

# Allflex ISO Compatible RF/ID Compact Reader

## Model No. RS200-V2

### User Manual

(Rev C June 2006 / Software V2.06)

These instructions guide the user through the basic setup, configuration, and operation of the Allflex Compact Reader, Model RS200-V2, an RF/ID scanner capable of reading and displaying ISO HDX and FDX-B type transponder identification codes.

#### Unpacking

The Compact Reader is shipped in a box with this instruction guide, one 9 volt alkaline battery, and a protective carrying case. Remove the reader and battery from the box, and follow the directions contained in this guide for battery installation, setup, and operating instructions. Transponders (not supplied with Reader) are helpful in verifying the configuration and operation procedures described in this guide.

#### Compact Reader User Interface

The figure below illustrates the Compact Reader's features that are instructive to its operation and use. Each feature and its corresponding function are described in the accompanying Table 1 on the following page.

**Figure 1 - Compact Reader Features and User Interface**



**Table 1 - Compact Reader Features and Descriptions of Use**

Feature/Item	Description of Use
READ Button	Turns Reader ON from OFF state Activates transponder reading from ON state Selects certain option alternatives in Options Menu
MENU Button	Activates Options Menu / Selects Options Menu Category
SCROLL UP/SCROLL DOWN Buttons	Navigates Options Menu (Press both buttons simultaneously to turn off unit)
2x8 Character LCD (Liquid Crystal Display)	Displays transponder ID Code information, Reader status, and Options Menu selections
Red LED Indicator (Light Emitting Diode)	Lights when valid transponder ID Codes are detected (optionally lights with Options Menu selections)
Antenna Coil	Transponder coil axis should be coaxial or parallel to Reader antenna axis for maximum reading distance (mounted inside enclosure – see Figure 3)
Battery Compartment	Accepts single 9 volt alkaline or nickel-cadmium battery (bottom)
Equipment Label	Provides model, serial number, and agency certification notices (bottom)
Enclosure	Compact ergonomic case

#### Setup

The Compact Reader requires only installation of the 9 volt battery in order to begin reading transponders. The Reader also permits the user to configure several options that control its functions and ID code presentation format.

#### Battery Installation Instructions

The Compact Reader is supplied with one 9 volt alkaline type disposable battery. A variety of battery technologies, both disposable and rechargeable types, can be used. Table 2 lists one manufacturer's compatible battery types, and the estimated service life each type will provide in use with the Compact Reader.

To install or replace the battery (ensure Reader is turned off before proceeding):

- Turn the Reader over so that the equipment label is visible. Push down gently on the small ribbed spot just beneath the label and push laterally away from the label.
- When the battery compartment cover has slid open approximately 10mm, it can be removed from the channel in which it fits to expose the battery compartment.
- Install the 9 volt battery observing the polarity orientation etching which appears in the bottom of the enclosure.

**Note:** Incorrect installation of the battery will not damage the reader. However, the Reader will fail to operate unless the battery polarity is correctly oriented.

Reposition the battery compartment cover and snap it into the channel approximately 10mm from the closed position. Once in the channel, press down gently on the ribbed spot and slide the cover back into the fully closed position.

**Note:** FDX-B reading distance performance may be slightly less when a nickel cadmium type battery is installed in the reader. Both HDX and FDX-B reading distance will gradually deteriorate as any type battery is discharged through normal use. The Compact Reader provides a Low Battery indication on its LCD display when the battery requires charging or replacement.

**Note:** Rechargeable batteries must be charged in compatible external charging apparatus.

**Note:** Actual number of transponder reads per battery life will vary with the pattern of use of the Reader. Numbers shown in Table 2 are based on 1 second scan intervals to level at which HDX transponder read distance is diminished to approximately 1/2 initial distance.

**Note:** When battery life has been exhausted to a point at which battery replacement is required, the LCD readout will indicate “LOW BATTERY / POWERING DOWN” and will automatically turn off.

