

Exhibit 8 – Users Manual

Serial 610

Mid-Range Reader

FCC ID: E9USER610

Model No. Serial 610

8.0 Serial 610 Users Manual

See Attached PDF file



FlexPass™ Serial Mid-Range Reader
Installation and Operation Manual



FCC Compliance: This device uses and generates radio frequency energy and, if not installed and used in accordance with this manual, may interfere with radio communications. It has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the Federal Communication Commission (FCC) Rules. These limits are designed to provide reasonable protection against harmful interference when the device is operated in a commercial environment. This device may not cause harmful interference and must accept any interference received, including interference that may cause undesired operation.

The rules and regulations of the FCC and other regulatory agencies in various countries limit the RF power level and frequency. The user is cautioned that changes and modifications made to the equipment without the approval of the manufacturer could void the user's authority to operate this equipment. It is suggested that the user use only shielded and grounded cables to ensure compliance with FCC Rules.

CE Compliance: This product complies with the European Community Council Directive 89/336/EEC if the installer/user adheres to the instructions detailed in this manual. The standards specified under EN50081-1 emission standard and EN50082-1 immunity standard to which this product conforms are EN55022, IEC 801-2, IEC 801-3, IEC 801-4, and IEC 801-6.

Notice: The FlexPass Serial Mid-Range Reader reader requires the use of linear, series pass, regulated power supplies. Use of other types of power supply can result in reduced read range. The use of switching power supplies is not recommended.

Do not use the reader's power supply for other equipment, particularly when operating switched inductive loads such as motor control relays and solenoids (i.e., magnetic locks, latch or strike). Doing so will affect the reader operation. Use a separate dedicated power supply for Motorola proximity readers.

Because this technology is based on radio frequency and because nearby environmental sources of electrical interference may affect the performance of the reader, below is a list of precautions that should be considered when installing or wiring the reader:

- **Metal affects radio signals. Do not cover the face of the reader with metal of any kind.**
- **Reduce or eliminate unwanted signals from external sources.**
- **Do not place the reader wiring bundled in conduit with AC power cables, lock power, or signal wiring.**
- **Maintain all reader wiring a minimum distance of 12" (30 cm) away from other wiring such as AC power, computer data wiring, telephone wiring, or wiring to electric locking devices, etc.**
- **Do not install the reader in areas where sources of broad spectrum EMI noise may be present. Examples of EMI broad spectrum noise producers are motors, pumps, generators, AC-DC converters, uninterruptable power supplies, AC switching relays, light dimmers, computer monitors, and CRTs.**
- **Do not install the reader within 3.5' (1.1 m) of computer CRTs (monitors).**

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1.0 Product Specification

- Input Voltage: 5.0 VDC to 14 VDC
- Input Current/Power:
 - Typical, quiescent off metal Vin = 5.0 DC 61 mA 0.31 W
Vin =12.0 VDC 108 mA 1.3 W
 - Typical, quiescent on metal Vin = 5.0 VDC 66 mA 0.33 W
(Dual Gang Box) Vin =12.0 VDC 126 mA 1.51W
 - Maximum with card present and reader mounted on metal 5.0 VDC ≤ Vin ≤ 14 VDC 140 mA 2.0 W
(Dual Gang Box)
- Power Supply:
 - Recommendation Regulated linear power supply
- Read Range:
 - With ASC-121T *LifeTime*TM Card Up to 10.0" (25.4 cm)
 - With ASK-116T *ProxTag*TM Up to 7.0" (17.8 cm)
 - With ISO-30 *Image30*TM Up to 9.0" (22.9 cm)
- Frequency:
 - Exciter Field 125 KHz
 - Receive 62.5 KHz
- Operating Temperature Range: -35° C to +65° C (-31° F to +149° F)
- Color: Black and sand beige
- Material: UV resistant, ABS (UL 94V0) plastic
- Weight (typical): 14.6 oz. (415 g)
- Dimensions: 5.10"H x 6.10"W x 1.00"T (12.95 x 15.49 x 2.54 cm)
- Output Formats: RS-232/485
- Certification: UL-294 indoor and outdoor compliant, CE Mark, and FCC Class A Digital Device (Part 15) ID Numbers E9U610

Read range is stated in an undisturbed electrical environment, with card presented parallel to reader, and reader installed in accordance with Motorola instructions. Power supply, reader, and controller must be on the same ground, connected to earth.

2.0 Introduction

The FlexPass Serial Mid-Range Reader is a modular, miniaturized and rugged low power radio frequency reader designed for applications such as identification systems, security systems, and data collection. The FlexPass Serial Mid-Range Reader mounts on any USA standard electrical gang box or on any flat surface. The reader electronics module is completely enclosed in an epoxy potting material, making it both vandal and weather resistant.

