

RSD-10

Digital Sharing Device



data communications

The Access Company

RSD-10

Digital Sharing Device

Installation and Operation Manual

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To facilitate the reuse, recycling and other forms of recovery of waste equipment in protecting the environment, the owner of this RAD product is required to refrain from disposing of this product as unsorted municipal waste at the end of its life cycle. Upon termination of the unit's use, customers should provide for its collection for reuse, recycling or other form of environmentally conscientious disposal.



General Safety Instructions

The following instructions serve as a general guide for the safe installation and operation of telecommunications products. Additional instructions, if applicable, are included inside the manual.

Safety Symbols



Warning

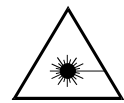
This symbol may appear on the equipment or in the text. It indicates potential safety hazards regarding product operation or maintenance to operator or service personnel.



Danger of electric shock! Avoid any contact with the marked surface while the product is energized or connected to outdoor telecommunication lines.



Protective ground: the marked lug or terminal should be connected to the building protective ground bus.



Warning

Some products may be equipped with a laser diode. In such cases, a label with the laser class and other warnings as applicable will be attached near the optical transmitter. The laser warning symbol may be also attached.

Please observe the following precautions:

- Before turning on the equipment, make sure that the fiber optic cable is intact and is connected to the transmitter.
- Do not attempt to adjust the laser drive current.
- Do not use broken or unterminated fiber-optic cables/connectors or look straight at the laser beam.
- The use of optical devices with the equipment will increase eye hazard.
- Use of controls, adjustments or performing procedures other than those specified herein, may result in hazardous radiation exposure.

ATTENTION: The laser beam may be invisible!

In some cases, the users may insert their own SFP laser transceivers into the product. Users are alerted that RAD cannot be held responsible for any damage that may result if non-compliant transceivers are used. In particular, users are warned to use only agency approved products that comply with the local laser safety regulations for Class 1 laser products.

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

Handling Energized Products

General Safety Practices

Do not touch or tamper with the power supply when the power cord is connected. Line voltages may be present inside certain products even when the power switch (if installed) is in the OFF position or a fuse is blown. For DC-powered products, although the voltages levels are usually not hazardous, energy hazards may still exist.

Before working on equipment connected to power lines or telecommunication lines, remove jewelry or any other metallic object that may come into contact with energized parts.

Unless otherwise specified, all products are intended to be grounded during normal use. Grounding is provided by connecting the mains plug to a wall socket with a protective ground terminal. If a ground lug is provided on the product, it should be connected to the protective ground at all times, by a wire with a diameter of 18 AWG or wider. Rack-mounted equipment should be mounted only in grounded racks and cabinets.

Always make the ground connection first and disconnect it last. Do not connect telecommunication cables to ungrounded equipment. Make sure that all other cables are disconnected before disconnecting the ground.

Some products may have panels secured by thumbscrews with a slotted head. These panels may cover hazardous circuits or parts, such as power supplies. These thumbscrews should therefore always be tightened securely with a screwdriver after both initial installation and subsequent access to the panels.

Connecting AC Mains

Make sure that the electrical installation complies with local codes.

Always connect the AC plug to a wall socket with a protective ground.

The maximum permissible current capability of the branch distribution circuit that supplies power to the product is 16A (20A for USA and Canada). The circuit breaker in the building installation should have high breaking capacity and must operate at short-circuit current exceeding 35A (40A for USA and Canada).

Always connect the power cord first to the equipment and then to the wall socket. If a power switch is provided in the equipment, set it to the OFF position. If the power cord cannot be readily disconnected in case of emergency, make sure that a readily accessible circuit breaker or emergency switch is installed in the building installation.

In cases when the power distribution system is IT type, the switch must disconnect both poles simultaneously.

Connecting DC Power

Unless otherwise specified in the manual, the DC input to the equipment is floating in reference to the ground. Any single pole can be externally grounded.

Due to the high current capability of DC power systems, care should be taken when connecting the DC supply to avoid short-circuits and fire hazards.

Make sure that the DC power supply is electrically isolated from any AC source and that the installation complies with the local codes.

The maximum permissible current capability of the branch distribution circuit that supplies power to the product is 16A (20A for USA and Canada). The circuit breaker in the building installation should have high breaking capacity and must operate at short-circuit current exceeding 35A (40A for USA and Canada).

Before connecting the DC supply wires, ensure that power is removed from the DC circuit. Locate the circuit breaker of the panel board that services the equipment and switch it to the OFF position. When connecting the DC supply wires, first connect the ground wire to the corresponding terminal, then the positive pole and last the negative pole. Switch the circuit breaker back to the ON position.

A readily accessible disconnect device that is suitably rated and approved should be incorporated in the building installation.

If the DC power supply is floating, the switch must disconnect both poles simultaneously.

Connecting Data and Telecommunications Cables

Data and telecommunication interfaces are classified according to their safety status.

The following table lists the status of several standard interfaces. If the status of a given port differs from the standard one, a notice will be given in the manual.

Ports	Safety Status
V.11, V.28, V.35, V.36, RS-530, X.21, 10 BaseT, 100 BaseT, Unbalanced E1, E2, E3, STM, DS-2, DS-3, S-Interface ISDN, Analog voice E&M	SELV Safety Extra Low Voltage: Ports which do not present a safety hazard. Usually up to 30 VAC or 60 VDC.
xDSL (without feeding voltage), Balanced E1, T1, Sub E1/T1	TNV-1 Telecommunication Network Voltage-1: Ports whose normal operating voltage is within the limits of SELV, on which overvoltages from telecommunications networks are possible.
FXS (Foreign Exchange Subscriber)	TNV-2 Telecommunication Network Voltage-2: Ports whose normal operating voltage exceeds the limits of SELV (usually up to 120 VDC or telephone ringing voltages), on which overvoltages from telecommunication networks are not possible. These ports are not permitted to be directly connected to external telephone and data lines.
FXO (Foreign Exchange Office), xDSL (with feeding voltage), U-Interface ISDN	TNV-3 Telecommunication Network Voltage-3: Ports whose normal operating voltage exceeds the limits of SELV (usually up to 120 VDC or telephone ringing voltages), on which overvoltages from telecommunication networks are possible.

Always connect a given port to a port of the same safety status. If in doubt, seek the assistance of a qualified safety engineer.

Always make sure that the equipment is grounded before connecting telecommunication cables. Do not disconnect the ground connection before disconnecting all telecommunications cables.

Some SELV and non-SELV circuits use the same connectors. Use caution when connecting cables. Extra caution should be exercised during thunderstorms.

When using shielded or coaxial cables, verify that there is a good ground connection at both ends. The grounding and bonding of the ground connections should comply with the local codes.

The telecommunication wiring in the building may be damaged or present a fire hazard in case of contact between exposed external wires and the AC power lines. In order to reduce the risk, there are restrictions on the diameter of wires in the telecom cables, between the equipment and the mating connectors.

Caution To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cords.

Attention Pour réduire les risques d'incendie, utiliser seulement des conducteurs de télécommunications 26 AWG ou de section supérieure.

Some ports are suitable for connection to intra-building or non-exposed wiring or cabling only. In such cases, a notice will be given in the installation instructions.

Do not attempt to tamper with any carrier-provided equipment or connection hardware.

Electromagnetic Compatibility (EMC)

The equipment is designed and approved to comply with the electromagnetic regulations of major regulatory bodies. The following instructions may enhance the performance of the equipment and will provide better protection against excessive emission and better immunity against disturbances.

A good ground connection is essential. When installing the equipment in a rack, make sure to remove all traces of paint from the mounting points. Use suitable lock-washers and torque. If an external grounding lug is provided, connect it to the ground bus using braided wire as short as possible.

The equipment is designed to comply with EMC requirements when connecting it with unshielded twisted pair (UTP) cables. However, the use of shielded wires is always recommended, especially for high-rate data. In some cases, when unshielded wires are used, ferrite cores should be installed on certain cables. In such cases, special instructions are provided in the manual.

Disconnect all wires which are not in permanent use, such as cables used for one-time configuration.

The compliance of the equipment with the regulations for conducted emission on the data lines is dependent on the cable quality. The emission is tested for UTP with 80 dB longitudinal conversion loss (LCL).

Unless otherwise specified or described in the manual, TNV-1 and TNV-3 ports provide secondary protection against surges on the data lines. Primary protectors should be provided in the building installation.

