RVCF Business Process Guideline for Digital Communications / EDI

Error Prevention, Notification and Root Cause Analysis for Shipping and Receiving V.12

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Background: This guideline is the result of retailers asking RVCF to look into difficulties with the EDI 856 Ship Notice and the corresponding shipping label. We received a strong response from the membership, with 20 retailers and 79 suppliers answering questions about their biggest issues. When we presented the findings we found that many would benefit from a basic business understanding of EDI concepts and best business practices. We also identified a need for more specific error notification using common language, so suppliers can fix the issues and analyze errors across retailers to find root cause.

About RVCF: The Retail Value Chain Federation (RVCF) provides platforms and opportunities for communication between retail industry stakeholders. We promote education through live events, teleconferences, webinars and research. We offer benchmarking of best practices, technology solutions, and strategic initiatives. RVCF works with Retailers and Merchandise Suppliers to address their individual priorities helping them to become more collaborative trading partners. We are committed to the advancement of the retail industry as a whole. Contact RVCF at mailto:Info@rvcf.com

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Introduction

RVCF business guidelines focus on a specific business process and the use of digital communications including Electronic Data Interchange (EDI), portals, and emailed reports, photographs and videos.

The general purpose of the guidelines is to provide a resource, for the business side, on standardized digital communications, so they can take advantage of its capabilities and optimize business processes. It is also to provide talking points when communicating within the company, with trading partners and with solution providers. It identifies industry best business practices and, where practical, streamlines and harmonizes, the various methods different retailers use to accomplish the same thing. This improves data quality and makes it more efficient and cost effective for both retailers and suppliers.

Scope for This Guideline – The scope for this guideline is to identify best practices for avoiding digital communication errors when possible, and effectively communicating the errors when they do occur, **specifically for the shipping and receiving process**. This includes the EDI Ship Notice / Manifest (aka Advanced Ship Notification or ASN) and the barcoded GS1 Logistics Label. We look at the EDI tools available for preventing an invalid ASN from leaving the supplier's system and digital communication methods used by retailers to send error notifications including email and EDI. This is not intended to be an implementation guideline for the ASN which would be much bigger in scope.

This guideline is intended for associates working with business systems in vendor compliance, chargebacks, AP/AR, shipping, receiving, logistics, warehousing, or transportation who are tasked with producing an accurate, timely ASN and a high quality, readable logistics label.

If you are new to EDI ASNs and logistics labels, it may be helpful to review the terms and concepts at the end of this document before reading the guideline.

The Value of Machine Processable Transactions such as EDI, rests in the ability to automatically process information based on metadata (information about the data carried in the file) presented in a predictable file format. In the case of EDI, this is possible due to the standardization of the data format, plus the code lists used to identify data element contents. In the US this is governed by the American National Standards Institute (ANSI) X.12 subcommittee (https://x12.org/) which consists of industry representatives.

Digital Communication Components - In general, there are at least three software applications used in digital communications:

- The software used to **translate** data into and out of a standardized file format (EDI, XML, etc.) according to the syntax rules for that digital communication type;
- One or more applications that **transmit** transactions to and from trading partners;
- A **business system**, such as Enterprise Resource Planning (ERP) used for normal business processes including ordering, inventory, financials, and so on.

These guidelines were created by an **RVCF Work Group** comprised of business and technical associates from retailer, supplier and solution provider companies. This is their Mission Statement:

The mission of the RVCF Business Process Guidelines for Digital Communications / EDI is twofold. The first is to provide guidelines for a specific retail business process relative to EDI and other digital workflow. This gives business operations the information needed to understand capabilities and communicate their requirements to intra-company business partners, inter-company trading partners and solution providers. In the process we will identify best business practices. The second goal is to streamline and harmonize the language used, including standardizing terms, codes, definitions and actions expected for the data qualifiers used, whether in EDI or other forms of digital communications.

Components in Automated Shipping and Receiving

The EDI 856 Ship Notice / Manifest (ASN) is the EDI transaction used by a supplier to convey the ship-to address, PO information, packaging and carrier information and the contents of a shipment.