The reader outputs data in RS-232/485 formats, making it easy to upgrade an existing site to proximity using the wiring already in place.

2.1 Features

- *QuickFlash™* for immediate user feedback.
- *SelfTest™* for installer assistance during installation.
- *WatchDog™* for increased supervisory control.
- Independently controlled audio tone and tri-color status LED.
- Field programmability via the use of option cards.
- Snap-on module construction, enabling configuration at installation site.
- Mounting on standard electrical box or on any flat surface.
- Indoor/outdoor operation.
- Attractive, contemporary styling.

2.2 Theory of Operation

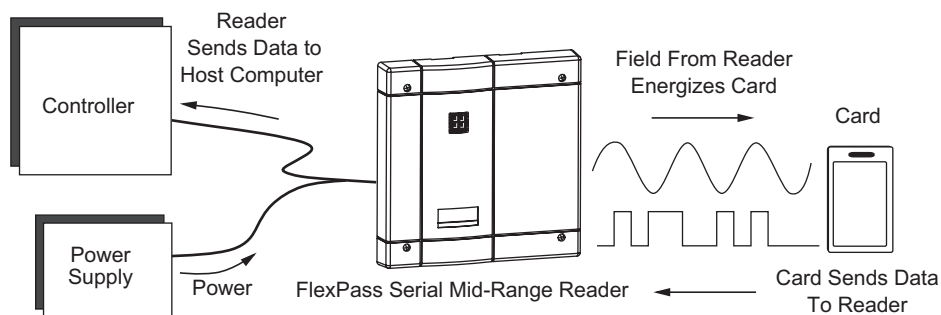


Figure 1 FlexPass Serial Mid-Range Reader Block Diagram

When the reader is powered, a low-power radio frequency (RF) field is continuously transmitted by the reader (see Figure 1). When a card is presented within the field of the reader, the microchip, embedded in the card, is activated and transmits a unique identification (ID) number back to the FlexPass Serial Mid-Range Reader. The reader decodes and converts this data to the pre-determined RS-232/485 compatible format and sends this code to an external controller through a data cable. With

this information, the controller determines what action is to be taken as a response to the card presentation (e.g. open door).

2.3 Unpacking and Identifying Supplied Parts

Unpack the equipment and become familiar with the components. The following list describes the contents of the package (see Figure 2):

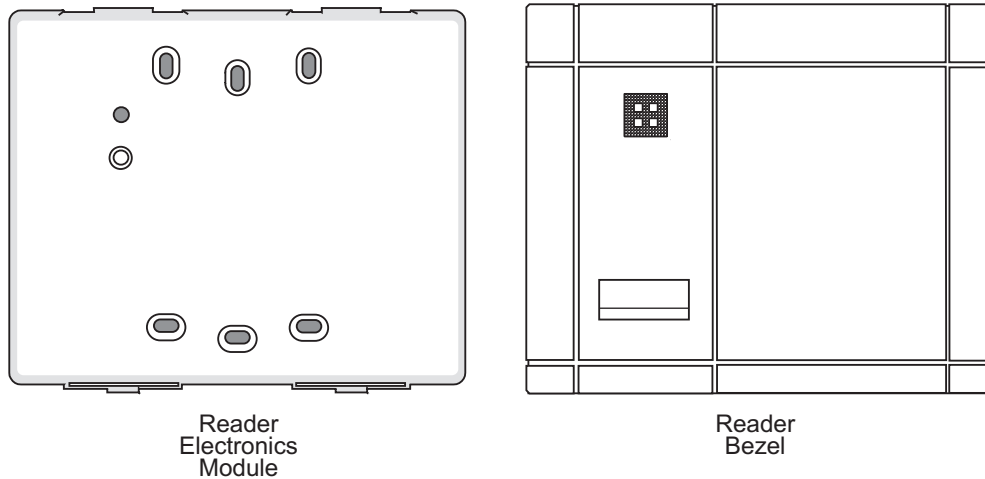


Figure 2 FlexPass Serial Mid-Range Reader Package Components

Reader Package: FlexPass Serial Mid-Range Reader electronics module and bezel.

2.4 Identifying the Reader Format

The reader format is typed on the ID label (see Figure 3) on the reader electronics module.

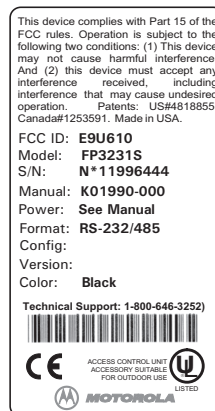


Figure 3 The Reader Label

2.5 Separating the Bezel from Electronics Module

To remove the FlexPass Serial Mid-Range Reader bezel, insert a nail into the holes at the bottom of the bezel to release the latches. Lift up the bezel as shown in Figure 4.

