Form PTO-1595 (Rev. 08/08)
OMB No. 0651-0027 (exp. 9/30/2008)

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

RECORDATION FORM COVER SHEET
PATENTS ONLY

To the Director of the U.S. Patent and Trademark Office: Please record the attached documents or the new address(es) below.

1. Name of conveying party(ies)

Kestrel Wireless, Inc.
2000 Power Street, Suite 830
Emeryville, California 94608

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

2. Name and address of receiving party(ies)

Name: NXP, B.V.
Internal Address:
Street Address: High Tech Campus 60, 5656 AG Eindhoven
City: Eindhoven
State:
Country: The Netherlands Zip:

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

3. Nature of conveyance/Execution Date(s):

Execution Date(s) 05-APR-2007

☐ Assignment ☐ Merger
☐ Security Agreement ☐ Change of Name
☐ Joint Research Agreement
☐ Government Interest Assignment
☐ Executive Order 9424, Confirmatory License
☒ Other License and Development Agreement

4. Application or patent number(s):

☐ This document is being filed together with a new application.

A. Patent Application No.(s)

Please refer to attached Spreadsheet, "Attachment I List of Assigned United States Patents and Applications."

EXPEDITED SERVICE PLEASE

B. Patent No.(s)

Please refer to attached Spreadsheet, "Attachment I List of Assigned United States Patents and Applications."

EXPEDITED SERVICE PLEASE

Additional numbers attached? ☒ Yes ☐ No

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

Name NXP, B.V. (Note: Customer No. 65913)
Internal Address: Intellectual Property & Licensing
Street Address: 1109 McKay Drive, M/S-41SJ
City: San Jose
State: California Zip: 95131
Phone Number: (408) 474-9063
Fax Number: (408) 474-9082
Email Address: peter.zawilski@nxp.com

6. Total number of applications and patents involved: 87

7. Total fee (37 CFR 1.21(h) & 3.41) $2160.00

☒ Authorized to be charged to deposit account
☐ Enclosed
☐ None required (government interest not affecting title)

8. Payment Information

Deposit Account Number 50-4019
Authorized User Name Peter Zawilski

9. Signature:

Peter Zawilski — Signature — 03-oct-2008 — Date

Peter Zawilski, Reg. No. 43,305 — Name of Person Signing

Total number of pages including cover sheet, attachments, and documents: 55

Documents to be recorded (including cover sheet) should be faxed to (571) 273-0140, or mailed to:
Mail Stop Assignment Recordation Services, Director of the USPTO, P.O.Box 1450, Alexandria, V.A. 22313-1450

Attachment I List of Assigned United States Patents and Patent Applications

Item No.	Case No.	A. Patent Application No.(s)
1		10/434676
2		11/149770
3		11/259578
4		11/259185
5		11/259578
6		11/259185
7		11/296082
8		11/295867
9		11/296081
10		11/296547
11		11/358352
12		11/753606
13		60/825737
14		11/464550
15		11/460/816
16		11/382205
17		11/456037
18		11/456040
19		11/456043
20		11/456046
21		11/457034
22		11/457045
23		11/456811
24		11/456680
25		11/457428
26		11/457429
27		11/457431
28		60/80738
29		60/820758
30		11/778,259
31		11/460823
32		11/460827
33		11/532,073
34		11/461113
35		60/823300
36		60/824536
37		60/825,827
38		11/550696
39		11/556958
40		60/868125
41		60/910488
42		11/625566
43		60/892092
44		11/751967

Item No.	Case No.	B. Patent No.(s)
1		7,050,756
2		7,227,445
3		7,286,061
4		7,273,181
5		7,227,445
6		7,286,061
7		7,273,181
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PLEASE PERFORM EXPEDITED SERVICE

44 Total Applications to Assign

7 Total Patents to Assign

51 Total Items to Record
$120 Expedited Service ($40/hr--3 hr)
$40 Recordation Fee per Item
$2,160 Total Fees to Pay

NXP, B.V.
Intellectual Property Department
1109 McKay Drive, M/S-41SJ
San Jose, California 95131

Customer Number: 65913

LICENSE AND DEVELOPMENT AGREEMENT

This License and Development Agreement (the "Agreement") is made and entered into as of April 5th, 2007 (the "Effective Date") by and between **NXP Semiconductors Netherlands B.V.** of Eindhoven, the Netherlands, with offices at High Tech Campus 60, 5656 AG Eindhoven, The Netherlands ("NXP") and **Kestrel Wireless, Inc.**, a Delaware corporation, with offices at 2000 Powell St. Ste. 830, Emeryville, California 94608, U.S.A. ("Kestrel"). NXP and Kestrel are occasionally referred to herein individually as a "Party" and collectively as the "Parties".

RECITALS

Whereas, Kestrel has developed certain Radio Frequency Activation (RFA™) technology which, when combined with RFID or other wireless integrated circuit technology, can be used to activate and deactive various products, e.g., to help deter theft and/or misuse of such products;

Whereas, NXP has developed certain RFID and other wireless integrated circuit technology which may be a basis for developing RFA-enabled integrated circuit products for use with Kestrel's RFA technology;

Whereas, Kestrel and NXP desire that NXP develop and supply certain RFA-enabled integrated circuit products for use with Kestrel's RFA technology (the "Activation ICs", as defined below), and that Kestrel license NXP as to such RFA technology, with certain exclusivity periods for such development and supply purposes, under the terms and conditions of this Agreement; and

Whereas, Kestrel and NXP desire to cooperate in the promotion of NXP's Activation ICs with Kestrel's RFA technology in accordance with the terms and conditions of this Agreement.

Now, therefore, for the mutual covenants, promises and conditions and other good and valuable consideration, as set forth herein, the Parties hereby agree as follows:

1. DEFINITIONS

In addition to other terms defined elsewhere in this Agreement, the following terms used herein, when the first letter is capitalized, shall have the meanings set forth below. All definitions below shall apply both to their singular or plural forms, as the context may require. All reference to days shall mean business days, unless otherwise provided. As used herein, "hereunder," "herein" and similar expressions refer to this Agreement; and "including" means "including without limitation."

1.1 "Activatable Product" shall mean a product for ultimate sale to a consumer or other end-user that supports selected activation states, while being transitionable

between such activation states via Activation Process(es). As a non-exhaustive illustration, an Activatable Product may have a lesser- or non-activated state so as to disallow the product's operation (in whole or in part)and, via an Activation Process, the product's state may be transitioned to a greater- or fully- activated state so as to allow the product's operation (in whole or in part). As a further non-exhaustive illustration, an Activatable Product may have an activated state and, via an Activation Process, the product's state may be transitioned to a lesser- or non-activated state. It is to be recognized that the activation states may be selected from a variety of states (e.g., in the range from fully de-activated to fully activated) and that the states may be greater than two in number.

1.2 "Activatable Optical Disc" shall mean an Activatable Product comprising an Optical Disc having an Optical Shutter, wherein, in a non-activated state, the Optical Shutter disallows the Optical Disc from being read (in whole or in part), or from being properly read, by an associated disc player and, in an activated state, the Optical Shutter allows the disc to be read by an associated disc player.

1.3 "Activation IC" shall mean (i) HF Activation ICs, (ii) UHF Activation ICs, and/or (iii) any other integrated circuit constructed to communicate at HF, UHF or other frequencies for use in combination with Kestrel RFA Technology to realize an Activatable Product.

1.4 "Activation IC Specification" shall mean technical and other requirements, as set forth in Exhibit A, applicable to a respective HF Activation IC, UHF Activation IC, or other Activation IC.

1.5 "Activation IC Data/Logic" shall mean the (i) security code data, (ii) functional processes, (iii) command structures and (iv) other data/logic relevant to the operation of an Activation IC in connection with Kestrel RFA Technology. As a non-exhaustive illustration, Activation IC Data/Logic may include security code data embedded in, designing into, or otherwise included in an Activation IC.

1.6 "Activation Circuits" shall mean the circuits external to the Activation IC that are associated with an Activation Process.

1.7 "Activation Process" shall mean a process performed in an Activation IC, the process relating to a transition between activation states as to an Activation Product. As a non-exhaustive illustration, an Activation Process may comprise sending an activation/deactivation token, receiving an activation/deactivation message, outputting an electrical signal responsive to receiving the activation/deactivation message, measuring or monitoring the electrical signal to determine that activation/deactivation was successful, or sending a confirmation message that activation/deactivation was successful. The Kestrel Specific Commands, as set forth in an Activation IC Specification, are expressly included in the Activation Process.

1.8 "Affiliate" shall mean (a) with respect to NXP: NXP B.V. of Eindhoven, The Netherlands (the parent company of NXP), and any corporation, company or other legal entity which is controlled, directly or indirectly, by NXP B.V., and (b) with respect to Kestrel: any corporation, company or other legal entity which controls, is controlled directly or indirectly by, or is under common control with Kestrel. Under this definition of "Affiliate", "control" in its various forms means ownership or control, directly or indirectly, of more than fifty percent (50%) of the stock or other equity interest entitled to vote for the election of directors or other persons performing similar functions of the entity. Any corporation, company or other legal entity shall be considered to be an Affiliate of a Party only for so long as such ownership or control exists.

1.9 "Development Schedule" shall mean the schedule set forth in Exhibit B.

1.10 "HF Activation IC" shall mean an integrated circuit compliant with an applicable Activation IC Specification, and constructed to communicate with an associated reader device at 13.56MHz.

1.11 "Intellectual Property Rights" (or "IPR") shall mean any and all, worldwide, patents (including reissues, divisions, continuations and extensions thereof), patent applications and patent registrations, utility models, registered and unregistered designs including mask works, copyrights, trade-secrets, trademarks, moral rights and any other form of protection afforded by law that may exist and/or hereafter come into existence as to inventions, models, designs or technical information, and applications thereof, or that otherwise arises or is enforceable, under the laws of the United States or any other jurisdiction, or under any bi-lateral or multi-lateral treaty or other legal regime.

1.12 "Kestrel Activation IP" shall mean any and all of the Activation Processes, Activation Circuits, and/or Activation IC Data/Logic (including Intellectual Property Rights therein), that Kestrel owns or otherwise has or acquires right to license at any time during the Term of this Agreement.

1.13 "Kestrel Network" shall mean servers, network infrastructure, databases, or other network software or hardware, owned or operated by or under the control of Kestrel, or otherwise by a third party, in connection with an Activation Process. As a non-exhaustive illustration, such servers, network infrastructure, databases, or other network software or hardware may be capable of receiving a Kestrel-compliant ID and activation token from a reader, retrieving or generating a Kestrel-compliant authorization key, and passing the authorization key to the reader.

1.14 "Kestrel RFA Technology" shall mean Kestrel Activation IP, Kestrel Network, and any and all other technology relating thereto (excluding NXP's technology and IPR), whether owned or controlled by Kestrel or a third party, in whole or in part, that enables, supports or otherwise is used to realize Activatable Products

and/or the activation, deactivation, other functional control, inventory or other commercial control, or other commercialization of such Activatable Products and/or related services.

1.15 "Kill Process" shall mean an Activation Process wherein the processes performed in the Activation IC are directed to permanently disallow operation of an Activatable Product. As a non-exhaustive illustration a Kill Process may comprise sending a kill token, receiving a kill message, outputting an electrical signal responsive to receiving the kill message, measuring or monitoring the electrical signal, determining that kill was successful, and/or sending a confirmation message that kill was successful.

1.16 "Not-RFS ICs" shall mean Activation ICs that NXP delivers prior to meeting the Ready for Ship (RFS) requirements or an RFS-directed milestone set out in the Development Schedule.

1.17 "Optical Disc" shall mean a DVD, HD-DVD, Blu-ray disc, CD, gaming disc, or other media that holds optically-retrievable data.

1.18 "Optical Shutter" shall mean a controllable area, layer, stack, film, composition, material or other element that is positioned on or in an Activatable Optical Disc and the control of which is associated with a transition of the Activatable Optical Disc's state.