The transaction is also known as an Advance Ship Notice (ASN) because the electronic transaction must arrive before the shipment if it is to be used for automated receiving. The shipment is automatically received when the individual carton Serial Shipping Container Code on the shipping label is scanned and matched with the information in the ASN.

ASN best business practices include sending the ASN after the shipment is complete and sealed, within two hours after it leaves the facility. Other best business practices include sending one ASN per shipment, and using the GS1 Bill of Lading form and numbering format (described in Terms and Concepts). However, it is important to understand the processes required by individual retailers. For instance, some retailers will allow multiple ASN's per shipment (and tie them together when the Bill of Lading Number is the same in each ASN) and some will only accept the first ASN they receive, rejecting subsequent ASNs with the same BoL number, as duplicates.

The Serial Shipping Container Code (SSCC) is a unique eighteen-digit number put on each logistics unit (carton, pallet load, tote, etc.). It uses the supplier's GS1 Company Prefix to insure uniqueness, similar to the way in which Global Trade Item Numbers (GTINs) are created. The SSCC appears in a barcode on the GS1 Logistics Label. When scanned and matched to the EDI Ship Notice, the logistics unit is linked to data about the PO and carton contents for automatic receiving.

The GS1 Logistics Label contains the SSCC in a barcode on a standard shipping label. The label has various zones or building blocks which can be mandatory or optional. Blocks of information commonly requested by US retailers include "From", "To", "Carrier", "Store", "Contents", and the mandatory SSCC in both a barcode and human readable at the bottom of the label. Retailers in the US have settled on a fairly common format. However, it is unlikely that one label format will work for all retailers and all channels. Good label printing software provides for retailer-specific templates and the ability to create, modify and save formats.

Errors occurring in the automated receiving process include an ASN which is not properly formatted, incomplete or incorrect data, the barcode is unreadable, the ASN doesn't match the actual shipment, or the ASN arrives after the shipment.

Understanding "EDI Standards"

While it is useful to discuss best business practices, or at least common business practices for the retail industry, the reality is that different retailers have different, and in some instances, opposing, requirements for EDI transactions and processes. There are many examples of this with the ASN. For instance, some retailers will only accept one ship notice per shipment and some will allow multiple ASN's per shipment. (Please see *Appendix C - Retailer ASN Checklist* for examples of processes that may differ between retailers.) This leads suppliers to ask why, if retailers say they are using "EDI standards", there are so many variations which cause inefficiencies and one-off processing for them.

As mentioned above, EDI standards in North America are maintained by the American National Standards Institute (ANSI). They manage hundreds of EDI transactions for multiple industries including car repair, healthcare, election campaigns, insurance, transportation, and retail. Some EDI documents are used across industries, such as the PO and invoice, so there are many ways they can be mapped and exchanged. In the 1990's the Uniform Code Council (UCC), the precursor to GS1-US, wrote implementation guides on the use of ANSI EDI standards for retail and grocery. The guidelines were the result of quarterly physical meetings for several years, with hundreds of retail and supplier representatives. Since then, variations to these guidelines have been introduced by retailers due to the need for new functionality and business practices. Because there are so many options for conveying information via EDI, the result is that retailers vary their ASN requirements (without knowing about other retailers' processes) while still technically following ANSI standards.

Both GS1 and ANSI state that participation in their "standards" are voluntary as reflected, in North America, by anti-trust and ability-to-compete laws. The language used in GS1 guidelines include "shall", "should" and "may". "Shall" means, if a company says they are following GS1 standards, then that action is required; "should" means it is highly recommended and "may" means that action may or may not be followed. GS1 and ANSI work is comprised of recommendations and individual companies are free to make independent and competitive decisions on their business processes.

RVCF recognizes that there are many advantages to normalizing and harmonizing the way in which business data is exchanged. Benefits are shared by both retailers and suppliers when EDI transactions and processes are simplified and consistent. RVCF forums provide an opportunity to exchange ideas about common and best business practices.

