

08-30-2001

Form PTO-1595

(Rev. 03/01)

OMB No. 0651-0027 (exp. 5/31/2002)

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U.S. DEPARTMENT OF COMMERCE
U.S. Patent and Trademark Office

To the Honorable Commissioner of Patents and Trademarks: Please record the attached original documents or copy thereof.

1. Name of conveying party(ies):

ServerDelta Networks, Inc. 8-27-01

Additional name(s) of conveying party(ies) attached? ☐ Yes ☒ No

2. Nature of conveyance:

- ☐ Assignment ☐ Merger
☒ Security Agreement ☐ Change of Name
☐ Other _____

Execution Date: July 11, 2001

2. Name and address of receiving party(ies)

Name: Silicon Valley Bank

DBA: Silicon Valley East

Internal Address: _____

Street Address: 3003 Tasman Drive

City: Santa Clara State: MA Zip: 95054

Additional name(s) & address(es) attached? ☐ Yes ☒ No

4. Application number(s) or patent number(s):

If this document is being filed together with a new application, the execution date of the application is: _____

A. Patent Application No.(s)

B. Patent No.(s)

Additional numbers attached? ☒ Yes ☐ No

5. Name and address of party to whom correspondence concerning document should be mailed:

Name: Christopher E. Kondracki

Internal Address: _____

Street Address: 2001 Jefferson Davis, Hwy.,

Suite 505

City: Arlington State: VA Zip: 22202

6. Total number of applications and patents involved: 8

7. Total fee (37 CFR 3.41).....\$ 320.00

☒ Enclosed☐ Authorized to be charged to deposit account

8. Deposit account number:

(Attach duplicate copy of this page if paying by deposit account)

DO NOT USE THIS SPACE

9. Statement and signature.

To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy is a true copy of the original document.

Christopher E. Kondracki

Name of Person Signing

Signature

Date

Total number of pages including cover sheet, attachments, and documents: 54

Mail documents to be recorded with required cover sheet information to:

Commissioner of Patents & Trademarks, Box Assignments
Washington, D.C. 20231

08/29/2001 TDIAZ1 00000096 09004857

01 FC:581

320.00 OP

**Patent Applications
Continuation of Item 4A**

Title	Filing Date	Applications
Data Rate Limiting	March 13, 2001	09/804,857
Radio Frequency Communications Redundancy	April 18, 2001	09/836,761
Data Packet Discarding	April 30, 2001	09/844,216
Packetized Data Discard	April 30, 2001	09/845,541
Data Rate Limiting	March 14, 2001	60/189,640
Radio Frequency Communications Redundancy	April 19, 2000	60/198,294
Data Packet Discarding	May 1, 2000	60/201,010
Packetized Data Discard	May 1, 2000	60/201,059

INTELLECTUAL PROPERTY SECURITY AGREEMENT

This Intellectual Property Security Agreement (this "IP Agreement") is made as of the 11th day of July, 2001 by and between **RIVERDELTA NETWORKS, INC.**, a Delaware corporation with its principal place of business at 3 Highwood Drive East, Tewksbury, Massachusetts 01876 ("Grantor"), and **SILICON VALLEY BANK**, a California-chartered bank, with its principal place of business at 3003 Tasman Drive, Santa Clara, California 95054 and with a loan production office located at One Newton Executive Park, Suite 200, 2221 Washington Street, Newton, Massachusetts 02462, doing business under the name "Silicon Valley East" ("Lender").

RECITALS

A. Lender has agreed to make advances of money and to extend certain financial accommodations to Grantor (the "Loan"), pursuant to a certain Loan and Security Agreement dated as of June 30, 2000, as amended by a certain Loan Modification Agreement dated as of November 29, 2000, as further amended by a certain Second Loan Modification Agreement dated as of May 31, 2001 between Grantor and Lender, as amended from time to time (as amended, the "Loan Agreement"). The Loan is secured pursuant to the terms of the Loan Agreement. Lender is willing to enter into certain financial accommodations with Grantor, but only upon the condition, among others, that Grantor shall grant to Lender a security interest in certain Copyrights, Trademarks, Patents, and Mask Works, and other assets, to secure the obligations of Grantor under the Loan Agreement. Defined terms used but not defined herein shall have the same meanings as in the Loan Agreement.

B. Pursuant to the terms of the Loan Agreement, Grantor has granted to Lender a security interest in all of Grantor's right title and interest, whether presently existing or hereafter acquired in, to and under all of the Collateral (as defined therein).

NOW, THEREFORE, for good and valuable consideration, receipt of which is hereby acknowledged and intending to be legally bound, as collateral security for the prompt and complete payment when due of Grantor's Indebtedness (as defined below), Grantor hereby represents, warrants, covenants and agrees as follows:

1. Grant of Security Interest. As collateral security for the prompt and complete payment and performance of all of Grantor's present or future indebtedness, obligations and liabilities to Lender (hereinafter, the "Indebtedness"), including, without limitation, under the Loan Agreement, Grantor hereby grants a security interest in all of Grantor's right, title and interest in, to and under its registered and unregistered intellectual property collateral (all of which shall collectively be called the "Intellectual Property Collateral"), including, without limitation, the following:

(a) Any and all copyright rights, copyright applications, copyright registrations and like protections in each work or authorship and derivative work thereof, whether published or unpublished and whether or not the same also constitutes a trade secret, now or hereafter existing, created, acquired or held, including without limitation those set forth on EXHIBIT A attached hereto (collectively, the "Copyrights");

(b) Any and all trade secrets, and any and all intellectual property rights in computer software and computer software products now or hereafter existing, created, acquired or held;

(c) Any and all design rights which may be available to Grantor now or hereafter existing, created, acquired or held;

(d) All patents, patent applications and like protections including, without limitation, improvements, divisions, continuations, renewals, reissues, extensions and continuations-in-part of the same, including without limitation the patents and patent applications set forth on EXHIBIT A attached hereto (collectively, the "Patents");

(e) Any trademark and service mark rights, slogans, trade dress, and tradenames, whether registered or not, applications to register and registrations of the same and like protections, and the entire goodwill of the business of Grantor connected with and symbolized by such trademarks, including without limitation those set forth on **EXHIBIT A** attached hereto (collectively, the "Trademarks");

(f) All mask works or similar rights available for the protection of semiconductor chips, now owned or hereafter acquired, including, without limitation those set forth on **EXHIBIT A** attached hereto (collectively, the "Mask Works");

(g) Any and all claims for damages by way of past, present and future infringements of any of the rights included above, with the right, but not the obligation, to sue for and collect such damages for said use or infringement of the intellectual property rights identified above;

(h) All licenses or other rights to use any of the Copyrights, Patents, Trademarks, or Mask Works and all license fees and royalties arising from such use to the extent permitted by such license or rights, including, without limitation those set forth on **EXHIBIT A** attached hereto; and

(i) All amendments, extensions, renewals and extensions of any of the Copyrights, Trademarks, Patents, or Mask Works; and

(j) All proceeds and products of the foregoing, including without limitation all payments under insurance or any indemnity or warranty payable in respect of any of the foregoing.

2. **Authorization and Request.** Grantor authorizes and requests that the Register of Copyrights and the Commissioner of Patents and Trademarks record this IP Agreement.

3. **Covenants and Warranties.** Grantor represents, warrants, covenants and agrees as follows:

(a) Grantor is now the sole owner of the Intellectual Property Collateral, except for non-exclusive licenses granted by Grantor to its customers in the ordinary course of business, and except as set forth on Exhibit A.

(b) Performance of this IP Agreement does not conflict with or result in a breach of any IP Agreement to which Grantor is bound.

(c) During the term of this IP Agreement, Grantor will not transfer or otherwise encumber any interest in the Intellectual Property Collateral, except for non-exclusive licenses granted by Grantor in the ordinary course of business or as set forth in this IP Agreement. Notwithstanding the foregoing, Grantor has granted to Motorola, Inc. a security interest in the Grantor's Intellectual Property. The Lender hereby consents to such grant, provided, however, that such grant shall be at all times junior and subordinate to the grant of a security interest set forth herein;

(d) To its knowledge, each of the Patents is valid and enforceable, and no part of the Intellectual Property Collateral has been judged invalid or unenforceable, in whole or in part, and no claim has been made that any part of the Intellectual Property Collateral violates the rights of any third party;

(e) Grantor shall promptly advise Lender of any material adverse change in the composition of the Collateral, including but not limited to any subsequent ownership right of the Grantor in or to any Trademark, Patent, Copyright, or Mask Work specified in this IP Agreement;

(f) Grantor shall (i) protect, defend and maintain the validity and enforceability of the Trademarks, Patents, Copyrights, and Mask Works, (ii) use its best efforts to detect infringements of the Trademarks, Patents, Copyrights, and Mask Works and promptly advise Lender in writing of material infringements detected and (iii) not allow any Trademarks, Patents, Copyrights, or Mask Works to be abandoned, forfeited or dedicated to the public without the written consent of Lender, which shall not be

unreasonably withheld, unless Grantor determines that reasonable business practices suggest that abandonment is appropriate.