The equipment is designed to provide adequate protection against electro-static discharge (ESD). However, it is good working practice to use caution when connecting cables terminated with plastic connectors (without a grounded metal hood, such as flat cables) to sensitive data lines. Before connecting such cables, discharge yourself by touching ground or wear an ESD preventive wrist strap.

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 Installation and Operation 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.

Canadian Emission Requirements

This Class A digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulation.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Warning per EN 55022 (CISPR-22)

Warning

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

Avertissement

Cet appareil est un appareil de Classe A. Dans un environnement résidentiel, cet appareil peut provoquer des brouillages radioélectriques. Dans ces cas, il peut être demandé à l'utilisateur de prendre les mesures appropriées.

Achtung

Das vorliegende Gerät fällt unter die Funkstörgrenzwertklasse A. In Wohngebieten können beim Betrieb dieses Gerätes Rundfunkstörungen auftreten, für deren Behebung der Benutzer verantwortlich ist.

Mise au rebut du produit



Afin de faciliter la réutilisation, le recyclage ainsi que d'autres formes de récupération d'équipement mis au rebut dans le cadre de la protection de l'environnement, il est demandé au propriétaire de ce produit RAD de ne pas mettre ce dernier au rebut en tant que déchet municipal non trié, une fois que le produit est arrivé en fin de cycle de vie. Le client devrait proposer des solutions de réutilisation, de recyclage ou toute autre forme de mise au rebut de cette unité dans un esprit de protection de l'environnement, lorsqu'il aura fini de l'utiliser.

Instructions générales de sécurité

Les instructions suivantes servent de guide général d'installation et d'opération sécurisées des produits de télécommunications. Des instructions supplémentaires sont éventuellement indiquées dans le manuel.

Symboles de sécurité



Avertissement

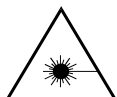
Ce symbole peut apparaître sur l'équipement ou dans le texte. Il indique des risques potentiels de sécurité pour l'opérateur ou le personnel de service, quant à l'opération du produit ou à sa maintenance.



Danger de choc électrique ! Evitez tout contact avec la surface marquée tant que le produit est sous tension ou connecté à des lignes externes de télécommunications.



Mise à la terre de protection : la cosse ou la borne marquée devrait être connectée à la prise de terre de protection du bâtiment.

**Avertissement**

Certains produits peuvent être équipés d'une diode laser. Dans de tels cas, une étiquette indiquant la classe laser ainsi que d'autres avertissements, le cas échéant, sera jointe près du transmetteur optique. Le symbole d'avertissement laser peut aussi être joint.

Veuillez observer les précautions suivantes :

- Avant la mise en marche de l'équipement, assurez-vous que le câble de fibre optique est intact et qu'il est connecté au transmetteur.
- Ne tentez pas d'ajuster le courant de la commande laser.
- N'utilisez pas des câbles ou connecteurs de fibre optique cassés ou sans terminaison et n'observez pas directement un rayon laser.
- L'usage de périphériques optiques avec l'équipement augmentera le risque pour les yeux.
- L'usage de contrôles, ajustages ou procédures autres que celles spécifiées ici pourrait résulter en une dangereuse exposition aux radiations.

ATTENTION : Le rayon laser peut être invisible !

Les utilisateurs pourront, dans certains cas, insérer leurs propres émetteurs-récepteurs Laser SFP dans le produit. Les utilisateurs sont avertis que RAD ne pourra pas être tenue responsable de tout dommage pouvant résulter de l'utilisation d'émetteurs-récepteurs non conformes. Plus particulièrement, les utilisateurs sont avertis de n'utiliser que des produits approuvés par l'agence et conformes à la réglementation locale de sécurité laser pour les produits laser de classe 1.

Respectez toujours les précautions standards de sécurité durant l'installation, l'opération et la maintenance de ce produit. Seul le personnel de service qualifié et autorisé devrait effectuer l'ajustage, la maintenance ou les réparations de ce produit. Aucune opération d'installation, d'ajustage, de maintenance ou de réparation ne devrait être effectuée par l'opérateur ou l'utilisateur.

Manipuler des produits sous tension

Règles générales de sécurité

Ne pas toucher ou altérer l'alimentation en courant lorsque le câble d'alimentation est branché. Des tensions de lignes peuvent être présentes dans certains produits, même lorsque le commutateur (s'il est installé) est en position OFF ou si le fusible est rompu. Pour les produits alimentés par CC, les niveaux de tension ne sont généralement pas dangereux mais des risques de courant peuvent toujours exister.

Avant de travailler sur un équipement connecté aux lignes de tension ou de télécommunications, retirez vos bijoux ou tout autre objet métallique pouvant venir en contact avec les pièces sous tension.

Sauf s'il en est autrement indiqué, tous les produits sont destinés à être mis à la terre durant l'usage normal. La mise à la terre est fournie par la connexion de la fiche principale à une prise murale équipée d'une borne protectrice de mise à la terre. Si une cosse de mise à la terre est fournie avec le produit, elle devrait être connectée à tout moment à une mise à la terre de protection par un conducteur de diamètre 18 AWG ou plus. L'équipement monté en châssis ne devrait être monté que sur des châssis et dans des armoires mises à la terre.

Branchez toujours la mise à la terre en premier et débranchez-la en dernier. Ne branchez pas des câbles de télécommunications à un équipement qui n'est pas mis à la terre. Assurez-vous que tous les autres câbles sont débranchés avant de déconnecter la mise à la terre.

Connexion au courant du secteur

Assurez-vous que l'installation électrique est conforme à la réglementation locale.

Branchez toujours la fiche de secteur à une prise murale équipée d'une borne protectrice de mise à la terre.

La capacité maximale permissible en courant du circuit de distribution de la connexion alimentant le produit est de 16A (20A aux Etats-Unis et Canada). Le coupe-circuit dans l'installation du bâtiment devrait avoir une capacité élevée de rupture et devrait fonctionner sur courant de court-circuit dépassant 35A (40A aux Etats-Unis et Canada).

Branchez toujours le câble d'alimentation en premier à l'équipement puis à la prise murale. Si un commutateur est fourni avec l'équipement, fixez-le en position OFF. Si le câble d'alimentation ne peut pas être facilement débranché en cas d'urgence, assurez-vous qu'un coupe-circuit ou un disjoncteur d'urgence facilement accessible est installé dans l'installation du bâtiment.

Le disjoncteur devrait déconnecter simultanément les deux pôles si le système de distribution de courant est de type IT.

Connexion d'alimentation CC

Sauf s'il en est autrement spécifié dans le manuel, l'entrée CC de l'équipement est flottante par rapport à la mise à la terre. Tout pôle doit être mis à la terre en externe.

A cause de la capacité de courant des systèmes à alimentation CC, des précautions devraient être prises lors de la connexion de l'alimentation CC pour éviter des courts-circuits et des risques d'incendie.

Assurez-vous que l'alimentation CC est isolée de toute source de courant CA (secteur) et que l'installation est conforme à la réglementation locale.

La capacité maximale permissible en courant du circuit de distribution de la connexion alimentant le produit est de 16A (20A aux Etats-Unis et Canada). Le coupe-circuit dans l'installation du bâtiment devrait avoir une capacité élevée de rupture et devrait fonctionner sur courant de court-circuit dépassant 35A (40A aux Etats-Unis et Canada).

Avant la connexion des câbles d'alimentation en courant CC, assurez-vous que le circuit CC n'est pas sous tension. Localisez le coupe-circuit dans le tableau desservant l'équipement et fixez-le en position OFF. Lors de la connexion de câbles d'alimentation CC, connectez d'abord le conducteur de mise à la terre à la borne correspondante, puis le pôle positif et en dernier, le pôle négatif. Remettez le coupe-circuit en position ON.

Un disjoncteur facilement accessible, adapté et approuvé devrait être intégré à l'installation du bâtiment.

Le disjoncteur devrait déconnecter simultanément les deux pôles si l'alimentation en courant CC est flottante.

