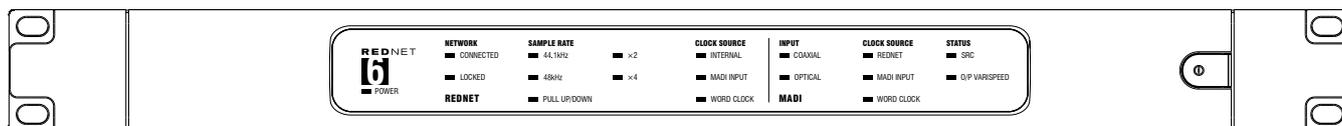


# REDNET® 6

## User Guide



Focusrite®  
www.focusrite.com

# IMPORTANT SAFETY INSTRUCTIONS

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12.  Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. No naked flames, such as lighted candles, should be placed on the apparatus.

The appliance coupler is used as the disconnect device, the disconnect device shall remain readily operable.

Do not use a damaged or frayed power cord.

If the mains plug supplying the apparatus incorporates a fuse then it should only be replaced with a fuse of identical or lower rupture value.

**GB** The apparatus shall be connected to a mains socket outlet with a protective earthing connection.

**FIN** Laitte on liitettävä suojamaadoituskoskettimilla va rustettuumpistorasiaan

**NOR** Apparatet må tikoples jordet stikkontakt

**SWE** Apparatens skall anslutas till jordat uttag



**CAUTION**  
RISK OF ELECTRIC SHOCK  
DO NOT OPEN



**CAUTION:** TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



The lightning flash with arrowhead symbol, within equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

**WARNING:** TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE AND OBJECTS FILLED WITH LIQUIDS, SUCH AS VASES, SHOULD NOT BE PLACED ON THIS APPARATUS.

## ENVIRONMENTAL DECLARATION

### Compliance Information Statement: Declaration of Compliance procedure

Product Identification: Focusrite RedNet  
Responsible party: American Music and Sound  
Address: 4325 Executive Drive  
Suite 300  
Southaven  
MS 38672  
Telephone: 800-431-2609

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

### For USA

#### To the User:

- 1. Do not modify this unit!** This product, when installed as indicated in the instructions contained in this manual, meets FCC requirements. Modifications not expressly approved by Focusrite may void your authority, granted by the FCC, to use this product.
- 2. Important:** This product satisfies FCC regulations when high quality shielded cables are used to connect with other equipment. Failure to use high quality shielded cables or to follow the installation instructions within this manual may cause magnetic interference with appliances such as radios and televisions and void your FCC authorization to use this product in the USA.
- 3. Note:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which the user will be required to correct the interference at his own expense

### For Canada

#### To the User:

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

### RoHS Notice

Focusrite Audio Engineering Limited has conformed where applicable, to the European Union's Directive 2002/95/EC on Restrictions of Hazardous Substances (RoHS) as well as the following sections of California law which refer to RoHS, namely sections 25214.10, 25214.10.2, and 58012, Health and Safety Code; Section 42475.2, Public Resources Code.

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# INTRODUCTION

Thank you for purchasing the Focusrite RedNet 6.



RedNet 6 provides an interface between MADI (AES10) devices and the RedNet Ethernet audio system.

RedNet is a powerful, low latency, digital audio networking system designed specifically for music, recording studio and broadcast applications. It is based on Audinate's Dante™, a well-established audio networking technology known for its extreme robustness. Dante – and the RedNet system – is capable of transporting up to 512 channels of bidirectional audio (at 48 kHz sample rate) over a single Gigabit Ethernet link.

RedNet 6 enables the integration of a RedNet audio system with an existing MADI system or the addition of MADI components to a RedNet system. It supports up to 64 bi-directional channels of either coaxial or optical MADI audio. In addition to both coaxial and optical MADI interfaces, RedNet 6 provides Word Clock in and out.

RedNet 6 enables integration of a RedNet system with MADI-based digital consoles, computer cards, converters and much more. It incorporates sample rate conversion (SRC) on each input and output and can interface between MADI and RedNet systems irrespective of the sample rate at which either is operating.

The RedNet 6 front panel contains a set of LEDs confirming network status, sample rate, clock sources and other device specific settings.

## About this User Guide

This User Guide applies only to the RedNet 6 MADI interface. It provides information about installing a RedNet 6 and how to connect it into your system.