**Table 2 - Recommended Battery Types (all Eveready/Energizer®)**

Type Number	Chemistry	Capacity mAH	Est. No. of Reads
1222 (Heavy Duty)	Zinc-Manganese	< 50	300
522	Alkaline	600	10,000
L522	Lithium	1200	20,000
CH22 *	Nickel-Cadmium	120	3,000

Note: Nickel Cadmium is rechargeable battery type.

## Operating and Using the Compact Reader

### Activating the Compact Reader

After installing the battery, the Compact Reader is ready for use. The Reader is activated from its normally OFF state by pressing the READ button for about 1 second. Upon depression of this button, the Reader is turned ON, and an indication of this state is enunciated by momentary flashing of the red LED visual indicator, beeping of the audible indicator, and displaying of READER READY on its LCD indicator.

**Note:** If the LAST TAG option in the Options Menu has been set ON, and a transponder has been previously read, the LCD indicator will show the ID code number of the last transponder tag that was read.

### Reading a Transponder Tag

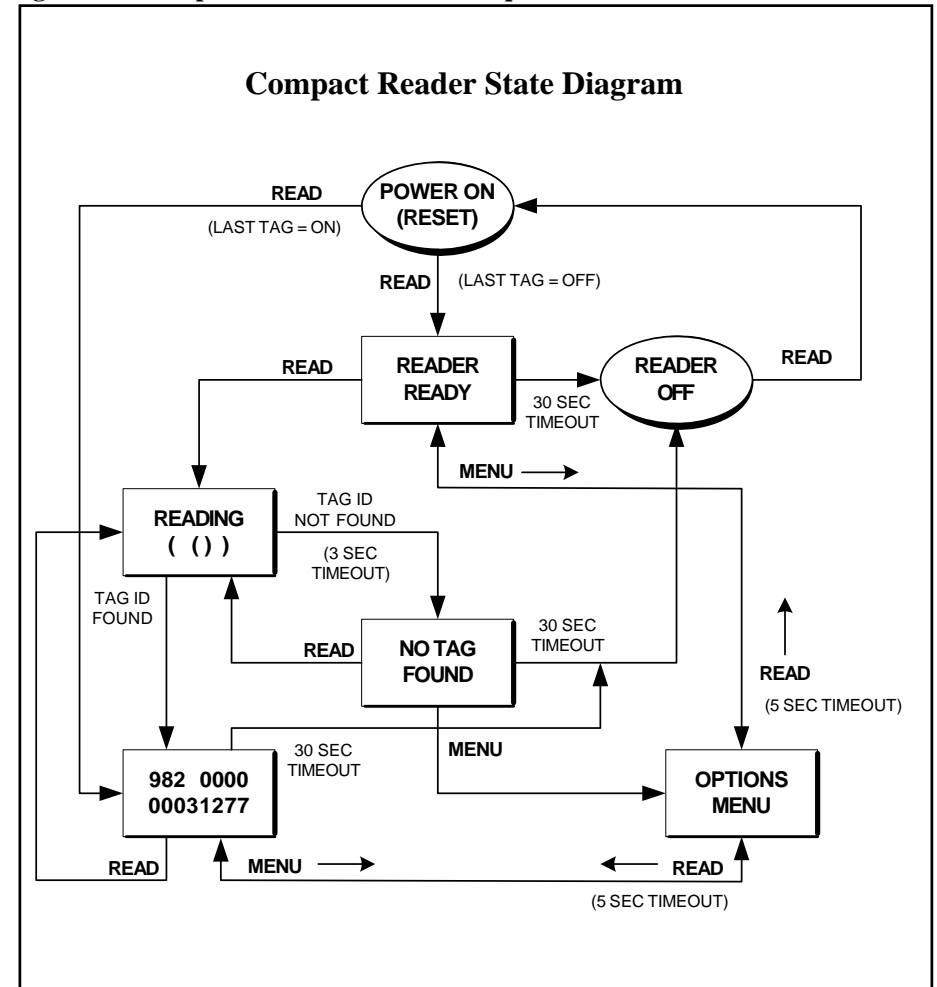
The Reader is immediately ready for use once it is turned on. Transponder scanning is performed by pressing the READ button. If the READ button is pressed momentarily, scanning will be active for a default interval of 3 seconds. If a transponder is detected during this time, its ID code will be displayed on the LCD, and the LED indicator will flash once, and the audible beeper will beep once. If the same ID code is read repetitively, the LED and beeper will flash and beep twice. If no transponder is detected after 3 seconds of scanning, the LCD will indicate NO TAG FOUND, and scanning will cease. Pressing READ again initiates the scanning sequence. Alternately, the READ button may be pressed continuously until the tag is read. Scanning automatically stops upon ID code acquisition, and the READ button must be