(g) Grantor shall promptly register the most recent version of any of Grantor's Copyrights, if not so already registered, and shall, from time to time, execute and file such other instruments, and take such further actions as Lender may reasonably request from time to time to perfect or continue the perfection of Lender's interest in the Intellectual Property Collateral;

(h) This IP Agreement creates, and in the case of after acquired Intellectual Property Collateral, this IP Agreement will create at the time Grantor first has rights in such after acquired Intellectual Property Collateral, in favor of Lender a valid and perfected first priority security interest and collateral assignment in the Intellectual Property Collateral in the United States securing the payment and performance of the obligations evidenced by the Loan Agreement upon making the filings referred to in clause (i) below;

(i) To its knowledge, except for, and upon, the filing with the United States Patent and Trademark office with respect to the Patents and Trademarks and the Register of Copyrights with respect to the Copyrights and Mask Works necessary to perfect the security interests created hereunder and except as has been already made or obtained, no authorization, approval or other action by, and no notice to or filing with, any U.S. governmental authority or U.S. regulatory body is required either (i) for the grant by Grantor of the security interest granted hereby, or for the execution, delivery or performance of this IP Agreement by Grantor in the U.S. or (ii) for the perfection in the United States or the exercise by Lender of its rights and remedies thereunder;

(j) All information heretofore, herein or hereafter supplied to Lender by or on behalf of Grantor with respect to the Intellectual Property Collateral is accurate and complete in all material respects.

(k) Grantor shall not enter into any agreement that would materially impair or conflict with Grantor's obligations hereunder without Lender's prior written consent, which consent shall not be unreasonably withheld. Grantor shall not permit the inclusion in any material contract to which it becomes a party of any provisions that could or might in any way prevent the creation of a security interest in Grantor's rights and interest in any property included within the definition of the Intellectual property Collateral acquired under such contracts.

(l) Upon any executive officer of Grantor obtaining actual knowledge thereof, Grantor will promptly notify Lender in writing of any event that materially adversely affects the value of any material Intellectual Property Collateral, the ability of Grantor to dispose of any material Intellectual Property Collateral or the rights and remedies of Lender in relation thereto, including the levy of any legal process against any of the Intellectual Property Collateral.

4. Lender's Rights. Lender shall have the right, but not the obligation, to take, at Grantor's sole expense, any actions that Grantor is required under this IP Agreement to take but which Grantor fails to take, after fifteen (15) days' notice to Grantor. Grantor shall reimburse and indemnify Lender for all reasonable costs and reasonable expenses incurred in the reasonable exercise of its rights under this section 4.

5. Inspection Rights. Grantor hereby grants to Lender and its employees, representatives and agents the right to visit, during reasonable hours upon prior reasonable written notice to Grantor, any of Grantor's plants and facilities that manufacture, install or store products (or that have done so during the prior six-month period) that are sold utilizing any of the Intellectual Property Collateral, and to inspect the products and quality control records relating thereto upon reasonable written notice to Grantor and as often as may be reasonably requested, but not more than once in every six (6) months; provided, however, nothing herein shall entitle Lender access to Grantor's trade secrets and other proprietary information.

6. Further Assurances; Attorney in Fact.

(a) On a continuing basis, Grantor will, subject to any prior licenses, encumbrances and restrictions and prospective licenses, make, execute, acknowledge and deliver, and file and record in the proper filing and recording places in the United States, all such instruments, including appropriate financing and continuation statements and collateral agreements and filings with the United States Patent and Trademarks Office and the Register of Copyrights, and take all such action as may reasonably be deemed necessary or advisable, or as requested by Lender, to perfect Lender's security interest in all Copyrights, Patents, Trademarks, and Mask Works and otherwise to carry out the intent and purposes of this IP Agreement, or for assuring and confirming to Lender the grant or perfection of a security interest in all Intellectual Property Collateral.

(b) Grantor hereby irrevocably appoints Lender as Grantor's attorney-in-fact, with full authority in the place and stead of Grantor and in the name of Grantor, Lender or otherwise, from time to time in Lender's discretion, upon Grantor's failure or inability to do so, to take any action and to execute any instrument which Lender may deem necessary or advisable to accomplish the purposes of this IP Agreement, including:

(i) To modify, in its sole discretion, this IP Agreement without first obtaining Grantor's approval of or signature to such modification by amending Exhibit A, Exhibit B, Exhibit C, and Exhibit D hereof, as appropriate, to include reference to any right, title or interest in any Copyrights, Patents, Trademarks or Mask Works acquired by Grantor after the execution hereof or to delete any reference to any right, title or interest in any Copyrights, Patents, Trademarks, or Mask Works in which Grantor no longer has or claims any right, title or interest; and

(ii) To file, in its sole discretion, one or more financing or continuation statements and amendments thereto, relative to any of the Intellectual Property Collateral without the signature of Grantor where permitted by law.

7. Events of Default. The occurrence of any of the following shall constitute an Event of Default under this IP Agreement:

(a) An Event of Default occurs under the Loan Agreement; or any document from Grantor to Lender; or

(b) Grantor breaches any warranty or agreement made by Grantor in this IP Agreement.

8. Remedies. Upon the occurrence and continuance of an Event of Default, Lender shall have the right to exercise all the remedies of a secured party under the Massachusetts Uniform Commercial Code, including without limitation the right to require Grantor to assemble the Intellectual Property Collateral and any tangible property in which Lender has a security interest and to make it available to Lender at a place designated by Lender. Lender shall have a nonexclusive, royalty free license to use the Copyrights, Patents, Trademarks, and Mask Works to the extent reasonably necessary to permit Lender to exercise its rights and remedies upon the occurrence of an Event of Default. Grantor will pay any expenses (including reasonable attorney's fees) incurred by Lender in connection with the exercise of any of Lender's rights hereunder, including without limitation any expense incurred in disposing of the Intellectual Property Collateral. All of Lender's rights and remedies with respect to the Intellectual Property Collateral shall be cumulative.

9. Indemnity. Grantor agrees to defend, indemnify and hold harmless Lender and its officers, employees, and agents against: (a) all obligations, demands, claims, and liabilities claimed or asserted by any other party in connection with the transactions contemplated by this IP Agreement, and (b) all losses or expenses in any way suffered, incurred, or paid by Lender as a result of or in any way arising out of, following or consequential to transactions between Lender and Grantor, whether under this IP Agreement or otherwise (including without limitation, reasonable attorneys fees and reasonable expenses), except for losses arising from or out of Lender's gross negligence or willful misconduct.

10. Reassignment. At such time as Grantor shall completely satisfy all of the obligations secured hereunder, Lender shall execute and deliver to Grantor all deeds, assignments, and other instruments as may be

necessary or proper to reinvest in Grantor full title to the property assigned hereunder, subject to any disposition thereof which may have been made by Lender pursuant hereto.

11. Course of Dealing. No course of dealing, nor any failure to exercise, nor any delay in exercising any right, power or privilege hereunder shall operate as a waiver thereof.

12. Amendments. This IP Agreement may be amended only by a written instrument signed by both parties hereto.

13. Counterparts. This IP Agreement may be executed in two or more counterparts, each of which shall be deemed an original but all of which together shall constitute the same instrument.

14. Law and Jurisdiction. This IP Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts. GRANTOR ACCEPTS FOR ITSELF AND IN CONNECTION WITH ITS PROPERTIES, UNCONDITIONALLY, THE NON-EXCLUSIVE JURISDICTION OF ANY STATE OR FEDERAL COURT OF COMPETENT JURISDICTION IN THE COMMONWEALTH OF MASSACHUSETTS IN ANY ACTION, SUIT, OR PROCEEDING OF ANY KIND, AGAINST IT WHICH ARISES OUT OF OR BY REASON OF THIS AGREEMENT; PROVIDED, HOWEVER, THAT IF FOR ANY REASON LENDER CANNOT AVAIL ITSELF OF THE COURTS OF THE COMMONWEALTH OF MASSACHUSETTS, GRANTOR ACCEPTS JURISDICTION OF THE COURTS AND VENUE IN SANTA CLARA COUNTY, CALIFORNIA. NOTWITHSTANDING THE FOREGOING, THE BANK SHALL HAVE THE RIGHT TO BRING ANY ACTION OR PROCEEDING AGAINST THE GRANTOR OR ITS PROPERTY IN THE COURTS OF ANY OTHER JURISDICTION WHICH THE BANK DEEMS NECESSARY OR APPROPRIATE IN ORDER TO REALIZE ON THE COLLATERAL OR TO OTHERWISE ENFORCE THE BANK'S RIGHTS AGAINST THE GRANTOR OR ITS PROPERTY.

GRANTOR AND LENDER EACH HEREBY WAIVE THEIR RESPECTIVE RIGHTS TO A JURY TRIAL OF ANY CLAIM OR CAUSE OF ACTION BASED UPON OR ARISING OUT OF ANY OF THE LOAN DOCUMENTS OR ANY OF THE TRANSACTIONS CONTEMPLATED THEREIN, INCLUDING CONTRACT CLAIMS, TORT CLAIMS, BREACH OF DUTY CLAIMS, AND ALL OTHER COMMON LAW OR STATUTORY CLAIMS. EACH PARTY RECOGNIZES AND AGREES THAT THE FOREGOING WAIVER CONSTITUTES A MATERIAL INDUCEMENT FOR IT TO ENTER INTO THIS AGREEMENT. EACH PARTY REPRESENTS AND WARRANTS THAT IT HAS REVIEWED THIS WAIVER WITH ITS LEGAL COUNSEL AND THAT IT KNOWINGLY AND VOLUNTARILY WAIVES ITS JURY TRIAL RIGHTS FOLLOWING CONSULTATION WITH LEGAL COUNSEL.

