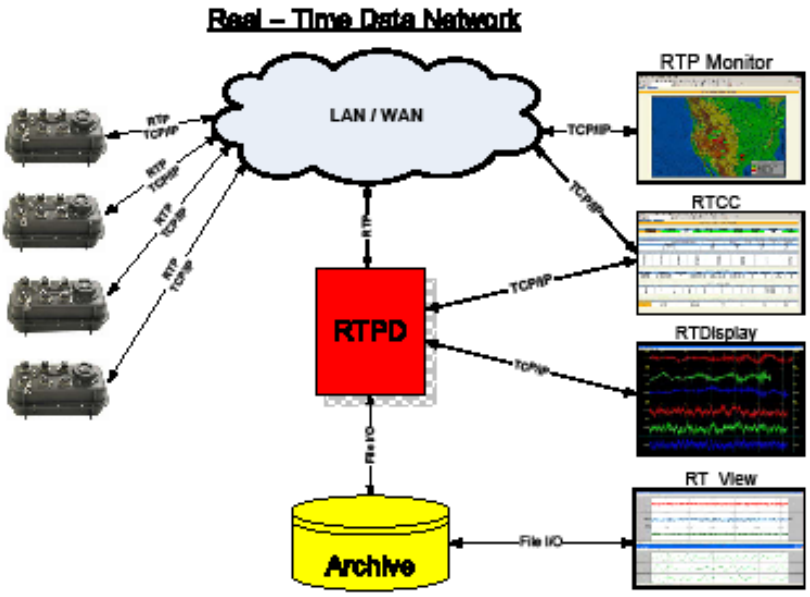
Refraction Technology

RTPD

Installation and Users Guide

Version 2.1.6.0

7/18/2008



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:

- Overview
- Installation on supported platforms
- Basic operations – log file and data clients
- RTP2RTPD
- SL2RTPD
- Chkdata
- Rtpid
- RTPMonitor
- RTPTRIG
- RTPPIPE
- RTPAUX
- RTPFTP

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 3
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 7
		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 7
	05/15/08	Converted to WORD template	All
	07/21/08	Added SL2RTPD	Section 6.2

CF Card Replacement:

Due to the large variability of CF cards available on the world market and the resulting problems with compatibility due to memory layout, signal structuring and power requirements, Refraction Technology cannot guarantee a CF card will work in a REFTEK data recorder unless it is sold through REFTEK itself. REFTEK ensures compatibility through communications with CF manufacturers and rigorous in-house testing. Some CF manufacturers refuse to provide adequate information or factory controls to ensure that the product being sold today is the same as the product sold earlier under the same part number. CF cards not purchased from REFTEK may work at one temperature but not at another, or may fail all together.

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.

Firmware Update:

To update firmware from the FTP site

1. Login to our FTP site at: ftp.reftek.com/pub as:
   `User name: Anonymous`
   `Password: Your E-mail address`
2. Find the 130 firmware at ftp.reftek.com/pub/130/cpu/prom.
3. Download the zip file of the most recently released firmware version.

Update firmware:

Updating firmware in a 130 DAS requires the presence of a firmware file on an installed Compact Flash device.

1. On power-up, the 130 checks the Compact Flash for the presence of 'main.s3' in the root directory.
2. If the 'main.s3' file is present on the Compact Flash, the 130:
   a. Reads the file.
   b. DELETES the file.
   c. Re-programs the internal flash memory.

Note: DO NOT DISTURB THE UNIT DURING THIS PROCESS.

Follow these steps to update the firmware of a 130 DAS:

1. Unzip the 'main.s3' file from the downloaded zip file of the most recently released firmware.
2. Copy the desired firmware image to the root of the Compact Flash as 'main.s3' using a PC with a Compact Flash reader or ftp into the 130 DAS, with a Compact Flash installed, in binary mode.
3. With the Compact Flash with the main.s3 image installed in the 130 DAS, issue a reset command.

(a) If you are at the 130 DAS:

1. Issue a Reset command from a PDA running PFC_130 or Physically disconnect and reconnect power to the unit.
2. Observe the LCD for the following messages:

```
READING DISK DO NOT DISTURB
WRITING FLASH DO NOT DISTURB
```

3. The 130 DAS resets and returns to normal messaging.

(b) If you are remotely connected to a 130 DAS via telemetry mode:

1. If you are connecting remotely by a TCP connection:
   a. **First connect**
   b. **Discover the unit**
   c. **Acquire status**
2. Issue a reset command from the Status screen.
3. Delete the unit from the Station List screen.
4. Wait at least 5 minutes.
5. At the Connections screen (reconnect id using a TCP connection) issue a Station Discovery again to discover the 130 DAS station.

Note: DO NOT DISTURB THE UNIT until the start-up LCD message reappears.

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; 103 = 1,000
M, MHz	Mega, MegaHertz; 106 = 1,000,000
G, GHz	Giga, GigaHertz; 109 = 1,000,000,000
Kb, KB	Kilobit, KiloByte; 210 = 1,024
Mb, MB	Megabit, MegaByte; 220 = 1,048,576
Gb, GB	Gigabit, GigaByte; 230 = 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-ArcUti ls	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
130-01 Board Documents	**Number**	**PDF file**
RT505 - A/D Board	Doc-130-RT505	RT505r.pdf[1]
RT506 - CPU Board	Doc-130-RT506	RT506r.pdf
RT520 - Lid Interconnect Board	Doc-130-RT520	RT520r.pdf
RT526 - MicroDrive/Flash Board	Doc-130-RT526	RT526rB01.pdf
RT527 - Sensor Control Board (Optional)	Doc-130-RT527	RT527rB01.pdf
RT535 - Mass Memory Board (Optional)	Doc-130-RT535	RT535rB01.pdf
Optional Manuals	**Number**	**PDF file**
SNDP Reference Guide	Doc-SNDP-Ref	SNDPRef.pdf
SNDP Installation and Users Guide	Doc-SNDP-	SNDPUser.pdf
RTPD Installation and Users Guide	Doc-RTPD	RTPD.pdf
RTP Protocol	Doc-RTP	RTP.pdf
RT_View Users Guide (Part of Data Utilities)[2]	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
131A-02/3 3G Triaxial Accelerometer	Doc-131A-02/3	131A023.pdf
131A-02/2 3G Biaxial Accelerometer	Doc-131A-02/2	131A022.pdf
131A-01/3 4G Triaxial Accelerometer	Doc-131A-01/3	131A013.pdf
131B-01/1 4G Unixial Accelerometer	Doc-131B-01/1	131B011.pdf

[1] R = Revison level of 130 Board

[2] * = 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, either you can send an email to 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 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.