1.19 "UHF Activation IC" shall mean an integrated circuit compliant with an applicable Activation IC Specification, and constructed to communicate with an associated reader device at 860 Mhz and 960 MHz.

1.20 "Activatable Product Class" shall mean a group of Activatable Products that use the same Activation IC.

2. SCOPE OF AGREEMENT

2.1 Under this Agreement, NXP (and its Affiliates) will develop and manufacture (and/or have developed or manufactured) Activation ICs pursuant to the license and the development provisions herein, and NXP (and its Affiliates) will offer to sell or sell such Activation ICs to Kestrel, replicators, studios and other third parties for use with, in or in relation to Kestrel's RFA Technology. NXP will be responsible for handling IC related issues concerning such Activation ICs, excluding any issues relating to or arising from Kestrel Activation IP.

2.2 Kestrel shall be responsible for all activities in order to get the Kestrel RFA Technology operational within the agreed timeframe, including the Kestrel Activation IP.

2.3 NXP and Kestrel will perform certain joint marketing activities to promote the

Activation ICs and the Kestrel RFA Technology, as set forth in the marketing provisions herein.

3. LICENSE GRANT

3.1 Kestrel hereby grants to NXP and its Affiliates, for the Term of this Agreement, a worldwide, non-transferable (subject to the transfer provisions of Section 18.7), exclusive license, under all of the Intellectual Property Rights of Kestrel and its Affiliates, to:

(a) use, reproduce, copy, modify and implement the Kestrel Activation IP to design, develop, manufacture, support, test and maintain Activation ICs;

(b) subject to Section 3.4, make, have made, import, offer for sale, sell, distribute and otherwise dispose of Activation ICs;

(c) to use Activation ICs for internal, promotion, sampling, marketing, support, test and maintenance purposes;

(d) subject to Section 3.3, sublicense third-party purchasers of Activation ICs so as to use the Kestrel Activation IP in connection with the use of such purchased Activation ICs.

3.2 All license grants in this Section 3 are exclusive. These license grants have exclusivity that may end, as set forth in Sections 4 and 5 as to, respectively, HF Activation ICs and UHF Activation ICs; provided, however, in the event that any such license grant's exclusivity shall end, such license grant shall continue in effect as non-exclusive.

3.3 The right to sublicense under Section 3.1(d) will be effected, if at all, pursuant to an agreement that provides for (1) only Kestrel-approved activation tokens being loaded in the Activation ICs, and (2) the Activation ICs processing activation commands responsive only to an authorization key received from the Kestrel Network.

3.4 As to any Activation IC which directly infringes any of Kestrel's Intellectual Property Rights in Kestrel Activation IP, NXP shall provide for delivery (directly or indirectly) to only Kestrel or Kestrel-approved entities.

4. EXCLUSIVITY FOR HF ACTIVATION ICS

4.1 The licenses under Section 3 shall be exclusive to NXP and its Affiliates with respect to HF Activation ICs for the HF Activation IC Exclusivity Period. During the HF Activation IC Exclusivity Period, Kestrel shall not license any of the rights licensed to NXP under Section 3 to any third party for any integrated circuit devices for a high frequency band (including 13.56 Mhz), except solely as

permitted under Section 4.4 in respect to HF Activation ICs for Activatable Product Classes not accepted by NXP.

4.2 The "HF Activation IC Exclusivity Period" shall begin on the Effective Date of this Agreement and shall remain in effect until the date that NXP has sold 250 million HF Activation ICs, unless earlier terminated pursuant to Section 4.3. The "HF Activation IC Exclusivity Period" shall terminate if NXP unreasonably exceeds the production delivery schedule set out in Section 6.2, or as otherwise mutually agreed in writing.

4.3 Prior to June 30, 2007, Kestrel may elect to make a one-time NRE payment to NXP of US$750,000 in which case the HF Activation IC Exclusivity Period will terminate as of January 1, 2008. For such election to be effective, Kestrel must both (i) notify NXP in writing of its election to end the HF Activation IC Exclusivity Period pursuant to this Section 4.3 and (ii) make the full payment of US$750,000 to NXP prior to June 30, 2007. If Kestrel properly notifies and makes full payment under this Section 4.3, Kestrel may license third parties to make, have made, use, offer for sale, and sell HF Activation ICs, provided such rights shall begin no earlier than January 1, 2008 for application as to Activatable Optical Discs, and provided, further, each so-licensed third party shall be required, under any such license, to pay royalty fees to Kestrel as set forth in Section 8.3.

4.4 As to Activation ICs in the high frequency band, NXP shall have a right of first refusal on the first commercial offering relating to each particular Activatable Product Class ("HF/AP Offering"). In the absence of NXP's refusal, NXP and Kestrel will prepare an Activation IC Specification directed to such HF/AP Offering. NXP shall have 90 days after such Activation IC Specification is prepared to commit to developing and producing the HF/AP Offering's Activation IC. If NXP does not commit to developing and producing the HF/AP Offering's Activation IC, Kestrel may license a third party to develop and deliver the HF/AP Offering's Activation IC, provided: (i) each third party's license shall be non-exclusive, shall begin after the 90 day period has expired and shall be restricted to the HF/AP Offering's Activation ICs that are fully compliant with the Activation IC Specification as prepared by NXP and Kestrel; (ii) each so-licensed third party shall be required, under such license, to pay royalty fees to Kestrel as set forth in Section 8.3; (iii) pursuant to Section 3.2, NXP's license grants shall continue in effect as non-exclusive as to such HF/AP Offering's Activation IC; and (v) NXP's license grants shall continue as exclusive other than as to such HF/AP Offering's Activation IC.

5. EXCLUSIVITY FOR UHF ACTIVATION ICS

5.1 The licenses under Section 3 shall be exclusive to NXP and its Affiliates with respect to UHF Activation ICs for the UHF Activation IC Exclusivity Period. During the UHF Activation IC Exclusivity Period, Kestrel shall not license any of

the rights licensed to NXP under Section 3 to any third party for any integrated circuit devices for a ultra high frequency band (including 860 Mhz and 960 Mhz), except solely as permitted under Section 5.4 in respect to UHF Activation ICs for Activatable Product Classes not accepted by NXP.

5.2 The "UHF Activation IC Exclusivity Period" shall begin on the Effective Date of this Agreement and shall remain in effect until the date that NXP has sold 250 million UHF Activation ICs, unless earlier terminated pursuant to Section 5.3.The "UHF Activation IC Exclusivity Period" shall terminate if NXP unreasonably exceeds the sample delivery schedule set out in Section 6.3, or as otherwise mutually agreed in writing.

5.3 Prior to June 30, 2007, Kestrel may elect to make a one-time NRE payment to NXP of US$750,000 in which case the UHF Activation IC Exclusivity Period will terminate six (6) months after the date that Kestrel and NXP agree upon Activation IC Specification for the UHF Activation IC. For such election to be effective, Kestrel must both (i) notify NXP in writing before June 30, 2007 of its election to end the UHF Activation IC Exclusivity Period pursuant to this Section 5.3 and (ii) make the full payment of US$750,000 to NXP within thirty (30) days of the date that Kestrel and NXP agree upon the Activation IC Specification for the UHF Activation IC. In the event of Kestrel's notification of such election, NXP will not unreasonably withhold its agreement with such Activation IC Specification. If Kestrel properly notifies and makes full payment under this Section 5.3, Kestrel may license third parties to make, have made, use, offer for sale, and sell UHF Activation ICs, provided such rights shall begin, for application as to Activatable Optical Discs, no earlier than six (6) months following the date the Parties agree upon the Activation IC Specification for the UHF Activation IC, and provided, further, each so-licensed third party shall be required, under any such license, to pay royalty fees to Kestrel as set forth in Section 8.3.

5.4 As to Activation ICs in the ultra high frequency band, NXP shall have a right of first refusal on the first commercial offering relating to each particular Activatable Product Class ("UHF/AP Offering"). In the absence of NXP's refusal, NXP and Kestrel will prepare an Activation IC Specification directed to such UHF/AP Offering. NXP shall have 90 days after such Activation IC Specification is prepared to commit to developing and producing the UHF/AP Offering's Activation IC. If NXP does not commit to developing and producing the UHF/AP Offering's Activation IC, Kestrel may license a third party to develop and deliver the UHF/AP Offering's Activation IC, provided: (i) each third party's license shall be non-exclusive, shall begin after the 90 day period has expired and shall be restricted to the UHF/AP Offering's Activation ICs that are fully compliant with the Activation IC Specification as prepared by NXP and Kestrel; (ii) each so-licensed third party shall be required, under any such license, to pay royalty fees to Kestrel as set forth in Section 8.3; (iii) pursuant to Section 3.2, NXP's license grants shall continue in effect as non-exclusive as to such UHF/AP

Offering's Activation IC; and (v) NXP's license grants shall continue as exclusive other than as to such UHF/AP Offering's Activation IC.

6. DEVELOPMENT

6.1 NXP agrees to develop with Kestrel the requirements for the first HF Activation IC for Activatable Optical Disc and the first UHF Activation IC for Activatable Optical Disc.

6.2 Except as may be otherwise set forth in the Development Schedule, NXP agrees to use commercially reasonable efforts to make the first HF Activation IC samples available by June 15, 2007, and to have production HF Activation ICs available six (6) months after the HF Activation IC has been validated by passing any validation process set forth in the applicable Activation IC Specification.

6.3 NXP agrees to use commercially reasonable efforts to make the first UHF Activation IC samples available nine months after Kestrel and NXP agree to the system specifications for the UHF Activation IC, which shall include exact definition of assembly, antenna, impedance, electrical characteristics, and packaging construction, and shall also include replicator workshops, as well as an Activation IC Specification.

6.4 The above schedule and availability of the HF Activation ICs and the UHF Activation ICs are subject to technical feasibility and commercially reasonable efforts.

6.5 If Kestrel has not exercised its NRE payment options under Sections 4.3 and/or 5.3 for HF Activation ICs and/or UHF Activation ICs, NXP will work with Kestrel to determine the requirements and business cases for HF Activation ICs and/or UHF Activation ICs as to an Activatable Product Class, building on respective HF and UHF protocols. The work under this Section 6.5 for each such Activation IC is subject to the provisions set forth in respective Section 4.4 and 5.4.

6.6 NXP agrees that any sample HF Activation ICs that NXP determines to provide to Kestrel during calendar year 2007, will be provided at no charge to Kestrel, provided Kestrel employs such sample HF Activation ICs in Kestrel's pilot programs. Kestrel agrees that Kestrel is due no royalty or any other fee for the Activation ICs received pursuant to this paragraph 6.6.

6.7 Kestrel shall exclusively use the sample HF Activation IC provided under Section 6.6 for NFC activation pilot programs. Kestrel will use commercially reasonable efforts to include studios, replicators, retailers and other development partners in its pilot programs. A pilot program is expected to include, at a minimum, several thousand activations. Kestrel shall report to NXP on a quarterly basis the status of all in-progress pilot programs. The report shall be generally according to the

format illustrated in Exhibit C.

7. OWNERSHIP

7.1 NXP and its Affiliates shall retain all of their right, title and interest in and to: (a) the Activation ICs (including the circuit(s), block diagram(s), chip implementation(s) and other technology embodied therein and thereby), including all of their Intellectual Property Rights therein, and (b) the tools, processes and other technology used to design, develop, manufacture, support, test, maintain and otherwise provide the Activation ICs, including all of their Intellectual Property Rights therein.

7.2 Except for the licenses granted under this Agreement, Kestrel shall retain all of its right, title and interest in and to Kestrel Activation IP and the Kestrel Network, , including all of its Intellectual Property Rights in such Kestrel Activation IP and Kestrel Network. Without limiting the generality of the foregoing, Kestrel's retention of rights under this Section 7.2 shall apply notwithstanding Kestrel Activation IP (in whole or in part) being embedded, designed into or otherwise included in an Activation IC.