A RedNet System User Guide is also available from the RedNet product pages of the Focusrite website. The Guide provides a detailed explanation of the RedNet system concept, that will help you achieve a thorough understanding of its capabilities. The RedNet System User Guide also provides information on the routing operations available within RedNet Control. We recommend that all users, including those already experienced in digital audio networking, take the time to read through the System User Guide so that they are fully aware of all the possibilities that RedNet and its software has to offer.

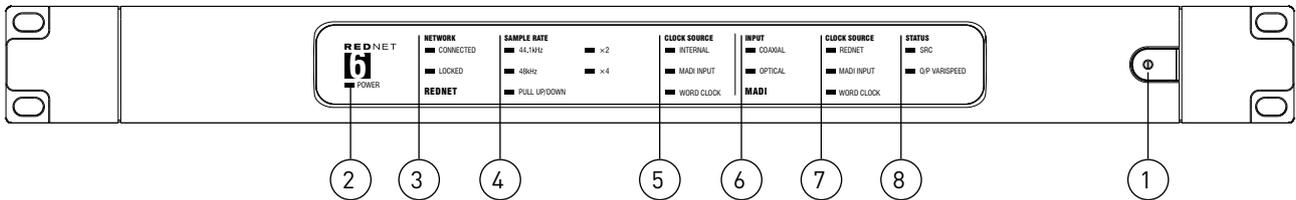
If either User Guide does not provide the information you need, be sure to consult [www.focusrite.com/rednet](http://www.focusrite.com/rednet), which contains a comprehensive collection of common technical support queries.

## **Box Contents**

- RedNet 6 unit
- 2 m Cat6 Ethernet cable
- IEC AC mains cable
- Product registration card with Bundle Code. Registration gives access to:
  - RedNet Control
  - RedNet PCIe drivers (installed with RedNet Control)
  - Audinate Dante Controller (installed with RedNet Control)
  - Dante Virtual Soundcard token and download instructions

# RedNet 6 connections and features

## Front Panel



### 1. AC Power Switch

### 2. Power Indicator

### 3. RedNet Network Status Indicators:

- **CONNECTED** – illuminates when the unit is connected to an active Ethernet network.
- **LOCKED** – illuminates when a valid sync signal is received from the network or the RedNet 6 unit is network master. When an incoming clock signal is invalid, the Locked indicator will flash to indicate that the unit has reverted to using its internal clock.

### 4. RedNet Sample Rate Indicators:

- Five yellow indicators. The Indicators illuminate individually or in combination to indicate **44.1 kHz**, **48 kHz**, **x2 multiple** (of 44.1 or 48), **x4 multiple** (of 48) and sample rate **Pull Up/Down**. For example, for a 96kHz pull up/down setting, the 48kHz, x2 and Pull Up/Down indicators will illuminate.

### 5. RedNet Clock Source Indicators:

When RedNet 6 is the clock master of the Dante network, one of the following indicators will illuminate.

- **INTERNAL** – illuminates to indicate the internal RedNet 6 sync clock is in use.
- **MADI INPUT** – illuminates to indicate an external MADI sync clock is in use.
- **WORD CLOCK** – illuminates to indicate an external Word Clock sync clock is in use.

### 6. MADI Input Indicators:

If a selected input signal is either invalid or not present the input source indicator will flash.

- **COAXIAL** – illuminates to indicate that coaxial connection is operational.
- **OPTICAL** – illuminates to indicate that optical connection is operational.

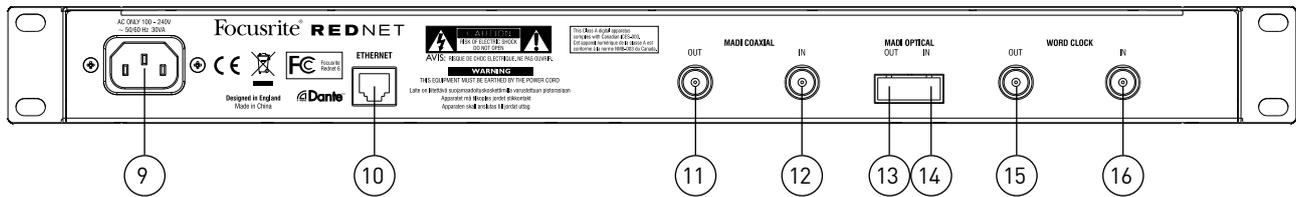
## 7. **MADI Clock Source Indicators:**

- **REDNET** – illuminates to indicate the internal network sync clock is in use.
- **MADI INPUT** – illuminates to indicate an external MADI sync clock is in use.
- **WORD CLOCK** – illuminates to indicate an external Word Clock sync clock is in use.

