for mounting. These brackets can be easily removed as follows:

1. Disconnect the power cord.
2. Unfasten the rear panel screw and slide back the top cover.
3. Unfasten the two screws from the bracket and remove the single bolt.

### **2.4 ELECTRICAL INSTALLATION**

#### **2.4.1 AC Power**

AC power is supplied to the RSD-20 through a 1.5 m (5 ft) cord terminated by a grounded 3-prong plug. The AC cord is fused at the rear panel of the unit. A 0.4A slow-blow fuse is required.

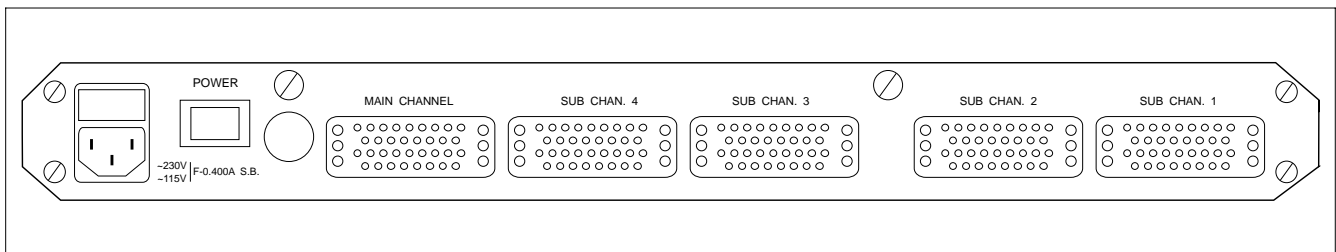
### 2.4.2 Rear Panel

Six connectors are located on the rear panel of the RSD-20, consisting of five channel connectors (four for the sub-channels and one for the main channel) and one 3-pin power connector, which also includes the fuse holder. The five channel connectors are 34-pin connectors for the V.35 interface or 15-pin, D-type for the X.21 interface. The ON/OFF power switch and the 110/220 VAC selection switch are located also on the rear panel (see Figure 2.1).

### 2.4.3 Internal Switches and Strap Selection

The internal switches and straps on the RSD-20 should be configured to meet system requirements. In order to change the settings, the following steps should be followed:

- a) Disconnect the AC power cable.
- b) Remove the RSD-20 top cover, loosen the two screws on the rear panel and slide back the top cover.
- c) Identify the straps according to Table 2.1 and Figures 2.3 and 2.4.



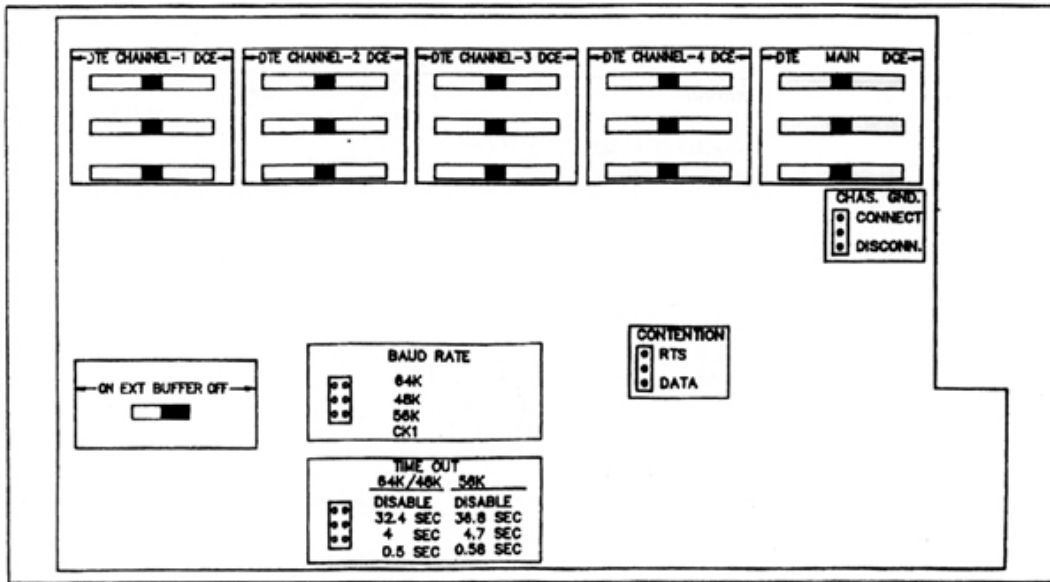
**Figure 2.1**  
**Rear Panel**

- d) Install the straps/switches in the required position.
- e) Reinstall the top cover.