Digital Communication and EDI Errors in Shipping and Receiving

Digital communication errors can be categorized as technical or business.

Technical errors include syntax errors that occur when the data file does not meet the applicable technical specifications. This means the data cannot be "translated" into a format that is usable to the receiver of the data. See *Appendix A* for components specific to EDI.

Business errors occur when the data is properly formed, but trading partner business rules are not met. A mandatory data element, e.g. PO Number or Invoice Number, may be present but the number itself is incorrect or incomplete. Another business error is a missing optional data element required by a retailer. An example of this is the Standard Carrier Alpha Code (SCAC) which is not designated mandatory by X.12 EDI standards, but many retailers require the information.

Preventing Errors

Technical Errors can be prevented by using the error identification capabilities in the software used to compile and translate the data. An EDI translator will verify the data structure, format and the presence of mandatory data for inbound and outbound transactions. **Ideally, an EDI document that fails based on ANSI X12 specifications should never leave the sender's system.**

Customizing or making configuration changes to the EDI translation software (either in-house or third-party), or the EDI translation process, can cause technical errors to "get through" causing unintended problems. There may also be provisions for changing master data right before translation to accommodate a specific retailer request. An example may be converting Unit of Measure from "case" to "each". While not a best business practice, these customizations may have been made as a 'work around' in the past, and may no longer be needed, or they may be necessary for exception handling for specific retailers. In any case, they should be documented and understood.

Business Errors and Additional Error Trapping - Errors can be prevented by executing error trapping routines on the data before it is streamed to the translator. This is often referred to as "pre-processing" and can be programmed for each retail trading partner. For instance, if a retailer requires an SCAC, an error trapping routine can be set up to make sure that data is present before sending the ASN. This error trapping should only be used to identify errors. Errors should be fixed in the original data source, and the data re-processed. "Fixing" errors in a pre-processing routine can lead to master data, security and audit issues (see *Fixing Errors*).

Synchronized Master and Transactional Data – A major source of ASN errors is master data that is not synchronized between the supplier and retailer systems. This includes differences in item attributes such as package measurements, GTIN (Global Trade Item Number / UPC), description, case/inner pack quantity, the ship-from location for each item, and, if permitted, acceptable substitutions for the item. Transactional data includes PO Changes not successfully communicated, approved and synchronized between the retailer and supplier. The cost of non-compliance charges, unavailability of product for the consumer, and unpaid invoices based on a failed ASN justify the effort needed to keep the retailer and supplier's systems concurrent.

Timing, especially for ASN's, is obviously important. An EDI Ship Notice should be created after the shipment is sealed, representing the actual shipment, and must arrive before the shipment is received. Best business practice is to transmit the ASN within two hours of finalizing the shipment. Suppliers should understand the frequency with which retailers process EDI transactions.

Changes that occur when an order is picked for shipment, such as a shortage due to an out of stock situation or damaged goods, must be reflected in the ASN. Likewise, last minute additions to the order

or permissible substitutions must be included in the ship notice. The supplier needs processes for adjusting the ASN accordingly and reprinting labels when needed.

Supplier Check List:

- ✓ Identify and document any customizations made to your in-house EDI translation process or with your EDI solution provider's translation process.
- ✓ Document instances of data changes in a pre-translation process, after leaving the master data table of record, and before it is converted to EDI. This is for both in-house and third-party systems)
- ✓ Understand, by retailer, the cadence used for processing EDI Ship Notices.
- ✓ Create a process for last minute PO changes and ASN corrections, including substitutions and shortages.
- ✓ Create a process for reprinting labels damaged when applied, keeping SSCC's in synch with what is sent in the ASN.
- ✓ Retailer's report that the biggest reason for ASN errors is a change in systems, supplier personnel, retailer requested carton configurations and new assortments / products. Be sure to test and verify systems and master data synchronization when changes are made.

Error Notifications

Error notifications can either be “push” or “pull”. Push notifications include EDI transactions and email notifications sent from the retailer to the supplier. Pull notifications include data that can be found on the retailer’s portal such as scorecards. Vendor scorecard information can include non-compliance information related to ASN and shipping label issues.