## 8. **MADI Status Indicators:**

- **SRC** – illuminates to indicate sample rate conversion is active.
- **O/P VARISPEED** – illuminates to indicate output is operating in varispeed mode. The Output Varispeed indicator will flash to indicate that the output is out of MADI tolerance (beyond 1% of nominal), or if 'MADI follow Rx' is set and an invalid input is detected. Please note that when running in varispeed mode the channel count of the MADI output will be decreased. Please see the specifications table on page 17 for full details.

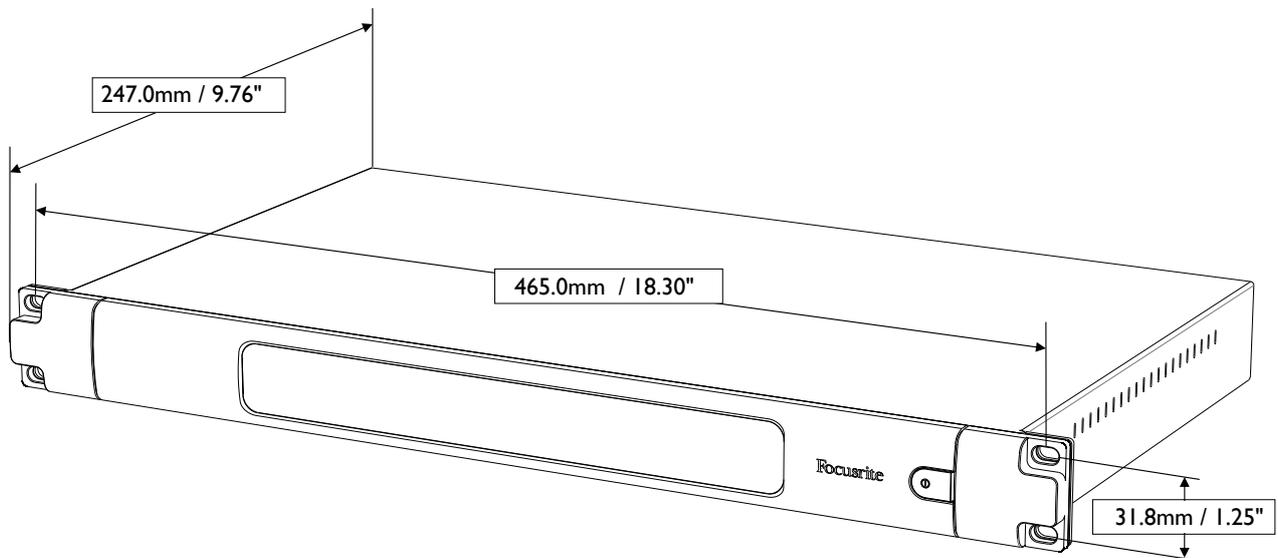
## Rear Panel



9. **AC mains** – standard IEC receptacle for connection of AC mains. RedNet 6 has a ‘Universal’ PSU, enabling it to operate from any supply voltages between 100 V and 240 V.
10. **Ethernet** – RJ45 network socket. Use a standard computer network cable to connect this socket to a local Ethernet switch to connect the RedNet 6 to the RedNet network. The socket has integral LEDs which illuminate to indicate connection to an active network port, and network activity. See page 13 for connector details.
11. **MADI Output** – BNC coaxial
12. **MADI Input** – BNC coaxial
13. **MADI Output** – Duplex SC optical
14. **MADI Input** – Duplex SC optical
15. **Word Clock Output** – BNC coaxial
16. **Word Clock Input** – BNC coaxial

**Note:** Word Clock Input can provide a clock source for the SRC or the network. Additionally when MADI and network are running synchronously Word Clock Input can accept a base-rate word clock signal.

## Physical Characteristics



RedNet 6 dimensions are illustrated in the diagram above.