15. Confidentiality. In handling any confidential information, Lender shall exercise the same degree of care that it exercises for its own proprietary information, but disclosure of information may be made: (i) to Lender's subsidiaries or affiliates in connection with their present or prospective business relations with Grantor; (ii) to prospective transferees or purchasers of any interest in the Loans; (iii) as required by law, regulation, subpoena, or other order; (iv) as required in connection with Lender's examination or audit; and (v) as Lender considers appropriate in exercising remedies under this Agreement. Confidential information does not include information that either: (a) is in the public domain or in Lender's possession when disclosed to Lender, or becomes part of the public domain after disclosure to Lender; or (b) is disclosed to Lender by a third party, if Lender reasonably does not know that the third party is prohibited from disclosing the information.

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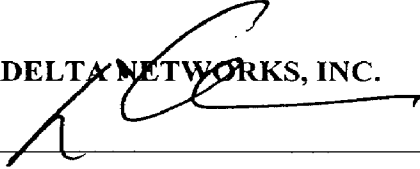
EXECUTED as a sealed instrument under the laws of the Commonwealth of Massachusetts on the day and year first written above.

Address of Grantor:

3 Highwood Drive East
Tewksbury, Massachusetts 01876

GRANTOR:

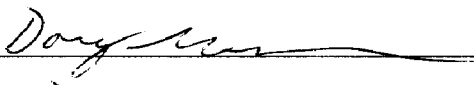
RIVERDELTA NETWORKS, INC.

By: 

Name: DAVID F. CALLAHAN

Title: President

SILICON VALLEY BANK

By: 

Name: Douglas Marshall

Title: Vice President

**PATENTS, TRADEMARKS AND
TRADE NAMES, COPYRIGHTS AND LICENSES**

United States Patent Applications

Title	Inventor(s)	Filing Date/ Serial No.	Owner	Related Cases
<i>Data Rate Limiting</i>	Zhao Liu Jerry Zhiyi Guo	March 13, 2001 09/804,857	RiverDelta Networks, Inc.	Utility Conversion of Serial No. 60/189,640, filed March 14, 2001
<i>Radio Frequency Communications Redundancy</i>	Gerard White Patrick A. Gerber	April 18, 2001 09/836,761	RiverDelta Networks, Inc.	Utility Conversion of Serial No. 60/198,294, filed April 19, 2000
<i>Data Packet Discarding</i>	Jon C.R. Bennett	April 30, 2001 09/844,216	RiverDelta Networks, Inc.	Utility Conversion of Serial No. 60/201,010, filed May 1, 2000
<i>Packetized Data Discard</i>	Jon C.R. Bennett	April 30, 2001 09/845,541	RiverDelta Networks, Inc.	Utility Conversion of Serial No. 60/201,059, filed May 1, 2000

Pending Trademark Applications

United States of America

Trademark	Owner	Application No.	Filing Date	Classes
BSR	RiverDelta Networks, Inc.	76/190,566	January 5, 2001	9, 42
BSR	RiverDelta Networks, Inc.	75/935,978	March 3, 2000	9, 37, 42
Misc. Design (Logo)	RiverDelta Networks, Inc.	75/933,388	March 2, 2000	9, 37, 42
RDN	RiverDelta Networks, Inc.	75/935,672	March 3, 2000	9, 37, 42
RDN	RiverDelta Networks, Inc.	76/191,770	January 5, 2001	9, 42
RIVERDELTA	RiverDelta Networks, Inc.	75/933,602	March 1, 2000	9, 37, 42
RIVERDELTA	RiverDelta Networks, Inc.	76/190,567	January 5, 2001	9, 42
RIVERGUIDE	RiverDelta Networks, Inc.	76/193,847	January 15, 2001	9, 37, 42
SMARTFLOW	RiverDelta Networks, Inc.	75/935,754	March 3, 2000	9, 37, 42

European Community

Trademark	Owner	Application No.	Filing Date	Classes
BSR	RiverDelta Networks, Inc.	1,678,564	May 26, 2000	9, 37, 42
Misc. Design (Logo)	RiverDelta Networks, Inc.	1,677,608	May 26, 2000	9, 16, 37, 42
RDN	RiverDelta Networks, Inc.	1,677,582	May 26, 2000	9, 16, 37, 42
RIVERDELTA	RiverDelta Networks, Inc.	1,678,218	May 26, 2000	9, 16, 37, 42
SMARTFLOW	RiverDelta Networks, Inc.	1,765,973	July 20, 2000	9, 16, 37, 42

Registered Internet Domain Names

Domain Name	Owner	Registration Renewal Date
riverdelta.org	RiverDelta Networks, Inc.	June 23, 2003
riverdeltanetworks.org	RiverDelta Networks, Inc.	June 23, 2003
riverdeltanetworks.com	RiverDelta Networks, Inc.	June 23, 2003
riverdeltanetworks.net	RiverDelta Networks, Inc.	June 23, 2003
riverdelta.com	RiverDelta Networks, Inc.	June 23, 2003
riverdelta.net	RiverDelta Networks, Inc.	July 7, 2003

Unregistered Intellectual Property

(i) Invention Disclosures

Invention Disclosed	Inventor
<i>Integrated Rate Limiting with Hierarchical Deficit Weighted Round Robin Scheduler</i>	Zhao Liu
<i>A Mechanism to Implement a Highly Available CMTS using a combination of Redundant components, RF and IF Relays</i>	Gerry White
<i>Hierarchical Packet Discard Mechanism</i>	Jon C.R. Bennett
<i>Efficient Buffer Accounting for Performing Longest Queue Discard</i>	Jon C.R. Bennett
<i>Method for Writing Network Packet Decoders</i>	Raj Duggal

(ii) – Proprietary Information

Area	Title	Author	Version
System Architecture	BSR 64000 System Architecture	P. Gerber	12
Market Requirements	BSR 64000 Market Requirements Specification	P. Gerber	7
	ATM Network Interface Module Market Requirements	P. DeMello	1
	BSR 64000 10/100 Module Market Requirements	P. DeMello	1
Routing SW	Virtual Routing Functional Specification and Design Framework	A. Lau	1
	Routing Software Architecture	S. Sahoo	1
	Virtual Routing Redundancy Protocol Design Specification	S. Sahoo	1
	IS-IS Design Specification	S. Sahoo	1
	Cable Bundling Design Specification	S. Sahoo	1
	PIM Sparse Mode Design Specification	S. Sahoo	1

CMTS SW	IP Multicast Routing Architecture	S. Sahoo	1
	Tunnel Interface Design Specification	S. Sahoo	1
	Interface Manager Design Specification	S. Sahoo	1
	Routing Policy Functional Specification	S. Sahoo	1
	Carrier Class Routing Software Requirements	S. Sahoo	1
	CLI Command List	S. Sahoo	1
	CLI Functional Requirements Specification	S. Sahoo	2
	System Logger API Specification	S. Sahoo	2
	Tachyon SRM Software Requirements	R. Duggal	1
	Resource Manager Functional Specification	K. Sheth	2
	Statistics Manager	K. Sheth	3
	Interslot Communications Protocol (ICP)	K. Sheth	2
	MPLS Functional Specification	K. Sheth	2
	Fastpath Programming API	K. Sheth	2
	RiverDelta Build Procedure	K. Sheth	1
	Fastpath Entry Format in HW	K. Sheth	2
	Switch Fabric Header Document	K. Sheth	2
	Buffer Manager Memory Requirements	K. Sheth	1
	Automatic Protection Switching	K. Sheth	1
	Tachyon BootROM Specification	S. Fang	2
	Transparent Bridge Design for RDN Stand-alone CMTS	Z. Liu	1
	Tachyon CMTS Data Path Architecture (Software)	Z. Liu	1
	Tachyon Baseline Manager Software Design	J. Chang	1
	Tachyon Resource Manager	Wei Chen	1
	SmartSpectrum Spectrum Management	W. Chen	2
	MAC Manager	W. Chen	1
	Upstream Bandwidth Manager	W. Chen	1

CMTS HW	Hardware Layer-2 Forwarding Engine Design for BSR1000	Z. Liu	1
	Tachyon CMTS Data Path Architecture (Hardware)	Z. Liu	1
	Topgun CMTS Module Data-path Architecture	Z. Liu	1
RiverGuide	Tachyon CMTS Data Path Architecture (Hardware)	Z. Liu	1
	Automated Subscriber Management System	R. Ramamirtham	1
	Tachyon Subscriber Management and Provisioning System Architecture	R. Ramamirtham	1
	XML Interfaces	R. Ramamirtham	1
	Service Management System	R. Ramamirtham	1
	SMS API	R. Ramamirtham	1
	DHCP Relay Agent	R. Ramamirtham	1
	LDAP Schema	R. Ramamirtham	1
	RiverGuide LDAP Schema	R. Ramamirtham	3
	RiverGuide Dynamic Quality of Service MIB Definition	R. Ramamirtham	4
	RiverGuide Overview	R. Ramamirtham	2
	RiverGuide Scheduler Design	R. Ramamirtham	2
	RiverGuide Service Management Test Plan	R. Ramamirtham	4
	RiverGuide Report Generator Test Plan	R. Ramamirtham	2
	RiverGuide Functional Specification	R. Ramamirtham	2
	RiverGuide GUI Design	R. Ramamirtham	2
	RiverGuide CLI Parser	R. Ramamirtham	3
	RiverGuide Coding Guidelines	R. Ramamirtham	1
	RiverGuide Flap List Design	R. Ramamirtham	1
	RiverGuide Interface for Third Party Provisioning/Mediation Systems	R. Ramamirtham	1
	RiverGuide Cable Modem Configuration File	R. Ramamirtham	1