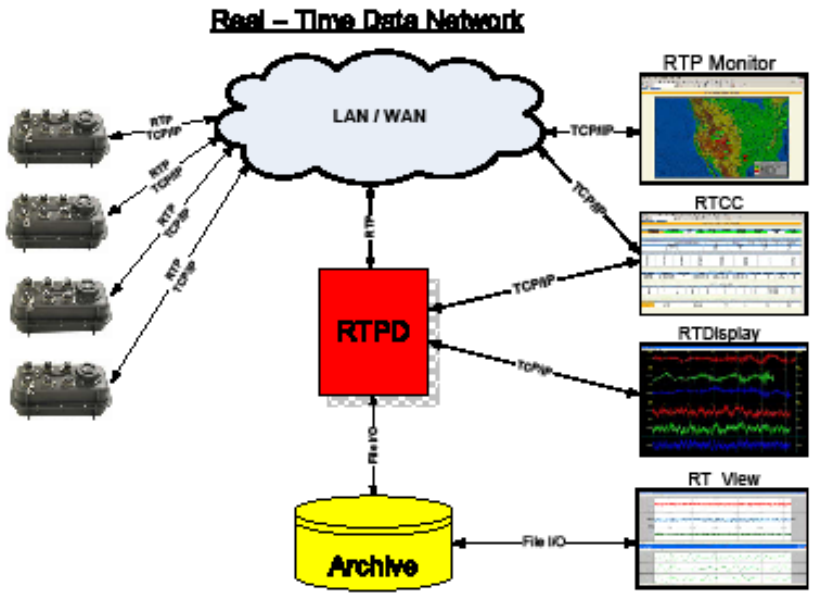


Figure 1 RTPD Flow

1.2 Clients

REF TEK distributes three data clients with **RTPD**, **rtpid**, **rtpc** and **chkdata**. 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/.

IRIS-PASSCAL has developed a data client, **rtp2orb** for importing data from RTPD into ORB. For more information visit the IRIS-PASSCAL web site at http://www.passcal.nmt.edu/.

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 except Windows 98. 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 and then 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 9x	Windows	Linux	Solaris
Version	9x/ME	NT/2000/XP	Red Hat 6.2+	Solaris 6+
Configuration file[3]	rtpd.ini	rtpd.ini	rtpd.ini	rtpd.ini
RTPD	rtpudpcon.exe	rtpudpsvc.exe rtpudpcon.exe	rtpd	rtpd
RTPD data integrity client	rtpid.exe rtpc.exe ChkData.exe	rtpid.exe rtpc.exe ChkData.exe	Rtpid rtpc	Rtpid rtpc
Command Client	RNC1 (72A) RTI[4] (130)	RNC1 (72A) RTI[5] (130)	RNC1(72A) RTI[6] (130)	RNC1 (72A) RTI[7] (130)
Ref Tek Archive Utilities	arccreate.exe arcrebuild.exe arcwrite.exe arccopy.exe arcinfo.exe arcfetch.exe	arccreate.exe arcrebuild.exe arcwrite.exe arccopy.exe arcinfo.exe arcfetch.exe	arccreate.exe arcrebuild.exe arcwrite.exe arccopy.exe arcinfo.exe arcfetch.exe	Arccreate Arcrebuild Arcwrite Arccopy Arcinfo arcfetch
Scripts, Misc.	rtp.bat rtpenv.bat generic_null_modem.inf	rtp.cmd rtpenv.cmd generic_null_modem.inf svc.exe	rtp	rtp

[3] See an example rtpd.ini file in Section 8. This file may require editing for a particular installation.
[4] RTI is an optional Refraction Technology Interface containing RTCC and RT_Display. Contact Refraction Technology for more information.
[5] RTI is an optional Refraction Technology Interface containing RTCC and RT_Display
[6] RTI is an optional Refraction Technology Interface containing RTCC and RT_Display
[7] RTI is an optional Refraction Technology Interface containing RTCC and RT_Display

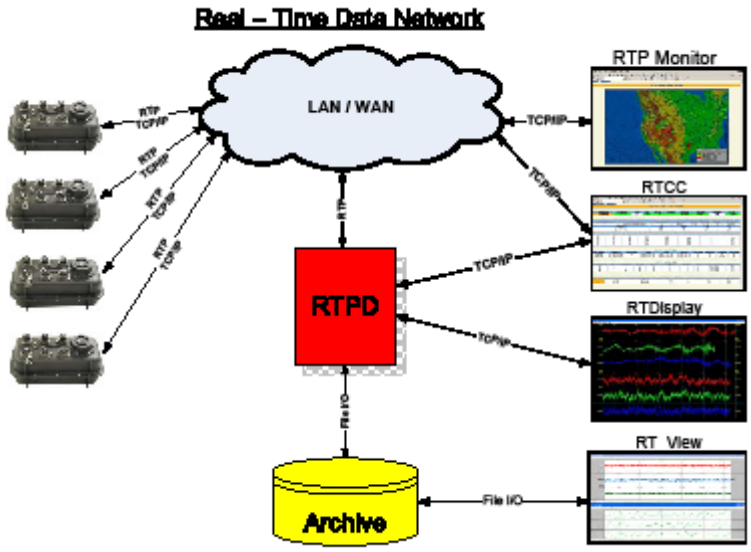


Figure 2 RTPD Flow

2 Windows 98 - Installation

2.1 Getting Started

This section installs the following on the Win32 platform:

Program	Description
Rtpudpcon	Console version of rtpd
Rtpid	Data client that monitors DAS connections
Rtpc	Example rtpd data client
ChkData	This data client performs an integrity check and displays the status of the incoming data
arccreate	Creates an archive
arcinfo	Views and verifies current status (size) of the local archive
arcfetch	Assembles raw data from the archive for processing
arcrebuild	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 Windows 98 Installation

Note: This command assumes the 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, that support Windows 98, 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 go to to the next section "Windows 98 serial configuration" to configure a serial connection.
8. For an **Ethernet** connection, proceed to "Basic operations".

2.3 Windows 98 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:\reftek** 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.

2.3.2 Add a Generic Null modem

To add a generic null modem perform the following instructions:

1. From the Start pop-up menu select **Settings**
2. Drag across and click **Control** Panel
3. Double-click the **Modems** icon
4. At the **Modems Properties** window click the **Add** button (See Figure 3).

Figure 3 Modem Properties

5. At the Install New **Modem** window, select [ ] **Don't detect my modem; I will select it from a list** (Refer to Figure 4)

6. Then click **Next>** when ready to install (Figure 4).

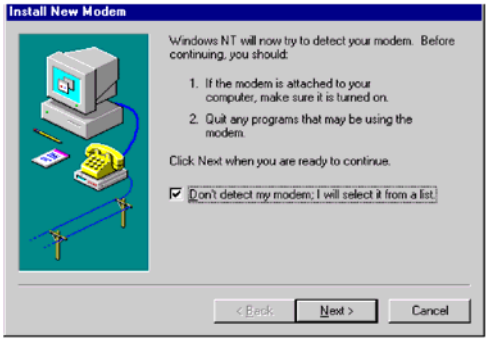


Figure 4 Don't Detect

7. At the **Install New Modem** window, click **Have Disk** (See Figure 5).

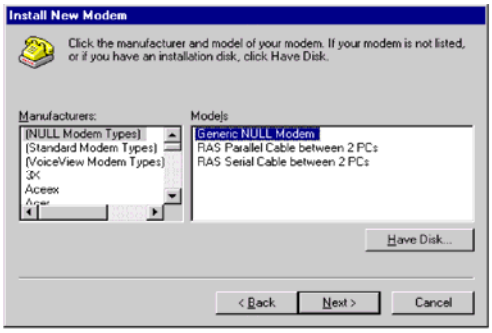


Figure 5 Install New Modem

8. At the **Install From Disk** window in the **Copy Manufacturer's files from**: text box type **c:\reftek** (See Figure 6).
9. Click the **OK** box when ready (See Figure 6).

