

## PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1  
 Stylesheet Version v1.2

EPAS ID: PAT3660941

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT
<b>CONVEYING PARTY DATA</b>	
<b>Name</b>	<b>Execution Date</b>
ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE (EPFL)	12/11/2015
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<b>PROPERTY NUMBERS Total: 3</b>	
<b>Property Type</b>	<b>Number</b>
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Patent Number:	8781028
Patent Number:	7683308
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<b>DATE SIGNED:</b>	12/16/2015
This document serves as an Oath/Declaration (37 CFR 1.63).	
<b>Total Attachments: 5</b>	
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ASSIGNMENT (US)

Ecole Polytechnique Fédérale de Lausanne (EPFL), a public institution with its principal place of business in Lausanne, Switzerland ("Assignor") declares that it is the sole owner of the patents and patent applications set forth on Attachment 1 hereto.

For valuable consideration, the receipt and adequacy of which is hereby acknowledged, Assignor hereby sells, assigns, and transfers unto Samsung Electronics Co. Ltd., a corporation incorporated under the laws of the Republic of Korea (the "Assignee"), the sole and entire right, title, and interest that exist today and may exist in the future in and to the patents and patent applications set forth on Attachment 1 hereto, including all rights pursuant to 35 U.S.C. § 154 and any and all Letters Patent issuing therefrom, and any and all reissues, reexaminations, extensions, continuations, continuations-in-part, divisionals, provisionals, substitutions, renewals, and registrations of any item in the foregoing; all inventions described in any of the foregoing; and any and all patents, patent applications and counterparts arising from any item in the foregoing (the "Assigned Patents"); and all past, present, and future causes of action and claims for damages derived by reason of patent infringement thereof, for said Assignee's own use and for the use of its assigns, successors, and legal representatives to the full end of the term of each of the Assigned Patents.

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Assignor hereby authorizes the respective patent office or governmental agency in each jurisdiction to issue any and all patents, certificates of invention, utility models or other governmental grants or issuances that may be granted upon any of the Assigned Patents in the name of Assignee, as the assignee to the entire interest therein.

IN WITNESS WHEREOF this Assignment is executed on Dec 11, 2015

Ecole Polytechnique Fédérale de Lausanne

Gabriel Clerc

Name Head of EPFL-TTO

Date Dec 11, 2015

EPFL  
Technology Transfer Office - TTO  
EPFL Innovation Park J  
CH-1015 Lausanne



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ATTESTATION OF SIGNATURE

The undersigned witnessed the signature of G. Clerc to the above Assignment on behalf of EPFL and makes the following statements:

1. I am over the age of 18 and competent to testify as to the facts in this Attestation block if called upon to do so.
2. G. Clerc is personally known to me (or proved to me on the basis of satisfactory evidence) and appeared before me on Dec 11, 2015 to execute the above Assignment on behalf of EPFL.
3. G. Clerc subscribed to the above Assignment on behalf of EPFL.

EXECUTED on Dec 11, 2015 (date)

Harold LANTIER  
Print Name: \_\_\_\_\_



Exhibit 1



(12) United States Patent  
Charbon et al.

(10) Patent No.: US 8,781,028 B2  
(45) Date of Patent: Jul. 15, 2014

(54) INTEGRATED RECEIVING CIRCUIT AND METHODS FOR RADIOFREQUENCY AND HIGH SPEED SIGNALS

(75) Inventor: Edouardo Charbon, Echandens (CH);  
Marek Gersbach, Leussane (CH);  
Maximilien Scrogio, Leussane (CH)

(73) Assignor: Ecole Polytechnique Fédérale de  
Leussane (EPFL), Leussane (CH)

(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 998 days.

(21) Appl. No.: 12/724,586

(22) Filed: Mar. 16, 2010

(65) Prior Publication Data

US 2010/0208845 A1 Aug. 19, 2010

Related U.S. Application Data

(63) Continuation of application No.  
PCT/EP2007/059995, filed on Sep. 20, 2007.

(51) Int. Cl.  
H04L 37/00 (2006.01)

(52) U.S. Cl.  
USPC 375/316; 330/277; 330/296; 330/307;  
330/308; 257/186; 257/438; 250/389

(58) Field of Classification Search  
USPC 375/316; 250/214; 363.03; 207;  
250/363.03 R

See application file for complete search history.

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Electro Mechanical S.A., Leussane, CH*, vol. 130-131, Aug. 14, 2006,  
pp. 273-281.

