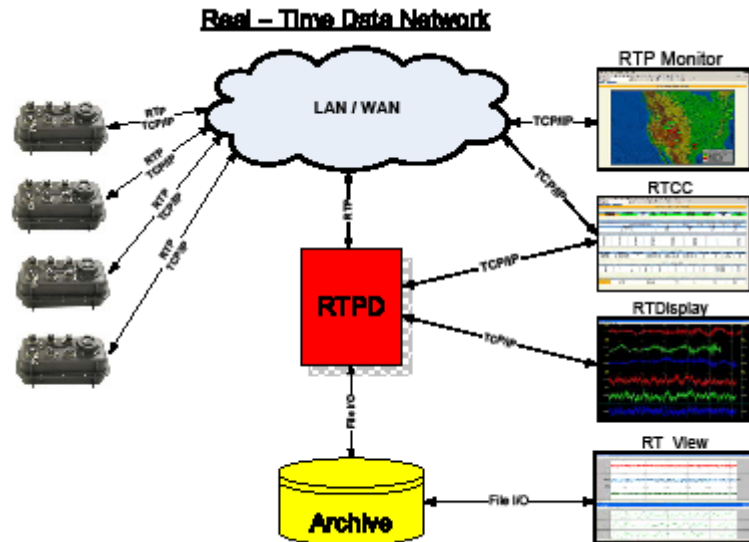


RTPD

Installation and Users Guide

Version 2.1.7.0

13 March 2009



This REF TEK RTPD manual provides installation and operating procedures for the REF TEK Protocol (RTP) server (RTPD) in order to communicate, process, store and analyze data. RTPD is a program that provides error-corrected communications with a DAS unit over a variety of media.

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About this manual:

This RTPD Users manual provides a detailed overview of RTPD operations and installation for use with the 130 family of products. It covers the following broad operational topics:

Revision History:

Revision	Date	Reason for change	Pages
0.1	11/11/02	Initial Draft	All
A	12/02/02	Update to new format (Release)	All
B	12/06/02	Update Windows 2000	Section 2
C	03/20/03	Reorganize and Update	All
D	06/10/03	Updated for 1.10.4	All
E	10/08/04	Added Data Client Updates	Section 6
		Release 1.10.6	
	10/08/05	Release 2.0.0	All
F	11/03/06	Release 2.1.2.0	All
G	03/07/07	Release 2.1.3.0	
		Release 2.1.4.0 (RTP2RTPD)	Section 6
	05/15/08	Converted to WORD template	All
	07/21/08	Added SL2RTPD	Section 5.2
H	09/09/08	Added RTPSMS and PacketFile	Section 5.11
	03/05/09	Release 2.1.7.0 update	All

Software Version:

Current software and documentation is available on our web site. Some early units may require hardware modifications to use the latest software. Contact REF TEK if you have any queries on the compatibility of your unit(s) and the current software release.

Notation Conventions

The following notation conventions are used throughout REF TEK documentation:

Notation	Description
ASCII	Indicates the entry conforms to the American Standard Code for Information Interchange definition of character (text) information.
Binary	Indicates the entry is a raw, numeric value.
Hex	Indicates hexadecimal notation. This is used with both ASCII characters (0 - 9, A - F) and numeric values.
BCD	Indicates the entry is a numeric value where each four bits represents a decimal digit.
FPn	Indicates the entry is the ASCII representation of a floating-point number with n places following the decimal point.
<n>	Indicates a single 8-bit byte. When the contents are numeric, it indicates a hexadecimal numeric value; i.e. <84> represents hexadecimal 84 (132 decimal). When the contents are capital letters, it represents a named ASCII control character; i.e. <SP> represents a space character, <CR> represents a carriage return character and <LF> represents a line feed character.
MSB	Most Significant Byte of a multi-byte value.
MSbit	Most Significant Bit of a binary number.
LSB	Least Significant Byte of a multi-byte value.
LSbit	Least Significant Bit (bit 0) of a binary number.
YYYY	Year as a 4-digit number
DDD	Day of year
HH	Hour of day in 24-hour format
MM	Minutes of hour
SS	Seconds of minute
TTT	Thousandths of a second (milliseconds)
IIII	Unit ID number

n, nS	nano, nanoSecond; $10^{-9} = 0.000000001$
u, uS	micro, microSecond; $10^{-6} = 0.000001$
m, mS	milli, milliSecond; $10^{-3} = 0.001$
K, KHz	Kilo, KiloHertz; $10^3 = 1,000$
M, MHz	Mega, MegaHertz; $10^6 = 1,000,000$
G, GHz	Giga, GigaHertz; $10^9 = 1,000,000,000$
Kb, KB	Kilobit, KiloByte; $2^{10} = 1,024$
Mb, MB	Megabit, MegaByte; $2^{20} = 1,048,576$
Gb, GB	Gigabit, GigaByte; $2^{30} = 1,073,741,824$

Related Manuals:

130-01/3 System Documents	Number	PDF file
130-01 System Startup	Doc-130-Ops	130_startup_01.pdf
PFC_130 Users Guide	Doc-130-PFC	130_pfc.pdf
Data Utilities Users Guide	Doc-DataUtils	130_utilities.pdf
Archive Utilities	Doc-ArcUtil s	arcutil.pdf
130 Theory of Operations	Doc-130-Theory	130_theory. pdf
130 PFC Release Notes	Doc-130-PFCRel	130_PFCRN.pdf
130 CPU Release Notes	Doc-130-CPURel	130_CPURN.pdf
130 Command Reference	Doc- 130-Cmd	130_command.pdf
130 Recording Format	Doc-130-Record	130_record.pdf
130-GPS Manual	Doc-GPS-Ops	130_gps. pdf
Optional Manuals	Number	PDF file
RTPD Installation and Users Guide	Doc-RTPD	RTPD.pdf
RTP Protocol	Doc-RTP	RTP.pdf
RT_View Users Guide (Part of Data Utilities) ¹	Doc-RTView	RTView.pdf
RTCC Command and Control Users	Doc-RTCC	RTCC.pdf
130 RTCC Release Notes*	Doc-RTCCRel	130_RTCCRN.pdf
RT_Display Users Guide*	Doc-RTDis	RTDisplay.pdf
RTPMonitor Installation and Users Guide	Doc-RTPMon	RTPM.pdf

¹ * = Programs are included in the optional REF TEK Command and Control Interface (RTI)

REF TEK Support and update notifications

As a valued user of REF TEK equipment we would like to provide the best support possible by keeping you up to date with our product updates.

If you would like to be notified of any REF TEK product updates please spend a couple of minutes to register with the REF TEK customer support team.

To register, email updates@reftek.com giving us your name and REF TEK product you currently have or fill out our online registration form at www.reftek.com/registration

Once we register your contact we will only send necessary notifications via email. The same notifications will be shown on our website's www.reftek.com/support page

Thanks,

Your REF TEK support team

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1 RTPD Introduction

1.1 Overview

RTPD is a workstation program that provides error-corrected communications with REF TEK DAS units over a variety of media. This is accomplished using REF TEK Protocol (RTP), a UDP-based error-correcting protocol developed by REF TEK. This protocol is supported natively by REF TEK 130 DAS units. Support for RTP in REF TEK 72A DAS units requires installation of an RT422 board in each 72A DAS unit.

RTPD receives PASSCAL data packets and stores them in a REF TEK data archive. **RTPD** allows client programs (data source modules) to receive the data and to issue commands to a DAS and receive the responses. Multiple clients can attach to **RTPD** simultaneously.

WARNING: Version 2.1.2.0 is **INCOMPATIBLE** with REF TEK data archives created prior to version 2.1.2.0 of RTPD and Archive Utilities. The user must run **ARCHREBUILD** version 2.1.0.0 or later on older archives before this version of RTPD will connect to it. Likewise, archives created and written to with RTPD and Archive Utilities version 2.1.0.0 or later are **INCOMPATIBLE** with earlier versions. The user must run the earlier version of **ARCHREBUILD** before using an earlier version of RTPD.

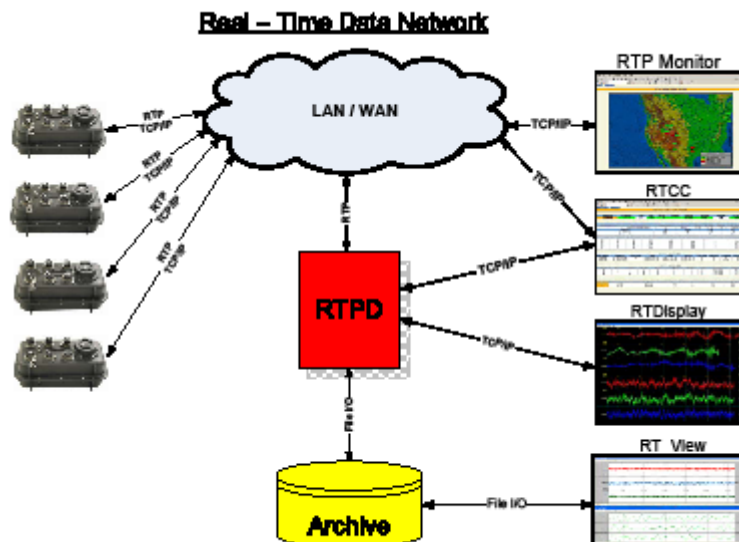


Figure 1.1 RTPD Flow

1.2 Clients

REF TEK distributes data clients with **RTPD** (refer to the table in section 1.3.2 for more information). REF TEK has also developed the RTI (REF TEK Interface) command client which is available separately. RTPD can also act as a data client for connecting to RTPD running on another workstation.

The United States Geological Survey (USGS) maintains a data client, *reftek2ew*, for importing data from **RTPD** into Earthworm. For more information visit the USGS web site at <http://gldbrick.cr.usgs.gov/>.

There is a data client, **rtp2orb** for importing data from **RTPD** into ORB. For more information contact Refraction Technology.

RTPD uses UDP/IP for communication with REF TEK DAS equipment. This allows communication over a variety of physical media. **RTPD** does not directly configure or control the media, but depends on the workstation's OS and device drivers to provide network protocol support for the selected media.

The REF TEK 130 DAS directly supports RTP over Ethernet and RS-232 serial links. The REF TEK 72A supports RTP over serial links only and requires installation of the optional RT422 board.

1.3 Running RTPD as a Service

RTPD is installed as a system service on all platforms. This allows it to run in the background at all times, even when no user is logged into the system. This also allows a system with a signaling Uninterrupted Power Supply (UPS) to cleanly stop **RTPD** when performing an unattended shutdown. Then it can automatically start **RTPD** at system startup.

1.3.1 Archive Utilities

The REF TEK Archive Utilities are installed with **RTPD**. These utilities are required to create a data archive for **RTPD** to store data. Utilities are also provided to maintain and extract data from an archive.

1.3.2 Platforms supported

	Windows	Linux	Solaris	MacOS
Version	XP/Vista	Red Hat 6.2+	Solaris 6+	X
RTPD	rtpudpsvc.exe rtpudpcon.exe	rtpd	rtpd	rtpd
Data integrity client	rtpc.exe ChkData.exe	rtpc	rtpc	rtpc
Data Clients	rtptrig.exe rtppipe.exe ? rtpaux.exe rtpftp.exe rtpsms.exe rt_display.exe	rtptrig rtppipe rtpaux rtpftp rtpsms rt_display	rtptrig rtppipe rtpaux rtpftp rtpsms rt_display	Rtpsms Rtppipe Rtpaux Rtpftp rtpsms rt_display
Command Clients	rtcc ² (RTI) rtpmonitor.exe rtpid.exe	rtcc ³ (RTI) rtpmonitor rtpid	rtcc ⁴ (RTI) rtpmonitor rtpid	rtcc ⁵ (RTI) rtpmonitor rtpid
Alternate Input Programs	rtp2rtpd.exe sl2rtp.exe	rtp2rtpd sl2rtp	rtp2rtpd sl2rtp	rtp2rtpd sl2rtp
Ref Tek Archive Utilities	arccreate.exe arcbuild.exe arcwrite.exe arccopy.exe arcinfo.exe arcfetch.exe	arccreate.exe arcbuild.exe arcwrite.exe arccopy.exe arcinfo.exe arcfetch.exe	arccreate arcbuild arcwrite arccopy arcinfo arcfetch	arccreate arcbuild arcwrite arccopy arcinfo arcfetch
Scripts, Misc.	rtp.cmd rtptrig.cmd rtenv.cmd generic_null_modem.inf svc.exe setdashost verifycont	rtp rtptrig.cmd setdashost verifycont	rtp rtptrig.cmd setdashost verifycont	Rtp rtptrig.cmd setdashost verifycont

² RTI is an optional Refraction Technology Interface containing RTCC and RT_Display

³ RTI is an optional Refraction Technology Interface containing RTCC and RT_Display

⁴ RTI is an optional Refraction Technology Interface containing RTCC and RT_Display

⁵ RTI is an optional Refraction Technology Interface containing RTCC and RT_Display

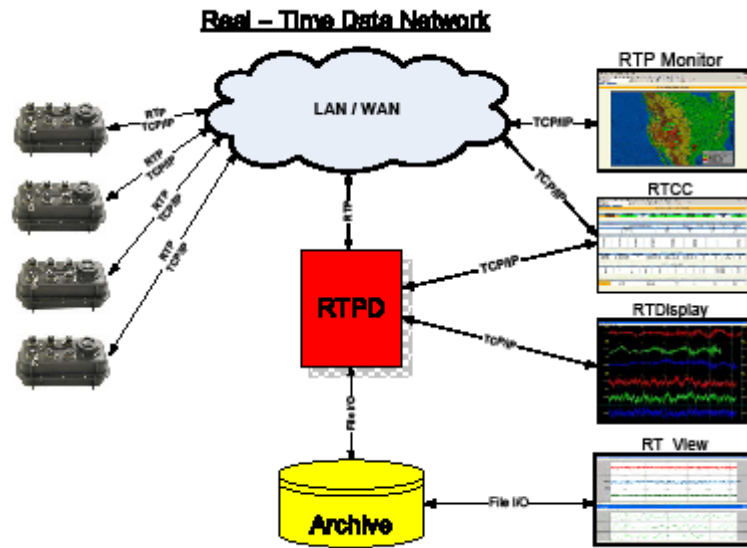


Figure 1.2 RTPD Flow

2 Windows XP and Vista - Installation

2.1 Getting Started

This section installs the following on the Win32 platform.