RedNet 6 requires 1U of vertical rack space and at least 350 mm of rack depth, to allow for cables. RedNet 6 weighs 3.74 kg and for installations in a fixed environment (e.g., a studio), the front panel mounting screws will provide adequate support. If the units are to be used in a mobile situation (e.g., flight-cased for touring, etc.), consideration should be given to using side support rails within the rack.

RedNet 6 generates little significant heat and is cooled by natural convection.

Ventilation is via slots in the enclosure at both sides. Do not mount RedNet 6 immediately above any other equipment which generates significant heat, for example, a power amplifier. Also, ensure that when mounted in a rack, the side vents are not obstructed.

## Power requirements

RedNet 6 is mains-powered. It incorporates a 'Universal' power supply, which can operate on any AC mains voltage from 100 V to 240 V. The AC connection is made via a standard 3-pin IEC connector on the rear panel. A mating IEC cable is supplied with the unit, which should be terminated with a mains plug of the correct type for your country.

The AC power consumption of the RedNet 6 is 30VA.



Please note that there are no fuses in RedNet 6, or other user-replaceable components of any type. Please refer all servicing issues to the Customer Support Team (see "Customer Support and Unit Servicing" on page 18).

## RedNet 6 Operation

### First Use and Firmware Updates

Your RedNet 6 will require a firmware update when it is first installed and switched on. Firmware updates are initiated and handled automatically by the RedNet Control application. It is important that the firmware update procedure is not interrupted, either by switching off the RedNet 6 or the computer on which RedNet Control is running or disconnecting either from the network.

From time to time Focusrite will release RedNet firmware updates with new versions of RedNet Control. We recommend keeping all RedNet units up to date with the latest firmware version supplied with each new version of RedNet Control.

### Digital Clocking

RedNet 6 is able to operate across two separate clock domains:

- The RedNet network clock
- The MADl clock

Due to the inclusion of sample rate converters in the product, the two clock domains do not need to be synchronous so independent clock sources can be used.

Three potential clock sources are possible:

- Network (RedNet 6 can also act as network master clock)
- Word Clock In
- MADl Input

When sample rate conversion is enabled, the clock source of the MADl output and the RedNet 6 can be selected independently in the RedNet Control application.

When sample rate conversion is disabled, the MADl output will be synchronous with the RedNet network. In this case, the selection of clock source for the unit is selected under RedNet Clock Source in the RedNet Control application. If MADl and the Network are to run synchronously, the following rules must be followed:

- If Network is selected as the clock source, it is important that any device sending a MADl signal to RedNet 6 is also receiving a word clock signal from the RedNet 6 or another RedNet unit.
- If Word Clock In is selected as the clock source, any device which is sending a MADl signal to RedNet 6 must also receive a valid clock signal from the same source as RedNet 6

The RedNet 6 Word Clock Output may be switched via the RedNet Control application to output one of four clock signals:

- Network Clock
- Network Clock (base rate)
- MADI Input
- Word Clock Input

The RedNet 6 Word Clock input has a software selectable 75 ohm termination selected via the RedNet Control application.

## **MADI Modes**

RedNet 6 supports both varispeed and non-varispeed MADI modes. Non-varispeed mode enables up to 64 channels I/O at 48 kHz. Varispeed mode enables up to 56 channels I/O at 48kHz. The MADI input of RedNet 6 will automatically detect the channel count of incoming signals, meaning the user does not need to adjust any settings. When 'Follow Rx' (located in MADI Output menu) is set, the MADI output of RedNet 6 will automatically be set to match the incoming MADI signal.

The RedNet 6 MADI input select is auto sensing by default although manual override is provided in the RedNet Control application. When Auto mode is selected and both coaxial and optical inputs are present, RedNet 6 will automatically prefer the optical input. If the optical cable is removed from the RedNet 6 input, the unit will automatically switch to the coaxial input. If auto input is selected while no valid coaxial or optical input is present, both the optical and coaxial input indicators will flash.

The RedNet 6 MADI output has three varispeed states selectable in the RedNet Control application:

- Varispeed
- Fixed
- Follow MADI input

In addition to the varispeed states the RedNet 6 MADI output is capable of a range of sample rates. These can be selected in the RedNet Control application:

- Single (44.1 or 48 kHz)
- Dual (88.2 kHz or 96 kHz)
- Quad (176.4 or 192 kHz)
- Follow MADI input

When a MADI input is present, the MADI output of RedNet 6 will automatically match the MADI input.