released and pressed again to perform a subsequent reading operation. See Figure 2 for a graphical illustration of the Compact Reader’s operating sequence.

**Note:** The battery is checked each time the reader is powered on. If the battery life is nearing its end, a LOW BATTERY indication will automatically appear on the LCD indicator. If the battery has become severely discharged, the Reader will fail to power up altogether.

**Note:** The Compact Reader turns itself off automatically after 30 seconds (or the user selected Options Menu alternative time). The Reader can be turned off manually by simultaneously pressing the SCROLL UP and SCROLL DOWN keys.

**Figure 2 - Compact Reader Functional Sequence**



## Reading Transponders

Prior to reading transponders in situ, it is recommended that the Reader be checked with test transponders to ensure satisfactory performance. The user should have available spare transponders of the types that the Allflex Compact Reader is capable of reading for this purpose. The chart below provides nominal read distance performance that can be expected when the transponder is optimally oriented to the Reader.

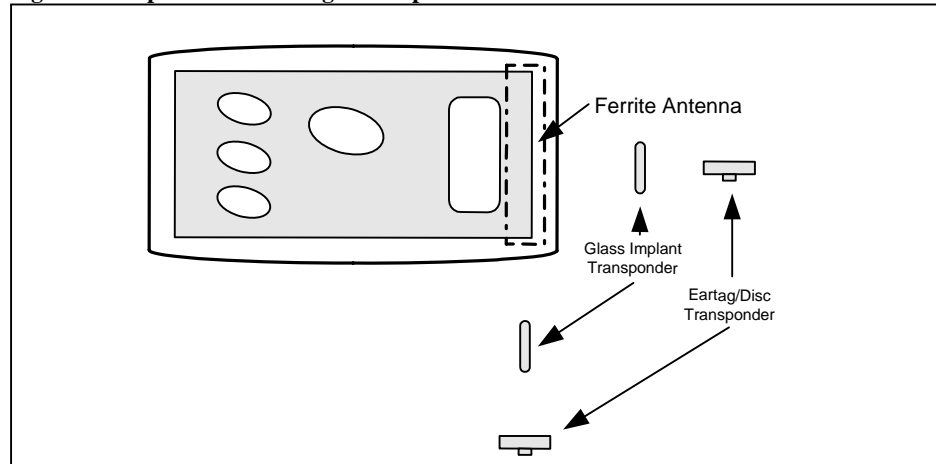
**Table 3 - Nominal Read Range Performances (with new 9V alkaline battery)**

Manufacturer	Transponder Description	Read Range (cm)
Allflex	FDX-B (ISO) 12mm Glass Implantable	6
Allflex	FDX-B Plastic Eartag	10
Allflex	HDX Plastic Eartag – High Performance	15
Allflex	HDX Plastic Eartag – Light Weight	12
Allflex	HDX 23mm Glass Implantable	9
Allflex	HDX 31mm Glass Implantable	11

**Note:** In order to read a transponder, position the transponder as shown in Figure 3 below within the read range specified in Table 3. Press and release the READ button. The Reader will search for a transponder for 3 seconds (the factory set default value). If the transponder is detected during this interval, the Red LED will flash, the audible beeper will sound, and the ID Code will be displayed on the LCD readout. If no transponder is detected during this search interval, there will be no audible/visual indication, and the LCD will display NO TAG FOUND. When any tag is read repeatedly, the LED and beeper flash and sound a double indication. Holding the READ button down permits scanning until a tag is read.

