

## PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1  
 Stylesheet Version v1.2

EPAS ID: PAT5119940

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT	
<b>NATURE OF CONVEYANCE:</b>	PATENT SECURITY AGREEMENT	
<b>CONVEYING PARTY DATA</b>		
<b>Name</b>		<b>Execution Date</b>
LEXMARK INTERNATIONAL, INC.		04/02/2018
<b>RECEIVING PARTY DATA</b>		
<b>Name:</b>	CHINA CITIC BANK CORPORATION LIMITED, GUANGZHOU BRANCH, AS COLLATERAL AGENT	
<b>Street Address:</b>	CITIC PLAZA, NO. 233 NORTH TIAN HE ROAD, TIAN HE DISTRICT	
<b>Internal Address:</b>	FLOOR 48-50	
<b>City:</b>	GUANGZHOU	
<b>State/Country:</b>	CHINA	
<b>PROPERTY NUMBERS Total: 1580</b>		
<b>Property Type</b>	<b>Number</b>	
Patent Number:	5901000	
Patent Number:	5918874	
Patent Number:	5926673	
Patent Number:	5936371	
Patent Number:	5942287	
Patent Number:	5950783	
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Patent Number:	6021297	
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Patent Number:	6027268	
Patent Number:	6037963	

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Patent Number:	D791229

#### CORRESPONDENCE DATA

##### Fax Number:

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ATTORNEY DOCKET NUMBER:	9083633-0002-BC15
NAME OF SUBMITTER:	PETER GIOVINE
SIGNATURE:	/Peter Giovine/
DATE SIGNED:	08/30/2018
	This document serves as an Oath/Declaration (37 CFR 1.63).

#### Total Attachments: 87

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## PATENT SECURITY AGREEMENT

**PATENT SECURITY AGREEMENT**, dated as of April 2, 2018, by Lexmark International, Inc., a Delaware corporation, located at 740 West New Circle Road, Lexington, Kentucky 40550 (the “Pledgor”), in favor of CHINA CITIC BANK CORPORATION LIMITED, GUANGZHOU BRANCH, located at Floor 48-50, CITIC Plaza, No. 233 North Tian He Road, Tian He District, Guangzhou, PRC, in its capacity as collateral agent pursuant to the Credit Agreement (in such capacity, the “Collateral Agent”).

### WITNESSETH:

WHEREAS, the Pledgors are party to a Security Agreement, dated as of April 2, 2018 (as amended, amended and restated, supplemented or otherwise modified from time to time, the “Security Agreement”), in favor of the Collateral Agent pursuant to which the Pledgor is required to execute and deliver this Patent Security Agreement;

NOW, THEREFORE, in consideration of the premises and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Pledgor and the Collateral Agent hereby agree as follows:

SECTION 1. Defined Terms. Unless otherwise defined herein, terms defined in the Security Agreement and used herein have the meaning given to them in the Security Agreement.

SECTION 2. Grant of Security Interest in Patent Collateral. As collateral security for the payment and performance in full of all the Co-Secured Obligations, the Pledgor hereby pledges and grants to the Collateral Agent for the equal and ratable benefit of the Co-Secured Parties a lien on and security interest in all of the right, title and interest of such Pledgor in, to and under the Patents included in the Pledged Collateral, including those Patents of such Pledgor listed on Schedule I attached hereto, wherever located, and whether now existing or hereafter arising or acquired from time to time; provided, however, that the foregoing grant shall not apply to any Excluded Assets, including any Patent application filed anywhere in the world.

SECTION 3. Security Agreement. The security interest granted pursuant to this Patent Security Agreement is granted in conjunction with the security interest granted to the Collateral Agent, for the equal and ratable benefit of the Co-Secured Parties, pursuant to the Security Agreement and Pledgor hereby acknowledges and affirms that the rights and remedies of the Collateral Agent with respect to the security interest in the Patents included in the Pledged Collateral made and granted hereby are more fully set forth in the Security Agreement. In the event that any provision of this Patent Security Agreement is deemed to conflict with the Security Agreement, the provisions of the Security Agreement shall control.

SECTION 4. Termination. Upon the payment in full of the Secured Obligations and termination of the Security Agreement and at the other times required by Section 10.16 of the Credit Agreement, the Collateral Agent shall execute, acknowledge, and deliver to the Pledgor an instrument in writing in recordable form releasing any and all collateral pledge, grant,

lien and security interest in the Patents included in the Pledged Collateral under this Patent Security Agreement.

SECTION 5. Execution in Counterparts. This Patent Security Agreement and any amendments, waivers, consents or supplements hereto may be executed in any number of counterparts and by different parties hereto in separate counterparts, each of which when so executed and delivered shall be deemed to be an original, but all such counterparts together shall constitute one and the same agreement. Delivery of any executed counterpart of a signature page of this Patent Security Agreement by facsimile or other electronic transmission shall be effective as delivery of a manually executed counterpart of this Patent Security Agreement.

SECTION 6. Governing Law, Jurisdiction and Consent to Service of Process; Waiver of Jury Trial. Sections 10.09 and 10.10 of the Credit Agreement are incorporated herein, mutatis mutandis, as if a part hereof. This Patent Security Agreement shall be governed by, and construed in accordance with, the law of the State of New York.

[signature page follows]

IN WITNESS WHEREOF, the Pledgor has caused this Patent Security Agreement to be executed and delivered by its duly authorized officer as of the date first set forth above.

Very truly yours,

LEXMARK INTERNATIONAL, INC.

By: \_\_\_\_\_

Name: Arthur S. Richards

Title: Treasurer

Accepted and Agreed:

CHINA CITIC BANK CORPORATION LIMITED, GUANGZHOU BRANCH,  
as Collateral Agent

By: \_\_\_\_\_

Name:

Title:

IN WITNESS WHEREOF, the Pledgor has caused this Patent Security Agreement to be executed and delivered by its duly authorized officer as of the date first set forth above.

Very truly yours,

LEXMARK INTERNATIONAL, INC.

By:

Name: Arthur S. Richards

Title: Treasurer

Accepted and Agreed:

CHINA CITIC BANK CORPORATION LIMITED, GUANGZHOU BRANCH,  
as Collateral Agent

By:

Name: 谢宏儒

Title: 中信银行广州分行行长

**SCHEDULE I**  
**to**  
**PATENT SECURITY AGREEMENT**  
**PATENT REGISTRATIONS**

**Patent Registrations:**

See attached list. Lexmark International, Inc. is the registered owner of each item on the attached list.

<b>Publication Number</b>	<b>Title</b>
US5901000	Sound reduced rotatable polygon assembly
US5918874	Tray for narrow and normal width sheets
US5926673	Driving mechanism for photosensitive image bearing drum in electrophotographic machines
US5936371	Method and apparatus for controlling a servo motor using a stepper motor controller integrated circuit
US5942287	Extended wear developer sleeve with coupling agent
US5950783	Self adjusting wrap spring clutch
US5966231	Method and apparatus for aligning multiple laser beams
US5976633	Dip coating through elevated ring
US5980139	Method of speed control for imaging system including printers with intelligent options
US5994013	Dual layer photoconductors with charge generation layer containing charge transport compound
US5995774	Method and apparatus for storing data in a non-volatile memory circuit mounted on a printer's process cartridge
US6001523	Electrophotographic photoconductors
US6004708	Electrophotographic photoconductor containing fluorenyl-azine derivatives as charge transport additives
US6004711	Toner composition including positive and negative tribocharging hydrophobic extra-particulate additives
US6005703	Optical system for light beam scanning
US6009291	Control of photosensitive roller movement
US6021297	Flexible doctor blade having a radiused contact surface
US6022657	Methods of making charge generation layers containing charge transport compound, and photoconductors containing the same
US6027268	Method and apparatus for replacing a printer with a new printer of a different

<b>Publication Number</b>	<b>Title</b>
	type
US6037963	Laser printer having variable beam spacing
US6038636	Method and apparatus for reclaiming and defragmenting a flash memory device
US6040098	Solution squarylium charge generation systems incorporating binder blends
US6042946	Polyurethane roller with high surface resistance
US6042980	Photoconductor with charge generation binder blend
US6064171	Host based stepper motor phase controller and method therefor
US6064853	Apparatus for curling materials
US6065886	Image forming apparatus with sheet separator
US6066427	Methods for making a charge generating layers comprising type i polymorph of titanyl phthalocyanine with reduced photosensitivity and photoconductors including the same
US6071660	Electrophotographic photoconductor containing high levels of polyolefins as charge transport additives
US6076419	Gear arrangement
US6076821	Method and apparatus for feeding sheets
US6078771	Low friction doctor blade
US6080518	Electrophotographic photoconductor containing simple quinones to improve electrical properties
US6082730	Integrated long sheet feeder
US6087011	Polyurethane roller with oxide surface layer
US6090305	Heater for use in electrophotographic image fixing device
US6100601	Measurement of toner level employing sensor on paddle
US6102388	Envelope feeder

<b>Publication Number</b>	<b>Title</b>
US6102591	Method of speed control for imaging system including printers with intelligent options
US6111230	Method and apparatus for supplying ac power while meeting the european flicker and harmonic requirements
US6111654	Method and apparatus for replacing or modifying a postscript built-in font in a printer
US6112048	Apparatus for curling materials
US6114583	Preparation of triarylamine
US6115031	Method of converting color values
US6118969	Electrophotographic fuser roll having distributed thermal mass
US6122460	Method and apparatus for automatically compensating a degradation of the charge roller voltage in a laser printer
US6124696	Programmable stepper motor controller and method therefor
US6126164	Bail assembly
US6133844	System and method for programming an operator panel led for printer
US6135438	Apparatus for feeding sheets from two separate sources
US6139007	Sheet separator dam with buckling element
US6147699	Low electromagnetic emissions and improved signal quality video drive architecture for laser printers
US6150025	Polyurethane roller with high surface resistance
US6157806	Fuser system with greased belt
US6160975	Closed loop ramping control and method of fusing temperature, and optimizing first copy time
US6165280	Method of cleaning toner resin from a printing device
US6167103	Variable spread spectrum clock
US6173151	Electrostatic fuser with post-nip electrically biased discharge member

<b>Publication Number</b>	<b>Title</b>
US6175375	Method and apparatus for compensating for a darkness shift during the life of an electrophotographic printer cartridge
US6181904	Toner cartridge with pre-doctoring comminuator
US6181908	Apparatus for corrugating materials
US6185389	Control of thermal heating in a belt fuser
US6198897	Method and apparatus for correcting transfer belt position via stored parameters
US6199990	Rotatable mirror assembly for optical path reversal in a laser scanning machine
US6213460	Label support
US6214502	Charge generation layers comprising binder blends and photoconductors including the same
US6219521	Belt fuser wiper to remove moisture
US6223005	Multi-level oiling device and process for a fuser system
US6227534	Method and apparatus for controlling an auto compensation pick mechanism to reduce the occurrence of multi-feeds
US6229555	Method and apparatus for minimizing visual artifacts generated by an electrophotographic machine during imaging
US6231043	Retractable exit tray for imaging apparatus
US6232025	Electrophotographic photoconductors comprising polaryl ethers
US6238114	Print media handling system and method of using same
US6238759	Coated charge roller
US6245471	Charge generation layers comprising at least one titanate and photoconductors including the same
US6246841	Removable toner cartridge
US6246842	Fuser control for limiting current draw in an electrophotographic machine

<b>Publication Number</b>	<b>Title</b>
US6247088	Bridgeless embedded pci computer system using synchronous dynamic ram architecture
US6247786	Dynamic pass buffer sizing
US6249659	Toner cartridge with conductive drive hub
US6252618	Method of controlling print registration in an electrophotographic machine
US6253045	Multi-level oiling device drive mechanism
US6253046	Multi-functional fuser backup roll release mechanism
US6255960	System and method for programming display characteristics of an led of an electrical appliance
US6262753	Electrophotographic imaging apparatus with reduced packaging size
US6263182	Fuser oil dispenser for an image forming apparatus
US6265124	Photoconductors and charge generation layers comprising polymeric hindered phenols
US6266165	Method for morphing n-dimensional data using a scattered data transformation
US6266496	Constant displacement oil web system and method of operating the same
US6266510	Control of wrinkling in belt fuser by nip configuration
US6272310	Toner fuser system having post-fuser media conditioner
US6278438	Method of displaying digital photograph based bitmaps
US6279897	Sheet separator dam
US6279899	Substrate sensing mechanism for use in a printer output bin
US6281918	Laser printhead mounting apparatus and printhead skew adjustment mechanism for an electrophotographic machine
US6284373	Electrostatic fuser rolls and belts
US6285383	Method of controlling laser scanner phase in a multicolor electrophotographic machine

<b>Publication Number</b>	<b>Title</b>
US6285838	Belt fuser overheat control
US6292507	Method and apparatus for compensating a spread spectrum clock generator
US6292646	Anti-unraveling device for a fuser oil supply web
US6300025	Photoconductors with polysiloxane and polyvinylbutyral blends
US6301456	Method and apparatus for inserting a cartridge into an image forming apparatus
US6304337	Stochastic method of enlarging a visual image
US6304731	Printer for narrow media
US6309784	Charge transport layers and/or charge generation layers comprising unsaturated aliphatic hydrocarbons and photoconductors including the same
US6311971	Stacker controlling curl
US6317218	Printer with adaptive printing mode
US6327455	Back-up roller with reduced mass
US6327458	Method and apparatus for positioning paper in an imaging system having an intermediate transfer medium
US6330424	Method and apparatus for minimizing the open loop paper positional error in a control system for an electrophotographic printing apparatus
US6331372	Toner particulates comprising an ethylene propylene wax
US6347197	Life determination in an oil web system
US6350552	Reactive compatibilization of polymeric components such as siloxane polymers with toner resins
US6350553	Electrophotographic photoconductors comprising polyaryl ethers
US6356726	Electrophotographic printer with compact pre-transfer erase assembly
US6357942	Method for reducing cyclic print errors
US6359640	Method and apparatus for minimizing visual artifacts resulting from laser scan process direction position errors

<b>Publication Number</b>	<b>Title</b>
US6362847	Electronic control arrangement for a laser printer
US6363228	Transfer belt image registration correction, operating parameters and life via stored parameters
US6366174	Method and apparatus for providing a clock generation circuit for digitally controlled frequency or spread spectrum clocking
US6367996	Printed image alignment control
US6370354	Method and apparatus for controlling media-to-image registration of a single-pass intermediate transfer member-based printing apparatus
US6375314	Removable cassette having integrated supply of consumables
US6376143	Charge generation layers comprising type i and type iv titanyl phthalocyanines
US6377646	Spread spectrum at phase lock loop (pll) feedback path
US6377774	System for applying release fluid on a fuser roll of a printer
US6390700	Absolute location low wear bearing for an imaging apparatus
US6394672	Imaging apparatus having a biased platen
US6396052	High precision analog encoder system
US6397026	Apparatus and methods for increasing bias force on opposing photosensitive member and developing means
US6397029	Coupler for an image-forming apparatus
US6403273	Toner particulates comprising aliphatic hydrocarbon waxes
US6404834	Segmented spectrum clock generator apparatus and method for using same
US6406656	Fabrication of photoconductor drum insert
US6410197	Methods for treating aluminum substrates and products thereof
US6429891	Printhead mounting apparatus providing adjustment to effect printhead skew correction
US6432597	Electrophotographic photoconductor containing fluorenyl-azine derivatives

<b>Publication Number</b>	<b>Title</b>
	and triarylamine in transport layer
US6434357	Oil exuding roller for an electrophotographic printer, including a method for its fabrication, and its function encompassed by a method for applying a toner repelling substance to a fuser roller
US6434358	Oil secreting supply roller for an electrophotographic printer, including a method for applying a toner repelling substance to a fuser roller
US6449665	Means for reducing direct memory access
US6452380	Rod and apparatus for calibrating magnetic roll testing apparatus
US6452512	Method for initializing an analog encoder
US6452695	System and method for enabling an image input device and a printer to operate as a digital copier
US6458461	Release agent composition
US6459443	Method of minimizing print delay due to mirror motor warm-up in an electrophotographic machine
US6459876	Toner cartridge
US6461781	Xerographic photoreceptor co-binder compositions
US6463227	Color adjustment method for a laser printer with multiple print resolutions
US6463254	Toner cleaner system vibrator and method
US6464414	Print media sensor adjustment mechanism
US6466763	Conveyor and waste toner reservoir for an image-forming apparatus
US6476844	Method and apparatus for electrophotographic laser video modulation and decode for spot fidelity
US6478401	Method for determining vertical misalignment between printer print heads
US6480221	Method and apparatus for determining a process position of a scan line in an electrophotographic machine
US6480301	Method and apparatus for gamut boundary determination

<b>Publication Number</b>	<b>Title</b>
US6486906	Apparatus and method for printhead to machine skew and margin adjustment for an electrophotographic machine
US6487383	Dynamic end-seal for toner development unit
US6489070	Photoconductors comprising cyclic carbonate polymers
US6490072	Mirror angle adjustment and mounting system for a laser scanner device
US6492083	Toner comprising wax and functionalized enhancing agent
US6496662	Optical toner low sensor
US6498611	System and method for providing a virtual operator panel for a peripheral device
US6500375	Fabrication of seamless tube
US6501584	Sound reduced rotatable polygon assembly
US6510291	Toner supply with level sensor and meter and method of using the same
US6511709	Method of dip coating fuser belt using alcohol as a co-solvent
US6512597	Method and apparatus for correcting unadjusted threshold arrays for halftoning by use of parameterized transfer functions that generate adjusted threshold arrays at run time
US6519443	Method for calculating a print medium pick time for an imaging apparatus that transports print media at variable speeds
US6520620	Gear train for a maintenance station of an ink-jet printer
US6521319	Assembly for cleaning toner resin from a printing device and method
US6523924	Printer method for reducing effect of paper feed errors
US6525837	Printer assembly and method for determining the position of a printer component
US6534230	Toner formulations
US6535236	Referencing mechanism for an imaging apparatus
US6536872	Connection module

<b>Publication Number</b>	<b>Title</b>
US6544710	Reactive compatibilization of polymeric components such as siloxane polymers with toner resins
US6546225	Auger for dispensing waste toner
US6549225	Method of margin alignment and plane-to-plane registration in a tandem color electrophotographic machine
US6550758	Finisher with frictional sheet mover
US6550763	Finisher with sheet placement control
US6553195	Dynamic end seal for image forming apparatus
US6558751	Method of dip coating fuser belts using polymer binders
US6560418	Method of setting laser power and developer bias in a multi-color electrophotographic machine
US6560434	Intermediate transfer member motion control via surface wheel feedback
US6561504	Finisher with single roller for frictionally moving each sheet
US6563285	Stepper motor control system
US6567015	Method for initializing an analog encoder
US6567620	Image forming apparatus with variable gap size based on recording media supply level
US6567633	Method and apparatus for reducing lateral motion of a transfer belt of a laser printer
US6570598	Sub-pel registration of color planes using cartridge velocity control
US6570604	Mode dependent time to begin printing
US6572105	Dual overlapping gates to control media movement through an image forming apparatus
US6580881	Method of detecting waste toner in a container of an image forming apparatus
US6580888	Contact development system reference structure
US6582089	Mirror angle adjustment and mounting system for a laser scanner device

<b>Publication Number</b>	<b>Title</b>
US6586759	Method and apparatus for aligning an optical detecting device
US6588624	Cover damping mechanism
US6590223	Apparatus and method for media presence detection
US6597226	Application specific integrated circuit architecture utilizing spread spectrum clock generator module for reducing emi emissions
US6599041	Sheet movement sensor
US6600150	Encoder systems for printers and related methods
US6600151	Optical encoder assembly with non-engageable encoder housing and receiver plate comprising a through hole and window
US6600570	Imager controlling destination of its output
US6600882	Measuring toner level in a closed container
US6606330	Laser drive compensation by duty cycle and power
US6609781	Printer system with encoder filtering arrangement and method for high frequency error reduction
US6612680	Method of imaging substance depletion detection for an imaging device
US6615297	System and method for manipulating device settings across different types of devices
US6616266	Method for increasing waste ink collection capacity in an ink jet printer by utilizing multiple ink spit areas along the carrier path
US6622582	Assembly for limiting axial motion of shaft in an imaging apparatus
US6624407	Encoder with mask spacer contacting the encoder film
US6624911	Method and apparatus for correcting unadjusted threshold arrays for halftoning by use of transfer function tables
US6628398	Toner patch sensor with integrating optical collection geometry
US6628426	Method of halftone screen linearization via continuous gradient patches
US6637961	Encoder control system for printers and related methods

<b>Publication Number</b>	<b>Title</b>
US6640157	Method for operating a media feed motor of a printer
US6643728	Method and apparatus for converting ieee 1284 signals to or from ieee 1394 signals
US6647437	Method for automatically detecting and processing binary postscript print jobs
US6650077	Method for controlling printer paper feed
US6650352	Electronic control arrangement for a laser printer
US6651100	Automatic negotiation of an internet protocol address for a network connected device
US6657650	Method of laser printhead registration control in an electrophotographic machine
US6658043	Method and apparatus for providing multiple spread spectrum clock generator circuits with overlapping output frequencies
US6659454	Printer exit tray and computer printer having an exit tray
US6660996	System and method for examining relationship between intersecting encoder output signals
US6661531	Method for adaptively matching print quality and performance in a host based printing system
US6661981	Method and apparatus for controlling transfer belt velocity of a color printer
US6667814	Automatic up image printing
US6671107	Mounting of pre-scan optics for a laser scanning device
US6678489	Two part cartridges with force biasing by printer
US6681094	Intermediate transfer member belt/roller configuration for single-pass color electrophotographic printer
US6681392	Method and apparatus for remote peripheral software installation
US6684504	Method of manufacturing an imageable support matrix for printhead nozzle plates
US6684773	Target and algorithm for color laser printhead alignment

<b>Publication Number</b>	<b>Title</b>
US6688590	Dual tray printer with single drive shaft and dual media picks
US6689528	Electrostatic fuser rolls and belts
US6695503	Print media feed system for an imaging apparatus
US6697094	Method and apparatus for locating the process position of a scan line in an electrophotographic machine
US6697589	Fuser latch system
US6697594	Doctor blade support for an image forming apparatus
US6701097	Movement tracking by time and scaling for start and stop
US6704033	Goal-oriented design for the printer property's graphical user interface
US6710778	Method for halftoning using a difference weighting function
US6713775	Method to correct for sensitivity variation of media sensors
US6718147	Toner measurement and darkness control using printer systems
US6721064	Two-domain chroma boost method for color printing
US6726384	Paper controlled clutch for a paper exit system in a printer
US6741829	Multi-function cleaner blade assembly
US6747431	Calibration technique for electric motor
US6758934	Method and apparatus for adhesively securing ink jet pen components using thin film adhesives
US6762580	Electric motor velocity controller
US6767489	Method to mold round polyurethane rollers free of injection gates, parting lines and bubbles
US6768427	Encoder initialization methods and related systems
US6771922	Toner cartridge
US6774923	Dual polygon laser printhead for a color printer

<b>Publication Number</b>	<b>Title</b>
US6775028	Non-linear method of mapping the lightness and chroma of a display device gamut onto a printing device gamut
US6775498	Multi-function cleaner blade assembly
US6785011	Optical sensor arrangement for start of scan detection and improved vertical beam alignment range
US6787276	Dual layer photoconductors with charge transport layer including styrene-acrylic resin
US6787279	Random copolymers used as compatibilizers in toner compositions
US6792218	Method of compensating for low toner consumption
US6794669	Media sensing apparatus for detecting an absence of print media
US6794794	Torsion oscillator stabilization
US6795207	System and method for controlling print jobs in host based printers
US6801745	Fuser for an electrophotographic printer and method of using same
US6801959	Relaxed-timing universal serial bus with a start of frame packet generator
US6804727	Method for communication from a host computer to a peripheral device
US6807011	Humidity tolerant scan lens
US6809740	Dithered quantization using neighborhood mask array to approximate interpolate
US6810229	Non-contact fusing roller/media separation apparatus and method for its use
US6813470	High density foam roll
US6816692	Support assembly for roller including roller body and support shaft
US6817697	Systems and methods for printhead architecture hardware formatting
US6818290	Belt fuser belt
US6819884	Determining toner usage
US6822672	Printhead and fuser standby management

<b>Publication Number</b>	<b>Title</b>
US6823150	Backup roller temperature prediction and control for fuser
US6827420	Device verification using printed patterns and optical sensing
US6830399	Methods and systems for compensation of media indexing errors in a printing device
US6832250	Usage-based billing and management system and method for printers and other assets
US6833937	Methods and apparatus for color mapping
US6834852	Printer exit tray and computer printer having an exit tray
US6834929	Method for printing in normal and borderless printing modes
US6836280	Collimation assembly and methods and apparatus for calibrating collimation and pre-scan assemblies in a laser scanning unit
US6838661	Torsion oscillator stabilization including maintaining the amplitude of the oscillator without changing its drive frequency
US6840514	Media alignment mechanism
US6840617	Mid-frame for an imaging apparatus
US6844951	Stationary coil oscillator scanning system
US6854726	Imaging apparatus including a print media feed system configured for reducing printing defects
US6865241	Method and apparatus for sampling digital data at a virtually constant rate, and transferring that data into a non-constant sampling rate device
US6865351	Method of using a fuser for a color electrophotographic printer
US6867883	Method and apparatus for expanding a color gamut
US6870140	Universal fuser heating apparatus with effective resistance switched responsive to input ac line voltage
US6870560	Bi-directional galvanometric scanning and imaging
US6871031	Coupling mechanism for a two piece printer cartridge

<b>Publication Number</b>	<b>Title</b>
US6873129	Method of controlling rotational velocity of a rotatable member during encoder initialization for an imaging apparatus
US6879792	Two part cartridges with force biasing by printer
US6879803	Belt fuser for a color electrophotographic printer
US6881272	Selective removal of photoreceptor coatings by ultrasonification
US6888654	Laser scanning unit and method and apparatus for calibrating a post-scan assembly in a laser scanning unit
US6889013	Optimizing a printing motor under varying torque loads
US6893013	Input tray mechanical blocking apparatus
US6897752	Magnetic roller and methods of producing the same
US6900449	Media type sensing method for an imaging apparatus
US6902161	Sheet feeder avoiding sheet sag
US6908164	Power control circuit for printers and other devices
US6908244	Split paper support
US6912060	Photoprinter control of peripheral devices
US6914400	Method and apparatus for synchronizing a scan operation with the motion of the scan mechanism
US6914684	Method and apparatus for detecting media type
US6914700	Method for reducing migrating residual error in error diffusion halftoning
US6919977	Stationary coil oscillator scanning system
US6926272	Sensor and diverter mechanism for an image forming apparatus
US6927368	Method and apparatus for controlling power to a heater element using dual pulse width modulation control
US6931224	Toner cartridge hopper with labyrinth channels for releasing air while trapping toner in cartridge

<b>Publication Number</b>	<b>Title</b>
US6933960	Collimation assembly and methods and apparatus for calibrating collimation and pre-scan assemblies in a laser scanning unit
US6954278	Dynamic printer operating system
US6954606	Polyurethane coatings and drive rollers including the same
US6956581	Gamut mapping algorithm for business graphics
US6956597	Scanning with multiple oscillating scanners
US6960741	Large area alumina ceramic heater
US6963820	Analog encoder method for determining distance moved
US6965748	Drive roller for belt in an electrophotographic image forming apparatus
US6967669	Accumulator drum and method of use for an image forming apparatus
US6968143	Automatic media alignment nip release mechanism
US6969164	Printing cartridge having a filter tower assembly and process for forming the same
US6970275	Stationary coil oscillator scanning system
US6970663	System and method of image formation on specialty media by altering interpage transfer voltage or current
US6970672	Electrophotographic toner regulating member with polymer coating having surface roughness modified by fine particles
US6978997	Recovery from double media feed
US6980296	Measuring laser light transmissivity in a to-be-welded region of a work piece
US6980767	Method and apparatus for adhering sheets of print media together by use of toner in an electrophotographic printer
US6982800	Apparatus and method for data management within a photoprinter
US6985683	Method of mitigating toner damage in high speed contact developing with end seal
US6987595	Oscillator imaging with control of media speed and modulation frequency

<b>Publication Number</b>	<b>Title</b>
US6989852	Method of margin alignment and plane-to-plane registration in a tandem color electrophotographic machine
US6989853	Method of margin alignment and plane-to-plane registration in a tandem color electrophotographic machine
US6990308	Image forming device, print cartridge and doctor blade assembly that reduce vibrations at doctoring media nip
US6991884	Chemically prepared toner and process therefor
US6991886	Closed air circulation toner rounding
US6995357	Device for determining position and movement of scanning laser beam
US6998628	Method of media type differentiation in an imaging apparatus
US7003245	Door assembly for an image forming device
US7003246	Fuser nip release mechanism
US7005611	Large area alumina ceramic heater
US7006250	Method of setting laser power and developer bias in an electrophotographic machine based on an estimated intermediate belt reflectivity
US7006785	Metering nip for moving a media sheet within an image forming device
US7012246	Multiple light beam imaging apparatus
US7012390	Method and apparatus for controlling a variable speed fan in an image forming device
US7013104	Toner regulating system having toner regulating member with metallic coating on flexible substrate
US7016198	Printed circuit board having outer power planes
US7018121	Combined paper and transparency sensor for an image forming apparatus
US7020424	Backup belt assembly for use in a fusing system and fusing systems therewith
US7020702	Method and apparatus to obtain real-time status information from a networked device

<b>Publication Number</b>	<b>Title</b>
US7021622	Image forming device having a sensor with two separate distinguishable triggers
US7021735	Reduction of color plane alignment error in a drum printer
US7023006	Method for shading an optical sensing element such as in a scanner
US7030708	Torsion oscillator stabilization
US7034097	Polyurethane elastomers with combination of curatives
US7035564	Method of operating an image forming apparatus using information stored in a fuser memory
US7043180	Gear and shaft arrangement for an image forming device
US7043189	Methods and devices for moving waste toner within an image forming device
US7044574	Method and apparatus for generating and assigning a cartridge identification number to an imaging cartridge
US7049620	Media type sensing method for an imaging apparatus
US7050726	Method for imaging with an imaging apparatus that facilitates the use of a starter cartridge
US7050734	Method of determining a relative speed between independently driven members in an image forming apparatus
US7050736	System and method for charging a photoconductive member to an operating voltage while isolating a conductive shaft
US7054571	Method of driving a fuser roll in an electrophotographic printer
US7055756	Deposition fabrication using inkjet technology
US7063399	Imaging apparatus and method for facilitating printing
US7064876	Resonant oscillating scanning device with multiple light sources
US7066671	Method for forming perforations in a sheet of media with a perforation system
US7068387	Quick edit and speed print capability for a stand-alone ink jet printer
US7076188	Toner cartridge having reduced toner capacity and method of using the same

<b>Publication Number</b>	<b>Title</b>
US7079686	Systems and methods for content-based document image enhancement
US7082275	Variable force biasing mechanism and electrical connection
US7085507	Method and apparatus to control waste toner collection in an image forming apparatus
US7103125	Method and apparatus for effecting synchronous pulse generation for use in serial communications
US7103425	Method of regulating a target system using a frequency comparison of feedback and reference pulse trains
US7116452	Method of calibrating a scanner to a printer
US7116821	Color trapping for an image forming apparatus
US7120375	Cover prop mechanism
US7121546	Speed mode for printer media transport
US7122800	Optical density sensor
US7123282	Method and apparatus for minimizing visual artifacts in images generated by an electrophotographic machine
US7126107	Methods and apparatuses for sensing rotational position of a component in a printing device
US7126611	Dithered quantization using neighborhood mask array to approximate interpolate
US7127184	Method and device for clearing media jams from an image forming device
US7128317	Moveable media dam
US7130562	Coupling retraction mechanism for an image forming device
US7130574	Image forming device with multimode duplexer
US7131644	Imaging apparatus having an automatic sheet feeder
US7136089	Dynamic time to first print selection
US7136609	Movable subunit and two piece cartridge for use in an image forming device

<b>Publication Number</b>	<b>Title</b>
US7139344	Method and apparatus for effecting synchronous pulse generation for use in variable speed serial communications
US7139505	Toner housing plug with toner level sensor
US7139510	Two part cartridges with force biasing by printer
US7142456	Distributed programmed memory cells used as memory reference currents
US7149449	Method of determining a relative speed between independently driven members in an image forming apparatus
US7149467	Waste toner system for an image forming device
US7149979	Data management system and method for peripheral devices
US7151154	Graft polymer curatives and polyurethanes formed therefrom
US7151557	Collimation assembly for adjusting laser light sources in a multi-beamed laser scanning unit
US7151949	Wireless facsimile adapter and system for printer and all-in-one devices and methods using the same
US7152798	Laser scanning unit having a sensor for detecting both start-of-scan and end-of-scan positions of a corresponding laser beam
US7154794	Memory regulator system with test mode
US7155777	Closure mechanism for hinged devices
US7158321	Pre-scan assembly for aligning a pre-scan lens in a laser scanning unit
US7158745	Method and device to regulate toner in an image forming device
US7159863	Compliant media stack height limiter
US7162182	Image forming device having a door assembly and method of use
US7162191	Buffed toner metering blade for use with an imaging apparatus
US7164869	Print delay based on media type
US7164881	Apparatus and method for establishing a default media size for an imaging device

<b>Publication Number</b>	<b>Title</b>
US7166358	Polyurethane rolls with graft polyacrylate curatives
US7167660	Standby temperature control to minimize fuser droop and overshoot
US7167672	Method and device for conveying waste toner in an image forming device
US7167673	Method and apparatus for using continuous media stock in a cut-sheet image forming device
US7168785	Method for performing edge-to-edge transition during printing with an imaging apparatus
US7171134	White vector adjustment via exposure
US7178914	Media pre-feed in intermittent printer
US7182192	Clutch mechanism and method for moving media within an image forming apparatus
US7184187	Optical system for torsion oscillator laser scanning unit
US7185885	Print media depletion detection in an imaging apparatus
US7186970	Resonant oscillating scanning device with multiple light sources and dual scan path
US7186982	Method for calibrating a dual channel scanner background
US7187294	Apparatus and methods of detecting print media orientation
US7187400	Method and apparatus for compensating for image misalignment due to variations in laser power in a bi-directional raster imaging system
US7187460	Host control of printer ready
US7187899	Fuser having reduced axial temperature droop
US7189949	Power control system and method for regulating power provided to a heating device
US7190473	Printer apparatus with integrated graphical user interface and method for using the same
US7190490	Method for correcting unadjusted threshold arrays for halftoning by use of parameterized transfer functions that generate adjusted threshold arrays at run