RTPD	Description
rtpudpcon	Console version of RTPD
rtpudpsvc	Service version of RTPD
Data Integrity Client	
rtpc	Checks data flow
ChkData	This data client performs an integrity check and displays the status of the incoming data
Data Client	
rtptrig	Monitors incoming packets and spawns a user script
rtppipe	Receives incoming recording packets and writes to a named pipe
rtpaux	Periodically requests auxiliary data status from a list
rtpftp	Monitors incoming recording packets and spawns a script when it receives an ET packet
rtpsms	Reads data packets from RTPD and determines if a user-specified MMI level is exceeded
rt_display	Allows viewing of REF TEK data in real-time. RT_Display is designed to connect to RTPD and receive a copy of all data packets.
Command Client	
rtcc	Command and control of either single or multiple 130 series DAS units over a TCP/IP (LAN/WAN) connection or through RTPD
rtpmonitor	Up-to-date status report of a network of 130 DAS units
rtpid	Data client that monitors DAS connections
Alternate Input Program	
rtp2rtpd	Forwards recording packets from a primary RTPD to secondary RTPD
sl2rtp	Forwards miniseed packets from a Seedlink Siescomp feed
Archive Utilities	
arccreate	Creates an archive
arcinfo	Views and verifies current status (size) of the local archive
arcfetch	Assembles raw data from the archive for processing
arcbuild	Rebuilds an archive from a corrupted archive
arccopy	Copy an archive from one medium to another
arcwrite	Archive raw REF TEK data into an existing archive

WARNING: Version 2.1.2.0 is INCOMPATIBLE with REF TEK data archives created prior to version 2.1.2.0 of RTPD and Archive Utilities. The user must run ARCREBUILD version 2.1.0.0 or later on older archives before this version of RTPD will connect to it. Likewise, archives created and written to with RTPD and Archive Utilities version 2.1.0.0 or later are INCOMPATIBLE with earlier versions. The user must run the earlier version of ARCHREBUILD before using an earlier version of RTPD.

2.2 Installing the Software on XP and Vista

Note: This command assumes your CD-ROM drive is drive D: and that you are installing the software to your C: drive. If this is not the case, substitute the appropriate drive letters.

To install RTPD and its associated applications, perform the following instructions to run the install.bat file from the CD:

1. Insert the provided CD-ROM in the appropriate CD-ROM drive.
2. Using standard Windows operations open a command prompt and enter the following:

```
C:\> D:  
D:\> cd \rtpd\win32  
D:\rtpd\win32> install  
D:\rtpd\win32> cd \arc_util\win32  
D:\arc_util\win32> install
```

Note: This command assumes the CD-ROM drive is D.

3. Once the command is executed and the installation is completed type **exit** at the command prompt.

```
D:\> exit
```

4. Verify that a **reftek** directory has been created on the local drive [C:].
5. Also verify that a **Refraction Technology** program Group exists by using the Windows Start menu.
6. If both are present then the installation was successful.
7. For a **Serial** connection proceed to the next section "XP serial configuration" to configure a serial connection.
8. For an **Ethernet** connection, proceed to Section 4, "Basic operations".

2.3 XP and Vista serial configuration

2.3.1 Information File (Generic Null Modem RTPD.inf)

REF TEK has supplied a modem information file (Generic Null Modem for **RTPD.inf**) that is located in the **C:\vreftek** directory. This information file is required to configure the serial port to provide communication over a direct serial link using a serial cable or serial radio. This file must be resident on the local drive, however, there is no reason to access or make changes to it.

This information file is not needed when using a standard telephone modem. If you do not need to install the Generic Null modem skip the next section.

Note: This file may be needed when making a direct PPP link from the DAS.

2.3.2 Add a Generic Null Modem

To add a generic null modem perform the following instructions:

1. From the **Control Panel** select the **Phone and Modems** icon.
2. Select the **Modems** tab.
3. Click **Add** (Figure 4 - 1).

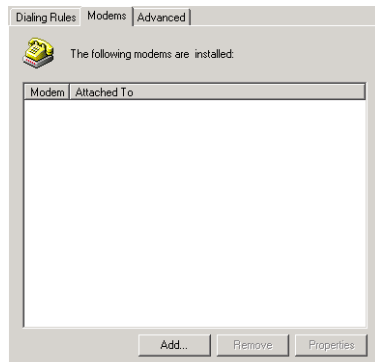


Figure 2.1 Select Add

4. Select the "Don't detect my modem" option if installing a Generic Null Modem.



Figure 2.2 Install New Modem

5. Select the **Next>** to select the modem from a list.
6. In the **Install New Modem** click **Have Disk** (Figure 2.3).

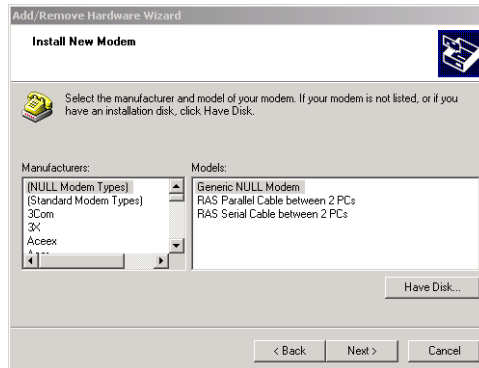


Figure 2.3 Have Disk

7. At the **Install From Disk** window in the **Copy Manufacturer's files from:** text box type **C:\reftek**
8. Click **OK** when ready (Figure 2.4).



Figure 2.4 Install From Disk

9. At the **Install New Modem** window under **Models** select **Generic NULL Modem**.
10. Click **Next>** when ready (Figure 2.5).

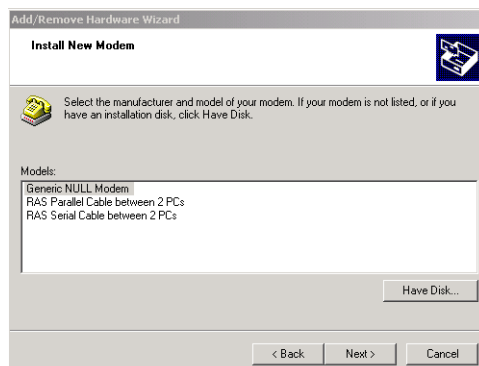


Figure 2.5 Select Generic NULL

11. At the next **Install New Modem** window select an available port to use for the modem
12. Click **Next>** when ready (Figure 2.6).

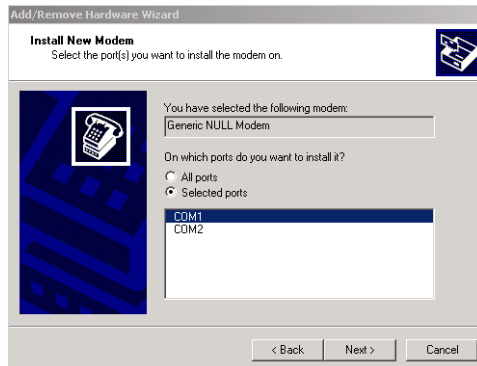


Figure 2.6 Select Comm Port

Note: If the “Digital Signature Not Found” warning appears, select the Yes button and proceed.

13. The **Install New Modem** window will display **Your modem has been set up successfully.**
14. Click the **Finish** button (Figure 2.7).

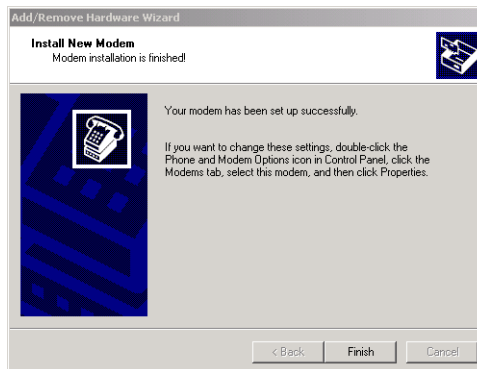


Figure 2.7 Modem Setup Success

15. At the **Phone and Modems Options** window select the **Properties** button.

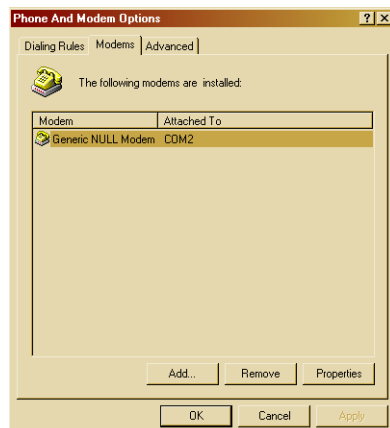


Figure 2.8 Phone and Modem Options

16. In the **Generic NULL Modem Properties** window on the **General** tab – click the **Maximum Port Speed** drop-down menu and select the maximum baud rate setting (Figure 2.8).

Note: The baud rate settings MUST match the configuration of the connected equipment.

- For direct connection to the 130, the baud rate the 130 is configured to.
- For direct connection to a 72A with the RT422 board, the RT422 board is configured at the factory to 9600 but can be changed. Reference the RT422 Asynchronous Serial Communications Card (Board Document) for additional information on the jumper configurations that support the baud rate setting.
- For connection to a DAS thru a radio or other equipment, consult their operations manual.

17. Click OK when ready.

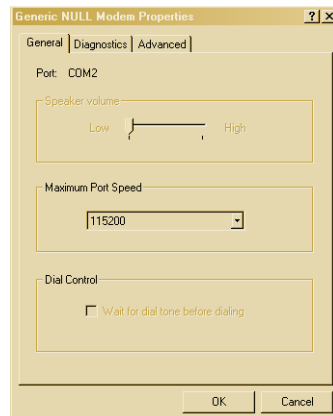


Figure 2.9 Set Modem

18. In the **Phone and Modems Options** window click the **OK** button.
19. At this point the PC needs to be restarted. Using standard operations restart the PC.

2.3.3 Configure Remote Access Services (RAS)

Configure the Remote Access Services (RAS) per the following:

1. Using standard window operations click **Start** —> **Settings** —> **Control Panel**.

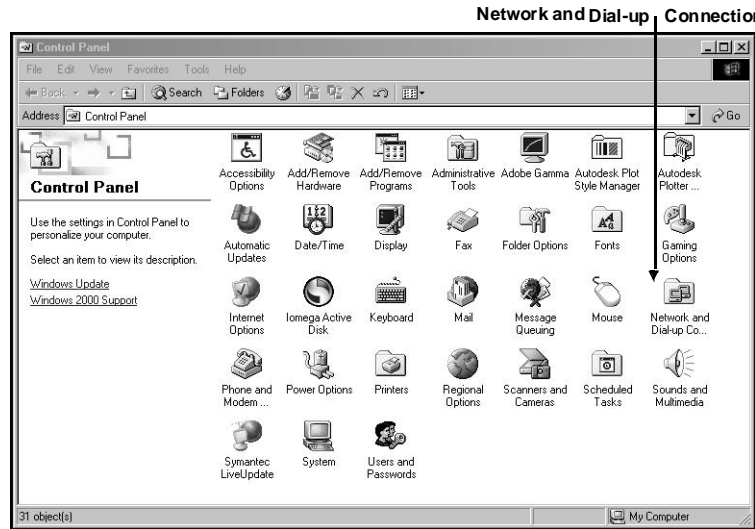


Figure 2.10 Control Panel

2. Double-click the **Network and Dial-up Connection** Icon.

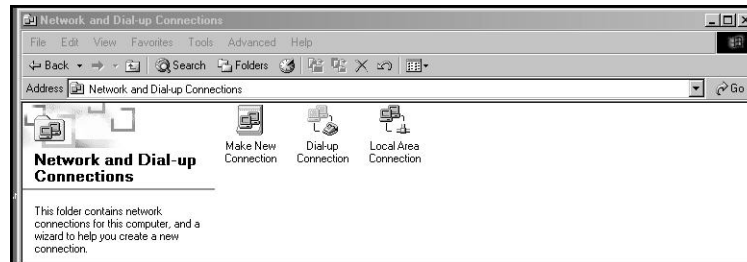


Figure 2.11 Network and Dial-up

Note: Windows XP uses a "New Connection" wizard.

3. Double-click the **Make a New Connection** Icon.



Figure 2.12 Make New Connection

4. Select the **Next** option screen and select **Accept incoming connections**.

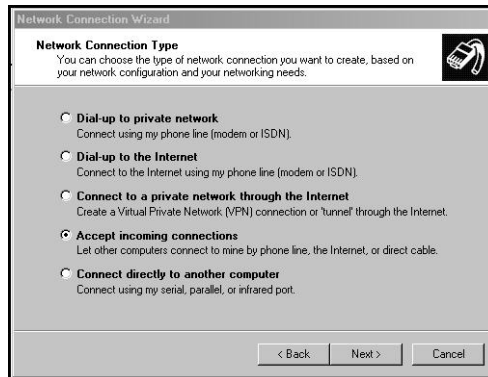


Figure 2.13 Accept Incoming

5. Select the **Next** button and check the **Generic Null Modem** option.

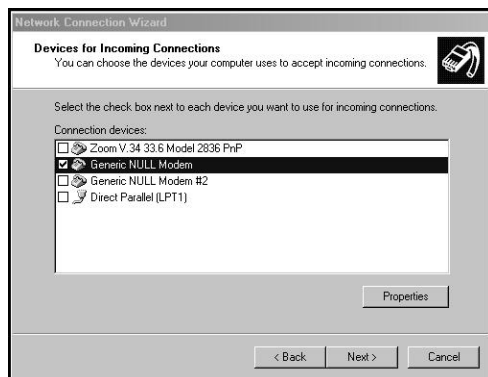


Figure 2.14 Device for Connect

6. Click the **Next** button when ready to continue.
7. Select the **Allow** option on the Incoming Virtual Connection window.