## **Pull Up and Pull Down Operation**

RedNet devices are able to run with pull up or pull down sample rates in one of two ways:

- Locking to an external clock at the desired clock frequency
- Operating at a specified pull up or pull down percentage as selected in the Dante Controller application\*

\* Note: Not all RedNet devices currently support this mode of operation.

During 64 channel (i.e. non-varispeed mode) operation, MAD I is not capable of operating at greater than approximately +1% of the nominal sample rate. This may become a problem when the network clock domain is pulled up beyond 1% of nominal. In this condition, the Output Varispeed indicator on the front panel will flash to indicate that the output is out of MAD I tolerance. Therefore to continue generating a valid RedNet 6 MAD I output it would be necessary to operate the MAD I output in 56 channel (varispeed) mode, use sample rate conversion or reduce the network rate to within 1% of nominal sample rate.

## **Sample Rate Converters**

RedNet 6 has sample rate converters on both its inputs and outputs allowing the network and MAD I domains to have sample rates which are independent of each other.

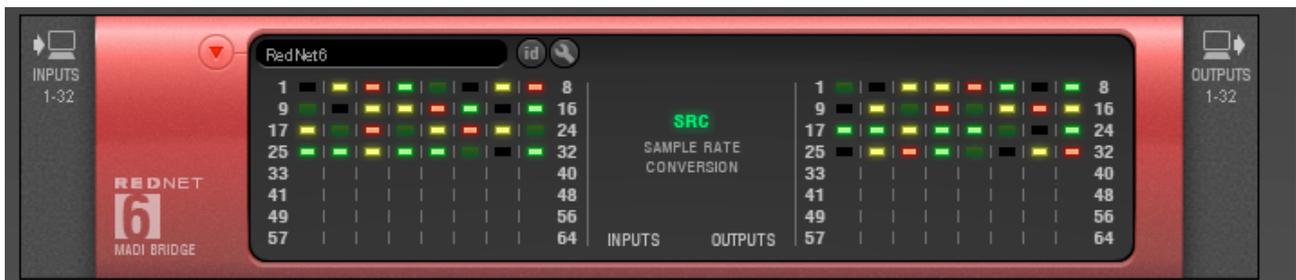
This can be particularly useful in post production environments where the network audio is pulled up or down, but it is necessary to have the MAD I stream run at a base sample rate to interface, for example, with a mixing console. Engaging the RedNet 6 sample rate converters will however increase the overall latency of the device.

## OTHER REDNET SYSTEM COMPONENTS

The RedNet hardware range includes various types of I/O interface and a PCIe digital audio interface card which is installed in the system's host computer. All the I/O units can be considered as "Break-Out" (and/or "Break-In") boxes to/from the network, and all are built in mains-powered, 19" rack-mount housings. There are also three software items, RedNet Control (see below), Dante Controller and Dante Virtual Soundcard.

## USING REDNET CONTROL

RedNet Control will reflect the status of the RedNet units present in the system, presenting an image representing each hardware unit.



The illustration above shows a RedNet 6 operating at 96kHz (denoted by the blanking of meters on channels 33-64), with SRC engaged, and sending/receiving audio at a range of signal levels.

### Signal Metering

Each input and output channel has a virtual signal indicator. Five different states are represented:

- Black: No signal present
- Dim green: -125 dBFS
- Green: -48 dBFS
- Yellow: -6 dBFS
- Red: -1 dBFS

**Note:** If none of the above are shown, the unit is in a reduced channel count mode either because it is in a varispeed mode or because it is operating at a double or quad sample rate.

SRC indicator: Illuminates to indicate sample rate converters are active.

### Spanner menu

The menu item list on the following page describes the structure of the RedNet 6 specific settings menus when a RedNet 6 is present in the system.