<b>Publication Number</b>	<b>Title</b>
	time
US7192113	Method and system for correcting color shift caused by printing with an imaging system using multiple cartridges
US7193180	Resistive heater comprising first and second resistive traces, a fuser subassembly including such a resistive heater and a universal heating apparatus including first and second resistive traces
US7193380	Method for rotating a printer paper-feed roller
US7195850	Photoconductor with light fatigue additives
US7198263	Dual tray selectable sheet picking assembly
US7198265	Imaging apparatus including a movable media sensor
US7204654	Perforation forming mechanism for use in an imaging apparatus
US7205561	Media sensor apparatus using a two component media sensor for media absence detection
US7205738	Method and apparatus for time-based dc motor commutation
US7206012	Memory device on optical scanner and apparatus and method for storing characterizing information on the memory device
US7206267	Defect area management system and method for optical storage medium
US7209252	Memory module, printer assembly, and method for storing printer code
US7215091	Method for controlling a dc printer motor with a motor driver
US7222848	Method and device to control the alignment of a media sheet in an image forming device
US7223030	Systems and methods for determining physical location of rfid tags on embedded print media
US7224493	Imaging apparatus having a media sensor
US7224918	Method and apparatus for controlling temperature of a laser printer fuser with faster response time
US7226048	Imaging apparatus having a print media dam in association with an automatic

<b>Publication Number</b>	<b>Title</b>
	sheet feeder mechanism
US7227652	Switching power supply, method of operation and device-and-power-supply assembly
US7227756	Power supply keying arrangement for use with an electrical apparatus
US7230637	Torsion oscillator current control driver
US7230769	Humidity tolerant scan lens
US7231163	Apparatus and method of reducing charge roller contamination
US7233760	Method and device for doctor blade retention
US7235761	Heating apparatus with mechanical attachment
US7236722	Helically splined drive member for an image forming device
US7236729	Electrophotographic toner regulating member with induced strain outside elastic response region
US7236730	Dampening mechanism for an image forming apparatus
US7236732	Toner image fixing apparatus having concentrated area heating
US7240995	Method of authenticating a consumable
US7245103	Motor speed and position control
US7245378	Measuring laser light transmissivity in a to-be-welded region of a work piece
US7246962	Exit roller system for an imaging apparatus
US7248280	Laser scanner having reduced air currents
US7248806	Paddle positioning system
US7249819	Apparatus and methods of detecting relative position of rf signature on print media
US7254351	Method and apparatus for reducing sheet material curl induced in a fusing operation
US7257358	Method and apparatus for detecting registration errors in an image forming

<b>Publication Number</b>	<b>Title</b>
	device
US7257363	Device for moving toner within an image forming device
US7258335	Eliminating drag of media sensor in printer media transport
US7258558	Electrical connectors for toner cartridges in an image forming device
US7260339	Fuser unit operation for gloss consistency
US7261290	Small/special media guide-in tray
US7261478	Systems and methods for handling defective rfid media according to available printer output options
US7262735	Snap-in antenna assembly for wireless radio circuit card
US7262873	Photoprinter access to remote data
US7262895	Determining operating point of feedback controller applied to operation of oscillating scanning device
US7263325	Auger for use in an image forming device
US7263661	Multi-function device having graphical user interface incorporating customizable icons
US7265856	Method and system for receiving and processing multiple compressed print data streams
US7267498	Six-sided printing method
US7269371	Imaging apparatus having interface device for print mode selection
US7271383	Scanning system with feedback for a mems oscillating scanner
US7271941	Laser scanning unit including a shield
US7272328	Development component detection in an electrophotographic device
US7272336	Cartridge with a movable electrical connector for use with an image forming device
US7272350	Method for positioning transfer members within an image forming apparatus

<b>Publication Number</b>	<b>Title</b>
US7272351	Transfer of a media sheet within an image forming device
US7272353	Fusing system including a tensioned belt with crowned roller
US7274163	Methods and apparatus for commutating a brushless dc motor in a laser printer
US7274194	Apparatuses and methods for repairing defects in a circuit
US7274856	Waveguide apparatus and method for laser welding
US7274903	Integrated fuser unit and drive system for use in an electrophotographic imaging process
US7275740	Method and apparatus for feeding sheets
US7276674	Component for an image forming apparatus with designed thermal response
US7277111	Multiple speed modes for an electrophotographic device
US7277654	Electrophotographic power supply configuration for supplying power to a fuser
US7277658	Sealing member for image forming device
US7278047	Providing different clock frequencies for different interfaces of a device
US7278701	Method of informing a user of an imaging apparatus of an event via a print fade
US7280772	Method for detecting whether a cartridge installed in an imaging apparatus is potentially counterfeit
US7280776	Method and apparatus to control waste toner collection in an image forming apparatus
US7283152	Collimation assembly with an adjustment bracket capable of flexing when receiving a light source
US7286783	Variable force biasing mechanism and electrical connection
US7287826	Method of performing dynamic printhead maintenance firing in an ink jet printer
US7287922	Exit roller system for an imaging apparatus including backup rollers

<b>Publication Number</b>	<b>Title</b>
	configured to reduce tracking
US7288350	Photoconductor member with bound silicone oil
US7289757	Shared high voltage power supply for image transfer in an image forming device
US7290762	Print media source for an imaging apparatus
US7290765	Exit roll for an image forming device
US7292449	Virtual ground return for reduction of radiated emissions
US7292815	Fuser member including an electrically conductive polymer layer, a resistive layer, an electrically conductive layer, and current supply and return rolls
US7292820	Integrated media input tray including electronics
US7296871	Device and structure arrangements for integrated circuits and methods for analyzing the same
US7300170	Apparatus for viewing an operating panel of an electronic device
US7301659	Systems and methods for use of profiles in multifunction devices
US7302107	Jpeg encoding for document images using pixel classification
US7304411	Method and apparatus for reducing q factor in an oscillating laser scanner
US7305204	Two part cartridges with force biasing by printer
US7309020	Deposition fabrication using inkjet technology
US7310282	Distributed programmed memory cell overwrite protection
US7310494	Developing agent transport and storage
US7312420	Switching device and system
US7316475	Thermal printing of silver ink
US7317467	System for controlling printer cooling fan
US7319549	Multiple weight error diffusion

<b>Publication Number</b>	<b>Title</b>
US7319829	Transfer bias adjustment based on component life
US7321372	Method for performing image editing
US7321379	Galvanometric scanning and imaging with multiple beams reflected from an oscillator
US7321739	Cartridge with a handle for use with an image forming device
US7324220	Print performance under the windows(r) operating system
US7324768	Method and device for determining one or more operating points in an image forming device
US7324771	Method for minimizing temperature droop in a fuser
US7325801	Method and apparatus for detecting an absence of print media
US7328411	Scrollbar enhancement for browsing data
US7330680	Drum support bushing with orienting features
US7333243	Calculating error diffusion errors to minimize memory accesses
US7336919	Multilayer fuser member including current elements
US7344212	Imaging apparatus having a programmable throughput rate
US7347808	Polyurethane rolls and methods of manufacturing
US7349123	Algorithms and methods for determining laser beam process direction position errors from data stored on a printhead
US7349640	Image offset prevention on plastic substrate media
US7349648	Securing mechanism for an image forming device module
US7350758	Module for mounting a mems device
US7352988	Fuser member including an electrically conductive polymer layer, a resistive layer, an electrically conductive layer, and current elements
US7353998	Image processing system receiving simultaneous scan requests from multiple scanners

<b>Publication Number</b>	<b>Title</b>
US7354211	Perforation forming mechanism for use in an imaging apparatus
US7354794	Printed conductive connectors
US7356278	Cleaning member for charging device
US7358015	Plasticized photoconductor
US7358017	Polyurethane-silica hybrid, or polyurethane-silica/silsesquioxane hybrid overcoat improves the life of the photoconductor drum without significantly altering the electrophotographic properties
US7358997	Multiple resolution optical imager using single size image elements
US7359085	Method and apparatus for recording sound information and playing sound information back using an all-in-one printer
US7359088	Methods and systems for estimating single or multi-color toner coverage on a printer page
US7359090	Shading an optical sensing element such as in a scanner
US7359500	Method for carrying out predetermined actions by a receiving telecom device using an answer prefix
US7365286	Heater assembly including housing with strain relief features
US7365613	Method of determining resonant frequency
US7366434	Periodic doctor element field reversal in an electrophotographic device
US7369267	High resolution printing method
US7369782	Method and system for providing technical support relating to an imaging cartridge
US7370860	Automatic edge guide assembly using springs and tapered surfaces
US7374163	Media tray stack height sensor with continuous height feedback and discrete intermediate and limit states
US7375738	Electronic systems and methods for reducing laser beam process direction position errors
US7376627	Method of licensing functionality after initial transaction

<b>Publication Number</b>	<b>Title</b>
US7377508	Pick mechanism and algorithm for an image forming apparatus
US7379682	Optimization of operating parameters, including imaging power, in an electrophotographic device
US7380783	Apparatus providing reduction in media skew during a sheet picking operation
US7380789	Methods of moving a media sheet from an input tray and into a media path within an image forming device
US7382994	Background energy density control in an electrophotographic device
US7382998	Robust door panel breakaway mechanism for an image forming device
US7383014	Auger for use within an image forming device
US7383016	Electrophotographic device capable of performing an imaging operation and a fusing operation at different speeds
US7385715	Quick edit and speed print capability for a stand-alone ink jet printer
US7385729	Optimization techniques during processing of print jobs
US7386249	Roller with mechanical properties influenced by rotation
US7386252	Door panel interlocks for an image forming device
US7386264	Fusing system including a backup belt assembly
US7387861	Additive for photoconductor end seal wear mitigation
US7388690	Method for calibrating an imaging apparatus configured for scanning a document
US7388693	System and methods for multiple imaging element scanning and copying
US7389066	Variable force biasing mechanism and electrical connection
US7389072	Reducing adhesion of toner to metering devices
US7390602	Photoconductor with protective overcoat
US7391525	Methods and systems to calibrate media indexing errors in a printing device

<b>Publication Number</b>	<b>Title</b>
US7396009	Method and device for correcting pick timing in an image forming device
US7396173	Perforation forming mechanism for use in an imaging apparatus
US7397493	Laser printhead having a mechanical skew correction mechanism
US7398025	White vector feedback adjustment
US7399129	User interface for a hand-operated printer
US7400661	Automatic setting of laser diode bias current
US7401780	Roller with recessed kicker feature
US7401878	Print media detection in an imaging apparatus
US7403214	Systems and methods for adjusting the dynamic range of a scanning laser beam
US7403215	Current driver and power control for electrophotographic devices
US7403722	Integrated media and media tray sensing in an image forming device
US7403737	Method of preventing media wrinkling
US7407394	Electrical connector for an image forming device
US7409023	Method and apparatus for effecting synchronous pulse generation for use in serial communications
US7414262	Electronic devices and methods for forming the same
US7417511	Modulation circuit with integrated microelectro-mechanical system (mems) components
US7418138	Image processor for and method of performing tonal transformation on image data
US7423073	Radiation curable compositions having improved flexibility
US7423789	Contaminant particle identification and compensation with multichannel information during scanner calibration
US7424253	Toner metering device

<b>Publication Number</b>	<b>Title</b>
US7424398	Boot validation system and method
US7425795	Customizable electroluminescent displays
US7426064	Scan bar and method for scanning an image
US7426613	Addressing, command protocol, and electrical interface for non-volatile memories utilized in recording usage counts
US7429102	Precision inkjet printing of epoxy compounds
US7431293	Dual path roll for an image forming device
US7431522	Method for reducing banding in an imaging apparatus
US7433085	Intelligent hardware for detecting color value of an image
US7433618	System and methods for enabling geographically specific fuser control process
US7433630	Method and apparatus for characterizing and compensating drive train rotational velocity errors
US7433632	Flexible toner feed member
US7433932	System and method of accessing dynamic web content from a multifunction printer using standard protocols
US7435523	Chemically prepared toners with size limiting binders
US7448612	Auto-compensating mechanism lifter
US7451975	Input tray and drive mechanism using a single motor for an image forming device
US7453587	Method for removing streaks from a scanned image
US7454145	Packaging detection and removal for an image forming device
US7454146	Fuser assembly including memory
US7462513	Methods for making printed fuse devices
US7463836	System, method and print cartridge for signaling user replacement of fuser wiper

<b>Publication Number</b>	<b>Title</b>
US7466449	System and method for controlling output quality
US7466783	Method and system to implement a double data rate (ddr) interface
US7466951	Heater assembly in a fuser with a raised resilient pad in an electrophotographic imaging device
US7467790	Paper feed assembly
US7469074	Method for producing a composite image by processing source images to align reference points
US7469107	Method for providing imaging substance for use in an imaging device via a virtual replenishment
US7471905	Backup of replaceable device information in an image-forming apparatus
US7480071	Maximizing performance in a hardware image scaling module
US7483165	User-selectable functions for use in output devices to generate background images
US7483589	Method for copying objects
US7483668	Method for achieving accurate page margins on a media and duplex imaging apparatus thereof
US7486834	System and method for dynamically shifting error diffusion data
US7496302	Black print quality enhancement for high humidity environment
US7500732	Maintenance and docking station for a hand-held printer
US7503561	Methods and devices for detecting the absence of a media sheet within an image forming device
US7504189	Chemically prepared toner and process therefor
US7505705	Electrical discharging of image transfer assemblies
US7507951	Torsion oscillator voltage control driver with each of dual voltage polarity for each of dual channel
US7510812	Toner formulations containing extra particulate additives

<b>Publication Number</b>	<b>Title</b>
US7515587	Device for processing data packets without use of a microprocessor and a memory
US7515646	Method and apparatus for reducing emi emissions for data signals traveling over a data pathway
US7515748	Controlled moving window adaptive histogram equalization
US7516699	Method for operating a printer which requests print density approval
US7518754	Apparatus and method for error diffusion with dither
US7518762	Illuminated media position indicator and method of use
US7519308	Device and method for removing image forming substance deposits
US7520437	Usb host device for printer interface
US7522732	Method for controlling the distribution of software code updates
US7522863	Gear train backlash removal during component acceleration in an image forming device
US7524051	Hand-operated printer having a user interface
US7529007	Methods of identifying the type of a document to be scanned
US7532339	Self-describing device interface system
US7532755	Image classification using concentration ratio
US7532843	Image forming substance engaging device
US7533878	Printer media transport for variable length media
US7536115	Securely adjusting setting of an image forming device
US7536281	Method for compensating for a contaminated calibration target used in calibrating a scanner
US7548345	High resolution print mode offering improved text print quality
US7548710	Dual sliding shutter system
US7549626	Media timing based on stack height for use within an image forming device

<b>Publication Number</b>	<b>Title</b>
US7551323	Systems and methods for error diffusion
US7552216	Method of sharing a printer
US7555231	Capacitive toner level sensor and methods of use
US7557954	Fast color interpolation
US7559635	Apparatus for facilitating determination of proper supply cartridge installation
US7560052	Silver ink compositions containing a cationic styrene/acrylate copolymer additive for inkjet printing
US7560665	Imaging device temperature management
US7561176	Laser power compensation in a scanning electrophotographic device
US7561652	High frequency spread spectrum clock generation
US7561820	Seals for an image forming apparatus
US7561823	Short passive duplex unit and method of use
US7562136	Automatic negotiation of an internet protocol address for a network connected device
US7564601	Method for generating a tonal response curve for a scanner
US7570386	Systems and methods that compensate for scan path errors in a multi-beam electrophotographic imaging apparatus
US7573625	Multiharmonic galvanometric scanning device
US7574055	Encoding documents using pixel classification-based preprocessing and jpeg encoding
US7580564	Method of an image processor for transforming a n-bit data packet to a m-bit data packet using a lookup table
US7580645	Detecting the presence of a photoconductor drum
US7583417	Bi-directional scanning and imaging with scanning compensation
US7584953	Step spring auto-compensator mechanism

<b>Publication Number</b>	<b>Title</b>
US7585043	Method of authenticating a consumable
US7586653	Method and system for enhancing an image using luminance scaling
US7587158	Second transfer area for an image forming device and methods of use
US7588242	Drive apparatus for driving media sheets in a printing device
US7589850	Licensing method for use with an imaging device
US7590373	Toner metering apparatus
US7591456	Media re-ingestion stopper
US7593132	Method for calibrating printing of lenticular images to lenticular media
US7593653	Optical sensor system with a dynamic threshold for monitoring toner transfer in an image forming device
US7594647	Pick mechanism with stack height dependent force for use in an image forming device
US7602531	Halftone edge enhancement for production by an image forming device
US7604320	Maintenance on a hand-held printer
US7605834	White vector adjustment via exposure using two optical sources
US7605953	Method and apparatus to compensate for imperfect scanner motion
US7606520	Shutter for a toner cartridge for use with an image forming device
US7613407	Method and apparatus to detect loads associated with one of a plurality of components driven by a shared motor in an image forming apparatus
US7613420	Uniform entry of media into an alignment nip
US7614737	Method for identifying an installed cartridge
US7615704	Multiple digital printing techniques for fabricating printed circuits
US7616348	Method and apparatus for enhancing scanned documents
US7616349	Font sharpening for image output device

<b>Publication Number</b>	<b>Title</b>
US7616745	Method for printing incoming facsimiles
US7616911	Electrophotographic printer and method of operation so as to minimize print defects
US7619762	Customizable multi-function printing device
US7619776	Method to produce a hardcopy output of an image formed at least in part by perforations
US7619780	Method for performing duplex copying
US7619783	Scanner analog-front-end calibration using percent of freedom
US7620359	Method for processing a duplexed document
US7620360	Method for reducing show-through in a scanned duplexed document
US7621684	Integrated home entertainment unit
US7623807	Dynamic seal for component surfaces
US7624500	Printing of multi-layer circuits
US7627146	Method and apparatus for effecting automatic red eye reduction
US7627257	Method for associating a customer accessible supply item with an imaging apparatus
US7627265	Seal and seal assembly for an image forming apparatus
US7627275	Properties of toner supply members for controlling toner layer thickness in an image forming device
US7627279	Fuser assembly having compliant end cap
US7628623	Memory card bezel for an apparatus
US7629742	Electroluminescent displays, media, and members, and methods associated therewith
US7630582	Rendering optimization method and system
US7633256	Encoder eccentricity correction for motion control systems

<b>Publication Number</b>	<b>Title</b>
US7636542	Duplexing adf using a paperpath shorter than the length of paper to be duplexed
US7639407	Systems for performing laser beam linearity correction and algorithms and methods for generating linearity correction tables from data stored in an optical scanner
US7639965	Architecture for an image-forming device
US7639979	Preconditioning media sheets to reduce transfer voltage
US7642027	Control of crazing, cracking or crystallization of a charge transport layer in a photoconductor
US7643525	Current driver and power control for electrophotographic devices
US7646284	Systems and apparatus for writing data to multiple rf tags contained on print media
US7648133	Media sheet input devices for use in an image forming apparatus
US7651183	Imaging apparatus for facilitating printing
US7652787	Architecture and memory card for hand-held printer
US7653785	Reconfigurable cache controller utilizing multiple asic srams
US7654513	Feed assist assembly
US7654630	Method for decreasing sensitivity to errors in an imaging apparatus
US7655311	Homogeneous low hardness polyurethane
US7656554	Method of correcting neutral color shifts caused by cartridge variations
US7657004	System and method for detecting a connection condition of a phone jack
US7657198	Methods for transferring toner in direct transfer image forming
US7657213	Doctor blade with tangential working tip
US7658876	Method to fabricate a seamless tube
US7661814	Hand held micro-fluid ejection devices configured to block printing based on printer orientation and method of blocking

<b>Publication Number</b>	<b>Title</b>
US7663777	Default settings customization system
US7666562	Image forming media containing reflecting pigment
US7667723	Angular adjustment of mems torsion oscillator scanner
US7668394	Background intensity correction of a scan of a document
US7668404	Method and system of deskewing an image using monochrome conversion to separate foreground from background
US7671300	Fuser assembly having heater element with spaced-apart features
US7672624	Bearing and locating member for a toner cartridge for use with an image forming device
US7672631	Fuser assembly having heater element with spaced-apart features
US7675536	Architectures for multi-functional image forming devices
US7675641	Method and device for converting scanned text to audio data via connection lines and lookup tables
US7675644	Extensible framework for parsing varying formats of print stream data
US7676090	Systems and methods for content-based document image enhancement
US7676169	Multipath toner patch sensor for use in an image forming device
US7676750	Method of printing, scanning, and faxing using device location
US7680439	Interference fit sleeved foam charge rolls and composite materials
US7681231	Method to wirelessly configure a wireless device for wireless communication over a secure wireless network
US7681965	Imaging apparatus having a programmable throughput rate
US7682017	Handheld printer minimizing printing defects
US7684095	Scanning apparatus having an ultraviolet light source
US7686293	Spring-assisted print media feeder apparatus
US7688956	Method and apparatus for validation of facsimile communication

<b>Publication Number</b>	<b>Title</b>
US7689513	Method of licensing functionality after initial transaction
US7692670	Methods and systems for scaling and rotating an image in a single operation
US7692812	System, method and apparatus for registration of printed image to media orientation
US7692882	Laser diode and lens assemblies
US7693329	Bound document scanning method and apparatus
US7693445	Cleaner units and methods for removing waste toner within an image forming device
US7693464	Stabilizer for a toner cartridge and related method
US7693473	Fuser assembly having complaint stopping flange
US7695882	Toner formulation for controlling mass flow
US7698812	Method for forming a ceramic laminate
US7699305	Smart pick control algorithm for an image forming device
US7701596	Image forming device diagnostics using served applets
US7702267	Apparatus and method for transfer of image forming substances
US7710441	Systems and methods for using multiple scanner facets to write a scan line of image data in an electrophotographic device
US7711298	Methods and devices to transfer toner in an image forming device to control charge buildup on a toner image
US7715622	Method for analyzing an image
US7715734	Paper change detection method
US7717417	Devices for improving the reliability of feeding media sheets within an image forming device
US7717421	System and method for sensing a media stack from side of stack and delivery path to stack to detect given stack height
US7717423	Duplex adf mechanism

<b>Publication Number</b>	<b>Title</b>
US7720404	Methods of operating a multi-color image forming device in a mono-color mode
US7723645	Switching device and system
US7724237	Handheld printing devices and systems adapted to receive radio signal information indicative of a position and methods for using the same
US7724400	Simple and configurable all-in-one operator panel
US7725060	Skirt for toner cartridge
US7726791	Conduit construction using films
US7729017	Scanning device and method for scanning
US7729546	Document segmentation for mixed raster content representation
US7729649	Methods and devices for reducing wear on a print cartridge
US7731176	Sheet picking system for an imaging apparatus
US7733365	Imaging apparatus having print engine that includes mems device
US7733521	Printer apparatus with selectable photo enhancement project and settings storage dynamically definable user interface and functions and template definition
US7733539	Scanning method for stitching images
US7734226	Lift mechanism for one or more developer members in an image forming device
US7735951	Alignment method for hand-operated printer
US7738006	Methods and apparatus for ascertaining sensor signal delay in an electrophotographic device
US7739198	System and method for remotely authenticating a device in a reward program
US7744077	Jam-door open sensing using media sensor and method for use thereof
US7746517	Image illumination and capture in a scanning device
US7747180	Methods and apparatuses for determining the number of printed pages

<b>Publication Number</b>	<b>Title</b>
	remaining in a toner cartridge
US7748839	Handheld printing with reference indicia
US7748840	Methods and apparatus for handheld printing with optical positioning
US7751081	Gamut mapping by controlling minimum and maximum color changes
US7753356	Locking mechanism for an image forming device
US7753465	Method for generating a reference signal for use in an imaging apparatus
US7756457	Fuser assembly having selectable fuser detack mechanism
US7760392	Variation of synchronization gain based upon laser power
US7762552	Movable gate with fluid damper for directing media sheets within an image forming apparatus
US7766320	Media handling system for maintaining stack top within given range of pick positions during feeding sheets from stack top
US7769306	Storing printer density control parameters in cartridge memory
US7770885	Variable stiffness friction buckler
US7771057	Peripheral with projection display
US7773314	Laser diode/pre-scan assembly
US7776447	Composite materials and fuser members having improved adhesion between a metal layer and a polyimide substrate
US7778559	Method to improve data collection accuracy by improved windowing in a toner density control system
US7784782	Automatic sheet feed extender for paperfeed modularity
US7784933	Smart projector guides for handprinters
US7787145	Methods for improving print quality in a hand-held printer
US7787791	Method of tracking the virtual location of a sheet of media to improve first copy time

<b>Publication Number</b>	<b>Title</b>
US7788490	Methods for authenticating an identity of an article in electrical communication with a verifier system
US7791756	Methods for identifying marks using a digital master document and scanned image enhancement
US7796932	Fuser assembly including a nip release mechanism
US7796936	Image forming device with multimode duplexer
US7798489	Media handling system for lowering and raising stack platform responsive to moving bin between external and internal positions
US7798594	Method of authenticating a consumable
US7800640	Obtaining pressure of an operating environment of a bi-directionally scanning electrophotographic device for implementing corrections per pressure
US7808660	Quick edit and speed print capability for a stand-alone ink jet printer
US7813656	Supply item for laser printer including keying structure
US7817178	Thermal compensation of bi-directional alignment in a bi-directional laser scanning unit
US7817179	Methods and apparatus for storing alignment information in a bi-directionally scanning electrophotographic device
US7817302	Optimizing raster operation functions during print job processing
US7817315	Method for adjusting a controller of a scanner
US7817929	System and method for adjusting selected operating parameters of image forming device based on selected environmental conditions to improve color registration
US7821687	Method for dynamically compensating for a faulty pixel in a scan line generated by a scanner
US7822352	Thermally conditioned image forming apparatus
US7823879	Apparatus for deskewing sheet media
US7826048	Apparatus for measuring doctor blade geometric deviations

<b>Publication Number</b>	<b>Title</b>
US7826774	Methods to control transitions between color printing and black-only printing in an image forming device
US7831168	Imaging units and methods of insertion into an image forming device
US7834776	Rfid linking device-based switchable sensor, component with switchable sensor, and system for detecting component unseated
US7835030	Processing print jobs
US7835041	Method and device for reducing a size of a scanning device
US7837168	Mounting device and method for positioning a motor within an image forming apparatus
US7841792	Peripheral with adjustable input and output trays
US7843609	Motion control method and apparatus for a flat bed scanner
US7844786	Addressing and command protocols for non-volatile memories utilized in recording usage counts
US7853178	Methods and devices for selectively driving developer members within an image forming device
US7859716	Optimizing to-be-printed objects during print job processing
US7859733	Multiharmonic galvanometric scanning device
US7862036	Media restraint device for an input tray
US7871072	Media tray media biasing devices
US7872775	Apparatus and method for a resolution quality redefinition control system for a multi-function device
US7878503	Alignment of media sheets in an image forming device
US7880909	Extensible framework for parsing varying formats of print stream data
US7880921	Method and apparatus to digitally whiteout mistakes on a printed form
US7881652	Modular printer and scanner adf duplexer feedpath including second tray
US7885557	Thermistor isolation technique for a ceramic fuser heater

<b>Publication Number</b>	<b>Title</b>
US7887045	Method for dynamically lifting elevator platform of media input tray during ongoing media process
US7889223	Print alignment for bi-directionally scanning electrophotographic device
US7889363	Color laser printer for printing prismatic duo-tone copy-resistant backgrounds
US7890006	Characterization of toner patch sensor
US7890018	Architecture for an image-forming device
US7890772	Multi-function printing device
US7894732	Ir fluorescent toner compositions
US7894746	Electrophotographic device architecture for media output option usability and interchangeability
US7897318	Ionic polymer flocculants for the preparation of chemically processed toner
US7898678	Photoprinter control of peripheral devices
US7898695	Method of compensating for electronic printhead skew and bow correction in an imaging machine to reduce print artifacts
US7899357	Reinforced doctor blade assembly seal and printer cartridge employing the reinforced seal
US7899384	Apparatus and method of reducing charge roller contamination
US7908414	Detecting by usb client device a connection to host usb device wherein power is not supply from host usb device to usb client device
US7909524	Folding edge guide assembly for an imaging apparatus
US7911654	Estimating light output of a lamp in a scanner
US7912400	Devices and methods for removing toner from a belt within an image forming apparatus
US7913992	Methods of moving a media sheet in a scanning device
US7914879	Thick fusing belt for a color electrophotographic printer
US7918444	Media handling device having media shingling mechanism for providing

<b>Publication Number</b>	<b>Title</b>
	uniform inter-page gap between successive media sheets
US7918519	Methods and apparatus for handheld printing with optical positioning
US7919433	Chromogenic media responsive to environmental conditions
US7920805	Photoconductor formulation containing boron nitride
US7923191	Polyester resin toner produced by emulsion aggregation
US7926806	Systems for aligning a media sheet in an image forming apparatus
US7926896	Print media detection in an imaging apparatus
US7933530	Fuser assembly fan control
US7938531	Methods and apparatus for handheld printing with optical positioning
US7938532	Hand held printer with vertical misalignment correction
US7939236	Chemically prepared toner and process therefor
US7945175	Toner container structure and method for assessing toner consumption in an image forming apparatus
US7946494	Laser scanning unit housing
US7953347	Retaining devices and methods for retaining a developer unit of an image forming device
US7953560	Method for measuring doctor blade geometric deviations
US7955769	Control of crazing, cracking or crystallization of a charge transport layer in a photoconductor
US7957018	Coversheet manager application
US7957040	Scan bar for scanning media sheet in image scanning device and method thereof
US7957598	Methods and systems for dynamic scan compression
US7957661	Control of overheating in an image fixing assembly
US7957665	Dual-range power supply for an image forming device

<b>Publication Number</b>	<b>Title</b>
US7957673	Toner transfer systems with an adjustable transfer belt for use in an image forming device
US7959148	Media friction buckler assembly
US7965953	Electrode-based post nip field conditioning method and apparatus
US7970042	Spread spectrum clock interoperability control and inspection circuit
US7970316	Method for advancing a media sheet through a nip in a media processing device
US7980554	Friction backup roller for media picking
US7983595	Separator hanger for enabling constrained positioning of a packaging fabric insert in an image forming device
US7986911	Architecture for a media feeding option for an image forming device
US7990578	Processing print jobs
US7992959	Printing system with transient and permanent imaging means
US7993702	Process and apparatus for forming a tubular article
US7995114	Method for providing image illumination calibration for an imaging apparatus
US7995254	Imaging apparatus having scan lid sensing
US7995939	Toner calibration measurement
US7999971	Optimization techniques during processing of print jobs
US8002262	Method for applying pick retry using a modified pick roller force to reduce likelihood of failure to pick top sheet from stack
US8002270	Media tray with media restraint assembly adjustable between and lockable at multiple closely spaced positions
US8005388	Media velocity, media present and bubble control in an electrophotographic process
US8005391	Methods for determining when to transition between color printing and black-only printing in an image forming device

<b>Publication Number</b>	<b>Title</b>
US8010017	Fuser assembly including a nip release bias spring
US8014005	Method for using an imaging apparatus to generate image panels for assembly as a poster
US8014025	System and method for outputting a job
US8014608	Web-based image extraction
US8016413	Hand held printer color misalignment correction
US8017192	Radiation cured coatings for image forming device components
US8018479	Method and system for correcting the linearity error in electrophotographic devices
US8018604	Multifunction sensor for an image forming device
US8019234	Supply item for laser printer including keying structure
US8020850	Removable input tray assembly having a dual function roller for feeding media and separating media in an image forming device
US8020860	Devices and methods for aligning and moving a media sheet within an image forming device
US8020953	Method for configuring the throughput rate of an imaging apparatus
US8022976	Laser power switching for alignment purposes in a laser printer
US8023144	Method for generating transposed image data
US8023836	Supply item for laser printer including keying structure
US8023851	Method and printer assembly for consistent power control in fuser assembly of electrophotographic printer
US8023875	System and drive arrangement for using fuser temperature cycling to change rotational position of a fuser roller wiper
US8025283	Continuous media edge reference surface for a removable media input tray assembly of an image forming device
US8036547	Method for adjusting transfer voltage controls based on environmental conditions to improve print quality in a direct transfer image forming device

<b>Publication Number</b>	<b>Title</b>
US8038591	Image forming apparatus component with triboelectric properties
US8041253	Systems and methods to control access to an interior of an image forming device
US8041262	Drive system with multiple motor-and-gear-train configurations for jitter and noise reduction and color developer preservation
US8041389	Camera cell phone with integrated wireless mouse
US8044988	Spring clip
US8045240	Imaging apparatus having a document planar member that displays scan operation related indicia
US8054493	Optimizing raster operation functions during print job processing
US8055176	Heat roller for electrophotographic image forming device
US8058995	Multi-frequency rfid image forming techniques
US8059993	Rotating toner cleaning member for a toner delivery device in an image forming apparatus
US8061704	Apparatus for feeding compressible media in an image forming device with rotation limiting stop
US8064093	Method and apparatus to digitally whiteout mistakes on a printed form
US8064787	Fuser life extension
US8064800	Composite torque transfer body and spline assembly to reduce jitter in an image forming device
US8064812	Toner transfer belt with textured surface for enhanced transfer and method of forming textured surface
US8064815	Wrap spring clutch auger
US8064816	Printer including a fuser assembly with backup member temperature sensor
US8072657	Dual path scanning system and method
US8078079	Air duct and toner cartridge using same

<b>Publication Number</b>	<b>Title</b>
US8081353	Enhanced illuminated scanning unit reference marker
US8086132	Photoconductor unit with charge roll wiper for an image forming device
US8089489	Method for converting a source gamut of an image to a destination gamut
US8089652	Licensing method for use with an imaging device
US8089663	Detachable transparent plate for scan head assembly
US8092006	Handheld printer configuration
US8095062	Media width sensors containing axially spaced paddles and method of using the media width sensor
US8099012	Developer roll lip seal
US8099791	Method of authenticating a consumable in an imaging device
US8102412	Calibrating a bi-directionally scanning electrophotographic device
US8103712	Method for performing a division operation in a system
US8107101	Apparatus and method for evaluating rfid programming
US8109499	Methods for moving a media sheet within an imaging device
US8111272	Method for compensating misalignment errors in electrophotographic device
US8113504	Media sheet feeding method for overcoming at least one media handling failure mode
US8116580	Embedded high frequency image details
US8116655	Charge roller cleaning member for use in media processing device
US8116657	Upper seal for inhibiting doctor blade toner leakage
US8118233	Printing device for printing of radio frequency identification (rfid) labels
US8123212	Method and apparatus for adjusting media positioning and indexing using an encoder in an image forming device
US8126342	System for tailoring a transfer nip electric field for enhanced toner transfer in diverse environments