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, Otto-Hahn-Str. 28-30, 85521 Ottobrunn-Riemerling, Germany

Quick Start Guide

If you are familiar with RSD-10, use this guide to prepare it for operation. Perform the following steps:

1. Disconnect all the cables connected to RSD-10.
2. Unscrew the two cover screws on the rear panel.
3. Remove the RSD-10 top cover by sliding it back.
4. Set the jumpers and switches as follows:

Jumper/Switch Identity	Function	Settings
MAIN DCE/DTE Switch	Determines the RSD-10 main channel interface as DTE (straight connection to modem) or as DCE (straight connection to computer or terminal)	DTE DCE
Subchannels 1-4 DCE/DTE switches (one switch for each subchannel)	Determines the RSD-10 subchannel interface as DTE or DCE	DTE DCE
TIME OUT (SEC)	Selects the time-out before activating automatic disabling (anti-streaming)	DISABLE 108 13.5 1.7
BAUD RATE (Rotary switch)	Selects the RSD internal data rate: internal (1.2 - 19.2) or from subchannel 1 (CLK 1) <i>Note:</i> When using CLK 1 mode, the main channel cannot be connected to a modem working with an internal clock	0 - 19.2 1 - 14.4 2 - 9.6 3 - 7.2 4 - 4.8 5 - 2.4 6 - 1.2 7 - CLK 1
FORMAT	Selects the data format	SYNC, ASYNC
CONTENTION	Determines the subchannel selection and deselection	DATA, RTS
CHAS.GND	Connects or disconnects signal ground to chassis ground	CONNECT DISCONN

5. Reinstall the RSD-10 cover.
6. Connect the RSD-10 unit to the DTEs or DCEs.
7. Set the 110/220 VAC connector located on the rear panel to match the mains voltage.
8. Connect RSD-10 to the mains outlet. Make sure to connect the power cable to the RSD-10 power connector first and only then to the mains outlet.
9. Power the unit by setting the ON/OFF switch to ON.

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Chapter 1

Introduction

1.1 Overview

RSD-10 is a Digital Sharing Device, enabling up to 8 modems or terminals to share a master modem, a multiplexer or a computer port in a multipoint environment. It operates with asynchronous or synchronous equipment at data rates up to 19.2 kbps.

Applications

RSD-10 operates in one of six modes: modem sharing, port sharing, remote port sharing, local port sharing, mix modem sharing and mix port sharing.

Figure 1-1 illustrates system configurations incorporating RSD-10 in each operating mode.

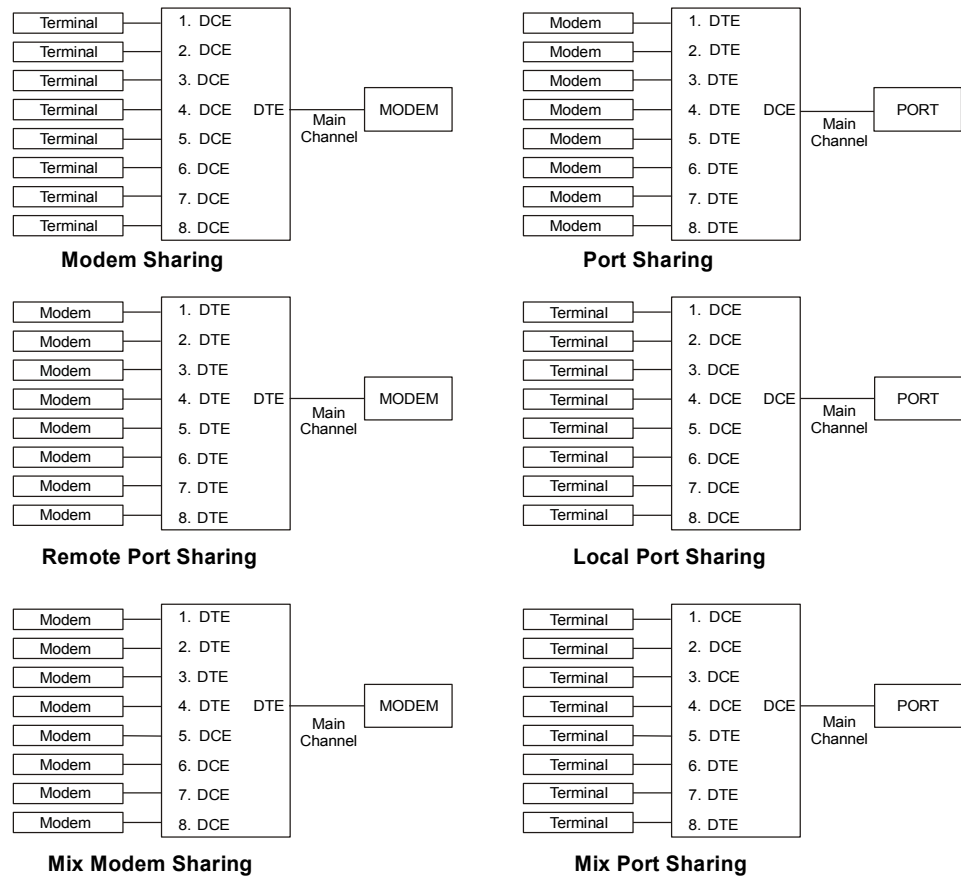


Figure 1-1. RSD-10 Applications

The following should be taken into consideration when configuring an RSD-10 system:

- The rate of the subchannel and main channel modems and/or ports connected to RSD-10 must be equal to the data rate set within RSD-10. This is important for both asynchronous and synchronous systems.
- You should configure the RSD-10 subchannels as all synchronous or all asynchronous only. Asynchronous equipment may not be mixed with synchronous equipment on the same RSD-10.

Features

Parallel Broadcast

The RSD-10 main channel broadcasts information to all subchannels in parallel. Subchannels contend to transmit to the main channel by activating RTS/DCD, or by data transition (strap-selectable).

Subchannel Disabling

A subchannel can be disabled by automatic circuitry if it stays active for longer than a preset time and blocks all other subchannels. The automatic disable resets itself as soon as the subchannel RTS/DCD drops or 15 idle bits are transmitted. A LED indicator lights up for each subchannel disabled by automatic circuitry. A subchannel can also be disabled manually with front panel push buttons.

LEDs

Front panel LED indicators provide information on RSD-10 general status (power and data flow from the main channel to the subchannels), show which subchannel has gained access to the main channel, and if one of the subchannels has been automatically disabled.

1.2 Physical Description

RSD-10 is a device intended for tabletop or 19" rack installation. [Figure 1-2](#) illustrates the 3D view of RSD-10.

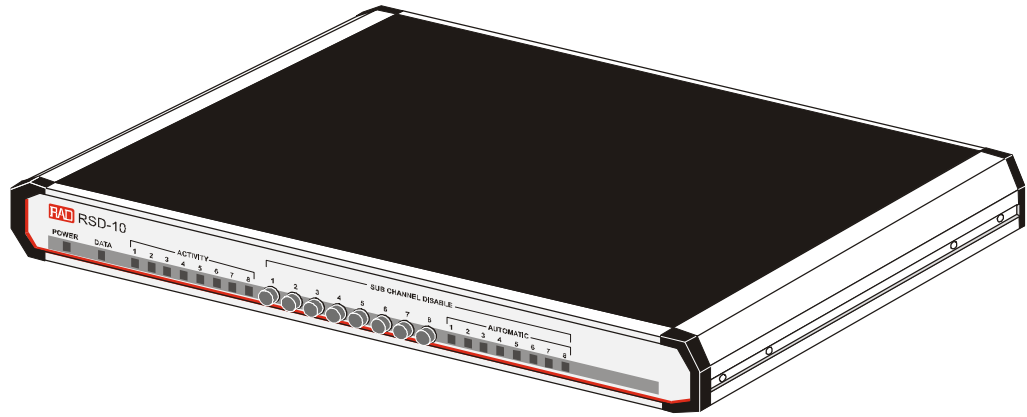


Figure 1-2. RSD-10, 3D View

Front Panel

The front panel of RSD-10 has push buttons for subchannel disabling and LEDs which provide real-time indications related to the operation and status of the unit. For more details about the RSD-10 push buttons and LEDs, refer to [Section 3.1, Front Panel Controls and Indicators](#), in Chapter 3.

Rear Panel

The RSD-10 electrical and interface connectors are located on the rear panel. The RSD-10 interface includes nine D-type, 25-pin female RS-232/V.24 connectors (DCE or DTE). One of the connectors is used for the main channel and the other eight, for the subchannels. Refer to [Section 2.5, Interfaces and Connections](#), in Chapter 2.

Jumpers and Switches

The jumpers and switches are located on the RSD-10 board. For more details about RSD-10 jumpers and switches, refer to [Section 2.3, Installation and Setup](#), in Chapter 2.