Editor

RiverGuide Policy Scheduler Algorithm Design	R. Ramamirtham	2
RiverGuide Server Design	R. Ramamirtham	1
Switch Fabric Bridge	D. Pattnaik	3
Tachyon Buffer Management FPGA	M. Kiernicki	6
Fast Path Forwarding Engine	D. Chen	17
SRM Test Plan	D. Pattnaik	2
Buffer Manager MAC Interface Functional Specification	D. Chen	8
Buffer Manager Switch Fabric Interface	T. Ray	1
Generation 2 Chip Architecture Rev. 1	D. Chen	1
Generation 2 Chip Architecture	D. Chen	4
BM1.2 Test Plan	J. Murphy	3
Tests1_2.xls	J. Murphy	14
Buffer Manager 1.3 FPGA Gigabit Mac Design Specification	F. Booth	11
Generation2 Buffer Manager I/O Interface	M. Kaiser	2
QoS Functional Specification	J. Bennett	1
Trunk Motherboard and QoS Daughterboard Interface	M. Holjo	4
Gen2 I/O FPGA Specification	M. Kaiser	4
CMTS Lockup Prevention (Abort)	M. Holjo	1
POS, GIGe, ATM and OC48 FPGA Logic Verification Test Plan	R. Abato	1
Buffer Manager 1.6 FPGA Eight Port Ethernet Design Specification	F. Booth	17
QoS Statistics FPGA Design Specification	F. Booth	7
QoS Policer FPGA Design Specification	M. Holjo	4
Buffer Manager 1.7 Functional Specification	P. Stropparo	1
MPLS Processing Hardware Functional Specification	M. Kiernicki	5

FPGA/ASIC

Hardware	Buffer Manager Design Spec., Appendix for Rate Limiting	M. Holjo	1
	Buffer Manager Design Spec., Appendix for Tunneling	M. Holjo	1
	Tachyon Supervisor Resource Module and Switch Fabric Functional Specification	D. Merriman	4
	OC3/OC12 POS Trunk Module Architecture	M. Bagherzadeh	1
	High Speed I/O Module Architecture	M. Bagherzadeh	2
	OC48 ADM Trunk Interface Module Architecture	M. Bagherzadeh	1
	Gigabit Ethernet Trunk Module Architecture	M. Bagherzadeh	1
	OSR2000- Dual OC48/Dual Gig Ethernet	M. Bagherzadeh	1
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H. Miller

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H. Miller

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Fabrication Family Data for RDN PCAs

PCB number	Board Description	Schematic	Layout File	Assembly Drawing	Fabrication Drawing	Outline Drawing	Mechanical Assembly	Reports to PCAs	
PCB-0007-05	CMTS 1x4 Dual 4 Meg flash BSR 1K Components	SCH-0007-05_revA.pdf	PCB-0007-05_rev01.brd	DWG-0011-05_revA.pdf	DWG-0010-05_revA.pdf	DWG-0168-01_revA.pdf	DWG-0164-01_revA.pdf	PCA-0007-05 PCA-0027-03	BSR64 BSR1
PCB-0012-01	CMTS 1x4 I/O	SCH-0012-01_revA.pdf	PCB-0012-01_revA.brd	DWG-0035-01_revA.pdf	DWG-0034-01_revA.pdf	DWG-0033-01_revA.pdf	N/A	PCA-0012-01	
PCB-0020-01	CMTS 2x8 Downstream (Analog Upconverter)	SCH-0020-02_rev01.pdf	PCB-0020-02_rev01.brd	DWG-0078-01_rev01.pdf	DWG-0077-01_rev01.pdf	DWG-0076-01_rev01.pdf	N/A	PCA-0020-02	
PCB-0029-01	CMTS 2x8 TI	SCH-0029-01_rev01.pdf	PCB-0029-01_rev01.brd	DWG-0192-01_rev01.pdf	DWG-0191-01_rev01.pdf	DWG-0190-01_rev01.pdf	N/A	PCA-0029-01	
PCB-0033-01	Digital Upconverter	SCH-0033-01_rev01.pdf	PCB-0033-01_rev01.brd	DWG-0243-01_rev01.pdf	DWG-0242-01_rev01.pdf	DWG-0241-01_rev01.pdf	N/A	PCA-0033-01	
PCA-0042-02	CMTS Protected I/O 1X4	SCH-0042-02_rev01.pdf	PCB-0042-02_rev01.brd	DWG-0249-02_rev01.pdf	DWG-0248-02_rev01.pdf	DWG-0247-02_rev01.pdf	N/A	PCA-0042-02	
PCA-0043-02	CMTS Spare I/O 1X4	SCH-0043-02_rev01.pdf	PCB-0043-02_rev01.brd	DWG-0252-02_rev01.pdf	DWG-0251-02_rev01.pdf	DWG-0250-01_rev01.pdf	N/A	PCA-0043-02	
PCB-0045-02	CMTS 2x8 Broadcom	SCH-0045-02_rev01.pdf	PCB-0045-02_rev01.brd	DWG-0262-01_rev01.pdf	DWG-0261-01_rev01.pdf	DWG-0260-01_rev01.pdf	N/A	PCA-0045-02 PCA-0065-02	BSR64 2x8 BSR2
PCB-0044-01	CMTS GigE Daughter Card	SCH-0044-01_rev01.pdf	PCB-0044-01_rev01.brd	DWG-0259-01_rev01.pdf	DWG-0258-01_rev01.pdf	DWG-0259-01_rev01.pdf	N/A	PCA-0044-01	
PCB-0024-02	BSR1000 RJ45 adapter	SCH-0024-02_revA.pdf	PCB-0024-02_revA.brd	DWG-0131-01_revA.pdf	DWG-0130-01_revA.pdf	DWG-0129-01_revA.pdf	N/A	PCA-0024-02	
PCB-0049-01	RF Backplane 1x4 50A	SCH-0049-01_rev01.pdf (rfbp1x4_sch-0049-01.pdf)	PCB-0049-01_rev01.brd	DWG-0275-01_rev01.pdf	DWG-0274-01_rev01.pdf	DWG-0273-01_rev01.pdf	N/A	PCA-0049-01	
PCB-0053-01	Midplane 2x8 / 1x4 50A	SCH-0053-01_rev01.pdf	PCB-0053-01_rev01.brd	DWG-0288-01_rev01.pdf	DWG-0287-01_rev01.pdf	DWG-0286-01_rev01.pdf	N/A		
PCB-0055-02	CMTS 1x4 US/Euro	SCH-0055-02_rev01.pdf	PCB-0055-02_rev01.brd	DWG-301-02_rev01.pdf	DWG-300-02_rev01.pdf	DWG-302-01_rev01.pdf	DWG-0365-01_rev01.pdf BSR1K	PCA-0055-02 PCA-0056-02	BSR1 US BSR1 Euro
PCA-0005-03	SRM	SCH-0002-3_revA.pdf	PCB-0006-03_revA_deliverables.zip	bundled in Zip file	bundled in Zip file	bundled in Zip file	DWG-0364-01_rev03.pdf BSR64K	PCA-0057-02 PCA-0058-02	BSR64 US BSR64 Euro
PCA-0011-03	SRM I/O	SCH-0011-03_revA.pdf	PCB-0011-03_rev1_deliverables.zip	bundled in Zip file	bundled in Zip file	bundled in Zip file			

PCB number	Board Description	Schematic	Layout File	Assembly Drawing	Fabrication Drawing	Outline Drawing	Mechanical Assembly	Reports to PCAs
PCA-0025-03	Gigabit Ethernet (1 Port)	SCH-0025-3_rev01.pdf	PCB-0025-03_rev01_deliverables.zip	bundled in Zip file	bundled in Zip file	bundled in Zip file		
PCA-0013-02	Optical I/O	SCH-0013-02_revA.pdf	PCB-0013-02_rev01_deliverables.zip	bundled in Zip file	bundled in Zip file	bundled in Zip file		
PCA-0014-01	Fast Ethernet (8 Port)	SCH-0014-01_rev02.pdf	PCB-0014-01_deliverables.zip	bundled in Zip file	bundled in Zip file	bundled in Zip file		
PCA-0015-01	Fast Ethernet I/O	SCH-0015-01_latest.pdf	PCB-0015-01_rev01_deliverables.zip	bundled in Zip file	bundled in Zip file	bundled in Zip file		
PCA-0010-06	POS (1 Port) + FastE (1 Port)	SCH-0010-06_rev_C.pdf	PCB-0010-02_rev01_deliverables.zip	bundled in Zip file	bundled in Zip file	bundled in Zip file		
PCA-0010-06	POS (2 Port)	SCH-0010-06_rev_C.pdf	PCB-0010-02_rev01_deliverables.zip	bundled in Zip file	bundled in Zip file	bundled in Zip file		
PCA-0026-01	OC-48 ADM	SCH-0026-01.pdf	PCB-0026_01_deliverables.zip	bundled in Zip file	bundled in Zip file	bundled in Zip file		
PCA-0035-01	ATM (2 Port)	SCH-0035-01_rev01.pdf	PCB-0035-01_rev01_deliverables.zip	bundled in Zip file	bundled in Zip file	bundled in Zip file		
PCB-0059-01	CMTS Quad Ethernet Daughter Card	SCH-0059-01_rev01.pdf	PCB-0059-01_rev01.brd	DWG-0310-01_rev01.pdf	DWG-309-01_rev01.pdf	DWG-308-01_rev01.pdf	N/A	PCA-0059-01
PCB-0073-01	Active I/O CMTS 2X8	SCH-0073-01_rev01.pdf	PCB-0073-01_rev01.brd	DWG-0353-01_rev01.pdf	DWG-0352-01_rev01.pdf	DWG-0351-01_rev01.pdf	N/A	PCA-0073-01
PCB-0074-01	Spare I/O CMTS 2x8	SCH-0074-01_rev01.pdf	PCB-0074-01_rev01.brd	DWG-0356-01_rev01.pdf	DWG-0355-01_rev01.pdf	DWG-0354-01_rev01.pdf	N/A	PCA-0074-01
PCB-0075-01	Spare RF Backplane 2x8	SCH-0075-01_rev01.pdf	PCB-0075-01_rev01.brd	DWG-0359-01_rev01.pdf	DWG-0358-01_rev01.pdf	DWG-0357-01_rev01.pdf	N/A	PCA-0075-01
PCB-0079-01	Midplane, 60A	SCH-0079-01_rev01.pdf	PCB-0079-01_rev01.brd	DWG-0381-01_rev01.pdf	DWG-0380-01_rev01.pdf	DWG-0379-01_rev01.pdf	N/A	PCA-0079-01
PCB-0080-01	RF Backplane 60A	SCH-0080-01_rev01.pdf	PCB-0080-01_rev01.brd	DWG-0384-01_rev01.pdf	DWG-0383-01_rev01.pdf	DWG-0382-01_rev01.pdf	N/A	PCA-0080-01