<b>Publication Number</b>	<b>Title</b>
US8130255	Method and system for selecting total job time print
US8133647	Black toners containing infrared transmissive
US8141870	Methods for moving a media sheet within an imaging device
US8145083	Toner calibration in an image forming device
US8146913	Removable media dam for a media tray of an image forming device
US8150297	Geneva drive and locking mechanism therefor in a toner metering mechanism for an image forming apparatus
US8159732	Apparatus and method for scanner skew adjustment in an image forming device
US8160969	System and method for ordering consumables
US8162313	Method for aligning a media sheet in an image forming apparatus
US8165495	Devices and methods for retracting a cartridge in an image forming devices
US8165918	Method of licensing functionality after initial transaction
US8167300	Method for determining the amount of media sheets in a media tray in an image forming device
US8171638	Process for providing improved electrical properties on a roll for use in electrophotography
US8172220	Dual shaft media picking mechanism
US8173338	Photoconductor system for electrophotographic device
US8175482	Printer including a fuser assembly with backup member temperature sensor
US8178265	Electrophotographic photoreceptor having a spectral marker and electrophotographic printer using the same
US8180240	Color belt fuser warm-up time minimization
US8180269	Resistive heating hot roll fuser
US8185957	Peripheral device

<b>Publication Number</b>	<b>Title</b>
US8189239	Media output option lighting system
US8190869	Dual boot strategy to authenticate firmware in a computing device
US8192906	Black toner formulation
US8194258	Processing print jobs
US8194292	Imaging apparatus having an lcd document glass
US8195064	Separator hanger for enabling constrained positioning of a packaging fabric insert in an image forming device
US8195083	Duplex architecture for an imaging apparatus
US8198547	Z-directed pass-through components for printed circuit boards
US8198548	Z-directed capacitor components for printed circuit boards
US8200112	Fuser assembly heater setpoint control
US8200126	Toner cartridges for an image forming device
US8200137	Fuser assembly including a single biasing member
US8201479	Drive conversion mechanism enabling constantly meshed gears in a drive input gear train
US8203588	Obtaining pressure of an operating environment of a bi-directionally scanning electrographic device for implementing corrections per pressure
US8203764	Phased illumination method for image capture system
US8204420	Fuser with end caps having protuberances for reducing belt skew
US8208169	Method and system for rendering a transparent object in an image
US8210521	Method for feeding compressible media in an image forming device
US8210522	Method for positioning and feeding media into a media feed path of an image forming device
US8210530	Clutched nip separator device for a roll assembly
US8210758	Guiding a hand-operated printer

<b>Publication Number</b>	<b>Title</b>
US8212575	Device for analyzing size and location of conductive item
US8213817	Transfer print voltage adjustment based on temperature, humidity, and transfer feedback voltage
US8213822	Power control for a printer fuser
US8213839	Reducing toner leaks using internal support
US8219012	Retraction mechanism for a toner image transfer apparatus
US8225021	Dynamic address change for slave devices on a shared bus
US8228571	Image scanning apparatus and methods
US8233834	Rake mechanism for distributing waste toner in a printer
US8235376	Removable input tray assembly having an integrated roller nip for an image forming device
US8237061	Z-directed filter components for printed circuit boards
US8238780	Wiping assembly in an image forming device
US8238799	Cartridge alignment member for aligning with a developer unit in an electrophotographic image forming device
US8238803	Doctor blade surface energy modification
US8243318	Imaging apparatus having a document planar member with an input operating state
US8246041	System and method for monitoring image forming machine media stack height and method of calibrating stack height sensing in the monitoring system
US8246042	Method for calibrating stack height sensing in a media stack height monitoring system in an image forming machine
US8253990	System and method for demarcating media sheets during a scan operation
US8254189	Method for tuning control signal associated with at least one memory device
US8256761	Sheet separator having multi axis motion for an image forming device

<b>Publication Number</b>	<b>Title</b>
US8256762	Raisable lift plate system for positioning and feeding media in an image forming device
US8256976	Edge guide adjustment system
US8257185	Metal and plastic oldham coupler with added retraction spline and plastic over molded features
US8257894	Toner having improved charge characteristics
US8265493	Optical sensor arrangement for an imaging apparatus
US8267393	Continuous media edge reference surface for a removable media input tray assembly of an image forming device
US8273996	Z-directed connector components for printed circuit boards
US8278568	Z-directed variable value components for printed circuit boards
US8280282	Assembly for achieving uniform doctor blade force
US8293443	Black toners containing infrared transmissive and reflecting colorants
US8297612	Apparatus for detecting media edges in a media input tray
US8301049	Characterization of toner patch sensor in an image forming device
US8301057	Roller separation cam with automatic engagement
US8304066	Toner release coating
US8306466	Lubricant retention features on heater body of a fuser
US8308159	Multi-planed media aligner
US8313187	Modular rfid imaging device option
US8313880	Magenta toner with binder resin of selected molecular weight composition
US8315548	Cleaner assembly for moving and storing waste toner in an imaging apparatus using an auger disposed within a tube
US8316733	Rotational coupling device
US8319813	Mounting assembly for reflection mirror in laser scanning unit

<b>Publication Number</b>	<b>Title</b>
US8320810	Belt fuser having a protuberance for an imaging device
US8322704	System and device for feeding sheets of media
US8322707	System for feeding and separating media in an image forming device
US8322709	Method and apparatus for adjusting media positioning and indexing using an encoder in an image forming device
US8322872	Linear light diffusing structure for document scanners
US8323161	Toner adder brush roller and method for controlled installation of brush filament population
US8328195	Exit path assembly for an imaging device
US8330785	Laser power switching for alignment purposes in a laser printer
US8335025	Method and apparatus for contact image scanning
US8339667	Optimizing to-be printed objects during print job processing
US8348273	Nip separator device for a roll assembly
US8366099	Media retractor and recycler system for automatic document feeders and duplexers and method for using same
US8371572	Detachable reversible pick mechanism for feeding media from a media tray of an image forming device
US8371576	Media sheet stacking implement
US8374535	Pivoting end cap for a fuser module of an image forming device
US8375215	Source selection apparatus and method using media signatures
US8379247	Method, system and test sheet image bitmap for carrying out a scanner-and-processor based image-to-paper registration setup
US8380102	Tubular skiving seal for a rotary toner metering mechanism
US8380106	Center-referenced photoconductor bearing plate and assembly for electro-photographic cartridge
US8386657	Dynamic address change for slave devices on a shared bus

<b>Publication Number</b>	<b>Title</b>
US8387965	Stapler system for an image forming apparatus
US8390850	Toy mailbox
US8391754	Cartridge alignment member for aligning with a developer unit in an electrophotographic image forming device
US8394575	Formulations for environmentally friendly photoresist film layers
US8396381	Methods and apparatuses for applying respective ep engine settings to different zones within a page of media
US8397660	Process and apparatus for forming a tubular article
US8398532	Developer rolls having a tuned resistivity
US8400688	Mounting bracket for image sensing unit of a scanner
US8401437	Toner cartridges for an image forming device
US8405889	Raisable scan head for an imaging apparatus
US8406649	Apparatus for providing electrical contact between a power supply and a photoconductive drum in an image forming device
US8412058	Method for detecting low toner in an electro-photographic toner cartridge
US8416272	Methods and apparatus for ascertaining sensor signal delay in an electrophotographic device
US8422096	Method for dissipating heat produced in scan head assembly of imaging apparatus
US8431631	Aqueous pigmented yellow inkjet ink composition
US8432584	Scanner and system employing composite illumination
US8433227	Backup roll with capacitive coating and an imaging device transfer station employing the backup roll
US8437653	System for cooling a developer roll inside an image forming device
US8448336	Electrophotographic roller with resistance to nip banding
US8459645	Media actuated media diverter for an imaging device

<b>Publication Number</b>	<b>Title</b>
US8469359	Media actuated media diverter for an imaging device
US8474812	Manually translatable pick mechanism for feeding sheets of media of different widths
US8482751	Radio frequency identification printing device
US8483585	System and method for adjusting voltage bias of a charge roller of an image forming device based on environmental conditions to control white vector
US8483602	Method for enlarging toner transfer window in ep imaging device and transfer station employing the method
US8485675	Illumination assembly for a scanner
US8488133	System and method for marking print media
US8489002	Method for delaying the start of a gage for tracking the life of a consumable item for an imaging device
US8496214	Anti-tip stability system integral to an imaging apparatus
US8498205	System and method for monitoring a plurality of network devices
US8500124	Media actuated media diverter for an imaging device
US8500616	Toner mass control by surface roughness and voids
US8510692	Verification system and method using constrained random test parameter selection
US8511120	Electronic locking system to secure consumable item in an image forming device and a method therefor
US8516304	Integrated circuit including a programmable logic analyzer with enhanced analyzing and debugging capabilities and a method therefor
US8521970	Addressing, command protocol, and electrical interface for non-volatile memories utilized in recording usage counts
US8522438	Developer rolls having a tuned resistivity method for making
US8538286	Air duct and toner cartridge using same
US8541248	Methods for fabricating planar heater structures for ejection devices

<b>Publication Number</b>	<b>Title</b>
US8549764	Fluid tilt sensor within ink tank supply item for micro-fluid applications
US8551681	Emulsion aggregation toner formulation
US8552141	Hyper-branched polyester for use in cpt toner and method of preparing the same
US8559074	Illumination device for an image capture system
US8567775	Translatable roller media aligning mechanism
US8576188	Haptic based user interface for an electronic device
US8583003	Tubular skiving seal for a rotary toner metering mechanism and methods for forming the tubular skiving seal
US8588659	Toner cartridge having a shutter lock mechanism
US8588667	Transfer nip for an electrophotographic device, and methods of making and using same
US8590889	Multi-translative roll assembly having a one-way clutching surface
US8594532	Door dampening device and system
US8606159	Fuser for an electrophotographic imaging device to maintain a high fuser belt temperature
US8610969	Illumination assembly for a scanner with thermally conductive heat sink
US8610972	Optical system for a scanner including a light source for illuminating a target area and a plurality of mirrors positioned to receive a light beam
US8621116	Dynamic address change optimizations
US8627453	Method and apparatus for managing multiple security protocols and users for imaging devices
US8627510	Electronic device and method for operating the electronic device
US8635908	Fluid tilt sensor within ink tank supply item for micro-fluid applications
US8636277	Automatically adjustable pick mechanism for feeding sheets of media of different widths

<b>Publication Number</b>	<b>Title</b>
US8639169	Belt fuser for an electrophotographic printer having tubular heating support member
US8641040	Kiosk-installable printer with duplex path utilized to deliver printed media sheets to lower front exterior of printer
US8644725	Multiple stiffness seal for imaging component surfaces
US8649710	Toner cartridge having a pivoting exit port cover
US8651677	Mounting mechanism for a component of an imaging apparatus, and methods of making and using same
US8653773	Method for calibrating a drive motor for a toner metering device in an imaging apparatus
US8654414	Led illumination system for a scanner including a uv light emitting device
US8658245	Spin coat process for manufacturing a z-directed component for a printed circuit board
US8659803	Image forming device with an adjustable scan unit
US8660443	Systems for detecting low toner in an electro-photographic toner cartridge
US8660469	Toner delivery system for a shake-free toner cartridge
US8669035	Process for preparing toner including a borax coupling agent
US8682213	Toner cartridge having a shutter lock mechanism
US8688016	Paddle assembly for a shake-free toner cartridge
US8691341	Method of controlling the height of encapsulant on an inkjet printhead
US8699091	System for previewing and imaging documents
US8705146	System for illuminating an original using additional colors and capturing an image thereof
US8705147	Image illumination and capture in a scanning device
US8718496	Capacitive toner level sensor
US8718511	Imaging unit having a pivoting, collapsible handle

<b>Publication Number</b>	<b>Title</b>
US8718526	High fusing performance externally heated fuser roller
US8724141	Method for receiving a change-mode command while printing on a plurality of media sheets
US8725017	Fuser assembly heater temperature control
US8731415	Capacitive sensor for sensing state of waste toner box in an imaging apparatus
US8735734	Z-directed delay line components for printed circuit boards
US8737875	Devices and methods for retracting a cartridge in an image forming device
US8737887	Shutter assembly for a toner container
US8743388	Access to networked peripheral device for impaired users
US8745447	System and method for analyzing an electronics device including a logic analyzer
US8750763	Charge roller for an image forming apparatus using hard filler particles
US8752280	Extrusion process for manufacturing a z-directed component for a printed circuit board
US8752696	Multi-translative roll assembly
US8755627	Method and system for reducing speckles in a captured image
US8755719	Toner agitator system for a developer unit for an image forming device
US8761639	Replaceable unit for an electrophotographic image forming device having a latching mechanism
US8768223	Imaging apparatus assembly with pressure equalization
US8774684	Toner cartridge having a pivoting exit port cover
US8774685	Venting system for a toner cartridge for use with an image forming device
US8780158	Laser scan unit housing for an imaging device
US8790520	Die press process for manufacturing a z-directed component for a printed circuit board

<b>Publication Number</b>	<b>Title</b>
US8792138	System and methods for automatic color deficient vision correction of an image
US8802339	Crosslinkable urethane acrylate charge transport molecules for overcoat
US8807564	Media actuated media diverter for an imaging device
US8814293	On-chip fluid recirculation pump for micro-fluid applications
US8817058	System and method for reducing scan line jitter in a laser scan unit for an imaging device
US8822838	Z-directed printed circuit board components having conductive channels for reducing radiated emissions
US8822840	Z-directed printed circuit board components having conductive channels for controlling transmission line impedance
US8824929	Method for increasing useful life of an image forming apparatus
US8829358	Z-directed pass-through components for printed circuit boards
US8830692	Ball grid array systems for surface mounting an integrated circuit using a z-directed printed circuit board component
US8833757	Method of using separator roll positioner in a removable media dam and separator roll speed to correct feed errors
US8833908	Planar heater structures for ejection devices
US8833967	Reduced height illumination assembly for a scanner
US8836747	Motor control system and method for a laser scanning unit of an imaging apparatus
US8837967	Device for determining and adjusting transfer voltage in an imaging apparatus and a method thereof
US8849146	Method and system for efficient duplex printing
US8849162	Toner cartridge with pressure equalization system
US8850079	Dynamic address change optimizations
US8867933	Methods for providing a transferable page countdown for a toner cartridge

<b>Publication Number</b>	<b>Title</b>
	between image forming devices
US8867966	Toner cartridge for use in an image forming device
US8867968	Movable toner port cover member for a replaceable unit of an imaging device
US8867970	Toner cartridges having positional control features
US8873995	Input port for a cooling system of an imaging unit
US8873996	Toner system for an image forming device including a toner cartridge having a shutter with bypassing actuation
US8879953	Retainer assembly having positioning features for processing circuitry used within an image forming device supply item
US8879964	Toner cartridge having an angled exit port surface
US8886080	Cleaner unit for removing waste toner within an image forming device
US8891949	Micro-fluidic pump
US8894175	Method of using star wheel with adjustable directional biaser
US8895220	Emulsion aggregation toner formulation
US8896890	Image capture system having a folded optical path
US8909143	Provisioning user attributes for use with mobile computing device
US8912452	Z-directed printed circuit board components having different dielectric regions
US8913256	Method and system for performing an imaging function by an imaging device
US8914681	Integrated circuit including a programmable logic analyzer with enhanced analyzing and debugging capabilities and a method therefor
US8916780	Z-directed delay line components for printed circuit boards
US8918031	Volumetric toner cartridge having driven detachable toner platform
US8918032	Volumetric toner cartridge having toner agitators
US8923734	Volumetric toner cartridge having removable exit paddle

<b>Publication Number</b>	<b>Title</b>
US8924709	Print release with end to end encryption and print tracking
US8938179	Toner cartridge for an image forming device having a retainer assembly having positioning features for processing circuitry
US8940466	Photo conductor overcoat comprising radical polymerizable charge transport molecules and hexa-functional urethane acrylates
US8943684	Continuous extrusion process for manufacturing a z-directed component for a printed circuit board
US8944428	Removable media dam with separator roll positioner for a media tray
US8948649	Sealing member having internal lubricant additives
US8948650	Toner cartridge having a shutter lock mechanism
US8948659	Shutter for a developer unit for use with an image forming device
US8948660	Toner cartridge having engagement features to actuate a developer unit shutter
US8951703	Wear resistant urethane hexaacrylate materials for photoconductor overcoats
US8963976	Method and system for correcting the linearity error in electrophotographic devices
US8964237	Imaging device including wear leveling for non-volatile memory and secure erase of data
US8966193	Addressing, command protocol, and electrical interface for non-volatile memories utilized in recording usage counts sensor
US8966761	Toner adder brush roller and method for controlled installation of brush filament population
US8976384	Secure, server-less print release
US8976423	Optical scanning system and imaging apparatus for using same
US8977160	Overmolded shutter for use in toner containing supply items of an imaging apparatus
US8977179	Externally heated fuser assembly for variable sized media

<b>Publication Number</b>	<b>Title</b>
US8985729	Methods and apparatus for automatic recovery within an imaging device
US8989611	Replaceable unit for an image forming device having a falling paddle for toner level sensing
US8989632	Toner anti-bridging agitator for an image forming device
US8994770	Optical scanning system for use in an imaging apparatus
US8995889	Toner anti-bridging agitator for an image forming device
US8997331	Method of fabricating an analyzer
US9000710	Method and apparatus for measuring speed of a brush motor
US9001369	Print job tracking and policy enforcement
US9001403	Obtaining pressure of an operating environment of a bi-directionally scanning electrophotographic device for implementing corrections per pressure
US9008422	Methods of content-driven image cropping
US9009954	Process for manufacturing a z-directed component for a printed circuit board using a sacrificial constraining material
US9020405	Bias member for the doctor blade of the developer unit in an imaging device
US9023569	Chemically prepared toner formulation including a borax coupling agent
US9027925	Methods for feeding media sheets having increased throughput
US9031424	Systems and methods for measuring a particulate material
US9031451	Toner cartridge having a shutter lock mechanism
US9031461	Transfer roll assembly for an electrophotographic image forming device
US9037018	Charge slope derivation control of toner concentration
US9037051	Toner cartridge having a shutter that includes an air duct therethrough
US9042746	Methods for providing a page countdown for a replaceable unit of an image forming device
US9042792	Toner delivery system for a shake-free toner cartridge

<b>Publication Number</b>	<b>Title</b>
US9045299	Star wheel with adjustable directional biaser
US9046543	Method and apparatus for measuring speed of a brush motor
US9046544	Method and apparatus for measuring speed of a brush motor
US9046817	Replaceable unit for an image forming device having a sensor for sensing rotational motion of a paddle in a toner reservoir of the replaceable unit
US9046868	Interlock/connector system for a replaceable item for an image forming device
US9052513	Laser scan unit for an imaging device
US9063460	Volumetric toner cartridge having driven toner platform
US9064316	Methods of content-based image identification
US9065960	System for non-uniformly illuminating an original and capturing an image thereof
US9069286	Rotational sensing for a replaceable unit of an image forming device
US9069297	Self lubricating fuser and method of operation
US9069315	Method for measuring media stack height using a translatable height sensor
US9075354	Self lubricating fuser and method of operation
US9078374	Screening process for manufacturing a z-directed component for a printed circuit board
US9090418	Automatically adjustable pick mechanism for feeding sheets of media of different widths
US9098031	Narrow media throughput control using temperature feedback
US9098055	Methods and systems for locking a replaceable unit in an image forming device
US9104134	Toner level sensing for replaceable unit of an image forming device
US9104135	Toner cartridge having positional control features
US9104141	Toner cartridge having a shutter with bypassing actuation

<b>Publication Number</b>	<b>Title</b>
US9106778	Device and method for determining presence of a document to be imaged and providing a preview of the document
US9109939	Capacitive supply level sensing circuit and method
US9118784	Scanner and process for detecting a scan lid open condition
US9122189	Scan unit for an imaging device and methods of using same
US9128412	Venting system for a toner cartridge for use with an image forming device
US9128438	Method of using an imaging device having a media stiffness sensor assembly
US9128443	Toner level sensing for replaceable unit of an image forming device
US9128444	Toner level sensing for a replaceable unit of an image forming device using pulse width patterns from a magnetic sensor
US9134687	Waste toner bottle for uniform distribution of residual toner from an image forming device
US9141319	Imaging system with reduced function mode, and methods therefor
US9152080	Replaceable unit for an image forming device having a toner agitator that includes a magnet for rotational sensing
US9152083	Carriage assembly for toner cartridge loading and latching
US9152089	Partial internal shunt and partial external shunt assembly for a magnetic roll of a dual component development electrophotographic image forming device
US9152899	Secure, server-less print release
US9154941	Provisioning user attributes for use with mobile computing device
US9158486	Print job tracking and policy enforcement
US9164425	Toner cartridge having loading and latching features
US9170559	Toner cartridge for an image forming device having a retainer assembly having positioning features for processing circuitry
US9170901	System and method for analyzing an electronics device including a logic analyzer

<b>Publication Number</b>	<b>Title</b>
US9172842	Image binarization for optical character recognition
US9176921	Dynamic address change optimizations
US9188907	End sealing and magnetic field truncation of a magnetic roll of a dual electrophotographic image forming device
US9201366	Flat heater for electrophotographic belt fusing systems, and methods of making same
US9207555	Charge roll mounting assembly for an electrophotographic image forming device
US9207577	Toner cartridge having shutter lock mechanism
US9213303	Replaceable unit for an image forming device having a drive coupler that includes a locking member
US9213396	Methods and apparatus for setting the address of a module using a clock
US9213927	Methods for setting the address of a module
US9216872	Reduced component translatable media stack height sensor assembly
US9217939	Toner formulations having improved toner usage efficiency and method to make the same
US9217955	Shutter having an air duct therethrough for use in a toner cartridge
US9218235	Systems and methods of verifying operational information associated with an imaging device
US9223741	Systems for setting the address of a module
US9225858	Systems and methods for location-aware imaging devices
US9228831	Fluid tilt sensor within ink tank supply item for micro-fluid applications
US9229367	Carriage assembly for toner cartridge loading having a pivotable cradle and a stationary hold-down feature
US9229668	Process enablement in network downtime condition
US9231926	System and method for secured host-slave communication

<b>Publication Number</b>	<b>Title</b>
US9233555	System and method for controlling multiple light sources of a laser scanning system in an imaging apparatus
US9244639	Secure, server-less print release
US9245591	Addressing, command protocol, and electrical interface for non-volatile memories utilized in recording usage counts
US9254980	Method for operating an imaging device with a failed media bin level sensor
US9256143	Photoconductor overcoat having tetrafunctional radical polymerizable charge transport molecule
US9256162	Method and apparatus for magnetic brush retraction in electrophotographic system
US9261812	Toner adder roll having an abrasive agent additive
US9261818	Venting system for a toner cartridge for use with an image forming device
US9261833	Backup roll having axial constraints and fuser therefor
US9261851	Positional control features of a replaceable unit for an electrophotographic image forming device
US9267497	Micro-fluidic pump
US9270336	Provisioning user attributes for use with mobile computing device
US9270837	System for calibrating a stationary image capture module of an optical scanner
US9274463	Heat transfer system for a fuser assembly
US9280084	Magnetic sensor positioning by a replaceable unit of an electrophotographic image forming device
US9280087	Electrophotographic image forming device latching system for retaining a replaceable unit
US9280094	Trim bar entry geometry for a dual component development electrophotographic image forming device
US9285583	Adjustable mirror motor mounting for laser printhead

<b>Publication Number</b>	<b>Title</b>
US9285758	Positional control features between replaceable units of an electrophotographic image forming device
US9291940	Toner feed profile
US9291947	Sealing ribs for a developer unit of a dual component development electrophotographic image forming device
US9291989	Replaceable unit for an electrophotographic image forming device having an engagement member for positioning a magnetic sensor
US9291992	Positional control features for an imaging unit in an electrophotographic image forming device
US9296584	Translatable roller media aligning mechanism
US9298130	Toner cartridge for use in an image forming device
US9298144	Backup belt assembly for a fusing system
US9298908	Methods and apparatus for setting the address of a module using a voltage
US9302863	System and method for adjusting a pick height of a pick mechanism in an image forming device
US9302866	Pick mechanism pick roll tire having multiple tread widths
US9304467	Methods for providing a page countdown for a replaceable unit of an image forming device
US9307063	Camera cell phone with integrated wireless mouse
US9310728	Latch mechanism for a fuser assembly having a heat transfer roll
US9316944	Toner cartridge having an alignment member for aligning with a developer unit in an electrophotographic image forming device
US9316951	Magnetic roll having a smoothed release pole for a dual component development electrophotographic image forming device
US9316973	Heat transfer system for a fuser assembly
US9317004	Handle and positioning stop assembly for a replaceable unit of an electrophotographic image forming device

<b>Publication Number</b>	<b>Title</b>
US9319093	System and method for communicating with an unpowered device
US9323178	Toner cartridge for use in an image forming device
US9335656	Toner level sensing using rotatable magnets having varying angular offset
US9335698	Transferable page countdown for a replaceable unit between image forming devices
US9341991	Deskewing mechanism for an intermediate transfer belt module and imaging drums in an electrophotographic printer
US9341996	Hub-based drive coupling mechanism for a fuser backup member and methods of using same
US9342892	Image binarization
US9344585	Image coordination in a fleet of disparate imaging devices
US9348273	Self lubricating fuser and method of operation
US9354568	Method and system for controlling a fuser assembly using temperature feedback
US9354569	Heat transfer system for a fuser assembly
US9357102	Systems and methods of securing operational information associated with an imaging device
US9360796	Angled toner paddles for a replaceable unit of an image forming device
US9360797	Toner cartridge having a movable projection for providing installation feedback to an image forming device
US9360822	Photoconductor overcoat having radical polymerizable charge transport molecules containing two ethyl acrylate functional groups and urethane acrylate resins containing six radical polymerizable functional groups
US9360834	Replaceable unit for an electrophotographic image forming device having positioning features for electrical contacts
US9364833	Micro-fluidic modules on a chip for diagnostic applications
US9366990	Method of quantifying coverage of extra particulate additives on the surface of toner particles

<b>Publication Number</b>	<b>Title</b>
US9367005	Imaging device and method for determining operating parameters
US9367016	Method for controlling media bubble formation in an imaging device
US9367029	Resettable separator for electrophotographic components
US9383711	Interlock/connector system for a replaceable item for an image forming device
US9387478	Micro-fluidic modules on a chip for diagnostic applications
US9389540	End sealing and magnetic field truncation of a magnetic roll of a dual component development electrophotographic image forming device
US9389576	Roll deskewing device for an electrophotographic image forming device
US9389582	Replaceable unit for an image forming device having magnets of varying angular offset for toner level sensing
US9394127	Self-aligning low profile spring-biased media feed roll assembly for an imaging device
US9394232	Cost effective method of producing triarylamine compounds having two alkyl alcohols
US9395645	Capacitive toner level sensor
US9400173	Translatable media stack height sensor assembly
US9400455	Imaging device having an adaptable cleaning system
US9400481	Latch mechanism for a fuser assembly having a heat transfer roll
US9400764	Addressing, command protocol, and electrical interface for non-volatile memories utilized in recording usage counts
US9411303	Positioning stop assembly for a replaceable unit of an electrophotographic image forming device
US9417537	Photo conductor overcoat comprising radical polymerizable charge transport molecules and hexa-functional urethane acrylates
US9417538	Photo conductor overcoat comprising radical polymerizable charge transport molecules and hexa-functional urethane acrylates

<b>Publication Number</b>	<b>Title</b>
US9417572	Fuser heating element for an electrophotographic imaging device
US9417600	Replaceable unit for an electrophotographic image forming device having an engagement member for positioning a magnetic sensor
US9417603	Toner cartridge having positional control features
US9420132	Scanner option assembly for an image forming device
US9423718	Laser scan unit housing for an image forming device
US9429870	System and method for magnetic communication between replaceable unit and imaging device
US9429899	Replaceable unit for an image forming device having a retainer assembly having positioning features for processing circuitry
US9436126	Toner inlet port alignment features for a developer unit of an electrophotographic image forming device
US9436128	Toner cartridge having an engagement member for actuating a shutter
US9444964	Method and apparatus for scanning an image
US9446919	Push-pull latch assembly for a detachable media pick mechanism
US9448497	Overcoat formulation for long-life electrophotographic photoconductors and method for making the same
US9448523	Dual input bump alignment assembly for an imaging device
US9448749	Determining multifunction printer location based on user location and common location
US9449238	Augmented image correlation
US9451111	Method of determining a media class in an imaging device using an optical translucence sensor
US9454125	Systems and methods for reincorporating waste toner with fresh toner within a toner cartridge
US9471027	Positional control features between replaceable units of an electrophotographic image forming device

<b>Publication Number</b>	<b>Title</b>
US9477175	Toner level sensing for a replaceable unit of an image forming device
US9477176	Toner cartridge having a movable projection for providing installation feedback to an image forming device
US9477177	Toner cartridge having a shutter lock mechanism
US9477178	System for determining the open or closed state of a toner cartridge shutter
US9482633	Capacitive measurement multiplexing circuit and method
US9482989	Replaceable unit for an electrophotographic image forming device having positioning features for electrical contacts
US9488935	Drive mechanism for an intermediate transfer member module of an electrophotographic imaging device
US9488955	Device for connecting a centerless auger to a rotatable member
US9500994	Developer unit architecture for an imaging device
US9501001	Transfer device and system for an electrophotographic device comprising multiple electrodes
US9501257	Pass-through printing with xps printer driver
US9507301	Heat transfer system for a fuser assembly
US9513591	Photoconductor overcoat having a radical polymerizable charge transport molecule containing two ethyl acrylate functional groups and urethane acrylate resins containing six radical polymerizable functional groups
US9519233	Toner formulations having improved toner usage efficiency and method to make the same
US9519243	Replaceable unit for an image forming device having magnets of varying angular offset for toner level sensing
US9519254	Systems for configuring settings of an electronic device for customization thereof
US9519261	Positional control features of a replaceable unit for an electrophotographic image forming device
US9519262	Positioning features and electrical contacts for a replaceable unit of an

<b>Publication Number</b>	<b>Title</b>
	electrophotographic image forming device
US9523932	Method to achieve tribocharge uniformity of a developer mix across different temperature and humidity conditions by modifying the surface of the magnetic carrier particle
US9523947	Time-based commutation method and system for controlling a fuser assembly
US9524456	Manufacturing a helical physical unclonable function
US9529311	Fuser assembly having extended nip width
US9531889	Media stiffness sensor assembly for an imaging device
US9533302	Fluid cartridge and system for dispensing fluid
US9533842	Systems for sensing sheet restraint position
US9535353	Formulation for a developer mix having tribocharge uniformity across different temperature and humidity conditions
US9535374	Positioning mechanism for a roller of an intermediate transfer member module
US9535852	System and method for secured host-slave communication
US9541860	Toner cartridge for use in an image forming device
US9541876	Imaging device with diagnostic testing for fatal errors
US9542576	Magnetic helical physical unclonable function measured above flight
US9546695	Hub-based drive coupling mechanism for a fuser backup member, and methods of using same
US9547275	Fuser locking assembly for an electrophotographic imaging device
US9551962	Hybrid heater with dual function heating capability
US9551974	Positioning features for electrical connectors of replaceable units of an image forming device
US9553582	Physical unclonable functions having magnetic and non-magnetic particles
US9563162	Transferable page countdown for a replaceable unit between image forming

<b>Publication Number</b>	<b>Title</b>
	devices
US9563169	Replaceable unit for an electrophotographic image forming device having a retractable electrical connector
US9564272	Continuous extrusion method for manufacturing a z-directed component for insertion into a mounting hole in a printed circuit board
US9569631	Method and apparatus for configuring an electronics device
US9571684	Method of using a fiducial in determining two media types of different lengths used on a flatbed scanner
US9575435	Magnetic roll for a dual component development electrophotographic image forming device
US9575453	System and method for controlling media bubble formation in an imaging device
US9579814	Motor control system and method for a rotary hole punch system
US9580258	Removable media tray having a media restraint with sliding cams and pivoting latching cams operable without the use of pinching
US9580259	Removable media tray having a rack and pinion media length sensing mechanism operable by a rear restraint
US9580266	Multi-path media diverter system for an imaging device
US9588462	Replaceable unit for an electrophotographic image forming device having an engagement member for positioning a magnetic sensor
US9599931	Floating toner port interface with a replaceable unit of an electrophotographic image forming device
US9604802	Removable media tray having a media restraint with translating and pivoting latching cams operable without the use of pinching
US9604803	Push-pull latch assembly for a detachable media pick mechanism
US9604804	Push-pull latch assembly for a detachable media pick mechanism
US9608634	Toothed-rack physical unclonable function
US9608828	Elongated physical unclonable function

<b>Publication Number</b>	<b>Title</b>
US9612545	Chemically prepared core shell toner formulation including a styrene acrylate polyester copolymer used for the shell
US9618891	Bi-directional spring brake for a photoductive drum
US9632477	Systems for detecting an axially moveable member within a toner cartridge
US9639031	Controlled transfer nip for an electrophotographic device and method of using same
US9639038	Power management and control for a fuser of an electrophotographic imaging device
US9639048	Media accumulator-ejector for use with an imaging device
US9652690	Automatically capturing and cropping image of check from video sequence for banking or other computing application
US9658590	Toner cartridge for use in an image forming device
US9663312	Removable media tray having a media restraint with a latching plunger operable without the use of pinching
US9663318	Noise dampened media re-drive assembly for an imaging device
US9664901	Collimation assembly for an imaging device
US9665047	Endless fuser belt with heat pipe and two heating elements
US9665748	Magnetic helical physical unclonable function measured adjacent to flight
US9671709	Chemically prepared core shell toner formulation including a borax coupling agent and a plasticizing agent in the core
US9671710	Toner formulation using crystalline polyester encapsulated with a styrene acrylate latex formulation and method of preparing the same
US9671750	Positional control features for an imaging unit in an electrophotographic image forming device
US9678642	Methods of content-based image area selection
US9696661	Methods for retrying pick in an image-before-pick system
US9696671	Fuser belt to be used in an electrophotographic printer

<b>Publication Number</b>	<b>Title</b>
US9699352	Laser scanning unit adjusting output power of modulated beam using shading information to reduce scan line energy variation
US9701119	Fluid ejection chip including hydrophilic and hydrophobic surfaces and methods of forming the same
US9701494	Two axis media guide system for an imaging device
US9703234	Toner cartridge having an expandable toner agitator
US9709925	Toner cartridge having a movable projection for providing installation feedback to an image forming device
US9709927	Developer unit air venting in a dual component development electrophotographic image forming device
US9709928	Drive mechanism for an intermediate transfer member module of an electrophotographic imaging device
US9709932	Fuser assembly and method for controlling fuser operations based upon fuser component attributes
US9709936	Control for a fuser of an electrophotographic imaging device which determines current line voltage
US9715209	Retainer assembly having positioning features for processing circuitry used with an image forming device supply item
US9720350	Device for connecting a centerless auger to a rotatable member
US9720366	Drive coupler for a rotatable component of an electrophotographic image forming device
US9733582	Toner formulation using wax encapsulated with a styrene acrylate latex formulation and method of preparing the same
US9740148	Method and system for controlling a fuser assembly
US9740157	Axially shifting a photoconductive drum using a wear surface
US9740161	Systems for configuring settings of an electronic device for customization thereof
US9745154	Removable media tray having a high latching force and a low opening force