8. PAYMENTS FROM NXP TO KESTREL

8.1 NXP shall pay to Kestrel Three Million Dollars (US$3,000,000), as a license fee in prepaid royalties ("Pre-Paid Royalties"), in accordance with, and subject to, the following:

(a) US$1,000,000 targeted within ten (10) days of executing this Agreement;

(b) US$2,000,000 conditional to both (i) the signature of a licensing agreement with a Fortune 100 electro-chemical film company ("License Agreement Trigger") and (ii) financial investments or license agreements that are, in the aggregate, no less than an additional US$8,000,000 (excluding the NXP license and the conversion of any debt) paid to Kestrel before June 30, 2008 ("Investment Trigger"). NXP shall make this payment as set forth in Section 8.2.

8.2 NXP shall pay to Kestrel the US$2,000,000 under Section 8.1(b) within fifteen (15) days from the date that it confirms both the License Agreement Trigger and the Investment Trigger have been achieved, as follows:

(a) License Agreement Trigger: Kestrel shall notify NXP when Kestrel has a binding license agreement with a Fortune 100 electro-chemical film company to act as its partner for both (i) advancing the optical film technology as to Activatable Optical Discs and (ii) integrating Activation ICs with optical media. Such notification shall include data that reasonably enables NXP to confirm achievement of the License Agreement Trigger. Following such

notification, NXP shall have ten (10) days to confirm such License Agreement Trigger has been achieved, in which effort Kestrel shall provide, upon NXP's request, reasonable assistance (including, if proper, furnishing appropriate consent(s) and permission(s) so that the Fortune 100 company may confirm the terms of the license agreement relevant to such Trigger).

(b) Investment Trigger: Kestrel shall notify NXP when Kestrel has binding investment agreements for aggregate investment financing for the additional US$8,000,000 payable to Kestrel before June 30, 2008. The Investment Trigger shall not include (i) any funds under the License Agreement Trigger of Section 8.2(a) that are payable to Kestrel contingent upon production, supply, sales, or any service transactions, (ii) any funds made or committed pursuant to this Agreement, including the US$3,000,000 of Section 8.1 or (iii) any conversion of existing Kestrel debt. For avoidance of doubt and without limiting the generality of the foregoing, the Investment Trigger includes investment funds committed under the License Trigger, provided those investment funds are committed for payment to Kestrel by June 30, 2008; and also includes any funds paid by a third party in a lump sum as prepaid royalties under terms and conditions substantially similar to those applicable to the Pre-Paid Royalties of this Agreement. Kestrel's notification under this Section 8.2(b) shall include data that reasonably enables NXP to confirm achievement of the Investment Trigger. Following such notification, NXP shall have ten (10) days to confirm such Investment Trigger has been achieved, in which effort Kestrel shall provide, upon NXP's request, reasonable assistance (including, if proper, furnishing consent(s) and permission(s) so that the respective investor(s) may confirm the terms of the investment agreement(s) relevant to such Trigger).

8.3 NXP shall pay to Kestrel a royalty fee for each Activation IC Sold ("Royalty Fee"), provided: (a) the Royalty Fee shall be US$0.015 (1.5 US cent) per Activation IC Sold and shall apply through December 31, 2013; (b) Kestrel shall charge, through December 31, 2013, to any other of its licensees, a royalty fee of no less than US$0.015 per Activation IC Sold; and (c) after December 31, 2013, or at any earlier date upon agreement with NXP, the Royalty Fee shall be (i) reduced on a most-favored-nation rate basis to the lowest royalty fee or rate that Kestrel gives to any other of Kestrel's licensees relating to Activation ICs Sold, and (ii) set quarterly during this Agreement according to Kestrel's licensing fees or rates in effect for that quarter. As used herein, Activation ICs shall be considered "Sold" when billed or invoiced by NXP or its Affiliates, or otherwise transferred when not sold or licensed, but delivered by NXP or its Affiliates to unaffiliated third parties regardless of the basis for compensation; provided, however, NXP shall have the right to distribute royalty-free (i) samples of Activation ICs, (ii) replacements for defective Activation ICs replaced under warranties, (iii) new Activation ICs provided for testing and demonstration purposes, and (iv) Activation IC prototypes (or other development deliverables) provided to customers without charge; and, provided, further, that such Activation

ICs under (i), (ii), (iii) and (iv) shall not be considered as "Sold."

8.4 For each Activation IC Sold by NXP, Royalty Fees shall be credited from the Pre-Paid Royalties, until the Pre-paid Royalties set forth in Section 8.1 have been consumed (e.g., Royalty Fees shall be so paid for the first 300,000,000 Activation ICs if such Royalty Fees are a constant US$0.01 for all such Activation IC so credited from the Pre-Paid Royalties).

8.5 All fees and payments under this Agreement are gross amounts but exclusive of any value added tax (VAT), sales tax, consumption tax or any other similar tax only. If the transactions as described in the Agreement are subject to any applicable VAT, sales tax, consumption tax or any other similar tax, Kestrel will be allowed to charge VAT, sales tax, consumption tax or any other similar tax to NXP, which charged amounts will be paid by NXP on top of the fees and payments and Kestrel will be responsible for paying the said VAT, sales tax, consumption tax or any other similar tax to the appropriate (tax) authority (except where a reverse charge or similar mechanism is applicable which places the legal obligation for VAT or any other similar tax to NXP, but in which case Kestrel shall not charge NXP and/or shall return to NXP any charged amounts). In the event that the government of a country imposes any income taxes on payments made or to be made hereunder by NXP to Kestrel and requires NXP to withhold such taxes from such fees and payments, NXP may deduct such taxes from such fees and payments, provided that such withheld taxes are timely paid to the appropriate tax authorities. In such event NXP shall promptly furnish Kestrel with tax receipts issued by the appropriate tax authorities. In the event that the government of a country imposes any income taxes on payments made or to be made hereunder by Kestrel to NXP and requires Kestrel to withhold such taxes from such fees and payments, Kestrel may deduct such taxes from such fees and payments, provided that such withheld taxes are timely paid to the appropriate tax authorities. In such event Kestrel shall promptly furnish NXP with tax receipts issued by the appropriate tax authorities. NXP and Kestrel shall reasonably cooperate to reduce or eliminate any withholding tax payments, if and as permitted by law. In that regard, Kestrel shall provide NXP with the required documentation allowing the payments under this Agreement to be free of such withholding taxes.

8.6 Except for the payments specified under Sections 8.1 and 8.2, all payments from both Parties under this Agreement shall be paid within seventy-five (75) days End-of-Month after invoice.

9. PAYMENTS FROM KESTREL TO NXP

9.1 Kestrel shall pay to NXP US$0.01 per Activation IC that is manufactured by NXP and is activated by Kestrel.

9.2 Kestrel shall pay to NXP US$0.02 per Activation IC that is not manufactured by

NXP and is activated by Kestrel.

9.3 At Kestrel's sole discretion, Kestrel may forego or otherwise reduce the Royalty Fee due from NXP pursuant to Section 8.3 of this Agreement.

9.4 All payments under Sections 9.1 and 9.2 and all royalty reductions under Section 9.3 shall terminate upon Kestrel's payments and reductions to or benefiting NXP under Sections 9.1-9.3 aggregate to US$30,000,000. For avoidance of doubt, the total payments and reductions under this Section 9.4 shall be the aggregate of: (1) all amounts paid to NXP by Kestrel under Section 9.1; (2) all amounts paid to NXP by Kestrel under Section 9.2; and (3) all amounts foregone and/or reduced under Section 9.3.

9.5 In the event that the US$30 million under Section 9.4 is paid to NXP as of some date prior to December 31, 2013, then Kestrel shall rebate to NXP, from that date until December 31, 2013, any Royalty Fees paid by NXP.

10. DEFENSE FUND

10.1 Kestrel shall reserve 10% of its revenue for and as an IPR defense fund. Kestrel shall be solely responsible for funding such IPR defense fund, including replenishing the defense fund following any payments against such defense fund. Kestrel shall be responsible for funding such IPR defense fund up to a maximum of three million U.S. Dollars (US$3,000,000). Kestrel shall use the IPR defense fund only in response to third party assertions, such that the IPR defense fund is directed solely (i) to fund defense against IPR infringement claims brought against it by independent third parties relating to Kestrel Activation IP (e.g., for attorneys' fees and court costs in defending such IPR infringement claims, and for settlement of such IPR infringement claims), (ii) to indemnify and hold harmless NXP and its Affiliates against any IPR infringement claim brought by an independent third party relating to Kestrel Activation IP, and/or (iii) to pay for licensing of third party IPR relating to Kestrel Activation IP. For avoidance of doubt, Kestrel shall use the IPR defense fund in response to a third party assertion directed to Kestrel Activation IP embedded, designed into or otherwise included in an Activation IC.

11. REPORTS AND AUDITS

11.1 NXP shall provide, within 30 calendar days after a calendar quarter, an IC Status Report showing all orders and deliveries of Activation ICs in that calendar quarter. The report shall set out, at a minimum, the date of order, actual or projected delivery date(s), quantity, type of Activation IC, name and address of ordering party. Kestrel reserves the right to request, at its own cost, a third-party accounting of the IC Status Report.

11.2 Kestrel shall provide, within 30 calendar days after a calendar quarter, an

Activation Status Report showing all activations for Activation ICs and Third-Party Activations (if any) in that calendar quarter. A Third-Party Activation is an activation effected using the Kestrel Network for an activation IC not made by NXP under this Agreement. NXP reserves the right to request, at its own cost, a third-party accounting of the Activation Status Report.

11.3 Any audits by either Party hereunder shall not be more frequently than annually, and will be conducted by a nationally recognized independent accounting firm chosen by the Party conducting the audit, and reasonably acceptable to the other Party. The audit will be conducted during normal business hours and the auditors will have access to relevant records and information as may be necessary to determine the correctness of any quarterly reports or payment due or made under this Agreement. All such auditors shall comply with the audited Party's safety and security procedures and shall conduct the audit without interfering with its normal business activities. All such auditors shall sign the audited Party's standard nondisclosure agreement and shall treat all records and information disclosed in connection with the audit as that Party's confidential and proprietary information, and shall agree not to disclose such information to the auditing Party or any third parties. In the event of any discrepancies, the auditors shall report to the auditing Party only the amount of and the reasons for the discrepancy. Each Party will provide its full, reasonable cooperation in such an audit.

12. MARKETING

12.1 NXP and Kestrel shall cooperate to issue a press release announcing the nature of their relationship under this Agreement within three weeks of the Effective Date.

12.2 Any use of a Kestrel trademark by NXP shall be pursuant to prior written authorization by Kestrel, and any use of an NXP trademark shall be pursuant to a prior written authorization by NXP. As to any NXP trademark, the written authorization shall be effective only if it sets forth specific usage rules (e.g., as to the size, colors, disposition, etc.) and parameters (e.g., where usable and over what period of time).

12.3 NXP and Kestrel will cooperate and contribute commercially reasonable business development support to identify potential partners and customers for RFA target applications, and will jointly plan and conduct meetings with or presentations to those potential partners or customers. The Parties anticipate, without limitation, that potential partners and customers would be film studios, disc replicators, inlay suppliers, integrators, infrastructure providers, retailers and mobile operators. The Parties' obligations of cooperation and joint action under this Section 12.3 shall continue until US$30 million is paid to NXP as described in Section 9.4. After that amount is paid, the Parties may pursue (but have no obligation to so pursue) further, such joint activities, subject to their mutual agreement (e.g., in light of and depending on actual business conditions).

12.4 NXP and Kestrel will promote RFA with at least one press release or other form of marketing publication per major commercial milestone until 500 million units of NXP's Activation ICs are Sold.

13. CONFIDENTIALITY

13.1 "Confidential Information" means all confidential and proprietary information which is disclosed by one Party and/or its Affiliates ("Disclosing Party") to the other Party and/or its Affiliates ("Receiving Party") in connection with this Agreement, which the Disclosing Party marks or otherwise designates, either orally or in writing, as confidential, or which, under the circumstances surrounding the disclosure, ought to be treated as confidential. Confidential Information includes, but is not limited to, product and business plans, product specifications and prices, technologies, software, materials, designs, inventions, developments, processes, customers, roadmaps, samples, prototypes and finances.

