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REFRIGERATOR APPLIANCE AND METHOD FOR CODE READING

Abstract

A refrigerator appliance is provided, including a dispenser assembly positioned at a door and having a recess extending into the door. A scanner assembly includes a scanner device and a targeting device positioned at an angle toward the recess and behind the external wall. A controller is communicatively coupled to the scanner device and the targeting device. The controller is configured to execute instructions that causes the refrigerator appliance to perform operations. The operations include commanding, at the scanner assembly, measuring fidelity of scan data reflected from the object at the recess; and commanding, at a lighting component or the targeting device at the scanner assembly, provision of light toward or from the recess after a pre-determined period of commanding measurement of the amount and pattern of light at the scanner device.

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Background/Summary

FIELD OF THE INVENTION

[0001] The present disclosure is related generally to refrigerator appliances.

BACKGROUND OF THE INVENTION

[0002] Refrigerator appliances generally include a refrigeration chamber and a freezer chamber. A dispenser may be included and configured to dispense ice and/or water to a user, such as a user's container. Dispensers may be positioned at a door or a panel at a refrigerator appliance casing. Dispensers may generally be recessed into the door or the panel. However, the recess may prevent access or positioning of containers larger than the recess, which may inhibit positioning of a machine-readable code at a scanner, which may inhibit integration of a scanner to a refrigeration appliance.

[0003] Still further, the machine-readable code may be positioned relative to a scanner but obscured, such that the code is at least partially unreadable.

[0004] As such, there is a need for improved structures and methods for code reading at refrigerator appliances.

BRIEF DESCRIPTION OF THE INVENTION

[0005] Aspects and advantages of the invention will be set forth in part in the following description, or may be apparent from the description, or may be learned through practice of the invention.

[0006] An aspect of the present disclosure is directed to a refrigerator appliance. The refrigerator appliance includes a cabinet forming a refrigeration compartment, a freezer compartment, or both. A door is attached to the cabinet. The door is configured to selectively allow entry to the refrigeration compartment, the freezer compartment, or both. A dispenser assembly is positioned at the door. The dispenser assembly includes a recess extending into the door, the dispenser assembly configured to egress a fluid, ice, or both, toward the recess. A scanner assembly includes a scanner device and a targeting device. The scanner device and the targeting device are positioned at an angle toward the recess and behind the external wall. A controller is communicatively coupled to the scanner device and the targeting device. The controller is configured to execute instructions that causes the refrigerator appliance to perform operations. The operations include commanding, at the scanner assembly, measuring fidelity of scan data reflected from the object at the recess; and commanding, at a lighting component or the targeting device at the scanner assembly, provision of light toward or from the recess after a pre-determined period of commanding measurement of the amount and pattern of light at the scanner device.

[0007] Another aspect of the present disclosure is directed to a refrigerator appliance. The refrigerator appliance includes a cabinet forming a refrigeration compartment, a freezer compartment, or both. A door is attached to the cabinet. The door is configured to selectively allow entry to the refrigeration compartment, the freezer compartment, or both. A dispenser assembly is positioned at the door. The dispenser assembly includes a recess extending into the door. The dispenser assembly is configured to egress a fluid, ice, or both, toward the recess. The dispenser assembly includes a first lighting component positioned behind an external wall. A scanner assembly includes a second lighting component, a scanner device, and a targeting device. The scanner device and the targeting device are positioned at an angle between approximately 15 degrees and approximately 90 degrees toward the recess. A controller is communicatively coupled to the scanner assembly, the first lighting component, and a proximity sensor. The controller is configured to execute instructions that causes the refrigerator appliance to perform operations. The operations include commanding, at the first lighting component, provision of light toward or from the recess when the targeting device detects a presence of an object at the recess; commanding, at

the scanner device, measurement of fidelity of scan data from light reflected from the object at the recess; and commanding, at the second lighting component, provision of light toward the recess after a pre-determined period of commanding measurement of the amount and pattern of light at the scanner device.

[0008] Still another aspect of the present disclosure is directed to a method for reading a machine-readable code at an object at a refrigerator appliance. The method includes providing, from a first lighting component of the refrigerator appliance directed toward or from a recess at a dispenser, light toward the recess when a targeting device or a proximity sensor detects a presence of an object at the recess; measuring, at a scanner device positioned adjacent from the proximity sensor along a width direction, a depth direction, or both, fidelity of scan data from light reflected from the object at the recess; and providing, at a second lighting component adjacent from the scanner device and the proximity sensor along the width direction, the depth direction, or both, light toward the recess after a pre-determined period of commanding measurement of the amount and pattern of light at the scanner device.

[0009] These and other features, aspects and advantages of the present invention will become better understood with reference to the following description and appended claims. The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] A full and enabling disclosure of the present invention, including the best mode thereof, directed to one of ordinary skill in the art, is set forth in the specification, which makes reference to the appended figures.

[0011] FIG. **1** is a perspective view of a refrigerator appliance according to an exemplary embodiment of the present subject matter with doors of the example refrigerator appliance shown closed.

[0012] FIG. **2** is a perspective view of the exemplary refrigerator appliance with doors shown open.

[0013] FIG. **3** is a front view of an exemplary dispenser assembly of the refrigerator appliance in accordance with aspects of the present disclosure.

[0014] FIG. **4** is a front view of an exemplary dispenser assembly of the refrigerator appliance in accordance with aspects of the present disclosure.

[0015] FIG. **5**A is a perspective view of an embodiment of the dispenser assembly with a lighting component in a low-or no-light emitting state in accordance with aspects of the present disclosure.

[0016] FIG. **5**B is a perspective view of an embodiment of the dispenser assembly with a lighting component in a light-providing state in accordance with aspects of the present disclosure.

[0017] FIG. **6** is a cross-sectional view of an embodiment of the dispenser assembly in accordance with aspects of the present disclosure.

[0018] FIG. **7** is a perspective view of an embodiment of the scanner assembly at the dispenser assembly in accordance with aspects of the present disclosure.

[0019] FIG. **8** provides a flowchart outlining steps of a method for code reading at an appliance in accordance with aspects of the present disclosure.

[0020] FIG. **9** provides a flowchart outlining steps of a method for code reading at an appliance in accordance with aspects of the present disclosure.

[0021] Repeat use of reference characters in the present specification and drawings is intended to represent the same or analogous features or elements of the present invention.