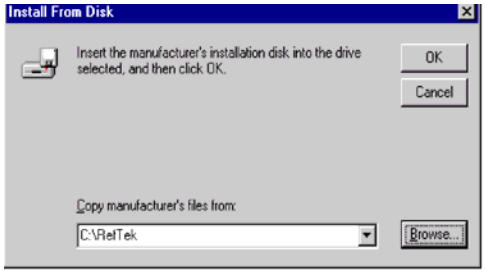


Figure 6 Have Disk

10. At the **Install New Modem** window, under **Models**, select (highlight) **Generic NULL Modem** (See).
11. Click **Next>** when ready (Figure 7).

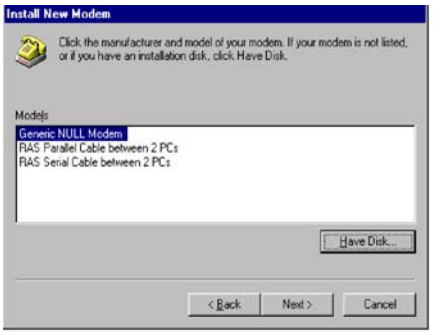


Figure 7 Install New Modem

12. At the next **Install New Modem** window select (highlight) **Communications Port (COM1)**.
13. Click **Next>** when ready (Figure 8).

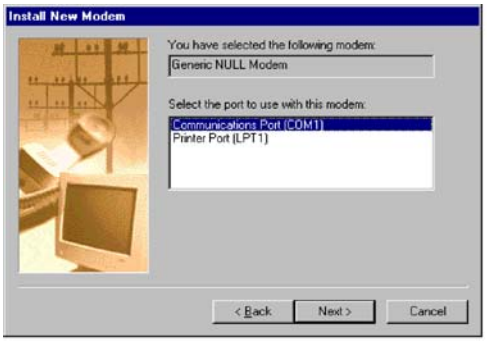
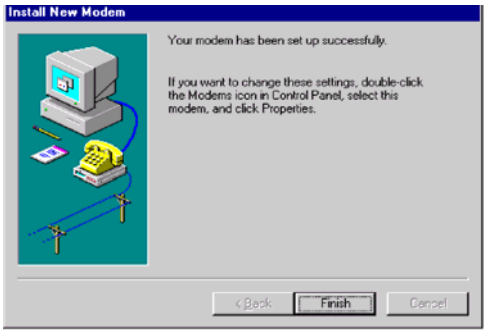


Figure 8 Next Install

14. The **Install New Modem** window will display **Your modem has been set up successfully.**
15. Click **Finish**.



16. Go back to the **Modems Properties** window located under **Control Panel > Modems** and click the **Properties** button.

Figure 9 Modem Properties

17. In the **Generic NULL Modem Properties** window on the **General** tab – click the **Maximum speed** drop-down menu.
18. Select a baud rate setting (Figure 10).

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

- 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.

19. Click **OK** when ready.

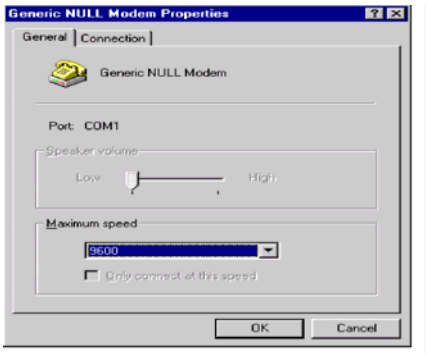


Figure 10 General Modem

20. In the **Modems Properties** window click the **Close** button.
21. At this point the PC needs to be **restarted** by using standard operations to **restart** the PC.

2.3.3 Network Neighborhood

Configure the dial-up network components per the following:

1. Insert the original Win 98 installation CD-ROM in the CD drive – close the index window.
2. Using standard window operations right-click the **Network Neighborhood** icon.

3. From the drop-down menu select **Properties**.
4. In the **Network** window within the **Configuration** tab click **Add** (See Figure 11).

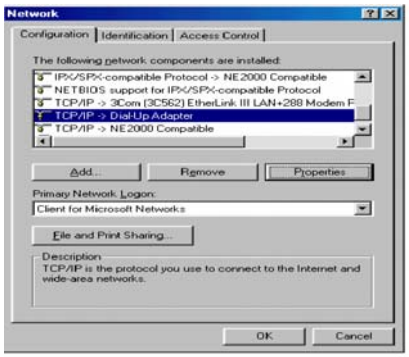


Figure 11 Network Window

5. In the **Select Network Component Type** window select **Adapter**.
6. Then click **Add**. (See Figure 12).

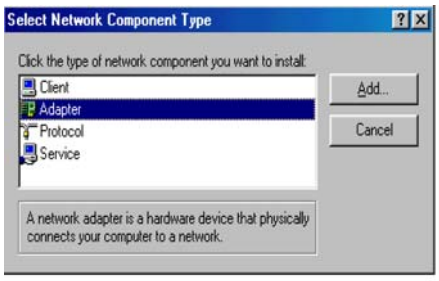


Figure 12 Select Network

7. The **Select Network adapter** window opens as shown in Figure 13.
8. Under **Manufacturers**: select (highlight) **Microsoft**
9. Under **Network Adapters** select (highlight) **Dial-up Adapter** (Figure 13).
10. Click **OK** – once the installation has been completed the system will return back to the **Network** window.

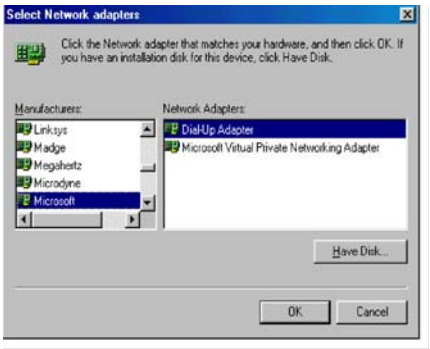


Figure 13 Select Network Adapter

Note: The installation process takes approximately 1 minute

11. At the **Network** window click **OK** when ready.
12. At this point the system will copy the required files.
13. When finished the **System Settings Change** window asks you to restart the computer – click **Yes**.

2.3.4 Dial-Up Networking

Once the computer has completed an orderly restart and if the components above where configured correctly a **Dial-Up Networking** icon should be present in the **My Computer** folder.

The following instructions will complete the dial-up networking configuration settings:

1. Using standard window operations double-click the **My Computer** icon located on the desktop.

2. Double-click the **Dial-Up Networking** icon.
3. From the menu bar click the **Connections** menu.
4. Drag-down and select the **Dial-Up Server** window.
5. In the **Dial-Up Server** window within the **Generic NULL Modem** tab select the **Allow caller access** option (See Figure 14).