<b>Publication Number</b>	<b>Title</b>
US9746815	Replaceable unit for an electrophotographic image forming device having a retractable electrical connector
US9747509	Automatically capturing and cropping image of check from video sequence for banking or other computing application
US9751713	Multiple edge media stapling system
US9764912	Removable media tray having sliding tray extension operable by a rear media restraint
US9796554	Media accumulator-ejector for use with an imaging device
US9798261	Toner formulation using wax encapsulated with a styrene acrylate latex and method of preparing the same
US9798268	Toner cartridge having a movable engagement member that protrudes from a front of the toner cartridge for acutating a shutter
US9798273	Endless fuser belt with heat pipe and two heating elements
US9798285	Door-actuated feed roll separator mechanism for an imaging device
US9798287	Replaceable unit for an electrophotographic image forming device having a latching mechanism
US9800756	Image forming device with laser scanner unit and memory therefor
US9814145	Methods for manufacturing a z-directed printed circuit board component having a removable end portion
US9815649	Door-actuated feed roll separator for an imaging device
US9817231	Optical scanning system and imaging apparatus for using same
US9818006	Rfid tag programming in a duplexer
US9827722	Elastomeric roll for an electrophotographic image forming device having compressive hollow microparticles defining a surface texture of the roll
US9829855	Drive coupler
US9835967	Surface modified magnetic carriers using hydrophobized titania
US9835978	Notched end seal for an electrophotographic image forming device

<b>Publication Number</b>	<b>Title</b>
US9835993	Method and system for controlling a fuser of an electrophotographic imaging device
US9836018	Replaceable unit for an image forming device having a retainer assembly having positioning features for processing circuitry
US9837136	Addressing, command protocol, and electrical interface for non-volatile memories utilized in recording usage counts
US9841702	Surface modified magnetic carriers using hydrophobized titania
US9841722	Replaceable unit for an image forming device having magnets of varying angular offset for toner level sensing
US9857742	Method and System for Controlling a Fuser of an Electrophotographic Imaging Device
US9857755	AXIALLY SHIFTING PHOTOCONDUCTIVE DRUM
US9857759	POSITIVE LOCKING MECHANISM FOR A REMOVABLE FUSER
US9858481	Identifying Consumer Products in Images
US9864292	TONER FORMULATION AND METHOD OF PREPARING THE SAME
US9869944	TONER FORMULATION AND METHOD OF PREPARING THE SAME
US9869950	TONER AGITATOR ASSEMBLY
US9874745	Collimation Assembly for an Imaging Device
US9874838	System and method for Controlling a Fuser Assembly of an Electrophotographic Imaging Device
US9874852	Heater Member for the Fuser Assembly of an Electrophotographic Imaging Device
US9876794	Systems and Methods for Authentication of Printer Supply Items
US9879730	Compact Metal and Plastic Oldham Coupler with an Integral Gear on an Input Plate and a Retraction Spline on an Output Plate
US9880499	Method and System for Controlling a Fuser of an Electrophotographic Imaging Device

<b>Publication Number</b>	<b>Title</b>
US9891553	Toner Level Sensing for a Replaceable Unit of an Image Forming Device
US9891578	CLEANER BLADE SEALING IN AN ELECTROPHOTOGRAPHIC IMAGE FORMING DEVICE
US9904209	Replaceable Unit for an Electrophotographic Image Forming Device Having an Engagement Member for Positioning a Magnetic Sensor
US9904212	TONER AGITATION SYSTEM INCLUDING A CAM DRIVEN RECIPROCATING TONER AGITATOR
US9904230	AXIALLY SHIFTING A PHOTOCONDUCTIVE DRUM USING A CAM
US9904239	FUSER ARCHITECTURE FOR ENABLING INTERCHANGEABILITY IN AN IMAGING DEVICE
US9906667	Fiducial for use in Determining Two Media Types of Different Lengths used on a Flatbed Scanner
US9910376	Toner Formulation Having a Silane Surface Treated on its Outer Surface and Method of Preparing the Same
US9910377	Toner Formulation Having a Silane Surface Treated on its Outer Surface and Method of Preparing the Same
US9910382	CAPACITIVE TONER LEVEL SENSOR
US9910395	Systems and Methods for Controlling Toner Development in an Image Forming Device
US9910403	Positioning Features for Electrical Contacts of a Replaceable Unit of an Electrophotographic Image Forming Device
US9915894	ELECTROPHOTOGRAPHIC IMAGE FORMING DEVICE HAVING A TONER CARTRIDGE THAT INCLUDES A MOVABLE PROJECTION FOR PROVIDING INSTALLATION FEEDBACK
US9917699	Physical Unclonable Function Imaged Through Two Faces
USD550762	Photoconductor unit
USD560713	Laser printer cartridge
USD611090	Photoconductor unit

<b>Publication Number</b>	<b>Title</b>
USD627389	Developer unit
USD645503	Laser printer cartridge
USD654533	Cleaner housing for a laser printer cartridge
USD671542	Imaging device
USD693400	Laser printer toner cartridge
USD695338	Laser printer toner cartridge
USD695820	Laser printer toner cartridge
USD695821	Laser printer toner cartridge
USD697605	Fluid dispenser
USD724138	Laser printer toner cartridge
USD724656	Laser printer toner cartridge
USD759154	Laser printer toner cartridge
USD759155	Laser printer toner cartridge
USD759156	Laser printer toner cartridge
USD759157	Laser printer toner cartridge
USD760295	Portion of a display screen with icon
USD762720	Display screen portion with icon
USD762721	Display screen portion with icon
USD764539	Portion of a display screen with icon
USD764540	Portion of a display screen with icon
USD764544	Portion of a display screen with icon
USD764547	Portion of a display screen with icon
USD774079	Display screen portion with icon

<b>Publication Number</b>	<b>Title</b>
USD774079	Display screen portion with icon
USD785088	Waste toner bottle for a printer
USD786346	Printer
USD791229	Printer



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## ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

### **Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)** (application filed on or after May 29, 2000)

The Patent Term Adjustment is 304 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

James Ronald Booth, Nicholasville, KY;  
Bryan Scott Willett, Lexington, KY;

# PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** Mail Stop ISSUE FEE  
**Commissioner for Patents**  
**P.O. Box 1450**  
**Alexandria, Virginia 22313-1450**  
**or Fax** (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

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08/13/2010

LEXMARK INTERNATIONAL, INC.  
INTELLECTUAL PROPERTY LAW DEPARTMENT  
740 WEST NEW CIRCLE ROAD  
BLDG. 082-1  
LEXINGTON, KY 40550-0999

## Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

12/107,278

04/22/2008

James Ronald Booth

2004-0784.15 (DIV)

9427

TITLE OF INVENTION: ADDRESSING AND COMMAND PROTOCOLS FOR NON-VOLATILE MEMORIES UTILIZED IN RECORDING USAGE COUNTS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	11/15/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
BERTRAM, RYAN	2187	711-156000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1. ....  
2. ....  
3. ....

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Lexmark International, Inc.

Lexington, Kentucky

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☒ Issue Fee  
☒ Publication Fee (No small entity discount permitted)  
☐ Advance Order - # of Copies .....

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.  
☐ Payment by credit card. Form PTO-2038 is attached.  
☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 12-1213 (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☒ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature



Date

10-25-10

Typed or printed name

Michael T. Sanderson

Registration No.

43,082

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	12107278			
<b>Filing Date:</b>	22-Apr-2008			
<b>Title of Invention:</b>	ADDRESSING AND COMMAND PROTOCOLS FOR NON-VOLATILE MEMORIES UTILIZED IN RECORDING USAGE COUNTS			
<b>First Named Inventor/Applicant Name:</b>	James Ronald Booth			
<b>Filer:</b>	Michael Thomas Sanderson/Wendy Winters			
<b>Attorney Docket Number:</b>	2004-0784.15 (DIV)			
Filed as Large Entity				
<b>Utility under 35 USC 111(a) Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
Utility Appl issue fee	1501	1	1510	1510
Publ. Fee- early, voluntary, or normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1810

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	8689664
<b>Application Number:</b>	12107278
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	9427
<b>Title of Invention:</b>	ADDRESSING AND COMMAND PROTOCOLS FOR NON-VOLATILE MEMORIES UTILIZED IN RECORDING USAGE COUNTS
<b>First Named Inventor/Applicant Name:</b>	James Ronald Booth
<b>Customer Number:</b>	21972
<b>Filer:</b>	Michael Thomas Sanderson/Wendy Winters
<b>Filer Authorized By:</b>	Michael Thomas Sanderson
<b>Attorney Docket Number:</b>	2004-0784.15 (DIV)
<b>Receipt Date:</b>	25-OCT-2010
<b>Filing Date:</b>	22-APR-2008
<b>Time Stamp:</b>	09:17:23
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 1810
RAM confirmation Number	7348
Deposit Account	121213
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and examination processing fees)

UNIVERSAL EXHIBIT 1008

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	2004-0784-15_Issue_Fee_Transmittal.pdf	450322 ff9d8e187d353a01d1889066b6b221256bf52500	no	1

### Warnings:

### Information:

2	Fee Worksheet (PTO-875)	fee-info.pdf	32178 3c2d2b5e4a97ad6b2f413b79b121486718452c6e	no	2
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### Warnings:

### Information:

Total Files Size (in bytes):			482500
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

### New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

### National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

### New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
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P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

## NOTICE OF ALLOWANCE AND FEE(S) DUE

21972 7590 08/13/2010

LEXMARK INTERNATIONAL, INC.  
INTELLECTUAL PROPERTY LAW DEPARTMENT  
740 WEST NEW CIRCLE ROAD  
BLDG. 082-1  
LEXINGTON, KY 40550-0999

EXAMINER

BERTRAM, RYAN

ART UNIT

PAPER NUMBER

2187

DATE MAILED: 08/13/2010

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

12/107,278

04/22/2008

James Ronald Booth

2004-0784.15 (DIV)

9427

TITLE OF INVENTION: ADDRESSING AND COMMAND PROTOCOLS FOR NON-VOLATILE MEMORIES UTILIZED IN RECORDING USAGE COUNTS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	11/15/2010

**THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.**

**THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.**

### HOW TO REPLY TO THIS NOTICE:

#### I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.**

# **PART B - FEE(S) TRANSMITTAL**

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
or Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

21972 7590 08/13/2010

LEXMARK INTERNATIONAL, INC.  
INTELLECTUAL PROPERTY LAW DEPARTMENT  
740 WEST NEW CIRCLE ROAD  
BLDG. 082-1  
LEXINGTON, KY 40550-0999

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## **Certificate of Mailing or Transmission**

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(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

12/107,278 04/22/2008 James Ronald Booth 2004-0784.15 (DIV) 9427

TITLE OF INVENTION: ADDRESSING AND COMMAND PROTOCOLS FOR NON-VOLATILE MEMORIES UTILIZED IN RECORDING USAGE COUNTS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
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nonprovisional NO \$1510 \$300 \$0 \$1810 11/15/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
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BERTRAM, RYAN 2187 711-156000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 \_\_\_\_\_
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 \_\_\_\_\_
- 3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature \_\_\_\_\_

Date \_\_\_\_\_

Typed or printed name \_\_\_\_\_

Registration No. \_\_\_\_\_

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

**UNIVERSAL - EXHIBIT 1008**



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/107,278	04/22/2008	James Ronald Booth	2004-0784.15 (DIV)	9427
21972	7590	08/13/2010	EXAMINER	
LEXMARK INTERNATIONAL, INC. INTELLECTUAL PROPERTY LAW DEPARTMENT 740 WEST NEW CIRCLE ROAD BLDG. 082-1 LEXINGTON, KY 40550-0999			BERTRAM, RYAN	
			ART UNIT	PAPER NUMBER
			2187	
			DATE MAILED: 08/13/2010	

## Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 304 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 304 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	12/107,278	BOOTH ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	RYAN BERTRAM	2187	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed 7/21/2010.
2. ☒ The allowed claim(s) is/are 1-6,10-14 and 16-20.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
  - \* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. <input type="checkbox"/> Notice of References Cited (PTO-892)</li> <li>2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)</li> <li>3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br/>Paper No./Mail Date _____</li> <li>4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br/>of Biological Material</li> </ol> | <ol style="list-style-type: none"> <li>5. <input type="checkbox"/> Notice of Informal Patent Application</li> <li>6. <input type="checkbox"/> Interview Summary (PTO-413),<br/>Paper No./Mail Date _____.</li> <li>7. <input type="checkbox"/> Examiner's Amendment/Comment</li> <li>8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance</li> <li>9. <input type="checkbox"/> Other _____.</li> </ol> |
|---|--|

## **DETAILED ACTION**

The examiner acknowledges the applicant's submission of the amendment dated 7/21/2010. At this point claims 1, 10-12, and 17-20 have been amended and claims 7-9, 15, and 21 have been cancelled. Thus, claims 1-6, 10-14, and 16-20 are pending in the instant application.

### **I. RELEVANT ART CITED BY EXAMINER**

The following prior art made of record and not relied upon is cited to establish the level of skill in the applicant's art and those arts considered reasonably pertinent to applicant's disclosure. See MPEP 707.05(c).

The following references teach various methods and systems for writing data to non-volatile memories.

#### **US Patent Number**

2004/0133794 (Kocher)

2002/0085433 (Tomori)

6,253,277 (Lakhani)

### **II. REASONS FOR ALLOWANCE**

Claims 1-6, 10-14, and 16-20 are allowed.

The prior art of record including the disclosures of Kocher, Tomori, or Lakhani neither anticipate nor renders obvious the below recited combinations.

The primary reasons for allowance of claims 1 and 12 in the instant application is the combination with the inclusion in the claims of “a punch out bit field command operable to instruct the one or more memory modules to punch out a specified bit field within the one or more memory modules”.

Because claims 2-6, 10-11, 13-14, and 16-19 depend directly or indirectly on claims 1 and 12, these claims are considered allowable for at least the same reasons noted above.

The primary reasons for allowance of claim 20 in the instant application is the combination with the inclusion in the claims of “instruct the one or more memory modules to punch out a specified bit within the one or more memory modules indicative of said usage of toner or ink”.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

### **III. CONCLUSION**

#### **(a) Status of Claims In the Application**

Per the instant office action, claims 1-6, 10-14, and 16-20 have received a second action on the merits and are in condition for allowance.

**(b) Directions of Future Correspondences**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan Bertram whose telephone number is 571-270-1377. The examiner can normally be reached on Mon-Fri 8:30am-5pm ET.

**Important Note**

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Ellis can be reached on 571-272-4205. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/R. B./  
Examiner, Art Unit 2187

Application/Control Number: 12/107,278

Page 5

Art Unit: 2187

/Kevin L Ellis/

Supervisory Patent Examiner, Art Unit 2187




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## BIB DATA SHEET

CONFIRMATION NO. 9427

<b>SERIAL NUMBER</b> 12/107,278	<b>FILING or 371(c) DATE</b> 04/22/2008 <b>RULE</b>	<b>CLASS</b> 711	<b>GROUP ART UNIT</b> 2187	<b>ATTORNEY DOCKET NO.</b> 2004-0784.15 (DIV)		
<b>APPLICANTS</b> James Ronald Booth, Nicholasville, KY; Bryan Scott Willett, Lexington, KY; <b>** CONTINUING DATA *****</b> This application is a DIV of 11/154,117 06/16/2005 PAT 7,426,613 <b>** FOREIGN APPLICATIONS *****</b> <b>** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **</b> 06/06/2008						
Foreign Priority claimed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 35 USC 119(a-d) conditions met <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Verified and Acknowledged <u>/RYAN BERTRAM/</u> Examiner's Signature		<input type="checkbox"/> Met after Allowance Initials	<b>STATE OR COUNTRY</b> KY	<b>SHEETS DRAWINGS</b> 9	<b>TOTAL CLAIMS</b> 21	<b>INDEPENDENT CLAIMS</b> 4
<b>ADDRESS</b> LEXMARK INTERNATIONAL, INC. INTELLECTUAL PROPERTY LAW DEPARTMENT 740 WEST NEW CIRCLE ROAD BLDG. 082-1 LEXINGTON, KY 40550-0999 UNITED STATES						
<b>TITLE</b> Addressing and Command Protocols for Non-Volatile Memories Utilized in Recording Usage Counts						
<b>FILING FEE RECEIVED</b> 1290	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit			

<b>Search Notes</b>  	<b>Application/Control No.</b>  12107278	<b>Applicant(s)/Patent Under Reexamination</b>  BOOTH ET AL.
	<b>Examiner</b>  RYAN BERTRAM	<b>Art Unit</b>  2187

SEARCHED			
Class	Subclass	Date	Examiner
711	103, 148, 150, 156	8/4/2010	rb

SEARCH NOTES		
Search Notes	Date	Examiner
Inventor Search	4/14/2010	rb
PLUS Search	4/14/2010	rb
EAST Search	4/14/2010	rb
NPL Search	4/14/2010	rb
Updated EAST & Inventor Search	8/4/2010	rb

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
711	103, 148, 150, 156	8/4/2010	rb

/RYAN BERTRAM/ Examiner.Art Unit 2187	
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## EAST Search History

## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	24	("20020085433"   "20030011409"   "20030043408"   "20030133331"   "20040133794"   "20040178278"   "20050036620"   "4586147"   "4631428"   "4689740"   "5023813"   "5044790"   "5297269"   "5479467"   "5689196"   "6002846"   "6052547"   "6249838"   "6253277"   "6307779"   "6442076"   "6641312"   "6665092"   "6760274").PN.	US-PGPUB; USPAT	OR	ON	2010/08/04 20:32
L2	5	booth-james.in.	US-PGPUB; USPAT; USOCR	OR	ON	2010/08/04 20:40
L3	14	willett-bryan-\$.in.	US-PGPUB; USPAT; USOCR	OR	ON	2010/08/04 20:40
L4	1518	711/156.ccls.	US-PGPUB; USPAT; USOCR	OR	ON	2010/08/04 20:42
L5	5518	711/148.ccls 711/150. ccls 711/103.ccls. 711/156.ccls.	US-PGPUB; USPAT; USOCR	OR	ON	2010/08/04 20:42
L6	389	(increment near counter) near2 (instruction or command)	US-PGPUB; USPAT; USOCR	OR	ON	2010/08/04 20:42
L10	3	5 and 6	US-PGPUB; USPAT	OR	ON	2010/08/04 20:43
L11	12014	(usage or count\$2) with printer	US-PGPUB; USPAT; USOCR	OR	ON	2010/08/04 20:43

UNIVERSAL - EXHIBIT 1008

L12	1487	L11 with memory	US-PGPUB; USPAT; USOCR	OR	ON	2010/08/04 20:43
L13	4	5 and L12	US-PGPUB; USPAT	OR	ON	2010/08/04 20:43
L14	7	"punch out bit"	US-PGPUB; USPAT	OR	ON	2010/08/04 20:44

8/ 4/ 2010 8:44:58 PM

C:\ Documents and Settings\ rbertram\ My Documents\ EAST\ Workspaces\ 12107278.wsp

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of	:
	:
James R. Booth, et al.	: Examiner: BERTRAM, Ryan
	:
Serial No.: 12/107,278	: Group Art Unit: 2187
	:
Filed: April 22, 2008	: Confirmation No. 9427
	:
For: Addressing and Command Protocols for	
Non-Volatile Memories Utilized in Recording	
Usage Counts	

**AMENDMENT**

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

Responsive to the non-final Office Action dated April 22, 2010, please amend the above-captioned application. No fees are believed due.

The **Amendments to the Claims** are reflected in the **Listing of Claims** which begin on page 2 of this paper.

**Remarks** begin thereafter on page 6.

**Amendments to the Claims:**

This listing of claims will replace all prior versions and listings of claims in the application.

**Listing of Claims:**

1. (Currently Amended) A method of updating memory modules, comprising:

receiving, at one or more memory modules, a command transmitted from a processing device, wherein the command comprises a) an increment counter command operable to instruct the one or more memory modules to increment a counter within the one or more memory modules and b) a punch out bit field command operable to instruct the one or more memory modules to punch out a specified bit field within the one or more memory modules;  
and

processing the command at the one or more memory modules.

2. (Original) The method of claim 1, wherein processing the command comprises incrementing, in each of the one or more memory modules, at least one counter.

3. (Original) The method of claim 2, wherein incrementing further comprises incrementing, in each of the one or more memory modules, the at least one counter by an increment value specified in the command.

4. (Original) The method of claim 2, wherein the command further comprises memory module addresses corresponding to each of the one or more one or memory modules.

5. (Original) The method of claim 1, further comprising establishing a busy status signal

during the processing of the command at the one or more memory modules.

6. (Original) The method of claim 1, wherein receiving further comprises receiving, at the one or more memory modules, the command from the processing device transmitted to the one or more memory modules via an asynchronous data channel.

7-9. Canceled.

10. (Currently Amended) The method of claim 1 9, wherein the punch out bit field command comprises implementing a command to change a bit associated with at least one memory module from an erased state to a programmed state.

11. (Currently Amended) The method of claim 1 9, wherein the bit field comprises at least eight bits.

12. (Currently Amended) A method of updating memory modules, comprising:

receiving, at one or more memory modules, a command transmitted from a processing device, wherein the command is a) a punch out bit field command operable to instruct the one or more memory modules to punch out a specified bit field within the one or more memory modules and b) an increment counter command operable to instruct the one or more memory modules to increment a counter within the one or more memory modules; and

processing the command at the one or more memory modules.

13. (Original) The method of claim 12, wherein the punch out bit field command comprises implementing a command to change a bit associated with at least one memory module from

an erased state to a programmed state.

14. (Original) The method of claim 12, wherein the bit field comprises at least eight bits.

15. Canceled.

16. (Original) The method of claim 12, wherein receiving further comprises receiving, at the one or more memory modules, the command from the processing device transmitted to the one or more memory modules via an asynchronous data channel.

17. (Currently Amended) The method of claim 12, wherein processing the command comprises incrementing, in each of the one or more memory modules, ~~at least one~~ said counter.

18. (Currently Amended) The method of claim 12 ~~15~~, wherein incrementing further comprises incrementing, in each of the one or more memory modules, the ~~at least one~~ counter by an increment value specified in the command.

19. (Currently Amended) The method of claim 12 ~~15~~, further comprising establishing a busy status signal during the processing of the command at the one or more memory modules.

20. (Currently Amended) A method of updating memory modules in an imaging device, comprising:

receiving, at one or more memory modules, a command transmitted from a processing device, wherein the command is indicative of usage of toner or ink in a consumable item in

the imaging device and is operable to instruct the one or more memory modules to punch out a specified bit within the one or more memory modules indicative of said usage of toner or ink; and

processing the command at the one or more memory modules.

21. Canceled.

### **REMARKS**

Claims 1-6, 10-14 and 16-20 are pending. Claims 1, 10-12 and 17-20 are amended. Claims 7-9, 15 and 21 are canceled. All others remain original.

The Examiner indicates allowance of claims 9-11, 15 and 18-19, provided the Applicant can overcome rejections cited under 35 U.S.C. §112, first paragraph. He notes the failure of these claims for including an increment counter command and a punch out bit field command when the specification, in at least paragraph 31, states that commands are either an increment counter command or a punch out bit field command, but “not both.” *4-22-10 Office Action, p. 3, first paragraph*. The Applicant requests reconsideration.

The specification charges skilled artisans with noting that embodiments of the invention having either the counter or the punch out bit fields are but “one aspect of the invention.” *Applicant’s specification, p. 9, paragraph 31*. Similarly, a command may typify “an increment counter or a punch out bit field command,” but this too represents only “another aspect of the invention.” *Underlining added, Applicant’s specification, p. 4, paragraph 12*.

Elsewhere, the Applicant unambiguously notes that certain embodiments of the invention contain both an increment counter command and a bit field command for punching out bits. At *page 9, paragraph 30*, the specification teaches “non volatile memory modules that have one or more counts, resource bit fields, **or a combination thereof**.” *Emphasis added*. Again, at *page 9, paragraph 33*, non volatile memory modules 103 “may contain one or more counts, bit fields, **or a combination thereof**.” *Emphasis added*. Likewise still, a command protocol specifying an “increment counter command” may “alternatively **or also** include a punch out bit field command protocol.” *Emphasis added, Applicant’s specification, p. 5, paragraph 14*. It appears the Examiner places too much emphasis on a single embodiment of the invention, when still other embodiments clearly allow the converse. The

Applicant submits the specification complies with the written description requirement outlined in 35 U.S.C. §112, first paragraph.

Since claims 1-6, 10-14 and 16-19 require the inclusion of both an increment counter and a punch out bit field command, they all stand in a condition for allowance. This comports with the Examiner's indication of allowable subject matter. Also, minor amendments have been introduced in claims 10, 11 and 17-20. The changes reflect altered claim dependencies and, in some instances, making proper the antecedent basis of certain limitations. No new matter is added.

In claim 20, the Applicant questions the Examiner's reasoning. Lakhani (U.S. Patent No. 6,253,277) either anticipates, or it doesn't. It cannot assume qualities from the Applicant's specification in the manner indicated. The Examiner may not take a disclosed embodiment in the Applicant's specification (increment counter), find a similar embodiment in the reference at hand ("tag command 0AH causes counter to increment" col. 29, ll. 39-46), and then conclude anticipation of claims having a second embodiment in the specification (punch out bit field command), but nowhere disclosed in the reference. The Lakhani reference does not take on qualities of the Applicant's specification because the Examiner asserts an "analogy" between the embodiments of the present invention. *4-22-10 Office Action, p. 9, first paragraph*. As has long been held, anticipation requires the presence of "each and every element of a claimed invention." *RCA Corp. v. Applied Digital Data Sys., Inc.*, 221 USPQ 385, 388 (Fed. Cir. 1984). **A reference "that 'almost' meets that standard does not 'anticipate.'"** *Emphasis added, Connell v. Sears, Roebuck & Co.*, 220 USPQ 193, 198 (Fed. Cir. 1983).

Notwithstanding, claim 20 patentably defines over the art for at least tying "usage" to "toner or ink in a consumable item in the imaging device" and for command instructions that "instruct" memory modules "to punch out a specified bit" relative to this "said usage of toner

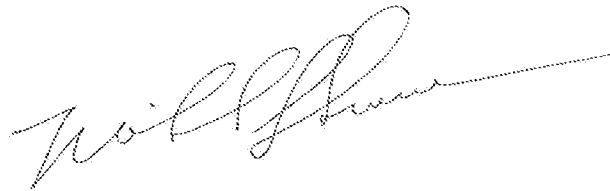
Application S.N. 12/107,278  
Amendment dated July 21, 2010  
Reply to non-final Office Action dated April 22, 2010

or ink.” Nowhere does Lakhani teach this. Instead, Lakhani relates to memory itself and cares not about imaging devices, much less toner or ink consumption.

The Applicant does not believe any fees are due with this response, but authorizes necessary deductions from Deposit Account No. 12-1213 to advance prosecution.

Respectfully submitted,

**LEXMARK INTERNATIONAL, INC.**

A handwritten signature in black ink, appearing to read "Michael T. Sanderson", with a long horizontal flourish extending to the right.

Michael T. Sanderson  
Registration No. 43,082  
740 W. New Circle Rd  
Bldg. 082-1  
Lexington, KY 40550  
(859) 232-3939

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	8061104
<b>Application Number:</b>	12107278
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	9427
<b>Title of Invention:</b>	Addressing and Command Protocols for Non-Volatile Memories Utilized in Recording Usage Counts
<b>First Named Inventor/Applicant Name:</b>	James Ronald Booth
<b>Customer Number:</b>	21972
<b>Filer:</b>	Michael Thomas Sanderson/Wendy Winters
<b>Filer Authorized By:</b>	Michael Thomas Sanderson
<b>Attorney Docket Number:</b>	2004-0784.15 (DIV)
<b>Receipt Date:</b>	21-JUL-2010
<b>Filing Date:</b>	22-APR-2008
<b>Time Stamp:</b>	15:06:24
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
------------------------	----

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment Copy Claims/Response to Suggested Claims	2004-0784-15_DIV_Response_to_4-22-10_NFOA.pdf	92022 c304c868a162b221e212dd68dee02e792984ba40	no	8

### Warnings:

### Information:

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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875					Application or Docket Number <b>12/107,278</b>		Filing Date <b>04/22/2008</b>		<input type="checkbox"/> To be Mailed	
<b>APPLICATION AS FILED – PART I</b>										
(Column 1)			(Column 2)		SMALL ENTITY <input type="checkbox"/>		OR		OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)				
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A		N/A					
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A		N/A					
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A		N/A					
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =		X \$ =					
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =		X \$ =					
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL		TOTAL					
<b>APPLICATION AS AMENDED – PART II</b>										
(Column 1)			(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY	
<b>AMENDMENT</b>	<b>07/21/2010</b>	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	* 16	Minus	** 21	=	X \$ =		X \$ =		
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 4	=	X \$ =		X \$ =		
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))									
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE		TOTAL ADD'L FEE		
<b>AMENDMENT</b>	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =		X \$ =		
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =		X \$ =		
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))									
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE		TOTAL ADD'L FEE		
<p>* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.</p> <p>** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".</p> <p>*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".</p> <p>The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.</p>										

Legal Instrument Examiner:  
/ELMIRA HALL/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/107,278	04/22/2008	James Ronald Booth	2004-0784.15 (DIV)	9427

21972 7590 04/22/2010  
LEXMARK INTERNATIONAL, INC.  
INTELLECTUAL PROPERTY LAW DEPARTMENT  
740 WEST NEW CIRCLE ROAD  
BLDG. 082-1  
LEXINGTON, KY 40550-0999

EXAMINER
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BERTRAM, RYAN

ART UNIT	PAPER NUMBER
----------	--------------

2187

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

04/22/2010

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

blambert@lexmark.com  
jpezdek@lexmark.com  
iplaw@lexmark.com

<b>Office Action Summary</b>	<b>Application No.</b> 12/107,278	<b>Applicant(s)</b> BOOTH ET AL.	
	<b>Examiner</b> RYAN BERTRAM	<b>Art Unit</b> 2187	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 April 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 April 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>7/29/2008</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

The instant application having Application No. 12/107,278 has a total of 21 claims pending in the application, there are 3 independent claims and 18 dependent claims, all of which are ready for examination by the examiner.

#### **I. INFORMATION DISCLOSURE STATEMENT**

The information disclosure statement (IDS) submitted on 7/29/2008 was filed before the mailing date of this office action. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

#### **II. REJECTIONS NOT BASED ON PRIOR ART**

##### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 9-11, 15, and 18-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application

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was filed, had possession of the claimed invention. Claims 9-11, 15, and 18-19 require the command to comprise **both** an increment counter command, and a punch out bit field command. However, the specification discloses, in paragraph 31 among other places, that the command may be an increment counter command **or** a punch out bit field command, not both.

Section 2161.01 of the M.P.E.P. states, “*The function of the written description requirement is to ensure that the inventor had possession of, as of the filing date of the application relied on, the specific subject matter later claimed by him or her; how the specification accomplishes this is not material.*” This application is a divisional of application 11/154,117, and is seeking the priority date of the parent application. Since the originally filed specification lacks support for the command to comprise both types of commands, claims 9-11, 15, and 18-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement

### **III. REJECTIONS BASED ON PRIOR ART**

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-8, 12-13, 16-17, and 20-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Lakhani et al (US 6,253,277), hereinafter Lakhani, with Kocher (US 2004/0133794) being used as evidentiary support for claims 7-8.

1. Regarding claim 1, Lakhani discloses a method of updating memory modules, comprising:

receiving, at one or more memory modules, a command transmitted from a processing device **[see Col. 5, lines 1-20; commands are sent from a memory controller to one or all of the connected memory devices]**, wherein the command comprises an increment counter command operable to instruct the one or more memory modules to increment a counter within the one or more memory modules **[see Col. 29, lines 39-46; tag command 0AH causes counter to increment]**; and

processing the command at the one or more memory modules **[see Col. 29, lines 39-46; the increment counter command causes the counter in the memory module to be incremented]**.

2. Regarding claim 2, Lakhani discloses the method of claim 1, wherein processing the command comprises incrementing, in each of the one or more memory modules, at least one counter **[see Col. 29, lines 39-46; the increment counter command causes the counter in the memory module that the command is directed towards to be incremented]**.

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3. Regarding claim 3, Lakhani discloses the method of claim 2, wherein incrementing further comprises incrementing, in each of the one or more memory modules, the at least one counter by an increment value specified in the command **[see Col. 29, lines 39-46; the increment counter command causes the counter in the memory module that the command is directed towards to be incremented by a default value of one, which would be encoded within the tag command]**.

4. Regarding claim 4, Lakhani discloses the method of claim 2, wherein the command further comprises memory module addresses corresponding to each of the one or more one or memory modules **[see Col. 5, lines 1-20, Fig. 18; the address is sent with the write command, the write command further including tag 0AH causing the counter to increment]**.

5. Regarding claim 5, Lakhani discloses the method of claim 1, further comprising establishing a busy status signal during the processing of the command at the one or more memory modules **[see Col. 12, lines 11-22; controller is forced to enter a wait state as memory devices process given commands]**.

6. Regarding claim 6, Lakhani discloses the method of claim 1, wherein receiving further comprises receiving, at the one or more memory modules, the command from the processing device transmitted to the one or more memory modules via an

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asynchronous data channel **[see Col. 5, lines 20-30; wherein the memory devices are not clocked and commands are only sent when there is a data transmission]**.

7. Regarding claim 7, Lakhani discloses a method of updating memory modules, comprising:

receiving, at one or more memory modules, a command transmitted from a processing device **[see Col. 5, lines 1-20; commands are sent from a memory controller to one or all of the connected memory devices]**, wherein the command is indicative of wear **[see Col. 29, lines 39-46; wherein the counter is incremented during a write command. Writes are well known to cause wear on memory, as supported by Kocher, paragraph 161]** and is operable to instruct the one or more memory modules to increment a counter within the one or more memory modules **[see Col. 29, lines 39-46; tag command 0AH causes counter to increment]**; and processing the command at the one or more memory modules **[see Col. 29, lines 39-46; the increment counter command causes the counter in the memory module to be incremented]**.

8. Regarding claim 8, Lakhani discloses the method of claim 7, wherein the command that is indicative of wear is a consumption counter that reflects a consumption of at least one resource **[see Col. 29, lines 39-46; wherein the counter is incremented during a write command. Writes are well known to cause wear on**

**memory, as supported by Kocher, paragraph 161. The resource that is being consumed would then be the memory itself].**

9. Regarding claim 12, Lakhani discloses a method of updating memory modules, comprising:

receiving, at one or more memory modules, a command transmitted from a processing device **[see Col. 5, lines 1-20; commands are sent from a memory controller to one or all of the connected memory devices]**, wherein the command is a punch out bit field command operable to instruct the one or more memory modules to punch out a specified bit field within the one or more memory modules **[see Col. 29, lines 39-46; tag command 0AH causes counter to increment. Applicant's specification, see paragraph 30, analogizes a punch out bit field command to be an increment counter command]**; and

processing the command at the one or more memory modules **[see Col. 29, lines 39-46; the increment counter command causes the counter in the memory module to be incremented]**.