1.3 Functional Description

The main channel of RSD-10 broadcasts information to all subchannels in parallel. Subchannels contend to transmit to the main channel by activating RTS/DCD or by data transition (strap-selectable). If the RTS/DCD or data of a subchannel is active, the subchannel's transmit data and control signals are connected to the main channel. When RTS/DCD drops or data transitions stops, the control circuitry

will switch to monitor other subchannels. A subchannel is disconnected immediately after it drops RTS/DCD or transmits 15 idle bits (strap-selectable).

A subchannel can be disabled automatically if it stays active for longer than a preset time and blocks all other subchannels (streaming). The automatic disable resets itself as soon as the subchannel's RTS/DCD drops, or 15 idle bits are transmitted (Data Contention). One of the SUBCHANNEL DISABLE LED indicators on the front panel will light up if the appropriate subchannel is disabled.

Timing

Three clock modes are supported:

- Internal
- External from the main channel
- External from subchannel 1.

A built-in buffer overcomes phase differences that might exist between the clocks of modems connected to the subchannels and the RSD-10 main channel transmit clock.

An extra buffer compensates for phase differences between the RSD-10 clock and the subchannels' clock. This buffer is required when the equipment connected to more than one subchannel must provide a clock and cannot accept an external clock. Examples are: DDS line in the U.S., any digital service in other countries, or modems which cannot be set to an external clock.

Main Principles of Operation

Contention

A subchannel access to the main channel for data transmission is controlled by RTS/DCD (Request to Send/Data Carrier Detect) or data contention. When selected, the active subchannel's data and timing signals pass through the contention circuit and the subchannel's SELECT/DESELECT circuit to the elastic buffer, where data is clocked in and out of the main channel.

An internally generated high speed lock is provided by the system clock module to the buffer, when working with asynchronous data. This minimizes bias distortion. When a continuous mark is detected, and RSD-10 is set to data contention, the select/deselect circuit will break the data path of the active subchannel. It then selects another subchannel and resets the buffer.

Otherwise, the subchannel will remain connected until RTS/DCD goes down.

Automatic Subchannel Disable

A streaming subchannel is automatically disabled if it has stayed active for longer than a preset period of time, thereby blocking all other subchannels. Automatic disabling of a subchannel resets itself each time RTS/DCD or data (in data contention mode) drops.

Three different time delays may be selected: 1.7, 13.5, or 108 seconds. Alternatively, one may also select a non-active mode.

If a DTE subchannel (connected to a modem) is disabled automatically, RSD-10 will drop RTS, and if a DCE subchannel (connected to a port) is disabled, RSD-10 will drop DCD and CTS. In addition, RSD-10 will stop transmitting data to the subchannel and will ignore any data received from it.

Control Signals

Subchannel control signals are combined to provide a composite signal to the main channel. Control signals from the main channel are passed to all subchannels in parallel (see [Table 1-1](#)).

Table 1-1. Main and Subchannel Control Signals

	Main Channel	Subchannel
RTS (DCD)	In RTS/DCD contention mode - Follows RTS (DCD) of the selected subchannel. In Data Contention mode - "ON" if one of the subchannels RTS (DCD) is "ON".	Follows the main channel RTS (DCD) unless the subchannel is disabled.
CTS	"ON" only when the CTS signals of all active subchannels are "ON". A subchannel is active if it is connected to a modem and the DSR signal is "ON" (enables connection of dial-up modems to RSD-10)	In RTS contention mode: Selected channel follows CTS signal of main channel. In Data Contention mode: Subchannel receives CTS from main channel immediately after it raises RTS, unless the subchannel is disabled.
DSR (DTR)	"ON" if one of the subchannel's DTR (DSR) is "ON".	Follows the main channel DSR (DTR).

Functional Block Diagram

The flow of data and control signals in RSD-10 in different DTE/DCE configurations is illustrated in [Figure 1-3](#) through [Figure 1-6](#).