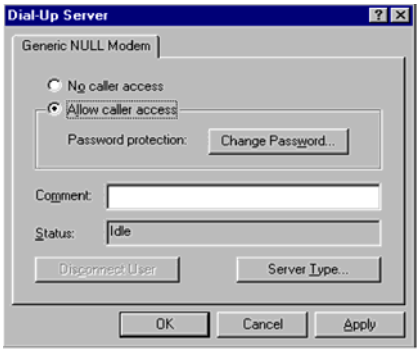


Figure 14 Dial-Up Server

6. Next, click the **Change Password** button.
7. In the **New password**: text box type the correct password as shown in Figure 2 - 13.

Figure 15 Change Password

Note: The correct password is 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).

8. Click down to the **Confirm new password**: text box.
9. Confirm (by re-typing) the new password.

Note: The password setting is case sensitive.

10. Click the **OK** box when ready and the **Dial-Up Server** will reopen.
11. When the **Dial-Up Server** window re-opens, click **Server Type**.
12. Using the **Type of Dial-Up Server**: drop-down menu select **PPP**: **Internet, Windows NT Server, Windows 98**.
13. In the **Advanced options**: box disable both the **Enable software compression** and **require encrypted password** (Figure 2 - 14).
14. Click **OK** when ready.

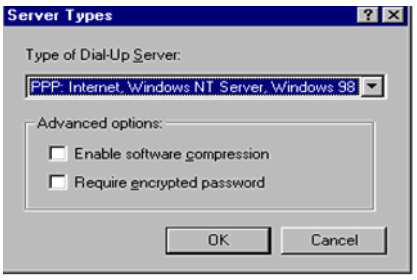


Figure 16 Server Type

15. When the **Dial-Up Server** window opens, click **Apply** (This action will initiate the connection).
16. The **Status**: box will change from idle to monitoring as the connection is being made.
17. Then it will go into answering mode.
18. Once the connection is successful the **Status**: box will display the DAS unit ID number and the actual connected time (Figure 2 - 15).
19. Click **OK** when ready.

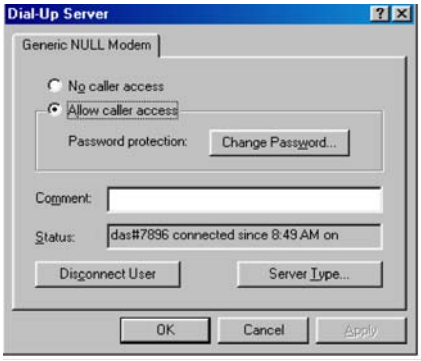


Figure 17 Dial-Up Server

3 Windows 2000 / XP / Vista - Installation

3.1 Getting Started

This section installs the following on the Win32 platform.

Program	Description
Rtpudpcon	Console version of rtpd
Rtpudpsvc	Service version of rtpd
Rtpid	Data client that monitors DAS connections
Rtpc	Example rtpd data client
ChkData	This data client performs an integrity check and displays the status of the incoming data
arccreate	Creates an archive
arcinfo	Views and verifies current status (size) of the local archive
arcfetch	Assembles raw data from the archive for processing
arcrebuild	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 Installing the Software on Windows 2000/XP/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, that support Windows NT, 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 "Windows 2000/XP serial configuration" to configure a serial connection.
8. For an **Ethernet** connection, proceed to Chapter 6, "Basic operations".

3.3 Windows 2000/XP/Vista serial configuration

3.3.1 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:\reftek 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.

3.3.2 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).

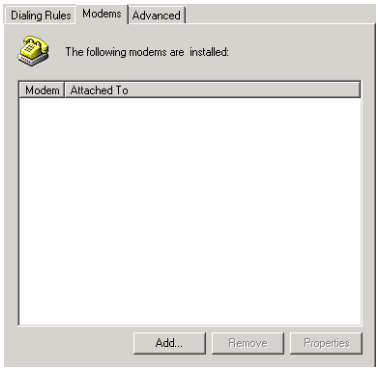


Figure 18 Select Add

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

Figure 19 Install New Modem

5. Select the **Next>** to select the modem from a list.

6. In the **Install New Modem** click **Have Disk** (Figure 37).

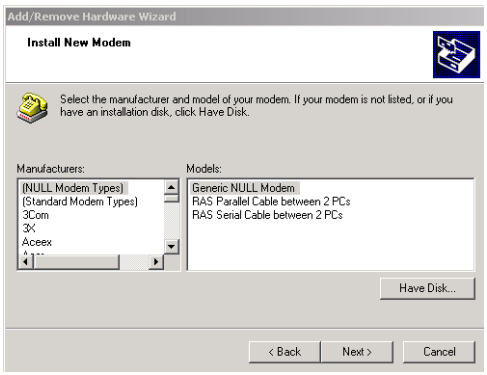


Figure 20 Have Disk

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 38).

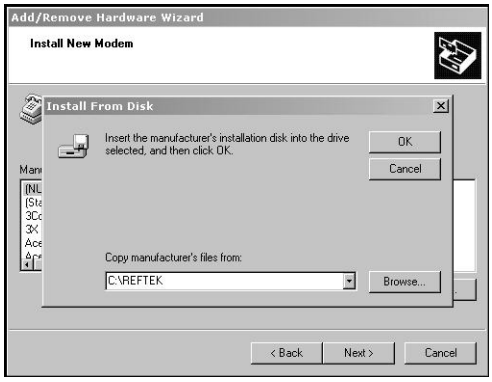


Figure 21 Install From Disk

9. At the **Install New Modem** window under **Models** select **Generic NULL Modem**.
10. Click **Next>** when ready (Figure 39).

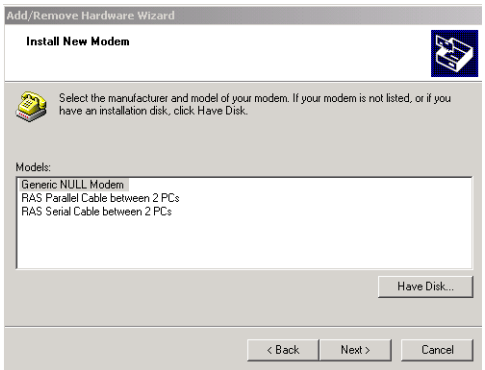


Figure 22 Select Generic NULL

11. At the next **Install New Modem** window select an available port to use for the modem
12. Click **Next>** when ready (Figure 40).

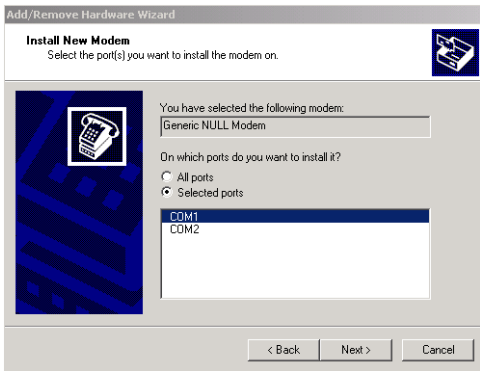


Figure 23 Select Comm Port

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 41).