10. Regarding claim 13, Lakhani discloses the method of claim 12, wherein the punch out bit field command comprises implementing a command to change a bit associated with at least one memory module from an erased state to a programmed state **[see Col. 29, lines 39-46; the increment counter command causes the**

**counter in the memory module to be incremented. If counter was at '0' and incremented to '1', this would be analogous to changing an erased state to a programmed state].**

11. Regarding claim 16, Lakhani discloses the method of claim 12, wherein receiving further comprises receiving, at the one or more memory modules, the command from the processing device transmitted to the one or more memory modules via an asynchronous data channel **[see Col. 5, lines 20-30; wherein the memory devices are not clocked and commands are only sent when there is a data transmission].**

12. Regarding claim 17, Lakhani discloses the method of claim 12, wherein processing the command comprises incrementing, in each of the one or more memory modules, at least one counter **[see Col. 29, lines 39-46; the command sent to memory devices may be an increment counter command, wherein the counter is within the memory device].**

13. Regarding claim 20, Lakhani discloses a method of updating memory modules, comprising:

receiving, at one or more memory modules, a command transmitted from a processing device **[see Lakhani, Col. 5, lines 1-20; commands are sent from a memory controller to one or all of the connected memory devices]**, wherein the command is indicative of usage **[see Lakhani, Col. 29, lines 30-46; the counter**

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**indicates how the incoming bytes are arranged in the page, and therefore how the page is being used, which is usage]** and is operable to instruct the one or more memory modules to punch out a specified bit within the one or more memory modules **[see Lakhani, Col. 29, lines 39-46; tag command 0AH causes counter to increment. Applicant's specification, see paragraph 30, analogizes a punch out bit field command to be an increment counter command];** and

processing the command at the one or more memory modules **[see Lakhani, Col. 29, lines 39-46; the increment counter command causes the counter in the memory module to be incremented].**

14. Regarding claim 21, Lakhani discloses the method of claim 20, wherein the command that is indicative of usage reflects a usage of at least one resource **[see Lakhani, Col. 29, lines 30-46; the counter indicates how the incoming bytes are arranged in the page, and therefore how the page is being used, which is usage, and the resource would be memory itself].**

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lakhani (US 6,253,277) in view of Tomori et al. (US 2002/0085433) hereinafter Tomori.

15. Regarding claim 14, Lakhani discloses the method of claim 12 as discussed above. The byte address counter is counting bytes and has to count 32 bytes (which is

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the sector size of the memory) into the 32 program data registers [see Col. 29, lines 44-46, Fig. 22], so it the counter would comprise at least 5 bits.

Lakhani does not expressly disclose that the bit field comprises at least 8 bits.

Tomori discloses a memory system which uses variable sector sizes, including 256 byte sectors [see paragraph 139]. A sector size of 256 bytes would require at least 8 bits to be used in the counter as taught by Lakhani.

Lakhani and Tomori are analogous art because they are from the same field of endeavor, namely memory access and control.

Since there is a finite number of sector sizes that may be implemented in memory, it would be obvious to a person with ordinary skill in the art to use sector sizes larger than the 32 byte sectors of Lakhani in attempts to improve the memory system.

#### **IV. ALLOWABLE SUBJECT MATTER**

Claims 9-11, 15, and 18-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, and all of the pending 112 rejections are resolved.

**IV. CLOSING COMMENTS**

**Conclusion**

(a) **Status of Claims In the Application**

Per the instant office action, claims 1-21 have received a first action on the merits and are subject of a first action non-final.

(b) **Directions of Future Correspondences**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan Bertram whose telephone number is 571-270-1377. The examiner can normally be reached on Mon-Fri 8am-5pm ET.

**Important Note**

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christian Chace can be reached on 571-272-4190. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/R. B./  
Examiner, Art Unit 2187

/Jared I Rutz/  
Examiner, Art Unit 2187

<b>Notice of References Cited</b>	Application/Control No. 12/107,278		Applicant(s)/Patent Under Reexamination BOOTH ET AL.	
	Examiner RYAN BERTRAM		Art Unit 2187	Page 1 of 1

#### U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2004/0133794	07-2004	Kocher et al.	713/193
*	B	US-2002/0085433	07-2002	Tomori et al.	365/200
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

#### FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

#### NON-PATENT DOCUMENTS


*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<b><i>Index of Claims</i></b>  	<b>Application/Control No.</b>  12107278	<b>Applicant(s)/Patent Under Reexamination</b>  BOOTH ET AL.
	<b>Examiner</b>  RYAN BERTRAM	<b>Art Unit</b>  2187

✓	<b>Rejected</b>	-	<b>Cancelled</b>	N	<b>Non-Elected</b>	A	<b>Appeal</b>
=	<b>Allowed</b>	÷	<b>Restricted</b>	I	<b>Interference</b>	O	<b>Objected</b>

<input type="checkbox"/> <b>Claims renumbered in the same order as presented by applicant</b>			<input type="checkbox"/> <b>CPA</b>			<input type="checkbox"/> <b>T.D.</b>			<input type="checkbox"/> <b>R.1.47</b>		
CLAIM		DATE									
Final	Original	04/14/2010									
	1	✓									
	2	✓									
	3	✓									
	4	✓									
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	16	✓									
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	18	✓									
	19	✓									
	20	✓									
	21	✓									

<b>Search Notes</b>  	<b>Application/Control No.</b>  12107278	<b>Applicant(s)/Patent Under Reexamination</b>  BOOTH ET AL.
	<b>Examiner</b>  RYAN BERTRAM	<b>Art Unit</b>  2187

<b>SEARCHED</b>			
<b>Class</b>	<b>Subclass</b>	<b>Date</b>	<b>Examiner</b>
711	156	4/14/2010	rb

<b>SEARCH NOTES</b>		
<b>Search Notes</b>	<b>Date</b>	<b>Examiner</b>
Inventor Search	4/14/2010	rb
PLUS Search	4/14/2010	rb
EAST Search	4/14/2010	rb
NPL Search	4/14/2010	rb
Test Based Search in 711/103, 726/2, 726/16-21, 726/34	4/15/2010	rb

<b>INTERFERENCE SEARCH</b>			
<b>Class</b>	<b>Subclass</b>	<b>Date</b>	<b>Examiner</b>

/RYAN BERTRAM/ Examiner.Art Unit 2187	
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## EAST Search History

## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"12107278"	US-PGPUB; USPAT	OR	ON	2010/04/08 15:00
S2	22	("20030011409"   "20030043408"   "20030133331"   "20040178278"   "20050036620"   "4586147"   "4631428"   "4689740"   "5023813"   "5044790"   "5297269"   "5479467"   "5689196"   "6002846"   "6052547"   "6249838"   "6253277"   "6307779"   "6442076"   "6641312"   "6665092"   "6760274").PN.	US-PGPUB; USPAT	OR	ON	2010/04/09 11:14
S3	25	("20030011409"   "20030043408"   "20030093612"   "20030133331"   "20040025040"   "20040178278"   "20050036620"   "4586147"   "4631428"   "4689740"   "5023813"   "5044790"   "5297269"   "5479467"   "5689196"   "6002846"   "6052547"   "6249838"   "6253277"   "6271928"   "6307779"   "6442076"   "6641312"   "6665092"   "6760274").PN.	US-PGPUB; USPAT	OR	ON	2010/04/09 14:40

S4	22	("20030011409"   "20030043408"   "20030133331"   "20040178278"   "20050036620"   "4586147"   "4631428"   "4689740"   "5023813"   "5044790"   "5297269"   "5479467"   "5689196"   "6002846"   "6052547"   "6249838"   "6253277"   "6307779"   "6442076"   "6641312"   "6665092"   "6760274").PN.	US-PGPUB; USPAT	OR	ON	2010/04/13 12:50
S5	25	("20030011409"   "20030043408"   "20030093612"   "20030133331"   "20040025040"   "20040178278"   "20050036620"   "4586147"   "4631428"   "4689740"   "5023813"   "5044790"   "5297269"   "5479467"   "5689196"   "6002846"   "6052547"   "6249838"   "6253277"   "6271928"   "6307779"   "6442076"   "6641312"   "6665092"   "6760274").PN.	US-PGPUB; USPAT	OR	ON	2010/04/13 12:50
S6	3	S5 not S4	US-PGPUB; USPAT	OR	ON	2010/04/13 12:50
S7	15	("4099253"   "4479178"   "5051890"   "5235545"   "5363337"   "5396468"   "5418752"   "5430859"   "5619453"   "5784712"   "5806070").PN. OR ("6253277").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2010/04/13 13:32
S8	378	(increment near counter) near2 (instruction or command)	US-PGPUB; USPAT; USOCR	OR	ON	2010/04/13 13:45

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S9	54	S8 and "711".clas.	US-PGPUB; USPAT; USOCR	OR	ON	2010/04/13 14:18
S10	5	booth-james.in.	US-PGPUB; USPAT; USOCR	OR	ON	2010/04/13 15:54
S11	0	willett-bryan.in.	US-PGPUB; USPAT; USOCR	OR	ON	2010/04/13 15:54
S12	14	willett-bryan-\$ .in.	US-PGPUB; USPAT; USOCR	OR	ON	2010/04/13 15:55
S13	246	booth-james-\$ .in.	US-PGPUB; USPAT; USOCR	OR	ON	2010/04/13 15:55
S14	50	(US-20070174841-\$ or US-20020118578-\$ or US-20020156993-\$ or US-20030002355-\$ or US-20030061457-\$ or US-20030088651-\$ or US-20030140241-\$ or US-20040044917-\$ or US-20040073840-\$ or US-20040160832-\$ or US-20040193808-\$ or US-20040230759-\$ or US-20050071580-\$). did. or (US-3803560-\$ or US-4124891-\$ or US- 4185323-\$ or US- 5056015-\$ or US- 5335339-\$ or US- 5481502-\$ or US- 5509059-\$ or US- 5586291-\$ or US- 5760770-\$ or US- 5816191-\$ or US- 5887146-\$ or US- 5890218-\$ or US- 5968149-\$ or US- 6175932-\$ or US- 6178126-\$ or US- 6249120-\$ or US- 6298448-\$ or US- 6341315-\$ or US- 6374312-\$ or US- 6418495-\$ or US- 6590246-\$ or US- 6724666-\$ or US- 6807609-\$ or US-	US-PGPUB; USPAT	OR	ON	2010/04/14 15:51

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		6834014-\$ or US-6880047-\$ or US-6959865-\$).did. or (US-7007107-\$ or US-7020757-\$ or US-7089391-\$ or US-7093104-\$ or US-7103588-\$ or US-7275201-\$ or US-7464295-\$ or US-7590737-\$ or US-7610366-\$ or US-7610430-\$ or US-7694031-\$).did.				
S15	1	(increment near2 counter) and S14	US-PGPUB; USPAT; USOCR	OR	ON	2010/04/14 15:52
S16	9855	711/103.ccls. or 711/156.ccls. or 726/2. ccls. 726/16-21.ccls. 726/34.ccls.	US-PGPUB; USPAT	OR	ON	2010/04/15 14:52
S17	7	"punch out bit"	US-PGPUB; USPAT	OR	ON	2010/04/15 14:52
S18	378	(increment near counter) near2 (instruction or command)	US-PGPUB; USPAT; USOCR	OR	ON	2010/04/15 14:53
S19	4	S16 and S18	US-PGPUB; USPAT	OR	ON	2010/04/15 14:53
S20	91	(increment near count) near2 (instruction or command)	US-PGPUB; USPAT; USOCR	OR	ON	2010/04/15 15:49
S21	1	S16 and S20	US-PGPUB; USPAT; USOCR	OR	ON	2010/04/15 15:49
S22	11723	(usage or count\$2) with printer	US-PGPUB; USPAT; USOCR	OR	ON	2010/04/15 15:51
S23	1462	S22 with memory	US-PGPUB; USPAT; USOCR	OR	ON	2010/04/15 15:52
S24	8	S23 and S16	US-PGPUB; USPAT; USOCR	OR	ON	2010/04/15 15:52
S25	126	("256" adj byte) near2 sector	US-PGPUB; USPAT; USOCR	OR	ON	2010/04/15 15:58

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L1	1470	711/156.ccls.	US-PGPUB; USPAT; USOCR	OR	ON	2010/04/16 10:13
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## BIB DATA SHEET

CONFIRMATION NO. 9427

<b>SERIAL NUMBER</b> 12/107,278	<b>FILING or 371(c) DATE</b> 04/22/2008 <b>RULE</b>	<b>CLASS</b> 711	<b>GROUP ART UNIT</b> 2187	<b>ATTORNEY DOCKET NO.</b> 2004-0784.15 (DIV)		
<b>APPLICANTS</b> James Ronald Booth, Nicholasville, KY; Bryan Scott Willett, Lexington, KY; <b>** CONTINUING DATA *****</b> This application is a DIV of 11/154,117 06/16/2005 PAT 7,426,613 <b>** FOREIGN APPLICATIONS *****</b> <b>** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **</b> 06/06/2008						
Foreign Priority claimed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 35 USC 119(a-d) conditions met <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Verified and Acknowledged <u>/RYAN BERTRAM/</u> Examiner's Signature		<input type="checkbox"/> Met after Allowance Initials	<b>STATE OR COUNTRY</b> KY	<b>SHEETS DRAWINGS</b> 9	<b>TOTAL CLAIMS</b> 21	<b>INDEPENDENT CLAIMS</b> 4
<b>ADDRESS</b> LEXMARK INTERNATIONAL, INC. INTELLECTUAL PROPERTY LAW DEPARTMENT 740 WEST NEW CIRCLE ROAD BLDG. 082-1 LEXINGTON, KY 40550-0999 UNITED STATES						
<b>TITLE</b> Addressing and Command Protocols for Non-Volatile Memories Utilized in Recording Usage Counts						
<b>FILING FEE RECEIVED</b> 1290	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit			

# **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** ( Not for submission under 37 CFR 1.99)

Application Number		12107278
Filing Date		2008-04-22
First Named Inventor	Booth et al.	
Art Unit	2187	
Examiner Name	<del>Not yet assigned</del> Ryan Bertram	
Attorney Docket Number	19403-0086	

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4586147		1986-04-29	Tadokoro	
	2	4631428		1986-12-23	Grimes	
	3	4689740		1987-08-25	Moelands, et al.	
	4	5023813		1991-06-11	Brown, III	
	5	5044790		1991-09-03	Kawamura	
	6	5297269		1994-03-22	Donaldson, et al.	
	7	5479467		1995-12-26	Katsumata	
	8	5689196		1997-11-18	Schutte	

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12107278
Filing Date	2008-04-22
First Named Inventor	Booth et al.
Art Unit	2187
Examiner Name	<del>Not yet assigned</del> Ryan Bertram
Attorney Docket Number	19403-0086

9	6002846		1999-12-14	Okamoto	
10	6052547		2000-04-18	Cuzzo, et al.	
11	6249838	B1	2001-06-19	Kon	
12	6253277	B1	2001-06-26	Lakhani, et al.	
13	6307779	B1	2001-10-23	Roohparvar	
14	6442076	B1	2002-08-27	Roohparvar	
15	6641312	B1	2003-11-04	Chang, et al.	
16	6665092	B2	2003-12-16	Reed	
17	6760274	B2	2004-07-06	Roohparvar	

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# **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** ( Not for submission under 37 CFR 1.99)

Application Number	12107278
Filing Date	2008-04-22
First Named Inventor	Booth et al.
Art Unit	2187
Examiner Name	<del>Not yet assigned</del> Ryan Bertram
Attorney Docket Number	19403-0086

1	20030011409	A1	2003-01-16	Altrichter, et al.	
2	20030043408	A1	2003-03-06	Fields, et al.	
3	20030133331	A1	2003-07-17	LaBerge	
4	20040178278	A1	2004-09-16	Fruhauf, et al.	
5	20050036620	A1	2005-02-17	Casden, et al.	

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	1	AN10216-01 Jean-Marc Irazabal, Steve Blozis, "I2C Manual," Application Note, Philips Semiconductors, pp. 1-51, (March 24, 2003).	<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12107278
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Attorney Docket Number	19403-0086

2	DS1961S "I <sup>2</sup> C Protected EEPROM iButton with SHA-1 Engine," Dallas Semiconductor, www.maxim-ic.com, pp. 1-36 (date: unknown).	<input type="checkbox"/>
3	"The I2C-Bus Specification" Version 2.1, Philips Semiconductors, pp. 1-46, (January 2000).	<input type="checkbox"/>

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**Keywords:** certified execution, e-wallet memory integrity checking, ke

- 2 [Offline untrusted storage with immediate detection of forking and rep](#)  
[Marten van Dijk, Jonathan Rhodes, Luis F. G. Sarmienta, Srinivas Devadas](#)  
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[Luis F. G. Sarmienta, Marten van Dijk, Jonathan Rhodes, Srinivas Devadas](#)  
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/107,278	04/22/2008	James Ronald Booth	2004-0784.15 (DIV)

**CONFIRMATION NO. 9427**

## PUBLICATION NOTICE



\*OC000000032985218\*

21972  
LEXMARK INTERNATIONAL, INC.  
INTELLECTUAL PROPERTY LAW DEPARTMENT  
740 WEST NEW CIRCLE ROAD  
BLDG. 082-1  
LEXINGTON, KY 40550-0999

**Title:**Addressing and Command Protocols for Non-Volatile Memories Utilized in Recording Usage Counts

**Publication No.**US-2008-0276048-A1

**Publication Date:**11/06/2008

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# IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Serial No. : **12/107,278** Confirmation No.: 9427  
Filed : April 22, 2008  
Applicant : Booth, et al.  
Title : **Addressing and Command Protocols for Non-volatile  
Memories Utilized in Recording Usage Counts**  
  
Art Unit : Not yet assigned  
Examiner : Not yet assigned  
Atty Docket No. : 19403-0086  
Customer No. : 29052

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The citation of information on the attached form PTO/SB/08A (1449/PTO), "Information Disclosure Statement by Applicant" is made pursuant to 37 C.F.R. §§ 1.56, 1.97, and 1.98.

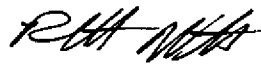
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Respectfully submitted,



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Rhett S. White  
Reg. No. 59,158

Date: **July 29, 2008**

SUTHERLAND ASBILL & BRENNAN LLP  
999 Peachtree Street, NE  
Atlanta, Georgia 30309-3996  
Telephone: (404) 853-8037  
Facsimile: (404) 853-8806

Attorney Docket: 19403-0086

# **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** ( Not for submission under 37 CFR 1.99)

Application Number		12107278
Filing Date		2008-04-22
First Named Inventor	Booth et al.	
Art Unit		
Examiner Name	Not yet assigned	
Attorney Docket Number	19403-0086	

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	1	4586147		1986-04-29	Tadokoro	
	2	4631428		1986-12-23	Grimes	
	3	4689740		1987-08-25	Moelands, et al.	
	4	5023813		1991-06-11	Brown, III	
	5	5044790		1991-09-03	Kawamura	
	6	5297269		1994-03-22	Donaldson, et al.	
	7	5479467		1995-12-26	Katsumata	
	8	5689196		1997-11-18	Schutte	

**INFORMATION DISCLOSURE  
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( Not for submission under 37 CFR 1.99)

Application Number	12107278
Filing Date	2008-04-22
First Named Inventor	Booth et al.
Art Unit	
Examiner Name	Not yet assigned
Attorney Docket Number	19403-0086

9	6002846		1999-12-14	Okamoto	
10	6052547		2000-04-18	Cuzzo, et al.	
11	6249838	B1	2001-06-19	Kon	
12	6253277	B1	2001-06-26	Lakhani, et al.	
13	6307779	B1	2001-10-23	Roohparvar	
14	6442076	B1	2002-08-27	Roohparvar	
15	6641312	B1	2003-11-04	Chang, et al.	
16	6665092	B2	2003-12-16	Reed	
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	1	AN10216-01 Jean-Marc Irazabal, Steve Blozis, "I2C Manual," Application Note, Philips Semiconductors, pp. 1-51, (March 24, 2003).	<input type="checkbox"/>

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Art Unit		
Examiner Name	Not yet assigned	
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STATEMENT BY APPLICANT**  
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Application Number	12107278
Filing Date	2008-04-22
First Named Inventor	Booth et al.
Art Unit	
Examiner Name	Not yet assigned
Attorney Docket Number	19403-0086

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<b>EFS ID:</b>	3691786
<b>Application Number:</b>	12107278
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	9427
<b>Title of Invention:</b>	Addressing and Command Protocols for Non-Volatile Memories Utilized in Recording Usage Counts
<b>First Named Inventor/Applicant Name:</b>	James Ronald Booth
<b>Customer Number:</b>	21972
<b>Filer:</b>	Rhett Stephen White/Maple Tran
<b>Filer Authorized By:</b>	Rhett Stephen White
<b>Attorney Docket Number:</b>	2004-0784.15 (DIV)
<b>Receipt Date:</b>	29-JUL-2008
<b>Filing Date:</b>	22-APR-2008
<b>Time Stamp:</b>	11:57:15
<b>Application Type:</b>	Utility under 35 USC 111(a)

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
12/107,278	04/22/2008	2186	1290	2004-0784.15 (DIV)	21	4

CONFIRMATION NO. 9427

UPDATED FILING RECEIPT



21972  
LEXMARK INTERNATIONAL, INC.  
INTELLECTUAL PROPERTY LAW DEPARTMENT  
740 WEST NEW CIRCLE ROAD  
BLDG. 082-1  
LEXINGTON, KY 40550-0999

Date Mailed: 07/25/2008

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

**Applicant(s)**

James Ronald Booth, Nicholasville, KY;  
Bryan Scott Willett, Lexington, KY;

**Assignment For Published Patent Application**

LEXMARK INTERNATIONAL, INC., Lexington, KY

**Power of Attorney:** None

**Domestic Priority data as claimed by applicant**

This application is a DIV of 11/154,117 06/16/2005

**Foreign Applications**

**If Required, Foreign Filing License Granted:** 06/06/2008

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/107,278**

**Projected Publication Date:** 11/06/2008

**Non-Publication Request:** No

**Early Publication Request:** No

**Title**

Addressing and Command Protocols for Non-Volatile Memories Utilized in Recording Usage Counts

**Preliminary Class**

711

**PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

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For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

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#### **NOT GRANTED**

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of: Booth, et al.	)	Confirmation No: 9427
	)	
Serial No. 12/107,278	)	Art Unit: Not Yet Assigned
	)	
Filed: April 22, 2008	)	Examiner: Not Yet Assigned
	)	
For: Addressing and Command Protocols	)	
for Non-volatile Memories Utilized	)	
in Recording Usage Counts	)	

**RESPONSE TO NOTICE TO FILE  
CORRECTED APPLICATION PAPERS**

---

Mail Stop Missing Parts  
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P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

Pursuant to 37 CFR 1.84 and 1.121(d) and in Response to the Notice To File Corrected Application Papers mailed June 11, 2008, applicants submit nine (9) sheets of replacement drawings that include Figures 1-7. The replacement drawing sheets for Figures 1-7 will replace prior versions of Figures 1-7. Additionally, it is respectfully submitted that the replacement drawing sheets have a line quality that is reproducible and, therefore, it is respectfully asserted that the replacement drawings comply with the requirements of 37 CFR 1.84 and 1.121(d) by Substitute Specification.

**Conclusion**

It is not believed that extensions of time or additional fees are required beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time or additional fees are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR §1.136(a), and any fee required therefore is hereby authorized to be charged to Deposit Account No. 19-5029.

Respectfully Submitted,



\_\_\_\_\_  
Rhett S. White  
Reg. No. 59,158

Date: **July 21, 2008**

SUTHERLAND ASBILL & BRENNAN LLP  
999 Peachtree Street, NE  
Atlanta, GA 30309  
Telephone: 404.853.8037  
Facsimile: 404.853.8806  
SAB No.: 19403-0086

Attorney Docket No. 2004-0784.15 (DIV)

