GS1 DataBar™ Implementation Guide

PMA
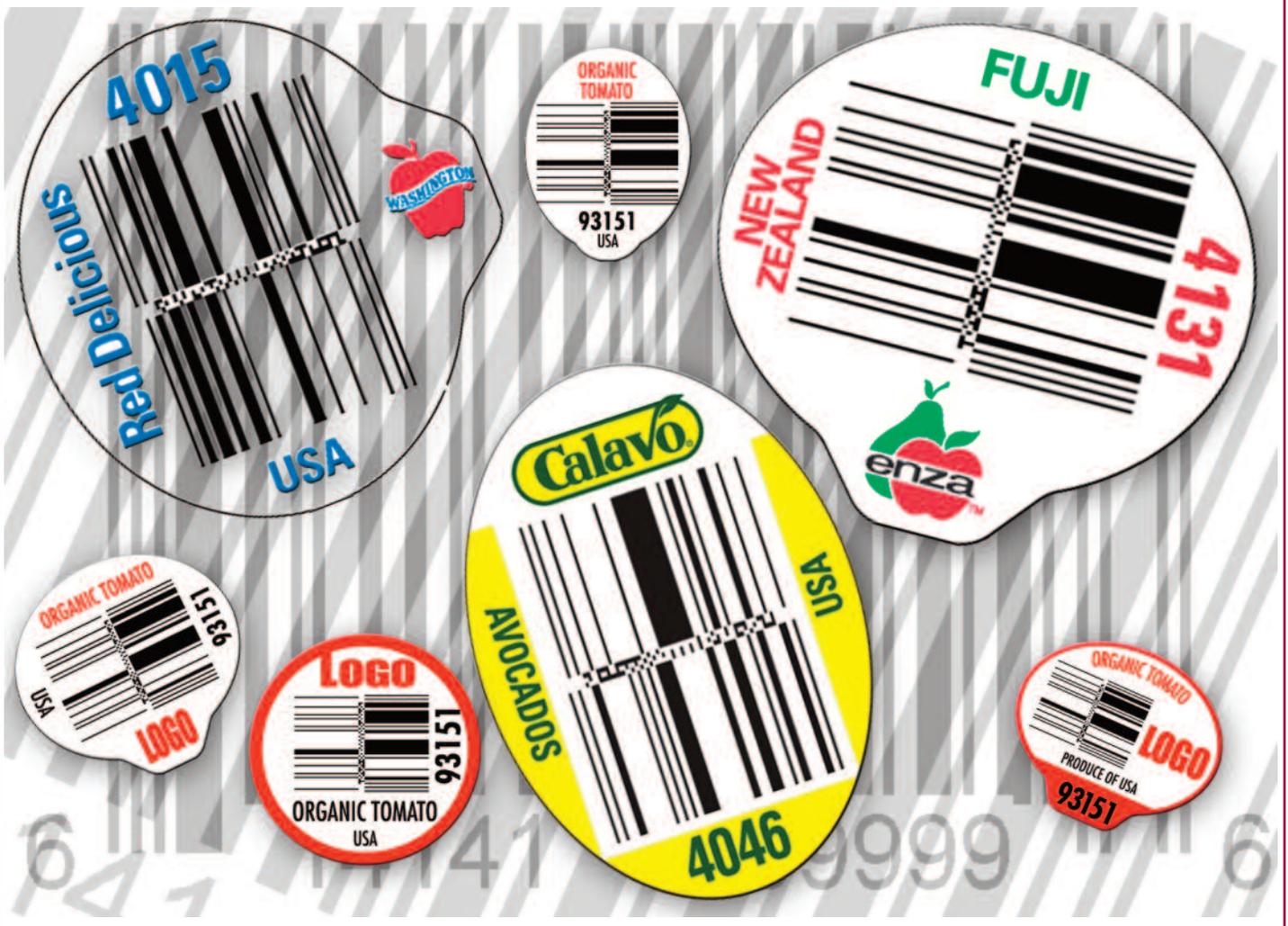
July 2009

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1 Recognition

The following companies and individuals, as part of a subgroup created by the Produce Electronic Identification Board (PEIB), contributed to the creation of this document:

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2 What is the GS1 DataBar?