13.2 Confidential Information does not include, and the Receiving Party's obligations under this Section 13 shall not apply to, any information, technology, or other item which: (i) is known by the Receiving Party or is publicly available at the time of disclosure by the Disclosing Party to the Receiving Party; (ii) becomes publicly available after disclosure by the Disclosing Party to the Receiving Party through no act or inaction of the Receiving Party; (iii) is independently developed by the Receiving Party, without reference to or use of any Confidential Information of the Disclosing Party; (iv) is hereafter rightfully furnished to the Receiving Party by a third party without restriction as to use or disclosure; or (v) is approved for release by the Disclosing Party in writing.

13.3 The Receiving Party may disclose Confidential Information of the Disclosing Party that is required to be disclosed pursuant to a judicial or governmental proceeding having proper jurisdiction (including pursuant to a subpoena), provided that Receiving Party promptly --after receiving notice of such proceeding-- shall notify Disclosing Party thereof, so as to give the Disclosing party a reasonable opportunity either/both to contest disclosure and/or to seek any available legal remedies toward maintaining such information in confidence.

13.4 The Receiving Party shall not use the Confidential Information disclosed to it by the Disclosing Party for any purpose except for the purposes of this Agreement. The Receiving Party shall not disclose any Confidential Information of the Disclosing Party to any third party except those directors, officers and employees of the Receiving Party who have a legitimate need to know and who are under written confidentiality obligations to the Receiving Party sufficient for the Receiving Party to comply with all the confidentiality provisions of this Agreement.

13.5 The Receiving Party shall use the same degree of care that it uses to protect its own confidential information of a similar nature, but no less than a reasonable

degree of care, to prevent the unauthorized use, disclosure, dissemination and/or publication of the Disclosing Party's Confidential Information. The Receiving Party agrees to notify the Disclosing Party in writing of any misuse or misappropriation of the Disclosing Party's Confidential Information which may come to its attention.

13.6 The obligations under this Section 13 shall apply while this Agreement is in force and for a period of five (5) years following the expiration or termination of this Agreement.

13.7 Each party shall treat this Agreement as Confidential Information, and neither Party shall publicize or disclose the terms or conditions of this Agreement to any third party other than to its Affiliates or its legal and financial advisors on a confidential basis, without the prior written consent of the other, save and except as may be required by law.

13.8 Upon termination of this Agreement, each Party shall return, or at the Disclosing Party's instruction destroy, the Confidential Information furnished by the other Party, except each Party may keep a copy for archival and support purposes, such copy being held in confidence by its attorneys. Upon the Disclosing Party's request, the Receiving Party shall certify the return or destruction of the Confidential Information pursuant to this Agreement.

14. REPRESENTATIONS AND WARRANTIES

14.1 Each Party represents and warrants to the other that, as of the Effective Date:

(a) it has the authority to enter into this Agreement; and

(b) it is a corporation duly incorporated, validly existing and in good standing under the laws of the jurisdiction in which it is organized, with full corporate power and authority to carry on its business as it is now being conducted;

14.2 Kestrel represents and warrants that it has the authority and all necessary rights to grant the licenses that it has expressly granted herein.

14.3 Kestrel represents and warrants that the Kestrel Activation IP does not contain any Open Source Technology (as that term is defined below).

(a) As used herein, "Open Source Technology" means any software, hardware or other technology that is licensed or otherwise provided under Open Terms.

(b) "Open Terms" means terms in any license or other agreement which requires, as a condition, e.g., of use, modification and/or distribution of the software, hardware or other technology, or any other software, hardware or other technology that might be incorporated into, derived from or distributed with

such software, hardware or other technology (a "Work") any of the following:

(i) the making available of source code, design information or other Confidential Information regarding the Work;

(ii) the granting of permission for creating derivative works regarding the Work; or

(iii) the granting of a royalty-free license to any party under any Intellectual Property Rights regarding the Work.

(c) By means of example and without limitation, any software modules, development packages or other technology licensed, distributed or otherwise provided under any of the following licenses or distribution models shall qualify as Open Source Technology:

(i) GNU's General Public License (GPL) or Lesser/Library GPL (LGPL),

(ii) the Artistic License,

(iii) the Mozilla Public License,

(iv) the Common Public License,

(v) the Sun Community Source License (SCSL), and

(vi) the Sun Industry Standards Source License (SISSL).

14.4 EXCEPT AS EXPRESSLY SET FORTH IN THIS SECTION 14, NEITHER PARTY MAKES ANY OTHER WARRANTY UNDER THIS AGREEMENT, EXPRESS, IMPLIED, OR STATUTORY, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS, WITH RESPECT TO THE ACTIVATION ICS, THE KESTREL ACTIVATION IP, ANY SERVICES TO BE PROVIDED HEREUNDER, OR ANY OTHER INFORMATION OR MATERIALS PROVIDED UNDER THIS AGREEMENT.

15. LIMITATION OF LIABILITY

15.1 IN NO EVENT SHALL EITHER PARTY HAVE ANY LIABILITY TO THE OTHER PARTY WHATSOEVER FOR ANY INCIDENTAL, INDIRECT, PUNITIVE, SPECIAL, OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, LOSS OF ANTICIPATED PROFITS, REVENUE, OR OTHER ECONOMIC LOSS, ARISING OUT OF OR RELATED TO THIS AGREEMENT, WHETHER OR NOT SUCH DAMAGES ARE BASED ON TORT, WARRANTY, CONTRACT OR ANY OTHER LEGAL THEORY, EVEN IF SUCH PARTY HAS BEEN ADVISED, OR IS AWARE, OF THE POSSIBILITY OF SUCH DAMAGES, OR SUCH LOSS OR DAMAGES WERE FORESEEABLE BY THE PARTIES.

15.2 EXCEPT FOR INDEMNIFICATION OBLIGATIONS PAYABLE TO ANY INDEPENDENT THIRD PARTY CLAIMANT UNDER SECTION 16, VIOLATION OF ANY OF NXP'S EXCLUSIVE RIGHTS UNDER THIS

AGREEMENT, AND PAYMENT OBLIGATIONS UNDER SECTIONS 8 AND 9, THE TOTAL AGGREGATE LIABILITY OF EACH PARTY UNDER THIS AGREEMENT SHALL NOT EXCEED THE AMOUNT EQUAL TO TEN PERCENT (10%) OF THE ACTUAL AMOUNTS RECEIVED BY THAT PARTY UNDER THIS AGREEMENT AT THE TIME OF THE VIOLATION OR, IF LESSER, THREE MILLION U.S. DOLLARS (US$3,000,000).

16. INDEMNIFICATION

16.1 Indemnification by Kestrel

(a) Kestrel shall, at its expense, defend any suit or proceeding brought by any independent third party claimant against NXP or its Affiliates ("NXP Indemnitees") to the extent that the suit or proceeding includes or arises from an assertion that the Kestrel Activation IP, Kestrel Network and/or Kestrel services relating to Kestrel RFA Technology ("Kestrel Indemnified Technology") infringes any of such claimant's Intellectual Property Rights, and shall reimburse all costs incurred by NXP Indemnitees (including attorneys' fees), and pay any damages awarded against NXP Indemnitees in such suit or proceeding to the extent attributable to such assertion; provided, that Kestrel is notified promptly by the applicable NXP Indemnitees in writing of any such suit or proceeding, and NXP Indemnitees provide reasonable assistance and cooperation in said defense. Neither Party shall be obligated or liable for any settlement without its prior written consent.

(b) Kestrel shall have no obligation or liability to NXP Indemnitees under Section 16.1(a) to the extent that any such suit or proceeding arises from: (i) modification of the Kestrel Indemnified Technology made by NXP Indemnitees, unless such modification either is responsive to Kestrel's instruction or approval to so modify, or is toward complying with an applicable Activation IC Specification, or unless the infringement would not have been avoided by use of unmodified Kestrel Indemnified Technology; or (ii) the combination of the Kestrel Indemnified Technology with any other product, service or technology, if such infringement would not occur but for such combination, unless the combination is necessary in order to realize the functionality of, or otherwise substantially use, the Kestrel Indemnified Technology.

(c) If any Kestrel Indemnified Technology is or, in Kestrel's reasonable and good faith opinion, is likely to become, the subject of such a suit or proceeding as set forth in Section 16.1(a), Kestrel will have the right, at its sole option and own expense, to do any of the following:

(1) obtain for NXP Indemnitees the right to continue to use or sell the Kestrel Indemnified Technology, consistent with this Agreement;

(2) modify the infringing portions of the Kestrel Indemnified Technology so such portions are non-infringing, while remaining in full compliance

with this Agreement (including any applicable system specification); or

(3) replace the Kestrel Indemnified Technology with non-infringing Technology that remains in full compliance with this Agreement (including any applicable system specification).

16.2 To the extent allowed by law, Kestrel shall defend, indemnify and hold harmless NXP Indemnitees for any suit or proceeding arising from the use of Not-RFS ICs. Kestrel shall also use commercially reasonable efforts to obtain both a similar indemnification and a waiver of liability on behalf of NXP Indemnitees, prior to delivering Not-RFS ICs to Kestrel's studios, retailers, replicators, manufacturers and/or other development partners (including those that are participating in a Kestrel pilot activation program).

16.3 Indemnification by NXP

(a) NXP shall, at its expense, defend any suit or proceeding brought by any independent third party claimant against Kestrel or its Affiliates ("Kestrel Indemnitees") to the extent that the suit or proceeding includes or arises from an assertion that an Activation IC that was made and sold by NXP or its Affiliates("NXP Indemnified Activation IC") infringes any of such claimant's Intellectual Property Rights, and shall reimburse all costs incurred by Kestrel Indemnitees (including attorneys' fees), and pay any damages awarded against Kestrel Indemnitees in such suit or proceeding to the extent attributable to such assertion; provided that NXP is notified promptly by the applicable Kestrel Indemnitees in writing of any such suit or proceeding, and Kestrel Indemnitees provide reasonable assistance and cooperation in said defense. Neither Party shall be obligated or liable for any settlement without its prior written consent.

(b) NXP shall have no obligation or liability to Kestrel Indemnitees under Section 16.3(a) to the extent that any such suit or proceeding arises from: (i) modification of the NXP Indemnified Activation IC made by Kestrel Indemnitees, unless such modification either is responsive to NXP's instruction or approval to so modify, or is toward complying with an applicable Activation IC Specification, or unless the infringement would not have been avoided by use of unmodified NXP Indemnified Activation ICs; (ii) the combination of the NXP Indemnified Activation IC with any other product, service or technology (including any of Kestrel Activation IP, Kestrel Network or Kestrel RFA Technology, whether or not any of same is embedded in, designed into or otherwise included in the Activation IC), if such infringement would not occur but for such combination, unless the combination is necessary in order to realize the native functionality of, or otherwise put to its substantial use, the NXP Indemnified Activation IC, wherein such native functionality and substantial use is herewith acknowledged to be unrelated to the Kestrel RFA Technology or (iii) to the extent the claim is based on any prototypes, samples, or other pre-production

units; or (iv) to the extent any such claim arises from any infringement or alleged infringement of any Intellectual Property Rights covering a standard set by a standard setting body.

(c) If any NXP Indemnified Activation IC is or, in NXP's reasonable and good faith opinion, is likely to become, the subject of such suit or proceeding as set forth in Section 16.3(a), NXP will have the right, at its sole option and own expense, to do any of the following:

(1) obtain for Kestrel Indemnitees the right to continue to use or sell the NXP Indemnified Activation IC, consistent with this Agreement;

(2) modify the infringing portions of the NXP Indemnified Activation IC so such portions are non-infringing while remaining in full compliance with this Agreement (including any applicable Activation IC Specification);

(3) replace the NXP Indemnified Activation IC with non-infringing ones that comply with this Agreement;

(4) terminate manufacture, sale or other distribution of the NXP Indemnified Activation IC.