**Note:** When reading installed transponders whose orientation cannot be ascertained, the reading distance may be less than those listed in Table 3. The Reader may need to be moved and its orientation may need to be changed in order to obtain a reading. Generally, reading such non-visible (implanted) transponders will require such Reader movement.

**Figure 3 - Optimal Read Range Transponder Orientation**



## Interpreting the Visual ID Codes

The Compact Reader is capable of reading the ISO HDX and FDX-B transponder technologies, and it can be configured via the Options Menu to display the corresponding tag information in various ways. Table 4 lists the available options, and provides illustrations of the corresponding display formats. Factory set default option settings are shown in bold type.

**Table 4 - Display Setup Options**

Option	Setting		Display Format	
# Format	Hex	<b>Dec</b>	3D6 <sub>H</sub> 000 0C45AE9 <sub>H</sub>	<b>982 0000</b> <b>12868329</b>
Lead 0's	<b>Yes</b>	No	<b>982 0000</b> <b>12868329</b>	<b>982</b> <b>12868329</b>
Cty Code	<b>Alpha</b>	Numeric	<b>USA 0001</b> <b>23456800</b>	840 0001 23456800
F / H	Yes	<b>No</b>	982F0000 12868329	<b>982 0000</b> <b>12868329</b>

**Note:** The Manufacturer's Code is displayed for ISO compliant HDX and FDX-B transponders that contain a decimal value in the range of 900 to 999, per ISO 11784 requirements, and per ICAR assignment. When a value less than 900 is detected, it represents a three letter Country Code per ISO 3166. Alternately, the three digit (decimal or hexadecimal) ISO 3166 alpha country code can be displayed by changing the Menu option (for example, "USA" would be displayed as "840" (decimal) or "348" (hexadecimal)).

**Table 5 - Manufacturer and Country Code Designations**

Manufacturer/ Country Code	Interpretation
900 > 999 (384 > 3E7 Hex)	ISO Compatible HDX or FDX-B type transponder Manufacturer Code per ISO 11784 and ICAR assignment ( Note: 999 is reserved for universal use to designate a prototype transponder).
001 > 899 (001 > 383 Hex)	ISO Compatible HDX or FDX-B type transponder Country Code per ISO 11784 and ISO 3166 or Country Alpha

**Note:** The Manufacturer or Country Code information appears on the LCD as the left-most 3 digits or characters on the top line of the display. When the LCD format has been set for hexadecimal representation, a subscript "H" character follows the last character of the numeric Manufacturer or Country Code and the Identification Code (see Table 4).

## Reading Performance

RFID Readers are most frequently assessed with respect to performance by reading distance. The reading distance performance of a Reader is principally affected by the following effects:

**Transponder Orientation** - For maximum reading distance, the axes of the transponder and reader antenna coils must be oriented coaxially.

**Transponder Quality** - Each manufacturer's transponder differs in (a) the amount of exciter signal energy necessary to sufficiently operate the transponder's internal circuitry, and (b) the signal level of the ID Code information that is returned to the reader. Consequently, it is normal for transponders of a common type (FDX-B, for example) made by different manufacturers to exhibit different read range performance characteristics.

**Transponder Motion** - Most portable readers have small antenna geometries, and consequently small effective "reading zones". Portable readers are generally designed for reading transponders under quasi-static conditions. Transponders that are moving quickly past the reader may not be present within the reader's read zone sufficiently long for all the ID Code information to be obtained.

**Transponder Size** - Physically larger transponders generally contain larger receiving coils which produce longer reading distances than smaller transponders.