The GS1 DataBar, formerly known as the RSS (Reduced Space Symbology), is a new barcode that was designed by the standards organization GS1 to fit in small, space-constrained areas (e.g., on a PLU sticker). The official name of the particular GS1 DataBar that was designed for produce is called the **GS1 DataBar *Stacked Omni-Directional*.** This particular barcode encodes the 14-digit Global Trade Item Number (GTIN). It is smaller than a UPC-A barcode, and therefore the bars and spaces are more precise. As such, on older scanning equipment (i.e., prior to 2002) it may be slower to read under various conditions than a larger, more forgiving, UPC-A barcode.

The Stacked Omni-Directional GS1 DataBar –
used for produce items

3 What is the GS1 DataBar used for?

The GS1 DataBar, as designed for use in the produce industry, is to be used on PLU stickers that are currently affixed to loose/bulk items. It is important to understand that it is designed for the item and not the case. It is not recommended that the GS1 DataBar be used on bags (e.g., grape or cherry bags), packages, clamshells or any other packaging material that has enough available real estate to use a UPC-A barcode, a much larger, more forgiving barcode that will give the cashier a better chance of reading the barcode on the item (please see Item Level Marking document at http://www.pma.com/cig/tech/rss.cfm at the bottom of that page).

The UPC-A Barcode – for use on bags, packages,
clamshells, large surface areas

4 Steps to Implementation

The following steps are in chronological order and should be implemented in this sequence to avoid duplication of efforts and ensure an efficient implementation.

4.1   Obtain Your GS1-issued Company Prefix

The number encoded in the GS1 DataBar is called a GTIN (Global Trade Item Number). This numbering protocol is used in more than 145 countries by more than 2 million companies. It includes the use of a GS1-issued Company Prefix that ties the item to the owner of the Company Prefix. It is the same standard protocol used for the UPC (Universal Product Code) and the GTIN used as part of the Produce Traceability Initiative for case marking.

IMPORTANT NOTE: The GTIN used for the DataBar identifies the <u>item</u>. The GTIN used at the case identifies the <u>case</u>.

What is a GS1-issued Company Prefix?

A GS1-issued Company Prefix is a number obtained from a GS1 Member Organization (such as GS1 U.S.) that uniquely identifies your company from any other company around the world. The Company Prefix, as encoded in the GTIN, uniquely identifies your company.

What is GS1?

GS1 is a not-for-profit standards organization that has over 108 branches or Member Organizations (MOs) around the world and is used in more than 145 countries. Each country has an MO – e.g., GS1 U.S., GS1 Canada, GS1 Japan, GS1 Germany, etc. The United States MO, now called GS1 U.S., was formerly called the Uniform Code Council (UCC).

Who needs to obtain a GS1-issued Company Prefix?

Any company that is a brand owner must obtain their own GS1-issued Company Prefix, including:

- Growers who wish to maintain their own brand

- Shippers maintaining their own brand

- Buyers requiring private labeled product

Is this the same GS1-issued Company Prefix used as part of the Produce Traceability Initiative for the creation of GTINs to identify cases?

Yes. The Company Prefix obtained by GS1 can be used with any GS1 numbering standards (e.g. UPC, GTIN, GLN, etc.).

For more information on the PTI, please visit www.producetraceability.org.

Where do I go to get my GS1 Company Prefix?

An application may be made through the Member Organization (MO) in the country in which your company is registered. For those in the United States, you can go to www.gs1us.org. For those outside of the United States, you can go to www.gs1.org to locate the correct MO.

How long will it take to get a GS1-issued Company Prefix?

After you have filled out the application for your Company Prefix on GS1's website and they have received payment, you will get your Company Prefix within one business day.

How much does it cost to get my Company Prefix?

This will vary company by company, and country by country. Every GS1 MO has a different pricing model.

What determines the length of my Company Prefix?

The number of products (i.e. packaging configurations) your company has will determine the length of the Company Prefix GS1 assigns to your company, as follows:

# of Items	Length of Company Prefix	Length of Item Reference Number
99,999	###### = 6 digits	##### = 5 digits
9,999	####### = 7 digits	#### = 4 digits
999	######## = 8 digits	### = 3 digits
99	######### = 9 digits	## = 2 digits

It is for this reason that the Company Prefix is said to be "variable-length."