16.4 NXP will indemnify its customers in respect to Activation ICs in accordance with NXP's standard terms and conditions of commercial sale, or separate written purchase/sale agreement between NXP and such customer for such products, if applicable.

16.5 THE FOREGOING STATES THE ENTIRE LIABILITY OF KESTREL AND NXP (AND ITS AFFILIATES), IN CONNECTION WITH INTELLECTUAL PROPERTY INDEMNIFICATION OBLIGATIONS UNDER THIS AGREEMENT AND, EXCEPT AS STATED ABOVE, KESTREL AND NXP (AND ITS AFFILIATES) SHALL NOT BE LIABLE FOR ANY LOSS OR DAMAGE OF ANY KIND WHATSOEVER PERTAINING TO INTELLECTUAL PROPERTY INDEMNIFICATION, INCLUDING INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES SUFFERED OR INCURRED.

17. TERM AND TERMINATION

17.1 This Agreement shall commence on the Effective Date and shall continue in effect for a term of twelve years, and will expire on the twelfth (12th) anniversary of the Effective Date, unless terminated sooner as set forth herein.

17.2 This Agreement may be terminated by written mutual consent of the Parties.

17.3 Either Party may terminate this Agreement for a material breach of this Agreement by the other Party, if the non-breaching Party provides the breaching Party written notice specifying the breach with a 60 calendar day period to cure the breach and the breaching Party fails to cure such breach within the 60 calendar

day period.

17.4 This Agreement may be terminated by NXP after the second Anniversary of the Effective Date by 90 calendar day's prior written notice.

17.5 Upon termination or expiration all licenses granted under this Agreement shall terminate immediately. Notwithstanding, NXP may sell any Activation ICs in finished goods inventory after the day of termination or expiration, and Kestrel may perform activation services for any of NXP's Activation ICs sold prior to the date of termination or expiration.

17.6 To the extent allowed by law, and subject to US Bankruptcy provisions, upon Kestrel's bankruptcy or involuntary dissolution, NXP and its Affiliates shall have the right to retain, and/or shall be granted, sufficient licenses so as to continue making, having made, using, importing, offering for sale, selling, distributing and otherwise disposing of Activation ICs.

18. GENERAL

18.1 The provisions of Sections 1, 7, 13, 14, 15, 16 and 18 shall survive any expiration or termination of this Agreement.

18.2 Any and all consents, instructions, or other notices permitted or required to be given hereunder shall be in writing and shall be deemed duly given: (i) upon actual delivery, if delivery is by hand; or (ii) upon delivery if by nationally recognized overnight courier service (e.g., FedEx, UPS), or (iii) upon delivery if by certified or registered mail, postage prepaid, return receipt requested, and properly addressed to the respective Party at the address indicated below (or to any other address that the respective Parties may designate from time to time by written notice).

If to NXP:

NXP Semiconductors Netherlands B.V.
High Tech Campus 60
5656 AG
Eindhoven, The Netherlands
Attn: Martijn van Dam

With a copy to:

NXP Semiconductors Netherlands B.V.
High Tech Campus 60
5656 AG
Eindhoven, The Netherlands
Attn: Legal Department

If to Kestrel:

Kestrel Wireless, Inc
2000 Powell St. Suite 830
Emeryville, California 94608, U.S.A.
Attn: Legal Department

18.3 Each Party agrees to comply with all applicable federal, state and local laws in their performance under this Agreement. Each Party agrees to comply with all applicable export control laws and regulations, including the laws and regulations of the United States of America and member states of the European Union's Export Administration or the export or import controls or restrictions of other applicable jurisdictions in performing under this Agreement.

18.4 This Agreement may be executed in one or more counterparts, each of which shall be deemed an original and all of which, when taken together, shall constitute one and the same original instrument.

18.5 This Agreement shall be governed by and interpreted in accordance with the substantive laws of the State of California, U.S.A., without regard to choice of law principles. Any action or claim arising from this Agreement shall be having venue in the state and federal courts in Northern District of California. The United Nations Convention on Contracts for the International Sale of Goods shall not apply to this Agreement. Notwithstanding the foregoing, each Party acknowledges that each Party shall be entitled to seek injunctive relief in any court of competent jurisdiction to protect its Intellectual Property Rights and/or Confidential Information.

18.6 Notwithstanding any provisions hereof, for all purposes of this Agreement each Party shall be and act as an independent contractor and not as a partner, joint venturer, or agent of the other and shall not bind nor attempt to bind the other to any contract or other agreement.

18.7 Neither Party shall have any right or ability to assign or transfer this Agreement, or delegate or assign any obligations or benefit under this Agreement, without the written consent of the other, such consent not to be unreasonably withheld, except that either Party --without the consent of the other-- may assign and transfer this Agreement to: (i) its Affiliates in connection with a business reorganization or (ii) a third party successor in interest in connection with a merger, acquisition or sale of all or substantially all its business or assets (including all IPR applicable to such business), or of its business units or divisions to which this Agreement relates (including all IPR applicable to such units or divisions). This Agreement shall inure to the benefit of and be binding upon the Parties hereto and their respective successors and permitted assigns (to the extent this Agreement is assignable). Any unauthorized assignment of this Agreement is void.

18.8 No delay or failure of either Party to exercise or enforce any of its rights or the provisions under this Agreement at any time for any period shall be construed as a waiver thereof or of such Party's right thereafter to exercise or enforce each and every right and provision of this Agreement. No single waiver shall constitute a continuing or subsequent waiver.

18.9 In the event that any provision of the Agreement shall be determined to be illegal or unenforceable, that provision will be limited or eliminated to the extent minimally necessary so that this Agreement shall otherwise remain in full force and effect, and be enforceable. Headings are for convenience only, and shall not be used in interpreting this Agreement. For purposes of interpretation, neither Party shall be considered to be the drafter of this Agreement.

18.10 A Party will be neither in default nor liable for any delay or failure to comply with this Agreement caused by fire, flood, storm, Acts of God, earthquakes, terrorism, acts of government, war or any other cause beyond the control of the affected Party, provided such Party promptly notifies the other.

18.11 Except as expressly stated in Section 3, nothing in this Agreement grants or confers, nor shall be construed as granting or conferring, any license, immunity, or other right in or to any patent, copyright, trademark, trade secret, or other Intellectual Property Right of either Party or its Affiliates, either expressly, directly, or by implication, estoppel or otherwise, to the other Party, its Affiliates, or any third party.

18.12 This Agreement and the Exhibits attached hereto contain the full and complete understanding and agreement between the parties relating to the subject matter hereof and supersede all prior and contemporaneous understandings and agreements, whether oral or written, relating to such subject matter. This Agreement cannot be modified or amended except by an instrument in writing executed by both Parties.

(Signature page follows)

In Witness Whereof, the Parties hereto have executed this Agreement by their duly authorized representatives.

For: NXP SEMICONDUCTORS NETHERLANDS B.V.

Signature: _____

Name: _____

Title: _____

Date: _____

Signature: _____

Name: _____

Title: _____

Date: _____

For: KESTREL WIRELESS, INC.

Signature: Paul D. Atkinson

Name: Paul D. Atkinson

Title: President

Date: 5 April 2007

EXHIBIT A

ACTIVATION IC SPECIFICATIONS

1. General
2. Electrical Properties
3. Physical Properties
4. RFID Compliance
5. Activation Specifications
6. Kestrel Specific Commands

EXHIBIT B

DEVELOPMENT SCHEDULE

Pursuant to Sections 6.2 of the Agreement, NXP agrees to use commercially reasonable efforts to provide HF Activation IC deliverables as follows on the following milestones:

a) first engineering samples available by June 15, 2007, with deliverables of such samples being 50 samples in form of bare dies in waffle pack; and

b) production HF Activation ICs available six (6) month after the HF Activation IC has been validated by passing the validation process set forth in the applicable Activation IC Specification, with deliverables being a Product Data Sheet, Product Qualification Data, and two (2) final wafers.

EXHIBIT C

Example Pilot Program Reporting Form

{Reporting Form to be determined by mutual agreement of the Parties}

Customer Requirements Specification

RFA Integrated Circuit

Doc Rev 0.6 Draft — 16 Mrz 2007 BCaM

Document information

Info	Content
Project Name	RFA Integrated Circuit
Project ID	11951
Filename	RFA_CustomerRequirementsSpecification_20070316.doc
Doc Name	Release–01–BL_ID_CustomerFunctionalRequirementsSpecification
Doc Key ID	DOC-065806
Doc URL	*Link to Document in IMPULSE BCP*
Doc Location/Path	<Doc Location>
Number of pages	27
Doc Author	not supplied Project Role: Heiko Scharke, Product Manager
Org Breakdown	BU Automotiv & Identification, BLID, MST RFID
Program Name	
Program ID	
Is a Subproject	NO
	Main Project Name:
	Main Project ID:
At Gate Review	PCA

founded by Philips

Revision history

Revision	Date	Description	Author
0.1	2006-11-10	Initial Version	Heiko Scharke
0.2	2006-11-13	- add description deactivation and termination state in chapter 1.3 - correction access conditions Table 3:	Heiko Scharke
0.3.	2007-01-17	- add OUT1 specification details - add Test Mode specification details - chapter 2.4	Heiko Scharke
0.4	2007-02-08	- Updated specification details Chapter 2.4 - Updated description of command set requirements chapter 2.7	Heinze Elzinga, Azad Khizri
0.5	2007-02-27	- add data retention information chapter 2.8 - update sample amount requirements chapter 1.7.1 - add VDD pad size information chapter 2.3	Heiko Scharke
0.6	2007-03-16	- update figure Fig 7	Heiko Scharke

Involved parties

Name	Role	Location	Date
Kestrel Wireless	RFA/CID specification		

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1. Introduction

1.1 Purpose and Scope

The purpose of this specification is to define the customer requirements of RFA (Radio Frequency Activation) CiD (chip in disc) used for optical media activation. The specification should feed the project core team with project objectives and design targets.

The RFA/CiD requires a customized chip to be integrated in CD and DVD to eliminate supply chain costs, minimize the cost of returns handling, reduce the cost and size of packaging (smaller shelf space per product), and eliminate retail theft of CDs, DVDs. The RFA/CiD project is a common development project between NXP (chip), Kestrel Wireless (electrochromic film), Inlay manufacturer, RFID reader manufacturer and system integrator. Main customers for the RFA/CiD are CD/DVD manufacturer or movie studios as well as retailer and merchants. Their ROI is driven by lower distribution costs, new channels of distributions, minimized theft and reduced CD/DVD returns. The solution is based on a simple proposition: "People won't steal products that they know won't work".

During inlay manufacturing, the RFA/CiD will be connected to a coil and a special electrochromic film (Kestrel Wireless). The electrochromic film can be switched from opaque to transparent by means of special RFID commands and passwords. Kestrel Wireless has developed the security concept. The CD/DVD is non-readable (film is opaque) before it leaves the factory and it remains non-readable during the supply-chain. Manufacturers/studios, merchants and consumers can switch on the CD/DVD at point of sales (film is transparent).

This specification will be used as input to the RFA/CiD development project. The Functional Requirements Specification will be derived from this document.

The intended audience of this document is the RFA/CiD project core team, MST-RFID Product Management and Marketing and any decision-making forum like BL-MT or BL-PPRB.

This specification is based on inputs from Kestrel RFA IC Requirements Overview [0001], Kestrel Wireless Company Presentation [0002] and NXP RFA/CiD Business Plan [0003].