Email Notifications - When surveyed by RVCF, a majority of the retailers and suppliers responded that ASN business error notifications are commonly sent in a report via email rather than EDI. When retailers use EDI for error notification, the supplier has to translate, process, reformat, and send the information to the right contact or department for action.

The advantages of email error notification include:

- It can be delivered to the correct party.
    - Often a ‘generic’ email address is used (e.g. custservice@domain.com) and associates are assigned to monitor the mail box.
    - It is possible to send the appropriate email address in the Contact Segment of every ASN, to make sure the right email address is used for ASN error notification.
    - Multiple parties can be included; business and technical teams can be copied on the same error/issue, helping with escalation.
- The email report is human readable and does not require translation.
- The email thread can be used for tracking the issue.
- Clear communication in the email can help with getting to the root cause.

The disadvantages of email notification can be the lack of receipt acknowledgment from the receiver and the issue of email address synchronization between the supplier and retailer.

The issue with both EDI and email error notification is that the language used to describe errors has not been standardized and is different for every retailer. It is often not specific enough to understand what to do to fix the problem.

EDI Transactions designed for error notification include:

- 997 Functional Acknowledgements
- 824 Application Advice
- 864 Text Message
- 812 Debit / Credit Adjustment
- 861 Receiving Advice / Acceptance Certificate

Technical Error Notification

The EDI 997 Functional Acknowledgement (FA) communicates technical errors in EDI syntax, but not those identified when the data is processed by the receiver’s business application. In discussion with RVCF members, we find that in retail, FA’s are fairly well understood, commonly used and successful.

EDI 997 Functional Acknowledgements are mandatory for every EDI transaction (e.g. Invoice, PO, Ship Notice, etc.). The FA is automatically created by the trading partner’s EDI translator. They are sent by the receiver to the sender and indicate:

1. The **transaction** was received and
    a. Accepted, or
    b. Rejected due to syntax errors, or

c. Accepted with Errors which were identified by the translator, but the document was brought into the receiver's application system and processed.

Suppliers should reconcile ASN FA's to insure the retailer got the transactions and could translate them. There may be conditions under which the receiving system cannot identify the sender (e.g. a certificate problem) and the receiving system cannot process the transaction or send an FA to the sender. If no FA is received for a transaction or if transactions are rejected, a follow up with the retailer is required. Our survey indicates that some suppliers respond to the FA's they receive, but do not compare transactions sent with transactions acknowledged to make sure the retailer received all transactions. Most EDI translators can be set up to produce a list of the transactions not functionally acknowledged.

See *Appendix B* for Functional Acknowledgement terms, concepts and fixing errors identified by FA's.

The same translator capability that determines whether an incoming transaction is syntactically correct on the retailer's side should also used by the supplier's EDI translator to determine if their outbound transactions are correct. While in-house EDI translators and EDI solution providers may differ in how they process data, they all have the capability to identify syntax errors in inbound and outbound data. If you are receiving FA's that indicate transactions are rejecting due to syntax errors, your EDI translator should be catching them before they are transmitted.

When using a third party EDI service, understand how they handle Functional Acknowledgements.

Business Error Notifications

An EDI transaction can successfully pass through an EDI translator, receive an "Accepted" FA, and still fail in the receiver's application if there are fatal errors in the data itself. For example, the GTIN was provided in the ASN, but it doesn't match the GTIN in the retailer's system. In this case an additional form of error notification is used.

As indicated above, the most common method for sending ASN business error notifications is a report sent via email. Retailers may also include photos or videos of carton damage, item shortages, torn labels, and so on.

In addition to email, there are a number of EDI transactions designed to notify trading partners of ASN business errors.

- The **EDI 824 Application Advice** is designed for business error notification, but is not widely used. It is intended as error notification for all EDI transactions including many used outside of retail. There are hundreds of codes listed in the transaction set; many are duplicates or ambiguous in meaning and use.