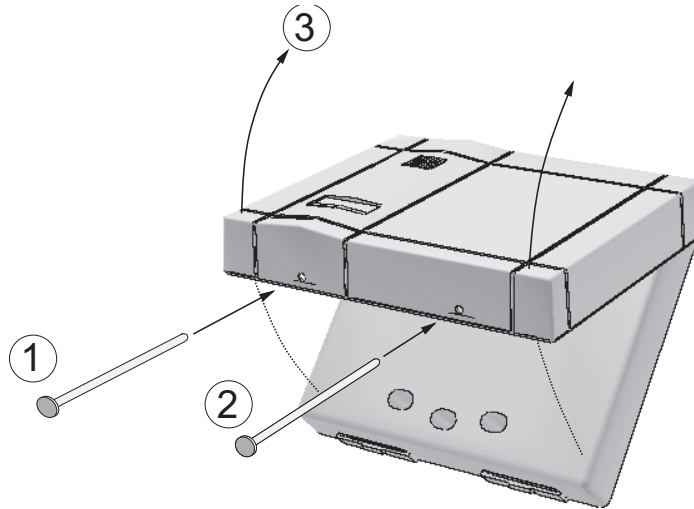


Figure 4 Separating the Bezel from Electronics Module

3.0 Installation

3.1 Mechanical Installation

3.1.1 Wall Mounting

To mount the FlexPass Serial Mid-Range Reader to a wall, drill a 0.375" hole for the reader cable. Feed the reader cable through the hole. Place the reader against the wall then mark the location for the mounting holes. Drill the proper size mounting holes (for 6-32 screws) at the marked locations. Using the 6-32 screws, attach the reader to the mounting holes. Once the reader module is screwed in place, snap the bezel per Figure 5. Route the reader cable to the controller. For mechanical dimensions, cable, and hole location refer to “**Mechanical Dimensions**” on page 16.

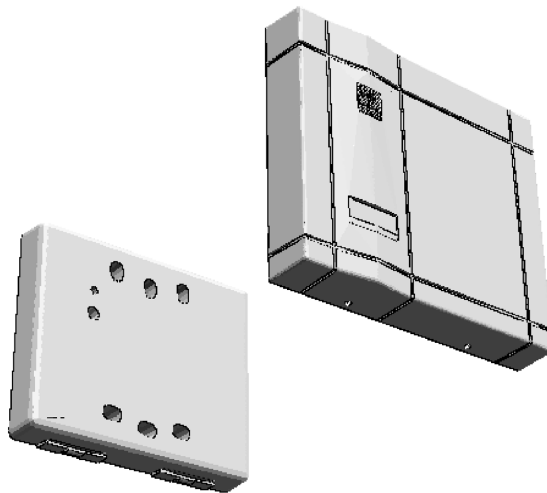


Figure 5 Wall Mounting

3.1.2 Gang Box Mounting (Preferred Mounting Configuration)

Though the FlexPass Serial Mid-Range Reader is designed to operate on either a dual or single metal gang box, mounting it on a metal dual gang box is recommended for optimum performance. **If mounting directly on a metal surface other than a gang box, insert a minimum 3/8" non-conductive spacer between the reader and the surface of the metal to prevent interference.** When installing the reader on a dual-gang box, make sure the gang box mounting holes fit the reader mounting holes. Using four 6-32 screws, attach the reader to the gang box. Once the reader module is screwed in place, snap on the reader bezel as shown in Figure 6. The additional two mounting holes in the middle of the module are for mounting the reader on a single-gang box. For mechanical dimensions of the FlexPass Serial Mid-Range Reader, refer to “**Mechanical Dimensions**” on page 16.

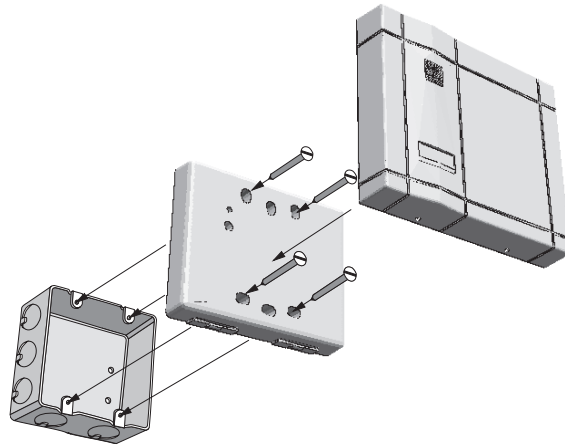
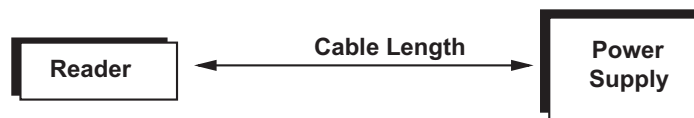