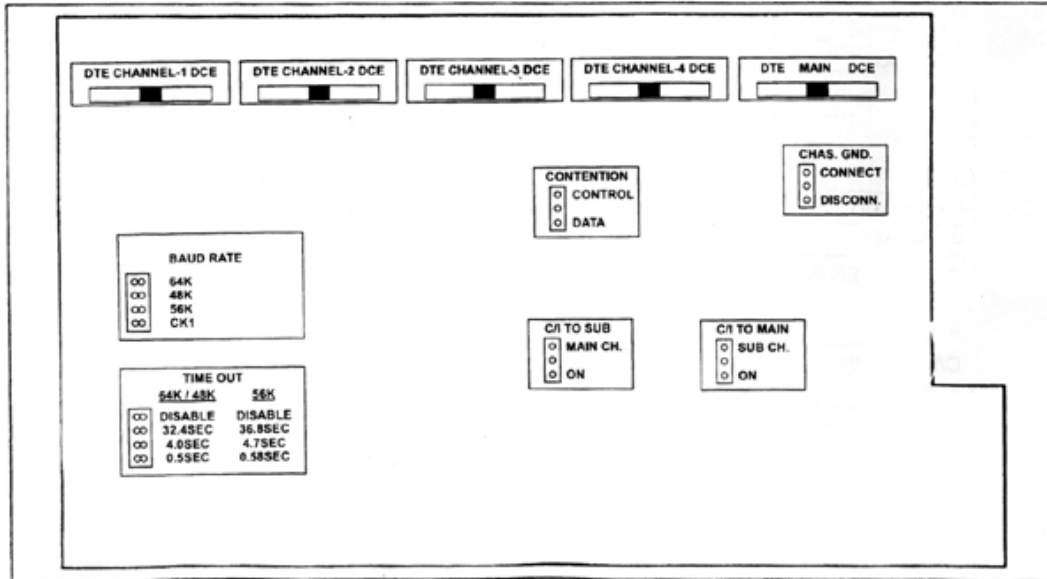
**CAUTION** *Disconnect the instrument from the input line power before removing covers.*

**Table 2.1**  
**PC Board Switch and Strap Selection**

<b>Strap Identity</b>	<b>Function</b>	<b>Possible Settings</b>	<b>Standard Factory Setting</b>
MAIN DCE/DTE Switch	Determines the RSD-20 main CH. interface as DTE (straight connection to modem) or as DCE (straight connection to computer or terminal). Note: for V.35, the three switches on the main should be set to the same position	DTE DCE	DTE
Subchannels 1-4 DCE/DTE Switches (one switch for each sub-channel)	Determines the RSD-20 sub-channel interface as DTE or DCE. Note: for V.35, the three switches which correspond to each sub-channel should be set to the same position	DTE DCE	DTE
BAUD RATE	Selects the RSD-20 internal data or internal clock from sub-channel 1 (CLK 1). Note: When using CLK 1 mode, the main channel cannot be connected to a modem working with an internal clock	48, 64 kbps CLK-1 in 64 option; or 56 kbps CLK-1 in 56 option	64 or 56 kbps
CONTENTION	Determines sub-hannel selection and deselection	RTS DATA (V.35) CONTROL (X.21)	RTS for V.35 CONTROL for X.21
TIME OUT	Selects the time-out before activating automatic disabling (anti-streaming)	32.4, 4 or 0.5 sec in 48, 64 kbps option; or 36.8, 4.7, 0.58 sec in 56 kbps option	32.4 sec
CHAS.GND Jumper	Connects or disconnects signal ground to chassis ground	CONNECT DISCONN	DISCONN
EXT.BUFFER (for V.35 only)	Activates or deactivates the extra buffer. The switch controls 4 sub-channels	ON OFF	OFF
C/I TO MAIN (for X.21 only)	Determines the state of the C/I control signal to the main channel	SUB CH. ON	SUB CH.
C/I TO SUB (for X.21 only)	Determines the state of the C/I control signal to the sub-channel	MAIN CH. ON	MAIN CH.