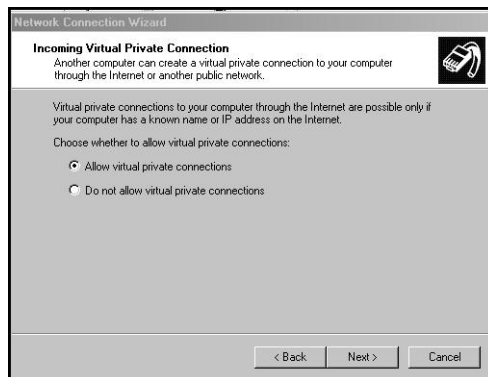


Figure 2.15 Select Allow

8. Click the **Next** button.

9. Select the **Add** button to add a new DAS connection.

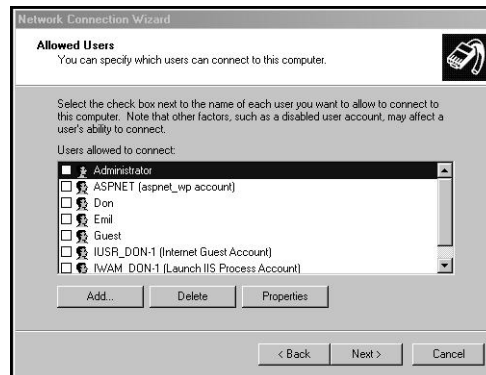
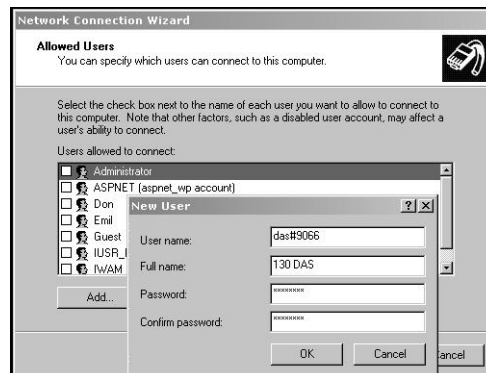


Figure 2.16 Add DAS User

Note: When a DAS unit is setup and is connected to a PC, an account must be created and added. The account Username **MUST** be the particular DAS unit ID that is directly connected to the PC.

10. At the **New User** window in the **User name:** text box type the correct user name `das#_ _ _ _` and password `das#_ _ _ _`, where `_` is the DAS unit ID number (if the DAS unit ID is only 3 digits use a leading zero), include the alpha characters `das` or `DAS` and number sign (`#`) (8 total characters only).



11. Click in the **Full Name:** and fill-in (any name or leave blank).
12. For the **Password:** setting you must use the Username (i.e., `das#9066`).
13. Next **Confirm Password** by re-typing the password.

Note: The **Password:** settings are case sensitive.

14. Select the **OK** button to create the new user.

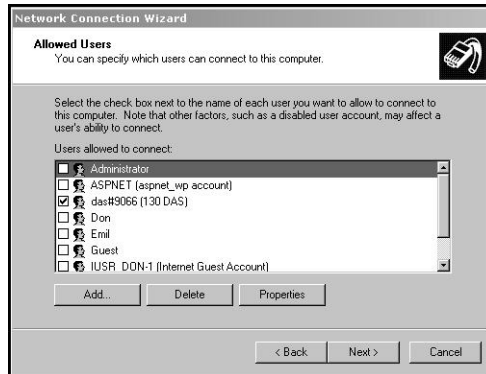


Figure 2.17 Added DAS User

15. Select the **Next** button.

16. In the **Network Components** window (Figure 2.18), under the components, highlight Internet Protocol (TCP/IP).

17. Select the **Properties** button.

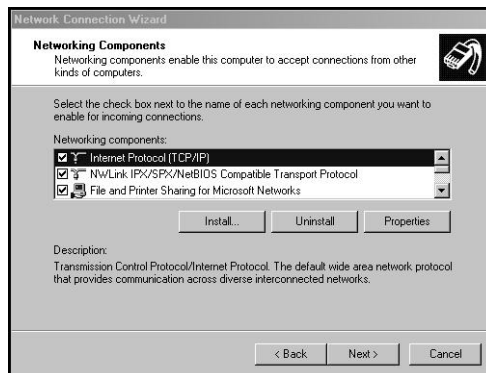


Figure 2.18 Networking Components

18. On the **Incoming TCP/IP Properties**, enable **Allow callers to access my local area network**.

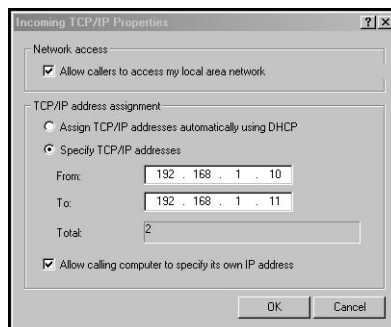


Figure 2.19 Incoming TCP/IP

19. Enable **Specify TCP/IP address**.

20. In the **From:** text box type a generic IP address where:
From IP address = PC's PPP IP address.
21. In the **To:** text box type a destination IP address where:
To IP address = Range of IP address for Serial PPP pool.
22. Click **OK** when ready.



Figure 2.20 Remote Access Setup

23. Click **Finish** after naming the connection.

2.3.4 Start Remote Access Service (RAS)

Windows provides a services control program. It must be used to start RAS. The control program can be accessed through the Windows Control Panel:

Windows XP: Start -> Settings -> Control Panel -> Administrative Tools -> Services -> Component Services

A shortcut to the control program has also been placed at **Start -> Programs -> Refraction Technology -> RTP Services -> Services**. The shortcut can be copied to the windows desktop by dragging it to the desktop while holding down the CTRL key.

To start RAS perform the following steps:

1. Start the Services control program.
2. Double-click the **Services** icon to open the windows services process window.

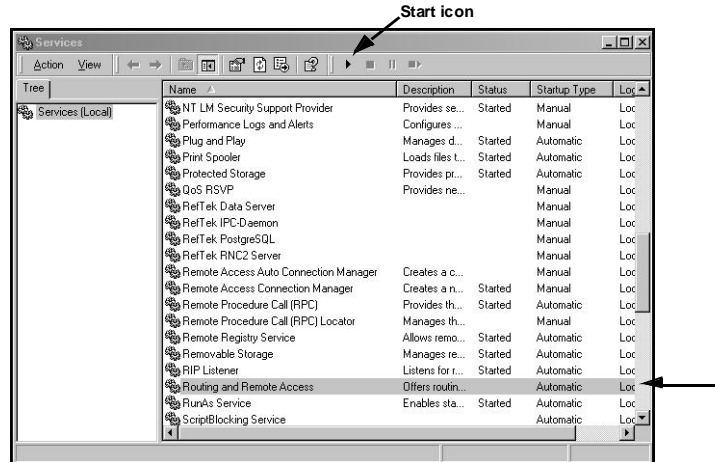


Figure 2.21 Services Window

3. Highlight and select the **Routing and Remote Access** service.
4. Start the service by using the **Action** pull-down or using the start icon on the task bar.

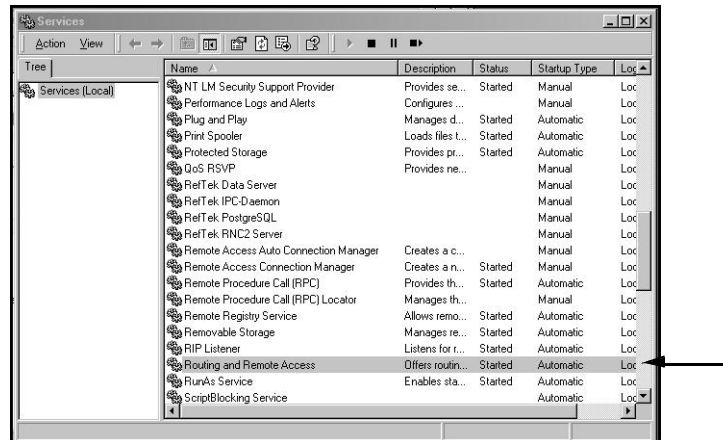


Figure 2.22 RAS Started

5. Close the control program.

3 Linux and Solaris installation

3.1 Getting Started

This section installs the following on the UNIX platform.

RTPD	Description
rtpudpcon	Console version of RTPD
rtpudpsvc	Service version of RTPD
Data Integrity Client	
rtpc	Checks data flow
ChkData	This data client performs an integrity check and displays the status of the incoming data
Data Client	
rtptrig	Monitors incoming packets and spawns a user script
rtppipe	Receives incoming recording packets and writes to a named pipe
rtpaux	Periodically requests auxiliary data status from a list
rtpftp	Monitors incoming recording packets and spawns a script when it receives an ET packet
rtpsms	Reads data packets from RTPD and determines if a user-specified MMI level is exceeded
rt_display	Allows viewing of REF TEK data in real-time. RT_Display is designed to connect to RTPD and receive a copy of all data packets.
Command Client	
rtcc	Command and control of either single or multiple 130 series DAS units over a TCP/IP (LAN/WAN) connection or through RTPD
rtpmonitor	Up-to-date status report of a network of 130 DAS units
rtpid	Data client that monitors DAS connections
Alternate Input Program	
rtp2rtpd	Forwards recording packets from a primary RTPD to secondary RTPD
sl2rtp	Forwards miniseed packets from a Seedlink Siescomp feed
Archive Utilities	
arccreate	Creates an archive
arcinfo	Views and verifies current status (size) of the local archive
arcfetch	Assembles raw data from the archive for processing
arcbuild	Rebuilds an archive from a corrupted archive
arccopy	Copy an archive from one medium to another
arcwrite	Archive raw REF TEK data into an existing archive

WARNING: Version 2.1.2.0 is INCOMPATIBLE with REF TEK data archives created prior to version 2.1.2.0 of RTPD and Archive Utilities. The user must run ARCREBUILD version 2.1.0.0 or later on older archives before this version of RTPD will connect to it. Likewise, archives created and written to with RTPD and Archive Utilities version 2.1.0.0 or later are INCOMPATIBLE with earlier versions. The user must run the earlier version of ARCHREBUILD before using an earlier version of RTPD.

3.2 Installation instructions for Linux and Solaris

The following instructions assume that you have logged into your computer as 'root' (superuser) and that you have mounted the CD containing REF TEK software.

Note: These instructions assume your CD-ROM is mounted as /cdrom. If this is not the case, substitute the actual path in these instructions.

1. Create a new user named 'reftek' with a home directory of the same name.
2. Change to the rtpd platform-specific subdirectory on the CD.

```
linux:          $ cd /cdrom/rtpd/linux.i86
solaris intel:  $ cd /cdrom/rtpd/solaris.8.i86
solaris sparc:  $ cd /cdrom/rtpd/solaris.6.sn4
```

3. Run the install script.
\$ install

4. Change to the archive utilities platform-specific subdirectory on the CD.

```
linux:          $ cd /cdrom/arc_util/linux.i86
solaris intel:  $ cd /cdrom/arc_util/solaris.8.i86
solaris sparc:  $ cd /cdrom/arc_util/solaris.6.sn4
```

5. Run the install script.
\$ install

3.3 Linux and Solaris serial configuration

No support for serial connections is provided.

4 Basic operations

4.1 Create a Data Archive

RTPD is designed to store incoming data into a REF TEK data archive. In order for this to occur the archive must be created and its location stored in `rtpd.ini`. If **RTPD** will only be used to forward data to data source modules no archive is needed.

To create a data archive perform the following steps:

1. Change to the `reftek` directory.
unix: `$ cd ~reftek`
windows: Start -> Programs -> Refraction Technology ->REFTEK
2. From the command prompt issue the following commands to create an archive.
unix: `$ arccreate Archive "Online Archive"`
windows: `arccreate ARCHIVE "Online Archive"`
3. Edit `rtpd.ini` to set the complete path to the archive.

Note: For more information on the options available for *ARCCREATE* see the *ARCCREATE (Archive Create)* section in the REF TEK Data Utilities guide.

Note: For more information on the `rtpd.ini` see section 9.1 Configuration options - `rtpd.ini` file in section 9.

4.2 Controlling RTPD

RTPD is properly controlled using the rtp script provided for each platform. On Windows platforms, the script is located in `c:\reftek`. On Linux and Solaris platforms, the script is located in the `init.d` directory. The `rtp` script has the following options:

Option	Win /XP /Vista	Linux/Solaris	Description
install	√		Installs RTPD as a service
remove	√		Removes the RTPD service
start	√	√	Starts the installed RTPD
stop	√	√	Stops the installed RTPD service
restart	√		Stops and restarts
status	√	√	Displays the status of RTPD

On Windows platforms, shortcuts are provided for easy access and control. A shortcut that opens a command prompt in the `c:\reftek` directory is located at **Start -> Programs -> Refraction Technology -> REFTEK**. Shortcuts for starting and stopping RTPD are located in **Start -> Programs -> Refraction Technology -> RTP Services**.