DETAILED DESCRIPTION

[0022] Reference now will be made in detail to embodiments of the present invention, one or more examples of which are illustrated in the drawings. The word “exemplary” is used herein to mean “serving as an example, instance, or illustration.” Any implementation described herein as “exemplary” is not necessarily to be construed as preferred or advantageous over other implementations. Moreover, each example is provided by way of explanation, rather than limitation of, the technology. In fact, it will be apparent to those skilled in the art that modifications and variations can be made in the present technology without departing from the scope or spirit of the claimed technology. For instance, features illustrated or described as part of one embodiment can be used with another embodiment to yield a still further embodiment. Thus, it is intended that the present disclosure covers such modifications and variations as come within the scope of the appended claims and their equivalents. The detailed description uses numerical and letter designations to refer to features in the drawings. Like or similar designations in the drawings and description have been used to refer to like or similar parts of the invention.
[0023] As used herein, the terms “first”, “second”, and “third” may be used interchangeably to distinguish one component from another and are not intended to signify location or importance of the individual components. The singular forms “a,” “an,” and “the” include plural references unless the context clearly dictates otherwise. The terms “coupled,” “fixed,” “attached to,” and the like refer to both direct coupling, fixing, or attaching, as well as indirect coupling, fixing, or attaching through one or more intermediate components or features, unless otherwise specified herein. As used herein, the terms “comprises,” “comprising,” “includes,” “including,” “has,” “having” or any other variation thereof, are intended to cover a non-exclusive inclusion. For example, a process, method, article, or apparatus that comprises a list of features is not necessarily limited only to those features but may include other features not expressly listed or inherent to such process, method, article, or apparatus. Further, unless expressly stated to the contrary, “or” refers to an inclusive-or and not to an exclusive-or. For example, a condition A or B is satisfied by any one of the following: A is true (or present) and B is false (or not present), A is false (or not present) and B is true (or present), and both A and B are true (or present).
[0024] Terms of approximation, such as “about,” “generally,” “approximately,” or “substantially,” include values within ten percent greater or less than the stated value. When used in the context of an angle or direction, such terms include within ten degrees greater or less than the stated angle or direction. For example, “generally vertical” includes directions within ten degrees of vertical in any direction, e.g., clockwise or counter-clockwise.
[0025] Benefits, other advantages, and solutions to problems are described below with regard to specific embodiments. However, the benefits, advantages, solutions to problems, and any feature(s) that may cause any benefit, advantage, or solution to occur or become more pronounced are not to be construed as a critical, required, or essential feature of any or all the claims.
[0026] FIG. **1** provides a perspective view of a refrigerator appliance **10** according to an exemplary embodiment of the present subject matter. FIG. **2** provides a perspective view of the refrigerator appliance **10** with doors **38**, **40** open to view refrigeration and freezer compartments **12**, **14** formed within a cabinet or outer case **16**. FIG. **1** provides a reference vertical direction V and width direction W. FIG. **6** further depicts a reference depth direction D orthogonal to the vertical direction V and width direction W, such as corresponding to a dimension extending from doors **38**, **40** toward a back wall of the outer case **16**.
[0027] Referring to FIG. **2**, refrigerator appliance **10** includes the refrigeration compartment **12** and the freezer compartment **14**, with the compartments arranged side-by-side and contained within the outer case **16**. Outer case **16** and inner liners **18** and **20** are generally molded from a suitable plastic or foam material. For instance, the outer case may form a molded plastic or foam outer case. Thus, refrigerator appliance **10** is generally referred to as a side-by-side style refrigerator appliance. In alternative exemplary embodiments, refrigerator appliance **10** may include a single liner and a mullion that spans between opposite sides of the single liner to divide it into the freezer

compartment **14**, such as a compartment configured for frozen foods, and the refrigeration compartment **12**, such as a compartment configured for fresh foods. Outer case **16** is normally formed by folding a sheet of a suitable material, such as pre-painted steel, into an inverted U-shape to form top and side walls of outer case **16**. A bottom wall of outer case **16** normally is formed separately and attached to the case side walls and to a bottom frame that provides support for refrigerator appliance **10**. However, it should be appreciated that outer case **16** may be formed by other suitable manufacturing methods.

[0028] A breaker strip **22** extends between a case front flange and outer front edges of inner liners **18** and **20**. Breaker strip **22** is formed from a suitable resilient material, such as an extruded acrylo-butadiene-styrene based material (commonly referred to as ABS). The insulation in the space between inner liners **18** and **20** is covered by another strip of suitable resilient material, which also commonly is referred to as a mullion **24** and may be formed of an extruded ABS material. Breaker strip **22** and mullion **24** may form a front face, and extend completely around inner peripheral edges of outer case **16** and vertically between inner liners **18** and **20**.

[0029] Slide-out drawers **26** and shelves **30** are normally provided in refrigeration compartment **12** to support items being stored therein. In addition, a shelf **30**, a basket **32**, or both, are generally provided in freezer compartment **14**.

[0030] Refrigerator appliance features are regulated with a controller **34** according to user preference via manipulation of a control interface **36** mounted in an upper region of refrigeration compartment **12** and coupled to controller **34**. Input/output ("I/O") signals may be routed between controller **34** and various operational components of refrigerator appliance **10**. The components of refrigerator appliance **10** may be in communication with controller **34** via one or more signal lines or shared communication busses.

[0031] Controller **34** can be any device that includes one or more processors and a memory. As an example, in some embodiments, controller **34** may be a single board computer (SBC). For example, controller **34** can be a single System-On-Chip (SOC). However, any form of controller **34** may also be used to perform the present subject matter. The processor(s) can be any suitable processing device, such as a microprocessor, microcontroller, integrated circuit, or other suitable processing devices or combinations thereof. The memory can include any suitable storage media, including, but not limited to, non-transitory computer-readable media, RAM, ROM, hard drives, flash drives, accessible databases, or other memory devices. The memory can store information accessible by processor(s), including instructions that can be executed by processor(s) to perform aspects of the present disclosure.

[0032] Referring to FIG. **1**, in some embodiments, the appliance **10** may include a sound emitting device **35** or other auditory device configured to emit an audio signal receptive by a user. The sound emitting device **35** is operably coupled to controller **34**, such as to receive a control signal to command an audible output, e.g., a voice, ring, tune, music, or other auditory output generally understood for a sound emitting device. In some embodiments, such as further described herein, the sound emitting device **35** is operably coupled to a scanner assembly **100** (FIG. **3**), such as to receive a control signal from the scanner assembly **100** to command an audible output, such as further described herein.