1.2 Product perspective

General overview chip, size,pads requirements:

- smallest possible chip size
- chip thickness that fits into CD/DVD substrate layers
- pads to connect antenna coil
- pads to connect electrochemical film
- physical data and logical processing that makes chip difficult to probe

General overview digital chip requirements:

- Memory is divided into NXP area, Protected/non-readable area, public Kestrel area and public memory area
- ISO14443A-3 protocol
- Special Kestrel command set

General overview analog chip requirements:

- ISO 14443A 106kbaud
- Pads to drive electrochemical film: current output, voltage controlled
- Tampering protection

General overview delivery type requirements:

- Product should be delivered as bumped wafer on FFC (UV-tape)

1.3 Basic Product Functions

The main purpose of the RFA/CiD chip is to protect optical media, such as CD, DVD, with RFA enhanced IC which is coupled to an embedded electro-optic film that works like an optical shutter disabling (non-readable) or activating (readable) the disc (Fig 1). RFID technology is used in the way that the optical media is disabled during production and supply chain and can be enabled at the point of sales only.

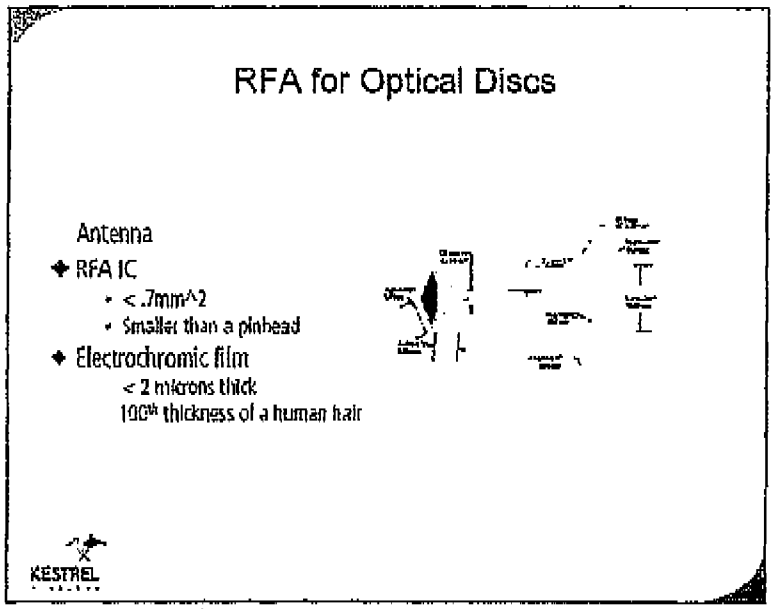

Fig 1. RFA Optical Disc

The benefits and advantages of such a protection are manifold:

Improve Studio Profits

- Lower distribution costs
- Increased same-store sales (60% Impulse Buy)
- New channels of distribution (Starbucks, McDonalds etc.)
- Home activation per mobile phone (NFC)

Reduce Cost

- Eliminating Theft
- Reduce DVD Returns ($1-2/return)
- Optimize Store Replenishment
- Enable smaller product packaging (smaller shelf space)

The RFA/CID chip is places together with antenna and electrochromic film in the inner diameter of the disc. The security concept is based on the "Security Model of Kestrel RFA Network" (see Fig 2).

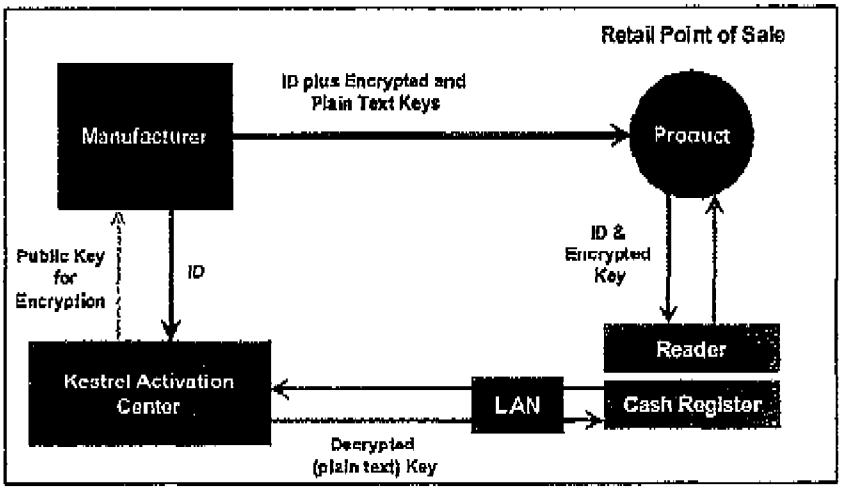

Fig 2. Kestrel Security Network Model

Kestrel Security Network Model assumes the following points:

- Activation time < 1s
- Each item must be individually hacked, no algorithms
- Network service can be distributed and replicated

The Kestrel security concept is based on decrypted/encrypted tokens to switch the RFA/CID chip between different logical states:

Uninitialized state

At the product manufacturer, the following steps will occur:

- A CD/DVD with RFA tag is placed next to a RFA writer, to be loaded.
- The Kestrel Load Application (KLA) creates unique activation, termination and reload tokens for the RFA tag, and encrypts them using public keys received from the Kestrel Command Center. The KLA gives the Kestrel data and tokens to the RFA writer.

  The RFA writer sends Write commands to the RFA tag to write the Kestrel data into the public memory bank and WOM. Once the RFA writer has written and verified the memory contents, it sends an Authenticate(Deactivate) command to change the state of the RFA tag to Deactivated. At this point the RFA tag resets and effectively locks the tag's memory.

Deactivated state

After initialization, the deactivation state is the default delivery state of the optical media during CD/DVD production.

- The electrochemical film is in opaque mode.
- The RFA chip accepts Read commands to read all public memory area, the Test/Test Deactivation command and the Authentication commands with Reload, Activation or Termination token.
- If a wrong token is sent the chip will go into Deadlock state until next RF reset.

Activated state & Activation Wait state

At the merchant POS, the following steps will occur:

- The RFA reader uses Read commands to read all Kestrel data from the public memory bank of the tag. The RFA Reader Application (RRA) sends Kestrel data, including the encrypted activation token, to the Kestrel Command Center.
- The Kestrel Command Center determines which private key to use from the Kestrel data, decrypts the activation token, and sends the decrypted token back to the RRA.
- The RFA reader sends an Authenticate(Activate) command to the RFA tag, passing the decrypted activation token as a parameter.
- The RFA tag compares the decrypted activation token with the plaintext token in WOM, and if they compare, activates the article.

Reload state

At the product manufacturer, these steps will occur if different data needs to be written to the public memory in the RFA tag (including a new encrypted activation token):

- The RFA writer uses a Kestrel Data Read command to read Kestrel data from the public memory bank, including the encrypted activation and reload tokens.
- The Kestrel Reload Application (KRLA) sends all the Kestrel data from the RFA tag to the Kestrel Command Center.
- At the Kestrel Command Center, the tokens are decrypted using the old Kestrel public key and then the activation token is potentially re-encrypted using a new Kestrel public key. Other changes to the Kestrel data may be made here.

PA

- The decrypted reload token and the new Kestrel data, including the new encrypted activation token, is sent back to the KRLA, which passes it on to the RFA writer.
- The RFA writer sends an Authenticate (Reload) command to the RFA tag, with the plaintext reload token as a parameter, to unlock the tag's public memory bank. If the token matches, the RFA writer sends Write commands to the RFA tag to write the updated Kestrel data into the public memory bank. The RFA writer then powers off the RF field, which effectively relocks the public memory bank.

Termination state

This command permanently deactivates an RFA tag, and so permanently disables the product within which it's embedded.

- The RFA chip accepts Read commands to read all public memory area and the Authentication(Termination) command.
- If a wrong token is sent the chip will go into Deadlock state until next RF reset.

When the chip powers up, it reads the STATE from a memory field, and jumps to the state indicated by that field. Every time the STATE changes, the chip will perform a reset. The next time it powers up (immediately, if the RF field stays on), it will restart in the Power Up state, from which it will jump to the appropriate state.

Fig 3 provides an overview of how RFA-tagged products are loaded and later activated.

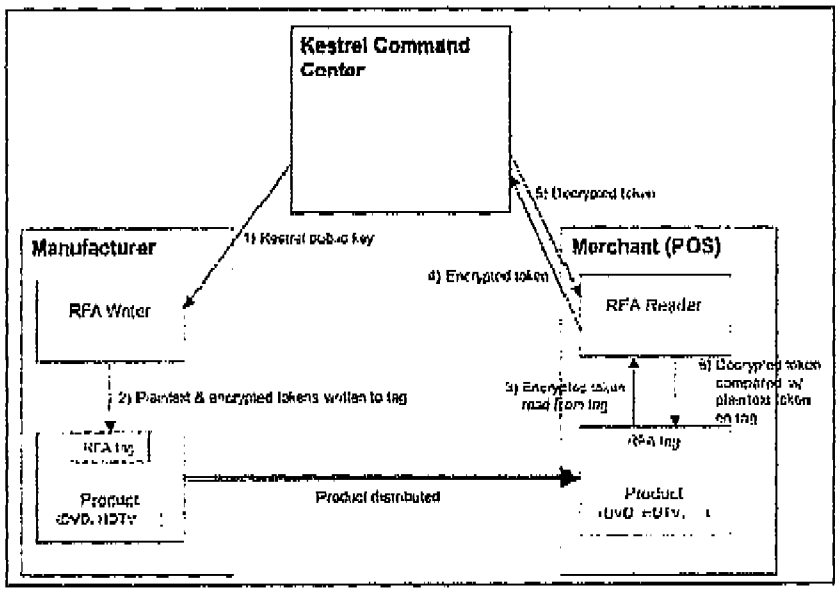

Fig 3. RFA Transactions Overview

In any state, if an RFA tag receives a command for which no state transition appears in the diagram, the tag will respond with a NAK, and go into the Deadlocked state.

An RFA tag will also accept a Test or Test Disable command only while in states Uninitialized, Deactivated or Activated. Whether or not it executes the test depends on the current setting of the Test Mode field. The tag will always go into the Deadlocked state after responding to a Test command. This will hamper any attack to try to get the electrochromic shutter to transition by sending repeated Test commands.

1.4 Statutory and Regulatory Requirements

- Functionality and design of RFA/CID chip has to support systems designs according regulatory requirements on frequency, radiation, emission etc., such as FCC, CE, ETSI, ESD protection.
- The RFA/CID chip has to meet standard NXP/BU A&ID requirements on medical safety for integrated circuits.
- The RFA/CID chip has to meet standard NXP/BU A&ID environmental requirements. In addition, the chip must meet European Union RoHs requirements (lead-free, prohibited substances).
- WEEE requirements have to be investigated.

1.5 External interfaces

The RFA/CID chip requires two pads for antenna connection (Ant1/2) and two pads to connect the electrochromic film (Out1/GND). For detailed explanations see also chapter 2.5 EO film driver output requirements (Out1).

1.6 Stakeholders

a) Movie Makers (e.g. Dreamworks, Paramount, 20CenturyFox, Universal, New Line Entertainment, Disney,...)

b) Merchants & Retailer (e.g. Kroger, Circuit City, WalMart, Costco, Target, Transworld Entertainment, Giant Eagle, Metro, Kaufhof, Amazon, BestBuy, Starbucks, MacDonalds,...)

c) EO film supplier, Switch&Network (Kestrel Wireless)

d) DVD assembly/replicator (e.g. Technicolor, Cinram, Sonopress)

e) Inlay manufacturer (e.g. RSI)

f) Reader terminal/POS manufacturer (e.g. VivoTech, XceedID, Skyetek)

g) Retail System integrators (IBM, NCR)

h) Mobile Phone Operators (T-Mobile etc.)

Below Fig 4 shows an overview of entire value chain network for RFA/CID system.