Windows includes a services control program that provides much more control but is also more complicated to use. The services control program is started from **Start -> Settings -> Control Panel -> Services**. It can also be started from **Start -> Programs -> Refraction Technology -> RTP Services -> Services**.

Note: All platforms, you must have administrative privileges to start or stop RTPD as a service. Any user can check the status of RTPD to see if it is running.

4.3 Data clients

A data client is a program that connects as a client to **RTPD** and receives the incoming DAS data from **RTPD**. A data client can act as a link from **RTPD** to a data processing program. It can also serve as a data monitoring program.

A data client can reside on a different workstation or even a different platform than the **RTPD** it connects to. However its IP address must be registered in the **rtpd.ini** file as a client (CmndClientIPADDR) only if it sends commands to the DAS.

REF TEK distributes several data clients with **RTPD**. The most commonly used data clients are the **RTPC** and **CHKDATA** modules. The **RTPC** module is a simple data integrity checker that is available for all platforms. The **CHKDATA** module is more extensive data integrity checker that is only available on Windows platforms.

These data clients are run from the command prompt. On windows platforms shortcuts for **RTPID** and **CHKDATA** are available as part of the REF TEK program menu.

RTPD can act as a data client itself and connect to a primary **RTPD** to receive forwarded data. This behavior is activated by specifying the primary **RTPD** in client RTPD's **rtpd.ini** file (Remote).

Note: See Section 9.1 *Configuration options - rtpd.ini file* for more information about the **rtpd.ini** file.

Note: See Section 6 *Data Clients* for more information on data clients.

4.4 Tools for troubleshooting

Some of the data clients also create log files which should be checked when problems occur.

4.4.1 RTPD.LOG file

RTPD creates a log file when it runs. The location of the log file is controlled by an entry in the **RTPD.INI** (Log). By default, the log is put in the current directory. The **RTPD.INI** file should be changed to specify the *reftek\log* directory (reftek/log) as the location for the log file. The **RTPD.LOG** file contains the current status of RTPD and can be used to evaluate operations. The times logged into the file reference the PC's time. See Section 9 *Configuration options - rtpd.ini* file for more information about the **RTPD.INI** file and **RTPD.LOG** file.

In version 2.1.x.x and above the log file is split into daily files with the day appended to the name (i.e. rtpd.2006261.log).

Note: The rtpd.log files need to be monitored. The number of files continues to increase and could cause a system problem. It is recommended to periodically delete files to avoid system problems.

4.4.2 RTPID.LOG file

The **RTPID** module also creates a log file. Currently it stores its log file in the directory from which the program is invoked (current directory). When started with the **RTPID** shortcut (windows) the current directory is the log directory. The **RTPID.LOG** file shows which DAS units stopped communicating and whether they responded to the subsequent ID request.

4.4.3 ARCINFO (Archive Information)

ARCINFO allows the viewing of the current status (size) of the local archive and verifies that the archive is collecting data. For more information see **ARCINFO** (Archive Information) in the REF TEK Archive Utilities Guide.

4.5 If the computer crashes while running RTPD

1. Stop **RTPD**.
2. Use the **arcrebuild** utility command as described in the Arcrebuild section in the REF TEK Utilities Guide.
3. Re-start **RTPD**.

Note: Failure to run *arcrebuild* before restarting RTPD may result in loss of data.

WARNING: Version 2.1.2.0 is **INCOMPATIBLE** with REF TEK data archives created prior to version 2.1.2.0 of RTPD and Archive Utilities. The user must run *arcrebuild* version 2.1.0.0 or later on older archives before this version of RTPD will connect to it. Likewise, archives created and written to with RTPD and Archive Utilities version 2.1.0.0 or later are **INCOMPATIBLE** with earlier versions. The user must run the earlier version of *archrebuild* before using an earlier version of RTPD.

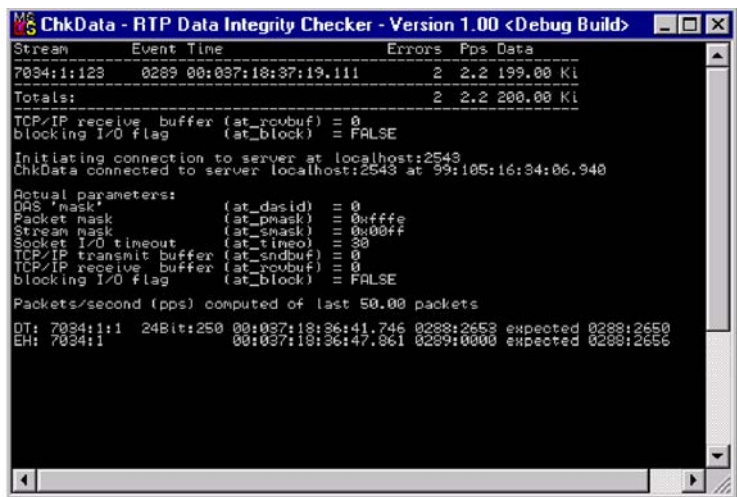
5 Data Integrity Clients

5.1 RTPC

The **RTPC** module is a simple data integrity checker that is available for all platforms.

5.2 CHKDATA

The RTP Data Integrity Checker is a simple data client that checks and displays an integrity status of the incoming data.



```

ChkData - RTP Data Integrity Checker - Version 1.00 <Debug Build>
-----
Stream      Event Time      Errors  Fps Data
-----
7034:1:123  0289 00:037:18:37:19.111    2  2.2 199.00 Ki
-----
Totals:      2  2.2 200.00 Ki
-----
TCP/IP receive buffer (at_rcvbuf) = 0
blocking I/O flag      (at_block) = FALSE

Initiating connection to server at localhost:2543
ChkData connected to server localhost:2543 at 99:105:16:34:06.940

Actual parameters:
OAS 'mask'          (at_dasid) = 0
Packet mask         (at_pmask) = 0xffff
Stream mask         (at_smask) = 0x00ff
Socket I/O timeout  (at_timeo) = 30
TCP/IP transmit buffer (at_sndbuf) = 0
TCP/IP receive buffer (at_rcvbuf) = 0
blocking I/O flag   (at_block) = FALSE

Packets/second (pps) computed of last 50.00 packets
DT: 7034:1:1  24Bit:250  00:037:18:36:41.746  0288:2653  expected 0288:2650
EH: 7034:1:1  00:037:18:36:47.861  0289:0000  expected 0288:2656
  
```

Figure 5.1 Data Integrity

6 Data Clients

6.1 RTPTRIG

RTPTRIG is a client program to **RTPD** that monitors incoming packets and spawns a user-specified script when the packets received meet the criteria specified in the configuration file passed. For the given DAS units and a given stream, if a given number of units trigger an event within the given window of time, the script is called.

RTPTRIG passes four parameters to the script file.

1. The first parameter is "`*,Datastream,*,starttime,length`". RTPTRIG assumes it will be passed to the 'arcfetch' program.
2. The second parameter is the starttime.
3. The third parameter is the Datastream.
4. The fourth parameter is the trigger time as `YY_MM_DD_HH_MM_SS_SSS`

Usage: `rtptrig config_file`

6.1.1 Algorithm Detail

As event header and trailer packets for the defined trigger stream and units are received, the start time and units number are extracted from them. The unit number and start time, along with the current time, are placed in an event table.

Unit Number	Event Start	Received Time
9014	05:229:07:47:09.220	220:09:47:10:139
90e8	05:229:07:47:20.120	220:09:47:21:009
Etc.		

This table is then scanned and if the specified number of triggers occurs within the specified trigger window, a batch request is generated. The batch is requested to run at the current time plus the batch latency time. This request is put in a batch table.

The batch table is then scanned to see if it is time to run any batch requests.

Batches are run with the parameters defined at the beginning of this document. The batch request is deleted after it is run.

The entries in the event table are deleted one hour after they are received or, when $(\text{current_time} - \text{received_time})$ is greater than one hour. In addition, in order to avoid multiple batch requests for seismic activity occurring around the same time, event entries in the table are deleted if their start is within the following window: $(\text{Batch starttime} - (.1 \times \text{Latency}))$ to $(\text{Batch starttime} + (.4 \times \text{RecLength}))$. For example, assume the trigger window is 20 seconds and the record length is 100. A batch request will be generated for the entries in the above table. After the batch request has been made, any entry in the table with a start time less than 05:229:07:47:49.220 will be deleted from the table.

6.1.2 Parameters defined in config_file:

***ServerHost**: The IP address of the computer running RTPD. This may also specify localhost.

```
ServerHost 192.168.100.198
```

ServerPort: The IP port number to use when connecting to RTPD; normally the registered RTP port, 2543

```
ServerPort 2543
```

[RTPTRIG]: Must be defined for **RTPTRIG** to read the following parameters

```
[RTPTRIG]
```

DAS: Defines units to consider for a trigger. ALL may be specified if all units in archive should be used.

```
DAS 9149  
or  
DAS ALL
```

TriggerStream: Defines stream to consider for trigger condition.

```
TriggerStream 2
```


UnitsRequired: Minimum number of units needed to cause a trigger

```
UnitsRequired 3
```

DataStream: Data stream to retrieve data from. This is passed to the script file.

```
DataStream 1
```

TriggerWindow: Defines the period of time in which the events must all occur. This is specified in seconds.

```
TriggerWindow 30.5
```

Latency: This is the number of seconds to wait after a trigger is detected, before calling the script file.

```
Latency 15
```

```
RecLength: The number of seconds worth of data to retrieve.
```

```
RecLength 60.5
```

PreTrigLength: This number is subtracted from the first trigger time and used as the starttime of the data to retrieve

```
PreTrigLength 30
```

BatchFile: The script file to call after latency period

```
BatchFile rtptrig.cmd
```

LogFile: This is the file that rtptrig information goes into. If none is defined, no informational output occurs.

```
LogFile rtptrig.log
```

CleanPrctTime: This is the way a user can modify the window of time from which to delete events used when considering if a trigger condition has been met. It defines the percent of the record length used to define the window (see formula below). The default is 4.

```
CleanPrctTime .6
```

6.1.3 VERIFYCONT and SETDASHOST

Two utilities, **VERIFYCONT** and **SETDASHOST** are used to assist in implementing failsafe systems.

The **VERIFYCONT** utility runs as an **RTPD** client. It verifies that DT, ET or EH packets are being sent to a given **RTPD** host. If none are sent within a specified timeout period, it calls a batch file and aborts.

Usage: `verifycont hostIP:port timeout batchfile`

The **SETDASHOST** utility is used to change the host IP for a specified DAS.

Usage: `setdashost DASID DASIP connection HOSTIP`

The connection is E for Ethernet and S for serial ppp.

Typical usage of these two utilities would be to set up the **VERIFYCONT** to connect to an **RTPD**. If no data is received, then a batchfile will be called. That batch file can then perform any other tests required to determine the state of the network, such as ping, etc. It can then call **SETDASHOST** to change the HOST IP address any DAS that is sending data to that **RTPD**.

6.2 RTPPIPE

6.2.1 Description:

RTPPIPE is a client program to **RTPD** that receives incoming recording packets and writes them to a named pipe.

Parameters for **RTPPIPE** are specified on the command line.

Usage: **RTPPIPE** [parameters]

6.2.2 Parameters:

Host=[IP]: The IP address of the computer running **RTPD**. This may also specify localhost (default)

`host=192.168.0.14`

Port=[port]: The IP port number to use when connecting to **RTPD**; normally the registered RTP port, 2543 (default)

`port=6010`

Log=[filespec]: The name of a log file in which to record program information. The default is `rtppipe.log` in the current directory.

`log=c:\reftek\log\rtppipe.log`

Facility=[0-7]: (UNIX) The local log facility to use when `log=syslogd`.

`Facility=2`

Pipe=[name]: The named pipe for data output. The default is `dev/ref2segy.fifo`

`pipe=c:\reftek\pipe.fifo`

6.2.3 Syntax screen:

RTPPIPE version 0.1

Copyright (C) 2006 Refraction Technology, Inc. All Rights Reserved.

usage: ./rtppipe [options]

Options:

-h	=> help (this screen)	
host=[name]	=> name/IP of rtpd server	(localhost)
port=[value]	=> port number to connect at	(2543)
log=[name]	=> logfile name or `syslogd'	(rtppipe.log)
facility=[0-7]	=> local log facility; 0 to 7, inclusive	
-v	=> verbose logging	(FALSE)
retry=[state]	=> rtpd connection retry control	(nonfatal)
never	no retry	
transient	retry on transient errors	
nonfatal	retry on non-fatal errors	
pipe=[name]	=> named pipe (FIFO)	(/dev/ref2segy.fifo)

6.2.4 Debug of RTPPIPE:

The **PIPECHK** program was written to open the pipe which **RTPPIPE** outputs to and read packets. It outputs the same data as **CHECKDATA**.

6.3 RTPAUX

6.3.1 Description:

RTPAUX is a client program to **RTPD** that periodically requests auxiliary data status from a list of DAS units and records the results.

Parameters for **RTPAUX** are stored in a configuration file that must be specified when **RTPAUX** is invoked. The configuration file includes several 'global' parameters plus a list of DAS units to request auxiliary data. The file **MUST** include a line that reads [**RTPAUX**] prior to the parameters. This allows the **RTPAUX** configuration information to be part of the RTPD configuration file instead of in a separate file.

Some parameters for **RTPAUX** may be included on the command line. If placed before the configuration file, they will be overwritten by settings in the configuration file. If placed after the configuration file, they will override the settings in the configuration file.

Usage: `rtpaux rtpd.ini [interval=seconds]`

6.3.2 Parameters:

ServerHost: The IP address of the computer running **RTPD**. This may also specify localhost.

`ServerHost localhost`

ServerPort: The IP port number to use when connecting to **RTPD**; normally the registered RTP port, 2543.