[0033] It should be appreciated that embodiments of the appliance **10** including the controller **34**, the scanner assembly **100**, or the sound emitting device **35** may include operable and communicative coupling via a wired or wireless bus as may generally be understood in the art. Schematic depictions of the controller **34**, the scanner assembly **100**, or the sound emitting device **35** should be understood to include busses, conduits, transmitters, wires, antennas, or other devices and structures generally understood for electrical or electronic between such devices.

[0034] Referring to FIGS. **1-2**, a freezer door **38** and a fresh food door **40** close access openings to freezer compartment **14** and refrigeration compartment **12**. Freezer door and fresh food door **38** and **40** are each mounted by a top hinge **42** and a bottom hinge (not shown) to rotate about its outer

vertical edge between an open position, as shown in FIG. **1**, and a closed position. Freezer door **38** may include a plurality of storage shelves **44** and a sealing gasket **46**, and fresh food door **40** also includes a plurality of storage shelves **48** and a sealing gasket **50**.

[0035] Freezer compartment **14** may include an automatic ice maker **52** and a dispenser assembly **54** provided in freezer door **38** such that ice and/or chilled water can be dispensed without opening freezer door **38**, as is well known in the art. Freezer door and fresh food door **38** and **40** may be opened by handles **56**. It should be appreciated that the dispenser assembly **54** may be positioned at an exterior portion of the door, such as depicted in FIG. **1**, or positioned in an interior portion, such as to require opening the door to access the dispenser assembly **54**.

[0036] Refrigerator appliance **10** also includes a machinery compartment (not shown) that at least partially contains a cooling system including components for executing a known vapor compression cycle for cooling air. The cooling system may include a compressor, a condenser, an expansion device, and an evaporator connected in series as a loop and charged with a refrigerant. The evaporator is a type of heat exchanger which transfers heat from air passing over the evaporator to the refrigerant flowing through the evaporator, thereby causing the refrigerant to vaporize. The cooled air is used to refrigerate one or more refrigerator or freezer compartments via fans. Also, a cooling loop can be added to direct cool the ice maker to form ice cubes, and a heating loop can be added to help remove ice from the ice maker. Collectively, the vapor compression cycle components in a refrigeration circuit, associated fans, and associated compartments are conventionally referred to as a sealed system. The construction and operation of the sealed system are well known to those skilled in the art.

[0037] Referring to FIG. **3**, a detailed view of an exemplary embodiment of the dispenser assembly **54** is provided. The dispenser assembly **54** may include a control panel **62** providing a display screen and a control interface **64**, such as buttons, knobs, levers, or other interfaces at which a user may select one or more functions of the dispenser assembly **54**. Functions may include, but not limited to, dispensing ice, selecting a type of ice to be dispensed (e.g., crushed or cubed), dispensing fluid (e.g., water), operating a light (e.g., first lighting component **110**, second lighting component **112**), etc. Control interface **64** may provide messages, such as, but not limited to, temperature, filter status, lock controls, etc.

[0038] The dispenser assembly **54** may include a dispenser control interface **55**, such as a dispenser panel, configured to release ice or fluid when articulated. For instance, a user may position a container onto the dispenser control interface **55** to command release of ice or fluid from the dispenser assembly **54**.

[0039] The dispenser assembly **54** includes a mouth **60** forming, at least in part, an outlet opening **66**. The mouth **60** may generally form a wall forming a passage through which ice passes toward the user's container. The mouth **60** may generally be positioned within a recess **76**. A drain **77** is positioned within the recess **76** and below the mouth **60**, such as to receive fluid or ice that may fall thereinto. A fluid nozzle **72** extends toward the drain **77** and is configured to dispense a fluid (e.g., water) to a container.

[0040] Referring now to FIGS. **4**-**7**, embodiments of the appliance **10** include the dispenser assembly **54** having a scanner assembly **100**. In various embodiments, the scanner assembly **100** is configured to direct a beam of light across a machine-readable code **104**, such as a barcode, a quick-response (QR) code, or other optical readable code format positioned at an object **102**, such as, but not limited to, a grocery item, foodstuff, container, or other object at which a machine-readable code may be positioned. The scanner assembly **100** includes an imaging or scanner device **114** configured to obtain or measure fidelity of scan data from light reflected from the object **102**. For instance, the scanner assembly **100** may be configured to detect or measure an amount and pattern of light reflected from the object **102**. For instance, the scanner device **114** may include a laser configured to direct a beam of light across the machine-readable code **104** and measure fidelity of scan data from the code **104**, such as an amount and patter of light that is reflected from

the code **104**. The scanner assembly **100** converts the obtained light energy into electrical energy, such as an electrical signal. The electrical energy or signal is converted into data by a decoder. For instance, in some embodiments, the scanner assembly **100** includes electronics, circuitry, and/or processors configured to convert the electrical signal into data. In still some embodiments, the scanner assembly **100** is communicatively coupled to the controller **54** and configured to transmit the electrical signal to the controller **54** to convert the signal into data. In various embodiments, the scanner assembly **100** or the controller **54** may include the decoder.

[0041] In some embodiments, the scanner assembly **100**, or portions thereof, is positioned behind an external wall **53** of the dispenser assembly **54**. For instance, referring to FIG. **6**, the external wall **53** may form an outer wall of the appliance **10**, such as may be flush with, or extend from, an outer face of one or more doors **38**, **40** (FIG. **1**). The external wall **53** may form an interior volume **92** at the dispenser assembly **54** at which the scanner assembly **100** is positioned. The external wall **53** may further separate the interior volume **92** from an exterior volume **91** outside of the appliance **10**. In some embodiments, the recess **76**, at which a container may be positioned to receive water, ice, or other fluids from the dispenser assembly **54**, is positioned below the dispenser assembly **54**. Various embodiments of the scanner assembly **100** position the scanner device **114** inward along the depth direction D from the external wall **53**, such as to position the scanner device **114** above the recess **76** along the vertical direction V. In still various embodiments, the scanner assembly **100**, or portions thereof, such as the scanner device **114**, is positioned adjacent along the width direction W, the depth direction D, or both, of the fluid nozzle **72**, the sensor **122**, or both.