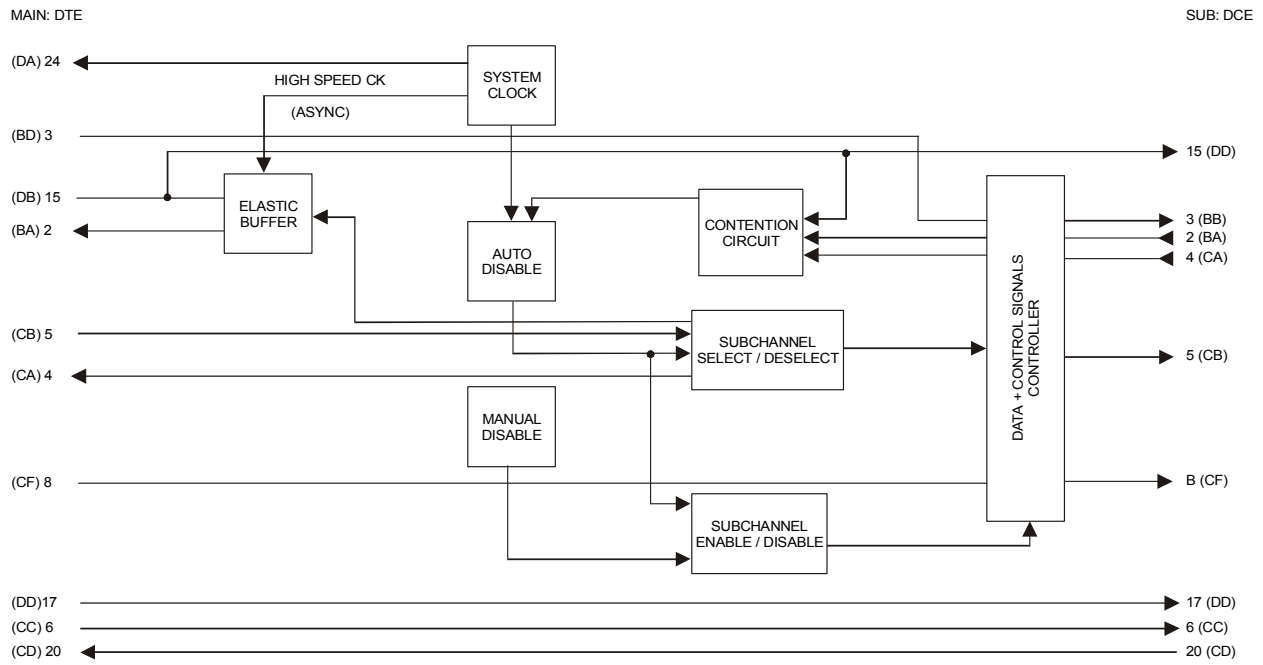


Figure 1-3. Main Channel DTE with Subchannel DCE

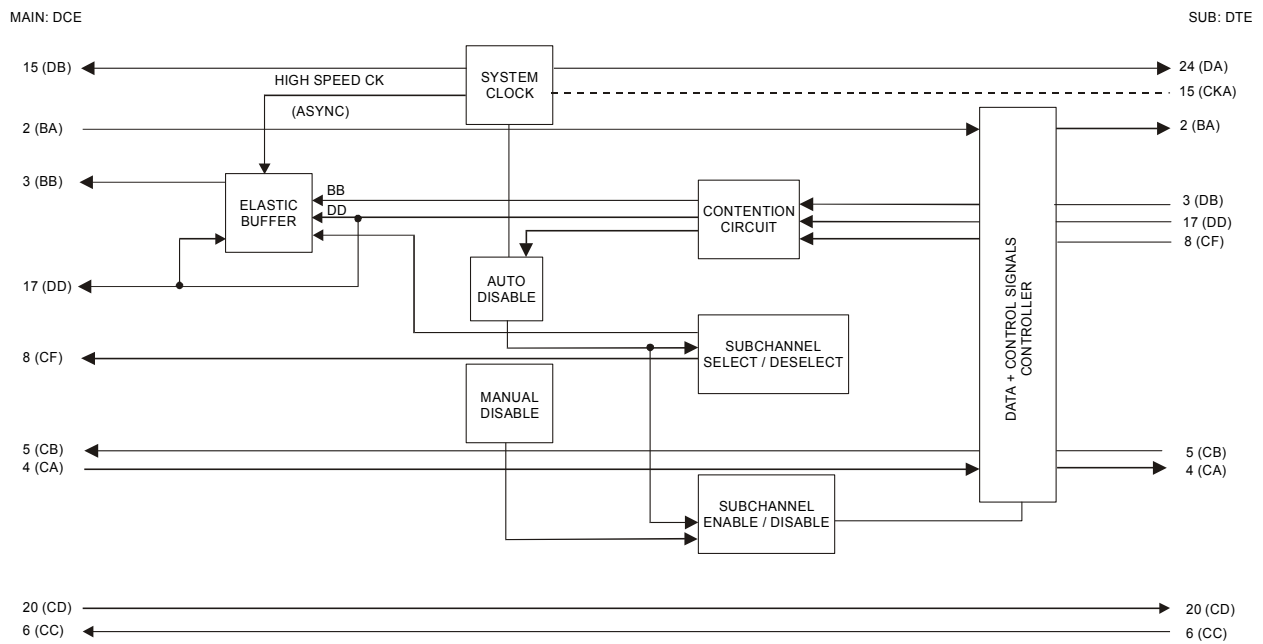


Figure 1-4. Main Channel DCE with Subchannel DTE

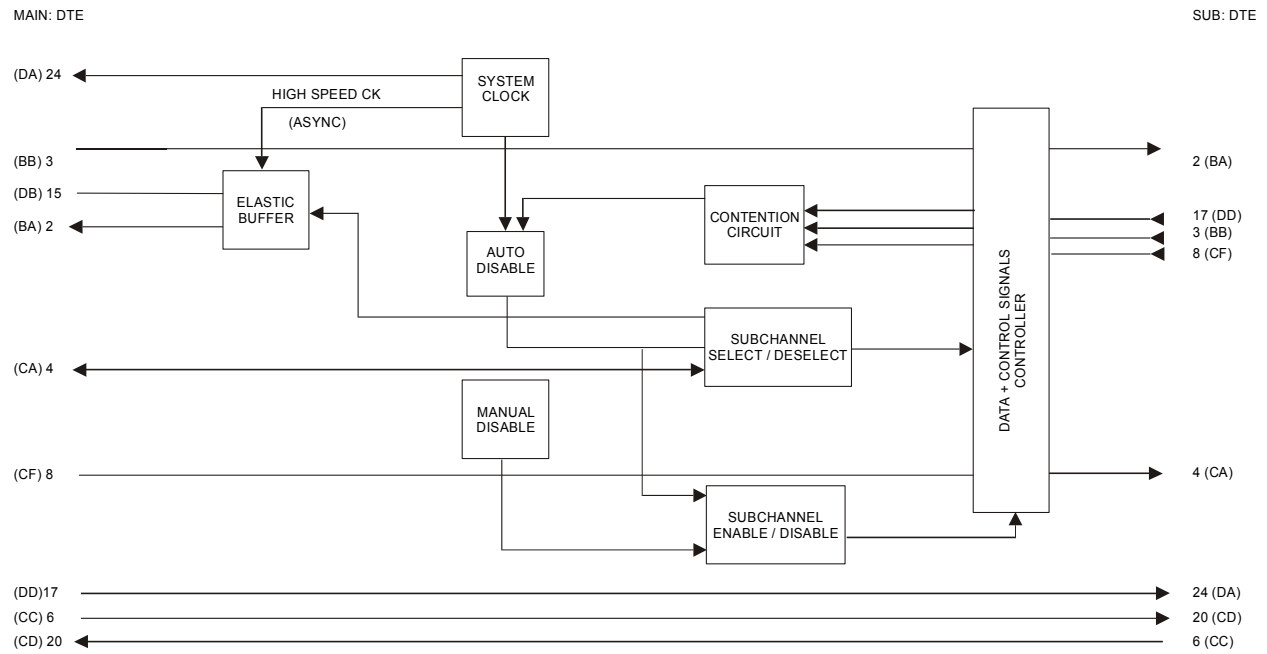


Figure 1-5. Main Channel DTE with Subchannel DTE

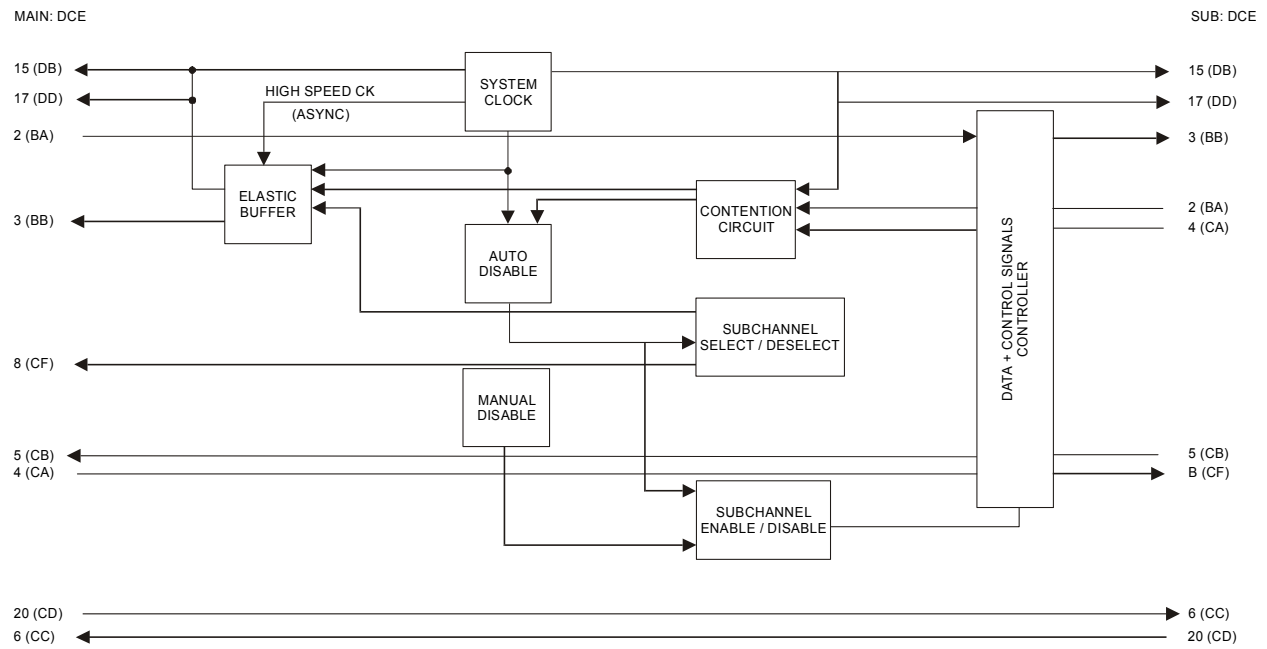


Figure 1-6. Main Channel DCE with Subchannel DCE

1.4 Technical Specifications

Channels	<i>Number of subchannels</i>	8
	<i>Channel configuration</i>	Subchannel 1 has lowest priority, Subchannel 8 has highest priority
	<i>Subchannel selection</i>	RTS/DCD or data contention
	<i>Subchannel deselection</i>	RTS/DCD off or 15 bits of idle data
	<i>Subchannel disabling</i>	Manual: by front panel push buttons Automatic: If a subchannel stays connected for more than a preset time period (1.7, 13.5 or 108 sec)
	<i>Transmit clock source</i>	Internal External derived from main channel External derived from subchannel 1
	<i>Data rates</i>	Asynchronous: up to 19.2 kbps Synchronous: <ul style="list-style-type: none"> Internal Clock: 1.2, 2.4, 4.8, 7.2, 9.6, 14.4, 19.2 kbps External Clock: Up to 19.2 kbps
	<i>Input and output interface</i>	RS-232/V.24, each DCE or DTE
	<i>Connectors</i>	Nine D-type, 25-pin female
LED Indicators	<i>POWER</i>	Lights up when RSD-10 is powered
	<i>DATA</i>	Displays data transmitted from main channel to subchannels
	<i>ACTIVITY</i>	8 LEDs indicate which subchannel has gained access to the main channel
	<i>DISABLE</i>	Indicates if one of the subchannels has been automatically disabled
Controls	<i>SUBCHANNEL DISABLE</i>	Front panel push buttons for manual subchannel disabling, one per each subchannel

Power	<i>Voltage</i>	115/230 VAC ($\pm 10\%$), selectable, or -48 VDC ($\pm 10\%$)
	<i>Frequency</i>	50 or 60 Hz
	<i>Power Consumption</i>	10W
Physical	<i>Height</i>	44 mm / 1.7 in (1U)
	<i>Width</i>	431 mm / 17.0 in
	<i>Depth</i>	208 mm / 8.2 in
	<i>Weight</i>	2.0 kg / 4.4 lb
Environment	<i>Temperature</i>	0°-50°C/32°-122°F
	<i>Humidity</i>	Up to 95%, non-condensing

Chapter 2

Installation and Setup

This chapter explains how to configure and install RSD-10. The information presented in this chapter includes:

- Site requirements for installing RSD-10 – [Section 2.1](#)
- Package contents – [Section 2.2](#)
- Installation and setup procedures – [Section 2.3](#)
- System synchronization and clock distribution – [Section 2.4](#)
- Interfaces and connections – [Section 2.5](#)

2.1 Site Requirements & Prerequisites

RSD-10 is delivered completely assembled, and is factory set for basic operation. It is designed for installation as a desktop unit or for mounting in a 19-inch rack. For rack installation instructions, refer to the *Rack Mounting Kit for 19-inch Racks* guide that comes with the RM kit.