`ServerPort 2543`

LogFile: The name of a log file in which to record program information.

`LogFile c:\reftek\log\rtpaux.log`

DataPath: The path where data will be recorded.

`DataPath c:\reftek\auxdata`

Interval: The time interval in seconds between auxiliary data requests. The minimum interval is 10 seconds. The maximum interval is 3600 seconds (1 hour).

```
Interval 60
```

DAS: The Unit ID of a DAS to be queried. There may be more than one of these in the file.

```
DAS F024
DAS F025
DAS 9498
```

6.3.3 Example configuration file:

```
[RTPAUX]

; RTPD connection information
ServerHost localhost
ServerPort 2543

; Log file for program info, error messages, etc.
LogFile c:\reftek\log\rtpaux.log

; Path for data files.
; This should NOT be the RTPD data archive.
DataPath c:\reftek\auxdata

; Interval in seconds between requests: 10 <= interval <= 3600
Interval 60

; List of units
DAS F024
DAS F025
DAS 9490
DAS 9776
```

6.3.4 Data:

The Auxiliary Data is recorded in a file per DAS per day in a separate subdirectory for each day. Each subdirectory is of the form: yyyyddd. Each data file has a name of the form: yyyyddd_iiii.aux.

The path for the data should NOT be the same as the path used by RTPD for the standard data archive. Placing the auxiliary data in the archive may prevent **RTPD** from properly purging data.

Example:

```
C:\reftek\auxdata
  \2004332_9490.aux
  \2004332_9776.aux
  \2004332_F024.aux
  \2004332_F025.aux
```

The contents of the auxiliary data files are ASCII text. Each line contains a time tag followed by one sample per auxiliary data channel and a line delimiter. The data is in volts with a range of +/- 9.9 volts. All channels are included regardless of whether anything is connected to the channel.

Example:

```
2004:332:12:14:07 +1.2 +1.3 -2.8 -5.2 +3.4 -9.6
```

6.4 RTPFTP

RTPFTP is a client program to **RTPD** that monitors the incoming recording packets and spawns a user-specified script when it receives an ET packet for a user-specified data stream of a DAS in its user-specified watch list. **RTPFTP** passes several parameters to the script, which can be used to perform a variety of operations. The typical script used with **RTPFTP** extracts data from the **RTPD**-generated data archive and makes it available for data conversion and processing.

6.4.1 Usage

```
rtpftp <rtpftp.conf>
```

All parameters for **RTPFTP** are stored in a configuration file that must be specified when **RTPFTP** is invoked. The configuration file includes several 'global' parameters plus information for each DAS to be watched.

6.4.2 Global parameters

ServerHost: The IP address of the computer running **RTPD**. This may also specify a localhost.

```
ServerHost localhost
```

ServerPort: The IP port number to use when connecting to **RTPD**; normally the registered RTP port, 2543.

```
ServerPort 2543
```

ConversionCommand: The script that will be run when an ET packet is detected.

```
ConversionCommand rtpftp.cmd
```

Logfile: The name of a log file in which to record 'trigger' information.

```
LogFile c:\reftek\log\rtpftp.log
```

Note: The log file is broken up into days and will contain the YYYYDDD as part of its filename.

6.4.3 DAS parameters

These are specified for each DAS to be watched:

TriggerStream: The DAS data stream for detecting ET packets.

TriggerStream 2

DataStream: The DAS data stream that contains actual data and the channels that are of interest.

DataStream 1:123

PreEventLength: The amount of time (seconds) prior to the trigger time in the ET packet for the first data sample of interest.

PreEventLength 5.0

PostEventLength: The amount of time (seconds) following the de-trigger time in the ET packet for the last data sample of interest.

PostEventLength 10.0

MinimumLength: The minimum amount of data (seconds) of interest, beginning with the pre-event data.

MinimumLength 20.0

MaximumLength: The maximum amount of data (seconds) of interest, beginning with the pre-event data.

MaximumLength 600.0

6.5 RTPSMS

RTPSMS is a client to **RTPD**. **RTPSMS** reads data packets from **RTPD** and determines if a user-specified MMI (Modified Mercalli Intensity) level is exceeded. It then calculates various ground motion values and stores them in a text file for transmission as an email/SMS message.

The **EMAIL** program is a separate console program which sends the contents of a file to specified email/SMS addresses.

6.5.1 RTPSMS Usage

```
rtpsms.exe <rtpsms.ini> [<rawtestfile>]
```

RTPSMS.INI is the configuration file. <rawtestfile> is an optional raw data file and is used for testing purposes only. If given as an option the **RTPSMS** will read the packets from this file instead of **RTPD**.

6.5.2 RTPSMS process

RTPSMS monitors REF TEK EH-DT-ET packets coming from **RTPD**. When the EH packet is detected **RTPSMS** starts filling the channel data arrays (maximum length set by the record length in the ini file). When the ET packet is detected **RTPSMS** processes the data through the following steps:

1. Remove the DC offset from each channel using the first 15 seconds of data for each channel.
2. Scale each channel using the TrueBitWeight and Volts per unit values. This converts each array to Acceleration (Z_A, N_A, E_A).
3. Find and store the Peak Acceleration of each channel.
4. Copy each array to a new array and zero-fill from the beginning of each new array up to the first zero-crossing (Z_0, N_0, E_0).
5. Calculate the Ground Acceleration (GA) array using:

$$GA = \text{SQRT}(Z*Z+N*N+E*E)$$

for each corresponding sample of the zero-padded channel acceleration arrays (Z_0, N_0, E_0).

6. Find and store the Peak Ground Acceleration (PGA) and its time.
7. Integrate the zero-padded horizontal arrays (N_0, E_0) into new displacement arrays (N_F, E_F) by applying a 2nd order High-pass Butterworth filter (cutoff = 1.2 Hz).

8. Calculate the Wood-Anderson horizontal shift (WA) array using:

$$WA = \text{SQRT}(N*N+E*E)$$
 for each corresponding sample of the filtered horizontal arrays (N_F, E_F).
9. Find and store the peak Wood-Anderson Horizontal shift (WAH) value and its time.
10. Integrate the zero-padded arrays (Z_0, N_0, E_0) into new velocity arrays (Z_V, N_V, E_V) by applying a 1st order High-pass Butterworth filter (cutoff = 0.1 Hz).
11. Calculate the Ground Velocity (GV) array using:

$$GV = \text{SQRT}(Z*Z+N*N+E*E)$$
 for each corresponding sample of the velocity arrays (Z_V, N_V, E_V).
12. Find and store the Peak Ground Velocity (PGV) value and its time.
13. Detects Modified Mercalli Intensity using the product of (PGV*PGA) based on the reference table from the USGS. The original reference table is located at (<http://earthquake.usgs.gov/eqcenter/shakemap/background.php>).

Perceived Shaking	Not felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme
Potential Damage	None	None	None	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PGA	<0.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PGV	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
PGA *	<0.017	0.017-1.54	1.54 - 13.26	13.26 - 74.52	74.52 - 288	288 - 1054	1054 - 3900	3900 - 14384	>14384
MMI	I	II-III	IV	V	VI	VII	VIII	IX	X+

14. Compute the Pseudo Spectral Acceleration (5%) on ten periods (sec) = 0.1, 0.15, 0.2, 0.3, 0.4, 0.5, 0.75, 1, 2, 3.
15. Filter the raw Acceleration arrays (Z_A, N_A, E_A) using a 6-order Butterworth BandPass (2Hz-6Hz) filter.
16. Calculate the arrival time of each filtered Acceleration array (Z_{AF}, N_{AF}, E_{AF}) by applying an STA/LTA algorithm using 0.5 seconds for the STA and 30 seconds for the LTA. The channel arrival is defined as the first sample whose STA/LTA ratio reaches 1.5.
17. Store the earliest channel arrival as the event arrival time.

6.5.3 SMS Example Message

```
0001 DPC2 22/7/2008 13:37:21 2267 12.1 5.9 11.2 gal
MMI 6.1
ARD95(sec) 48
ACC(gal) 14.979 22/7/2008 13:37:22
WAH(mm) 8.033 22/7/2008 13:37:21
VEL(cm/s) 57.709 22/7/2008 13:37:21
PSA(gal) 1.1 0.4 0.3 0.2 0.1 0.1 0.1 0.1 0.1 0.1
```

Line	Label	Example	Description
1	(none)	0001	Event Number
		DPC2	Station Name
		22/7/2008 13:37:21	Arrival Time
		2267	Event length in seconds
		12.1 5.9 11.2	Peak Acceleration per channel
2	MMI	6.1	Modified Mercalli Intensity
3	ARD95 (sec)	48	
4	ACC (gal)	14.979 22/7/2008 13:37:22	Peak acceleration vector
5	WAH (mm)	8.033 22/7/2008 13:37:21	Wood-Anderson horizontal shift vector
6	VEL (cm/s)	57.709 22/7/2008 13:37:21	Peak velocity vector
7	PSA (gal)	1.1 0.4 0.3 0.2 0.1 0.1 0.1 0.1 0.1 0.1	Pseudo Spectral Acceleration (spectral response; 5% damping) at the following ten periods (secs): 0.1, 0.15, 0.2, 0.3, 0.4, 0.5, 0.75, 1.0, 2.0, 3.0

6.5.4 EMAIL program option

A script can be used to monitor the SmsPath directory specified in the **RTPSMS.INI** file and invoke the **EMAIL** program to send the file contents as an email/SMS message.

```
Usage:  ./email <ini file> <key> <sms file>;

Example: ./email rtpsms.ini 1 2008016054134.SMS

If key=1;
Email will take the section [email1] from the ini file;

If key=2;
Email will take the section [email2] from the ini file;

If key=3;
Email will take the section [email3] from the ini file; ...
```

6.5.5 RTPMS INI

```

#program setting for rtpsms
[rtpsms]
rtpdhost=91.189.238.115      #rtpd IP
rtpdport=2543               #rtpd port
rtpdtimeout=60              #Socket Timeout (seconds)

reconnectinterval=180       #Reconnection Interval (seconds)

numberofsensors=1          #Number of 3-component sensors

sensor1ZNE=9F53:02:01:02:03 #DAS:STREAM:VertCH:NorthCH:EastCH
sensor1VPU=2.453:2.370:2.382 #VPU:VertCH:NorthCH:EastCH
sensor1Serial=131A          #Sensor Serial Number
sensor1Station=ABCD        #Station Name

samplerate=200              #sample rate for filter design
recordlength=120            #recordlength for memory
MmiThreshould=0.1          #Intensity threshold
MessageDetails=0           # 0-one message 1-extra messages

AccPeakUnits=1             # 0-gal,1-mG,2-%g
To:=Service&Name&Test      #To: smtp mail header: <&>=<SP>
SmsPath=/home/dima/rtp/src/bin/rtpsms8 #message folder

#program setting for email
[email1]
smtpdhost=172.16.0.2        #smtp server
smtpport=25                 #smtp port
smtptimeout=180             #smtp timeout
smtpretry=5                 #email retry number
mailto=ddv@emsd.ru;d.droznin@reftek.com #reciever
mailfrom=d.droznin@reftek.com #sender

[email2]
smtpdhost=relay2.gin.ru     #smtp server
smtpport=25                 #smtp port
Smtptimeout=180            #smtp timeout
smtpretry=1                 #email retry number
mailto=ddv@emsd.iks.ru     #reciever
mailfrom=d.droznin@reftek.com #sender

[email3]
smtpdhost=mail.emsd.ru      #smtp server
smtpport=25                 #smtp port
Smtptimeout=180            #smtp timeout
smtpretry=1                 #email retry number
mailto=ddv@emsd.iks.ru     #reciever
mailfrom=d.droznin@reftek.com #sender

```


7 Alternate Input Programs

7.1 RTP2RTPD (Version 2.1.0.0 Feb. 07)

7.1.1 Description:

RTP2RTPD is a program whose primary function is to forward recording packets from the primary local **RTPD** to a secondary **RTPD**. Although the **RTPD** program can connect to a remote **RTPD** and have packets forwarded to it, when the link goes down packets are immediately dropped. **RTP2RTPD** solves this problem by mimicking a DAS connection to the secondary **RTPD**. This **RTP2RTPD** connection to a secondary **RTPD** uses the RTP protocol which waits for acknowledgements to ensure data is received.

The user defines the primary **RTPD** to get the packets from. These packets are received by **RTP2RTPD** and queued in a buffer. The maximum size of this buffer is defined in the configuration file. If the link to the secondary **RTPD** goes down, and the buffer reaches its maximum size, packets will be dropped. If the buffer is very large, the user should ensure that the system has enough swap space or virtual memory to handle this buffer. This is done on Windows by right clicking Computer Management (Local) and changing the advanced performance, virtual memory properties. In Linux, additional swap space may need to be added. You can cat */proc/meminfo* to get an idea of the systems abilities. **RTP2RTPD** allows the user to configure the DAS and streams to be buffered and forwarded. **RTP2RTPD** will also pass any command or command responses thru.

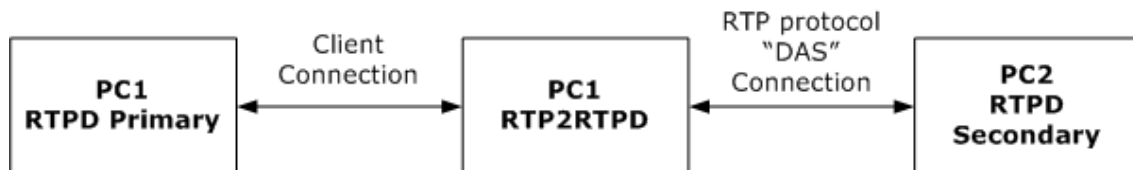


Figure 7.1 RTP2RTPD Flow

7.1.2 Parameters:

A '#' sign can be used to comment a line out.