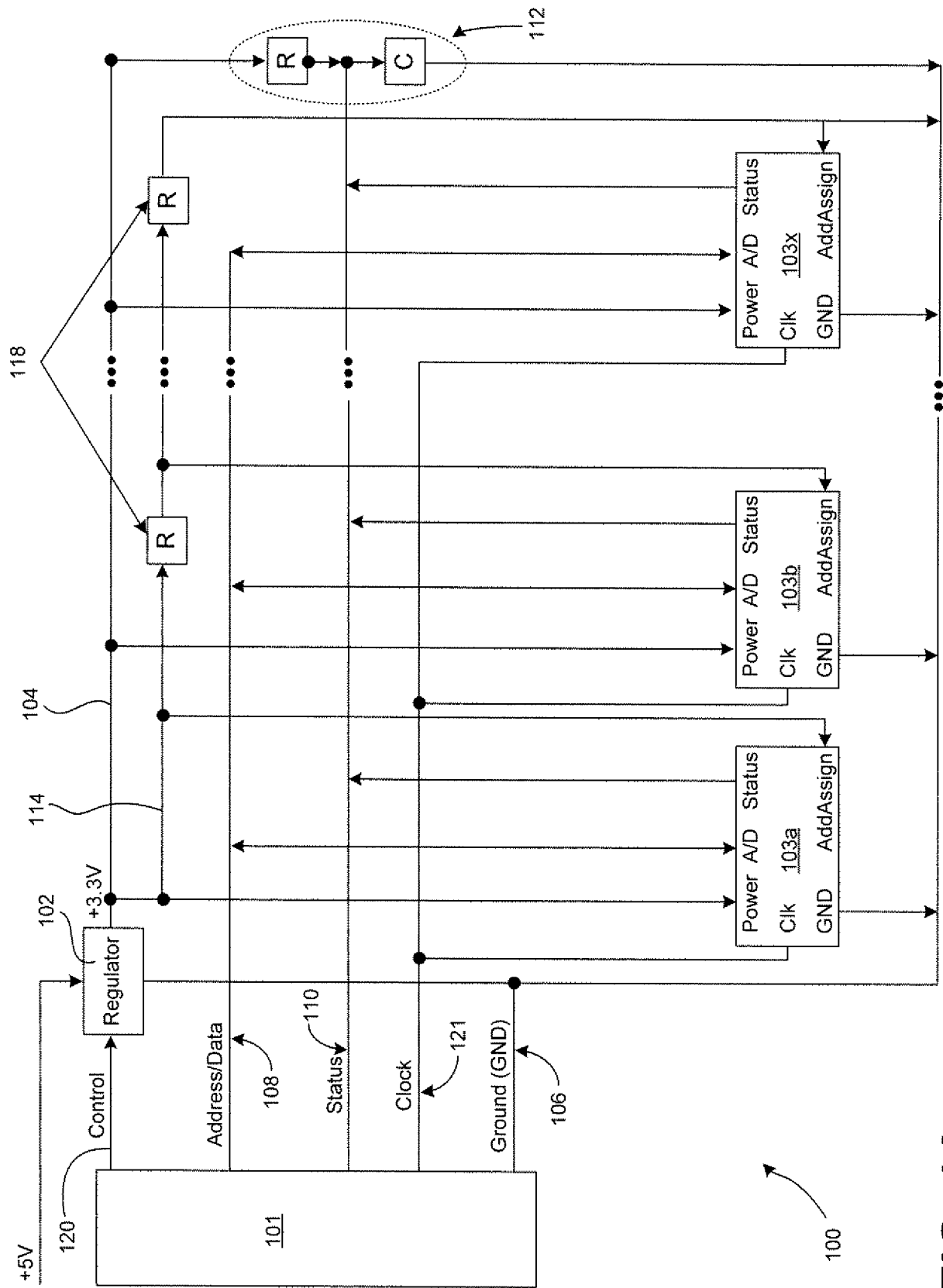


FIG. 1A

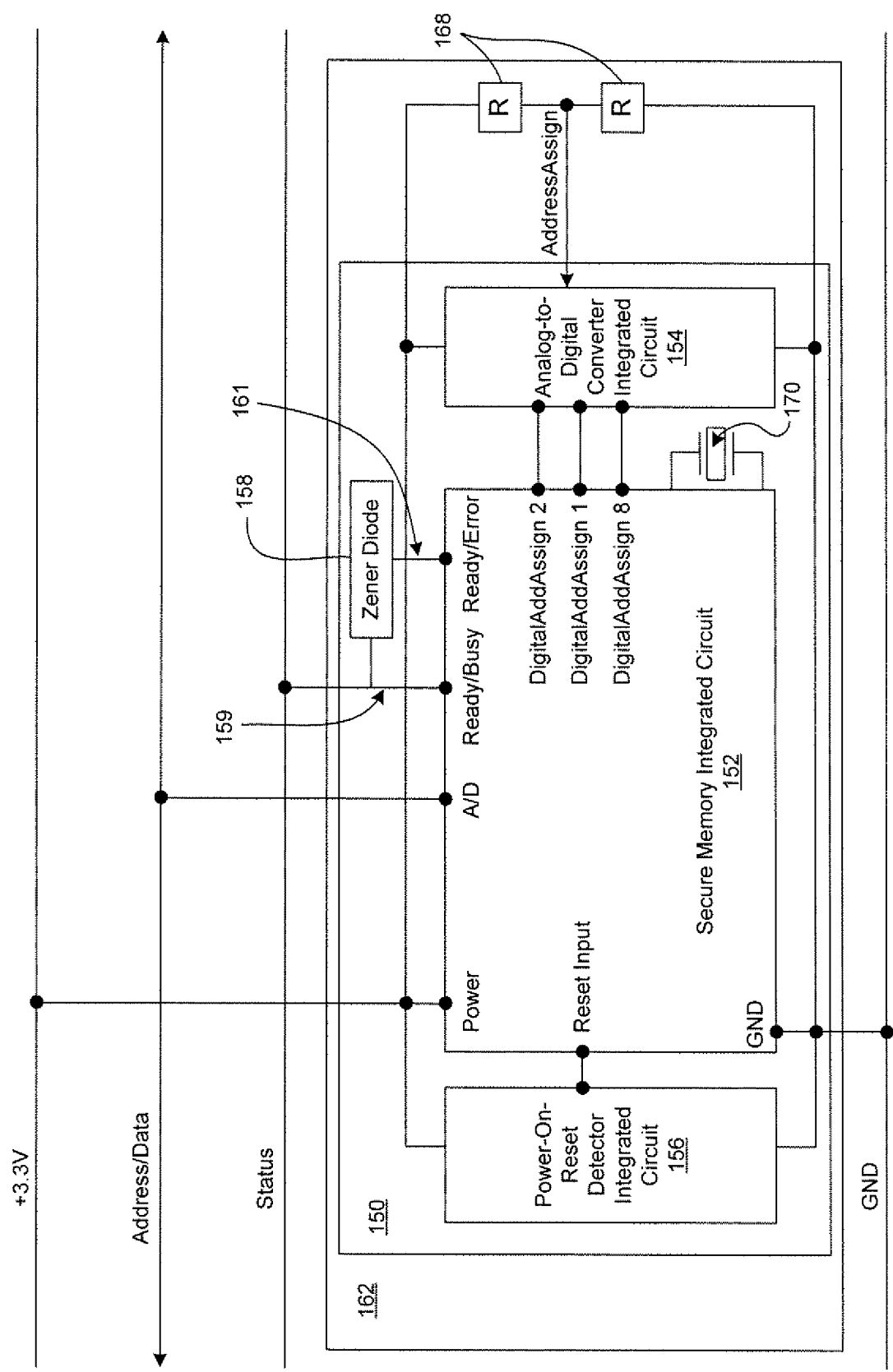


FIG. 1B

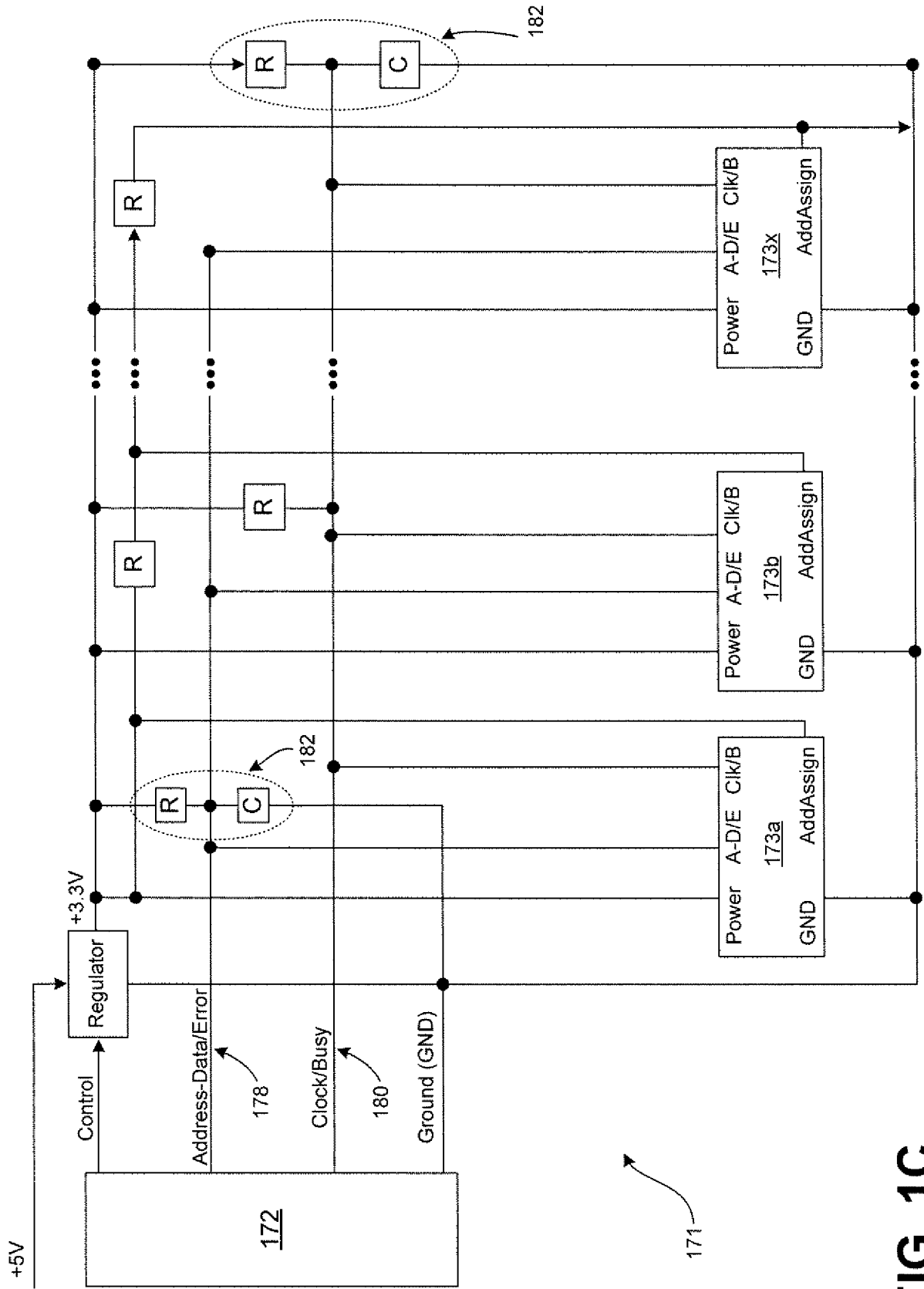


FIG. 1C

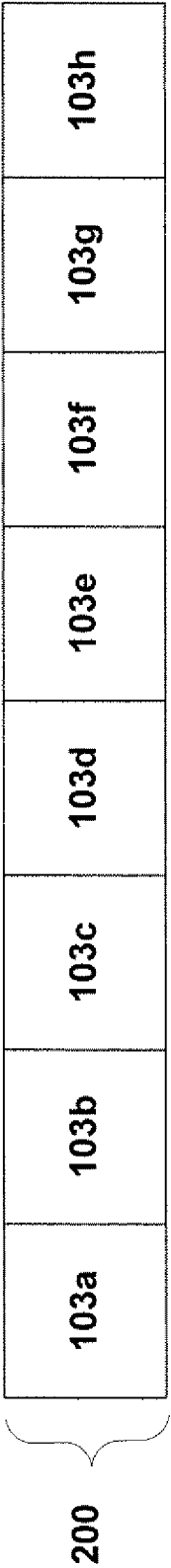


FIG. 2A

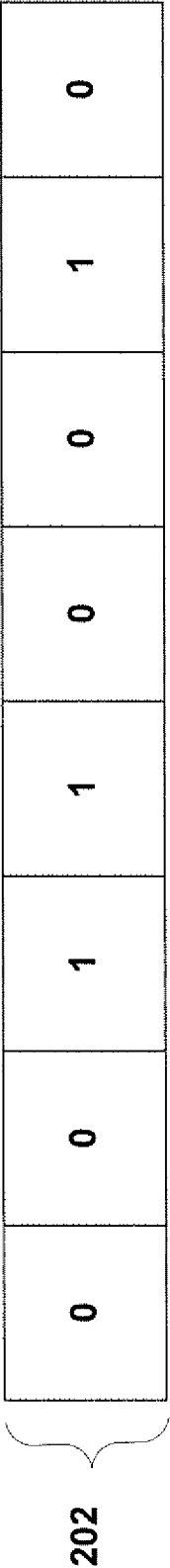
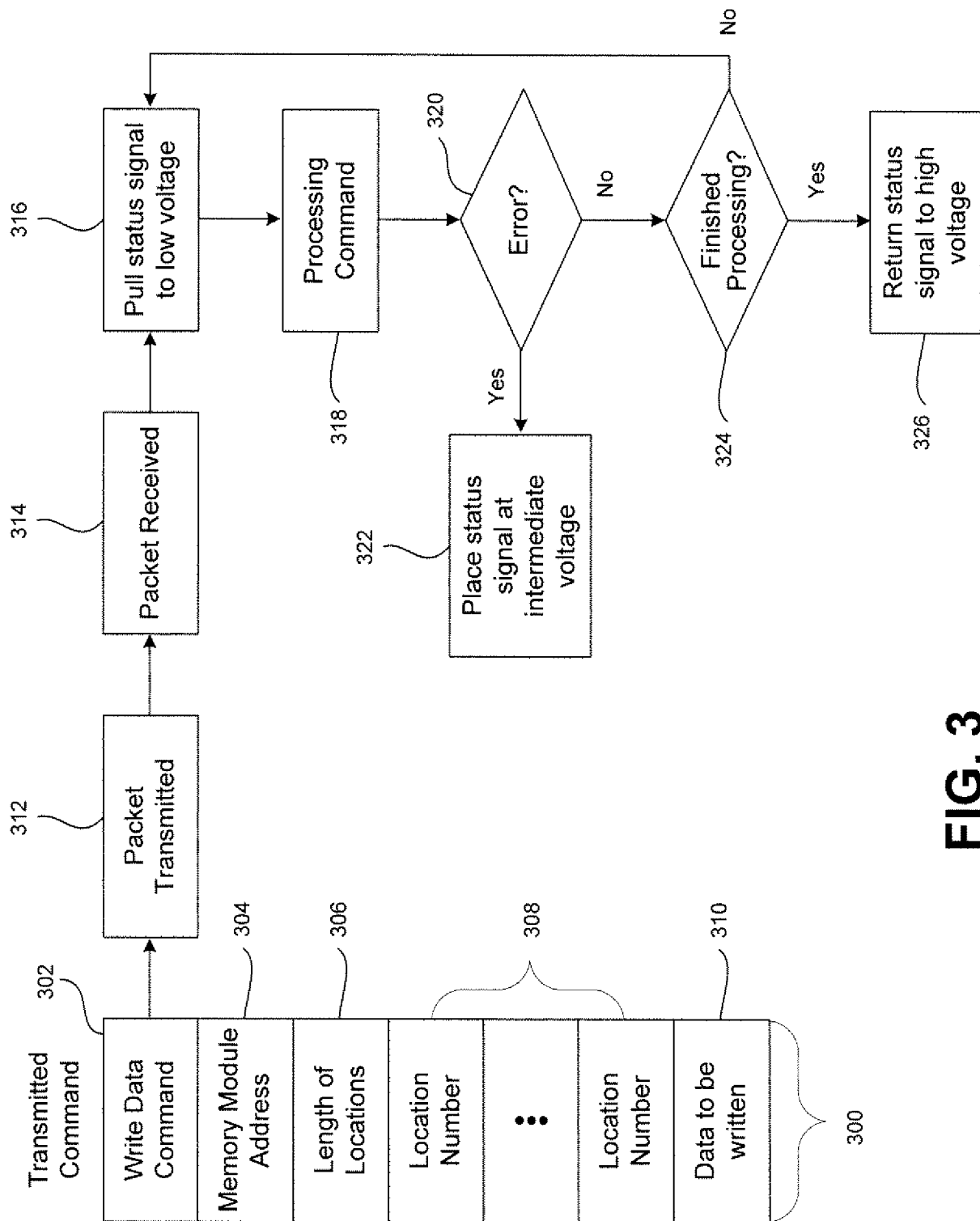


FIG. 2B

**FIG. 3**

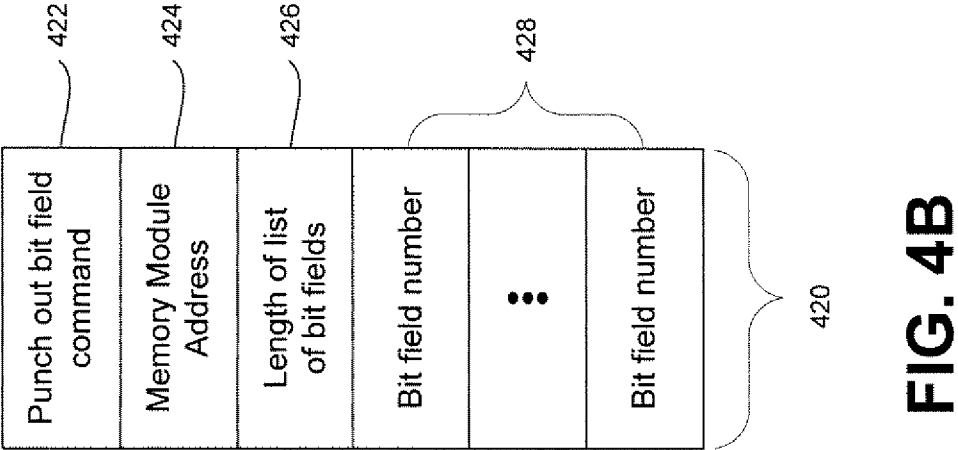


FIG. 4B

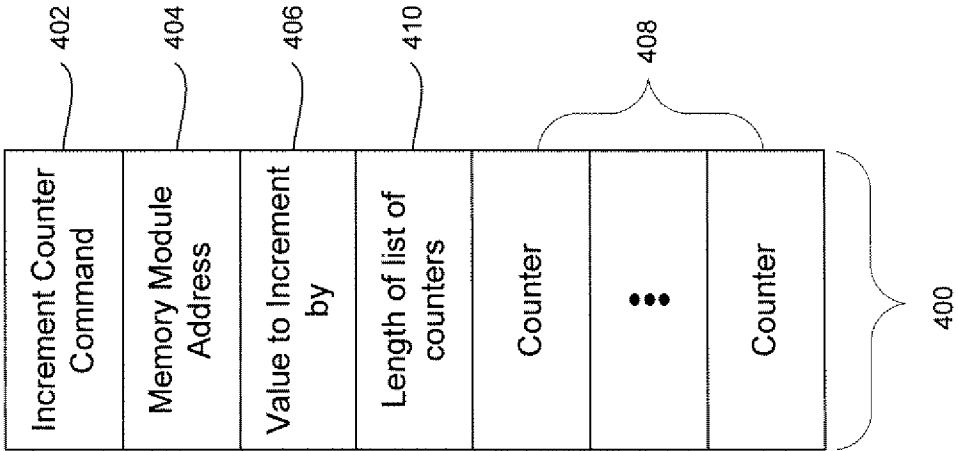


FIG. 4A

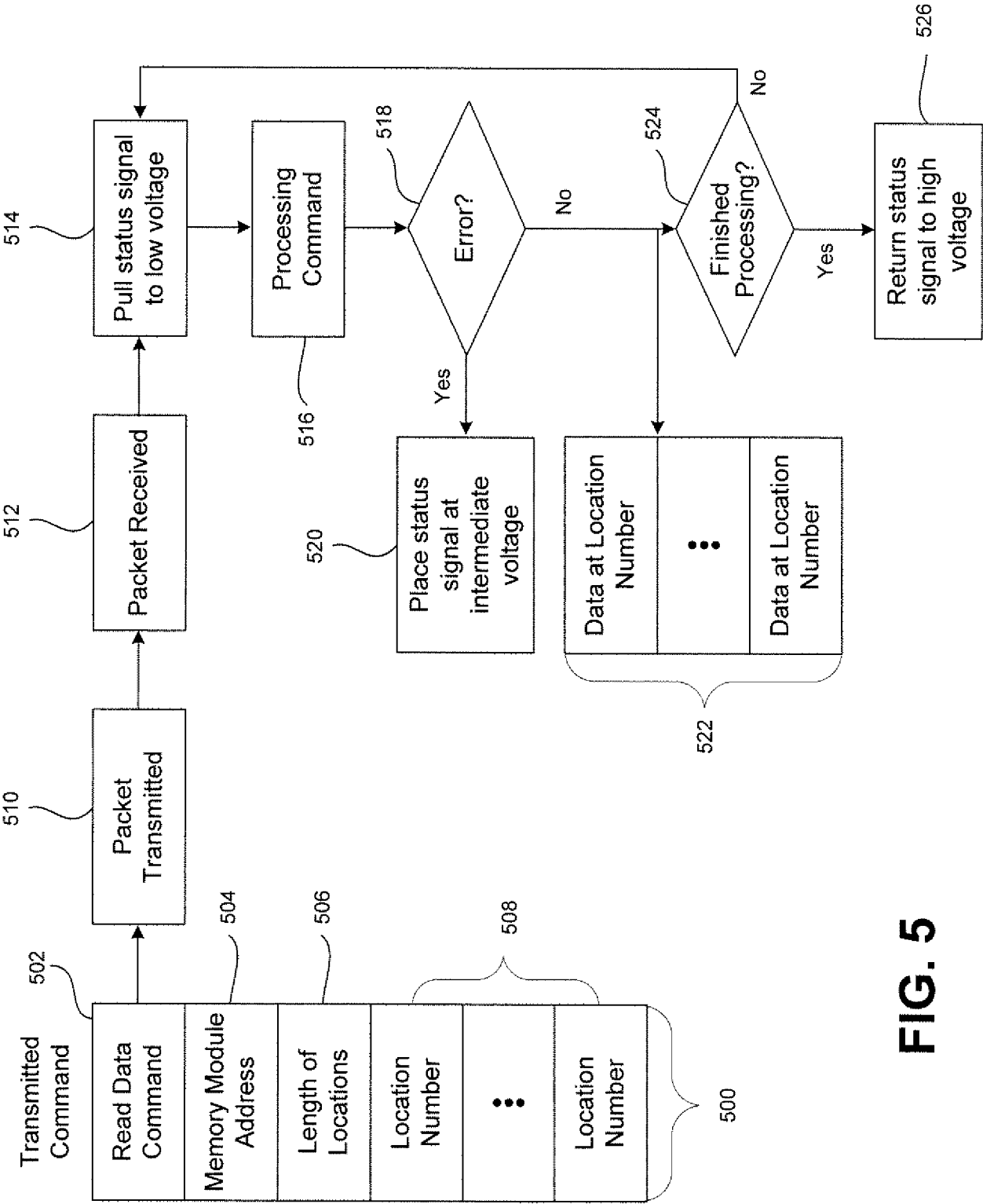
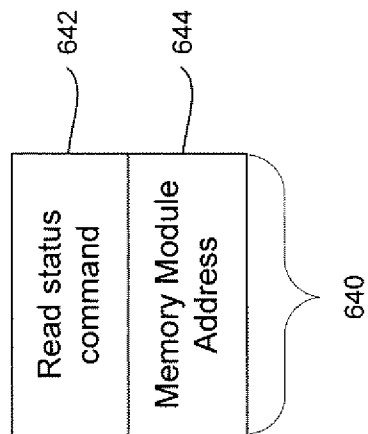
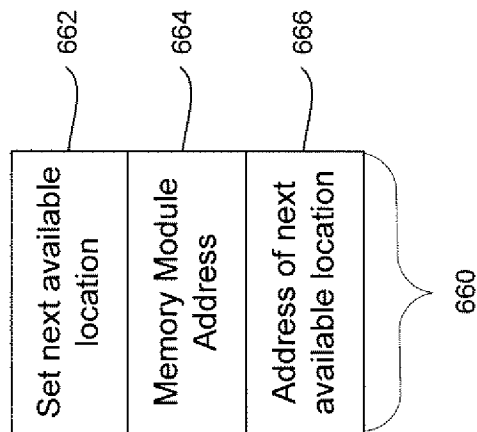


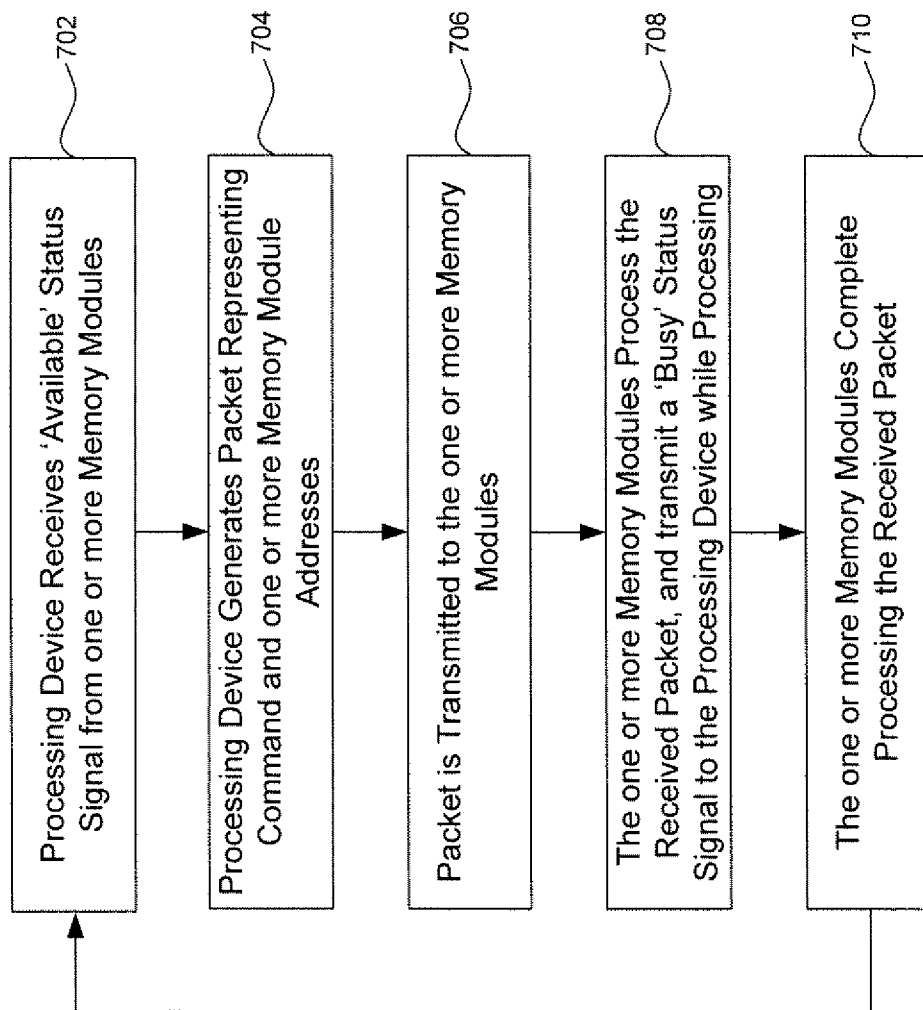
FIG. 5



**FIG. 6A**



**FIG. 6B**

**FIG. 7**

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	3649122
<b>Application Number:</b>	12107278
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	9427
<b>Title of Invention:</b>	Addressing and Command Protocols for Non-Volatile Memories Utilized in Recording Usage Counts
<b>First Named Inventor/Applicant Name:</b>	James Ronald Booth
<b>Customer Number:</b>	21972
<b>Filer:</b>	Rhett Stephen White/Eva Mukasa
<b>Filer Authorized By:</b>	Rhett Stephen White
<b>Attorney Docket Number:</b>	2004-0784.15
<b>Receipt Date:</b>	21-JUL-2008
<b>Filing Date:</b>	22-APR-2008
<b>Time Stamp:</b>	16:21:08
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1		Response-to-Notice.PDF	190529	yes	11
			20029b320ec6ceec11a1e2ca7b5fe5672eb0acfe		

	<b>Multipart Description/PDF files in .zip description</b>		
	<b>Document Description</b>	<b>Start</b>	<b>End</b>
	Applicant Response to Pre-Exam Formalities Notice	1	2
	New or Additional Drawings	3	11
<b>Warnings:</b>			
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
12/107,278	04/22/2008	2186	1290	2004-0784.15	21	4

CONFIRMATION NO. 9427

21972  
LEXMARK INTERNATIONAL, INC.  
INTELLECTUAL PROPERTY LAW DEPARTMENT  
740 WEST NEW CIRCLE ROAD  
BLDG. 082-1  
LEXINGTON, KY 40550-0999

FILING RECEIPT



\*OC000000030411757\*

Date Mailed: 06/11/2008

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

**Applicant(s)**

James Ronald Booth, Nicholasville, KY;  
Bryan Scott Willett, Lexington, KY;

**Assignment For Published Patent Application**

LEXMARK INTERNATIONAL, INC., Lexington, KY

**Power of Attorney:** None

**Domestic Priority data as claimed by applicant**

This application is a DIV of 11/154,117 06/16/2005

**Foreign Applications**

**If Required, Foreign Filing License Granted:** 06/06/2008

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/107,278**

**Projected Publication Date:** To Be Determined - pending completion of Corrected Papers

**Non-Publication Request:** No

**Early Publication Request:** No

**Title**

Addressing and Command Protocols for Non-Volatile Memories Utilized in Recording Usage Counts

**Preliminary Class**

711

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/107,278	04/22/2008	James Ronald Booth	2004-0784.15

**CONFIRMATION NO. 9427**

## FORMALITIES LETTER



\*OC000000030411758\*

21972  
LEXMARK INTERNATIONAL, INC.  
INTELLECTUAL PROPERTY LAW DEPARTMENT  
740 WEST NEW CIRCLE ROAD  
BLDG. 082-1  
LEXINGTON, KY 40550-0999

Date Mailed: 06/11/2008

## NOTICE TO FILE CORRECTED APPLICATION PAPERS

### *Filing Date Granted*

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given TWO MONTHS from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
  - The drawings submitted to the Office are not electronically reproducible because portions of figures 1-7 are missing and/or blurry.

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

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Alexandria VA 22313-1450

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/pwallace sr/

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Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Serial No. : To Be Assigned  
Filed : April 22, 2008  
Applicant : Booth, et al.  
Title : Addressing and Command Protocols for  
Non-volatile Memories Utilized in  
Recording Usage Counts

TC/AU : To Be Assigned  
Examiner : To Be Assigned

Docket No. : 2004-0784.15 (DIV)  
Customer No. : **21972**

**PRELIMINARY AMENDMENT**

---

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir or Madam:

Prior to calculation of the filing fees for the above-identified application submitted herewith, please enter the following amendments in the above-identified application prior to the examination thereof.

**Amendments to the Claims** are reflected in the listing of claims which begins on page 2 of this paper.

**Remarks** begin on page 5 of this paper.

**Amendments to the Claims**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (Original) A method of updating memory modules, comprising:  
receiving, at one or more memory modules, a command transmitted from a processing device, wherein the command comprises an increment counter command operable to instruct the one or more memory modules to increment a counter within the one or more memory modules;  
and processing the command at the one or more memory modules.
2. (Currently Amended) The method of claim 1, wherein ~~the step of~~ processing the command comprises ~~the step of~~ incrementing, in each of the one or more memory modules, at least one counter.
3. (Currently Amended) The method of claim 2, wherein ~~the step of~~ incrementing further comprises incrementing, in each of the one or more memory modules, the at least one counter by an increment value specified in the command.
4. (Original) The method of claim 2, wherein the command further comprises memory module addresses corresponding to each of the one or more one or memory modules.
5. (Currently Amended) The method of claim 1, further comprising ~~the step of~~ establishing a busy status signal during the processing of the command at the one or more memory modules.
6. (Currently Amended) The method of claim 1, wherein ~~the receiving step~~ further comprises receiving, at the one or more memory modules, the command from the processing device transmitted to the one or more memory modules via an asynchronous data channel.

7. (Original) A method of updating memory modules, comprising:  
receiving, at one or more memory modules, a command transmitted from a processing device, wherein the command is indicative of wear and is operable to instruct the one or more memory modules to increment a counter within the one or more memory modules; and  
processing the command at the one or more memory modules.
8. (Original) The method of claim 7, wherein the command that is indicative of wear is a consumption counter that reflects a consumption of at least one resource.
9. (New) The method of claim 1, wherein the command further comprises a punch out bit field command operable to instruct the one or more memory modules to punch out a specified bit field within the one or more memory modules.
10. (New) The method of claim 9, wherein the punch out bit field command comprises implementing a command to change a bit associated with at least one memory module from an erased state to a programmed state.
11. (New) The method of claim 9, wherein the bit field comprises at least eight bits.
12. (New) A method of updating memory modules, comprising:  
receiving, at one or more memory modules, a command transmitted from a processing device, wherein the command is a punch out bit field command operable to instruct the one or more memory modules to punch out a specified bit field within the one or more memory modules; and  
processing the command at the one or more memory modules.
13. (New) The method of claim 12, wherein the punch out bit field command comprises implementing a command to change a bit associated with at least one memory module from an erased state to a programmed state.

14. (New) The method of claim 12, wherein the bit field comprises at least eight bits.
15. (New) The method of claim 12, wherein the command further comprises an increment counter command operable to instruct the one or more memory modules to increment a counter within the one or more memory modules.
16. (New) The method of claim 12, wherein receiving further comprises receiving, at the one or more memory modules, the command from the processing device transmitted to the one or more memory modules via an asynchronous data channel.
17. (New) The method of claim 12, wherein processing the command comprises incrementing, in each of the one or more memory modules, at least one counter.
18. (New) The method of claim 15, wherein incrementing further comprises incrementing, in each of the one or more memory modules, the at least one counter by an increment value specified in the command.
19. (New) The method of claim 15, further comprising establishing a busy status signal during the processing of the command at the one or more memory modules.
20. (New) A method of updating memory modules, comprising:  
receiving, at one or more memory modules, a command transmitted from a processing device, wherein the command is indicative of usage and is operable to instruct the one or more memory modules to punch out a specified bit within the one or more memory modules; and  
processing the command at the one or more memory modules.
21. (New) The method of claim 20, wherein the command that is indicative of usage reflects a usage of at least one resource.

### **REMARKS**

After entry of the present Amendment, Claims 1-21 are pending. Independent Claims 1 and 7 and dependent Claims 2-6 and 8 represent non-elected subject matter from prior U.S. Serial No. 11/154,117, from which the present application claims priority. By the present Amendment, dependent Claims 2, 3, 5, and 6 have been amended. New independent Claims 12 and 20, and new dependent Claims 11, 13-19, and 21 have been added. The Applicants respectfully submit that no new matter has been added by the foregoing amendments.

**CONCLUSION**

The present claims are now believed to be in condition for allowance. Examination of the present application is respectfully requested, and allowance of the present claims is requested. It is not believed that any fees for extensions of time or addition of claims are required beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 19-5029.

Respectfully submitted,



---

Rhett S. White  
Reg. No. 59,158

**Date: April 22, 2008**

SUTHERLAND ASBILL & BRENNAN LLP  
999 Peachtree Street NE  
Atlanta, GA 30309-3996  
404.853.8000  
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Docket No.: 2004-0784.15 (DIV)

SAB Docket No.: 19403-0086

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>				
<b>Filing Date:</b>				
<b>Title of Invention:</b>	Addressing and Command Protocols for Non-Volatile Memories Utilized in Recording Usage Counts			
First Named Inventor/Applicant Name:	James Ronald Booth			
<b>Filer:</b>	Rhett Stephen White/Eva Mukasa			
<b>Attorney Docket Number:</b>	2004-0784.15			
Filed as Large Entity				
<b>Utility      Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
Utility application filing	1011	1	310	310
Utility Search Fee	1111	1	510	510
Utility Examination Fee	1311	1	210	210
<b>Pages:</b>				
<b>Claims:</b>				
Claims in excess of 20	1202	1	50	50
Independent claims in excess of 3	1201	1	210	210
<b>Miscellaneous-Filing:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
Post-Allowance-and-Post-Issuance:				
<b>Extension-of-Time:</b>				
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>1290</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	3187971
<b>Application Number:</b>	12107278
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	9427
<b>Title of Invention:</b>	Addressing and Command Protocols for Non-Volatile Memories Utilized in Recording Usage Counts
<b>First Named Inventor/Applicant Name:</b>	James Ronald Booth
<b>Customer Number:</b>	21972
<b>Filer:</b>	Rhett Stephen White/Eva Mukasa
<b>Filer Authorized By:</b>	Rhett Stephen White
<b>Attorney Docket Number:</b>	2004-0784.15
<b>Receipt Date:</b>	22-APR-2008
<b>Filing Date:</b>	
<b>Time Stamp:</b>	14:23:42
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 1290
RAM confirmation Number	8034
Deposit Account	195029
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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UNIVERSAL - EXHIBIT 1008

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	DIV-PA-DATASHEET.pdf	1064276	no	4
			330afc1 22b2602bfa972297f8c1 109bf9da266ae		
Warnings:					
Information:					
2		DIV-APPLICATION.pdf	1097991	yes	30
			58ee045c8a8178937d7b36c9d817a3e50ae4cb77		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	27	
	Claims		28	29	
	Abstract		30	30	
Warnings:					
Information:					
3	Drawings-only black and white line drawings	DIV-DRAWINGS.pdf	142039	no	9
			d8c1d38852388354f5ca14850f95c185b36d6d52		
Warnings:					
Information:					
4	Oath or Declaration filed	DIV-DECLARATION-POA.pdf	122569	no	2
			835964fc20529f14d0c1e9dc186abb9740a2ddc6		
Warnings:					
Information:					
5		Preliminary-Amendment.pdf	155964	yes	6
			844b9dd20fd220cef3d8f19d23e99980315a75f		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Preliminary Amendment		1	1	
	Claims		2	4	
	Applicant Arguments/Remarks Made in an Amendment		5	6	
Warnings:					
UNIVERSAL - EXHIBIT 1008					

<b>Information:</b>					
6	Fee Worksheet (PTO-06)	fee-info.pdf	8593	no	2
			90541301676cf8b915135f70080dbb89 a995cf0a		
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			2591432		
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## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	3187971
<b>Application Number:</b>	12107278
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	9427
<b>Title of Invention:</b>	Addressing and Command Protocols for Non-Volatile Memories Utilized in Recording Usage Counts
<b>First Named Inventor/Applicant Name:</b>	James Ronald Booth
<b>Customer Number:</b>	21972
<b>Filer:</b>	Rhett Stephen White/Eva Mukasa
<b>Filer Authorized By:</b>	Rhett Stephen White
<b>Attorney Docket Number:</b>	2004-0784.15
<b>Receipt Date:</b>	22-APR-2008
<b>Filing Date:</b>	
<b>Time Stamp:</b>	14:23:42
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 1290
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Deposit Account	195029
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	DIV-PA-DATASHEET.pdf	1064276	no	4
			330afc1 22b2602bfa972297f8c1 109bf9da266ae		
Warnings:					
Information:					
2		DIV-APPLICATION.pdf	1097991	yes	30
			58ee045c8a8178937d7b36c9d817a3e50ae4cb77		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	27	
	Claims		28	29	
	Abstract		30	30	
Warnings:					
Information:					
3	Drawings-only black and white line drawings	DIV-DRAWINGS.pdf	142039	no	9
			d8c1d38852388354f5ca14850f95c185b36d6d52		
Warnings:					
Information:					
4	Oath or Declaration filed	DIV-DECLARATION-POA.pdf	122569	no	2
			835964fc20529f14d0c1e9dc186abb9740a2ddc6		
Warnings:					
Information:					
5		Preliminary-Amendment.pdf	155964	yes	6
			844b9dd20fd220cef3d8f19d23e99980315a75f		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Preliminary Amendment		1	1	
	Claims		2	4	
	Applicant Arguments/Remarks Made in an Amendment		5	6	
Warnings:					
UNIVERSAL - EXHIBIT 1008					

<b>Information:</b>					
6	Fee Worksheet (PTO-06)	fee-info.pdf	8593	no	2
			90541301676cf8b915135f70080dbb89 a995cf0a		
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			2591432		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

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<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	2004-0784.15
		Application Number	
Title of Invention	Addressing and Command Protocols for Non-Volatile Memories Utilized in Recording Usage Counts		
<p>The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.</p> <p>This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.</p>			

## Secrecy Order 37 CFR 5.2

<input type="checkbox"/>	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
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## Applicant Information:

<b>Applicant 1</b>						<a href="#">Remove</a>	
<b>Applicant Authority</b>		<input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117		<input type="radio"/> Party of Interest under 35 U.S.C. 118	
<b>Prefix</b>	<b>Given Name</b>	<b>Middle Name</b>		<b>Family Name</b>		<b>Suffix</b>	
	James	Ronald		Booth			
<b>Residence Information (Select One)</b> <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service							
<b>City</b>	Nicholasville	<b>State/Province</b>	KY	<b>Country of Residence i</b>		US	
<b>Citizenship under 37 CFR 1.41(b) i</b>		US					
<b>Mailing Address of Applicant:</b>							
<b>Address 1</b>		65 Lantern Way					
<b>Address 2</b>							
<b>City</b>	Nicholasville	<b>State/Province</b>		KY			
<b>Postal Code</b>		40356		<b>Country i</b>	US		
<b>Applicant 2</b>						<a href="#">Remove</a>	
<b>Applicant Authority</b>		<input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117		<input type="radio"/> Party of Interest under 35 U.S.C. 118	
<b>Prefix</b>	<b>Given Name</b>	<b>Middle Name</b>		<b>Family Name</b>		<b>Suffix</b>	
	Bryan	Scott		Willett			
<b>Residence Information (Select One)</b> <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service							
<b>City</b>	Lexington	<b>State/Province</b>	KY	<b>Country of Residence i</b>		US	
<b>Citizenship under 37 CFR 1.41(b) i</b>		US					
<b>Mailing Address of Applicant:</b>							
<b>Address 1</b>		2708 Woodlawn Way					
<b>Address 2</b>							
<b>City</b>	Lexington	<b>State/Province</b>		KY			
<b>Postal Code</b>		40511		<b>Country i</b>	US		
<p>All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the <b>Add</b> button.</p>							
<a href="#">Add</a>							

## Correspondence Information:

<p>Enter either Customer Number or complete the Correspondence Information section below.</p> <p>For further information see 37 CFR 1.33(a).</p>
<input type="checkbox"/> An Address is being provided for the correspondence information of this application.

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	2004-0784.15	
		Application Number		
Title of Invention	Addressing and Command Protocols for Non-Volatile Memories Utilized in Recording Usage Counts			
Customer Number	21972			
Email Address	rhett.white@sablaw.com		<input type="button" value="Add Email"/>	<input type="button" value="Remove Email"/>

## Application Information:

Title of the Invention	Addressing and Command Protocols for Non-Volatile Memories Utilized in Recording Usage Counts			
Attorney Docket Number	2004-0784.15	Small Entity Status Claimed	<input type="checkbox"/>	
Application Type	Nonprovisional			
Subject Matter	Utility			
Suggested Class (if any)		Sub Class (if any)		
Suggested Technology Center (if any)				
Total Number of Drawing Sheets (if any)	9	Suggested Figure for Publication (if any)		

## Publication Information:

<input type="checkbox"/>	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
<input type="checkbox"/>	<b>Request Not to Publish.</b> I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application <b>has not and will not</b> be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

## Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.			
Please Select One:	<input checked="" type="radio"/> Customer Number	<input type="radio"/> US Patent Practitioner	<input type="radio"/> Limited Recognition (37 CFR 11.9)
Customer Number	21972		

## Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.			
Prior Application Status	Pending	<input type="button" value="Remove"/>	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Division of	11154117	2005-06-16
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the <b>Add</b> button.			<input type="button" value="Add"/>

## Foreign Priority Information:

UNIVERSAL - EXHIBIT 1008

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	2004-0784.15
		Application Number	
Title of Invention	Addressing and Command Protocols for Non-Volatile Memories Utilized in Recording Usage Counts		

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

			<b>Remove</b>
Application Number	Country <sup>i</sup>	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			<input checked="" type="radio"/> Yes <input type="radio"/> No
Additional Foreign Priority Data may be generated within this form by selecting the <b>Add</b> button.			<b>Add</b>

## Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

<b>Assignee 1</b>				<b>Remove</b>
If the Assignee is an Organization check here. <input checked="" type="checkbox"/>				
Organization Name	Lexmark International, Inc.			
<b>Mailing Address Information:</b>				
Address 1	740 West New Circle Road			
Address 2				
City	Lexington	State/Province	KY	
Country <sup>i</sup>	US	Postal Code	40550	
Phone Number		Fax Number		
Email Address				
Additional Assignee Data may be generated within this form by selecting the <b>Add</b> button.				<b>Add</b>

## Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

<b>Signature</b>	/Rhett S. White/		Date (YYYY-MM-DD)	2008-04-22
First Name	Rhett	Last Name	White	Registration Number
				59158

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

# **ADDRESSING AND COMMAND PROTOCOLS FOR NON-VOLATILE MEMORIES UTILIZED IN RECORDING USAGE COUNTS**

## **CROSS REFERENCE TO RELATED APPLICATIONS**

[0001] This application is a divisional of U.S. Serial No. 11/154,117, filed June 16, 2005, the content of which is hereby incorporated by reference.