An AC-powered RSD-10 should be installed within 1.5 m (5 ft) of an easily accessible grounded AC outlet. The outlet should furnish 115 VAC or 230 VAC, depending on rated voltage of the unit.

A DC-powered RSD-10 requires a -48 VDC power source, which must be adequately isolated from the mains supply. The unearthed supply line must be protected by a suitable fuse or circuit breaker.

The unit must be situated within 15 m (50 ft) of the associated data terminals or modems.

Allow at least 90 cm (36 in) at the front of RSD-10 for operating and maintenance access. Ensure that there is at least 10 cm (4 in) clearance at the rear of the unit for power and interface cables.

The ambient operating temperature of RSD-10 should be 0° to 50°C (32° to 122°F), at a relative humidity of up to 95%, non-condensing.

2.2 Package Contents

RSD-10 package includes the following items:

The package contains the following items:

- One RSD-10 unit

- AC power cord or DC adaptor connector
- RM-7/NEW kit
- Technical documentation CD.

2.3 Installation and Setup

RSD-10 is a standalone device designed for tabletop or 19" rack installation. It is delivered completely assembled. No provisions are made for bolting the unit to the tabletop.



Disconnect the AC power cord or DC power supply before performing the following procedures. Installation, operation and maintenance should be performed only by an experienced technician.

To complete the installation of RSD-10, you must perform the following (in the given order):

- Determine the required configuration of RSD-10, according to your application and set the internal switches and jumpers accordingly.
- Connect the RSD-10 main channel and subchannels.
- Connect power to the unit.

Setting the Internal Jumpers and Switches

To set the internal jumpers and switches, you must open the RSD-10 case, identify jumper and switch locations and settings (referring to *Figure 2-1*), change settings as required, and reinstall the RSD-10 cover.



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

To avoid accidental electric shock, always disconnect the interface cables and power cord before removing the unit from its casing.

Line voltages are present inside RSD-10 when it is connected to power.

Any adjustment, maintenance, and repair of the opened instrument under voltage should be avoided as much as possible and, when inevitable, should be carried out only by a skilled technician who is aware of the hazard involved. Capacitors inside the instrument may still be charged even after the instrument has been disconnected from its source of supply.

Opening the RSD-10 case

To reach the internal jumpers and switches of RSD-10, you need to open the case. To do this, proceed as follows:

1. Disconnect all the cables connected to RSD-10.
2. Unscrew the two cover screws on the rear panel.

3. Remove the RSD-10 top cover by sliding it back.

Setting the Internal Jumpers and Switches

The internal jumpers and switches located on the RSD-10 main board are identified in *Figure 2-1*. The functions of jumpers and switches are described in *Table 2-1*.

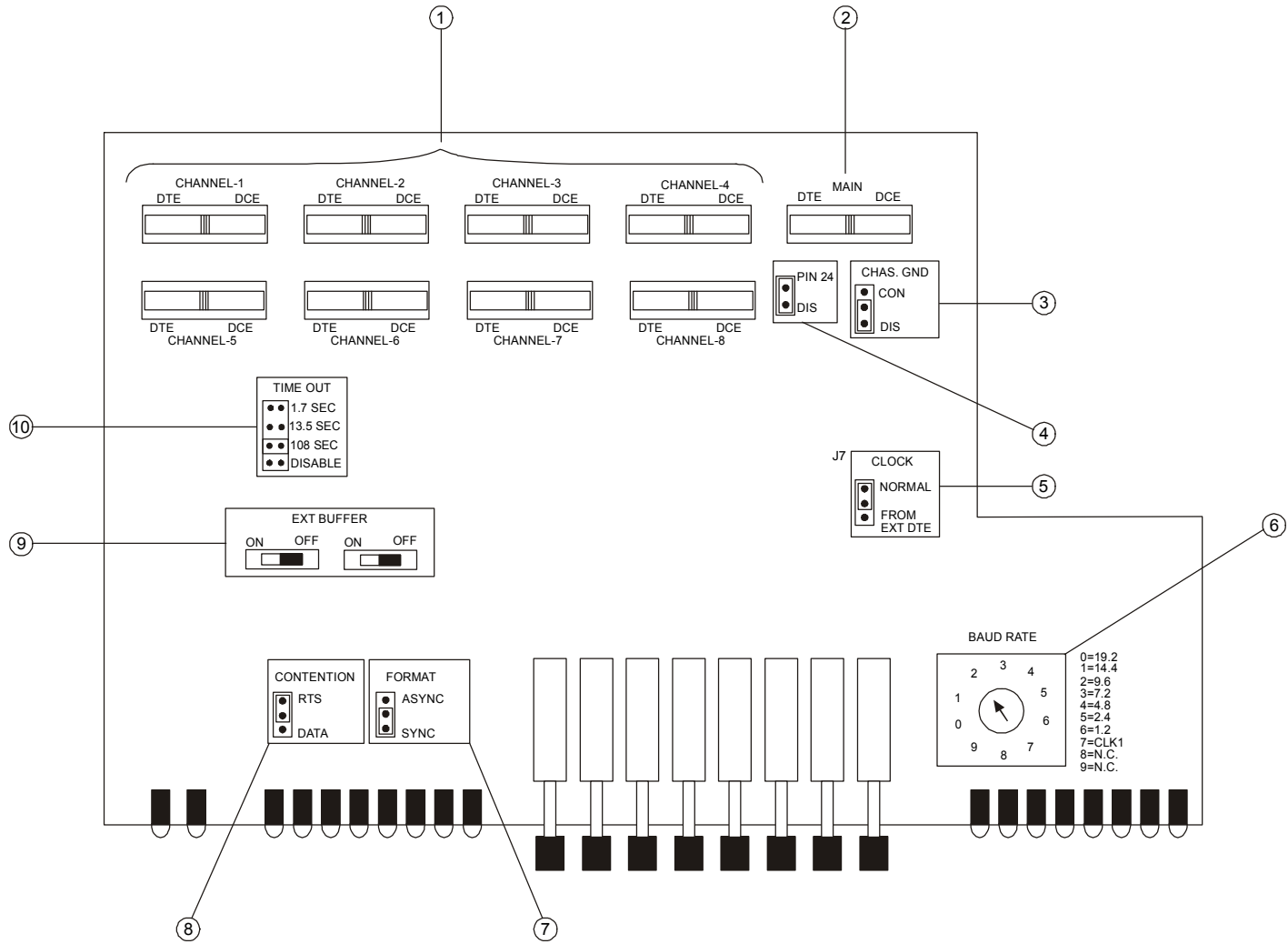


Figure 2-1. RSD-10 Board Layout

Table 2-1. RSD-10 Switch and Jumper Selection

No	Jumper/Switch Identity	Function	Possible Settings	Factory Setting
1	Subchannels 1-8 DCE/DTE switches (one switch for each subchannel)	Determines the RSD-10 subchannel interface as DTE or DCE	DTE DCE	DTE
2	MAIN DCE/DTE Switch	Determines the RSD-10 main channel interface as DTE (straight connection to modem) or as DCE (straight connection to computer or terminal)	DTE DCE	DTE
3	CHAS.GND Jumper	Connects or disconnects signal ground to chassis ground	CONNECT DISCONN	DISCONN
4	PIN 24 Jumper	Exits main channel when Pin 24 is disabled	ENABLE DISABLE	ENABLE
5	CLOCK Jumper	Determines source of clock as internally or externally derived	NORMAL FROM EXT DTE	NORMAL
6	BAUD RATE Rotary switch	Selects the RSD-10 internal data rate: internal (1.2 - 19.2) or from subchannel 1 (CLK 1) <i>Note:</i> When using CLK 1 mode, the main channel cannot be connected to a modem working with an internal clock	0 - 19.2 1 - 14.4 2 - 9.6 3 - 7.2 4 - 4.8 5 - 2.4 6 - 1.2 7 - CLK 1	9.6
7	FORMAT Jumper	Selects the data format	ASYNCR SYNCR	SYNCR
8	CONTENTION Jumper	Determines the subchannel selection and deselection	RTS DATA	RTS
9	EXT.BUFFER Two switches	Activates or deactivates the extra buffer (left switch for subchannels 1-4, right switch for subchannels 5-8)	ON OFF	OFF
10	TIME OUT (SEC) Jumper	Selects the time-out before activating automatic disabling (anti-streaming)	1.7 sec 13.5 sec 108 sec DISABLE	108 sec