The configuration file has the following parameters:

```
PrimeHost localhost
PrimePort 2543
```

RTP2RTPD connects as a client to this **RTPD**. Data from this **RTPD** is not verified, so this link must be very reliable. It is intended that this always be the local host. Packets from this primary host are buffered in an output queue. The packets will be recording packets or command responses.

```
SecondHost 172.16.1.7
SecondPort 2543
```

This is the host to send the buffered packets to.

```
LogFile rtp2rtpd.log
```

This is the file errors and status information are logged to. The day will be appended to the name of this file so that daily logs are generated.

```
LogLevel 3
```

This is the level of logging that should occur.

1. Errors only
2. State changes for DASs, Memory and user initiated occurrences
3. Server Discovery Retries and EH/ET packets
4. Everything and should be used briefly for debugging only


```
DAS 9AC7:1:2 9AC8:1
DAS 9AE8:1
DAS 9C8C:1:2
DAS 9D07:1
DAS 9C8C
# DAS ALL
```

This is the list of DASs and streams whose packets should be sent. DAS ALL can be used to specify all DAS and streams. DAS units can be on one line or multiple lines. If on the same line, a space should precede the DAS number. Colons are used to separate the stream numbers. If no streams are defined, then all streams will be sent for that DAS.

```
MaxPacketBuff 320000
```

This is the maximum number of packets to buffer before dropping them. This value should be set according to the integrity of the link to the secondary **RTPD** host and the amount of memory and virtual memory available. If this value is large then virtual memory may need to be increased on the system. This is done on Windows by right clicking Computer Management (Local), and changing the advanced performance, virtual memory properties. In Linux, additional swap space may need to be added. Cat */proc/meminfo* to see swap space available on Linux.

```
PauseOnCommErr 65
```

If messages are being received by **RTPD** but not getting back, the router may need to timeout and reset its tables. Pick a period of time which allows the router to timeout if transmission problems occur.

```
PacketFileDirectory /reftek/fetched
```

This is the directory that should be checked for .rt files. This is the type of file generated by **ARCFETCH**. If the *.rt* files exist, they will be read in and packets forwarded to the secondary host. The files are deleted after they are read.

RTPD

BindPort1 4002
BindPort2 4003

When the program makes a connection to **RTPD**, the port is passively bound by the OS to an available port. This is usually desirable for client connections. However, if the connection is made thru a firewall, the firewall often will only keep the wall open for incoming traffic to a port for a short period of time after that port has sent data. The firewall prevents commands from being sent thru **RTP2RTPD** to a DAS if no outbound traffic is present. To overcome this, the firewall requires an entry be placed in its NAT table to allow inbound traffic to a particular port. To do this, a fixed address must be known. If the BindPort2 is set, then **RTP2RTPD** will actively bind the secondary port to a fixed address every time. This port id can then be used for the firewall NAT entry. BindPort1 is used to solve similar problems to the Primary **RTPD** connection. (Added Oct 2008)

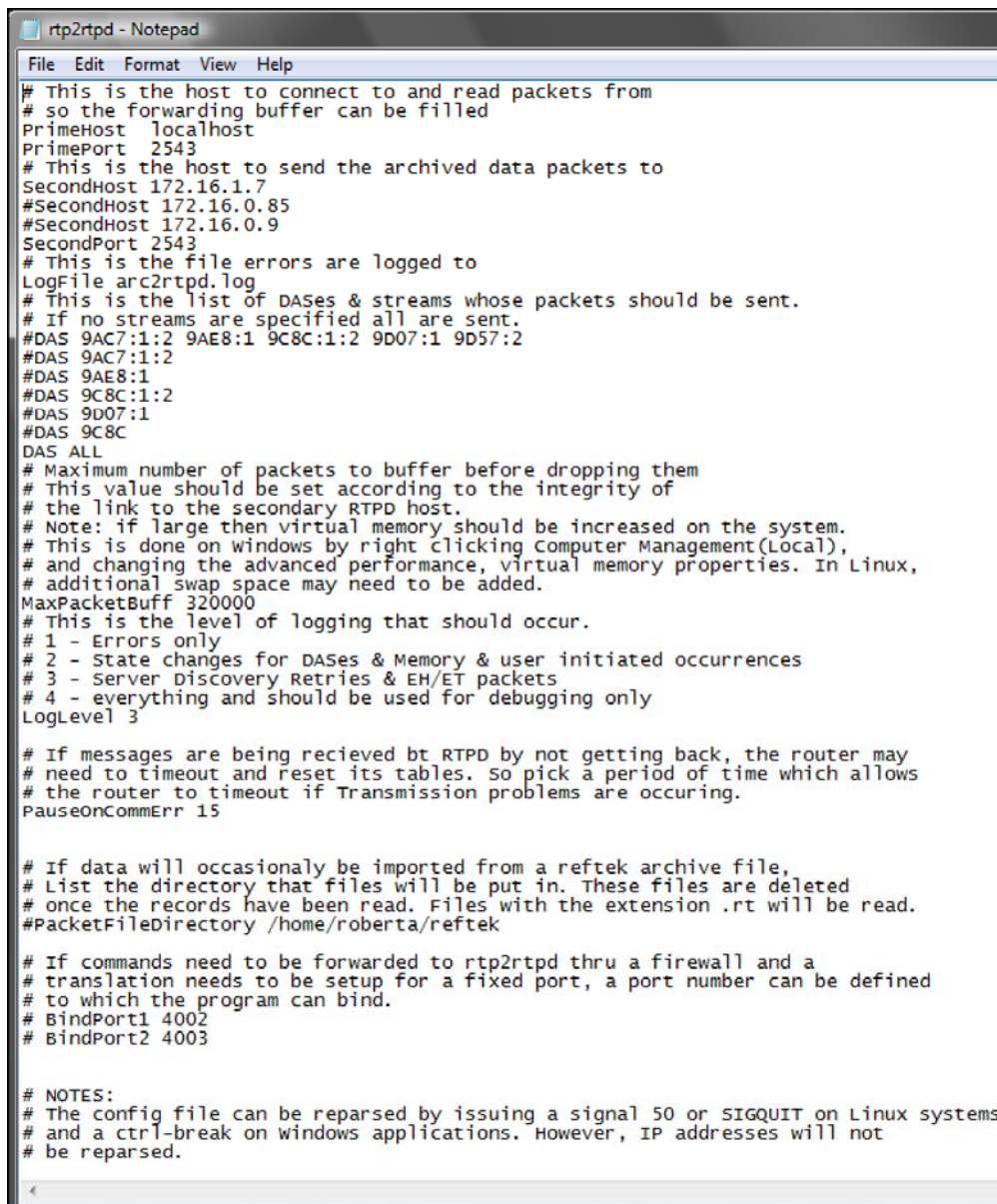
7.1.3 Command Syntax:

```
rtp2rtpd config_file_name
```

Note: There is a way to force the program to reread the configuration file so that the buffer size, logging level or DAS filters can be changed on the fly.

- On Windows, a control break can be used.
- On Solaris or Linux, the SIGQUIT or a signal 50 can be sent to the application by issuing the following command: "kill -QUIT pid" or "kill -S 50 pid".

7.1.4 RTP2RTPD ini



```

rtp2rtpd - Notepad
File Edit Format View Help
# This is the host to connect to and read packets from
# so the forwarding buffer can be filled
PrimeHost localhost
PrimePort 2543
# This is the host to send the archived data packets to
SecondHost 172.16.1.7
#SecondHost 172.16.0.85
#SecondHost 172.16.0.9
SecondPort 2543
# This is the file errors are logged to
LogFile arc2rtpd.log
# This is the list of DASEs & streams whose packets should be sent.
# If no streams are specified all are sent.
#DAS 9AC7:1:2 9AE8:1 9C8C:1:2 9D07:1 9D57:2
#DAS 9AC7:1:2
#DAS 9AE8:1
#DAS 9C8C:1:2
#DAS 9D07:1
#DAS 9C8C
DAS ALL
# Maximum number of packets to buffer before dropping them
# This value should be set according to the integrity of
# the link to the secondary RTPD host.
# Note: if large then virtual memory should be increased on the system.
# This is done on windows by right clicking Computer Management(Local),
# and changing the advanced performance, virtual memory properties. In Linux,
# additional swap space may need to be added.
MaxPacketBuff 320000
# This is the level of logging that should occur.
# 1 - Errors only
# 2 - State changes for DASEs & Memory & user initiated occurrences
# 3 - Server Discovery Retries & EH/ET packets
# 4 - everything and should be used for debugging only
LogLevel 3

# If messages are being recieved bt RTPD by not getting back, the router may
# need to timeout and reset its tables. So pick a period of time which allows
# the router to timeout if Transmission problems are ocuring.
PauseonCommErr 15

# If data will occasionally be imported from a reftek archive file,
# List the directory that files will be put in. These files are deleted
# once the records have been read. Files with the extension .rt will be read.
#PacketFileDirectory /home/roberta/reftek

# If commands need to be forwarded to rtp2rtpd thru a firewall and a
# translation needs to be setup for a fixed port, a port number can be defined
# to which the program can bind.
# BindPort1 4002
# BindPort2 4003

# NOTES:
# The config file can be reparsed by issuing a signal 50 or SIGQUIT on Linux systems
# and a ctrl-break on windows applications. However, IP addresses will not
# be reparsed.

```

Figure 7.2 RTP2RTPD ini

7.2 SL2RTPD (Version 2.1.1.0 Feb. 22, 2008)

7.2.1 Description:

SL2RTPD is a program whose primary function is to forward miniseed packets from a Seedlink Siescomp feed to an **RTPD** archiver. **SL2RTPD** functions similar to **RTP2RTPD**. The difference is that **SL2RTPD** gets data from the Seedlink feed and converts it into REF TEK packets before forwarding it to **RTPD**. Where **RTP2RTPD** gets packets from one **RTPD** and sends it to another. The connection to **RTPD** uses the **RTP** protocol normally used between a DAS and **RTPD**. Therefore, it will appear to the **RTPD** archiver that multiple REFTEK DAS stations are sending data to it, but they will all have the same IP address.

The user defines the Seedlink Siescomp feed to get the packets from. It also defines the network/station/channels to get. These packets are received by **SL2RTPD** and queued in a buffer. The maximum size of this buffer is defined in the configuration file. If the link to the secondary **RTPD** goes down, and the buffer reaches its maximum size, packets will be dropped. If the buffer is very large, the user should ensure that the system has enough swap space or virtual memory to handle this buffer. This is done in Windows by right clicking Computer Management (Local) and changing the advanced performance, virtual memory properties. In Linux, additional swap space may need to be added. You can cat */proc/meminfo* to get an idea of the systems abilities.

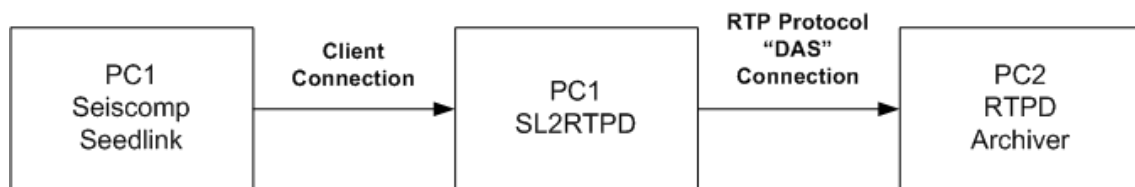


Figure 7.3 SL2RTPD Flow

7.2.2 INI File Parameters:

A '#' sign can be used to comment a line out.

The configuration file has the following parameters

```
SLHost seedlinklhost IP
SLPort 18000
```

SL2RTPD connects to this Siescomp server using the seedlink library. Packets from this seedlink host are converted to REF TEK packets and buffered in an output queue.

```
RTPDHost 172.16.1.7
RTPDPort 2543
```

This is the IP and port of the PC to send the buffered REF TEK packets to.

```
LogFile sl2rtpd.log
```

This is the file errors and status information are logged to. The day will be appended to the name of this file so that daily logs are generated.

```
LogLevel 3
```

This is the level of logging that should occur.

1. Errors only
2. Warnings, rtpd DAS connections made and New Reftek events created
3. More detailed information on handling of packets
4. Everything and should be used briefly for debugging only

```
DAS130 ID=8FF1 streamID=1 name=VTS network=MN channel=BH?
```

This is the the REF TEK unit and stream to use for the seedlink miniseed station, network and channels requested.

`MaxPacketBuff 320000`

This is the maximum number of packets to buffer before dropping them. This value should be set according to the integrity of the link to the secondary **RTPD** host and the amount of memory and virtual memory available. If this value is large then virtual memory may need to be increased on the system. This is done in Windows by right clicking Computer Management (Local), and changing the advanced performance, virtual memory properties. In Linux, additional swap space may need to be added. Cat `/proc/meminfo` to see swap space available on Linux.

`PauseOnCommErr 15`

If messages are being received by **RTPD** but not getting back, the router may need to timeout and reset its tables. Pick a period of time which allows the router to timeout if transmission problems occur.

7.2.3 Command Syntax:

`sl2rtpd config_file_name`

8 Command Clients

8.1 RTPID

The **RTPID** module monitors incoming data and issues a REF TEK 130 id request through **RTPD** if no data is received from a unit for a period of time. The **RTPID** data client monitors the communications received by **RTPD** from all connected 130 DAS units. The **RTPID** module tracks only DAS units that send information to **RTPD** after **RTPID** starts. As additional units send information to **RTPD**, **RTPID** adds them to the list of units it monitors. If one of these units does not send information for a specified time-out period, **RTPID** issues a 130 ID command to the specific unit. If **RTPID** issues 5 ID requests to a specific unit without receiving something from the unit, it removes the unit from its list of units.