## **FIELD OF THE INVENTION**

[0002] The present invention relates generally to non-volatile memories, and more specifically, to addressing schemes, command protocols, and electrical interfaces for non-volatile memories utilized in recording the usage of a device.

[0003] Non-volatile memory modules are commonly found in computing devices for recording the usage of components, including consumable components having a limited life span. For instance, non-volatile memory modules are common in imaging and printing devices, such as in multifunction printers, for recording the use of components such as fusers, accumulation belts, and the like, and for recording the use of consumables such as print cartridges. In imaging or printing devices, for instance, usage may be recorded based upon the number of pages printed by the device, or based upon the partial or full depletion of the print cartridges. Such usage counts are helpful in a variety of ways, including for billing purposes and in monitoring the status and/or use of consumable components.

[0004] As computing devices have advanced and become more complex, the number of non-volatile memory modules included within each device has increased. The speed with which each non-volatile memory module must be updated or read in a computing device has also increased. Continuing with the illustrative example of printing and imaging devices, the speed and page

rates of these devices are constantly improving. Therefore, not only do the contents of a greater number of non-volatile memory modules have to be updated, but the contents of these memory modules must be updated in a shorter amount of time to keep up with the faster page rates. In imaging and printing devices, because conventional many memory modules have relatively long wait times for updating, faster page rates present difficulties in updating each of the non-volatile memories in a device in a timely manner.

[0005] In addition, non-volatile memory modules (e.g., EEPROM, NOR flash memory, NAND flash memory, etc.) in computing devices may experience degradation during operation, thereby necessitating error handling to mitigate interruption of operation of the memory modules. Further, non-volatile memory modules may be physically part of removeable and/or consumable components of a computing device, such as printer cartridges. Because such removeable and/or consumable components should be easily installed and removed by users, there is a cost premium associated with each electrical connection between the computing device and its removeable and/or consumable component, as exists, for instance, with a printing device and a printer cartridge. By utilizing multi-level or analog level communication techniques appropriately, the number of these electrical connections can be minimized, thereby helping to increase reliability and decrease cost.

[0006] Conventional protocols do not sufficiently handle all of these problems discussed. Thus, there remains an unsatisfied need in the industry for addressing schemes, command protocols, and electrical interfaces for quickly updating non-volatile memories, such as in non-volatile memory modules utilized in imaging and printing devices.

## BRIEF SUMMARY OF THE INVENTION

[0007] The present invention overcomes the disadvantages of the prior art by providing addressing schemes, command protocols, and electrical interfaces that quickly update memory modules, such as non-volatile memory modules, in computing devices such as imaging and printing devices.

[0008] According to one embodiment of the present invention, there is disclosed a of updating memory modules. The method includes receiving, at one or more memory modules, a command transmitted from a processing device, where the command is an increment counter command operable to instruct the one or more memory modules to increment a counter within the one or more memory modules. The method also includes processing the command at the one or more memory modules.

[0009] According to one aspect of the invention, the step of processing the command includes the step of incrementing, in each of the one or more memory modules, at least one counter. According to another aspect of the invention, the step of incrementing also includes incrementing, in each of the one or more memory modules, the at least one counter by an increment value specified in the command. According to yet another aspect of the invention, the command includes memory module addresses corresponding to each of the one or more one or memory modules.

[0010] The method may also include the step of establishing a busy status signal during the processing of the command at the one or more memory modules. Furthermore, the receiving step may include receiving, at the one or more memory modules, the command from the processing device transmitted to the one or more memory modules via an asynchronous data channel.

[0011] According to another embodiment of the invention, there is disclosed an electrical interface. The electrical interface includes a conductor having a plurality of discrete voltages

levels, and a plurality of memory modules, where each of the plurality of memory modules is coupled to a respective one of the plurality of the discrete voltage levels to establish unique module addresses for each of the plurality of memory modules. The electrical interface also includes a first channel for exchanging data between a processing device and at least one of the plurality of memory modules, and a second channel coupled to the processing device and the plurality of memory modules, where the second channel identifies a status of the memory modules, and where the status corresponds to a voltage level of the second channel.

[0012] According to one aspect of the invention, the status is selected from the group of statuses consisting of a busy status, an error status, and a ready status. According to another aspect of the invention, the electrical interface may also include an open-drain for controlling the voltage level of the second channel. According to yet another aspect of the invention, the first channel is operable with asynchronous modulation communications or half-duplex communications. Additionally, a single command operable on the plurality of memory modules may be transmitted by the processing device via the first channel. According to another aspect of the invention, the single command may be an increment counter command or a punch out bit field command.

[0013] According to yet another embodiment of the invention, there is disclosed a method of interfacing with one or more memories. The method includes the steps of assigning an address, through an electrical conductor, to each of a plurality of memories, and exchanging data, via a first channel, between a processing device and at least one of the plurality of memories. The method also includes the steps of receiving a status of at least one memory from the at least one memory via a second channel, and providing at least one protocol for exchanging data between

the processing device and the plurality of memories, where the at least one protocol is operable to address one, several, or all of the plurality of memories.

[0014] According to one aspect of the invention, the electrical conductor may include a set of discrete voltage levels for assigning the address to each of the plurality of memories. According to another aspect of the invention, the method may also include the step of assigning a counter to a location in at least one of the plurality of memories. Furthermore, the status of at least one memory may be a busy status, an error status, or a ready status. Additionally, the status may correspond to one of three voltage levels of the second channel. According to yet another aspect of the invention, the at least one protocol includes an increment counter command protocol, where the increment counter command protocol specifies an increment counter command identifying at least one of the plurality of memories, and a value by which to increment a counter in at least one of the plurality of memories. The at least one protocol may alternatively or also include a punch out bit field command protocol, where the punch out bit field command protocol specifies a punch out command identifying at least one of the plurality of memories, and a location of a bit field in at least one of the plurality of memories.

[0015] According to another embodiment of the present invention, there is disclosed a method of communicating with one or more memory modules. The method includes receiving, at a processing device, a first signal from at least one memory module, the first signal indicating that the at least one memory module is ready to receive data. The method also includes generating, at the processing device, a packet including a set of bits representing a command and a memory module address, where the memory module address utilizes singular addressing to identify each memory module. The method further includes transmitting the packet from the processing device to each identified memory module.

[0016] According to one aspect of the invention, the command includes an increment counter command, and the packet further includes an increment value. According to another aspect of the invention, the command includes a punch out bit field command. The command may also or alternatively include a write data command, where the packet includes data to be written. According to yet another aspect of the invention, the data in the packet is encrypted and the method further includes the step of decrypting the packet at each identified memory module.

[0017] According to yet another embodiment of the present invention, there is disclosed an electrical interface that uses a single conductor to deliver power for the normal operation of a plurality of memory modules and to force the modules to a known initial state, such as a reset state. According to an aspect of the invention, this may be implemented using switched power supply conductor and a power-on-reset detection circuit located in all the memory modules.

#### BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S)

[0018] Having thus described the invention in general terms, reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

[0019] FIG. 1A is a schematic of an illustrative electrical interface, according to an embodiment of the present invention.

[0020] FIG. 1B is a schematic of an alternative manner by which the electrical interface of FIG. 1A may be achieved by an electronic assembly including integrated circuits, according to an illustrative embodiment of the present invention.

[0021] FIG. 1C is a schematic of an illustrative electrical interface, according to an embodiment of the present invention.

[0022] FIGS. 2A and 2B are illustrative memory module addresses according to an embodiment of the present invention.

[0023] FIG. 3 is a block diagram flow chart of a write data operation, according to an illustrative embodiment of the present invention.

[0024] FIGS. 4A and 4B are illustrative command protocols, according to an embodiment of the present invention.

[0025] FIG. 5 is a block diagram flow chart of a read data operation, according to an illustrative embodiment of the present invention.

[0026] FIGS. 6A and 6B are illustrative command protocols according, to an embodiment of the present invention.

[0027] FIG. 7 shows a block diagram flow chart illustrating a method of communicating with one or more memory modules, according to one embodiment of the present invention.

#### DETAILED DESCRIPTION OF THE INVENTION

[0028] The present inventions now will be described more fully hereinafter with reference to the accompanying drawings, in which some, but not all embodiments of the inventions are shown. Indeed, these inventions may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will satisfy applicable legal requirements. Like numbers refer to like elements throughout.

[0029] Further, although the present invention is described in the context of addressing schemes, command protocols, and electrical interfaces for quickly updating non-volatile memories in imaging and printing devices, it will be appreciated that the present invention may

be implemented in any device having non-volatile memories. This may include mobile phones, handheld computers, laptop computers, personal computers, servers, mainframe computers, personal digital assistants, and the like, and devices having minimal processing power and functionality, such as in devices with dedicated circuits for performing preprogrammed or uncomplicated tasks. In brief, the present invention may be implemented in any computing device in which the usage of components may wish to be recorded using non-volatile memory. Therefore, the embodiments herein describing non-volatile memories for tallying page counts and recording the depletion of ink in ink or toner cartridges are for illustrative purposes only and are not intended to be limiting examples.

[0030] In imaging and printing devices, page counts recorded by non-volatile memory modules ("memory modules") may be incremented as pages are printed. Page counts may include the total number of pages printed by a printer and the total number of pages printed for each of a number of print categories. Recording the number of pages for individual print categories permits the recording of page counts for specific types of printing tasks, such as the total number of color pages, monochrome pages, letter size pages, legal size pages, transparencies, etc., that may be printed. In addition to recording page counts, non-volatile memory modules may be packaged with reservoirs such as ink or toner cartridges, and the memory modules may contain one or more bit fields for recording the depletion of the reservoirs. By comparison, each bit field may be in either an erased or programmed state (e.g., a "0" or "1") while each page count may include a plurality of bits representing a numeric value. As an example, a non-volatile memory module provided with a toner cartridge may contain thirty-two bit fields, and as a particular amount of toner has been depleted (e.g., 1/32 of the total toner), a bit field may be "punched out," thereby changing the bit field from an erased state to a

programmed state. For instance, the value in the bit field may be changed from an initial value of "0" to a value of "1". In this illustrative example, all thirty-two bit fields may be punched out after all of the toner had been depleted, thereby signifying full depletion of the toner cartridge. It will be appreciated by one of ordinary skill in the art that imaging and printing devices may contain non-volatile memory modules that have one or more counts, resource bit fields, or a combination thereof.

[0031] Embodiments of the present invention describe electrical interfaces, addressing schemes, and command protocols for efficiently commanding a single memory module, a group of memory modules, or all of the memory modules in an imaging or printing device. According to one aspect of the invention, each memory module in the imaging or printing device may be directed to increment one or more page counts by a specified value or to punch out a resource bit field. In order to direct a group of memory modules with a common command, the group of memory modules may be synchronized prior to issuance of the command. Further, memory modules may be able to report errors and obtain assistance in resolving those errors from a processing device. A given count or resource bit field in a non-volatile memory module may degrade with use, and therefore it may be necessary to adjust the location of the count or bit field.

[0032] I. Electrical Interface

[0033] FIG. 1A illustrates an electrical interface 100 according to an illustrative embodiment of the present invention. The interface 100 includes a processing device 101 in communication with a plurality of non-volatile memory modules 103a, 103b, . . . 103x, which may contain one or more counts, bit fields, or a combination thereof. According to one aspect of the invention, the processing device 101 may be an application-specific integrated circuit (ASIC). According to

another aspect of the invention, the processing device 101 may be a general processor or microprocessor running on a computing device to execute the functions described herein. To implement the functions described herein, the processing device 101 may also include software, hardware, or a combination thereof, and may include one or more integrated components in close proximity or components that are distributed throughout an imaging and printing device.

[0034] As shown in FIG. 1A, the processing device 101 controls a voltage regulator 102 that provides a voltage source 104 to the memory modules 103a, 103b, . . . 103x. According to a preferred embodiment, the voltage source for the memory modules 103a, 103b, . . . 103x may be a common voltage source. The memory modules 103a, 103b, . . . 103x in the illustrative electrical interface 100 operate at 3.3V, but it will be appreciated by one of ordinary skill in the art that non-volatile memory modules such as the memory modules 103a, 103b, . . . 103x shown in FIG. 1 may operate at other voltages. As illustrated in FIG. 1A, the non-volatile memory modules 103a, 103b, . . . 103x are also provided with a common ground reference 106.

[0035] The processing device 101 may exchange data with one or more of the non-volatile memory modules 103a, 103b, . . . 103x through an address/data channel 108. According to one embodiment of the present invention, the address/data channel 108 may include a unidirectional first channel and a unidirectional second channel. In particular, data from the processing device 101 may be sent over the first channel to the memory modules 103a, 103b, . . . 103x using an asynchronous modulation technique and a transmission rate supported by the memory modules 103a, 103b, . . . 103x. Similarly, data may be sent from the memory modules 103a, 103b, . . . 103x to the processing device 101 over the second channel utilizing an asynchronous modulation technique and a transmission rate supported by the memory modules 103a, 103b, . . . 103x. According to one aspect of the invention, the transmission rate may be common to all of the

memory modules 103a, 103b, . . . 103x. In a preferred embodiment, the transmission rates for both the first and second channels may be between approximately 38,400 bits/second and 115,200 bits/second, though the transmission rates may vary depending on the specific types of memory modules utilized. It will be appreciated that other transmission rates may also be used, including those not supported by all of the memory modules 103a, 103b, . . . 103x. For example, one memory module may transmit a response to a read command at a faster rate than another memory module.

[0036] According to other embodiments of the present invention, the address/data channel 108 may only include a single bidirectional channel capable of sending and receiving data between the processing device 101 and the memory modules 103a, 103b, . . . 103x. A single bidirectional address/data channel 108 may use an asynchronous modulation technique and a transmission rate supported by the memory modules 103a, 103b, . . . 103x. When a single bidirectional channel is used, the processing device 101 may wait before current commands in process are completed before issuing additional commands to the memory modules 103a, 103b, . . . 103x. In addition, it will be appreciated that any command requiring a response from a memory module 103a, 103b, . . . 103x may be issued over the address/data channel 108 to a single memory module 103a, 103b, . . . 103x at a time. To prevent other memory modules from utilizing the address/data channel 108 while another memory module is transmitting data, a half-duplex sharing technique or other scheduling method may be implemented. Furthermore, it will be appreciated by those of ordinary skill in the art that other alternatives for the address/data channel 108 may be possible to execute the processing device's 101 exchange data with one or more of the non-volatile memory modules 103a, 103b, . . . 103x, such as the use of two bi-

directional channels, and that other transmission techniques known to those of ordinary skill in the art may be used to effect communication via the address/data channel 108.

[0037] As illustrated in FIG. 1A, the processing device 101 receives the status of the memory modules 103a, 103b, . . . 103x through a status channel 110. According to one embodiment of the present invention, the status channel 110 may include a first channel representing a busy/available status and a second channel representing an error/no-error status. In a preferred embodiment, the busy/available status may be provided on the first channel by effectively "anding" the busy/available output signals from each of the memory modules through the use of an open-collector/open-drain 112. The open-collector/open-drain 112 may include one or more common resistors and one or more capacitors. In such a configuration, each memory module 103a, 103b, . . . 103x may output a high voltage signal if it is able to accept a command, or a low voltage signal if it is busy executing a command. Thus, if all of the memory modules 103a, 103b, . . . 103x are available, then the first channel signal may be pulled up to a "high" voltage by the resistor in the open-collector/open-drain 112, signifying that all of the memory modules 103a, 103b, . . . 103x are available.

[0038] On the other hand, if any memory module 103a, 103b, . . . 103x is busy, then the first channel signal may be pulled to a "low" voltage close to ground by the open-collector/open-drain 112. If at least one memory module 103a, 103b, . . . 103x is busy, the processing device 101 may wait until the first channel signal is pulled to a high voltage level before issuing a subsequent command to the memory modules 103a, 103b, . . . 103x. In this manner, the processing device 101 may synchronize the memory modules 103a, 103b, . . . 103x before issuing a common command, such as an increment counter command, to a plurality of the memory modules 103a, 103b, . . . 103x. Similarly, the second channel may also effectively "and" the error/no-error

output signals from each of the memory modules. This may also be provided with another open-collector/open-drain 112 having a common resistor and capacitor.

[0039] Each of the memory modules 103a, 103b, . . . 103x may output a high voltage signal on the second channel when there is no error detected and a low voltage signal if an error is detected. Thus, if one of the memory modules 103a, 103b, . . . 103x has an error, the second channel may be pulled to a low voltage by the open-collector/open-drain 112, signifying that at least one memory module 103a, 103b, . . . 103x contains an error. If all of the memory modules 103a, 103b, . . . 103x are error-free, then the second channel may be pulled to a high voltage. All of the memory modules 103a, 103b, . . . 103x will be ready and error-free if the first and second channels are at a high voltage level. It will be appreciated by one of ordinary skill that there are many alternatives to the "anding" function of open-collector/open drain 112 discussed above. For example, a plurality of physical "and" gates can be used instead of the open-collector/open-drain 112.

[0040] According to another embodiment of the present invention, the status channel 110 may include only a single channel capable of representing the ready, error, and busy states for the memory modules 103a, 103b, . . . 103x. When only a single channel is used, all addressed memory modules 103a, 103b, . . . 103x may release their respective busy signals from a low voltage level to a high voltage level after each finishes processing its current command. The status channel 110 may then be pulled to a high voltage level by the open-drain/open-collector 112. Once the addressed memory modules 103a, 103b, . . . 103x have completed their commands and released each of their output signals above the low voltage, any memory module that needs to report an error may hold the status channel 110 at an intermediate voltage level that is higher than the low voltage level (e.g., close to ground) but lower than the high voltage (e.g.,

approximately 3.3V). For instance, each of the memory modules 103a, 103b, . . . 103x may use a 1.5V zeener diode component to ground to provide the intermediate voltage level. Other methods of providing an intermediate voltage levels may alternatively be implementing using resistors, as is known in the art, such as using a 5.1K.OMEGA. resistance to ground to provide the intermediate voltage level. In this way, a single status channel 110 may be sufficient for reporting the ready, error, and busy states of the memory modules 103a, 103b, . . . 103x thereby reducing the electrical connections required between the processing device 101 and the memory modules 103a, 103b, . . . 103x.

[0041] It will be appreciated by one of ordinary skill in the art that the low, high, and intermediate voltage levels do not have to correspond to the busy, error, and ready status, respectively, of the memory modules 103a, 103b, . . . 103x. According to an alternative embodiment, the low voltage level may correspond to a ready status while a high voltage level may correspond to a busy level. According to another embodiment, the address/data channel 108 may be utilized to transmit the status of one or more of the memory modules 103a, 103b, . . . 103x to the processing device 101. For example, the processing device may wait to receive a ready status from each of the memory modules 103a, 103b, . . . 103x on the address/data channel 108 before issuing a subsequent command.

[0042] As illustrated in FIG. 1A, the controlling computer system 101 may also provide a common time reference to the memory modules 103a, 103b, . . . 103x through a clock channel 121. According to one embodiment of the present invention, the clock channel 121 may operate at a frequency directly correlated to the bit rate of the Address/Data channel 108 or may operate at a frequency unrelated to this bit rate. Phase-locked-loop circuits present in each memory module 103a, 103b, . . . 103x may use the common time reference provided by the clock channel

121. It will be appreciated by one of ordinary skill in the art that the clock channel 121 may either be a fixed frequency or a modulated frequency to spread the electromagnetic emissions associated with the clock channel 121 over a wider frequency range.

[0043] FIG. 1B is a schematic showing an alternative manner by which the memory modules 103a, 103b, . . . 103x in the illustrative electrical interface of FIG. 1A may be achieved via an electronic assembly 162 including several integrated circuits, according to an illustrative embodiment of the present invention. More specifically, in FIG. 1B an electronic assembly 162 includes a memory module 150 that includes a Power-On Reset Detector Integrated Circuit (IC) 156, a Secure Memory IC 152, and an Analog-to-Digital (A/D) Converter IC 154. Each of the ICs 152, 154, 156 act in concert to implement the memory modules 150 described above with respect to FIG. 1. Thus, the memory module 150 implemented by a single electronic assembly 162 of FIG. 1B is equivalent to the multiple memory modules 103a, 103b, . . . 103x discussed above with respect to FIG. 1A. To enable a single electrical connection to the memory module 150 to carry complete memory module 150 status (i.e., ready/busy/error) information, FIG. 1B illustrates the use of conventional open collector output circuits 159, 161 from the secure memory IC 152 and a zeener diode 158. Other arrangements for carrying status information, including those described above with respect to FIG. 1A, may also be used, as will be appreciated by those of ordinary skill in the art. The crystal 170 can provide a precision time reference that performs a similar function as that of the clock channel 121 described with respect to FIG. 1A. Other arrangements for carrying status information, including those described above with respect to FIG. 1A, may also be used, as will be appreciated by those of ordinary skill in the art. FIG. 1B also illustrates the use of a resistor divider circuit 160 to generate the specific voltage required to assign the memory module 150 a desired address. Therefore, it will be

appreciated that the remainder of the specification is discussed with respect to the embodiment described in FIG. 1A, that alternative embodiments in which memory modules are implemented with one or more ICs are also within the scope of the invention described herein.

[0044] FIG. 1C shows another electrical interface 171 according to an illustrative embodiment of the present invention. The interface 171 includes a controlling computer system 172 in communication with a plurality of non-volatile memory modules 173a, 173b, . . . 173x, which implement the basic functions as the embodiments described with respect to FIGS. 1A and 1B. It will be appreciated that in the embodiments shown in FIGS. 1A and 1B, support for a common time reference is implemented either by a clock channel 121 or by a crystal circuit 170, which can increase the number of connections between the controlling computer system 101 and the memory modules 103a, 103b, . . . 103x or the incorporation of additional components into the memory modules 103a, 103b, . . . 103x, respectively. The electrical interface 171 illustrated in FIG. 1C encodes a binary clock with values 0 and 1, binary data transmission values of 0 and 1 along with busy status and error status information on two open drain, three-level channels. These channels are the Address-Data/Error channel 178 and the Clock/Busy channel 180.

[0045] When the Address-Data/Error 178 channel is at a low voltage it encodes a logical 0 data transmission state independent of whether any of the memory modules 173a, 173b, . . . 173x, are reporting an error condition. When the Address-Data/Error 178 is at an intermediate voltage level it encodes a logical 1 data transmission state and that at least one of the memory modules 173a, 173b, . . . 173x are reporting an error condition. When the Address-Data/Error 178 is at a high voltage level it encodes a logical 1 data transmission state and that none of the memory modules 173a, 173b, . . . 173x are reporting an error state. The clamping of the maximum voltage to the intermediate level, as opposed to the high voltage determined by the

pull-up resistor and capacitor combinations 182 alone, can be achieved by the memory modules 173a, 173b, . . . 173x reporting an error state shorting the Address-Data/Error 178 to ground through a zeener diode or similar component known in the art to limit the maximum voltage. When the Clock/Busy channel 180 is at a low voltage it encodes a logical 0 clock state independent of whether any of the memory modules 173a, 173b, . . . 173x, are reporting a busy condition. When the Clock/Busy channel 180 is at an intermediate voltage level it encodes a logical 1 clock state and that at least one of the memory modules 173a, 173b, . . . 173x are reporting a busy condition. When the Clock/Busy channel 180 is at a high voltage level it encodes a logical 1 clock state and that none of the memory modules 173a, 173b, . . . 173x are reporting a busy state. The clamping of the maximum voltage to the intermediate level, as opposed to the high voltage determined by the pull-up resistor and capacitor combinations 182 alone is achieved by the memory modules 173a, 173b, . . . 173x reporting an error state shorting the Clock/Busy channel 180 to ground through a zeener diode or similar component so as to limit the maximum voltage.

[0046] II. Addressing Memory Modules

[0047] In order for a processing device to send commands and receive responses from a set of non-volatile memory modules distributed throughout a printing or imaging device, each of the memory modules are first assigned a memory module address according to an addressing scheme. Referring again to FIG. 1A, according to one aspect of the addressing scheme, the processing device 101 is capable of specifying a single memory module and an address or addresses location within the memory module that is to be read or modified. According to another aspect of the addressing scheme, an individual, multiple, or all of the memory modules

may be issued the same command at the same time. This allows a plurality of memory modules to be updated in parallel.

[0048] A variety of methods are possible for an addressing scheme. According to one embodiment, a singular addressing scheme may be applied to the memory modules. With a singular addressing scheme, a specified number of bits in a communications protocol are allocated for the "memory module address." As necessary, each of the bits (or at least a portion thereof) in the memory module address corresponds to a particular memory module. For example, as shown in FIG. 2A, if eight bits are allocated for the memory module address, and there are eight memory modules 103a, 103b, . . . 103h, each memory module may be assigned to one of the eight bits in the memory module address 200. Each of the memory modules 103a, 103b, . . . 103h will understand that it is being addressed when its corresponding bit in the memory module address 200 is at a specific state (e.g., high or a "1"). By setting a plurality of bits in the memory module address 200, the corresponding plurality of memory modules may be addressed simultaneously by the processing device 101. For instance, if memory modules 103c, 103d, and 103g are to be addressed at the same time, then the illustrative memory module address 202 shown in FIG. 2B may be utilized.

[0049] A method by which memory modules are assigned an address under the singular addressing scheme will now be described in more detail. Many variations of address assignments are possible with commands or software activity. However, it is also possible to assign an address to a memory module without the use of issued commands or software. One embodiment is shown in FIG. 1A, in which a conductor 114 with a set of discrete voltage levels is provided through the use of resistors 118, and where each discrete voltage level corresponds to a particular bit position in the memory module address. Each of the plurality of memory modules 103a,

103b, . . . 103x will be in communication with the conductor 114, and will be assigned a memory module address based on the discrete voltage level of the conductor 114. For example, the discrete voltages of 3.3V may be provided for memory module 103a while a discrete voltage of 3.0V may be provided for memory module 103b. In this example, memory module 103a may be assigned the first bit position in the memory module address and memory module 103b may be assigned to the next bit position adjacent to the first bit position. The use of a single conductor 114 to assign addresses also reduces the number of connections required for implementing the addressing scheme, and simplifies the connections needed for memory modules packaged on removable components such as print cartridges.

[0050] According to an alternative embodiment, separate conductors, each with a discrete voltage, could be utilized with each of the memory modules 103a, 103b, . . . 103x. In yet another alternative embodiment, the specific address of a memory module may be assigned by a resistor divider circuit designed to produce a specific voltage level based upon the specific component of the imaging device. This would allow the reduction of another connection between the processing device 101 and the memory modules 103a, 103b, . . . 103x. In addition, according to another alternative embodiment, the address/data channel 108 could be utilized to program an address for each of the memory modules 103a, 103b, . . . 103x. According to yet another alternative embodiment of the present invention, the addresses of each of the memory modules 103a, 103b, . . . 103x may be pre-defined prior to its inclusion within the electrical interface 100.

[0051] Further, within each memory module 103a, 103b . . . 103x, the addresses or locations that are to be read or modified may be assigned. According to one embodiment, the processing device 101 may assign the address or location by using a hardware strapping capability. As an example, the processing device 101 may provide that particular counts in each memory module

103a, 103b, . . . 103x will be assigned to a particular address or location. For example, within each memory module 103a, 103b, . . . 103x, a total page count may be assigned to one address, a number of printed color pages to a second address, a number of printed monochrome pages to a third address, a number of letter-sized printed pages to a fourth address, a number of legal-sized printed pages to a fifth address, and a number of printed transparencies to a sixth address, and so on. Further, the address or location in a memory module 103a, 103b, . . . 103x may be specified for resource usage bit fields that may be utilized in metering resource usage in print cartridges.

[0052] III. Command Protocols

[0053] The command sets and protocols (also referred to as "command protocols") utilized in accordance with an embodiment of the present invention support the writing of data to and the reading of data from one or more memory modules 103a, 103b, . . . 103x. FIG. 3 is a block diagram flow chart of an exemplary write data command protocol that allows a specified value to be written to one or more locations in one or more memory modules 103a, 103b, . . . 103x. As shown in FIG. 3, the write data command protocol 300 includes sets of bits representing the write data command 302, the memory module address 304, the length of the list of locations 306, the corresponding locations 308, and the data to be written 310. The write data command 302 may be, for instance, an eight bit field representing the "write data" command. The memory module address 304 may, for instance, a sixteen bit field utilizing singular addressing to indicate which of a potential sixteen memory modules 103a, 103b, . . . 103x the command 302 is addressed to. As indicated above with singular addressing, one memory module, a set of memory modules, or all of the memory modules 103a, 103b, . . . 103x may be addressed simultaneously by setting each of the respective bits in the memory module address to a "1". The length of the locations 306, perhaps an eight bit field, may indicate how many locations within each memory

module 103a, 103b, . . . 103x are to be updated. Each of the location numbers 308 may be for instance, a sixteen bit field indicating the address of the location in the memory module 103a, 103b, . . . 103x that is to be updated. As an example, if four separate locations are to be updated, then the length of the list of locations 306 will be four, and there may be four separate sixteen-bit location numbers 308 specified. The data to be written 310 represents the specified data that is to be written in each of the locations 306.

[0054] Once the write data command protocol 300 is prepared, it is transmitted to each of the memory modules 103a, 103b, . . . 103x (blocks 312, 314) if the memory modules are all ready (e.g., status signal 110 at a high voltage level). If the memory module address 304 indicates that a particular memory module 103a, 103b, . . . 103x is being addressed, then each memory module 103a, 103b, . . . 103x that is being addressed pulls its status signal 110 to a low voltage to indicate a busy status (block 316) while it processes the write data command 302 (block 318). If the memory module 103a, 103b, . . . 103x encounters an error while processing the write data command 302 (block 320), its status signal 110 may be placed at an intermediate voltage level to indicate an error (block 322). Assuming no error is encountered, each addressed memory module 103a, 103b, . . . 103x will write the data value 310 to each of the locations 306. When the write data command 302 is completed (block 324), the memory module 103a, 103b, . . . 103x releases its status signal from a low voltage level to a high voltage level to signify completion of the command 302 (block 326).

[0055] In addition to the writing of specified data values to particular locations, command protocols are also supported in order to have one or more counters incremented. According to one embodiment of the invention, another command protocol of the present invention is an increment counter command protocol, which permits the memory modules to receive an

increment counter command. With an increment counter command, each memory module may include a counter that maintains its own count, which is increased by a specified value upon receipt of the increment counter command. The increment counter command may be utilized with a plurality of counters with different counts--for example global page counts, color page counts, letter-sized page counts, legal-sized paged counts, transparency page counts, etc. Thus, the global page count, the color page count, the letter-sized page counts, and the transparency page counts in one or more memory modules 103a, 103b, . . . 103x may be incremented at the same time, which makes it unnecessary for the processing device 101 to know of the present values of each of those counts that are being updated. Instead, each memory module 103a, 103b, . . . 103x is responsible for maintaining its own counts and updating the counts upon receipt of the increment counter command protocol.

[0056] As shown in FIG. 4A, similar to the write data command protocol 300, the increment counter protocol 400 includes a set of bits allocated for the increment counter command 402, the memory module address 404, the value that each counter will increment by 406, the length of the list of counters 408, and the address of each counter to increment within the memory module 410. According to one illustrative example, the increment counter command 402 may be eight bits, the memory module address 404 may be sixteen bits, the value that each counter will increment by 406 may be eight bits, the length of the list of counters 408 may be eight bits, and the address of each counter 410 may be sixteen bits. Each memory module 103a, 103b, . . . 103x that is addressed will pull the signal on the status channel 110 to a low voltage to signify that it is busy while it updates one or more counters by the value specified. The memory module 103a, 103b, . . . 103x will release the signal on the status channel 110 to a high voltage to signify that it is ready after each addressed counter has been updated.

[0057] Referring next to FIG. 4B, the protocol 420 for commands to punch out a resource bit field is shown, according to one embodiment of the invention. The punch out protocol 420 includes a plurality of bits allocated for the punch out bit field command 422, the memory module address 424, the length of list of bit-field numbers to address 426, and the address of each bit field number in the memory module 428. According to one illustrative embodiment, the punch out bit field command 422 may be eight bits, the memory module address 424 may be sixteen bits, the length of the list of bit-field numbers 426 may be eight bits, and the address of each bit field number 428 may be sixteen bits. No data value needs to be specified because the punch out bit field command 422 does not require that a memory module 103a, 103b, . . . 103x update a particular value, but only to punch out a particular bit field (e.g., changed from an erased state to a programmed state).

[0058] FIG. 5 is block diagram flow chart of an exemplary read data command protocol that allows the processing device 101 to query a particular memory module 103a, 103b, . . . 103x for a stored value. The read data command protocol 500 differs from the write command protocols above in that the addressed memory module 103a, 103b, . . . 103x sends data 522 back to the processing device 101. Referring to FIG. 5, the read data command protocol 500 includes sets of bits representing the read data command 502, the memory module address 504, the length of the list of locations 506, and the corresponding locations 508. For example, the command 502 may consist of an eight bit long command representing the "read" data command for a memory module 103a, 103b, . . . 103x. The memory module address 504 may be a sixteen bit field utilizing singular addressing to indicate which of the potential sixteen memory modules 103a, 103b, . . . 103x the command is addressed to. The length of the list of locations 506, perhaps an eight bit field, will indicate how many locations within each memory module 103a, 103b, . . .

103x are to be read. Each of the location numbers 508 may be perhaps a sixteen bit field indicating the address of the location in the memory module 103a, 103b, . . . 103x that is to be read.

[0059] Once the read data command protocol 500 is prepared, it is transmitted to each of the memory modules 103a, 103b, . . . 103x (blocks 510 and 512) assuming that the memory modules 103a, 103b, . . . 103x are ready (e.g., the status signal 110 is at a high voltage). If the memory module address 504 indicates that a particular memory module 103a, 103b, . . . 103x is being addressed, then the memory module 103a, 103b, . . . 103x that is being addressed pulls its status signal 110 to a low voltage to signify a busy status (block 514) while it processes the read data command 502 (block 516). If the memory module 103a, 103b, . . . 103x encounters an error while processing the read data command 502, then its status signal 110 may be pulled to an intermediate voltage level to signify an error status (block 520). Assuming no error is encountered, data 522 retrieved from the requested location numbers will be sent to the processing device 101. Once the write command has been completed (block 524), the memory module releases its signal on the status channel 110 from a low voltage level to a high voltage level (block 526).