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Primary Examiner --- Daniel Washburn

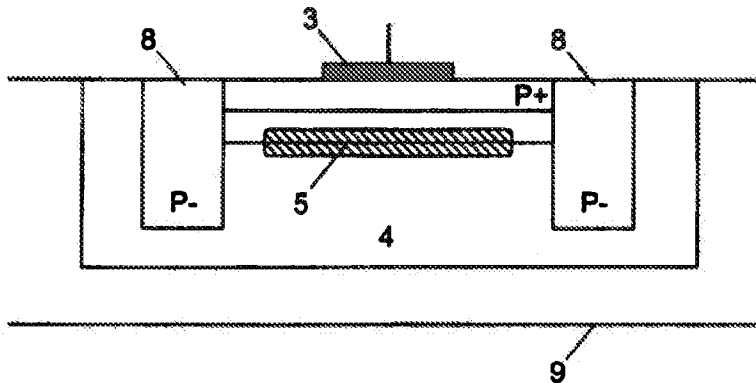
Assistant Examiner --- Ebori Hughes

(74) Attorney, Agent, or Firm --- Blank Rome LLP

(57) ABSTRACT

Integrated receiving circuit for radiofrequency signals as  
amplifying element using the multiplication noise of a reverse  
biased semiconductor junction operating in Geiger mode for  
amplifying an input radiofrequency signal (Vin) and convert-  
ing it into a digital signal. And a digital part for digitally  
processing the digital signal.

13 Claims, 4 Drawing Sheets







(33) **United States Patent**  
**Fredembach et al.**

(16) **Patent No.:** US 8,462,238 B2  
 (45) **Date of Patent:** Jun. 11, 2013

(54) **CAMERA DESIGN FOR THE  
 SIMULTANEOUS CAPTURE OF  
 NEAR-INFRARED AND VISIBLE IMAGES**

(58) **Field of Classification Search**  
 USPC ..... 348/272, 274, 275, 279, 278, 276,  
 348/236  
 See application file for complete search history.

(73) **Inventor:** **Clément Fredembach, Scriver (CI);  
 Yves Le, Arlington, MA (US); Subira  
 Shastri, Lannion (CI)**

(56) **References Cited**

(73) **Assignor:** **Kodak Patentechnique Frédéric de  
 Lannion (EPFL, Lannion (CI))**

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(\*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 9 days.

(21) **Appl. No.:** 12/998,567

(22) **PCT Filed:** Sep. 8, 2009

(86) **PCT No.:** PCT/EP2009/050919

§ 371 (c)(1),  
 (2), (4) Date: Jun. 28, 2011

(87) **PCT Pub. No.:** WO2010/052903

PCT Pub. Date: May 14, 2010

(68) **Prior Publication Data**

US 2011/0249157 A1 Oct. 13, 2011

**Related U.S. Application Data**

(60) Provisional application No. 61/311,608, filed on Nov. 6, 2009.

(51) **Int. Cl.**  
**H04N 5/335** (2011.01)

(53) **U.S. Cl.**  
 USPC ..... 348/273; 348/279

International Search Report, Dec. 15, 2009

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Primary Examiner - Tam Ho

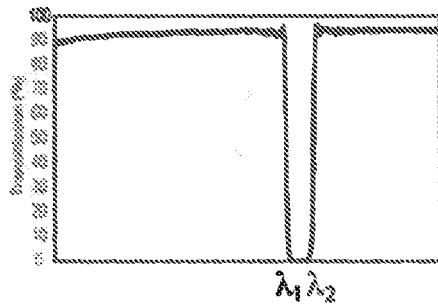
Assistant Examiner - Kristina Wu

(74) **Attorney, Agent, or Firm:** Harmon, Siu & Pines, PLLC.

(57) **ABSTRACT**

The present invention aims to capture two images simultaneously in the visible part of the spectrum and a NIR image. This is achieved through a camera for simultaneously capturing a visible and near-infrared image by at least a sensor producing sensor response data and having at least one color filter array (CFA) comprising at least four different filters, said color filter array having visible and near-infrared light filters, and said camera comprising means to obtain a visible image while using the sensor response data from the visible part of the spectrum and a NIR image using the sensor response data from the near-infrared part of the spectrum.

14 Claims, 5 Drawing Sheets



R <sub>IR</sub>	B <sub>IR</sub>	G <sub>IR</sub>	R <sub>IR</sub>	B <sub>IR</sub>	G <sub>IR</sub>
B <sub>IR</sub>	G <sub>IR</sub>	R <sub>IR</sub>	B <sub>IR</sub>	G <sub>IR</sub>	R <sub>IR</sub>
G <sub>IR</sub>	R <sub>IR</sub>	B <sub>IR</sub>	G <sub>IR</sub>	R <sub>IR</sub>	B <sub>IR</sub>
R <sub>IR</sub>	B <sub>IR</sub>	G <sub>IR</sub>	R <sub>IR</sub>	B <sub>IR</sub>	G <sub>IR</sub>
B <sub>IR</sub>	G <sub>IR</sub>	R <sub>IR</sub>	B <sub>IR</sub>	G <sub>IR</sub>	R <sub>IR</sub>
G <sub>IR</sub>	R <sub>IR</sub>	B <sub>IR</sub>	G <sub>IR</sub>	R <sub>IR</sub>	B <sub>IR</sub>