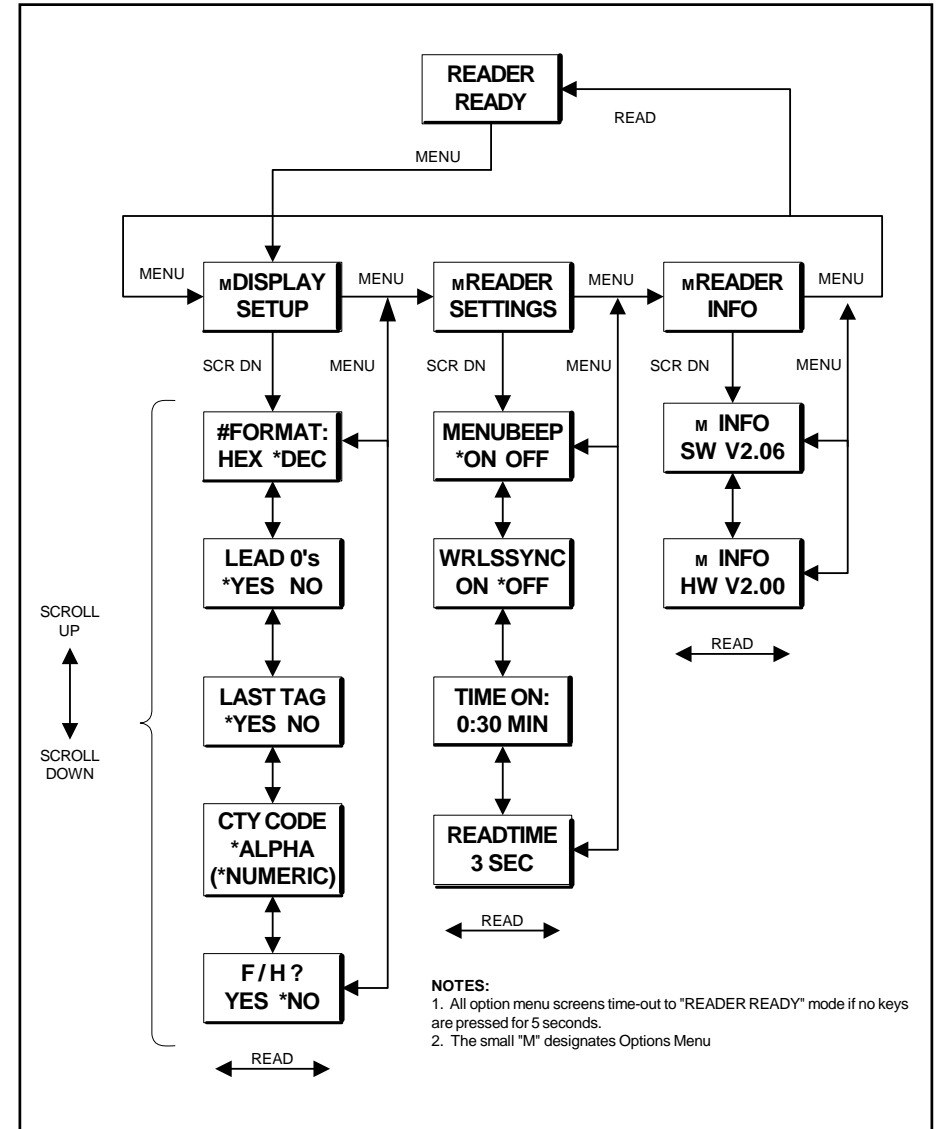
**Transponder Type** - HDX transponders generally exhibit greater reading distances than FDX-B transponders of comparable size.

**Proximal Metallic Objects** - Metal objects located near the transponder or Reader can attenuate and distort the electromagnetic fields generated in RFID systems, and thus diminish read distance performance.

**Electrical Noise Interference** - RFID transponders and readers use electromagnetic signals as a premise of operation. Other electromagnetic phenomena – radiated electrical noise from computer displays, for example – can interfere with the transmission and reception of RFID signals, and consequently reduce reading distance.

**Transponder/Reader Interference** - Multiple transponders within the sensing range of the reader, or other readers emitting excitation energy in the immediate vicinity will adversely affect the reading performance or prevent operation of the Compact Reader.

Figure 5 - Options Menu Navigation



## Default Option Settings

The Options Menu (see Figure 5) provides the user with means to configure the Compact Reader in a manner that best suits the user and the Reader's intended application.

- Press the MENU button until the desired Option Category listed in Table 5 appears on the LCD.
- Press SCROLL UP or SCROLL DOWN until the Option Item appears on the LCD
- Press the READ button to select the desired option setting

The Compact Reader is shipped from the factory with these options set in the default state. An abbreviated listing of the principal options is provided in Table 5.