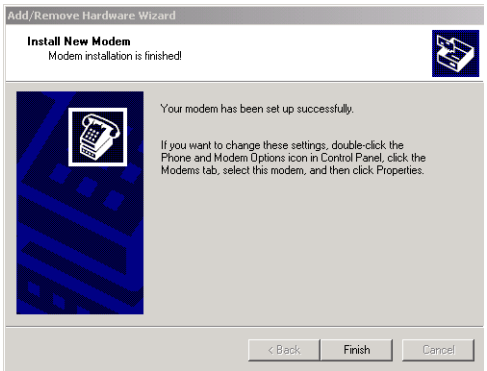


Figure 24Modem Setup Success

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

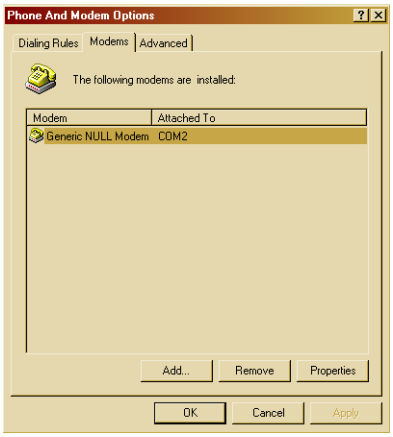


Figure 25 Phone and Modem Options

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 4 - 9).

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.

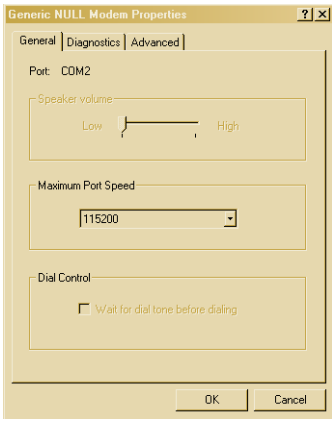


Figure 26 Set Modem

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.

3.3.3 Configure Remote Access Services (RAS)

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

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

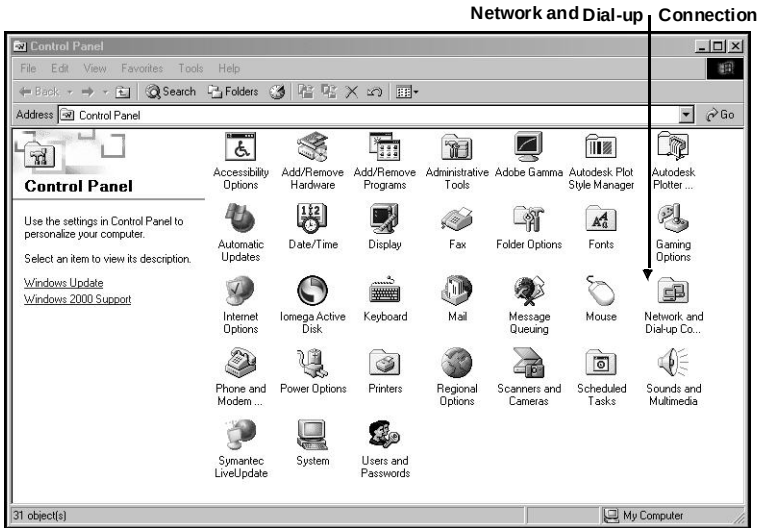


Figure 27 Control Panel

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

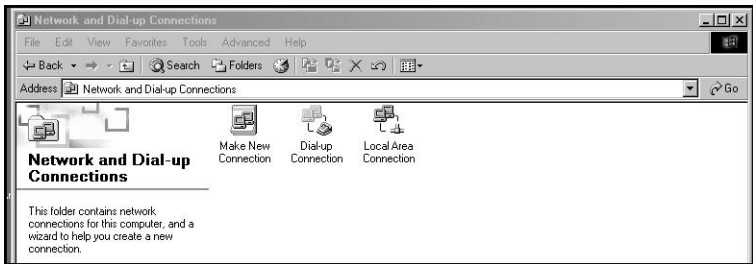


Figure 28 Network and Dial-up

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

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

Figure 29 Make New Connection

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

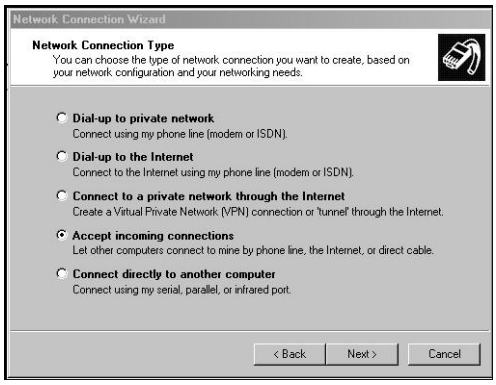


Figure 30 Accept Incoming

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

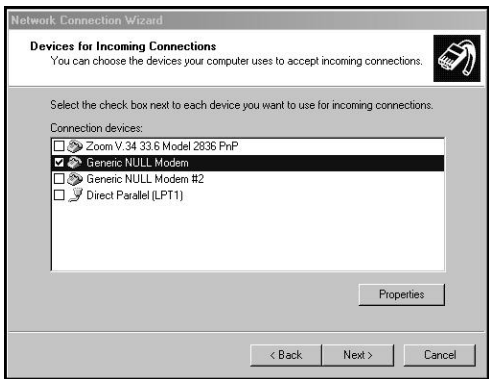


Figure 31 Device for Connect

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

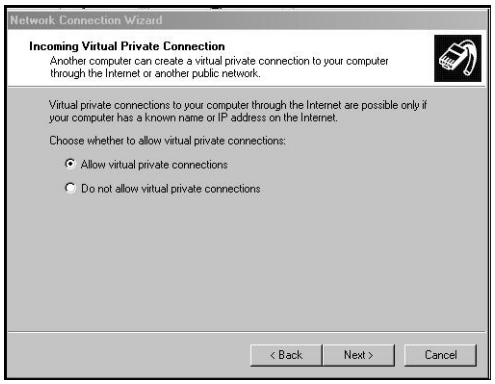


Figure 32 Select Allow

8. Click the **Next** button.

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

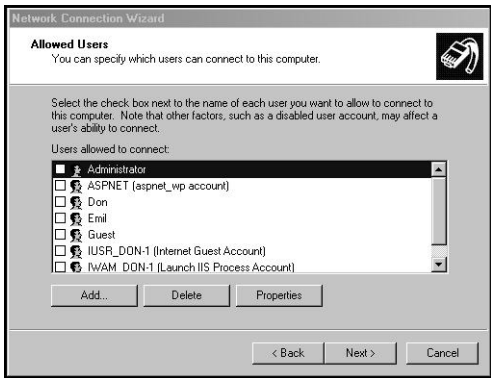
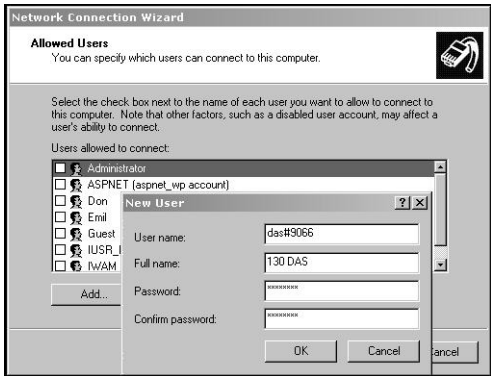


Figure 33 Add DAS User

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.

