

Agilent G2615A Bar Code Reader

User Information



Notices

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Safety Notices

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.



Agilent G2615A Bar Code Reader

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The Agilent G2615A Bar Code Reader (BCR) attaches to the tray of a 7683 Automatic Sampler. It reads labels attached to sample vials for positive sample identification.

- The reader attaches directly to the 7683 tray. A provided spacer may be required to attach some trays.
- The G2615A Bar Code Reader is not compatible with trays for 18596A, 18596B or 18596C samplers.
- The 7683 tray must be delivered from Agilent with A.01.04 or greater firmware. Field upgrade to A.01.04 or greater is not adequate.

You can verify your tray firmware using the 6890N keypad and display. Select **Options/Diagnostics/Instrument status**. Scroll to observe what firmware is installed on the G2614A tray. 6890A and 6890 Plus GCs will not display the tray firmware. Contact your local Agilent office for assistance.



Parts identification

Figure 1 identifies those parts in the installation kit that may not be easily recognized.





Installation

1 Locate the recess in the bottom front of the tray. The BCR must be located at this location. See Figure 2.



- Figure 2 Mounting location
- **2** Locate the mounting screw holes. Some trays have two holes that are flush with the bottom of the recess. Those trays require the spacer. Other trays have raised areas around three mounting holes and do not need the spacer.

The tray shown in Figure 2 is the two hole version. This style tray requires use of the spacer to mount the BCR.

3 If the spacer is needed, align the holes in the spacer with the mounting holes in the bottom of the tray. Place the mounting bracket under the spacer, insert the two long screws and tighten them firmly.

If the spacer is not needed, place the mounting bracket under the mounting holes in the bottom of the tray. Insert the three short screws and tighten them firmly.

4 Run the cable to the back of the tray and connect it to the Barcode receptacle. Tighten the two securing screws. See Figure 3.



- Figure 3 Connecting the cable
- **5** This completes bar code reader installation. See the section on Automatic Samplers in your Agilent 6890 Series Gas Chromatograph user information to configure the bar code reader.

About bar codes

A bar code is a printed pattern of bars and spaces that encodes information. The most frequently encountered bar code is the UPC code (Universal Product Code) that appears on most packaged products in the supermarket.

The information in a UPC symbol is not the price of the product; it is simply a number that has been assigned to that product to distinguish it from all others. The supermarket checkout register obtains the price by looking up the code in a master list (actually, the store computer does it).

The Agilent Bar Code Reader (BCR) reads and decodes several different bar codes. The most useful one for general laboratory use is the Standard 3 of 9 Code, which encodes both letters and numbers and allows variable message length. The others may prove useful in special cases. The preprinted labels available from Agilent are in Standard 3 of 9 Code without a checksum. See Table 1.

Bar code elements

All codes represent the characters as a pattern of dark bars and light spaces. Some codes only distinguish between narrow and wide bars, some have several possible bar widths, some use spaces to encode characters, others use spaces only as bar separators, and so on. Why so many different ways of accomplishing the same simple task? They were developed by different groups at different times and for different purposes.

Standard 3 of 9 code



Each character is represented by five bars and the four spaces between them. The bar/space patterns are defined so that exactly three are wide and the rest narrow. Characters are separated by a narrow space. See Table 1.

 Table 1
 Standard 3 of 9 code properties

Character set	Capital letters: A to Z (check values 10 to 35) Numerals: 0 to 9 (check values 0 to 9) Other characters: space \$ / + % (check values 36 to 42)
Message length	Variable
Checksum	Optional

The three wide and six narrow requirement makes each character self-checking, but an additional checksum character may be inserted in the message if desired. The checksum is generated by adding the check values for all the message characters, dividing by 43, and using the remainder to select the checksum character. If a checksum is used, the character is placed after the message characters.

When a checksum is used, the bar code reader verifies that the checksum in the message matches the checksum calculated from the message characters, but does not include the checksum character in the returned message.

An extended 3 of 9 code includes the complete ASCII character set, but it is **not** read by the bar code reader.

Interleaved 2 of 5 code



Message length, including the checksum character if used, must be an even number. If it is not, a leading zero is inserted. See Table 2.