[0042] Referring still to FIG. **6**, in various embodiments, the scanner assembly **100** is housed in a casing **118**. The casing **118** may generally position the scanner device **114** angled toward the recess **76** and behind the external wall **53**. The casing **118** may position a separator wall **120** between the recess **76** and the scanner assembly **100**. In some embodiments, the separator wall **120** forms a clear or transparent surface through which light is transmittable to and from the scanner assembly **100**. In still some embodiments, the separator wall **120** includes a prism or mirror configured to direct light to or from the scanner assembly **100**, such as the second lighting component **112**, the scanner device **114**, or the targeting device **116**.

[0043] Referring to FIGS. **5**A-**5**B and FIG. **6**, the appliance **10** includes a first lighting component **110**. The first lighting component **110** is configured to provide lighting to or from the recess **76**. The first lighting component **110** may be positioned at the interior volume **92** or at the recess **76**. The scanner assembly **100** includes a second lighting component **112** positioned substantially co-directional to an orientation of the scanner device **114** or targeting device **116**, such as a laser or other light-based aiming guide. The second lighting component **112** may generally be positioned at the casing **118**, such as alongside the targeting device **116**, the scanner device **114**, or both. The second lighting component **112**, the targeting device **116**, or both, may be included with the scanner device **114** or as a separate component.

[0044] Referring to FIG. **6**, in various embodiments, the scanner assembly **100** is configured to transmit or receive light at an angle **108** extending relative to the depth direction D. The angle **108** may extend between approximately **15** degrees and approximately **90** degrees from the depth direction D. In some embodiments, the casing **118** includes walls **119** positioning the scanner assembly **100** at the angle **108** from the depth direction D. In still some embodiments, the separator wall **120** is a prism or mirror configured to output light corresponding to the angle **108**, such as depicted schematically via light rays **109**.

[0045] Referring now to FIGS. **5**A-**5**B and FIG. **7**, in some embodiments, the appliance **10** may include a sensor **122** at the dispenser assembly **54**. The sensor **122** can include a proximity sensor or transducer, such as, but not limited to, an ultrasonic sensor, a light-emitting sensor, a magnetic sensor, or other appropriate sensor at a dispensing assembly for an appliance.

[0046] In various embodiments, the sensor **122** is positioned adjacent along the width direction W, the depth direction D, or both, to the scanner assembly **100**. The sensor **122** may be supported or

affixed at a housing **124**. In some embodiments, the housing **124** may support or affix the casing **118** and the separator wall **120** at the dispenser assembly **54**. Embodiments of the dispenser assembly **54** including the scanner assembly **100** positioned at the interior volume **92** may facilitate scanning a machine-readable code. Embodiments depicted and described herein may further improve a field of view of the sensor **122**, such as removing the scanner assembly **100** from the field of view of the sensor **122**.

[0047] In various embodiments, a user may manually articulate the second lighting component **112** (e.g., via controller interface **64**) to provide or discontinue lighting. In some embodiments of a method for operation, the controller **54** or scanner assembly **100** is configured to provide light from the second lighting component **112** after a pre-determined period or frequency of obtaining partial scans from the scanner device **114**, such as may be indicative of poor fidelity of scan data, such as a failure of the scanner device **114** to obtain an amount and pattern of light reflected from the object **102**.

[0048] In an exemplary embodiment of a method for operation, the controller **54** or scanner assembly **100** may be configured to maintain the second lighting component **112** in a low-or no-light emitting state (e.g., depicted in FIG. **5**A) until a user signal or control signal articulates the second lighting component **112** to a light-providing state (e.g., depicted in FIG. **5**B). For instance, the first lighting component **110** may form a primary recess lighting at the appliance **10**. Light from the first lighting component **110** may be sufficient for the scanner device **114** to scan the machine-readable code **104**. When the light from the first lighting component **110** is insufficient for the scanner device **114** to scan the machine-readable code **104**, the second lighting device **112** is articulated to the light-providing state (e.g., depicted in FIG. **5**B) to provide additional lumens toward the object **102**, such as to facilitate scanning the machine-readable code **104**.

[0049] Referring back to FIG. **3**, in various embodiments, the sound emitting device **35** is positioned outside of the casing **118** at which the scanner assembly **100** is housed. The sound emitting device **35** may form a structure or device separate from the scanner assembly **100**, such as outside or separate from the casing **118**, the housing **124**, or both. The sound emitting device **35** may be integrated to the controller **34** or positioned outside of the dispenser assembly **54** generally. Accordingly, embodiments of the scanner assembly **100** may be communicatively coupled with the controller **34** and sound emitting device **35**, such as to transmit signals based on partial or completely obtained scans, or operation or discontinuation of provision of light (e.g., from one or more lighting components **110**, **112**).

[0050] Referring now to FIGS. **8**-**9**, flowcharts outlining a method for a reading a machine-readable code at an appliance are provided (hereinafter, "method **1000**"). Embodiments of the method **1000** may be performed at embodiments of the appliance **10** such as provided herein. One or more steps of the method **1000** may be stored at the controller **34** and executed, at least in part, by the controller **34**, the scanner device **114**, the lighting components **110**, **112**, the targeting device **116**, the sensor **122**, the sound emitting device **35**, or combinations thereof. For instance, embodiments of the method **1000** may include communicatively coupling (e.g., via a wired or wireless communication connection) a controller (e.g., controller **34**) to a scanner assembly (e.g., scanner assembly **100**), a lighting component at the dispenser assembly (e.g., first lighting component **110**), a lighting component at the scanner assembly (e.g., second lighting component **112**), or a proximity sensor (e.g., sensor **122**). The controller is configured to store or execute instructions that causes the refrigerator appliance, or portions thereof (e.g., the scanner assembly **100**, the lighting component **110**, the sound emitting device **35**, the sensor **122**, etc.) to perform operations, such as one or more steps of the method **1000**.

[0051] In some embodiments, method **1000** includes at **1010** providing or commanding, at the lighting component (e.g., first lighting component **110**), provision of light toward or from the recess (e.g., recess **76**) when the targeting device (e.g., targeting device **116**) or the proximity sensor (e.g., sensor **122**) detects a presence of an object (e.g., object **102**) at the recess.