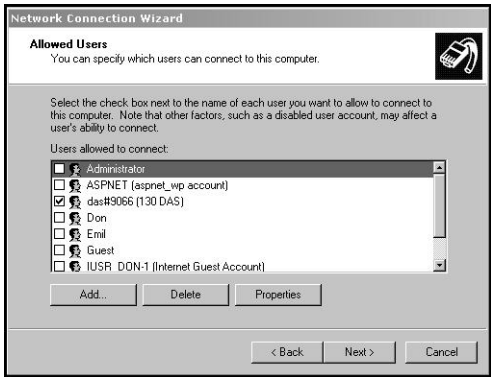


Figure 34 Added DAS User

15. Select the **Next** button.
16. In the **Network Components** window (Figure 52), under the components, highlight Internet Protocol (TCP/IP).
17. Select the **Properties** button.

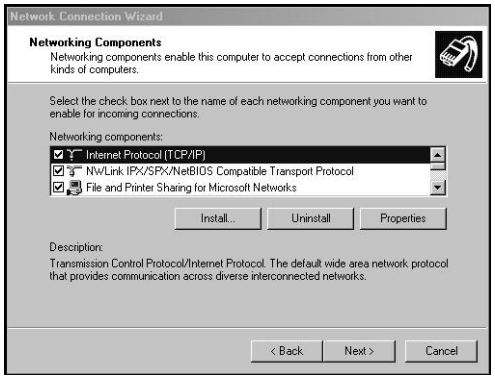


Figure 35 Networking Components

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

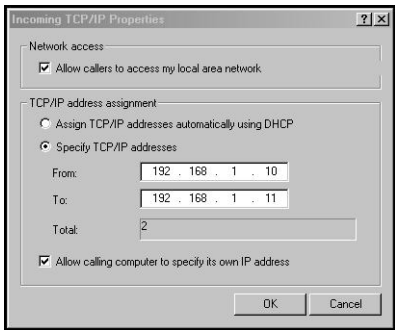


Figure 36 Incoming TCP/IP

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 37 Remote Access Setup

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

3.3.4 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 2000: Start -> Settings -> Control Panel -> Administrative Tools -> Services

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.

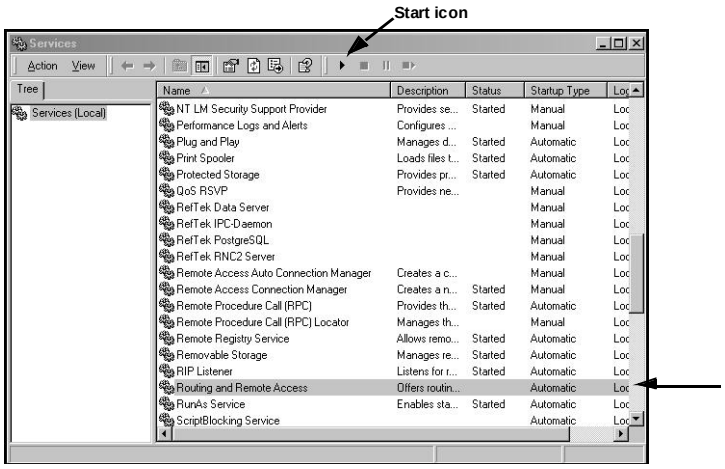


Figure 38 Services Window

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.

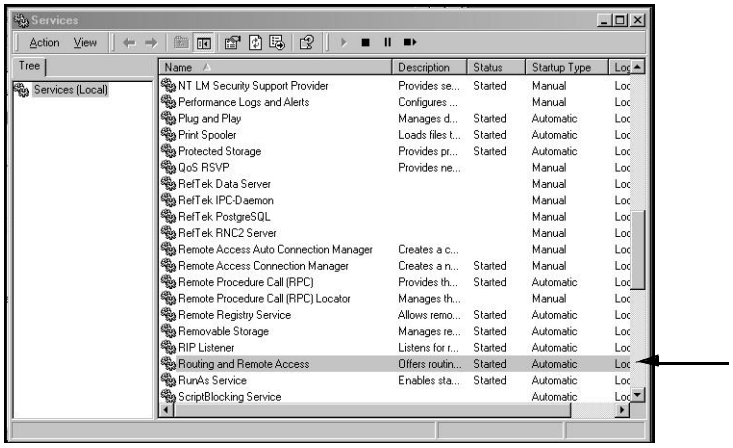


Figure 39 RAS Started

5. Close the control program.

4 Linux and Solaris installation

4.1 Getting Started

This section installs the following on the UNIX platform.

Program	Description
Rtpd	rtpd program
Rtpid	Data client that monitors DAS connections
Rtpc	Example rtpd data client
ChkData	This data client performs an integrity check and displays the status of the incoming data
arccreate	Creates an archive
arcinfo	Views and verifies current status (size) of the local archive
arcfetch	Assembles raw data from the archive for processing
arcrebuild	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.

4.2 Installation instructions for Linux and Solaris

The following instructions assume that your 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
```

4.3 Linux and Solaris serial configuration

No support for serial connections is provided.

5 Basic operations

5.1 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 Section 8 "Arccreate (Archive Create)" in the REF TEK Utilities guide.

Note: For more information on the rtpd.ini see Appendix A "Configuration options - rtpd.ini file" on page A-77.

5.2 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	Win98	Win NT/2K/XP	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 NT/2000/XP 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.

5.3 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 "Configuration options - rtpd.ini file" for more information about the rtpd.ini file.

Note: See "Data Clients" for more information on data clients.

5.4 Tools for troubleshooting

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

5.4.1 The 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, REF TEK has specified 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 "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.

5.4.2 The 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.

5.4.3 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** "Arcinfo (Archive Information)" in the REF TEK Utilities Guide.

5.5 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.

6 Data Clients

6.1 RTP2RTPD (Version 2.1.0.0 Feb. 07)

6.1.1 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.