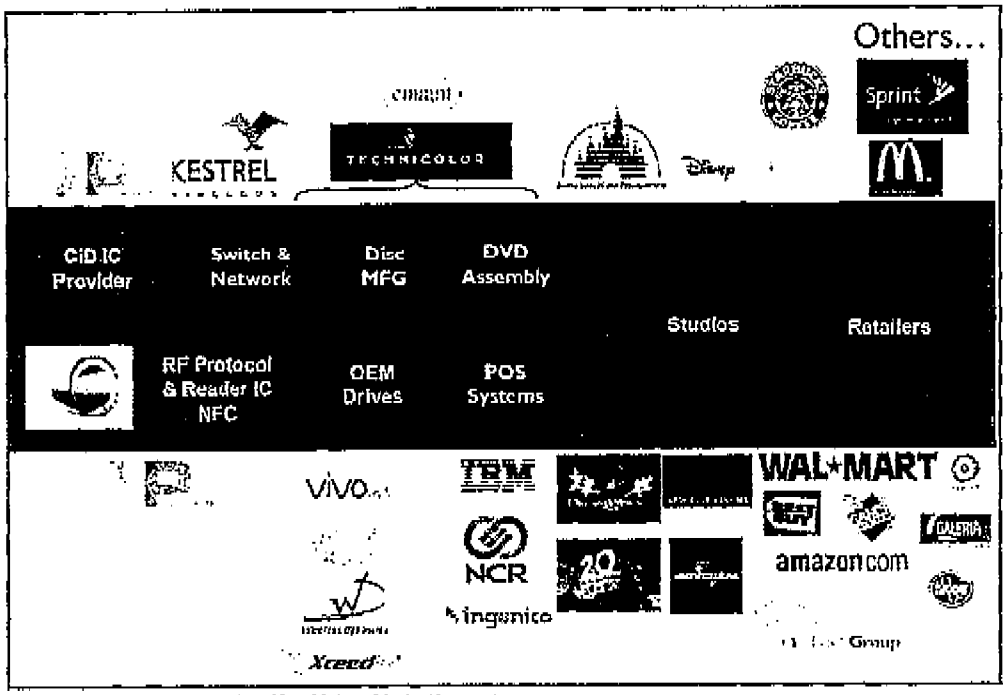

Fig 4. RFA/CID Value Chain Network

1.7 Constraints

1.7.1 Business constraints

- Align on minimum technical solution and synchronize with market timeline for chip development.
- Develop RFA/CiD IC within the timeline of retailers/studios/technology requirements and with that strengthen the relationships.

The below time line has been proposed by Kestrel Wireless in order to meet target business for end 2007 (Christmas business). Main impact for NXP development is first chip development samples in Apr/Mai 2007 and final chip version end Q3/2007 or latest begin Q4/2007.

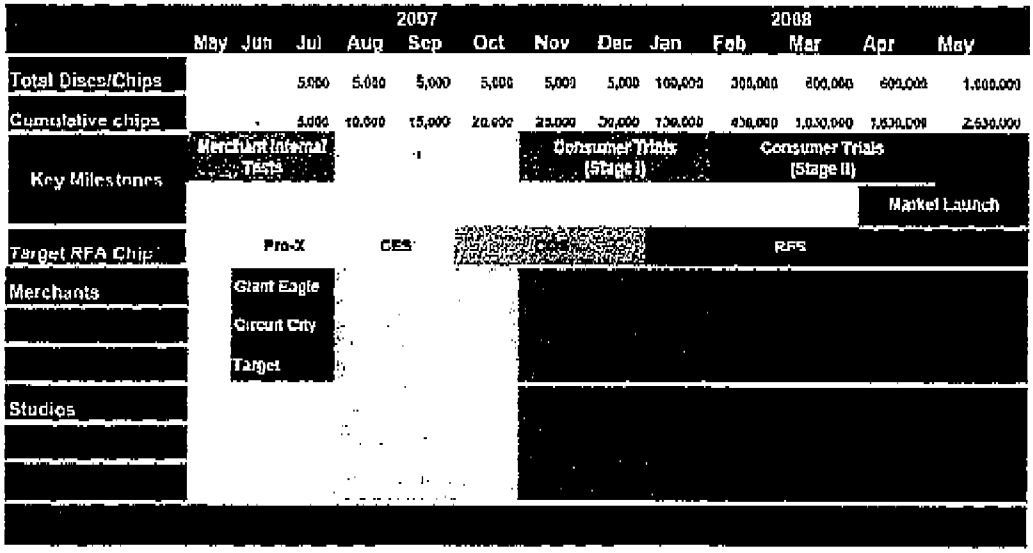

Fig 5. Kestrel Wireless proposed time line

Updated by Joerg Hauer

Open issue: NXP asks generally on issue such high amount of sample pieces during CES/COS phase. Although parties signing a legal waiver could possibly receive it. NXP will propose development plan and sample availability to Kestrel Wireless.

1.7.2 Technical constraints

n.a.

1.8 Boundary conditions

n.a.

1.9 Assumptions

The target process is CMOS14NV.

2. Requirements list

This chapter gives a detailed overview of RFA/CiD chip requirements, such as chip size, pads, memory, functional, electrical requirements. IC size and high as well as pad size, height and location is a proposal only. Specific values have to be aligned with PSI group during project execution.

2.1 IC Size

The nominal IC dimensions shall approximately 0.5 mm x 0.5 mm and shall be 120 microns thick. 75 microns thickness would be nice to have. The final die size is to be determined after design completion.

2.2 Pads

It has been agreed that the RFA/CiD chip requires at least two pads for antenna connection and two pads to connect the electrochomic film. A fifth pad is required for test purpose.

2.3 Pad Locations and Bumps

The nominal pad locations and dimensions shall be in accordance with Fig 6 shown below. The final pad locations and dimensions to be determined after design completion.

Bumps shall be Gold, nominally 60 microns by 60 microns. Bump height for LA, LB, GND and OUT1 shall be 18 microns; bump height for VDD shall be 3 microns.

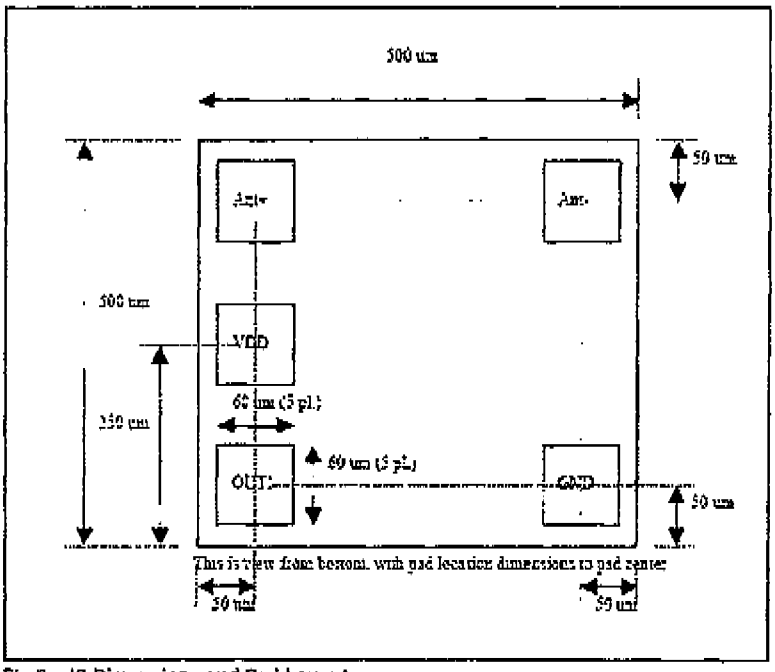

Fig 8. IC Dimensions and Pad Layout

Remark: Has to be realigned with inlay manufacturer, depends on coil design, coil connection, film connection etc. Is in any pre-manufactured or integrated during COB/COG manufacturing

Add. Information: VDD Pad will be disconnected after wafer sawing. VDD will have 30x30um size

2.4 Pad electrical requirements

Electrical/functional requirements of pads are summarized in below Table 1:. The requirements have been worked out and agreed together with Kestrel Wireless.

Contact	Optical Media Mode, HF Band
Ant+, Ant-	
Frequency Range:	13.56±0.007 MHz (Per ISO14443-2)
Input Capacitance	C_{in} = 17pF OR C_{in} = 50pF
Antenna Coil	To be selected with regard to Frequency Range and appropriate C_i
Input Amplitude:	1.5 A/m minimum to 7.5A/m Maximum per ISO 14443A, with ISO card size antenna at typical

	f(resonance)=14.5 MHz
Modulation Type:	Per ISO 14443A- 106kBaud
RF communication protocol:	ISO 14443A with Kestrel extensions
Temperature range:	-25 °C to +70°C
OUT1:	
Output Type:	Current source voltage limited. See Driver output requirements.
Voltage Range:	[redacted]
Output Current:	1mA minimum average at 1.5A/m RF field and up to 5mA minimum average at 7.5A/m with ISO card-size antenna.
Current Limiting:	The output current shall be limited to prevent the IC from dropping below an operational threshold due to current consumption, i.e. the IC must not undergo Reset due to current drain.
Film Switching Monitor:	See Driver output requirements
Test Mode:	In order to verify IC connectivity to the film, the IC shall have a test mode to provide a low voltage output for a very brief duration and current monitoring capability. See Driver output requirements
Tampering Protection:	The IC design shall incorporate features to assure positive voltage no greater than 100 mV on Out1 pad, relative to GND pad, in non activated state.

[1] - In order to find out the best optimal antenna solution on the first silicon run we try to implement same IC with two different input capacitors. Base on the evaluation best solution will be implemented on the final IC.

Table 1: Pads electrical requirements

2.5 EO film driver output requirements (Out1)

OUT1 shall be capable of achieving 2.3 V and 1 mA at RF field strength of 1.5 A/m. The OUT1 voltage shall be programmable between VOUT1=1.7 V and VOUT1=2.3 V inclusive, in 200 mV steps (2 bit resolution). Possible values:

1.7V: 0000b

1.9V: 0001b

2.1V: 0010b

2.3V: 0011b

Reserved All other values

When Activated, OUT1 shall be capable of supplying 1 mA minimum and up to 5 mA to the shutter film, depending on the RF field strength. The OUT1 voltage shall adjust itself to maintain this nominal constant current, increasing as the film switches to the "clear" state. The completion of the film switching will be determined when the OUT1 voltage increases to Vendpoint.

Vendpoint shall be programmable between approximately VOUT1 – 700mV and VOUT1 – 100 mV, in 200 mV steps (2 bit resolution). Possible values:

VOUT1 – 100mV: 0000b

VOUT1 – 300mV: 0001b

VOUT1 – 500mV: 0010b

VOUT1 – 700mV: 0011b

Reserved All other values

For Test purposes, OUT1 shall apply voltage Vtest=100mV (±30mV) after a settling time of minimum 60µs the current Itest will be measured. PASS = 40µA < Itest < 60µA. The chip shall respond with indication of [redacted]

2.6 IC Memory requirements

Kestrel requires the use of two memory banks:

- Public memory (always readable, part of it can be modified)
- Write-Once Memory (WOM) (written once, non-readable from outside the tag)

Another memory area is required by NXP for SNR and configuration pages.

A size of 2kBit memory is necessary in order to fit all required data into the memory. The proposed Memory Mapping of the serial 2kBit EEPROM is illustrated in Table 2:and the access conditions are illustrated in Table 3: below.