**Figure 2.2**  
**SD-20V.35 PC Board Layout**



**Figure 2.3**  
**RSD-20X.21 PC Board Layout**

## 2.5 SYSTEM SYNCHRONIZATION AND CLOCK DISTRIBUTION

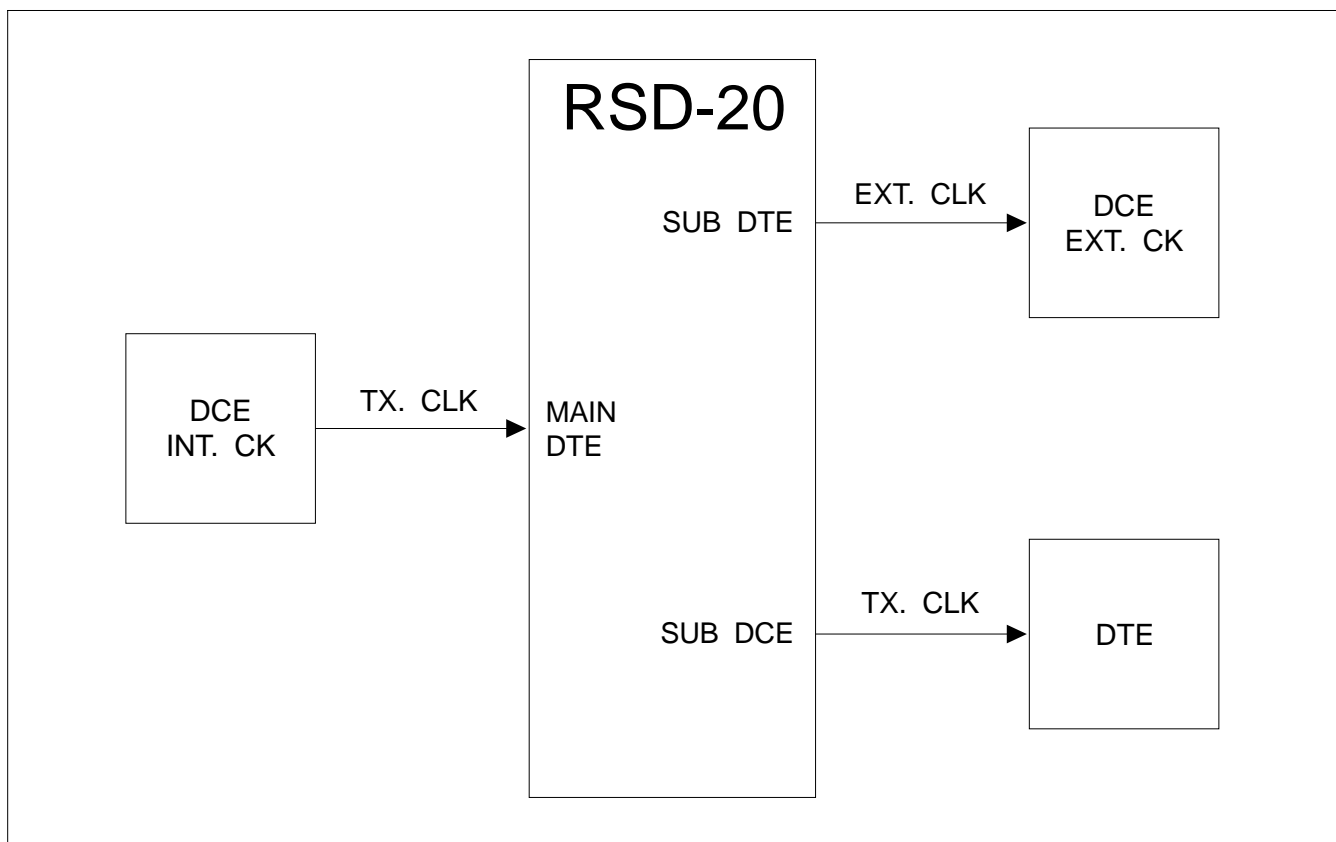
### 2.5.1 RSD-20/V.35

Four alternatives are available for synchronization of the system:

- Main channel modem timing signals.
- RSD-20 internal clock.
- Sub-channel 1 modem timing signals.
- Any sub-channel modem timing signals. For this the optional buffer is required.

#### 2.5.1.1 Synchronization on Main Channel Modem Clock

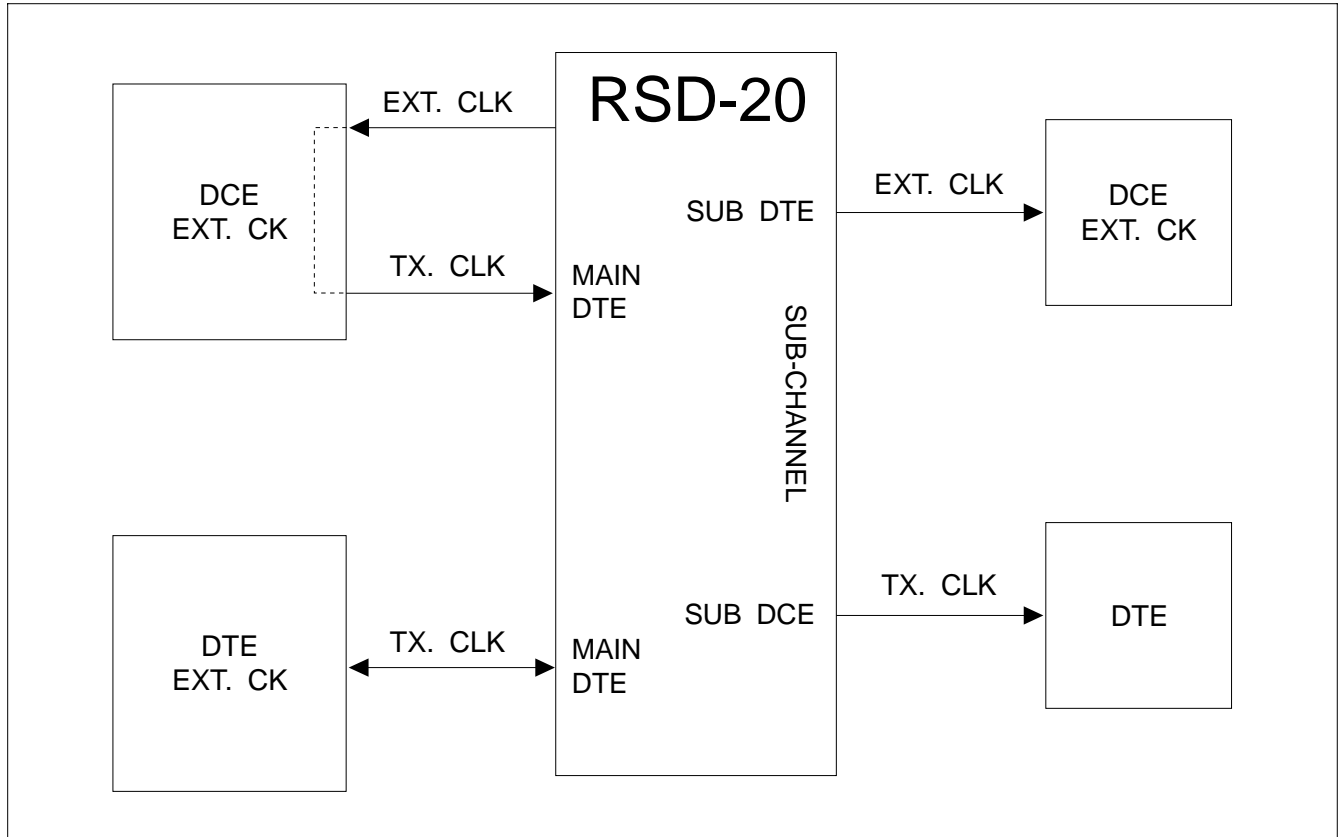
- Main channel modem – strapped to internal clock.
- DCEs attached to sub-channels are strapped to external clock.
- RSD-20 bit rate setting is ignored (bit rate is determined by main channel modem clock).