## **RedNet Control Settings Menu Items**

### **MADI Input Select**

- Coaxial
- Optical
- Auto

### **SRC**

- Enable
- MADI Output Rate
  - Follow Rx
  - Single rate
  - Double rate
  - Quad rate
- SRC Clock Source
  - MADI Input
  - Word Clock
  - RedNet

### **RedNet Clock Source**

- Internal
- MADI Input
- Word Clock

### **Preferred Master**

### **Word Clock Output**

- Network
- Network (Base Rate)
- MADI Input
- Word Clock Input

### **Word Clock Input Termination<sup>1</sup>**

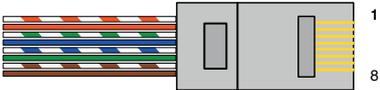
### **MADI Output Varispeed**

- Follow Rx
- Fixed (64/32/16)
- Varispeed (56/28/14)

# APPENDIX

## Ethernet connector

Connector type: RJ-45 receptacle  
Applies to: ETHERNET



Pin	Cat6 Core
1	White + Orange
2	Orange
3	White + Green
4	Blue
5	White + Blue
6	Green
7	White + Brown
8	Brown

## Performance Specifications

<b>Word Clock</b>			
Connectors	BNC 75Ω		
Output	5V 75Ω DC-coupled		
Input	locks down to 0.2V AC-coupled (75Ω software switchable termination)		
<b>MADI Coaxial</b>			
Electrical standard	as per AES10:2008		
Recommended Cable	75Ω characteristic impedance		
Connector	BNC 75Ω		
<b>MADI Optical</b>			
Optical Standard	as per AES10:2008 (ISO/IEC 9314-3, FDDI, ANSI X3.166)		
Recommended Cable	Multi-mode, Graded-index, 62.5μm core, 125μm cladding		
Connector	Duplex-SC		
<b>SRC</b>			
SRC lock range	41kHz to 216kHz (MADI)		
Sample Rate Ratio Limit	6:1		
THD	-130dB typical		
Latency	43 to 196 samples (Network and MADI sample rate dependent)		
<b>Channel Count</b>	<b>RedNet Clock</b>		
<b>MADI Clock</b>	<b>Single</b>	<b>Double</b>	<b>Quad</b>
Single	64	32	16
Single Varispeed	56	32	16
Double	32	32	16
Double Varispeed	28	28	16
Quad	16	16	16
Quad Varispeed	14	14	14
<b>Power</b>			
PSU	Internal, Universal type, consumption 30VA		

## **Focusrite RedNet Warranty and Service**

All Focusrite products are built to the highest standards and should provide reliable performance for many years, subject to reasonable care, use, transportation and storage.

Very many of the products returned under warranty are found not to exhibit any fault at all. To avoid unnecessary inconvenience to you in terms of returning the product please contact Focusrite support.

In the event of a Manufacturing Defect becoming evident in a product within 12 months from the date of the original purchase Focusrite will ensure that the product is repaired or replaced free of charge.

A Manufacturing Defect is defined as a defect in the performance of the product as described and published by Focusrite. A Manufacturing Defect does not include damage caused by post-purchase transportation, storage or careless handling, nor damage caused by misuse.

Whilst this warranty is provided by Focusrite the warranty obligations are fulfilled by the distributor responsible for the country in which you purchased the product.

In the event that you need to contact the distributor regarding a warranty issue, or an out-of-warranty chargeable repair, please visit: [www.focusrite.com/distributors](http://www.focusrite.com/distributors)

The distributor will then advise you of the appropriate procedure for resolving the warranty issue. In every case it will be necessary to provide a copy of the original invoice or store receipt to the distributor. In the event that you are unable to provide proof of purchase directly then you should contact the reseller from whom you purchased the product and attempt to obtain proof of purchase from them.

Please do note that if you purchase a Focusrite product outside your country of residence or business you will not be entitled to ask your local Focusrite distributor to honour this limited warranty, although you may request an out-of-warranty chargeable repair.

This limited warranty is offered solely to products purchased from an Authorised Focusrite Reseller (defined as a reseller which has purchased the product directly from Focusrite Audio Engineering Limited in the UK, or one of its Authorised Distributors outside the UK). This Warranty is in addition to your statutory rights in the country of purchase.

## **Registering your product**

For technical support, please register your product at: [www.focusrite.com/register](http://www.focusrite.com/register)

## **Customer Support and Unit Servicing**

you can contact our dedicated RedNet Customer Support team free of charge:

Email: [rednetsupport@focusrite.com](mailto:rednetsupport@focusrite.com)

Phone (UK): +44 (0)1494 462246

Phone (USA): +1 (310) 322-5500

## **Troubleshooting**

If you are experiencing problems with your RedNet 6, we recommend that in the first instance, you visit our Support Answerbase at: [www.focusrite.com/answerbase](http://www.focusrite.com/answerbase)