	Byte # / Page #	0	1	2	3	
public	0	SN0	SN1	SN2	BCC0	Chip Manufacturer data, Read Only
	1	SN3	SN4	SN5	SN6	
	2	BCC1	NXP Data	NXP Data	NXP Data	
	3	NXP Data	NXP Data	NXP Data	NXP Data	
	4	[illegible]	[illegible]	[illegible]	[illegible]	Writeable in Uninit. State, always readable
	5	[illegible]	[illegible]	[illegible]	[illegible]	
	6	[redacted]				Read Only (modified via Authenticate command)
	7					
	8					
	9					
	10					
	11					
	12					
	13					
	14	[illegible]				Writeable in Uninit.State or Reload State; always readable
	...					
	38	[illegible]				
	39	Reserved (11 pages)				
	...					
	49					
private	50	Activation Token (128 Bit)				Writeable and readable only in Uninit.State
	...					
	53					
	54	Termination Token (64 Bit)				
	55					
	56	Reload Token (64 Bit)				
	57					
	58	Termination Confirmation Token (64 Bit)				
	59					
hidden	60	NXP Internal Data				No access, hidden
	...					
	63					

Table 2: Memory Mapping 2kBit EEPROM

Page	Access Conditions	Remarks
Page 0 – 3	RO WR during Wafer Test only	NXP: Serial Number and manufacturer information. Written during wafertest. Cannot be modified in field.
Page 4 - 5	RO WR in Uninitialized state only	Kestrel: Chip relevant information: 8 Bit Version Number, 2 Bit IC Type, 6 Bit Transaction Set, 8 Bit Shutter Transition Time, 4 Bit OUT1 Voltage, 4 Bit Endpoint Voltage and 32 Bit Padding. *(These bits can be used by Kestrel for further information on the IC).*
Page 6 – 11	RO	State Byte and Counter Bytes incl. double save (DS). Data can only be modified via Authenticate command.
Page 12 – 13	RO	Configuration Byte for Testmode
Page 14 – 38	RO WR in Uninitialized and Reload state only	25 Pages (100 Byte) Kestrel Data.
Page 39 – 49	RO WR in Uninitialized and Reload state only	Reserved Memory
Page 50 – 53	RW in Uninitialized state only	128 Bit Activation Token
Page 54 – 55	RW in Uninitialized state only	64 Bit Termination Token
Page 56 – 57	RW in Uninitialized state only	64 Bit Reload Token
Page 58 – 59	RW in Uninitialized state only	64 Bit Termination Confirmation Token
Page 60 – 63	Always hidden	4 Pages for NXP internal data.

Table 3: Memory pages access conditions

2.7 IC Protocol and commands set requirements

The RFA/CID IC should support protocol and command structure of ISO14443A up to level 3 (anti-collision/select). The following Fig 7 shows the RFA/CID chip state diagram after ISO14443A-3 anti-collision/select was successful (please refer also to chapter 1.3 Basic Product Functions).

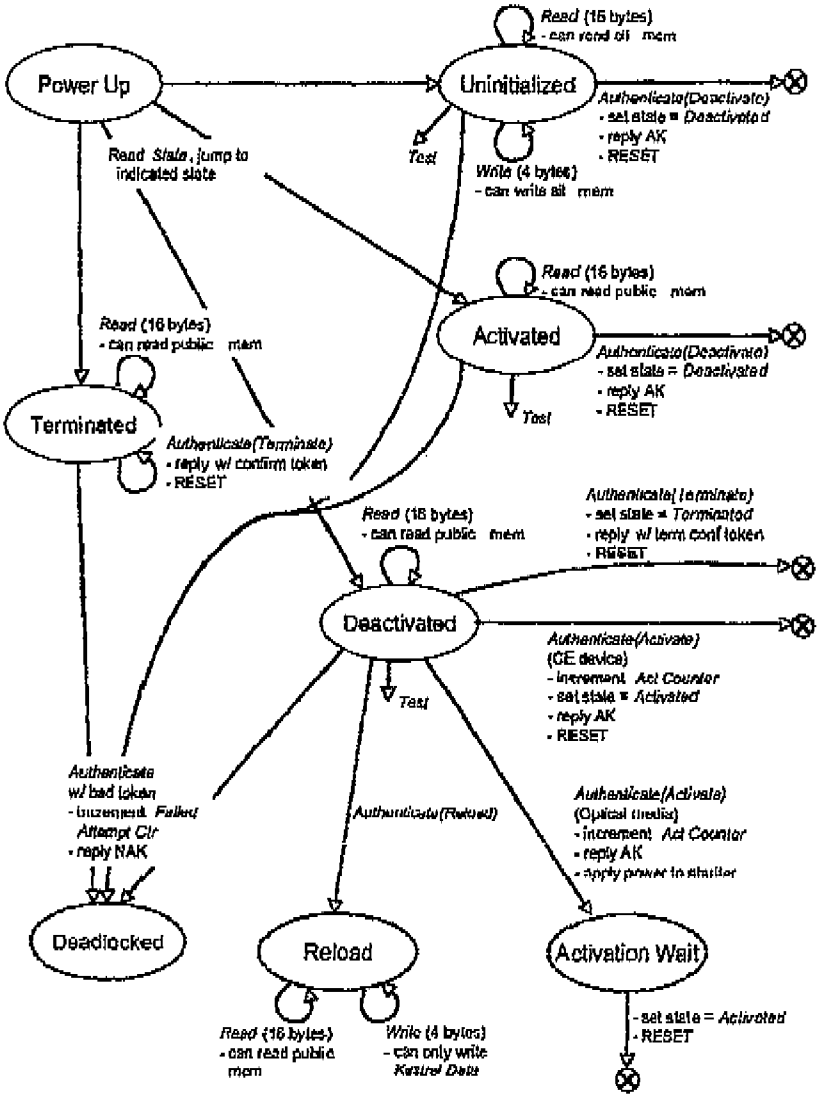

Fig 7. RFA/CID IC state diagram

Following general proprietary commands should be supported:

- **Read**
  This command returns 16 bytes (4 pages) of tag memory, taking the starting page address (ADR) as a parameter. For page # not supported, the chip returns a NAK.
- **Write**
  This command writes 4 bytes (1 page) of tag memory, taking the page address (ADR) as a parameter. Response is AK for successful or NAK in case of any error.
- **Authenticate**
  This command specifies an action (ACT) for the RFA chip to perform and passes a token as a parameter. The RFA chip compares the incoming token with the corresponding plaintext token stored in WOM, and if the tokens match, performs the specified action. Response is AK or NAK depending on success or not.
- **Test**
  It allows the manufacturer to verify that the chip has electrical connectivity to the EO shutter and that there are no shorts in the circuit. When the RFA chip receives this command, it verifies that the Test Mode field is set to Tests allowed. If so, the chip applies a small voltage (< 100 mV) to the shutter leads, and tests for a minimum and maximum current. It then reports the result back to the reader. The voltage applied will be less than the threshold required to cause the EO shutter transition to start, so even repeated Test commands won't cause the film to transition. Response NAK if any error occurred.
- **Test Disable**
  When the RFA chip receives this command, it sets the Test Mode field to all 0s, and then resets the chip. This disables any further Test commands. There is no way to re-enable tests after the chip receives this command. Response AK or NAK.

The following overview shows which command is applicable in which chip state and what restrictions should be applied to the memory access:

Uninitialized state:

CMD	*Response*	*Restriction*
Read	Data(16Byte) or NAK	Public and private
Write	ACK or NAK	Public and private
Auth(Deactivate)	ACK+RESET or NAK	
Test	Pass, Fail, NAK + DL	
Test-Disable	ACK or NAK	

Deactivated state:

CMD	*Response*	*Restriction*
Read	Data(16Byte) or NAK	Public memory
Auth(Activate)	ACK or NAK + DL	
Auth(Terminate)	ACK+RESET or NAK + DL	
Auth(Reload)	ACK or NAK + DL	
Test	Pass, Fail, NAK + DL	
Test-Disable	ACK or NAK	

Activated state:

CMD	Response	Restriction
Read	Data(16Byte) or NAK	Public memory
Auth(Deactivate)	ACK+RESET or NAK + DL	
Test	Pass, Fail, NAK + DL	
Test-Disable	ACK or NAK	

Terminated state:

CMD	Response	Restriction
Read	Data(16Byte) or NAK	Public Memory
Auth(Terminate)	Term.Token+RESET or NAK + DL	

Reload sate:

CMD	Response	Restriction
Read	Data(16Byte) or NAK	Public Memory
Write	ACK or NAK	Kestrel Data + Reserved

In the states "ACTIVATION WAIT" and "DEADLOCKED" the chip will NOT respond to any command from the reader.

Each Command-frame should also contain one Startbit, one Stopbit and a Parity bit after each Byte and also should be protected by one byte CRC.

2.8 Memory Data Retention Requirements

Table 4: Requirements list

Identity	Requirement	Rationale	Source	Priority	Status
1	Two antenna connection pads	Tag design, RFID communication 13.56MHz	HS	1	
2	Two pads to connect and switch EO film	Shutter activation, current driven, voltage controlled (see definitions above)	HS	1	
3	Smallest possible chip size	Has to fit into optical media	HS	2	
4	Small chip thickness	Has to fit into optical media	HS	2	
5	Support ISO14443A-3	Compatible to current ISO infrastructure until anti-collision/select	HS	1	
6	2kbit memory	To fit all required data (see definitions above)	HS	1	
7	Kestrel Wireless defined proprietary command set and state diagram	Support for Kestrel Security Network	HS	1	
8					

3. Quality Requirements

- Beside any quality requirements coming from the customer, the standard BU-A&ID quality requirements shall be considered.
- Standard NXP/BU A&ID reliability requirements for integrated circuits should be applied.
- The RFA/CID chip requires a temperature range from -25°C to +70°C.
- All known-good dies and fail parts should be marked on wafer map when shipped.

3.1 Functional integrity

- Product should be compliant to ISO 14443A - part 3.
- It has to be investigated if standard EMV/ESD requirements for integrated circuits are sufficient. There could be potentially problems with electrostatic charges/discharges coming from special material of optical media's.
- Please refer also to chapter 1.4 Statutory and Regulatory Requirements.

3.2 Summary quality requirements

Table 5: Quality requirements list

Identity	Quality Requirement	Rationale	Source	Priority	Status
1	Standard BU A&ID quality requirements	Standard chip qualification	HS	1	
2	Standard BU A&ID reliability requirements	Standard chip qualification	HS	1	
3	Kestrel temperature range -25°C to +70°C	Kestrel requirement	Kestrel	1	
4	Wafer delivery on FFC (UV tape)	Inlay manufacturer	HS	1	
5	Wafer map with known good dies and fail parts marked	Inlay manufacturer	HS	1	
6	EMV/ESD standard or special?	Connected to reliability for that special application	HS	1	implement NXP standard chip requirements
7	Chip design to get FCC, CE or ETSI compliant system	To facilitate required system certification	HS	1	
8	Standard BU A&ID requirements for medical safety on integrated circuits	Standard chip qualification	HS	1	
9	Chip must meet European Union RoHs requirements (lead-free, prohibited substances),WEEE requirements have to be investigated	To facilitate required system certification	HS	1	implement NXP standard chip requirements

4. Open issues

Table 6: Open issues to be clarified

	Open issue to be clarified	By	Until	Status
1	EMV/ESD requirements	Heiko Scharke, Wolfgang Steinbauer, Kestrel	S-Gate	Assume NXP standard specification
2	Exact switching behavior of FO film	Kestrel	S-gate	Open
3	Optimal coil parameter (Inductance, Q etc.)	Kestrel, Chuck Pagano	S-Gate	Open
4	Specification chip size and height, pad size, location and height - Align with inlay manufacturer, Replicator, coil manufacturer Inlay pre manufactured or integrated during CD/DVD production	PSI group Inlay manuf. Coil manuff. Replicator	S-gate	Assume NXP expertise & align with Muehlbauer experts
5	Requirements for WEEE	Kestrel	S-gate	Assume NXP standard specification
6	Agreed development schedule and sample amount	NXP Kestrel	S-gate	Open

5. Acceptance Reviews and Approvals

Table 7: Acceptees

Name	Role	Location	Date

Table 8: Approvers

Name	Role	Location	Date	Signature (if required)

6. Document management

6.1 Abbreviations and terminology

Table 9: Abbreviations and terminology

Abbreviation	Description
RFA	Radio Frequency Activation
CID	Chip In Disc

6.2 Referenced documents

Table 10: Referenced documents

Doc ID	Doc Title	Version	Author	Issue Date
0001	Kestrel RFA IC Requirements Overview	1.28	Jim Kruest Dave Hendricks Eric Mikutelt	2006-10-23
0002	Kestrel Wireless Company Overview		Kestrel Wireless	2006-06-01
0003	RFA / CID Business Plan	1.0	Joerg Huser	2006-05-11

6.3 Distribution

Table 11: Distribution

Name	Role	Location

Appendix A <appendix>