[0052] Method **1000** includes at **1020** measuring or commanding, at the scanner device (e.g., scanner device **114**), measurement of fidelity of scan data from light reflected from the object at the recess from the first lighting component. For instance, method **1000** at **1020** may include measuring an amount and pattern of light from the first lighting component reflected from the object at the recess, such as at the machine-readable code (e.g., code **104**).
[0053] Method **1000** includes at **1030** providing or commanding, at the second lighting component (e.g., second lighting component **112**), provision of light toward the recess after a pre-determined period of commanding measurement of the amount and pattern of light at the scanner device. In some embodiments, method **1000** includes at **1032** increasing an intensity of the provision of light from the second lighting component over a period of time. In still some embodiments, the method **1000** includes at **1034** discontinuing provision of light from the second lighting component when a complete scan is obtained at the scanner device. In various embodiments, the period of time over which the intensity of the provision of light is provided may correspond to a period between commencing provision (or a command therefor) of the light from the second lighting component to when light is discontinued (or a command therefor) from the second lighting component.
[0054] In some embodiments, method **1000** includes at **1012** determining, via the targeting device, the presence of the object at the recess. In still some embodiments, method **1000** includes at **1014** determining, via the proximity sensor, the presence of the object at the recess.
[0055] In still some embodiments, method **1000** includes at **1040** obtaining a pre-determined quantity of partial scans at the scanner device, The pre-determined quantities may correspond to incomplete or partial scans by the scanner device to the machine-readable code. Method **1000** may provide light from the second lighting component (e.g., from the scanner assembly) after the pre-determined period of time or obtaining the pre-determined quantity of partial scans. The additional lumens from the second lighting component generally, or particularly directed along the angle **108** such as described herein, may facilitate obtaining the full or complete scan of the machine-readable code at the object by the scanner assembly.
[0056] Referring to FIG. **9**, in some embodiments, method **1000** includes at **1050** transmitting, from the scanner device to a sound emitting device (e.g., sound emitting device **35**) positioned outside of the scanner assembly, a scanner control signal commanding a scanner sound output when the pre-determined period of commanding measurement of the amount and pattern of light at the scanner device is complete.
[0057] Method **1000** may include at **1025** transmitting respective control signals commanding respective sound outputs corresponding to obtaining completed scans or determination of presence of the object at the recess by the targeting device, the proximity sensor, or both.
[0058] Embodiments of the scanner assembly **100** may allow for the first lighting component **110** to be positioned with regard to aesthetics while allowing the second lighting component **112** to augment or facilitate operation of the scanner device **114**. Embodiments of the appliance **10** may position the scanner assembly **100** to be obscured from view by a user (e.g., obscured from view from the exterior volume **91**) while allowing for scanning of objects at the recess **76**. Such obstruction may mitigate risks of the targeting device or lighting component shining toward a person or animal whose eye is positioned along the vertical direction V at or below the scanner assembly.
[0059] Embodiments of the appliance **10** may facilitate interchangeability of scanner assemblies **100**, or components thereof (e.g., second lighting component **112**, scanner device **114**, targeting device **116**, or combinations thereof). For instance, the casing **118** may provide a housing configured to direct the scanner assembly **100** toward the machine-readable code **104** without requiring snapping, fitting, or direct mounting of an imaging or scanner device to the dispenser assembly **54** or surrounding walls at the appliance **10**.
[0060] Embodiments of the appliance **10** may mitigate fluid contact (e.g., from the fluid nozzle or a container at the recess) at the scanner assembly **100**. For instance, the separator wall **120** may

provide a splash shield protecting the scanner assembly **100** from undesired fluid contact. The separator wall **120** may additionally focus, diffuse, or orient light to or from the scanner assembly **100** and the machine-readable code **104**, such as along angle **108** described herein.

[0061] Embodiments of the appliance **10** and method **1000** may facilitate interchangeability of scanner assemblies, or components thereof, and sound emitting devices **35**. For instance, the sound emitting device **35** may form a separate component from the scanner assembly **100**, such as to allow for an integrated sound emitting device at the appliance **10** to be utilized for control signals, commands, and sound outputs based on operations of the scanner assembly **100**.

[0062] Further aspects of the disclosure are provided in one or more of the following clauses:

[0063] 1. A refrigerator appliance, including a cabinet forming a refrigeration compartment, a freezer compartment, or both; a door attached to the cabinet, the door configured to selectively allow entry to the refrigeration compartment, the freezer compartment, or both; a dispenser assembly positioned at the door, the dispenser assembly including a recess extending into the door, the dispenser assembly configured to egress a fluid, ice, or both, toward the recess; and a scanner assembly including a scanner device, the scanner assembly positioned behind an external wall of the dispenser assembly. [0064] 2. The refrigerator appliance of any one or more clauses herein, including a casing at which the scanner assembly is positioned, wherein the casing disposes the scanner device at an angle toward the recess and behind the external wall. [0065] 3. The refrigerator appliance of any one or more clauses herein, wherein the angle is between approximately 15 degrees and approximately 90 degrees. [0066] 4. The refrigerator appliance of any one or more clauses herein, the scanner assembly including a targeting device, wherein the casing disposes the targeting device at the angle toward the recess and behind the external wall. [0067] 5. The refrigerator appliance of any one or more clauses herein, wherein the scanner assembly includes a lighting component. [0068] 6. The refrigerator appliance of any one or more clauses herein, including a housing at which a sensor is positioned, wherein the sensor is directed toward the recess. [0069] 7. The refrigerator appliance of any one or more clauses herein, wherein the housing includes a casing at which the scanner assembly is positioned, and wherein the housing positions the scanner assembly adjacent along a width direction, a depth direction, or both, to the sensor. [0070] 8. The refrigerator appliance of any one or more clauses herein, wherein the dispenser assembly includes an outlet opening configured to egress the fluid, the ice, or both, toward the recess, and wherein the housing positions the scanner assembly above the outlet opening. [0071] 9. The refrigerator appliance of any one or more clauses herein, wherein the sensor is a proximity sensor. [0072] 10. The refrigerator appliance of any one or more clauses herein, including a housing at which a separator wall is positioned, wherein the separator wall is disposed between the scanner device and the recess. [0073] 11. The refrigerator appliance of any one or more clauses herein, wherein the separator wall forms a prism or mirror. [0074] 12. A dispenser assembly for a refrigerator appliance, including a first lighting component positioned behind an external wall, the first lighting component configured to illuminate a recess formed at the dispenser assembly; and a scanner assembly including a second lighting component and a scanner device, the scanner assembly positioned behind the external wall of the dispenser assembly, wherein the scanner device is directed toward the recess at an angle between approximately 15 degrees and approximately 90 degrees. [0075] 13. The dispenser assembly of any one or more clauses herein, including a casing at which the scanner assembly is positioned, wherein the casing disposes the scanner device at the angle toward the recess and behind the external wall. [0076] 14. The dispenser assembly of any one or more clauses herein, the scanner assembly including a targeting device, wherein the casing disposes the targeting device at the angle toward the recess and behind the external wall. [0077] 15. The dispenser assembly of any one or more clauses herein, wherein the scanner assembly includes a second lighting component. [0078] 16. The dispenser assembly of any one or more clauses herein, including a housing at which a proximity sensor is positioned. [0079] 17. The dispenser assembly of any one or more clauses herein, wherein the housing includes