NOTE: Be sure to consider future growth when determining the number of items you might need. This could be a result of new commodities, new mergers, and/or new acquisitions.

How do I use the GS1-issued Company Prefix?

Simply put, the Company Prefix, when attached as part of any GS1 identification number, links that number to the owner of the Company Prefix. If the number is on an item, it links the item to the owner of the Company Prefix. If the number is on a case, it links the case to the owner of the Company Prefix. If the number is on a pallet, it links the pallet to the owner of the Company Prefix.

Can I use the "generic company prefix" 033383 obtained from PMA as my Company Prefix?

No. This prefix is used on pre-packed consumer items used in both the U.S. and Canada, not on cases. It is not a company-specific Company Prefix and cannot be used. A company-specific prefix is needed to ensure a link is established between the company and the item, thereby differentiating one company's product from another.

4.2 Create GTINs for Your Items

What is a GTIN?

Although a Global Trade Item Number (or GTIN) can be used to identify items as well as cases of produce, *for the context of this document,* a GTIN is a 14-digit number based upon GS1 standard protocols that is used to *identify a produce item.*

What are the components that make up a GTIN?

The 14-digit GTIN has four major components:

- **Indicator:** This is also known as the Packaging Indicator and is found in position 1 (see diagram below). The recommendation from GS1 U.S. is to use a "0" in this position when using the GTIN to identify an item.

- **Company Prefix:** See "Obtaining Your GS1-issued Company Prefix" above. The length of the Company Prefix could vary from 6 to 9 digits in length.

- **Item Reference #:** the number assigned by the owner of the Company Prefix that uniquely identifies the item being numbered. This number can be whatever the owner of the Company Prefix wishes it to be, as long as this item reference number is unique within their own operation. The length of this item reference # will vary depending on the size of your Company Prefix (see "Obtaining Your GS1-issued Company Prefix" above).

- **Check Digit:** A single digit that is derived from an algorithm. This digit serves as a "checks and balances" to ensure that the preceding digits were not incorrectly entered.

GTIN Diagram for Item Level Coding of Produce

Position 1: Indicator (GS1 U.S. recommendation is to use a "0" when using the GTIN to identify item-level products)

If the Company Prefix is assigned by GS1 US or GS1 Canada:
      Position 2: a "0" is inserted into this position.
      Positions 3 - 13: combination of GS1-issued Company Prefix and Item Reference #.

If the Company Prefix is assigned by any GS1 member organization <u>other than</u> GS1 US or
      GS1 Canada <u>AND</u> you export product to the US and/or Canada:
      Positions 2 - 13: combination of GS1-issued Company Prefix and Item Reference #.

1	2	3	4	5	6	7	8	9	10	11	12	13	14
0	0 or N	N	N	N	N	N	N	N	N	N	N	N	CD

How do I assign GTINs to my items?

The Produce Electronic Identification Board (PEIB) recommends that companies assign GTINs for their items using the same granularity that is used when assigning PLU numbers: Commodity, Variety, Size Group. This will allow for an easy transition from PLU # to the GTIN used in the GS1 DataBar. As an example, if you are currently using 4 PLU #'s, then you will create 4 GTINs. Very simply put, a GTIN # equals a PLU # on a one-to-one match.

How long will it take me to assign my GTINs?

This will depend on how many items you carry. If you follow the recommendation made by the PEIB to assign GTINs at the same level of granularity as the PLU number (e.g., commodity, variety, size group), this should be a relatively easy and quick exercise, regardless of how many items you carry.

How do I calculate the Check Digit?

Log onto http://www.gs1.org/barcodes/support/check_digit_calculator and enter the first 13 digits of your GTIN, which will then automatically calculate the check digit. Each GTIN will need a calculated check digit. If you have more than just a few numbers, scroll down underneath the Check Digit Calculator and it will show you the calculation used for each Check Digit so that you can automate the calculation of this Check Digit.

NOTE: Because the calculation of the Check Digit is different for different GS1 number formats, be careful which calculation you choose both for the manual Check Digit Calculator and for the formula below the calculator. If you need to calculate the check digit for the GTIN, use the GTIN-14 portion of the calculator and corresponding formula below the calculator.