```
|           |   Client                  | RTP protocol “DAS” |       |
|  PC1      | Connection  |    PC1      |      Connection    | PC2   |
|RTPD Primary ----------- RTP2RTPD ------------------ RTPD Secondary|
|           |             |             |                    |
```

6.1.2 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 proceed 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 should 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.

6.1.3 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”.

6.2 SL2RTPD(Version 2.1.1.0 Feb. 22, 2008)

6.2.1 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 REFTEK packets before forwarding it to **RTPD**. Whereas **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.

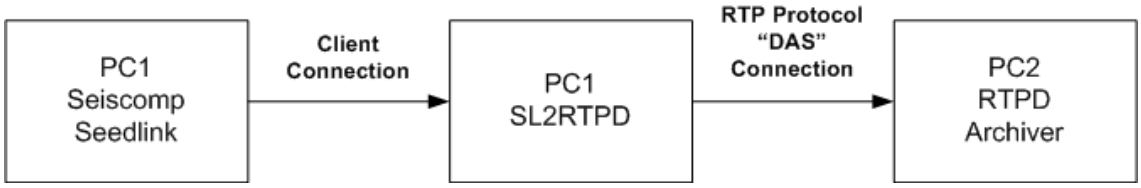


Figure 40 SL2RTPD Flow

6.2.2 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 Reftek 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 Reftek 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.

6.2.3 Command Syntax:

sl2rtpd config_file_name

6.4 Chkdata

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

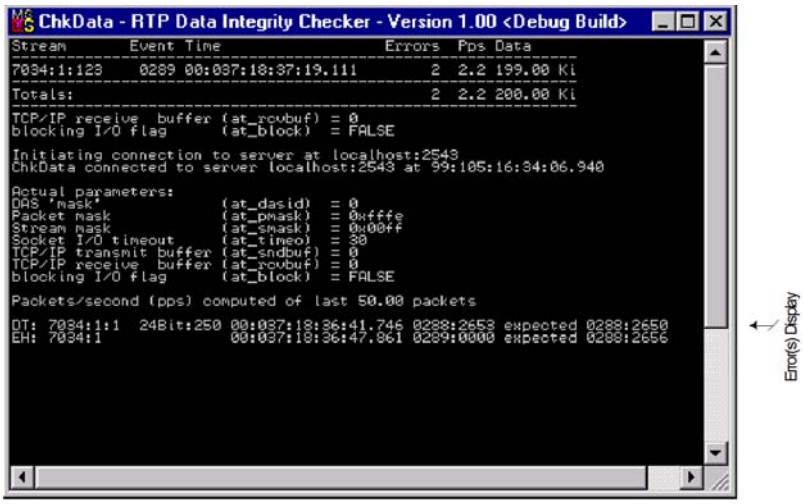


Figure 41 Data Integrity

6.5 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)

6.6 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.

6.6.1 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).

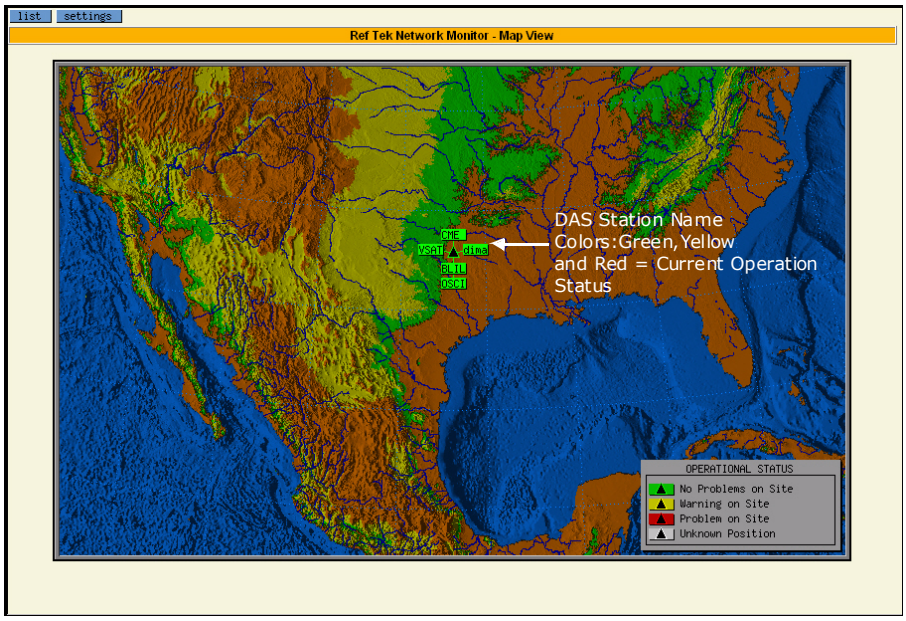


Figure 42 RTPMonitor

6.6.2 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.

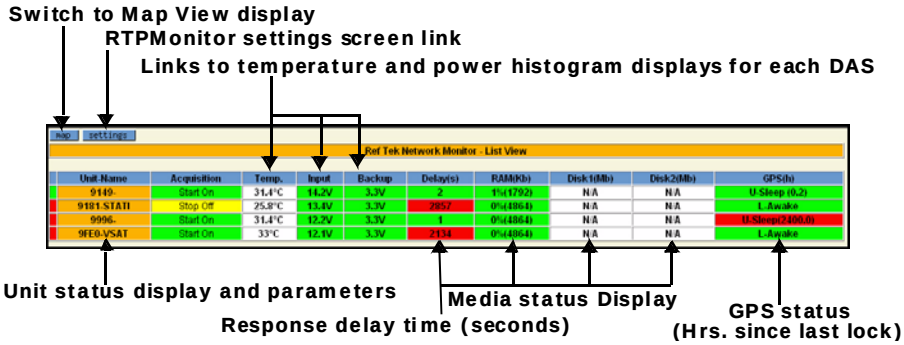


Figure 43 List View Page

6.6.3 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.

map list settings

Ref Tek Network Monitor-DAS UNIT#9149

Unit-Name	Acquisition	Temp.	Input	Backup	Delay(s)	RAM(Kb)	Disk1(Mb)	Disk2(Mb)	GPS(h)
9149.	Start On	31.4°C	11.2V	3.3V	1	1%(1792)	N/A	N/A	U.Sleep (0.3)

Status Information (SS)

Experiment Number	Experiment Name	Station Number	Station Name	Latitude	Longitude	Altitude	Pk.Error(Sec.)
0		0		32.0662	-96.0079	109	-0.000002

CPU Version	Board Number	Board Revision	Board Acronym	Board Serial Number	FPGA Board Number	FPGA Minimum brd.rev.	FPGA Version
gar012	520	B	LID	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 44 Status

Ref Tek Network Monitor-DAS UNIT#9149 STREAM#1

Continuous Trigger Description (CON)

Description	Value
Record Length	3600
First Trigger Time	2001001000000

Figure 45 Stream Info

6.6.4 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).

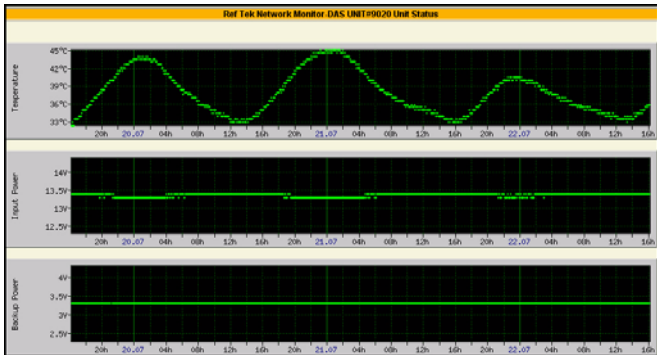


Figure 46 Temperature and Power

6.6.5 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.

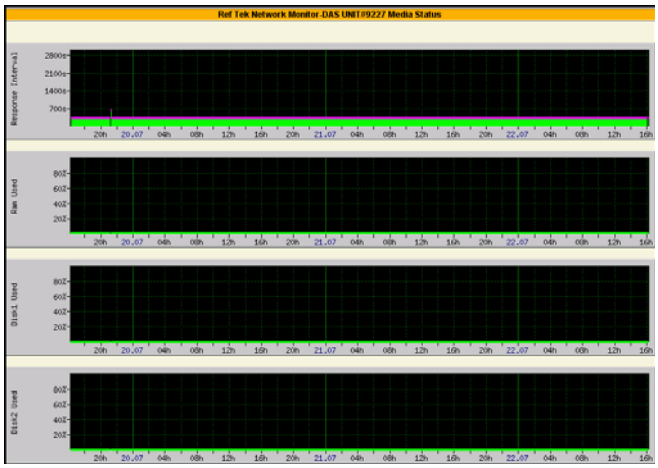


Figure 47 Media Status

6.6.6 GPS Status displays

The GPS status displays GPS parameters over a time period. The first figure (Figure 48) shows the Altitude, Longitude and Latitude of the GPS Unit for the individual DAS over a number of hours.

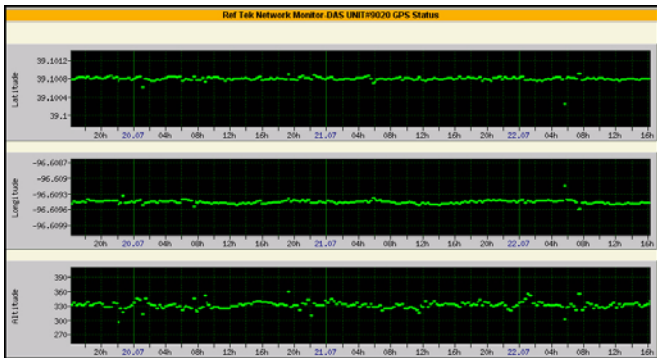


Figure 48 GPS Status

The second figure (Figure 49) shows Last Lock, number of tracked satellites and phase errors for the same GPS unit of the DAS during the same period of time.

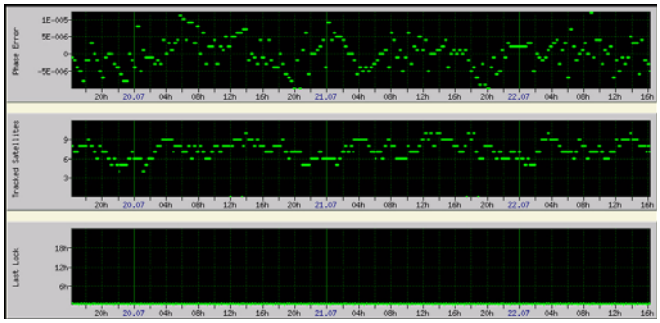


Figure 49 GPS Status

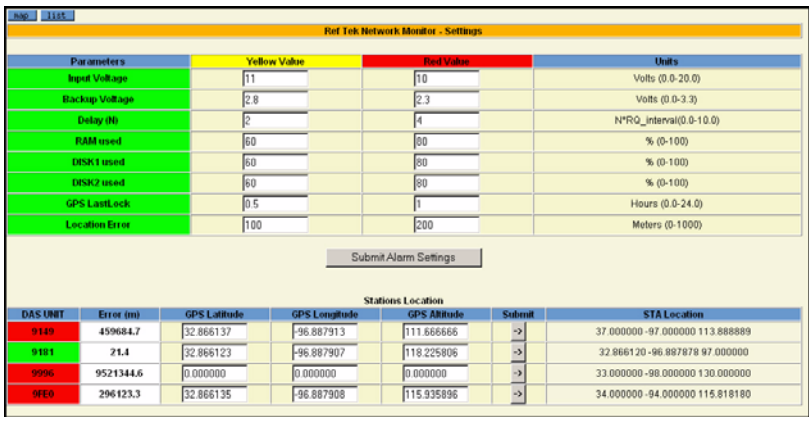
6.6.7 Settings Screen of RTPMonitor

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.



Map List

Ref Tek Network Monitor - Settings

Parameters	Yellow Value	Red Value	Units
Input Voltage	11	10	Volts (0.0-20.0)
Backup Voltage	2.8	2.3	Volts (0.0-3.3)
Delay (N)	2	4	N*RQ_interval(0.0-10.0)
RAM used	60	80	% (0-100)
DISK1 used	60	80	% (0-100)
DISK2 used	60	80	% (0-100)
GPS LastLock	0.5	1	Hours (0.0-24.0)
Location Error	100	200	Meters (0-1000)

Submit Alarm Settings

Stations Location

DAS UNIT	Error (m)	GPS Latitude	GPS Longitude	GPS Altitude	Submit	STA Location
9149	459684.7	32.866137	-96.887913	111.666666	->	37.000000 -97.000000 113.888889
9181	71.4	32.866123	-96.887907	118.225806	->	32.866120 -96.887878 97.000000
9996	9521344.6	0.000000	0.000000	0.000000	->	33.000000 -98.000000 130.000000
9FE0	296123.3	32.866135	-96.887908	115.935896	->	34.000000 -94.000000 115.818180

6.7 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

6.7.1 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 rune 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. In other words,when (current_time – 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: (Batch starttime – (.1xLatency)) to (Batch starttime + (.4xRecLength)). 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.

6.7.2 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
```