The **RTPID** module logs all of its actions to its logfile, **RTPDID.LOG**. The file is located in the current directory from which **RTPID** was invoked. The **RTPID** module also echoes all log entries to the console.

Note: As of version 2.1.2.0 the log file is split into daily files with names (i.e. rtpid_YYYYDDD.log)

8.2 RTPMonitor

RTPMONITOR is an optional standalone program that is also available from REF TEK for an additional cost. Contact REF TEK Sales for more information about this product.

RTPMONITOR (REF TEK Network Monitor) provides an up-to-date status report of a network of 130 DAS units to the user. **RTPMONITOR** is a console program that connects to **RTPD** and requests status from all connected 130's. **RTPMONITOR** also listens for incoming Client connections on a user settable port and acts as an html server on this port. **RTPMONITOR** serves up html pages that can be displayed in any standard web browser. **RTPMONITOR** provides both a map and list overview as well as details for each particular 130 DAS. Most of the **RTPMONITOR** Status Views provide easy to read, Green, Yellow, and Red indicators for quick station status checks. The Green, Yellow, and Red thresholds are all user editable allowing each user to customize the warning levels to meet their needs. **RTPMONITOR** also maintains a ring buffer on disk for the status of each 130. The ring buffer holds at least 3 days worth of status for each DAS. **RTPMONITOR** can display this 3 days worth of status as a histogram plot.

8.2.1 RTPMONITOR Map View screen

The **RTPMONITOR** map screen displays a map of unit locations on a map and their current status (Red, Green, and Yellow).

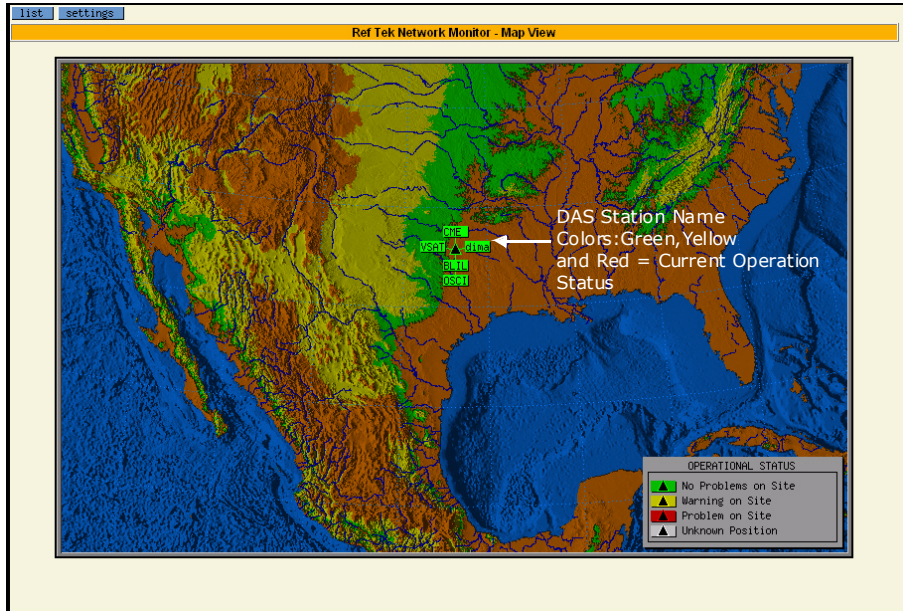


Figure 8.1 RTPMonitor

8.2.2 RTPMONITOR List View screen

The **RTPMONITOR** List View screen shows the status summary of each DAS. By selecting the bold letters in each status column it is possible to select and view a histogram for each particular status. The histogram includes the previous 72 hours worth of status for a particular DAS.

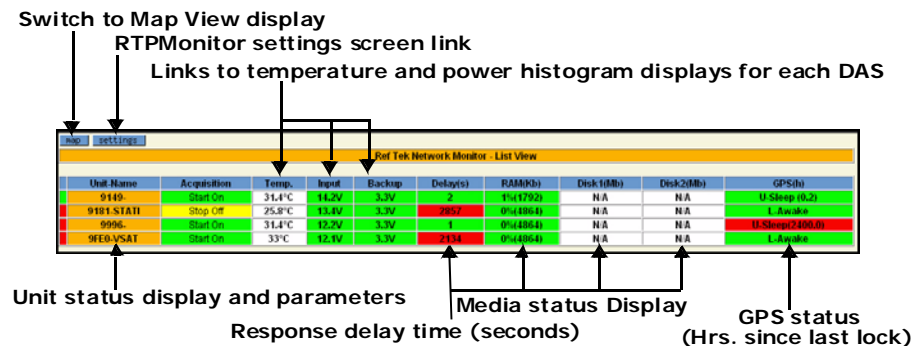


Figure 8.2 List View Page

8.2.3 Unit Status screen

The **Unit Status** screen shows an updated status report of settings for individual DAS units. Selecting the bold **Stream** field will display data stream trigger information.

Ref Tek Network Monitor DAS UNIT#9119									
Unit Name	Acquisition	Temp.	Input	Backup	Delay(s)	RAM(Kb)	Disk1(Mb)	Disk2(Mb)	GPSch
9119	Start On	31.4°C	14.7V	3.7V	1	15(1792)	NA	NA	U Sleep (0.3)
Status Information (SI)									
Experiment Number	Experiment Name	Station Number	Station Name	Latitude	Longitude	Altitude	Ph.Error(Sec.)		
0		0		32.8662	-96.0079	109	-0.000002		
CPU Version	Board Number	Board Revision	Board Acronym	Board Serial Number	FPGA Board Number	FPGA Minimum hw.Rev.	FPGA Version		
gar012	520	B	LJD	149	0				
gar012	506	C	CPU	325	506	A		C03	
gar012	505	D	ATD	535	505	A		E02	
gar012	505	D	ATD	644	505	A		E02	
Network Parameters (PN)									
Port Number	IP Address	Device Power	IP Mask	RTPD	Gateway	Line Down	Line Mode	Port Speed	Toss Delay
Ethernet	192.168.100.047	P	255.255.255.000	192.168.100.034	192.168.100.001	T	D	9600	20
Serial PPP	000.000.000.000		000.000.000.000	000.000.000.000	000.000.000.000	K	A	9600	0
Channel Parameters (PC)									
Channel	Name	Azimuth	Incline	Latitude	Longitude	Altitude	Gain	Model	Serial N
1	NEW_CH	0	0	0	0	0	1	UNKNOWN	UNKNOWN
2	NEW_CH	0	0	0	0	0	1	UNKNOWN	UNKNOWN
3	NEW_CH	0	0	0	0	0	1	UNKNOWN	UNKNOWN
4	NEW_CH	0	0	0	0	0	1	UNKNOWN	UNKNOWN
5	NEW_CH	0	0	0	0	0	1	UNKNOWN	UNKNOWN
6	NEW_CH	0	0	0	0	0	1	UNKNOWN	UNKNOWN
Data Stream Parameters (PD)									
Stream	Stream Name	Recording Destination	Channels	Sample Rate	Data Format	Trigger Type			
1	NEW_STREAM	Ethernet	1,2,3,4,5,6	200	CO	CON			

↑
Stream

Figure 8.3 Status

Ref Tek Network Monitor DAS UNIT#9119 STREAM#1	
Continuous Trigger Description (CON)	
Description	Value
Record Length	3600
First Trigger Time	2001.001.000000

Figure 8.4 Stream Info

8.2.4 Temperature, Input and backup power displays

This DAS unit status screen displays views showing Backup power level (Volts), Temperature (C°) and Input power (Volts) to the DAS over a time period (in hours).

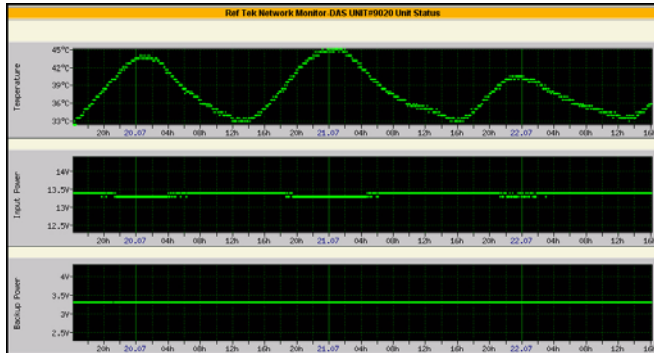


Figure 8.5 Temperature and Power

8.2.5 Media status displays and Response Intervals

The media status displays shows the response interval (in seconds), amount of RAM used (as a % of total), and amount of disk space used over a 72 hour time period.



Figure 8.6 Media Status

8.2.6 GPS Status displays

The GPS status displays GPS parameters over a time period. The first figure (Figure 8.7) shows the Altitude, Longitude and Latitude of the GPS Unit for the individual DAS over a number of hours.

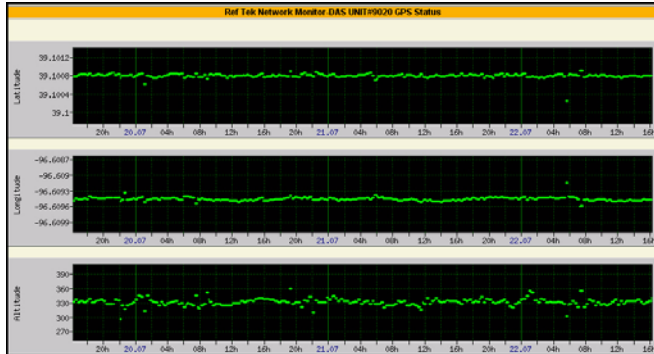


Figure 8.7 GPS Status

The second figure (Figure 8.8) shows Last Lock, number of tracked satellites and phase errors for the same GPS unit of the DAS during the same period of time.

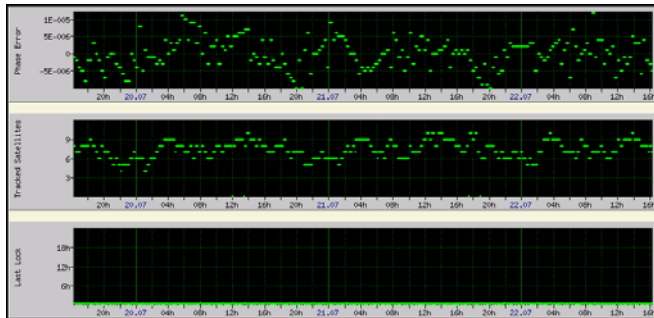


Figure 8.8 GPS Status

8.2.7 Settings Screen of RTPMONITOR

The **Settings Screen** allows the user to set the Green, Yellow, and Red limits to use. Also provided are map image parameters settings to adjust the **RTPMONITOR** Map View display.

Setting the Alarms from the Map View, List View, or Unit displays

1. Click on the **Settings** button in the upper-left hand corner of the web browser window.

The top section of the settings screen is known as the Alarm settings section. These settings control at which point **RTPMONITOR** will switch each DAS units status indicator between Green, Yellow, and Red.

Ref Tek Network Monitor - Settings (Read Only)

Parameters	Sms Log	Yellow Value	Red Value	Units
Input Voltage	<input checked="" type="checkbox"/>	11	10	Volts (0.0-20.0)
Backup Voltage	<input checked="" type="checkbox"/>	2.8	2.3	Volts (0.0-3.3)
Delay (N)	<input checked="" type="checkbox"/>	2	4	N*RO_interval(0.0-10.0)
RAM used	<input checked="" type="checkbox"/>	75	90	% (0-100)
DSK1 used	<input checked="" type="checkbox"/>	60	80	% (0-100)
DSK2 used	<input checked="" type="checkbox"/>	60	80	% (0-100)
GPS LastLock	<input checked="" type="checkbox"/>	1	2	Hours (0.0-24.0)
Location Error	<input type="checkbox"/>	100	200	Meters (0-1000)

Submit Alarm Settings

Stations Location

DAS UNIT	Error (m)	GPS Latitude	GPS Longitude	GPS Altitude	Submit	STA Location
99C1	924762.9	33.012218	-96.690130	193.637720	→	34.946200 -106.456700 1700.000000
9995-STAD	16.3	33.012184	-96.690200	183.714151	→	33.012185 -96.690193 200.000000
9AA7-STAD	5.4	33.012172	-96.690203	196.637303	→	33.012167 -96.690197 202.000000
9AER-RFTA	6.6	33.012185	-96.690203	193.474340	→	33.012188 -96.690198 200.000000
9FC2-RFTA	11.4	33.012176	-96.690193	197.354875	→	33.012122 -96.690115 191.000000
9FCE	2.3	33.012189	-96.690203	198.735135	→	33.012185 -96.690202 201.000000
ARRC	20.9	33.012227	-96.690288	217.333329	→	33.012198 -96.690168 200.000000
A326-STAD	9439929.4	0.000000	0.000000	0.000000	→	33.012175 -96.690195 200.000000
A481-RFTB	3.4	33.012186	-96.690196	195.138137	→	33.012178 -96.690213 198.000000
A751-STAD	9439914.7	0.000000	0.000000	0.000000	→	33.012187 -96.690198 190.000000
A942-STAD	9439911.3	0.000000	0.000000	0.000000	→	33.012178 -96.690215 174.000000