a casing at which the scanner assembly is positioned, and wherein the housing positions the scanner assembly adjacent along a width direction, a depth direction, or both, to the sensor. [0080] 18. The dispenser assembly of any one or more clauses herein, wherein the dispenser assembly includes an outlet opening through which a fluid nozzle extends toward the recess, and wherein the housing positions the scanner assembly above the outlet opening. [0081] 19. The dispenser assembly of any one or more clauses herein, including a housing at which a separator wall is positioned, wherein the separator wall is disposed between the scanner device and the recess. [0082] 20. The dispenser assembly of any one or more clauses herein, wherein the separator wall forms a prism or mirror [0083] 21. A refrigerator appliance, including a cabinet forming a refrigeration compartment, a freezer compartment, or both; a door attached to the cabinet, the door configured to selectively allow entry to the refrigeration compartment, the freezer compartment, or both; a dispenser assembly positioned at the door, the dispenser assembly including a recess extending into the door, the dispenser assembly configured to egress a fluid, ice, or both, toward the recess; a scanner assembly including a scanner device and a targeting device, wherein the scanner device and the targeting device are positioned at an angle toward the recess and behind the external wall; and a controller, the controller communicatively coupled to the scanner device and the targeting device, the controller configured to execute instructions that causes the refrigerator appliance to perform operations, the operations including commanding, at the scanner assembly, measuring fidelity of scan data reflected from the object at the recess; and commanding, at a lighting component or the targeting device at the scanner assembly, provision of light toward or from the recess after a pre-determined period of commanding measurement of the amount and pattern of light at the scanner device. [0084] 22. The refrigerator appliance of any one or more clauses herein, the operations including determining, via the targeting device, the presence of the object at the recess. [0085] 23. The refrigerator appliance of any one or more clauses herein, wherein the pre-determined period of commanding measurement of the amount and pattern of light at the scanner device includes obtaining a pre-determined quantity of partial scans at the scanner device. [0086] 24. The refrigerator appliance of any one or more clauses herein, the operations including increasing an intensity of the provision of light from the lighting component over a period of time. [0087] 25. The refrigerator appliance of any one or more clauses herein, the operations including discontinuing provision of light from the lighting component when a complete scan is obtained at the scanner device. [0088] 26. The refrigerator appliance of any one or more clauses herein, including a casing at which the scanner assembly is positioned, wherein the casing disposes the scanner device and the targeting device at the angle toward the recess and behind the external wall. [0089] 27. The refrigerator appliance of any one or more clauses herein, wherein the angle is between approximately 15 degrees and approximately 90 degrees. [0090] 28. The refrigerator appliance of any one or more clauses herein, including a housing at which a proximity sensor is positioned. [0091] 29. The refrigerator appliance of any one or more clauses herein, the operations including determining, via the proximity sensor, the presence of the object at the recess. [0092] 30. The refrigerator appliance of any one or more clauses herein, wherein the housing includes a casing at which the scanner assembly is positioned, and wherein the housing positions the scanner assembly adjacent along a width direction, a depth direction, or both, to the proximity sensor. [0093] 31. A refrigerator appliance, including a cabinet forming a refrigeration compartment, a freezer compartment, or both; a door attached to the cabinet, the door configured to selectively allow entry to the refrigeration compartment, the freezer compartment, or both; a dispenser assembly positioned at the door, the dispenser assembly including a recess extending into the door, the dispenser assembly configured to egress a fluid, ice, or both, toward the recess, the dispenser assembly including a first lighting component positioned behind an external wall; a scanner assembly including a second lighting component, a scanner device, and a targeting device, wherein the scanner device and the targeting device are positioned at an angle between approximately 15 degrees and approximately 90 degrees toward the recess; a proximity sensor; and