Chassis Number	Description	Mechanical Assembly	Base Unit Assembly	Other	Sheetmetal Subassembly	CMTS PCAs used
CHS-0002-04	1U CMTS BSR1000	N/A	DWG-0232-01_revF.pdf	DWG-0203-01_revB.pdf	N/A	PCA-0027-03
CHS-0007-01	1U CMTS BSR1000	N/A	DWG-0366-01_rev02.pdf	DWG-0203-01_revB.pdf	N/A	PCA-0055-02

PCB number	Board Description US	Schematic	Layout File	Assembly Drawing	Fabrication Drawing	Outline Drawing	Mechanical Assembly	Reports to PCAs
CHS-0008-01	1U CMTS BSR1000 Euro	N/A	DWG-0366-01_rev02.pdf	DWG-0203-01_revB.pdf	N/A	PCA-0056-02		
CHS-0015-01	14U Redundant 1X4, 50A BSR64K Chassis	DWG-0051-03_rev03.pdf	DWG-0362-01_rev01.pdf	none	SUB-0017-03	PCA-0057-02 + I/O PCA-0058-02 + I/O		
CHS-0006-01	14U Redundant 2X8, 60A BSR64K Chassis	TBD	TBD	TBD	TBD	PCA-0045-02 + I/O		
CHS-0017-01	BSR 2000, CMTS 2X8 with Ethernet	TBD	TBD	TBD	TBD	PCA-0065-02 + I/O		

Unfiled Trademarks

Trademark	Country
BSR	Australia China Japan Republic of Korea Singapore
RDN	Australia China Japan Republic of Korea Singapore
RIVERDELTA	Australia China Japan Republic of Korea Singapore
RIVERGUIDE	Australia China Japan Republic of Korea Singapore
SMARTFLOW	Australia China Japan Republic of Korea Singapore

Other Agreements

NAME

PARTIES

RSVPD ReSerVation Protocol Daemon	University of Southern California
Xilinx Annual Software Support Agreement	RiverDelta Xilinx, Inc.
RSA Receipt of Services	RiverDelta RSA Data Security, Inc.
Software License Agreement, Addendum and Purchase Orders	Packet Technologies phase2
Purchase Order #506	RiverDelta Wind River Systems, Inc.
Emperative, Inc. Relationship Agreement	RiverDelta Networks Emperative, Inc.
Preferred Provider Agreement -- RiverDelta Networks, Inc.	RiverDelta Networks Compath, Inc.
Employment Letter w/NDA, Non-compete Agreement, Developments Agreement	RiverDelta Networks, Inc. F. Dennis Periquet
@Home Network -- @Home Testing and Approval Agreement	RiverDelta Networks, Inc. At Home Corp.
OEM Program License Agreement	RiverDelta Networks Virata Corp.
EMWEB Evaluation License Agreement	RiverDelta Networks Agranat Systems, Inc.
Software Evaluation License and Agreement	RiverDelta Networks ClearBand, LLC
Memorandum of Understanding	RiverDelta Networks MindTree Consulting Pvt. Ltd.
RSA Security Inc. Professional Services Agreement	RiverDelta Networks, Inc. RSA Security, Inc.
Open Source Licenses	
RiverGuide Licenses	n/a
Netscape Public License	Netscape Corp.
Project Agreement No. A3A55 Revision A	RiverDelta Networks Agilent Technologies Company Software

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System Architecture	BSR 64000 System Architecture	P. Gerber	12
Market Requirements	BSR 64000 Market Requirements Specification	P. Gerber	7
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	BSR 64000 10/100 Module Market Requirements	P. DeMello	1
Routing SW	Virtual Routing Functional Specification and Design Framework	A. Lau	1
	Routing Software Architecture	S. Sahoo	1
	Virtual Routing Redundancy Protocol Design Specification	S. Sahoo	1
	IS-IS Design Specification	S. Sahoo	1
	Cable Bundling Design Specification	S. Sahoo	1
	PIM Sparse Mode Design Specification	S. Sahoo	1
	IP Multicast Routing Architecture	S. Sahoo	1
	Tunnel Interface Design Specification	S. Sahoo	1
	Interface Manager Design Specification	S. Sahoo	1
	Routing Policy Functional Specification	S. Sahoo	1
	Carrier Class Routing Software Requirements	S. Sahoo	1
	CLI Command List	S. Sahoo	1
	CLI Functional Requirements Specification	S. Sahoo	2
	System Logger API Specification	S. Sahoo	2
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	Resource Manager Functional Specification	K. Sheth	2
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	MPLS Functional Specification	K. Sheth	2
	Fastpath Programming API	K. Sheth	2
	RiverDelta Build Procedure	K. Sheth	1
	Fastpath Entry Format in HW	K. Sheth	2
	Switch Fabric Header Document	K. Sheth	2
	Buffer Manager Memory Requirements	K. Sheth	1
	Automatic Protection Switching	K. Sheth	1
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	Tachyon CMTS Data Path Architecture (Software)	Z. Liu	1
	Tachyon Baseline Manager Software Design	J. Chang	1
	Tachyon Resource Manager	Wei Chen	1
	SmartSpectrum Spectrum Management	W. Chen	2
	MAC Manager	W. Chen	1
	Upstream Bandwidth Manager	W. Chen	1
CMTS HW	Hardware Layer-2 Forwarding Engine Design for BSR1000	Z. Liu	1
	Tachyon CMTS Data Path Architecture (Hardware)	Z. Liu	1
	Topgun CMTS Module Data-path Architecture	Z. Liu	1
	Tachyon CMTS Data Path Architecture (Hardware)	Z. Liu	1
RiverGuide	Automated Subscriber Management System	R. Ramamirtham	1
	Tachyon Subscriber Management and Provisioning System Architecture	R. Ramamirtham	1
	XML Interfaces	R. Ramamirtham	1

Service Management System	R. Ramamirtham	1
SMS API	R. Ramamirtham	1
DHCP Relay Agent	R. Ramamirtham	1
LDAP Schema	R. Ramamirtham	1
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Module 1- Evolution of R/F	A. Konar	1
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Module 2- Introduction to the BSR 1000	A. Konar	1
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Module 3 – Electronic Communications	A. Konar	1
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Module 4- Introduction to Internetworking	A. Konar	1
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Module 5 – Introduction to DOCSIS	A. Konar	1
Module 6 – CATV Systems	A. Konar	1
Module 7 – CM to CMTS Operation	A. Konar	1
Module 8 – Internetworks	A. Konar	1
Module 9 – RIP	A. Konar	1
Module 10 – Appendix A	A. Konar	1
Module 11 – Appendix B	A. Konar	1
Module 12 – Appendix C	A. Konar	1
Lab Guide	A. Konar	1
Lab Diagrams	A. Konar	1
Module 0 – Introduction	H. Miller	1
Module 1 – Install	H. Miller	1
Module 2 – Initial Config	H. Miller	1
Module 3 – Routing Basics	H. Miller	1
Module 4 – CMTS Configuration	H. Miller	1
Module 5 – Dynamic Routing (RIP)	H. Miller	1
Module 6 – OSPF	H. Miller	1
Module 7 – BGP	H. Miller	1
Module 8 – Appendix A – Labs	H. Miller	1
Module 9 – Appendix B – Maps and addresses	H. Miller	1
Module 10 – Appendix C – Supplementary Materials	H. Miller	1
Lab Diagrams and Addressing Scheme	H. Miller	1
Cisco Network Registrar – Self-study Guide	H. Miller	1
Lab Guide	H. Miller	1