9 Configuration Reference

9.1 Configuration options - RTPD.INI file

Listed below is the full text example of a windows *RTPD.INI* file. This information is provided and should be reviewed to verify that all settings are correct. The actual file must match the setup configuration and can be edited as required. This file must be in the *C:\reftek* directory. Please do the necessary changes for the file to look the same as this one.

```
# @(#)rtpd.ini      1.10
# Initialization file for RTPD

# Specify the port to use for incoming connections

    Port      2543

# If you want to enable logging, specify the name of the logfile. If
# you want to log via the system logger then specify "syslogd" as the
# name of the log file.  If you want to log to the screen, specify "-"
# as the name of the log file.

# Log          C:\REFTEK\server\log\rtpd.log
# Log          /home/reftek/log/rtpd.log

    Log      rtpd.log

# If you are using syslogd logging, then give the name of the facility
# to use as one of LOCAL0 through LOCAL7, USER, or DAEMON. The default
# is LOCAL7.If you are not using syslogd, or if your OS does not have
# it (eg, Windows NT) then the Facility entry, if any, is ignored.

    Facility  LOCAL7 

# Specify the maximum number of simultaneous connections we'll support

    MaxClient 8 

# Specify the size of the largest possible message of any type (special
# or PASSCAL).This is used to prepare pre-allocated space in the message
# queues.

    MaxMsgLen 1024 
```

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```
# Specify the depth of the message queues for handling packets from
# the DASes to the front end and from the front end to the clients.
```

```
DataNbuf 125 6
```

```
# Specify the depth of the message queues for packets from the client
# to the DASes (ie, special packets). Set this value to 0 if you don't
# intend to use the server for command and control connections.
```

```
CmndNbuf 1024 7
```

```
# If CmndNbuf is set, then this is potentially a command and control
# server, however it will not forward packets to any client not explicitly
# given access via the "CmdHost" keyword. List the IP addresses of
# all clients which are permitted to send special packets to the DASes.
# Any number of clients may be listed. Generally, you'll always want
# to list localhost (127.0.0.1).
```

```
CmndClientIPAddr 127.0.0.1 # localhost 8
CmndClientIPAddr 172.16.1.22
```

```
# You can specify any number of connections to remote rtpd servers
# using the keyword "Remote" followed by exactly 6 items, as shown
# below. Whitespace is permitted only between fields. If this is
# a command and control server, then any special packets which it
# forwards to its local back end (if any) are also forwarded to all
# remote servers.
# 9
```

#	Hostname	Port	DAS	Packets	Streams	T/O
#Remote	nt.essw.com	7007	0	AD,CD,DS,DT,EH,ET,OM,SC,SH	1,2,3	10
#Remote	nt.essw.com	7008	0	ALL	ALL	10
#Remote	192.168.100.198	2543	0	ALL	ALL	10

```
# Specify the number of seconds to wait between reconnect
# attempts with remote servers
```

```
RemoteReconnInterval 30 10
```

```
# Multihomed servers will respond to server discovery requests
# with their primary IP address. If the network topology and
# configuration is such that the DAS is unable to reach the
# server via it's primary address, then you can work around this
# by forcing the server to respond with other IP addresses.
```

```
DiscoveryAddr 172.16.1.22 11
```



```
# If you want to automatically save all data from the backend,  
# specify the path name of archive to use. This archive needs to  
# already exist (see arccreate).
```

```
#Archive C:\REFTEK\server\rtpd\archive  
#Archive /home/reftek/archive
```

```
Archive archive 12
```

```
# Specify the directory to use for command exchange via optional file  
# based NCI.
```

```
#NCIPath /home/reftek/cpk 13
```

```
# The UDP backend requires a port number and the name of a file which  
# holds the DAS unit ID to IP address mappings. This mapping file, if  
# present, is loaded on startup. It is automatically updated by RTPD  
# as units announce themselves. If the UDP backend is not in place then  
# these entries, if present, are ignored.
```

```
UDPport 2543 14
```

```
#UDPaddrmap C:\REFTEK\server\rtpd\rtpd.map  
#UDPaddrmap /home/reftek/rtpd.map
```

```
UDPaddrmap rtpd.map 15
```

```
# Some RTP devices (such as the RT112) don't have a unit id available  
# so the server must assign one. For such systems, specify the starting  
# ID to assign.
```

```
UDPStartID 8501 16
```

```
# The simulator backend reads from a disk file. Specify the path of  
# the file to read. If the simulator backend is not in place then  
# this entry, if present, is ignored.
```

```
#SIMULfile /home/reftek/rtpd.dat 17
```

```
# For the HSI backend, list each of the devices  
# HSI /dev/hih0  
# HSI /dev/hih1  
# HSI /dev/hih2
```

```
HSI /dev/hih3 18
```

```
# Purge Parameters  
# Maximum number of files that will be purged in purge cycle  
# Default is 1
```

```
MaxPurgeFiles 10 19
```

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```
# Purge cycle ends when more than this many Megabytes (X times 1048576) are
removed
# Default is 1
    MaxPurgeMBytes 1000 

# Maximum number of console clients
    # ConMaxClient 2 
# Optional port for console messages to come thru
    # ConPort 2544 

#How many minutes of no activity to see before removing connection
    # ConMinTimeout 10 

#Console clients that can change RTPD settings
    ConCmndClientIPAddr 127.0.0.1      # localhost 

# Broadcast information about RTPD to clients (2.1.7.0)
# Such as the archive size information (130 RIAS command)
# default interval is 0
    #RTPDInfoInterval 10 
# Only first 10 characters will be used
    #RTPDInfoName Central 
# The Unit ID used to send the message in the guise
# of a DAS response message
    #RTPDInfoUID 9560 
```

Entry	Parameter	Description
1	Port	Specify the port to use for incoming connections. Port 2543 is registered to Ref Tek for RTP protocol.
2	Log	Location for the logfile
3	Facility	Entry for syslogd logging
4	MaxClient	Maximum number of simultaneous connections allowed
5	MaxMsgLen	Pre-allocated space in message queues. Normally 1024 since this is the size recording packets created by the DAS.
6	DataNbuf	Depth of the message queues for handling packets from the DAS. Message queue which buffers data from the backend (from the DAS) which is DataNbuf packets long (Default DataNbuf length is 2048).
7	CmndNbuf	Depth of the message queues for packets from the client to the DAS. A "frontend thread" does nothing but pull packets from this queue and copy them into message queues which feed each connected client. The clients have threads which do nothing but pull packets from this queue and write them to the client socket. These packets are also DataNbuf packets long.
8	CmndClientIPAddr	IP addresses of all clients which are permitted to send packets to the DASs. Always include localhost.
9	Remote	Used to connect this RTPD to another RTPD (called "chaining") that is actually communicating with DAS units.
		Hostname: IP or domain name of primary RTPD.
		Port: TCP/IP port number to use for the connection.
		DAS:
		Packets: List of packets to be forwarded by the primary RTPD.
		Streams: List of streams to be forwarded by the primary RTPD.
		T/O: Time-out in seconds for this connection.
10	ReconnInterval	Number of seconds to wait between reconnect attempts with remote servers.
11	DiscoveryAddr	Used in multihome machines, or machines that are behind a NATing firewall. These addresses should match what is entered into the RTPD field of the 130 Network Parameters.
		As of 2.1.2.0 more than one address may be specified at a time. Previous versions allowed only one address to be specified at a time.
12	Archive	Save all incoming DAS data to this REF TEK archive data file. Must already exist. See the arcreate command for more information.
13	NCIPath	Directory for use as command exchange via optional file based NCI user interface (72A Only)
14	UDPport	Port number used by DAS units to connect to RTPD.
15	UDPaddrmap	Location for address map that associates DAS unit IDs with IP addresses.
16	UDPstartID	Starting Unit ID assigned

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Entry Num.	Parameter	Description
17	SIMULfile	Simulator reads from this file. Specify the path for this file. If the simulator backend is not in place this field is ignored.
18	HIS	List HIS backend devices
19	MaxPurgeFiles	The maximum number of files to be purged (Default is 10).
		When the purge threshold is reached, RTPD will build a list of files containing the number specified in MaxPurgeFiles, and will try and delete these files until the MaxPurgeBytes has been exceeded.
		The number of files deleted may be less than that specified.
		If a file in the list is opened (as stream 0 is until the next day), that file deletion will fail.
		If the purge reaches the end of a day's directory, only that directory's files will be deleted.
		If small archives with less than one day's worth of data are maintained, then the number of files should be larger than the number of DAS units collecting data (the default is 10).
20	MaxPurge MBytes	The maximum megabytes to be purged (Default is 1).
		When the purge threshold is reached, RTPD will build a list of files containing the number specified in MaxPurgerFiles, and will then delete these files until the MaxPurgeMBytes has been exceeded.
21	ConMaxClient	Maximum number of Console Clients.
22	ConPort	Optional port for message output.
23	ConMinTimeout	Number of no activity minutes before removing connection
24	ConCmndClientIP Addr	Console Clients that can change RTPD settings
25	RTPDInfo Interval	How often RTPD sends information to its clients. Specified in seconds, where 0 seconds means no information provided. Used in RTPD 2.1.7.0 & above
26	RTPDInfoName	Name put in 130 RI: AS response when Archive information is sent. Only First 10 characters are used. Used in RTPD 2.1.7.0 & above
27	RTPDInfoUID	The Unit ID of the 130 response message RTPD uses to pass its information to its clients. Must be hexadecimal number.

9.2 Command Line Options

- From the command line, the following command line options for **RTPUDCON** are available where:

```
c:\reftek>rtpudpcon - help
Usage: rtpudcon [options]
```

Options=argument	Description
port=value	Port number for client connections
nci=path	NCI Comm directory
archive=path	Archive path name
addrmap=name	RTP unit vs UDP endpoint map
startid=value	Initial unit number to use when/if assigning them
rd=host:port	name:port of remote RTPD
cc=dot_decimal_addr	IP address of client OK for command and control
maxclient=value	Maximum number of simultaneous clients allowed
q=value	Maximum number of outbound messages to queue
log=name	Name of log file, or 'syslogd' if using syslogd
facility=local [0-7]	Log facility, if syslogd
-bd	Run as a daemon (in background)
-debug	Verbose logging
-dumpudp	Dump raw UDP packets
-cleanup	Ignore existing addrmap entries

9.3 RTPD messages - RTPD.log file

Note: A log of the operations of RTPD will be logged to a log file (a text file).

Note: Always check the log file the first time you run RTPD to make sure it attached to the archive and has no errors. It should be similar to this one:

```
2006:279-17:00:54 RefTek029 rtpudpcon[2832] exit 1000
2006:279-17:00:59 RefTek029 rtpudpcon[2652] RTPD Production Release 2.0.1x (RTP)
2006:279-17:00:59 RefTek029 rtpudpcon[2652] RTP library version 2.0
2006:279-17:00:59 RefTek029 rtpudpcon[2652] UTIL library version 2.0
2006:279-17:00:59 RefTek029 rtpudpcon[2652] MSGQ library version 2.0
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Copyright (C) 1998-2005 Refraction
Technology, Inc. All Rights Reserved.
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Command Line ini=rtpd.ini
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Working Dir C:\REFTEK\server\rtpd
2006:279-17:00:59 RefTek029 rtpudpcon[2652] INI Path rtpd.ini
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Port 2543
2006:279-17:00:59 RefTek029 rtpudpcon[2652] NCI Path disabled
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Archive C:\REFTEK\server\rtpd\Archive
2006:279-17:00:59 RefTek029 rtpudpcon[2652] MaxClient 8
2006:279-17:00:59 RefTek029 rtpudpcon[2652] DataNbuf 126
2006:279-17:00:59 RefTek029 rtpudpcon[2652] CmdnNbuf 256
2006:279-17:00:59 RefTek029 rtpudpcon[2652] MaxMsgLen 1024
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Remote 172.16.0.7 2543
2006:279-17:00:59 RefTek029 rtpudpcon[2652] ReconnInterval 30
2006:279-17:00:59 RefTek029 rtpudpcon[2652] CmdnClientIPAddr 127.0.0.1
2006:279-17:00:59 RefTek029 rtpudpcon[2652] CmdnClientIPAddr 172.16.1.22
2006:279-17:00:59 RefTek029 rtpudpcon[2652] CmdnClientIPAddr 172.16.0.7
2006:279-17:00:59 RefTek029 rtpudpcon[2652] UDPport 2543
2006:279-17:00:59 RefTek029 rtpudpcon[2652] UDPaddrmap C:\REFTEK\server\rtpd\addr.map
2006:279-17:00:59 RefTek029 rtpudpcon[2652] UDPStartId 32770
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Open archive for write:
C:\REFTEK\server\rtpd\Archive
2006:279-17:00:59 RefTek029 rtpudpcon[2652] LOCAL IP & pid 172.16.1.22 2652
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Starting purge thread
2006:279-17:00:59 RefTek029 rtpudpcon[2652] attached to archive
`C:\REFTEK\server\rtpd\Archive'
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Running API: RefTek Archive API 2.0X
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Created by: RefTek Archive API 2.0X
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Archive name: Unnamed Archive
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Created on: 06:279:16:57:22.468
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Last modification: 06:279:16:57:22.468
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Writes allowed: No
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Earliest data: Undefined
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Latest data: Undefined
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Streams present: 0
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Max allowed size: 200.00 Mi bytes
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Purge threshold: 100.00 Mi bytes
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Current size: 0 bytes
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Process ID : 2652
2006:279-17:00:59 RefTek029 rtpudpcon[2652] Host IP: 172.16.1.22
2006:279-17:00:59 RefTek029 rtpudpcon[2652] loading existing entries in
C:\REFTEK\server\rtpd\addr.map
2006:279-17:00:59 RefTek029 rtpudpcon[2652] mapped RTP unit 9976 with endpoint
172.16.1.120:2543
2006:279-17:00:59 RefTek029 rtpudpcon[2652] mapped RTP unit 93A0 with endpoint
172.16.1.117:2543
2006:279-17:00:59 RefTek029 rtpudpcon[2652] mapped RTP unit 9FE3 with endpoint
172.16.1.102:2543
2006:279-17:00:59 RefTek029 rtpudpcon[2652] mapped RTP unit 9D57 with endpoint
172.16.1.116:2543
```