 Table 2
 Interleaved 2 of 5 code properties

Character set	Numerals: 0 to 9 (check values 0 to 9)
Message length	Variable (may require a dummy character)
Checksum	Optional

Each character is represented by five elements, of which two are wide and three are narrow. Characters in odd-numbered positions are encoded with five bars. Characters in even numbered positions are encoded with the five spaces associated with the preceding even character. There is no character separator.

EAN/JAN-13 codes



The printed EAN/JAN-13 symbol is divided into left and right halves by a pattern of narrow bars and spaces. Two different code pattern sets are defined for the left side and one for the right side. Bars and spaces may be 1, 2, 3, or 4 units wide. See Table 3.

Character set	Numerals: 0 to 9
Message length	13 (2 country-of-origin characters, 10 data characters, 1 checksum character)
Checksum	Required

Table 3 EAN/JAN-13 code properties

The printed EAN/JAN-13 symbol is divided into left and right halves by a pattern of narrow bars and spaces. Two different code pattern sets are defined for the left side and one for the right side. Bars and spaces may be 1, 2, 3, or 4 units wide.

The left side contains the code patterns for the country-of-origin characters and the first five data characters. The last five data characters and the checksum character are on the right side.

The first country-of-origin character determines which of the left side pattern sets to use for the rest of the left side characters. For example, call the left side pattern sets A and B. If the first country-of-origin character is 0, the second country of origin character and the first five data characters will all be encoded using pattern set A (AAAAAA). If it is 1, the pattern sets for the left side are AABABB.

A different pattern set is used for the right side characters.

EAN/JAN-8 codes



This is a variation on the EAN/JAN-13 codes. The left side consists of the two country-of-origin characters and the first two data characters, all encoded using the left side A pattern set.

The right side contains the last three data characters and the checksum character, all encoded as right side characters.



The UPC-A symbols are a subset of the EAN/JAN symbols. There are two sides, but only one code pattern set for each side. The symbol is equivalent to an EAN/JAN-13 symbol with the first country-of-origin character set to 0 and the second one replaced by a number-system character. The number-system character depends on the kind of product and whether the symbol is applied at the factory (pre-packaged products) or at the store (weighed items such as meat). See Table 4.

Table 4UPC code properties

Character set	Numerals: 0 to 9
Message length	UPC-A: 12 (1 number-system character, 10 data characters, 1checksum character) UPC-E: 6 (6 data characters & checksum character compressed into 6 encoded characters)
Checksum	Required

The UPC-E code is called the "zero suppressed" version and is used for small packages. It requires that the number system character and at least four of the 10 data characters be 0 (zero). The Bar Code Reader can process both versions.

UPC-E is not divided into halves but still uses two different code pattern sets. One is identical to the left side UPC-A set; the other is the reverse of the right side UPC-A set. The choice of which to use is based on the position of the data character and the value of the checksum.

Summary

The Standard 3 of 9 code offers the greatest versatility for laboratory use. It can encode both letters and numbers, plus a few punctuation marks, and message length can be varied to suit both the amount of data to be encoded and the space available.

Interleaved 2 of 5 code is restricted to numbers but does allow variable message length.

The other codes are number-only and fixed message length.

Label and vial information

To minimize label and/or vial induced errors, always use labels and vials that meet the specifications in Figure 4 and Figure 5 respectively.



Figure 4 Label dimensions



Figure 5 Vial dimensions

Applying labels

One roll of preprinted labels, numbered from 1 to 1000, is provided with the bar code reader. This roll of labels is designed for use with the Label Applicator, discussed later in this section. To purchase additional labels, see your Agilent consumables and supplies catalog or visit our web site at www.Agilent.com.

If you have worked as an analyst for more than a day, you have encountered the problem of sample labels that do not stick to sample bottles. Rubber bands, transparent tape, putting the bottle and the (loose) label in a beaker—these are some common "solutions". But they will not work with bar code labels. The following hints will help avoid loose labels.

- Label adhesives have an annealing time during which the strength of the bond increases. For the Agilent labels, this is about 20 minutes. Give the label bond a chance to anneal before you stress it, whether mechanically or by placing it in a refrigerator or freezer.
- The Agilent labels have a slight overlap. Be sure that the tail of the label is firmly pressed down.
- The adhesive anneals best when both the label and the bottle are at room temperature. After the bond has strengthened, it will retain that strength when refrigerated.
- It is difficult to stick anything to a wet surface, including the thin film of moisture that condenses almost immediately on a bottle removed from a refrigerator.
- If you do find it necessary to overwrap the label with transparent tape, apply it smoothly and avoid placing the ends over the bar code itself.
- Keep the bottles and the labels clean. This improves both adhesion and readability. Do not write over the bar code.