**Figure 2.4**  
**Synchronization on Main Channel Modem's Clock**

**2.5.1.2 Synchronization on RSD-20 Internal Clock**

- a) RSD-20 baud rate should be strapped to the required speed.
- b) DCEs attached to sub-channels should be strapped to external clock.
- c) DCE attached to main channel should be strapped to external clock.

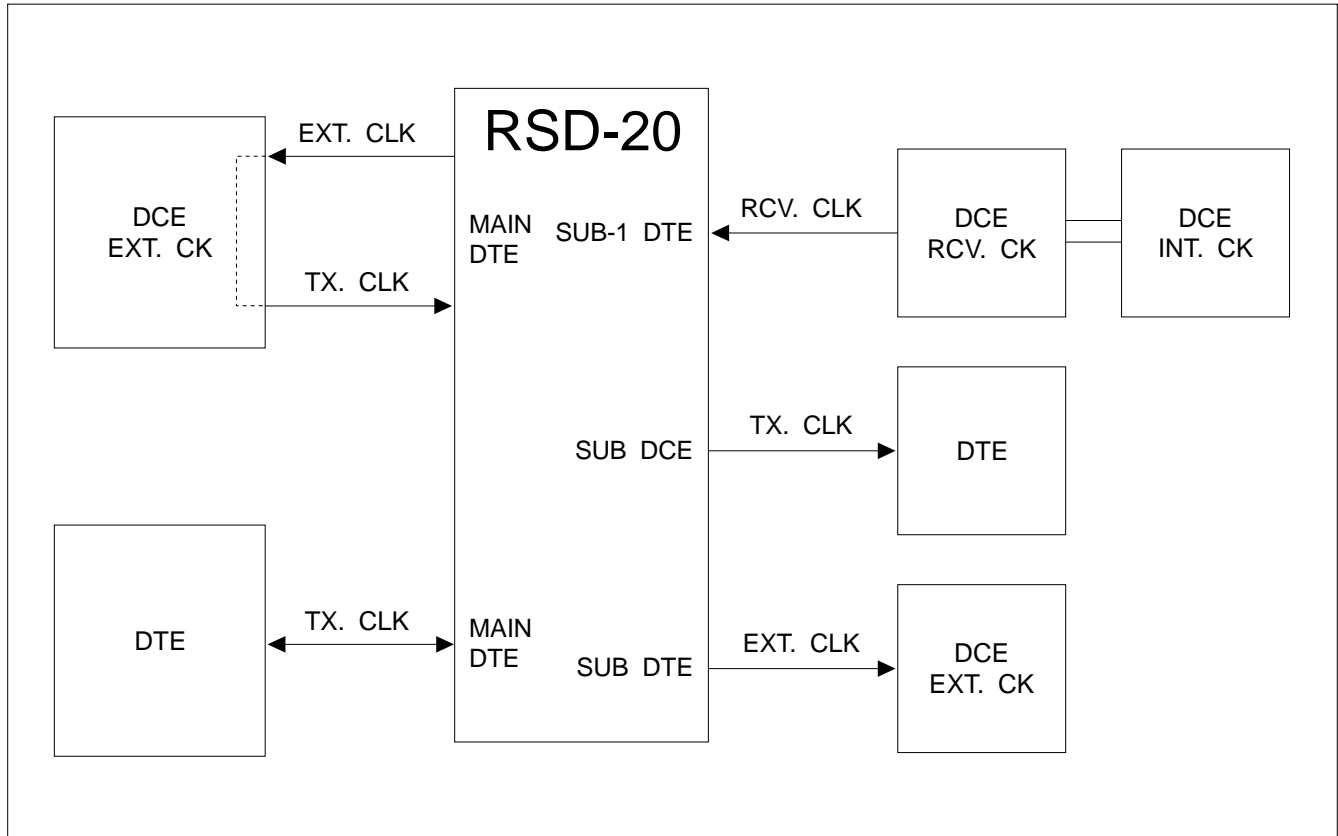


**Figure 2.5**  
**Synchronization on Internal Clock**

**2.5.1.3 Synchronization on Sub-channel 1**

- a) RSD-20 baud rate should be strapped to CLK-1.
- b) DCE attached to main channel should be strapped to external clock.
- c) DCEs attached to sub-channel 1 should be strapped to internal clock.

**NOTE** *Synchronization on sub-channel 1 is not recommended when the modem connected to sub-channel 1 operates in switched carrier mode, as it causes fluctuations in clock frequency and phase.*



**Figure 2.6**  
**Synchronization on Sub-channel 1**

### **2.5.1.4 External Clock for more than one Sub-channel**

This option enables connection of more than one sub-channel to the line from the P.T.T. service. Generally, the P.T.T. modems supply clock to every line – i.e. the P.T.T. has to provide the clock. Since the modems are all from the same service, the clocks are synchronized. The external buffer will compensate for phase differences between the clocks received from the sub-channels. However, the external buffer option will not compensate for the clock differences, if different clock sources are used.