Third-Party Software

Item	Description	Source Vendor
Software Tools	Clear-Case software source control system	Rational Software, Inc.
	Vision-Click	WindRiver
	VxWorks Tornado for PowerPC and StongARM	WindRiver
	VxWorks Memory Protection Device	WindRiver
	VxSIM	WindRiver
	WindView	WindRiver
	ProfileScope	WindRiver
	MemScope	WindRiver
	IXP1200 Microcode Development Workbench	Intel
	SDS Debugger	SDS
	HP Probe	HP
	emacs	GNV
	C-Scope	Public Domain
	Visual C++	Microsoft
	SWMP Tool	Silver Creek
SYSTEM CODE		

BSR Release
1.0

Board Level Support

Boot-Rom	RiverDelta
Switch Fabric Driver	RiverDelta
Flash File System	WindRiver

TCP/IP Stack

TCP/UDP/IP/ICMP/IRDP	WindRiver + River Delta
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ARP/RARP/Proxy ARP

WindRiver + River Delta

Routing Protocols

RIPv1

WindRiver

RIPv2

RiverDelta

OSPFv2 (Carrier Class)

Phase2 + River Delta

BGPv4 (Carrier Class)

Phase2 + River Delta

Routing Policy Support (Carrier Class)

RiverDelta

IGMPv2

RiverDelta

DVMRPv3

Phase2 + River Delta

System Management & Control

DHCP Relay

RiverDelta

BOOTP Relay

RiverDelta

DNS Client

WindRiver + RDN

SNTP

RiverDelta + Wind River

FTP/TFTP

WindRiver + RDN

Access List

RiverDelta

Routing Table Management

WindRiver + River Delta

Interface Manager

RiverDelta

Cisco CLI support

RiverDelta

CLI Scripting and Config Save Support

RiverDelta

LDAPv3 Client Support

Netscape

SNMPv1/v3 Agent

Epilogue (WindRiver)

SNMP Trap & Error Logging

Epilogue (WindRiver)

Flexible Packet Tracing Support

RiverDelta

Protocol Debug mode

RiverDelta

Sys Log support

WindRiver + River Delta

Standard Mib Support	RiverDelta
DOCSIS 1.0 & DOCSIS 1.1 CMTS MIBs	RiverDelta
Show cable modem with 3 states	RiverDelta
CM reset	RiverDelta
Debug CM details	RiverDelta
Trace Route	Public Domain
Extended Ping	RiverDelta
Board-Level Diags	RiverDelta
Run-Time Debug Support	RiverDelta
ICP	Resonance Manager - River Delta

High Speed Network Interface Modules

PPP	WindRiver + River Delta
Packet-over-Sonet (POS)	RiverDelta
Fast-E, Gig Mac, Pos Drivers Fast-Path FPGA Drivers	RiverDelta RDN

DOCSIS Support

Registration with either DOCSIS 1.0 or DOCSIS 1.1 CM configuration.	RiverDelta
BPI and BPI+.	RiverDelta + RSA
Broadcom Reference Design-Modification of Drivers	Broadcom
Dynamic and static multicast SAID.	RiverDelta
CM initiated DSA, DSC, and DSD.	RiverDelta
CMTS initialed DSA, DSC, and DSD.	RiverDelta
Upstream Channel Change (UCC).	RiverDelta
Layer-3 classification.	RiverDelta
Concatenation.	RiverDelta
Piggy-back fragmentation.	RiverDelta

Payload header suppression.	RiverDelta
UGS, UGS-AD, rtPS, and nrtPS.	RiverDelta
RFC-2670 (DOCSIS IF mib).	RiverDelta
RFC-2669 (DOCSIS Cable Device mib).	RiverDelta
BPI+ MIB.	RiverDelta
QoS MIB.	RiverDelta
DHCP option 82.	RiverDelta
Maximum CPE enforcement.	RiverDelta
Rate limiting.	RiverDelta
Minimum guaranteed traffic rate.	RiverDelta
<i>Upstream Scheduling</i>	
Two-level hierarchical scheduling.	RiverDelta
Scheduled time scheduling for periodical grants and station maintenance grants.	RiverDelta
Deficit round robin scheduling for best effort services.	RiverDelta
Flexible MAP size with maximum length control.	RiverDelta
Leaky-bucket access control for traffic shaping.	RiverDelta
Backlog detection.	RiverDelta
Initial maintenance synchronization.	RiverDelta
Dynamic MAP lead-time.	RiverDelta
Synchronized UCD change.	RiverDelta
Zero-jitter admission for UGS, UGS-AD, and rtPS.	RiverDelta
<i>Data Forwarding</i>	
Three-level hierarchical per-flow scheduling with 8000 queues per direction.	RiverDelta
Leaky-bucket traffic policing.	RiverDelta

Longest queue push-out buffer management.	RiverDelta
Proxy ARP.	RiverDelta
Up to 8 subnets per interface.	RiverDelta

**BSR Release
1.1**

SYSTEM CODE

Routing

Policy Based Routing	RiverDelta
IS-IS	Phase 2 + River Delta
PIM-Sparse Mode	RiverDelta
Multicast Routing Table	RiverDelta
VRRP	RiverDelta

System Management and Control

SNMP Informs	Epilogue (WindRiver)
Entity Mib Support	RiverDelta
Telnet Client	Public Domain + River Delta
Mtrace	Public Domain + River Delta
Show cable modem with 20 CM states	RiverDelta
Ping DOCSIS	RiverDelta
Flap list	RiverDelta
Persistent CM States	RiverDelta
Show CPEs behind CM	RiverDelta
Disable CM	RiverDelta

**High Speed Network Interface
Modules**

Qos DRR	RiverDelta
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CMTS Interface Bundling RiverDelta

DOCSIS Support

Upstream transmitter disable message. RiverDelta

Device class information message. RiverDelta

Multi-grant fragmentation support. RiverDelta

Pre-equalization with adjustable length
equalization training sequence. RiverDelta

Upstream channel signal to noise
measurement. RiverDelta

Subscriber mib. RiverDelta

Upstream Scheduler

Jitter sensitive grant placement. RiverDelta

Flexible MAP size with lead-time reduction. RiverDelta

Synchronized spectrum sampling. RiverDelta

Data Forwarding

CM and CPE authorization through DHCP. RiverDelta

Static ARP entry. RiverDelta

Traffic filtering. RiverDelta

Two level longest queue push out. RiverDelta

Spectrum Management

Spectrum Analysis. RiverDelta

In-band power monitoring. RiverDelta

Spectrum hopping triggered by error rate. RiverDelta

Frequency hopping. RiverDelta

Dynamic modulations, including modulation
profile, channel width, and power-level. RiverDelta

Fully configurable spectrum hopping
sequence. RiverDelta

Rollback support.

RiverDelta

Scheduled band availability.

RiverDelta

**RiverGuide
1.0**

RiverGuide Client/Server

RiverGuide Client
RiverGuide Server
Java Runtime Environment
Java API for XML Processing
SNMP Libraries
Java Plug-in
Java Help
IBM Task Guide Library
Java Cryptology Extensions
Netscape LDAP Library
Apache Web Server

RiverDelta
RiverDelta
Sun Microsystems
Sun Microsystems
Adventnet
Sun Microsystems
Sun Microsystems
IBM
Sun Microsystems
Netscape
Apache

Vera Developer Kit

Synopsis

**FPGA/Board
Design Tools**

Vera Runtime
VCS
HDL Compiler
DC-Expert
Analyzer
Covermeter
SynplifyPro

Synopsis
Synopsis
Synopsis
Synopsis
Synopsis
Synopsis
Synopsis

Verlog-XL
NCSim
Allegro Studio
Allegro Performance
CCT Performance

Cadence
Cadence
Cadence
Cadence
Cadence

Modeltech hdlsim
Leonardo

Mentor Graphics
Mentor Graphics

ViewDraw
DxDataBook
Allegro Interface
Viewdraw

Viewlogic
Viewlogic
Viewlogic
Viewlogic

Alliance

Xylinx

SRM Switch Fabric FPGA

RiverDelta

FPGAs

sfb_top_1012.mcs
sfb_top_1012.bit

SRM Redundancy PLD

RiverDelta

srm3_cp1dV4.xeb
srm3_cp1dV4.jed

Gigabit Ethernet

RiverDelta

bm_gig_top_chipF3_rev80.bit

Fast Ethernet (8-Port)

RiverDelta

bm_8pe_top_revE6.bit

Pos (1-Port) + Fast Ethernet (1 Port)

RiverDelta

bm_1e1s_top_rev76.bit

Pos (2-Port)

RiverDelta

bm_sonet_top_revDA.bit

OC-48 ADM

RiverDelta

bm_oc48_top_revA2.bit

ATM (2-Port)