Figure 6 Gang Box Mounting

4.0 Power and Cabling

4.1 Power Supply Cable Types and Maximum Lengths

The FlexPass Serial Mid-Range Reader requires a minimum voltage of 5.0 VDC at the reader. Voltage drops, caused by the cable resistance, can be made up by increasing the power supply voltage. **DO NOT SET THE POWER SUPPLY VOLTAGE TO HIGHER THAN 14 VDC!** In noisy environments, use shorter cable runs. The following are the recommended cable types and maximum cable lengths for cables connecting the power supply to the reader (**DO NOT USE CABLES WITH GAUGES SMALLER THAN 24 AWG**):

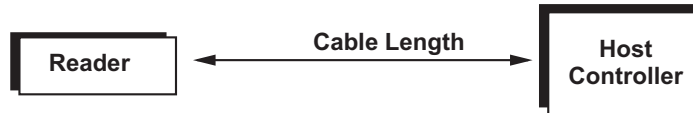


Cable Type	Maximum Cable Length
24 AWG (0.60mm), three conductors, with an overall foil shield, Belden 9533 or equivalent.	200' (61 m)
22 AWG (0.80mm), two conductors, with an overall foil shield, Alpha 5192 or equivalent.	300' (91 m)
18 AWG (1.20mm), two conductors, with an overall foil shield, Alpha 5836 or equivalent.	500' (152 m)

Figure 7 Power Cable Types and Lengths

4.2 Reader to Host Interface Cable Types and Lengths

Refer to the table below to determine the recommended wiring type at various maximum distances. Variation in distance requires different wire gauges. Because of system data termination differences, contact your system manufacturer for its exact requirements. Installation should be in accordance with National Electric Code ANSI/NFPA 70.



Cable Type	Maximum Cable Length (RS-232/RS-485)
22 AWG (0.80mm), six or eight conductor, with an overall foil shield, Alpha 5196, 5198 or equivalent.	50' (15m)/500' (152m)*
18 AWG (1.20mm), six or eight conductor, with an overall foil shield, Alpha 5386, 5388 or equivalent.	50' (15m)/500' (152m)*

Figure 8 .Reader Host Interface Cable Types and Lengths

* For short cable lengths (< 100 feet, 30m) in RS-485 termination resistors should not be necessary; however, if the rise and/or fall time of the signal is greater than half the time for the signal to travel from the transmitter to the receiver, termination resistors may be necessary.

5.0 Earth Grounding

Connect the Power Supply and Controller directly to an earth ground. An earth ground can be established by driving a copper clad ground rod into the earth. Make certain the DC resistance between your established earth ground and the system ground is 50 Ohms or less. If direct connection to a ground rod is not possible, connect the reader to an earth-grounded cold water metal pipe (do not connect to copper fire sprinkler system because it may have non-conductive couplings), or steel frames (building beams) that connect to earth.

Prevent ground loops by connecting the cable shield, controller ground and the negative line of the power supply to one common earth ground point. Connecting different points to separate earth grounds may result in a ground loop. Ground loops may cause poor read range and communication line interference resulting in no code or improper code being seen by the controller.

In a multiple reader installation, connect all readers to a single earth ground reference point (common ground).