### **2.5.2 RSD-20/X.21**

The X.21 standard states that DCEs and DTEs will only have one clock signal (signal timing). The direction of this clock is always from the DCE to DTE. This signal timing is used for the transmit clock and receive clock.

According to this standard, four alternatives are available for the synchronization of the system when working with the RSD-20/X.21:

- a) Main channel is DTE (attached to a modem).
- b) Main and all sub-channels are DCE (attached to DTEs).
- c) Main channel is DCE (attached to a DTE and all sub-channels are DTE (attached to modems).
- d) Main channel is DCE and sub-channels are mixed (DTEs and DCEs).

#### **2.5.2.1 Main channel is DTE (attached to a modem)**

In this mode the RSD operates according to the signal timing of clock of the main channel modem. DTEs attached to the RSD-20 sub-channels are synchronized to the mains clock.

DCEs attached to sub-channels are synchronized on their own signal timing. A special buffer, integrated in the RSD-20/X.21, compensates for the phase difference between the modems of the sub-channels and the main channel modem.

#### **2.5.2.2 Main and all sub-channels are DCE (attached to DTEs)**

In this mode the RSD provides the clock to all ports attached to the main and sub-channels. The RSD's baud rate should be strapped to the appropriate system baud rate.

#### **2.5.2.3 Main channel is DCE (attached to a DTE) and all sub-channels are DTE (attached to modems)**

In this mode the RSD's baud rate is strapped to CLK-1. The DTE attached to the main channel is synchronized to the RSD's clock, the modems attached to sub-channels 2, 3, 4 should be strapped to external clock, except for the modem attached to sub-channel 1 which should be strapped to internal clock.

**NOTE**      *It is also possible to work with the RSD's internal clock in this mode, but CLK-1 is preferred.*



#### **2.5.2.4 Main channel is DCE and sub-channels are mixed (DTE and DCE)**

In this mode one of the modems attached to the sub-channels (configured as DTE) should be attached to sub-channel 1, and the RSD baud rate should be strapped to CLK-1.

The DTEs attached to the main and sub-channels are synchronized to the RSD's clock; the modems attached to the sub-channels are synchronized to their own clock; and the internal buffer compensates for the phase difference between the signal timing of the modem attached to sub-channel 1 to the rest of the modems.

- NOTE**
1. *Working with RSD's internal clock is also possible but CLK-1 is preferred.*
  2. *On DTE (sub-channels 1 to 4 and Main channel), the RSD-20 supplies clock on pins 7 and 14 for DCE external clock (The DCE must support external clock as in the ASM-20/8-X.21).*

**WARNING** *Before plugging in this unit, the protective ground (earth) terminals must be connected to the protective conductor of the (mains) power cord. The mains plug should only be inserted in a socket outlet provided with a protective ground (earth) contact. The protective action must not be negated by use of an extension cord (power cable) without a protective conductor (grounding).*

*Ensure that only fuses with the required rated current, and specified type (slow blow, 0.4A) are used for replacement. The use of repaired fuses, and the short-circuiting of fuse holders is strictly forbidden.*

*Whenever it is likely that the protection offered by fuses has been impaired, the instrument must be made inoperative and secured against unintended operation.*

*With the unit power turned on, operating personnel are not exposed to voltages in excess of 30 volts on any I/O pin, provided that the equipment to which the RSD-20 is connected is safe.*

# 3

## OPERATION

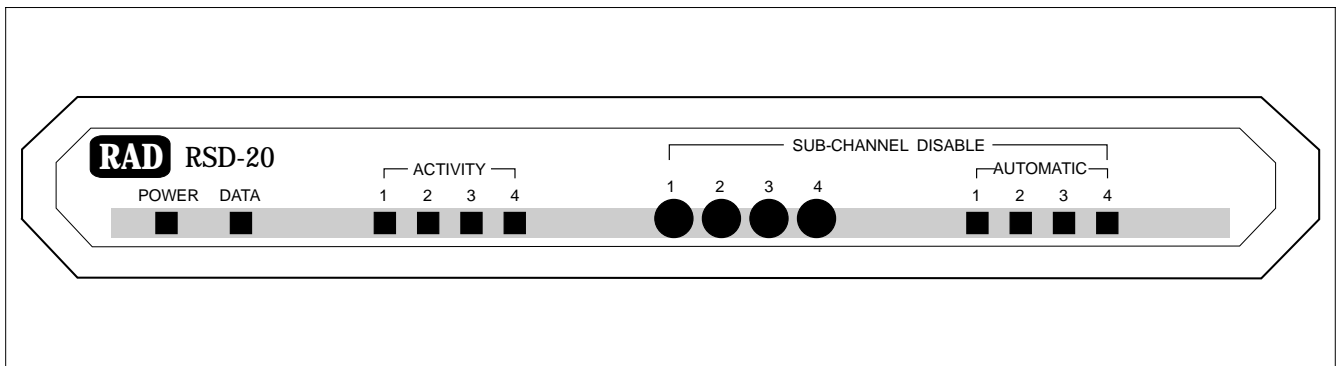
### 3.1 GENERAL

This chapter details the RSD-20 controls and indicators, their functions, and operating procedures.

The installation procedures given in Chapter 2 must be completed and checked before operation of the RSD-20 is attempted.

**NOTE** For an explanation of all the possible system installations of the RSD-20, refer to Chapter 4.

### 3.2 CONTROLS AND INDICATORS



**Figure 3.1**  
**Front Panel**

Four controls and ten indicators are located on the RSD-20 front panel; two controls are located on the rear panel. Their functions are described in Tables 3.1 and 3.2.