Fabrication Family Data for RDN PCAs

PCB number	Board Description	Schematic	Layout File	Assembly Drawing	Fabrication Drawing	Outline Drawing	Mechanical Assembly	Reports to PCAs
PCB-0007-05	CMTS 1x4 Dual 4 Meg flash BSR 1K Components	SCH-0007-05_revA.pdf	PCB-0007-05_rev01.brd	DWG-0011-05_revA.pdf	DWG-0010-05_revA.pdf	DWG-0168-01_revA.pdf	DWG-0164-01_revA.pdf	PCA-0007-05 PCA-0027-BSR1K03
PCB-0012-01	CMTS 1x4 I/O	SCH-0012-01_revA.pdf	PCB-0012-01_revA.brd	DWG-0035-01_revA.pdf	DWG-0034-01_revA.pdf	DWG-0033-01_revA.pdf	N/A	PCA-0012-01
PCB-0020-01	CMTS 2x8 Downstream (Analog Upconverter)	SCH-0020-02_rev01.pdf	PCB-0020-02_rev01.brd	DWG-0078-01_rev01.pdf	DWG-0077-01_rev01.pdf	DWG-0076-01_rev01.pdf	N/A	PCA-0020-02
PCB-0029-01	CMTS 2x8 TI	SCH-0029-01_rev01.pdf	PCB-0029-01_rev01.brd	DWG-0192-01_rev01.pdf	DWG-0191-01_rev01.pdf	DWG-0190-01_rev01.pdf	N/A	PCA-0029-01
PCB-0033-01	Digital Upconverter	SCH-0033-01_rev01.pdf	PCB-0033-01_rev01.brd	DWG-0243-01_rev01.pdf	DWG-0242-01_rev01.pdf	DWG-0241-01_rev01.pdf	N/A	PCA-0033-01
PCA-0042-02	CMTS Protected I/O 1X4	SCH-0042-02_rev01.pdf	PCB-0042-02_rev01.brd	DWG-0249-02_rev01.pdf	DWG-0248-02_rev01.pdf	DWG-0247-02_rev01.pdf	N/A	PCA-0042-02
PCA-0043-02	CMTS Spare I/O 1X4	SCH-0043-02_rev01.pdf	PCB-0043-02_rev01.brd	DWG-0252-02_rev01.pdf	DWG-0251-02_rev01.pdf	DWG-0250-01_rev01.pdf	N/A	PCA-0043-02
PCB-0045-02	CMTS 2x8 Broadcom	SCH-0045-02_rev01.pdf	PCB-0045-02_rev01.brd	DWG-0262-01_rev01.pdf	DWG-0261-01_rev01.pdf	DWG-0260-01_rev01.pdf	N/A	PCA-0045-02 BSR64K 2x8 PCA-0065-BSR2K02
PCB-0044-01	CMTS GigE Daughter Card	SCH-0044-01_rev01.pdf	PCB-0044-01_rev01.brd	DWG-0259-01_rev01.pdf	DWG-0258-01_rev01.pdf	DWG-0259-01_rev01.pdf	N/A	PCA-0044-01
PCB-0024-02	BSR1000 RJ45 adapter	SCH-0024-02_revA.pdf	PCB-0024-02_revA.brd	DWG-0131-01_revA.pdf	DWG-0130-01_revA.pdf	DWG-0129-01_revA.pdf	N/A	PCA-0024-02
PCB-0049-01	RF Backplane 1x4 50A	SCH-0049-01_rev01.pdf (rfbp 1x4_sch-0049-	PCB-0049-01_rev01.brd	DWG-0275-01_rev01.pdf	DWG-0274-01_rev01.pdf	DWG-0273-01_rev01.pdf	N/A	PCA-0049-01

PCB number	Board Description	Schematic	Layout File	Assembly Drawing	Fabrication Drawing	Outline Drawing	Mechanical Assembly	Reports to PCAs
		01.pdf)						
PCB-0053-01	Midplane 2x8 / 1x4 50A	SCH-0053-01_rev01.pdf	PCB-0053-01_rev01.brd	DWG-0288-01_rev01.pdf	DWG-0287-01_rev01.pdf	DWG-0286-01_rev01.pdf	N/A	
PCB-0055-02	CMTS 1x4 US/Euro	SCH-0055-02_rev01.pdf	PCB-0055-02_rev01.brd	DWG-301-02_rev01.pdf	DWG-300-02_rev01.pdf	DWG-302-01_rev01.pdf	DWG-0365-01_rev01.pdf BSR1K	PCA-0055-02 US PCA-0056-02 Euro
PCA-0005-03	SRM	SCH-0002-3_revA.pdf	PCB-0006-03_revA_deliverables.zip	bundled in Zip file	bundled in Zip file	bundled in Zip file	DWG-0364-01_rev03.pdf BSR64K	PCA-0057-02 US PCA-0058-02 Euro
PCA-0011-03	SRM I/O	SCH-0011-03_revA.pdf	PCB-0011-03_rev1_deliverables.zip	bundled in Zip file	bundled in Zip file	bundled in Zip file		
PCA-0025-03	Gigabit Ethernet (1 Port)	SCH-0025-3_rev01.pdf	PCB-0025-03_rev01_deliverables.zip	bundled in Zip file	bundled in Zip file	bundled in Zip file		
PCA-0013-02	Optical I/O	SCH-0013-02_revA.pdf	PCB-0013-02_rev01_deliverables.zip	bundled in Zip file	bundled in Zip file	bundled in Zip file		
PCA-0014-01	Fast Ethernet (8 Port)	SCH-0014-01_rev02.pdf	PCB-0014-01_deliverables.zip	bundled in Zip file	bundled in Zip file	bundled in Zip file		
PCA-0015-01	Fast Ethernet I/O	SCH-0015-01_latest.pdf	PCB-0015-01_rev01_deliverables.zip	bundled in Zip file	bundled in Zip file	bundled in Zip file		
PCA-0010-06	POS (1 Port) + FastE (1 Port)	SCH-0010-06_rev_C.pdf	PCB-0010-02_rev01_deliverables.zip	bundled in Zip file	bundled in Zip file	bundled in Zip file		
PCA-0010-06	POS (2 Port)	SCH-0010-06_rev_C.pdf	PCB-0010-02_rev01_deliverables.zip	bundled in Zip file	bundled in Zip file	bundled in Zip file		
PCA-0026-01	OC-48 ADM	SCH-0026-01.pdf	PCB-0026_01_deliverables.zip	bundled in Zip file	bundled in Zip file	bundled in Zip file		
PCA-0035-01	ATM (2 Port)	SCH-0035-01_rev01.pdf	PCB-0035-01_rev01_deliverables.zip	bundled in Zip file	bundled in Zip file	bundled in Zip file		
PCB-0059-01	CMTS Quad Ethernet Daughter Card	SCH-0059-01_rev01.pdf	PCB-0059-01_rev01.brd	DWG-0310-01_rev01.pdf	DWG-309-01_rev01.pdf	DWG-308-01_rev01.pdf	N/A	PCA-0059-01

PCB number	Board Description	Schematic	Layout File	Assembly Drawing	Fabrication Drawing	Outline Drawing	Mechanical Assembly	Reports to PCAs
PCB-0073-01	Active I/O CMTS 2X8	SCH-0073-01_rev01.pdf	PCB-0073-01_rev01.brd	DWG-0353-01_rev01.pdf	DWG-0352-01_rev01.pdf	DWG-0351-01_rev01.pdf	N/A	PCA-0073-01
PCB-0074-01	Spare I/O CMTS 2x8	SCH-0074-01_rev01.pdf	PCB-0074-01_rev01.brd	DWG-0356-01_rev01.pdf	DWG-0355-01_rev01.pdf	DWG-0354-01_rev01.pdf	N/A	PCA-0074-01
PCB-0075-01	Spare RF Backplane 2x8	SCH-0075-01_rev01.pdf	PCB-0075-01_rev01.brd	DWG-0359-01_rev01.pdf	DWG-0358-01_rev01.pdf	DWG-0357-01_rev01.pdf	N/A	PCA-0075-01
PCB-0079-01	Midplane, 60A	SCH-0079-01_rev01.pdf	PCB-0079-01_rev01.brd	DWG-0381-01_rev01.pdf	DWG-0380-01_rev01.pdf	DWG-0379-01_rev01.pdf	N/A	PCA-0079-01
PCB-0080-01	RF Backplane 60A	SCH-0080-01_rev01.pdf	PCB-0080-01_rev01.brd	DWG-0384-01_rev01.pdf	DWG-0383-01_rev01.pdf	DWG-0382-01_rev01.pdf	N/A	PCA-0080-01

Chassis Number	Description	Mechanical Assembly	Base Unit Assembly	Other	Sheetmetal Subassembly	CMTS PCAs used
CHS-0002-04	1U CMTS BSR1000	N/A	DWG-0232-01_revF.pdf	DWG-0203-01_revB.pdf	N/A	PCA-0027-03
CHS-0007-01	1U CMTS BSR1000 US	N/A	DWG-0366-01_rev02.pdf	DWG-0203-01_revB.pdf	N/A	PCA-0055-02
CHS-0008-01	1U CMTS BSR1000 Euro	N/A	DWG-0366-01_rev02.pdf	DWG-0203-01_revB.pdf	N/A	PCA-0056-02
CHS-0015-01	14U Redundant 1X4, 50A BSR64K Chassis	DWG-0051-03_rev03.pdf	DWG-0362-01_rev01.pdf	none	SUB-0017-03	PCA-0057-02 + I/O PCA-0058-02 + I/O
CHS-0006-01	14U Redundant 2X8, 60A BSR64K Chassis	TBD	TBD	TBD	TBD	PCA-0045-02 + I/O
CHS-0017-01	BSR 2000, CMTS 2X8 with Ethernet	TBD	TBD	TBD	TBD	PCA-0065-02 + I/O