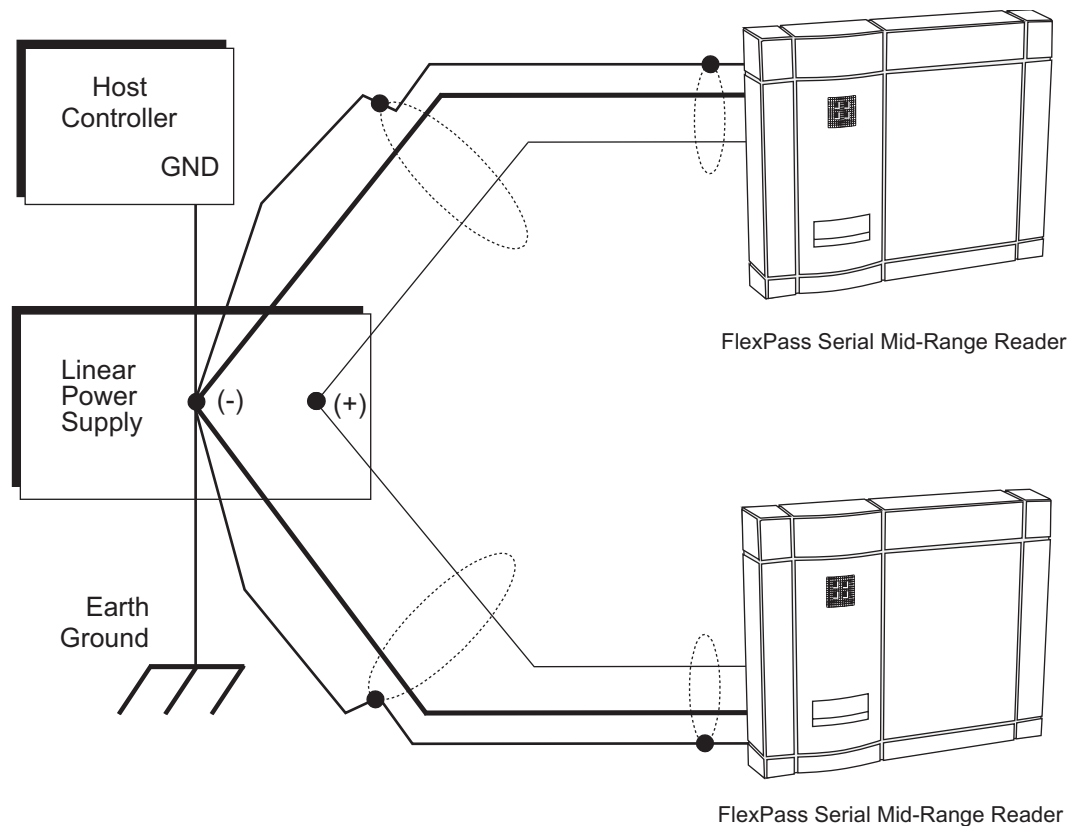


Figure 9 Grounding the Reader

6.0 Reader to Host Interface Wiring

Figure 10 shows all the possible interfaces. Choose the appropriate interface for your installation.

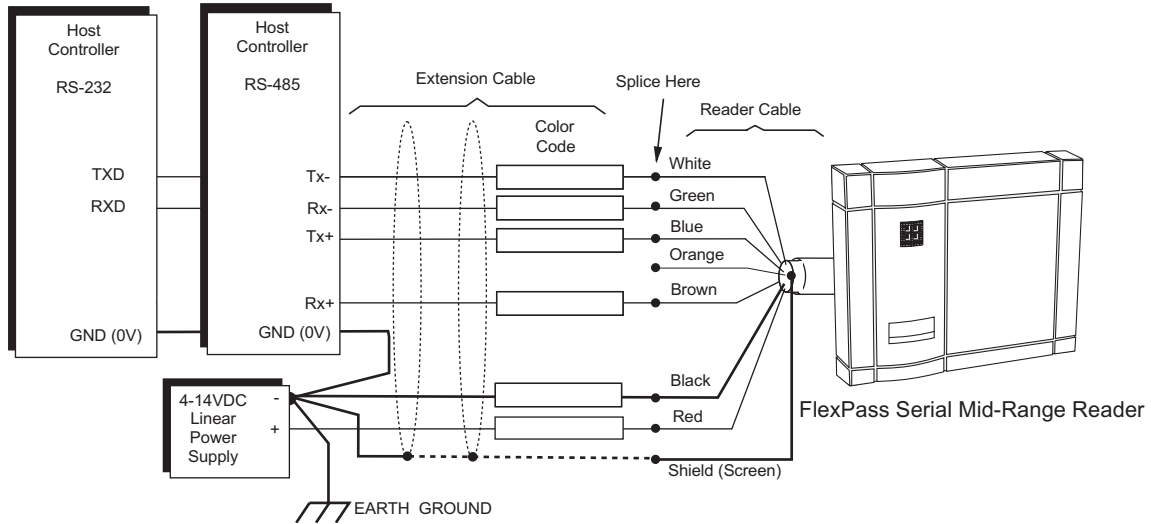


Figure 10 Reader to Host Interface Wiring

Notes:

- The system must have a single earth ground point.
- The internal circuit configuration for the reader inputs and outputs are as shown below:

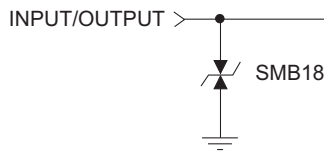


Figure 11 Reader Internal Circuit Input and Output Configuration

7.0 Operation

When power is first applied to the reader, it performs an internal circuit *Self Test*. If it is functioning properly, the reader will flash the amber LED and beep twice. After the *SelfTest* is completed, the reader is in a READY status mode and you may present the card to the reader.