**Table 3.1  
Control Functions**

<b>Control</b>	<b>Location</b>	<b>Function</b>
Power switch (with lamp) ON/OFF	Rear Panel	Turns AC power ON or OFF
110/220 VAC Selector	Rear Panel	Selects main power source: 115 or 230 VAC
Four manual DISABLE push-button switches	Front Panel	Manually deactivates sub-channels connected to defective terminals or modems. A <i>depressed</i> push button <i>disables</i> the sub-channel

**Table 3.2  
Indicator Functions**

<b>Indicator</b>	<b>Functions</b>
Power	Green LED is ON when power is present and the DC power supply is O.K.
Main	Yellow LED flickers according to main channel XMT data
Sub-channels Activity 1-4	Four yellow LEDs flicker according to sub-channels XMT data
Automatic Disable 1-4	Four red LEDs light when the corresponding sub-channel has been automatically disabled (due to time-out)

### **3.3 OPERATING PROCEDURE**

#### **3.3.1 Power Turn On**

- 1) Make sure the power switch is turned to OFF. Set the 110/220 selector located on the rear panel to the main voltage used in your country. The white arrow should point to the correct main voltage.
- 2) Apply AC power by connecting the AC cord to the AC connector on the rear panel of the RSD-20 and then plug it into the AC source.
- 3) Turn the power switch located on the rear panel to ON. The power switch should light up, indicating that the main power is fed to the RSD-20 while the power LED (on the front panel) should light indicating that the internal power supply is O.K.

#### **3.3.2 Operation**

The RSD-20 operates unattended, unless it is required to manually disable one or more sub-channels.

#### **3.3.3 Power Turn Off**

To turn off the AC power to the RSD-20, simply switch off the power switch.

### 3.4 OPERATIONAL FIELD STRAPPING CHANGES

Access inside the equipment is only permitted to authorized service personnel.

If it becomes necessary to reconfigure the RSD-20 for a different type of operation, the internal straps must be changed to correspond to the new operating mode. For guidance in repositioning the straps, refer to the information given in Chapter 2 of this manual. It is recommended that the straps be changed by an experienced technician.

**CAUTION** *Do not open the top cover for strap changes before removing the AC power from the unit.*

### 3.5 FAULT ISOLATION PROCEDURE

**WARNING** *These service instructions should be used by qualified personnel only.*

Access inside the equipment is only permitted to authorized service personnel.

#### 3.5.1 Power Supply

If AC power has been applied to the RSD-20 but the green power LED does not light up, check installation according to the following procedure:

- a) Verify that the 110/220 selector is set correctly.
- b) Verify that the power switch light is on.
- c) Unplug the AC cord and then pull out the fuse (located above 3-pin power connector). Check the fuse and replace if necessary (0.4A S.B.).
- d) Remove the top cover of the unit and check that the 5-pin power connector (connecting the secondary wires of the transformer to the main card) is connected properly.

#### 3.5.2 RSD Malfunction

If the Power LED is ON but the RSD-20 is not functioning in the system, proceed as follows:

- a) Unplug the AC cord and remove the top cover.
- b) Verify that all the DCE/DTE switches are set according to the data system requirements.\*
- c) Verify that the strap settings are correct.
- d) Check the three large LSI chips (RJ-006) and if necessary reposition in the socket.

\* In the V.35 option, check that main and sub-channel's three switches are set to the same position.

# 4

---

## THEORY OF OPERATION AND APPLICATIONS

### 4.1 INTRODUCTION

This chapter contains a simplified functional description of the RSD-20, and covers the flow of data, controls and clocks in all RSD-20 operating modes.

### 4.2 CONTENTION

RTS/DCD contention in V.35 interface is interchangeable with CONTROL/INDICATION contention for X.21 interface. Sub-channel access to the main channel for data transmission is controlled by RTS/DCD (Request to Send/Data Carrier Detect) or (CONTROL/INDICATION in X.21 version) or data contention. When selected, the data and timing signals of the active sub-channels pass through the contention circuit and the SELECT/DESELECT circuit of the sub-channels to the elastic buffer, where data is clocked in and out of the main channel.

When a continuous mark is detected, and if strapped to data contention, the SELECT/DESELECT circuit breaks the data path of the active sub-channel. It then selects another sub-channel and resets the buffer. Otherwise the sub-channel will remain connected until RTS/DCD or (CONTROL/INDICATION) go down.

### 4.3 SUB-CHANNEL DISABLE

Manual or automatic disable of streaming sub-channels is possible. If the sub-channel is DTE (connected to a modem) the RSD-20 drops RTS, and if the sub-channel is DCE (connected to port) the RSD-20 drops DCD and CTS and X.21 drops CONT. In addition, the RSD-20 will stop transmitting data to the sub-channel, and will ignore any data received from it.

#### 4.3.1 Manual Disable

Manual disable is activated by four push-button switches, one for each sub-channel, which are located on the front panel. Disabling the sub-channel is achieved by depressing the appropriate switch. The sub-channel will remain inactive until the switch is released by depressing it again.

#### 4.3.2 Automatic Disable

A streaming sub-channel is disabled automatically if it has stayed active for longer than a preset period of time, thereby blocking all other sub-channels. Automatic disabling of a sub-channel resets itself each time RTS/DCD or data (in data contention mode) drops. Selection of one of three different time delays or non-active mode as indicated on the PCB.