Label applicator

The Label Applicator (part number 18587-60530) supplied with the bar code reader applies Agilent preprinted labels in the correct position on the vial. Two vial plates are supplied with the applicator. The one marked UNCAPPED VIALS is used when applying labels to vials that have not been capped. Vials that have been capped will not fit in this plate. A second plate, marked CAPPED VIALS, allows for the extra length of the cap. While uncapped vials will fit in this plate, they may not be properly positioned when the label is applied.

Loading labels

The following instructions assume that Agilent labels are used.

- **1** Remove the screws holding the side plate. See Figure 6.
- **2** Remove the side plate and discard the empty roller (if any).
- **3** Unwrap a new roll of labels. Use care because the roll will tend to unwind.
- **4** Place a new roll of labels on the three posts. The labels must be on the outside of the roll and the roll must feed from the bottom. See Figure 6.



Figure 6 Loading labels

- **5** Replace the side plate and the screws.
- **6** Verify that the correct vial plate (CAPPED or UNCAPPED) is in place. If not, remove the four screws holding the top and bottom plates, make the change, and replace the screws.

- 7 The roll begins with a 12-label leader. These labels contain text but no bar code. Peel off and discard these leader labels. Cut the end of the backing tape to a point to make loading easier.
- 8 Feed the end of the tape under the bottom plate and up through the large opening. See Figure 7.

Pass tape under the bottom plate

Remove leader labels and cut to a point

Figure 7 Threading the tape. Under the bottom plate.

9 Fold the tape and feed the end through the space between the bottom and top plates. It will help to bend the tip upward. See Figure 8.



Figure 8 Threading the tape. Between the plates.

10 Pull the backing through until it points straight up. See Figure 9.



Figure 9 Ready to apply labels

Using the applicator

- 1 Place a bottle in the opening in the top plate. It will only fit in one position (to the right). See Figure 9.
- **2** Pull the backing up until the end of a label appears under the bottle.
- **3** Hold the bottle in position (let it rotate) and continue to feed the label onto the bottle.
- **4** Remove the bottle and press down the trailing edge of the label.
- **5** Verify correct position with the gauge on top of the label applicator. With the bottle on the ledge, there must be no white space above or below the code and visible in the slot. See Figure 9.

In case of difficulty

CAUTION

Correct sample vial and label dimensions and label placement are critical for proper tray gripper operation. Vials and labels that do not meet the specifications in Figure 4 and Figure 5 may cause sampler errors. Service calls and repairs found to be due to vials or labels that do not meet these specifications are not covered under warranty or service contract.

How the tray gripper works

- It slides over the vial body near the vial shoulder
- As the gripper rises, the vial may slide down in the gripper so that the underside of the cap rests on the top edge of the gripper fingers

Labels

- ✓ Bar code labels must not be in the gripper area. This may interfere with the gripper's ability to engage the vial. The maximum height of the top of the label, measured from the outside bottom of the vial, is 21.5 mm.
- ✓ Label thickness must not increase the vial outside diameter such that the vials do not fit in the various sampler, BCR, and tray locations.
- Labels or tape on the lower part of the vial may interfere with delivering the vial to its destination.
- ✓ Labels must be applied smoothly with no bumps. Ends must be securely fastened down.

Bar code labels supplied by Agilent meet these restrictions when properly placed.

Residue on gripper

Any buildup of residue (grease, label adhesive, etc.) on the gripper may interfere with its ability to engage the vials. Inspect gripper fingers periodically and clean if necessary.

Vial caps

The vial is sometimes carried by the underside of the vial cap. It is important that the lowest edge of the cap is perpendicular to the sides of the vial. If this is not so, the vial may be carried at an angle and the base of the vial may miss its intended receptacle when lowered.

Labeled test vial

A properly labeled test vial is provided with the bar code reader. It is labeled in Standard 3 of 9 code and the message (a number) is printed on the label. If you suspect that the reader is not working correctly, use this vial to verify that it does successfully read a properly labeled vial.



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