4.3   Communicate GTINs to Your Buyers

There are multiple ways that you can communicate your GTINs for your items to your buying customers. This document will not be prescriptive in telling you how. However, in conjunction with the recommendation made by the PEIB around the granularity of assigning GTINs (see Section 4.2 above), it is recommended to, at minimum, use GS1 DataBar Online Repository to communicate which GTINs apply to a single PLU number (contact PMA's Solution Center at +1 (302) 738-7100 for more information). Remember, using the GS1 DataBar Online tool will only allow you to communicate the GTIN on the *item*, not the GTIN used with the case.

GS1 DataBar Online will give minimal information regarding the GTIN used with the GS1 DataBar shown on your items. It will simply indicate which GTIN is equated to which PLU number, nothing more. If it is necessary to communicate more information on the GTIN itself, the decision on how to do so is one made between the buyer and the seller.

4.4   Design the Label for Your GS1 DataBar Sticker

- Determine what label size to use. The smallest label a GS1 DataBar code fits on is a CP 3.0-23 non-tab or Tab-Lift™. If a 2.5-size label (or smaller) is currently being utilized, a change to the 3.0-23 or larger is necessary. Potentially, a larger size may be necessary to accommodate branding, graphics, etc.

- After a label size is determined, assess machinery and cassette needs. In many cases, the labeling applicators may be modified to run more than one size label, and your vendor's technical service can adjust the applicators to run the new size label. Cassettes, however, are label size-specific. Once a new label size is determined, cassettes will be changed to run the new size. Additional rental cassettes may be necessary to have greater flexibility for running dual (old and new) inventories. Lead-times vary for changing machinery and cassettes and it is suggested that a minimum of approximately 4 weeks is necessary to make such changes.

- Contact your label supplier at the beginning of your decision-making process in the transition to GS1 DataBar. They can provide assistance and advice on how to most effectively transition equipment and label inventories.

  Note: *A decision should be made on whether or not to run dual label inventories: existing, conventional (non-GS1 DataBar) vs. new, bar coded. Running two vs. one label inventory will determine which equipment needs modification and how many cassettes are affected.*

- Label artwork is generated based on artwork objectives and the list of GTINs provided by the packer/shipper. Each bar code encodes a GTIN unique to each PLU for each packer/shipper.

- Once label artwork is approved by packer/shipper, an order may be placed.

- Review the Application Guidelines published by GS1 available at http://barcodes.gs1us.org/dnn_bcec/DesktopModules/Bring2mind/DMX/Download.aspx? TabId=136&DMXModule=731&Command=Core_Download&EntryId=48&PortalId=0. The Application Guidelines outline:

  - Use 8 mil, 100% height GS1 DataBar-14 Stacked Omni-Directional symbols

  - Print the PLU number on the label *(this is a convenient back-up for retailers who currently do not have GS1 GS1 DataBar scanners)*

  - Minimum ISO Symbol Grade 1.5

  In addition, some vendors recommend:

  - The quiet zone around the bar-code should be at least 20 mil**

  - Background behind the code is white and the bar code symbol is black

- Size of the label

- The smallest label that GS1 DataBar accommodates is a CP 3.0-23 or the CP 3.0-23 Tab-Lift™.

- Changes that may occur on the label itself

- Label graphics may be affected as the bar code, depending on the size of the label, can comprise up to 65% of the label. Below are some examples of bar-coded labels illustrating the same information on different size labels:

CP 3.0-23 TL	CP 3.75-23 TL	CP 4.3-26	CP 5.0-26 TL
• DataBar	• DataBar	• DataBar	• DataBar
• PLU	• PLU	• PLU	• PLU
• Variety	• Variety	• Variety	• Variety
• COOL	• Brand/Logo	• Brand/Logo	• Brand/Logo
	• COOL	• COOL	• COOL

- Once the design is approved, the printing lead-time of GS1 DataBar bar-coded produce labels should not be any different than your historical experience with non-GS1 DataBar labels.