## **4.4 CONTROL SIGNALS**

Sub-channel control signals are combined to provide a composite signal to the main channel. Control signals from the main channel are passed to all sub-channels in parallel.

The following are details of control signals:

### **4.4.1 Main Channel Control Signals**

#### **4.4.1.1 RSD-20/V.35**

##### **RTS (DCD)**

In RTS/DCD (CONTROL/INDICATION) contention mode – Follows RTS (DCD) of the selected sub-channel.

In Data Contention mode – “ON” if RTS (DCD) of one of the sub-channels is “ON”.

##### **CTS**

“ON” only when the CTS signals of all active sub-channels are “ON”. A sub-channel is active if it is connected to a modem and the DSR signal is “ON” (Enables connection of dial-up modems to the RSD-10).

##### **DSR (DTR)**

“ON” if DTR (DSR) of one of the sub-channels is “ON”.

#### **4.4.1.2 RSD-20/X.21**

##### **CONTROL/INDICATION**

Is dependent upon contention mode and “C/I to MAIN” jumper

If the “C/I to MAIN” jumper is selected for the “sub-channel” state, and the contention mode is data, then the C/I to MAIN is “ON” if the C/I of one of the sub-channels is “ON”.

If “C/I to MAIN” jumper is in the “ON” state, then the C/I to MAIN is always “ON”, regardless of the contention mode.

### **4.4.2 Sub-channel Control Signals**

#### **4.4.2.1 RSD-20/V.35**

##### **RTS (DCD)**

Follows the main channel RTS (DCD) (Unless the sub-channel is disabled).

##### **CTS**

In RTS contention mode – Selected channel follows CTS signal of main channel.

In Data Contention mode – sub-channel receives CTS from main channel immediately after it raises RTS. (Unless the sub-channel is disabled).

##### **DSR (DTR)**

Follows the main channel DSR (DTR)

**4.4.2.2 RSD-20/X.21****CONTROL/INDICATION**

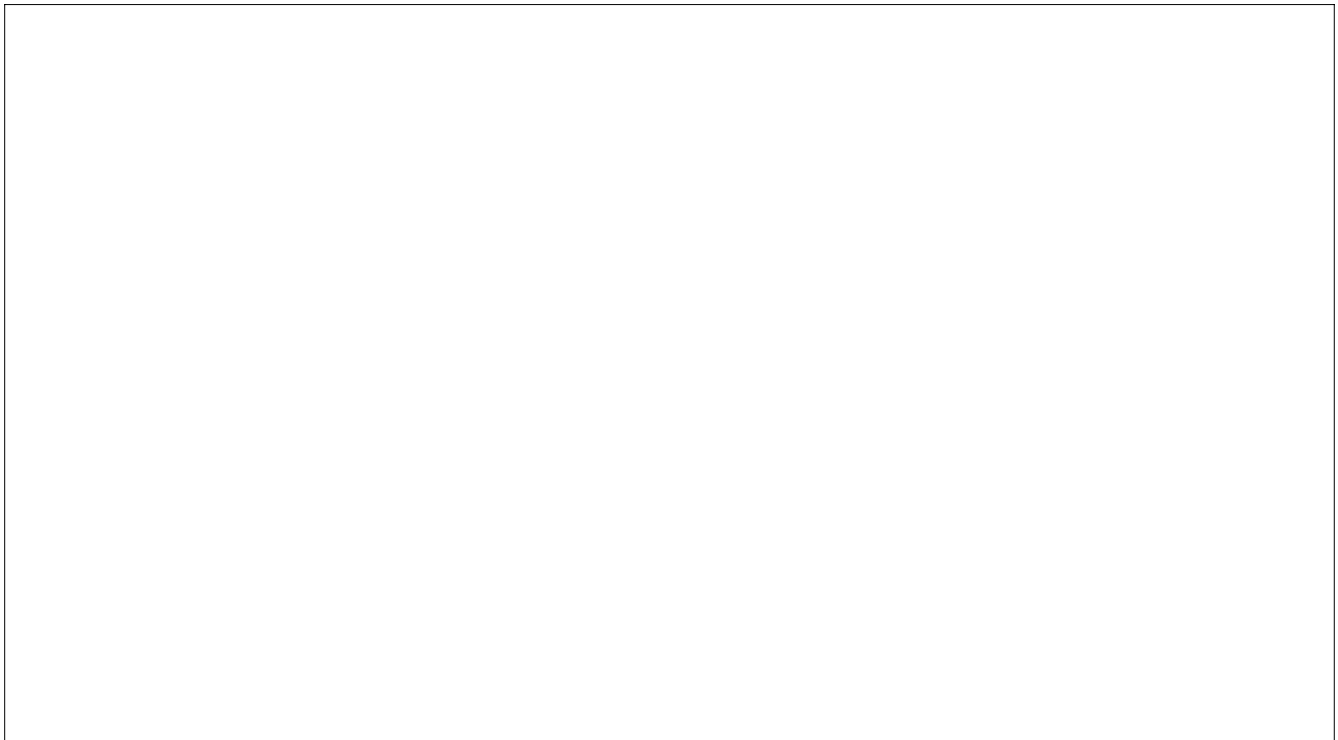
If the "C/I to Sub-channel" jumper is in the "MAIN CHANNEL" state, the C/I to sub-channel follows the main C/I (unless the sub-channel is disabled, then the C/I is OFF). If the "C/I to sub-channel" is in the "ON" state, all of the sub-channels' C/O are "ON" irrespective of the main channel C/I.