7.1 Presenting the Card

To obtain maximum read range, present the card to the reader as shown in Figure 12. Keeping the card parallel to the FLEXPASS SERIAL MID-RANGE READER, move it slowly toward the face of the reader until a *QuickFlash* (refer to section 7.3) is obtained. This is the point at which the card is read and the data is transmitted to the controller. To read the card again, remove it from the antenna field and present it again. During normal use, the card can be presented to the antenna at any angle, although this will result in a reduced read range.

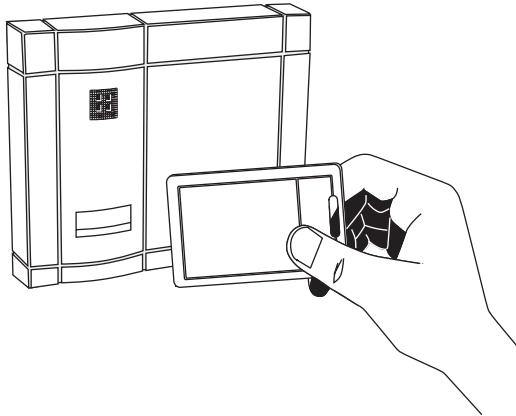


Figure 12 Presenting the Card

7.2 Data Output

The FlexPass Serial Mid-Range Reader is capable of outputting either RS-232/485 formatted data. For further information please call technical support at (800) 646-3252.

7.3 *QuickFlash*

When a valid card is presented, unless *QuickFlash* is activated, the LED will flash and the audio tone (beeper) will be activated for 70 to 100 milliseconds, regardless of the card's access status. This gives the user immediate feedback that the card was read and that data was sent to the controller. After the 100 millisecond *QuickFlash* period, the controller takes over the LED and beeper.

7.4 *SelfTest*

The readers have an internal diagnostic routine to assure reader operation at start-up, as well as a means to test the integrity of the data lines. When power is first applied to a reader, it will beep and flash twice to let the installer know that it has performed an internal check and is functioning properly. If the reader start-up routine determines one of the critical memory devices inside the reader has failed, the reader will emit a chirping sound.

7.5 Verifying Data at Host

To verify that the controller can read the data, put the reader into line test mode by holding a *SelfTest* card (Motorola part number 07257-001) in front of the reader. The reader will respond with an alternately flashing LED in all three colors and an audio signal to let you know it is in the line test mode. The reader will remain in the line test mode until power is removed and reapplied or the *SelfTest* card is presented again. While in this mode, the reader will send output pulses down the data lines at a 1 Hz rate, which can be measured at the controller end with a volt meter. If the pulses are not present, then there is probably a break or short in the line. If the pulses are present and the system is still not working, the reader may not be connected to the controller properly, the controller/system may be incorrectly programmed, or the controller may be broken.

8.0 Card Data Formats

8.1 ASCII Structure

Byte	1	2	3	4	5	6	7	8	9	10
Character	x	x	x	x	x	x	y	"0"	<CR>	<LF>
	MSB			LSB						

Where x is one of the following ASCII characters: "0", "1", "2", "3", "4", "5", "6", "7", "8", "9", "A", "B", "C", "D", "E", "F", and y is always an even value.

Byte 1 is the most significant nibble of the card value. Byte 7 is the least significant 3 bits of the card value shifted to the left on bit. Byte 8 is always a Zero.

This format is similar to format 2 except that the information has been converted to printable ASCII. See format 2 for more information about card data.

8.2 HEX Structure

Byte	1	2	3	4	5	6	7
Binary	00000010	01000001	bbbbbbbbb	bbbbbbbbb	bbbbbbbbb	bbb00000	00000011
ASCII	<STX>	"A"					<ETX>
			MSB			LSB	

There are 27 data bits on a card. These bits are sent with a header and a trailer as shown above. The data bits are marked by b, where b is either a 0 or 1. The leftmost bit of byte 3 is the MSB of the card value. The third bit from the left of byte 6 is the LSB of the card value.

8.3 Decimal Structure

Byte	1	2	3	4	5	6	7	8	9	10	11
Character	d	d	d	d	d	d	d	d	d	<LF>	<CR>
	MSB			LSB							

Where d is any one of "0", "1", "2", "3", "4", "5", "6", "7", "8", or "9".