**Table 5 - Option Menu Categories, Items, and Default Settings**

Option Category	Option / Possible Settings	Default Setting
DISPLAY SETUP	#FORMAT: DEC(imal) or HEX(adecimal)	DEC(imal)
	LEAD 0's: YES or NO	YES
	LAST TAG ON or OFF	ON
	CTY CODE ALPHA or NUMERIC	ALPHA
READER SETTINGS	F / H ? YES or NO	NO
	MENUBEEP ON or OFF	ON
	WRLSSYNC ON or OFF	OFF
	TIME ON 20, 30, 40, 50 seconds 1, 1.5, 2, 2.5, 3, 3.5, 4 minutes TIMEOFF (i.e., no automatic shutoff)	30 Seconds
	READTIME 1, 2, 3, 4, 5, 7, 9 seconds	3 seconds
VERSION INFO	None – information only	SW V2.06 HW V2.00

### Allflex Worldwide Sales Offices

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### FCC ID: NQY-930042

Note: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

NOTE: THE MANUFACTURER IS NOT RESPONSIBLE FOR ANY RADIO OR TV INTERFERENCE CAUSED BY UNAUTHORIZED MODIFICATIONS TO THIS EQUIPMENT. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

This device has been tested and meets the Electromagnetic Compatibility (EMC) requirements of EN50082-1, EN50022, and ETSI 300 330-1 for the CE Declaration of Conformity (DoC), and with Industry Canada RSS-210.

## Compact Reader Technical Specifications

### GENERAL

RFID Compatibility:	ISO 11784 & 11785 HDX and FDX-B and Industrial HDX
Form Factor:	Portable Handheld ABS Plastic Enclosure
User Interface:	Single "On/Press to Read" Activation Button Menu & Scroll Up/Down Option Select Buttons 16 character (2x8) LCD display Audible Beeper and Red LED "Read" Indicators
ID Code Display Format	Decimal or Hexadecimal
Memory:	Holds last ID Code in memory and on display indefinitely until next read
Battery Power:	1 9V Alkaline Battery (disposable), or 1 9V Ni-Cad Battery (externally recharged)
Electromagnetic Compatibility (EMC) Certifications	FCC Part 15 Class A CISPR 22 (EN55022), and EN50082-1 ETSI 300 330-1 Industry Canada RSS-210

### PHYSICAL/ENVIRONMENTAL

Dimensions:	125.5mm L x 70mm W x 24mm H (4.9" L x 2.75" W x 0.94" H)
Weight:	0.18 kg. (6.5 oz.) with alkaline battery installed
Material:	ABS UL94 HB Plastic
Color:	Black
Operate Temperature	+5°C to +40°C (IEC68.2.1/.2)
Storage Temperature	-10°C to +55°C (IEC68.2.1/.2)
Humidity:	0 to 95% (IEC68.2.56)
Altitude:	-100 to +3,000 meters
Mechanical Shock:	Per IEC 68-2-27
Vibration:	Per IEC 68-2-6
Hermeticity:	IP-50 (dust resistant / no protection against water) per IEC 529

### RELIABILITY

MTBF:	50,000 hours
MTTR:	0.5 hours
Expected Life:	5 years, minimum

### PERFORMANCE

Read Distance:	6cm (typical - Allflex 11.5mm FDX-B transponder) 15cm (typical - Allflex HDX eartag)
Reading Orientation:	0° to 45° with less than 10% range decrease
Read Error Rate:	Less than 1 in 10 <sup>6</sup>
Read Cycles/Battery:	10,000 - Alkaline (disposable) (based on 2 second read intervals) 3,000 - Ni-Cad (rechargeable)

### Battery Disposal Information

The disposal of exhausted rechargeable and non-rechargeable batteries is regulated by local laws, and such laws vary significantly among countries worldwide. All batteries must be disposed of in a manner compliant with the local requirements, and proper compliance is entirely the responsibility of the owner and/or user of the Compact Reader.