[0060] Because the memory modules 103a, 103b, . . . 103x may sometimes report errors by holding the status channel 110 at an intermediate voltage level, a command protocol to read the status of the memory modules is needed. When the processing device 101 detects that an error has occurred, it may individually query each of the memory modules 103a, 103b, . . . 103x with a "read status" command 642. As illustrated in FIG. 6A, this protocol 640 may include a set of bits representing the read status command 642 and the memory module address 644. The read status command 642 may be, for instance, eight bits and the memory module address 644 may be

sixteen bits. After processing the read status command 642, the addressed memory module 103a, 103b, . . . 103x may then respond with its current status and return its status channel 110 to the Ready status (e.g., a high voltage level).

[0061] One error that a memory module 103a, 103b, . . . 103x may report is that one of its counters is not maintaining a value as expected. This may occur because particular locations in the non-volatile memory modules 103a, 103b, . . . 103x may degrade over time with use. In such a situation, the processing device 101 may send a command to set the next available location. As shown in FIG. 6B, this protocol 660 may include a set of bits representing the set next available location command 662, the memory module address 664, and the address of the next available location 666. According to an illustrative example, the set next available location 662 may be eight bits, the memory module address 664 may be sixteen bits, and the address of the next available location 666 may be sixteen bits. In an alternative embodiment of the present invention, the set next available location command protocol 660 may not be necessary if each memory module 103a, 103b, . . . 103x is able to automatically remap a counter or bit field to a new address or location without assistance from the processing device 101. According to yet another alternative embodiment of the present invention, one or more reserved memory modules may be provided such that a faulty memory module may be remapped to one of the reserved memory modules, either automatically or with assistance from the processing device 101.

[0062] One of ordinary skill will recognize that many variations and additions to the described command protocols are possible. For example, a different number of bits may be used for the memory module addresses and for the address/locations in the command protocols. For example, eight bits or twenty-four bits may be used for the memory module address as well to accommodate fewer or more memory modules 103a, 103b, . . . 103x. In addition, the fields

contained in each of the command protocols may be rearranged in other orders as well. For example, in the write data command protocol 300, the data that is to be written 310 could be placed between the memory module address 304 and the length of the locations 306. In addition, horizontal parity bits, vertical parity bits, or both may be used with the transmitted protocols for checking and resolving transmission errors. Further, for security purposes, authentication may be utilized between the memory modules 103a, 103b, . . . 103x and processing device 101. For example, in FIG. 3, the data 310 may be encrypted prior its transmission to the memory modules 103a, 103b, . . . 103x. In such a case, the memory module will be responsible for decrypting the data 310. A variety of encryption algorithms known in the art may be utilized, including an RSA encryption algorithm (e.g., 1024-bit, 2048-bit, etc.) that utilizes asymmetrical keys (e.g., public and private keys). If encryption/decryption is utilized, then the command protocols may also support reading asymmetric keys and accepting asymmetric keys from the processing device 101 and memory modules 103a, 103b, . . . 103x. In addition, the memory modules 103a, 103b, . . . 103x, including those provided with print cartridges, may include serial numbers to authenticate the manufacturer of the cartridges. Accordingly, a command protocol may be supported in order to read the serial number from the memory module. The read serial number command protocol may include a set of bits for the read serial number command and the memory module address. A memory module 103a, 103b, . . . 103x that receives the read serial number command protocol will respond with its serial number.

[0063] FIG. 7 shows a block diagram flow chart illustrating a method of communicating with one or more memory modules, such as one or more non-volatile memory modules, according to one embodiment of the present invention. As shown in FIG. 7, the method may begin with a processing device, such as the illustrative processing device 101 of FIG. 1A, receiving a status

signal from one or more memory modules (block 702) instructing the processing device that the one or more memory modules are prepared to receive data. According to one embodiment of the invention, the one or more memory modules may be one or more of the memory modules 103a, 103b, . . . 103x illustrated in FIG. 1A. The status signal may be an 'available' status signal, as described in detail above. Next, the processing device generates a packet including a command and one or more memory module addresses (block 704) to which the command will be transmitted. According to one aspect of the invention, the command is an increment counter command to increment one or more of the memory modules by an increment value also included in the command. According to other aspects of the invention, the command may include a punch out bit field command, and/or a write data command, both of which were described above. Referring again to FIG. 7, after the processing device transmits the packet to the one or more memory modules (block 706), the one or more memory modules process the received packet and transmit a 'busy' status signal to the processing device while processing the packet (block 708). After the one or more memory modules complete processing the packet (block 710), an available status signal may be sent to the processing device, which receives the status (block 702) so that additional commands may be sent to the one or more memory modules.

[0064] Many modifications and other embodiments of the inventions set forth herein will come to mind to one skilled in the art to which these inventions pertain having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the inventions are not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

## CLAIMS

The claimed invention is:

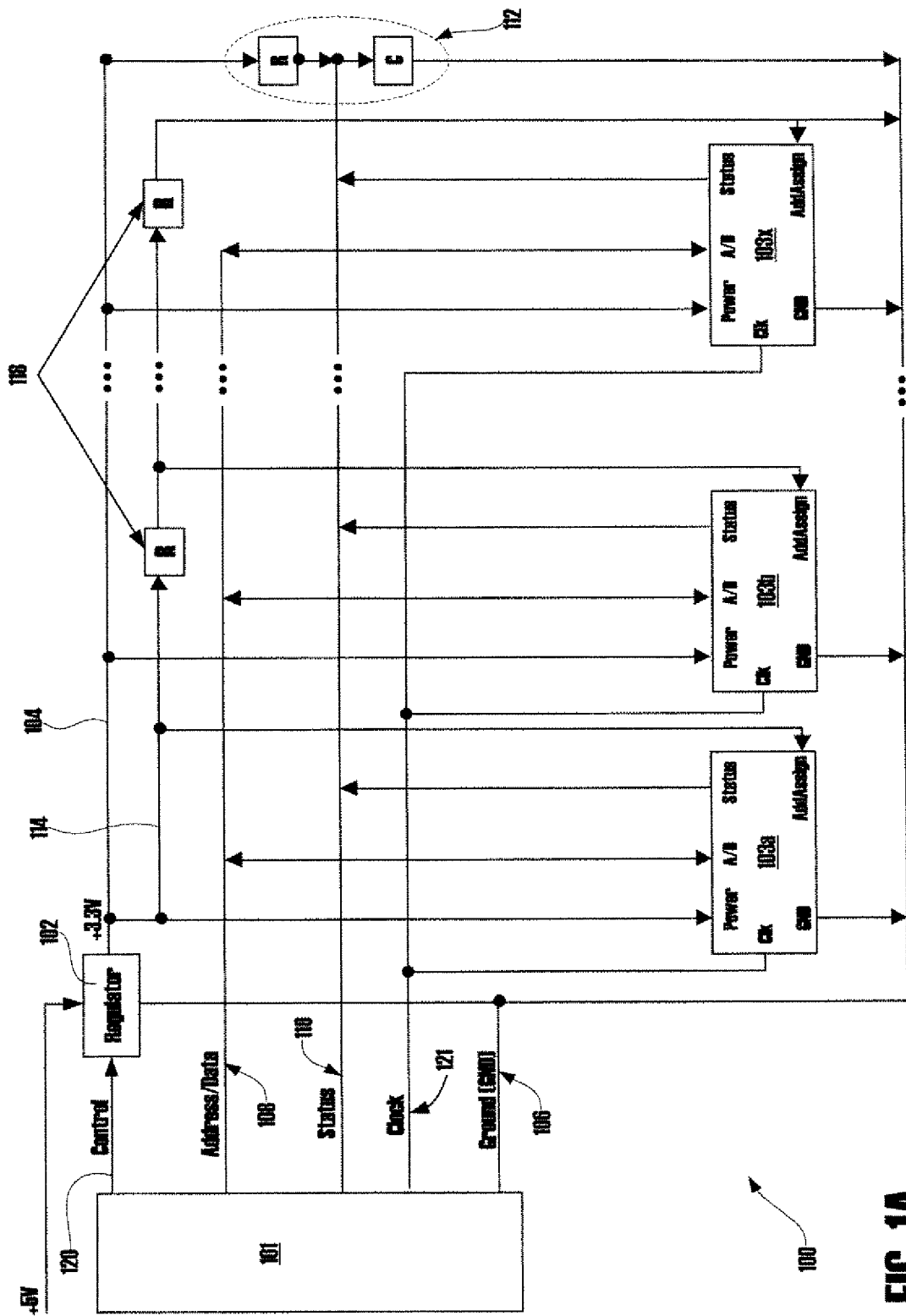
1. A method of updating memory modules, comprising:  
receiving, at one or more memory modules, a command transmitted from a processing device, wherein the command comprises an increment counter command operable to instruct the one or more memory modules to increment a counter within the one or more memory modules;  
and  
processing the command at the one or more memory modules.
2. The method of claim 1, wherein the step of processing the command comprises the step of incrementing, in each of the one or more memory modules, at least one counter.
3. The method of claim 2, wherein the step of incrementing further comprises incrementing, in each of the one or more memory modules, the at least one counter by an increment value specified in the command.
4. The method of claim 2, wherein the command further comprises memory module addresses corresponding to each of the one or more one or memory modules.
5. The method of claim 1, further comprising the step of establishing a busy status signal during the processing of the command at the one or more memory modules.

6. The method of claim 1, wherein the receiving step further comprises receiving, at the one or more memory modules, the command from the processing device transmitted to the one or more memory modules via an asynchronous data channel.
7. A method of updating memory modules, comprising:  
receiving, at one or more memory modules, a command transmitted from a processing device, wherein the command is indicative of wear and is operable to instruct the one or more memory modules to increment a counter within the one or more memory modules; and  
processing the command at the one or more memory modules.
8. The method of claim 7, wherein the command that is indicative of wear is a consumption counter that reflects a consumption of at least one resource.

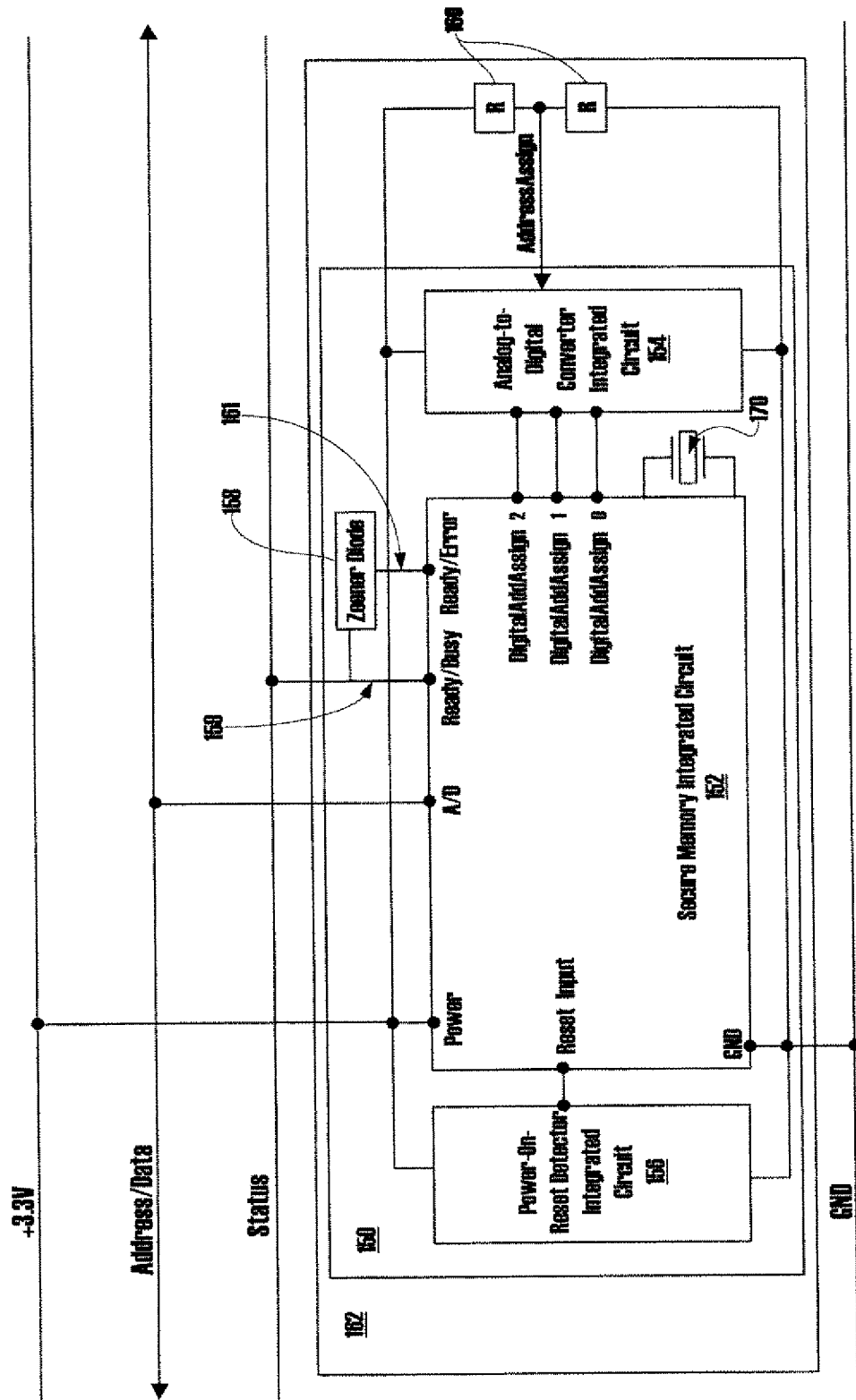
**ADDRESSING AND COMMAND PROTOCOLS FOR NON-VOLATILE MEMORIES  
UTILIZED IN RECORDING USAGE COUNTS**

**ABSTRACT OF THE DISCLOSURE**

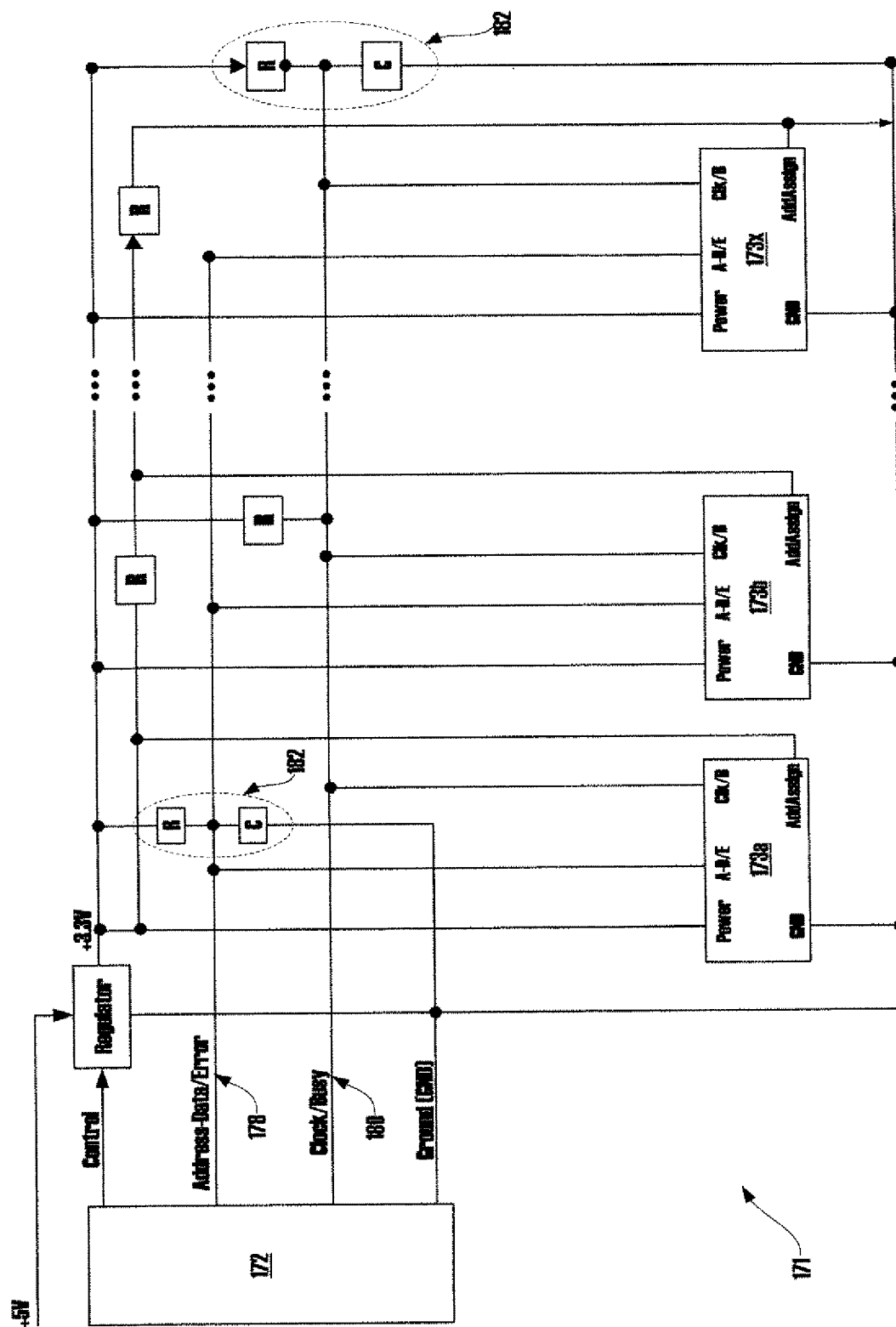
Electrical interfaces, addressing schemes, and command protocols allow for communications with memory modules in computing devices such as imaging and printing devices. Memory modules may be assigned an address through a set of discrete voltages. One, multiple, or all of the memory modules may be addressed with a single command, which may be an increment counter command, a write command, or a punch out bit field. The status of the memory modules may be determined by sampling a single signal that may be at a low, high, or intermediate voltage level.



**FIG. 1A**



**FIG. 1B**



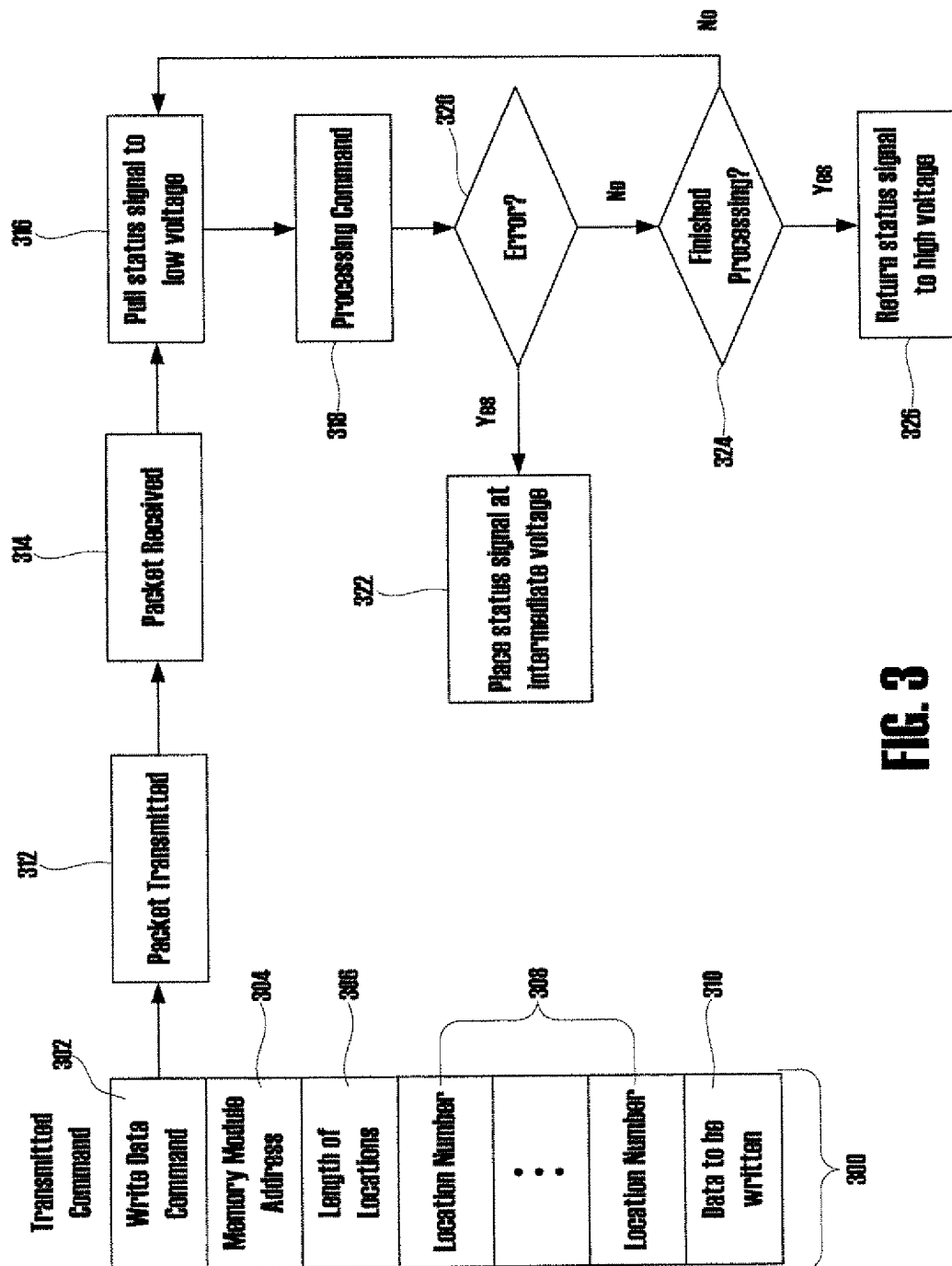
**FIG. 1C**



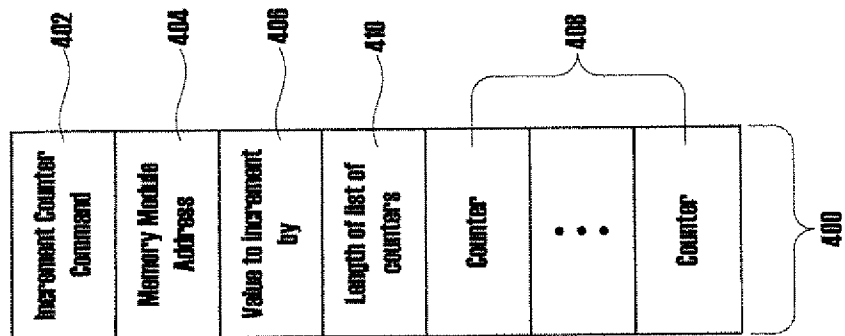
**FIG. 2A**



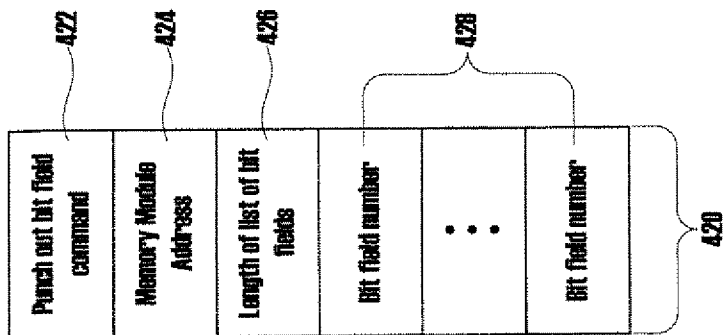
**FIG. 2B**



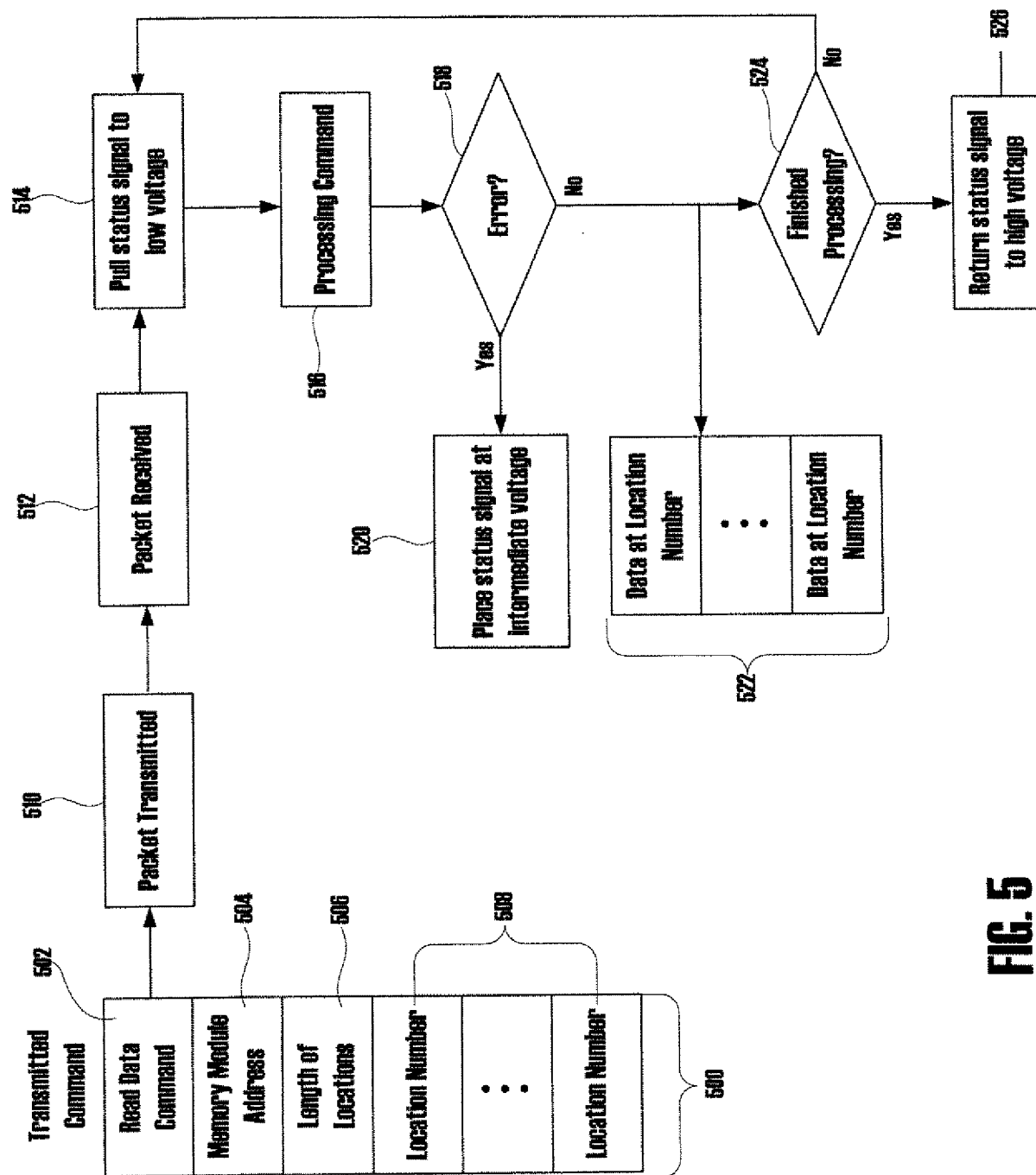
**FIG. 3**



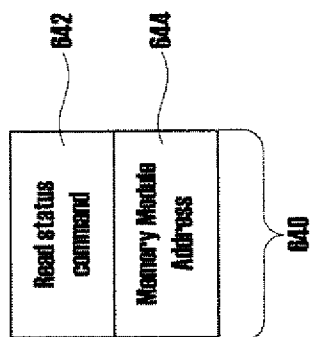
**FIG. 4A**



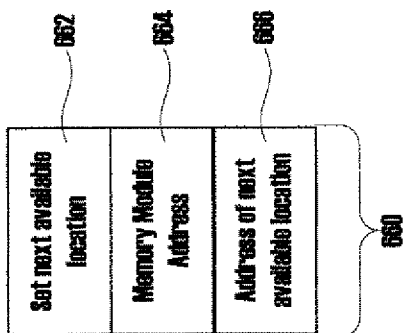
**FIG. 4B**



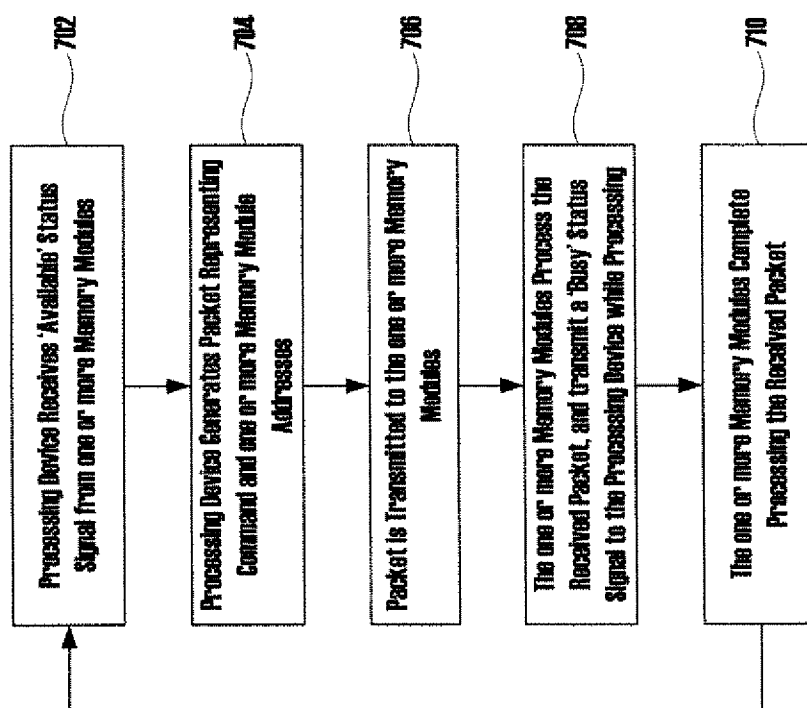
**FIG. 5**



**FIG. 6A**



**FIG. 6B**



**FIG. 7**

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

**DECLARATION FOR UTILITY OR  
DESIGN  
PATENT APPLICATION  
(37 CFR 1.63)**



Declaration  
Submitted  
With Initial  
Filing

OR



Declaration  
Submitted after Initial  
Filing (surcharge  
(37 CFR 1.16 (e))  
required)

Attorney Docket  
Number

2004-0784.02

First Named Inventor

James Ronald Booth

COMPLETE IF KNOWN

Application Number

Filing Date

Art Unit

Examiner Name

I hereby declare that:

Each inventor's residence, mailing address, and citizenship are as stated below next to their name.

I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Addressing, Command Protocol, And Electrical Interface For Non-Volatile Memories Utilized in  
Recording Usage Counts

(Title of the Invention)

the specification of which



is attached hereto

OR



was filed on (MM/DD/YYYY)

as United States Application Number or PCT International

Application Number

and was amended on (MM/DD/YYYY)

(if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



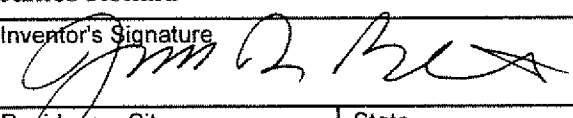
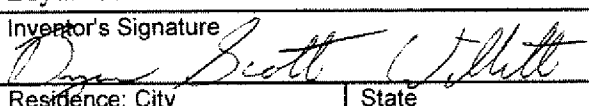
Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

[Page 1 of 2]

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 21 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance completing the form, call 1-800-PTO-9199 and select option 2.

**DECLARATION — Utility or Design Patent Application**

Direct all correspondence to:		<input checked="" type="checkbox"/> The address associated with Customer Number:	21972		OR	<input type="checkbox"/> Correspondence address below
Name						
Address						
City			State		ZIP	
Country		Telephone			Email	
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.						
NAME OF SOLE OR FIRST INVENTOR:				<input type="checkbox"/> A petition has been filed for this unsigned inventor		
Given Name (first and middle [if any])				Family Name or Surname		
James Ronald				Booth		
Inventor's Signature					Date	
					JUNE 15, 2005	
Residence: City		State		Country		Citizenship
Nicholasville		KY		USA		USA
Mailing Address 65 Lantern Way						
City		State		Zip		Country
Nicholasville		KY		40356		USA
NAME OF SECOND INVENTOR:				<input type="checkbox"/> A petition has been filed for this unsigned inventor		
Given Name (first and middle [if any])				Family Name or Surname		
Bryan Scott				Willett		
Inventor's Signature					Date	
						
Residence: City		State		Country		Citizenship
Lexington		KY		USA		USA
Mailing Address 2708 Woodlawn Way						
City		State		Zip		Country
Lexington		KY		40511		USA
<input type="checkbox"/> Additional inventors or a legal representative are being named on the supplemental sheet(s) PTO/SB/02A or 02LR attached hereto.						

**Filing Date: 04/22/2008**

Approved for use through 7/31/2006. OMB 0651-0032

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

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number <b>12/107,278</b>		
<b>APPLICATION AS FILED – PART I</b>					<b>OTHER THAN SMALL ENTITY</b>		
(Column 1)		(Column 2)		SMALL ENTITY		OR	
FOR	NUMBER FILED	NUMBER EXTRA		RATE (\$)	FEE (\$)		
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A		RATE (\$)	
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A		N/A		FEE (\$)	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	21	* 1		X 25=		X 50=	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4	* 1		X 100=		X 200=	
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
				N/A		N/A	
				TOTAL		TOTAL	
						1,290	
* If the difference in column 1 is less than zero, enter "0" in column 2.							
<b>APPLICATION AS AMENDED – PART II</b>							
(Column 1)		(Column 2)		(Column 3)			
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		SMALL ENTITY		OR
	Total (37 CFR 1.16(i))	Minus **	=		RATE (\$)	ADDITIONAL FEE (\$)	
	Independent (37 CFR 1.16(h))	Minus ***	=		X =		OR
	Application Size Fee (37 CFR 1.16(s))				X =		OR
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))				N/A		OR
				TOTAL		TOTAL	
				ADD'T FEE		ADD'T FEE	
(Column 1)		(Column 2)		(Column 3)			
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		SMALL ENTITY		OR
	Total (37 CFR 1.16(i))	Minus **	=		RATE (\$)	ADDITIONAL FEE (\$)	
	Independent (37 CFR 1.16(h))	Minus ***	=		X =		OR
	Application Size Fee (37 CFR 1.16(s))				X =		OR
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))				N/A		OR
				TOTAL		TOTAL	
				ADD'T FEE		ADD'T FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.							

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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