5 Benefits of the GS1 DataBar

- Product movement data by grower-shipper

  o Because the Company Prefix is part of the GTIN that is encoded in the GS1 DataBar, it will enable buyers to track which company's or brand owner's item is being sold to the consumer. The item reference number, also part of the GTIN, will allow buyers to continue to track what item is being sold to the consumer.

  o This newfound product movement data by grower-shipper can help the marketing teams at each grower-shipper understand precisely how much of the commodity that moved to consumers was theirs versus their competitor's.

- Tracking shrink by grower-shipper

  o Because the Company Prefix is part of the GTIN that is encoded in the GS1 DataBar, a buyer will also be able to track shrink back to a specific grower-shipper.

- Better category management

  o As buyers will now have both product movement by grower-shipper and shrink by grower-shipper, they will now be better able to manage the category, similar to that of packaged goods.

- Product/brand differentiation

  o Because buyers and sellers will have product movement data and shrink data to support the item's performance in quality, consumer preference, and actual movement to the consumer, grower-shippers can brand their products more effectively and accurately. This could allow for brand differentiation and pricing according to brand, rather than pricing by commodity.

- Ensuring accurate pricing at retail and checkout

  o Because the GTIN inside of a GS1 DataBar will specify a conventional item versus an organic item, when scanned, the correct price will be charged to the consumer. Many dollars are lost because cashiers input the conventional PLU # rather than the organic PLU #.

  o This same situation exists with other items where human error is common such as field/hothouse/on-the-vine tomatoes, varietals of apples, etc. Removing human key entry ensures the correct item identification and correct price, as is commonplace in any scanning environment for bar-coded products.

- Improving consumer shopping experience

  o Consumers will be able to scan their own produce in self-scan environments.

- Assisting with traceability

  o Although the Stacked Omni-Directional GS1 DataBar used in the produce application does not allow for inclusion of a lot number, and cannot therefore accurately trace product to this level, it does allow for identification of the brand owner, which can significantly limit the scope of product implicated in the event of an incident.

  o If retailers have a frequent shopper program, the buyer can proactively contact the consumer who purchased the product in question.

6 Challenges of the GS1 DataBar

- Incremental costs for PLU stickers

  o Given a variety of factors: label size (old vs. GS1 DataBar), equipment changes (if necessary), cassettes (if conversions are needed), etc., generally there may be a 28% difference between GS1 DataBar and non-GS1 DataBar applications.

- Consistent read rates at POS

    o When trying to read the GS1 DataBar though plastic bags containing loose/bulk produce, clear bags function best. However, some bags with many graphics on the bag could inhibit the read rate of the GS1 DataBar stickers inside the bag.

- Increase of item numbers to manage versus PLU numbers

    o As each GTIN is unique by grower-shipper, a retailer's point-of-sale systems will have to store multiple GTINs as opposed to a single PLU number for all growers of that commodity.

7 Appendix

7.1 Frequently Asked Questions

What is GS1 DataBar™?

This is the family of bar codes formerly known as RSS (Reduced Space Symbology).

What is GS1 DataBar Stacked Omni-Directional?

It is a small bar code being used to identify loose produce, specifically variable weight at the item level, and it encodes a 14-digit number. For brevity, this symbology will be referred to as GS1 DataBar™.

Why are supermarket retailers using DataBar to mark loose produce?

Retailers have expressed that using a bar code on loose produce will yield benefits including improved category management, increased check-out accuracy, a reduction in shrink, and some measure of traceability. Some also feel it will help aid throughput in self-checkout.

Is the produce industry the only fresh food sector that is changing how product is being marked (identified)?

No, many categories in the fresh food industry are also beginning to use the GS1 DataBar to mark goods for the same reasons as mentioned above. These categories include meat and poultry, seafood, dairy, deli, and bakery. The GS1 DataBar barcode used for other categories, however, is a slightly different symbology. Contact GS1 for more information.

Can the PLU be used for the item reference within my GTIN?

Yes, it can be assuming there are enough digits once your company prefix, check digit, and 00 or 0 as the first/ second digits are added. Many packer/shippers may find they may have only two digits for the Item Reference, and it may be useful to devise your own numbering system that works best with your database, data retrieval, and/or inventory system. Given best practices suggested by the PEIB, there is a 1:1 ratio of PLU to GTIN. Regardless of whether or not the actual PLU number is used within your GTIN, it must be included in human readable format on the PLU sticker.