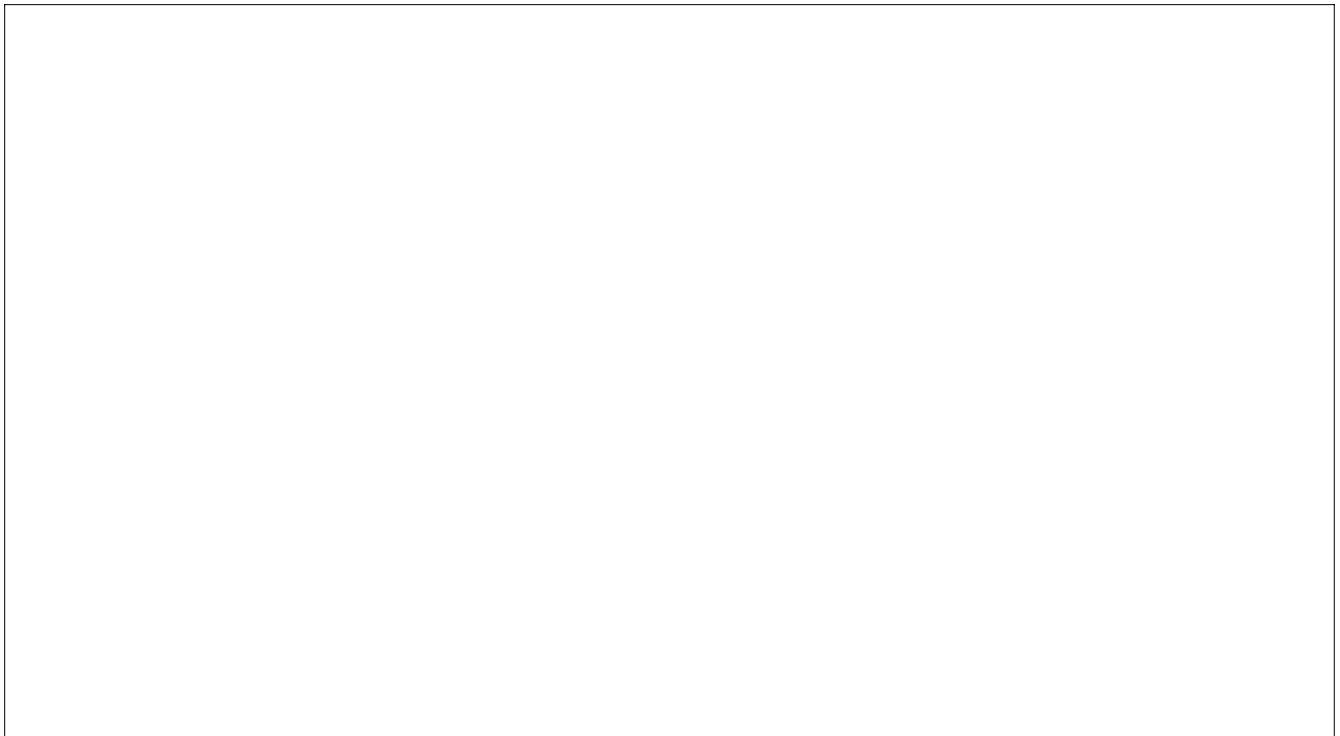
**Figure 4.1**  
**Main Channel DTE with Sub-channel DCE**



**Figure 4.2**  
**Main Channel DCE with Sub-channel DTE**



**Figure 4.3**  
**Main channel DTE with Sub-channel DTE**



**Figure 4.4**  
**Main channel DCE with Sub-channel DCE**

## 4.5 APPLICATIONS

The RSD-20 operates in one of six modes: modem sharing, port sharing, remote port sharing, local port sharing, mix modem sharing and mix port sharing. System configurations incorporating the RSD-20 in each operating mode are described in Figure 4.1.

The following should be taken into consideration when configuring an RSD-20 system:

The rate of the sub-channel and main channel modems and/or ports must be equal to the data rate strapped within the RSD-20.



**Figure 4.5**  
**RSD-20 Operating Modes**

---

# APPENDIX A

*Table A.1*  
*X21 Interface Signal Description*

<b>X.21</b>	<b>SIGNAL NAME</b>	<b>PIN</b>
	SHIELD	1
G	GROUND	8
T	TRANSMIT	2 9
R	RECEIVE	4 11
C	CONTROL	3 10
I	INDICATION	5 12
S	SIGNAL TIMING	6 13
-	EXTERNAL CLOCK	7 14

# APPENDIX B

**Table B.1**  
**V.35 Interface Signal Description**

<b>V.35</b>			
<b>Signal Function</b>	<b>34-pin Stand-Alone</b>		
	<b>Pin</b>	<b>Circuit</b>	
Protective Ground	A	Frame	101
Signal Ground	B	Signal GND	102
Transmitted Data	S	TD(B)	103
	P	TD(A)	103
Received Data	R	RD(A)	104
	T	RD(B)	104
Request to Send	C	RTS	105
Clear to Send	D	CTS	106
Data Set Ready	E	DSR	107
Data Terminal Ready	H	DTR	108
Carrier Detect	F	DCD	109
External Transmit Clock	U	SCTE(A)	113
	W	SCTE(B)	113
Transmit Clock	Y	SCT(A)	114
	a	SCT(B)	114
Receive Clock	X	SCR(B)	115
	V	SCR(A)	115