2.4 System Synchronization and Clock Distribution

Synchronizing the System

Four alternatives are available for synchronizing the system:

- Synchronizing on the main channel's clock (see *Figure 2-2*)
- Synchronizing on the RSD-10 internal clock (see *Figure 2-3*)
- Synchronizing on subchannel 1 modem timing signals (see *Figure 2-4*).
- Synchronizing on any subchannel modem timing signals.

Synchronization on Main Channel DCE Clock

To synchronize RSD-10 on the main channel DCE clock:

1. Set the main channel modem to internal clock.
2. Set the DCEs attached to subchannels to external clock.

Note *Ignore the RSD-10 bit rate setting (the bit rate is determined by the main channel modem clock). If DTE is connected, CLOCK jumper should be strapped to FROM EXT DTE.*

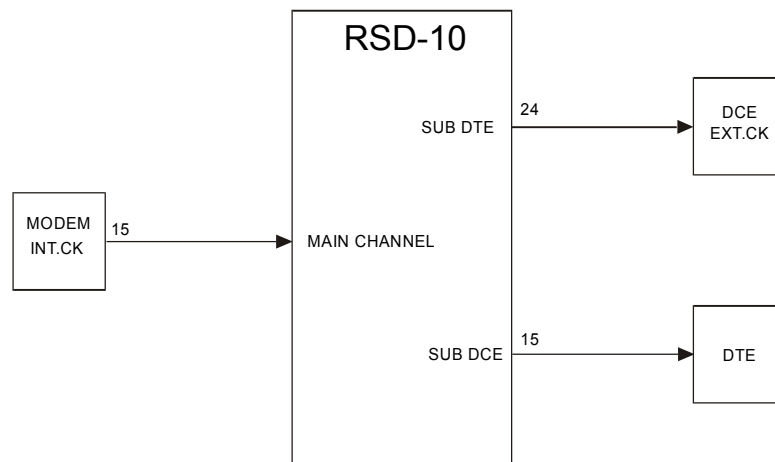


Figure 2-2. Synchronization on the Main Channel's DCE Clock

Synchronization on RSD-10 Internal Clock

To synchronize RSD-10 on the internal clock:

1. Set the BIT RATE rotary switch to the required speed.
2. Set the DCEs attached to subchannels to external clock (EXT CLK).
3. Set the DCE attached to the main channel to external clock.

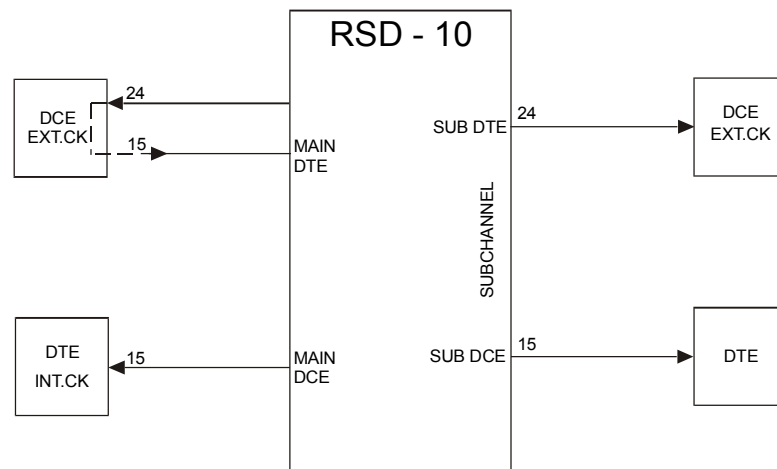


Figure 2-3. Synchronization on the Internal Clock

Synchronization on Subchannel 1

To synchronize RSD-10 on subchannel 1:

1. Set the RSD-10 BIT RATE rotary switch to position 7.
2. Set the DCE attached to the main channel to external clock.
3. Set the DCEs attached to the subchannels to external clock.
4. Set the modem attached to subchannel 1 to internal clock.

Note *It is not recommended to synchronize on subchannel 1 when the modem connected to subchannel 1 operates in switched carrier mode; this may cause fluctuations in clock frequency and phase.*

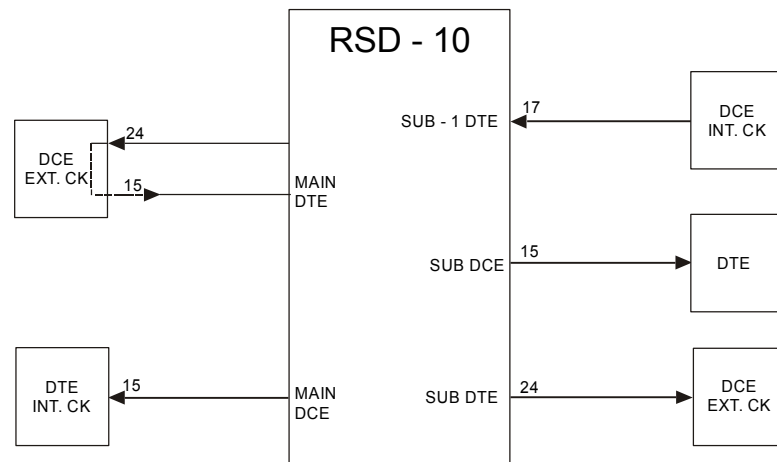


Figure 2-4. Synchronization on Subchannel 1

Synchronization on any Subchannel

This feature enables you to connect more than one subchannel to the P.T.T. service line. The P.T.T. modems supply synchronized clocks to every line. The RSD-10 extra buffers compensate for phase differences between clocks received from the subchannels. However, if the different clock sources are used, extra buffers will not compensate for the clock differences.

To synchronize on any subchannel, set the EXT. BUFFER switch to ON.

Note Each EXT.BUFFER switch controls one extra buffer and 4 subchannels.

Setting Up in an Asynchronous System

To set up RSD-10 in an asynchronous system:

1. Set the FORMAT jumper to ASYNC.
2. Set the BIT RATE rotary switch to the correct speed.

Reinstalling the RSD-10 Cover

After completing the internal settings, reinstall the top cover as follows:

1. Insert the top cover into the guiding grooves of the casing.
2. Slide the top cover forward.
3. Secure the cover by tightening the two screws on the rear panel.

2.5 Interfaces and Connections

Connecting the Interfaces

Use standard RS-232/V.24 cables with 25-pin D-type, male connectors to connect the RSD-10 main channel and 8 subchannels. Refer to [Figure 2-5](#) and [Figure 2-6](#) for identifying interface and power connectors.