a controller, the controller communicatively coupled to the scanner assembly, the first lighting component, and the proximity sensor, the controller configured to execute instructions that causes the refrigerator appliance to perform operations, the operations including commanding, at the first lighting component, provision of light toward or from the recess when the targeting device detects a presence of an object at the recess; commanding, at the scanner device, measurement of fidelity of scan data from light reflected from the object at the recess; and commanding, at the second lighting component, provision of light toward the recess after a pre-determined period of commanding measurement of the amount and pattern of light at the scanner device. [0094] 32. The refrigerator appliance of any one or more clauses herein, the operations including determining, via the targeting device, the presence of the object at the recess. [0095] 33. The refrigerator appliance of any one or more clauses herein, the operations including determining, via the proximity sensor, the presence of the object at the recess. [0096] 34. The refrigerator appliance of any one or more clauses herein, wherein the housing includes a casing at which the scanner assembly is positioned, and wherein the housing positions the scanner assembly adjacent along a width direction, a depth direction, or both, to the proximity sensor. [0097] 35. The refrigerator appliance of any one or more clauses herein, including a casing at which the scanner assembly is positioned, wherein the casing disposes the scanner device and the targeting device at the angle toward the recess and behind the external wall. [0098] 36. The refrigerator appliance of any one or more clauses herein, wherein the pre-determined period of commanding measurement of the amount and pattern of light at the scanner device includes obtaining a pre-determined quantity of partial scans at the scanner device. [0099] 37. The refrigerator appliance of any one or more clauses herein, the operations including increasing an intensity of the provision of light from the second lighting component over a period of time. [0100] 38. The refrigerator appliance of any one or more clauses herein, the operations including discontinuing provision of light from the second lighting component when a complete scan is obtained at the scanner device. [0101] 39. A method for reading a machine-readable code at an object at a refrigerator appliance, the method including providing, from a first lighting component of the refrigerator appliance directed toward or from a recess at a dispenser, light toward the recess when a targeting device or a proximity sensor detects a presence of an object at the recess; measuring, at a scanner device positioned adjacent from the proximity sensor along a width direction, a depth direction, or both, fidelity of scan data from light reflected from the object at the recess; and providing, at a second lighting component adjacent from the scanner device and the proximity sensor along the width direction, the depth direction, or both, light toward the recess after a pre-determined period of commanding measurement of the amount and pattern of light at the scanner device. [0102] 40. The method of any one or more clauses herein, including increasing an intensity of the provision of light from the second lighting component over a period of time; and discontinuing provision of light from the second lighting component when a complete scan is obtained at the scanner device. [0103] 41. A refrigerator appliance, including a cabinet forming a refrigeration compartment, a freezer compartment, or both; a door attached to the cabinet, the door configured to selectively allow entry to the refrigeration compartment, the freezer compartment, or both; a dispenser assembly positioned at the door, the dispenser assembly including a recess extending into the door, the dispenser assembly configured to egress a fluid, ice, or both, toward the recess; a scanner assembly including a scanner device and a targeting device, wherein the scanner assembly is positioned at a casing disposing the scanner device and the targeting device at an angle toward the recess, wherein the scanner assembly and the targeting device are positioned at an angle toward the recess and behind the external wall; and a sound emitting device positioned outside of the casing at which the scanner assembly is positioned, wherein the sound emitting device is configured to selectively emit sounds based on a command signal from the scanner assembly, the sound emitting device communicatively coupled to the scanner assembly. [0104] 42. The refrigerator appliance of any one or more clauses herein, wherein the angle is between approximately 15 degrees and approximately 90 degrees. [0105] 43. The refrigerator appliance of

any one or more clauses herein, including a housing at which a proximity sensor is positioned, wherein the proximity sensor is directed toward the recess. [0106] 44. The refrigerator appliance of any one or more clauses herein, wherein the casing at which the scanner assembly is positioned is positioned at the housing. [0107] 45. The refrigerator appliance of any one or more clauses herein, wherein the housing positions the scanner assembly adjacent along a width direction, a depth direction, or both, to the proximity sensor. [0108] 46. A refrigerator appliance, including a cabinet forming a refrigeration compartment, a freezer compartment, or both; a door attached to the cabinet, the door configured to selectively allow entry to the refrigeration compartment, the freezer compartment, or both; a dispenser assembly positioned at the door, the dispenser assembly including a recess extending into the door, the dispenser assembly configured to egress a fluid, ice, or both, toward the recess; a scanner assembly including a scanner device and a targeting device, wherein the scanner assembly is positioned at a casing disposing the scanner device and the targeting device at an angle toward the recess and behind the external wall, wherein the scanner assembly and the targeting device are positioned at an angle toward the recess and behind the external wall; a sound emitting device configured to selectively emit sounds based on a command signal from the scanner assembly, the sound emitting device communicatively coupled to the scanner assembly; and a controller communicatively coupled to the scanner assembly and the sound emitting device, the controller configured to execute instructions that causes the refrigerator appliance to perform operations, the operations including commanding provision of light toward or from the recess when the targeting device detects a presence of an object at the recess; commanding, at the scanner device, measuring fidelity of scan data from light reflected from the object at the recess; commanding provision of light toward or from the recess after a pre-determined period of commanding measurement of fidelity of scan data; and transmitting, from the scanner assembly to the sound emitting device, a scanner control signal commanding a scanner sound output when the pre-determined period of commanding measurement of the amount and pattern of light at the scanner device is complete. [0109] 47. The refrigerator appliance of any one or more clauses herein, wherein the sound emitting device is positioned outside of the casing at which the scanner assembly is positioned. [0110] 48. The refrigerator appliance of any one or more clauses herein, wherein the scanner assembly is communicatively coupled to the sound emitting device via the controller, and wherein transmitting the scanner control signal includes transmitting the scanner control signal from the scanner assembly to the controller and transmitting the scanner control signal from the controller to the sound emitting device. [0111] 49. The refrigerator appliance of any one or more clauses herein, the operations including determining, via the targeting device, the presence of the object at the recess. [0112] 50. The refrigerator appliance of any one or more clauses herein, wherein the pre-determined period of commanding measurement of the amount and pattern of light at the scanner device includes obtaining a pre-determined quantity of partial scans at the scanner device. [0113] 51. The refrigerator appliance of any one or more clauses herein, the operations including increasing an intensity of the provision of light over a period of time. [0114] 52. The refrigerator appliance of any one or more clauses herein, the operations including discontinuing provision of light when a complete scan is obtained at the scanner device. [0115] 53. The refrigerator appliance of any one or more clauses herein, the operations including transmitting, from the scanner assembly to the sound emitting device, a second control signal commanding a second sound output when the complete scan is obtained at the scanner device. [0116] 54. The refrigerator appliance of any one or more clauses herein, wherein the angle is between approximately 15 degrees and approximately 90 degrees. [0117] 55. The refrigerator appliance of any one or more clauses herein, including a housing at which a proximity sensor is positioned, wherein the sensor is directed toward the recess. [0118] 56. The refrigerator appliance of any one or more clauses herein, wherein the casing at which the scanner assembly is positioned at the housing. [0119] 57. The refrigerator appliance of any one or more clauses herein, wherein the housing positions the scanner assembly adjacent along a width direction, a depth direction, or both,

to the proximity sensor. [0120] 58. The refrigerator appliance of any one or more clauses herein, the operations including determining, via the proximity sensor, the presence of the object at the recess. [0121] 59. The refrigerator appliance of any one or more clauses herein, the operations including transmitting, from the proximity sensor to the sound emitting device, a sensor control signal commanding a sensor sound output when the presence of the object at the recess is determined. [0122] 60. A method for reading a machine-readable code at an object at a refrigerator appliance, the method including providing, from a lighting component of the refrigerator appliance directed toward or from a recess at a dispenser, light toward the recess when a targeting device or a proximity sensor detects a presence of an object at the recess; scanning, via a scanner device, a machine-readable code at an object at the recess; and transmitting, from the scanner device to a sound emitting device positioned outside of a scanner assembly including the scanner device, a scanner control signal commanding a scanner sound output when a pre-determined period of commanding measurement of fidelity of scan data at the scanner device is complete. [0123] 61. A refrigerator appliance in accordance with any one or more clauses herein. [0124] 62. A method for reading a machine-readable code in accordance with any one or more clauses herein. [0125] 63. A dispenser assembly in accordance with any one or more clauses herein. [0126] 64. A refrigerator appliance including the dispenser assembly of any one or more clauses herein. [0127] 65. A refrigerator appliance including a controller configured to execute one or more steps of any one or more clauses herein.