Note that in this format byte 1 is the most significant digit and byte 9 is the least significant digit. Unlike format 1 and format 2, there are no trailing zeros in the value. Thus the range of values using this format (interpreting the first nine bytes as a decimal number) is 0 to 134,217,727. This format sends leading zeroes e.g., the number 15 is sent as follows:

000000015<CR><LF>

9.0 Option Cards

9.1 *QuickFlash* Beep Enable/Disable

This option card toggles the state of the *QuickFlash* beep option (Motorola part number 07259-001). If one beep is heard when the card is presented to the reader, the automatic beep is enabled. If two beeps are heard, the automatic beep is disabled.

9.2 *QuickFlash* LED Enable/Disable

This option card toggles the state of the *QuickFlash* LED option (Motorola part number 07258-001). If one beep is heard when the card is presented to the reader, the automatic *QuickFlash* is enabled. If two beeps are heard, the automatic *QuickFlash* is disabled.

9.3 *SelfTest* Card

This option card enables or disables the *SelfTest* mode upon presentation (Motorola part number 07257-001). Present the card once to enable the *SelfTest* mode. Present a second time to revert to normal operation.

9.4 *WatchDog* Enable/Disable Card

This option card toggles the state of the automatic *WatchDog* option (Motorola part number 07508-001). If one beep is heard when the card is presented to the reader, the *WatchDog* output is enabled. If two beeps are heard, the *WatchDog* output is disabled. The *WatchDog* will output an 8-bit “10101010” pattern approximately once every minute over the data lines. This option card is available with either RS-232/485 interfaces.

10.0 Troubleshooting

If the reader does not function properly when installed according to instructions, please complete this form and fax it to (408) 434-7057 before calling (800) 646-3252 for technical assistance. International customers call (408)383-4000:

<h1>FAX</h1>	
From: _____	To: <u>Technical Support</u>
Phone: _____	Model: _____
Fax: _____	Fax: <u>(408) 434-7057</u>
Product S/N: _____	Date: _____
Dead Reader	
1. Is the reader wired according to instructions?	<input type="radio"/> Yes <input type="radio"/> No
2. Is the recommended power supply being used?	<input type="radio"/> Yes <input type="radio"/> No
3. Is the DC voltage correct? <input type="radio"/> Yes, _____ volts	<input type="radio"/> No
4. Is the DC current correct? <input type="radio"/> Yes _____ mA	<input type="radio"/> No
5. What is the cable length between the power supply and the reader? _____ feet	
6. Is the cable type according to specifications?	<input type="radio"/> Yes <input type="radio"/> No
Short Read Range	
1. Is the reader wired according to instructions?	<input type="radio"/> Yes <input type="radio"/> No
2. Is earth ground connected according to instructions?	<input type="radio"/> Yes <input type="radio"/> No
3. Is the cable shield connected according to instructions?	<input type="radio"/> Yes <input type="radio"/> No
4. Is the recommended power supply being used?	<input type="radio"/> Yes <input type="radio"/> No
5. Is the DC voltage correct? <input type="radio"/> Yes, _____ volts	<input type="radio"/> No
6. Is the DC current correct? <input type="radio"/> Yes _____ mA	<input type="radio"/> No
7. Is there a CRT (computer monitor) nearby? <input type="radio"/> Yes _____ feet	<input type="radio"/> No
8. Is the card presentation according to instructions?	<input type="radio"/> Yes <input type="radio"/> No
9. What is the card tag number? _____	Card model number: _____
Data Incorrect or Non-existent	
1. At reader power up, did reader exhibit <i>SelfTest</i> TM ?	<input type="radio"/> Yes <input type="radio"/> No
2. Upon card presentation, did reader exhibit <i>QuickFlash</i> TM ?	<input type="radio"/> Yes <input type="radio"/> No
3. If you answered Yes to question 1 and 2, put the reader into line test mode as detailed in section 7.5 "Verifying Data at Host".	
4. Is the reader wired according to instructions?	<input type="radio"/> Yes <input type="radio"/> No
5. Is earth ground connected according to instructions?	<input type="radio"/> Yes <input type="radio"/> No
6. Is the cable shield connected according to instructions?	<input type="radio"/> Yes <input type="radio"/> No
7. Is there a CRT (computer monitor) nearby? <input type="radio"/> Yes _____ feet	<input type="radio"/> No
8. Is the card presentation according to instructions?	<input type="radio"/> Yes <input type="radio"/> No
9. What is the reader format? _____	Reader format: _____