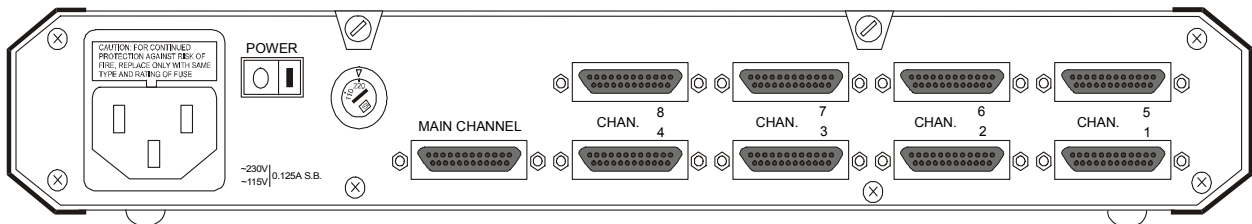


Figure 2-5. RSD-10 Rear Panel (AC-Powered Unit)

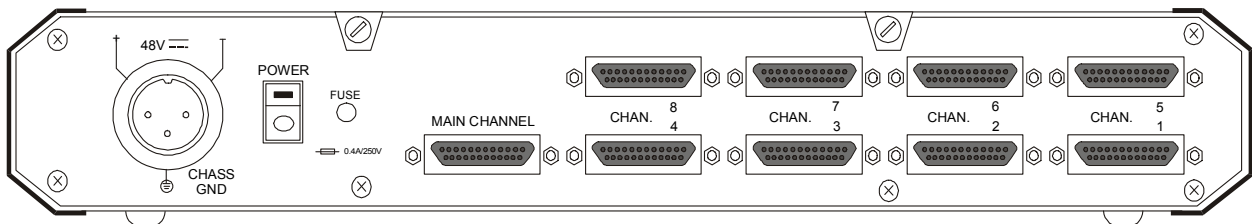


Figure 2-6. RSD-10 Rear Panel (DC-Powered Unit)

Connecting the Power

To connect the power to RSD-10, refer to the appropriate section below, depending on your unit version.

AC Power Connection

AC power is supplied to RSD-10 through the 1.5m (5 ft) standard power cable terminated by a standard 3-prong plug (see *Figure 2-5*). The cable is provided with the unit.

The fuse is located in an integral-type fuse holder located on the rear panel. The rated fuse for the unit is 250V/0.125A slow-blow for both 230 VAC and 130 VAC.

Connect AC power to the unit as follows:

4. Verify that the ON/OFF switch on the RSD-10 rear panel is set to OFF.
5. Set the 110/220 VAC selection switch to the required voltage.
6. First, connect the power cable to the connector on the RSD-10 rear panel, and then to the mains outlet.

DC Power Connection

The rated fuse for the DC-powered unit is 250V/0.4A slow-blow. The fuse is located on the rear panel of RSD-10.

To connect DC power to RSD-10, refer to *DC Power Supply Connection Supplement*.

Chapter 3

Operation

This chapter describes the RSD-10 controls, indicators and their functions, and explains the operating procedures.

Installation procedures given in *Chapter 2* must be completed before attempting to operate RSD-10.

3.1 Front Panel Controls and Indicators

The front panel of RSD-10 is illustrated in *Figure 3-1*.

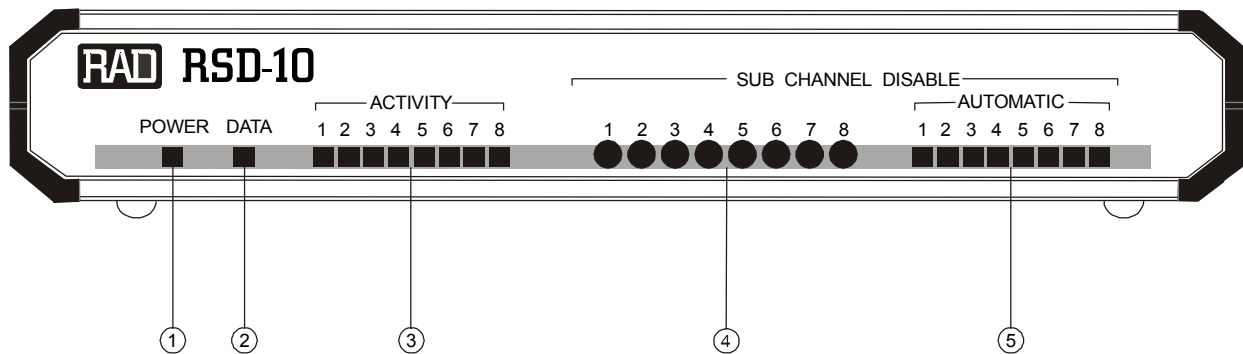


Figure 3-1. RSD-10 Front Panel

Table 3-1 lists the functions of controls and indicators located on the RSD-10 front panel.

Table 3-1 . RSD-10 Controls and Indicators

No		Type	Function
1	POWER	Green LED	ON when RSD-10 is powered
2	DATA	Yellow LED	Flickers according to main channel XMT data
3	ACTIVITY (1-8)	Yellow LEDs	Flickers according to subchannel XMT data
4	SUB CHANNEL DISABLE (1-8)	Push Buttons	Manually deactivates the corresponding subchannel. The subchannel remains inactive until the push button is released
5	SUB CHANNEL DISABLE AUTOMATIC (1-8)	Red LEDs	Lights up when the corresponding subchannel is automatically disabled

3.2 Operating Instructions

Setup

Prior to connection and power-up, set the internal jumpers and switches to the required configuration, as described in [Section 2.3, Installation and Setup](#), in Chapter 2.



Before switching on this instrument and connecting any other cable, the protective earth terminals of this instrument must be connected to the protective ground conductor of the mains power cord. If you are using an extension cord (power cable) make sure that it is grounded as well.

Any interruption of the protective (grounding) conductor (inside or outside the instrument) or disconnection of the protective earth terminal can make this instrument dangerous. Intentional interruption is prohibited.

Make sure that only fuses of the required rating - as marked on the rear panel - are used for replacement. Always disconnect the mains cable before removing or replacing the fuse. Whenever it is likely that the fuse protection has been damaged, make the unit inoperative and secure it against unintended operation.

Power Turn-on

To turn RSD-10 on, proceed as follows:

1. Check that the ON/OFF switch on the RSD-10 rear panel is set to OFF.
2. Set the 110/220 VAC selector located on the rear panel to match the mains voltage (AC version). The white arrow should point to the correct mains voltage.
3. Connect the power cable to the rear panel power connector. Plug the cable to the mains outlet (AC version) or connect the DC-powered unit to the power supply, as described in [DC Power Supply Connection Supplement](#).
4. Set the rear POWER switch to ON.

When the power is connected, the POWER indicator lights up, and remains lit up as long as RSD-10 is connected to power.

Operation

RSD-10 operates unattended, unless you need to disable one or more subchannels manually.

To disable a subchannel, press the corresponding push button. The subchannel remains inactive until the push button is released.

Power Turn-off

To turn RSD-10 off, set the RSD-10 power switch to OFF.

Operational Jumper Changes

If you need to reconfigure RSD-10 for a different type of operation, internal jumpers settings must be changed to correspond to the new operating mode. For guidance in repositioning the jumpers, refer to the [Section 2.3, Installation and Setup](#), in Chapter 2. It is recommended that the jumper settings should be changed only by an experienced technician.

Chapter 4

Troubleshooting

4.1 Fault Isolation Procedure



These service instructions are for use by qualified personnel only. To avoid electric shock, do not perform any servicing other than that contained in the operating instructions, unless you are qualified to do so.

Power Supply

If RSD-10 is on and the green POWER LED does not light up, check the installation as follows (depending on your unit version):

AC Version

1. Check that the 110/220 VAC selector matches the mains voltage.
2. Check that the POWER switch is set to ON.
3. Unplug the AC cable and pull out the fuse (located above the 3-pin power connector). Check the fuse and replace it, if necessary (0.125A, slow-blow).
4. Remove the top cover of the unit and check that the 4-pin power connector (connecting the secondary wires of the transformer to the mainboard) is properly installed.

DC Version

1. Check that the POWER switch is set to ON.
2. Pull out the fuse (located near the power switch). Check the fuse and replace it, if necessary (0.4A, slow-blow).
3. Check that the DC plug is properly fastened to RSD-10, on one side, and to the DC outlet, on the other side.

RSD-10 Malfunction

If the POWER LED is lit up, but RSD-10 is not functioning, perform the following:

1. Unplug the power cable and remove the top cover.
2. Check that all the DCE/DTE switches are set according to the data system requirements.

3. Check the jumper settings.
4. Replace the top cover carefully and tighten the screws.

4.2 Technical Support

Technical support for this product can be obtained from the local distributor from whom it was purchased.

For further information, please contact the RAD distributor nearest you or one of RAD's offices worldwide. This information can be found at www.rad.com (offices – About RAD > Worldwide Offices; distributors – Where to Buy > End Users).



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Customer Response Form

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Thank you for your assistance!

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Publication Number: 552-200-12/08

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