Company Licenses

NAME

PARTIES

RSA Receipt of Services	River Delta RSA Data Security, Inc.
Software License Agreement, Addendum and Purchase Orders	Packet Technologies phase2
Memorandum of Understanding	River Delta Viasat
Purchase Order #506	River Delta Wind River Systems, Inc.
Purchase Order #107-991604	Packet Technologies, Inc. WindRiver
Emperative, Inc. Relationship Agreement	RiverDelta Networks Emperative, Inc.
Employment Letter w/NDA, Non-compete Agreement, Developments Agreement	RiverDelta Networks, Inc. F. Dennis Periquet
OEM Program License Agreement	RiverDelta Networks Virata Corp.
Employment Letter w/NDA, Non-compete Agreement, Developments Agreement	Packet Technologies, Inc. Jon C.R. Bennett
Employment Letter w/NDA, Non-compete Agreement, Developments Agreement	Packet Technologies, Inc. Swarup Sahoo
Executive Agreement w/Developments Agreement	RiverDelta Networks, Inc. Weidong Chen
Executive Agreement w/ Developments Agreement	RiverDelta Networks, Inc. Zhao Liu
Executive Agreement w/Developments Agreement	RiverDelta Networks, Inc. Doug Wood
Executive Agreement w/Developments Agreement	RiverDelta Networks, Inc. Jeffrey Walker
Executive Agreement w/Developments Agreement	RiverDelta Networks, Inc. Joseph A. Cozzolino
Executive Agreement	Packet Technologies, Inc. Raj K. Duggal

NAME	PARTIES
Executive Agreement w/Developments Agreement	RiverDelta Networks, Inc. Jerry Z.Y. Guo
Employment Letter w/NDA, Non-compete Agreement, Developments Agreement	Packet Technologies, Inc. Robert Kelly
Jacobs Rimell-RiverDelta Networks Co-Marketing Partnership Agreement	RiverDelta Networks, Inc. Jacobs Rimell
Marketing and Referral Agreement	RiverDelta Networks, Inc. Unisphere Networks, Inc.
Manufacturing Services Agreement	RiverDelta Networks, Inc. IEC Electronics Corp.
Letter Agreement	RiverDelta Networks, Inc. ViaSat, Inc.
DRAFT -- ViaSat-RiverDelta Broadband Series Router Term Sheet May 14, 2001	RiverDelta Networks, Inc. ViaSat
RiverDelta Networks, Inc. International Distribution Agreement	RiverDelta Networks, Inc. KabelKON Trading & Consultancy Ltd.
RiverDelta Networks, Inc. International Distribution Agreement	RiverDelta Networks, Inc. GENO Trading s.r.o.
RiverDelta Networks, Inc. International Distribution Agreement	RiverDelta Networks, Inc. Teleste Corp.
RiverDelta Networks, Inc. International Distribution Agreement	RiverDelta Networks, Inc. [template]
RiverDelta Networks, Inc. Distribution Agreement	RiverDelta Networks, Inc.
Employment Offer Letter	RiverDelta Networks, Inc. and Gerard White
Executive Agreement w/ Developments Agreement	RiverDelta Networks, Inc. and Gerard White
Correspondence re Domain Name Registration and Invoices	RiverDelta Networks, Inc.
Receipt relating to Domain Name Payments	RiverDelta Networks, Inc.
Web Address Registration Invoice	RiverDeltaNetworks.org
Web Address Registration Invoice	RiverDeltaNetworks.net

NAME	PARTIES
Web Address Registration Invoice	RiverDeltaNetworks.com
Web Address Registration Invoice	RiverDelta.org
Web Address Registration Confirmation	RiverDeltaNetworks.org
Web Address Registration Confirmation	RiverDeltaNetworks.net
Web Address Registration Confirmation	RiverDeltaNetworks.com
Web Address Registration Confirmation	RiverDelta.org
Statement of Work	RiverDelta Networks, Inc. RSA Security, Inc.
RSA Security Inc. Professional Services Agreement	RiverDelta Networks, Inc. RSA Security, Inc.
Price Quote	RiverDelta Networks, Inc. Insight Electronics, Inc.
Invention Disclosure – A Mechanism to Implement a Highly Available CMTS using a combination of Redundant components, RF and IF Relays	Gerry White
RDN Patent Disclosure – Hierarchical Packet Discard Mechanism	Jon C.R. Bennett
U.S. PTO Transmittal Papers For Data Rate Limiting	Inventor Zhao Liu, et al
U.S. PTO Transmittal Papers For Radio Frequency Communications Redundancy	Gerard White, et al
U.S. PTO Transmittal Papers For Data Packet Discarding	Jon C. R. Bennett
U.S. PTO Transmittal Papers For Packetized Data Discard	Jon C. R. Bennett
PCT General Power of Attorney	RiverDelta Networks Mintz, Levin et al.
Power of Attorney	RiverDelta Networks TIPL0 Attorneys-at-Law
Netscape Public License	Netscape Corp.
Project Agreement No. A3A55 Revision A	RiverDelta Networks Agilent Technologies

Licenses

NAME

PARTIES

RSA Receipt of Services	RiveDelta RSA Data Security, Inc.
Software License Agreement, Addendum and Purchase Orders	Packet Technologies phase2
Memorandum of Understanding	River Delta Viasat
Purchase Order #506	RiverDelta Wind River Systems, Inc.
Purchase Order #107-991604	Packet Technologies, Inc. WindRiver
Operative, Inc. Relationship Agreement	RiverDelta Networks Emperative, Inc.
Employment Letter w/NDA, Non-compete Agreement, Developments Agreement	RiverDelta Networks, Inc. F. Dennis Periquet
OEM Program License Agreement	RiverDelta Networks Virata Corp.
Employment Letter w/NDA, Non-compete Agreement, Developments Agreement	Packet Technologies, Inc. Jon C.R. Bennett
Employment Letter w/NDA, Non-compete Agreement, Developments Agreement	Packet Technologies, Inc. Swarup Sahoo
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Executive Agreement w/ Developments Agreement	RiverDelta Networks, Inc. Zhao Liu
Executive Agreement w/Developments Agreement	RiverDelta Networks, Inc. Doug Wood
Executive Agreement w/Developments Agreement	RiverDelta Networks, Inc. Jeffrey Walker
Executive Agreement w/Developments Agreement	RiverDelta Networks, Inc. Joseph A. Cozzolino
Executive Agreement	Packet Technologies, Inc. Raj K. Duggal

NAME**PARTIES**

Executive Agreement w/Developments Agreement	RiverDelta Networks, Inc. Jerry Z.Y. Guo
Employment Letter w/NDA, Non-compete Agreement, Developments Agreement	Packet Technologies, Inc. Robert Kelly
Jacobs Rimell-RiverDelta Networks Co-Marketing Partnership Agreement	RiverDelta Networks, Inc. Jacobs Rimell
Marketing and Referral Agreement	RiverDelta Networks, Inc. Unisphere Networks, Inc.
Manufacturing Services Agreement	RiverDelta Networks, Inc. IEC Electronics Corp.
Letter Agreement	RiverDelta Networks, Inc. ViaSat, Inc.
DRAFT -- ViaSat-RiverDelta Broadband Series Router Term Sheet May 14, 2001	RiverDelta Networks, Inc. ViaSat
RiverDelta Networks, Inc. International Distribution Agreement	RiverDelta Networks, Inc. KabelKON Trading & Consultancy Ltd.
RiverDelta Networks, Inc. International Distribution Agreement	RiverDelta Networks, Inc. GENO Trading s.r.o.
RiverDelta Networks, Inc. International Distribution Agreement	RiverDelta Networks, Inc. Teleste Corp.
RiverDelta Networks, Inc. International Distribution Agreement	RiverDelta Networks, Inc. [template]
RiverDelta Networks, Inc. Distribution Agreement	RiverDelta Networks, Inc.
Employment Offer Letter	RiverDelta Networks, Inc. Gerard White
Executive Agreement w/ Developments Agreement	RiverDelta Networks, Inc. Gerard White
Correspondence re Domain Name Registration and Invoices	RiverDelta Networks, Inc.
Receipt relating to Domain Name Payments	RiverDelta Networks, Inc.
Web Address Registration Invoice	RiverDeltaNetworks.org
Web Address Registration Invoice	RiverDeltaNetworks.net

NAME**PARTIES**

Web Address Registration Invoice	RiverDeltaNetworks.com
Web Address Registration Invoice	RiverDelta.org
Web Address Registration Confirmation	RiverDeltaNetworks.org
Web Address Registration Confirmation	RiverDeltaNetworks.net
Web Address Registration Confirmation	RiverDeltaNetworks.com
Web Address Registration Confirmation	RiverDelta.org
Statement of Work	RiverDelta Networks, Inc. RSA Security, Inc.
RSA Security Inc. Professional Services Agreement	RiverDelta Networks, Inc. RSA Security, Inc.
Price Quote	RiverDelta Networks, Inc. Insight Electronics, Inc.
Invention Disclosure – A Mechanism to Implement a Highly Available CMTS using a combination of Redundant components, RF and IF Relays	Gerry White
RDN Patent Disclosure – Hierarchical Packet Discard Mechanism	Jon C.R. Bennett
U.S. PTO Transmittal Papers For Data Rate Limiting	Inventor Zhao Liu, et al
U.S. PTO Transmittal Papers For Radio Frequency Communications Redundancy	Gerard White, et al
U.S. PTO Transmittal Papers For Data Packet Discarding	Jon C. R. Bennett
U.S. PTO Transmittal Papers For Packetized Data Discard	Jon C. R. Bennett
PCT General Power of Attorney	RiverDelta Networks Mintz, Levin et al.
Power of Attorney	RiverDelta Networks TIPLO Attorneys-at-Law
Netscape Public License	Netscape Corp.
Project Agreement No. A3A55 Revision A	RiverDelta Networks

NAME

PARTIES

Agilent Technologies