CleanPrcntTime: 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.

```
CleanPrcntTime .6
```

6.8 RTPPIPE

6.8.1 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]

6.8.2 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

6.8.3 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)
```

6.8.4 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**.

6.9 RTPAUX

6.9.1 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]
```

6.9.2 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
```

6.9.3 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
```

6.9.4 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
```

6.10 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.

6.10.1 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.

6.10.2 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.

6.10.3 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
```

7 Configuration Reference

7.1 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                                                    1

# 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\log\rtpd.log                                  2


# 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 doe
#not have it (eg, Windows NT) then the Facility entry, if any, is
#ignored.

 Facility  LOCAL7                                                  3

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

MaxClient  8                                                       4
```

```
# 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                                                    5

# 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      128                                                     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      128                                                     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 192.168.100.27         # filed_nt

# 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   hub1          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 its secondary IP address.

DiscoveryAddr             192.168.100.198                             11
DiscoveryAddr             172.16.1.22
```

DiscoveryAddr 172.16.1.23

#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:\archive 12

 # 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 13
UDPaddrmap c:\reftek\log\addr.map 14

 # 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 15

 # Specify the directory to use for command exchange via optional file #based NCI. This is ignored if not using NCI.

NCIPath c:\reftek\cpk 16
 # Maximum number of files that will be purged in the purge cycle #Default is 1

MaxPurgeFiles 300 17

#Purge cycle ends when more than this many Megabytes (X times 1048576) are removed #Deafult is 1

MaxPurgeMBytes 1000 18

Entry Num.	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	UDPport	Port number used by DAS units to connect to RTPD.
14	UDPaddrmap	Location for address map that associates DAS unit IDs with IP addresses.
15	UDPStartID	Starting Unit ID assigned
16	NCIPath	Directory for use as command exchange via optional file based NCI user interface (72A Only)
17	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).
18	MaxPurgeMBytes	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.

7.2 Command Line Options

1. 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

7.3 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] CmndNbuf 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] CmndClientIPAddr 127.0.0.1
2006:279-17:00:59 RefTek029 rtpudpcon[2652] CmndClientIPAddr 172.16.1.22
2006:279-17:00:59 RefTek029 rtpudpcon[2652] CmndClientIPAddr 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
```