11.0 Additional Information

11.1 Mechanical Dimensions

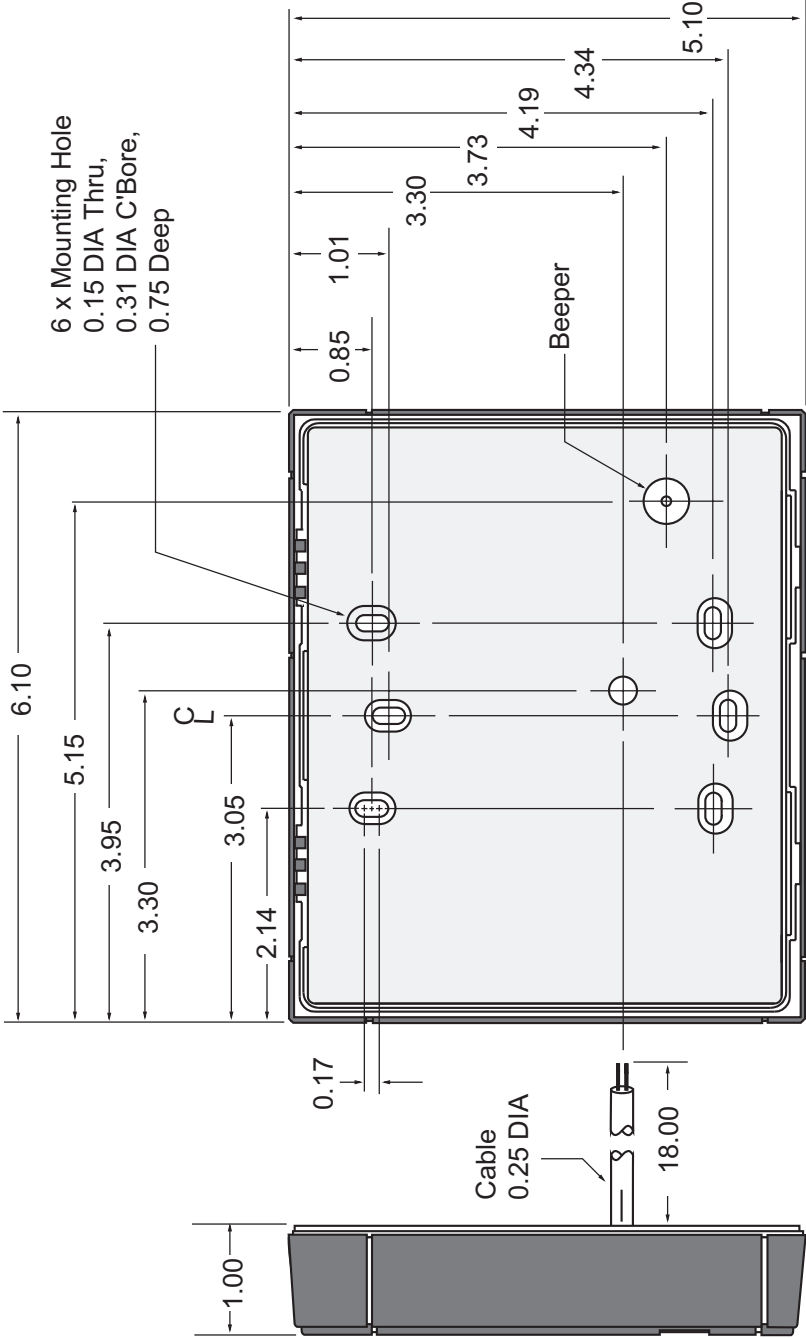


Figure 13 FlexPass Serial Mid-Range Reader Mechanical Dimensions

11.2 Copyrights, Patents, and Trademark Credits

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Products are covered by United States patent 4818855, Canadian patent 1253591, and other patents pending worldwide.

11.3 RMA (Return Material Authorization)

Goods returned for repair, warranty or non-warranty, must be assigned an RMA (Return Material Authorization) number. The customer is to provide a description of the specific problem. The customer is to include serial numbers, formats, card ID numbers, and correct facility codes with the items to be returned. If exact duplicates of returned cards or tags are requested, the customer must provide Motorola with the exact format and ID numbers needed.

For readers returned and not covered by the warranty (due to age, misuse and/or damage), a quote for repairs will be issued, and no work will be performed until a valid purchase order is received. Readers left over 30 days without a repair authorization and a purchase order will be returned with evaluation charges and shipping costs applied.

11.4 Contacting Customer Support

Please answer all questions in section 10.0 "Troubleshooting" and have your answers ready before you call the Technical support number listed below:

U.S.A. Office:

3041 Orchard Parkway
San Jose, CA 95134-2017
Tel (408) 383-4000, Main
Tel (800) 646-3252, Technical Support
Fax (408) 434-7057

European Office:

Jays Close
Viabes Industrial Estate
Basingstoke
Hants RG22 4PD
UK
Tel: +44 1256 358211
Fax: +44 1256 488144

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