[0128] This written description uses examples to disclose the invention, including the best mode, and also to enable any person skilled in the art to practice the invention, including making and using any devices or systems and performing any incorporated methods. The patentable scope of the invention is defined by the claims, and may include other examples that occur to those skilled in the art. Such other examples are intended to be within the scope of the claims if they include structural elements that do not differ from the literal language of the claims, or if they include equivalent structural elements with insubstantial differences from the literal languages of the claims.

Claims

1. A refrigerator appliance, comprising: a cabinet forming a refrigeration compartment, a freezer compartment, or both; a door attached to the cabinet, the door configured to selectively allow entry to the refrigeration compartment, the freezer compartment, or both; a dispenser assembly positioned at the door, the dispenser assembly comprising a recess extending into the door, the dispenser assembly configured to egress a fluid, ice, or both, toward the recess; a scanner assembly comprising a scanner device and a targeting device, wherein the scanner device and the targeting device are positioned at an angle toward the recess and behind the external wall; and a controller, the controller communicatively coupled to the scanner device and the targeting device, the controller configured to execute instructions that causes the refrigerator appliance to perform operations, the operations comprising: commanding, at the scanner assembly, measuring fidelity of scan data reflected from the object at the recess; and commanding, at a lighting component or the targeting device at the scanner assembly, provision of light toward or from the recess after a pre-determined period of commanding measurement of the amount and pattern of light at the scanner device.

2. The refrigerator appliance of claim 1, the operations comprising: determining, via the targeting device, the presence of the object at the recess.

3. The refrigerator appliance of claim 2, wherein the pre-determined period of commanding measurement of the amount and pattern of light at the scanner device comprises obtaining a pre-determined quantity of partial scans at the scanner device.

4. The refrigerator appliance of claim 1, the operations comprising: increasing an intensity of the

provision of light from the lighting component over a period of time.
5. The refrigerator appliance of claim 4, the operations comprising: discontinuing provision of light from the lighting component when a complete scan is obtained at the scanner device.
6. The refrigerator appliance of claim 1, comprising: a casing at which the scanner assembly is positioned, wherein the casing disposes the scanner device and the targeting device at the angle toward the recess and behind the external wall.
7. The refrigerator appliance of claim 6, wherein the angle is between approximately 15 degrees and approximately 90 degrees.
8. The refrigerator appliance of claim 1, comprising: a housing at which a proximity sensor is positioned.
9. The refrigerator appliance of claim 8, the operations comprising: determining, via the proximity sensor, the presence of the object at the recess.
10. The refrigerator appliance of claim 9, wherein the housing comprises a casing at which the scanner assembly is positioned, and wherein the housing positions the scanner assembly adjacent along a width direction, a depth direction, or both, to the proximity sensor.
11. A refrigerator appliance, comprising: a cabinet forming a refrigeration compartment, a freezer compartment, or both; a door attached to the cabinet, the door configured to selectively allow entry to the refrigeration compartment, the freezer compartment, or both; a dispenser assembly positioned at the door, the dispenser assembly comprising a recess extending into the door, the dispenser assembly configured to egress a fluid, ice, or both, toward the recess, the dispenser assembly comprising a first lighting component positioned behind an external wall; a scanner assembly comprising a second lighting component, a scanner device, and a targeting device, wherein the scanner device and the targeting device are positioned at an angle between approximately 15 degrees and approximately 90 degrees toward the recess; a proximity sensor; and a controller, the controller communicatively coupled to the scanner assembly, the first lighting component, and the proximity sensor, the controller configured to execute instructions that causes the refrigerator appliance to perform operations, the operations comprising: commanding, at the first lighting component, provision of light toward or from the recess when the targeting device detects a presence of an object at the recess; commanding, at the scanner device, measurement of fidelity of scan data from light reflected from the object at the recess; and commanding, at the second lighting component, provision of light toward the recess after a pre-determined period of commanding measurement of the amount and pattern of light at the scanner device.
12. The refrigerator appliance of claim 11, the operations comprising: determining, via the targeting device, the presence of the object at the recess.
13. The refrigerator appliance of claim 11, the operations comprising: determining, via the proximity sensor, the presence of the object at the recess.
14. The refrigerator appliance of claim 11, wherein the housing comprises a casing at which the scanner assembly is positioned, and wherein the housing positions the scanner assembly adjacent along a width direction, a depth direction, or both, to the proximity sensor.
15. The refrigerator appliance of claim 11, comprising: a casing at which the scanner assembly is positioned, wherein the casing disposes the scanner device and the targeting device at the angle toward the recess and behind the external wall.
16. The refrigerator appliance of claim 11, wherein the pre-determined period of commanding measurement of the amount and pattern of light at the scanner device comprises obtaining a pre-determined quantity of partial scans at the scanner device.
17. The refrigerator appliance of claim 11, the operations comprising: increasing an intensity of the provision of light from the second lighting component over a period of time.
18. The refrigerator appliance of claim 17, the operations comprising: discontinuing provision of light from the second lighting component when a complete scan is obtained at the scanner device.
19. A method for reading a machine-readable code at an object at a refrigerator appliance, the

method comprising: providing, from a first lighting component of the refrigerator appliance directed toward or from a recess at a dispenser, light toward the recess when a targeting device or a proximity sensor detects a presence of an object at the recess; measuring, at a scanner device positioned adjacent from the proximity sensor along a width direction, a depth direction, or both, fidelity of scan data from light reflected from the object at the recess; and providing, at a second lighting component adjacent from the scanner device and the proximity sensor along the width direction, the depth direction, or both, light toward the recess after a pre-determined period of commanding measurement of the amount and pattern of light at the scanner device.

20 The method of claim 19, comprising: increasing an intensity of the provision of light from the second lighting component over a period of time; and discontinuing provision of light from the second lighting component when a complete scan is obtained at the scanner device.