- The **EDI 864 Text Message** was used many years ago in retail and is still used by some retailers. The transaction has a free form text field and the error codes sent are unique to each retailer.

- The **EDI 812 Debit / Credit Adjustment** provides detail information for chargebacks, including those related to the ASN and shipping label. Although there has been interest in this document over the years, it is not widely used and again, contains a very long list of adjustment codes that are not well understood or standardized in retail. The timing of the Debit / Credit Adjustment is generally not acceptable for ASN's because it accompanies the payment information. However, some retailers can send the Debit / Credit Adjustment when an ASN error is discovered.

- The **EDI 861 Receiving Advice / Acceptance Certificate** provides information on goods received by the retailer and may provide error information to the supplier if what the retailer received

differs from what the supplier sent; i.e. the receipt doesn't match the ASN. This transaction is not widely used in retail.

The one thing these error notification methods have in common is a lack of standardized coding including well defined and specific reason codes with an understanding of the appropriate response.

For example, the error message "Missing SSCC" could mean:

- The Serial Shipping Container Code was not on the label;
- The SSCC was on the label, but defective;
- The SSCC was on the label, but the label was not in the correct location on the carton to be read;
- The SSCC was on the label or in the Ship Notice, but the number itself was invalid;
- The SSCC on the carton didn't match an SSCC in the Ship Notice;
- The Ship Notice was never received so all SSCC's in the shipment are "missing".

The supplier needs well defined, specific, and actionable information to determine ASN error root cause and fix the issues. To help with this, RVCF has put together an *ASN Error Code Matrix* with the following information:

Error Code Matrix

- Error name;
- The type of error (EDI, Label, Missing / Duplicate / Invalid Data, etc.);
- Notes with a description of the error, possible causes and fixes;
- Where applicable, the EDI Segment / Element (e.g. BSN04)
- Possible matching error codes used in the EDI 824 Application Advice;
- Suppliers or retailers may add a column to indicate the codes used for that error.

Fixing Errors

ASN error notification and the expected response will vary by retailer.

Technical errors communicated in a Functional Acknowledgement may call out the first error encountered in the ASN and not subsequent errors. If this is the case, the entire ASN should be reviewed to see if there are multiple errors to fix. If the retailer sends an FA with the status "Accepted with Errors", understand their expectations which may be to fix and resend the ASN or it may be to not resend the transaction, but fix the error in future ASN's. If the retailer sends a status of "Rejected", in most cases they want the entire ASN fixed and retransmitted. When resending ASN's use different control numbers than those sent in the original transaction. Some retailers may ask that the ASN be designated as a Replacement ASN in the beginning segment of the ship notice. Some retailers want the Shipment ID number from the failed ASN to be used in the replacement ASN (so they know it is the replacement), but others might reject the ASN as a duplicate if the same Shipment ID number is used. Understand the requirements for each retail trading partner.

If the error is a business error, the above concepts apply. Understand if a retailer communicates the first error or all errors in an ASN.

When bad data is the source of the error, the data should be changed in the supplier's source system and the ASN reprocessed from their business application (including pre-processing, if used), and then through their EDI translator (in house or third party).

Normal security protocols are followed when changing data:

- Provisioning access
  - Determine who can make changes. This should be reviewed, minimally, annually and when an associate's job responsibilities change.
- Separation of duties must be maintained (SOX Compliance)
  - No one individual should have the ability to create or change each step in the lifecycle of a transaction, for instance, set up a vendor, issue a PO and approve an invoice.
- Data Change Logs
  - Change logs indicating who, what, and when, should be maintained for all changes.

Because ASN's are time sensitive, although not a best business practice, there may be provisions for directly changing the data that streams into the EDI translator. Make sure the same security measures are in place, including for those changes made by third party providers.

Supplier Check List:

- ✓ Understand each retailer's error notification process. Do they send a notification for the first error found in an ASN or for all errors in the ASN?
- ✓ Understand each retailer's requirements for fixing an ASN.
- ✓ If a "Functional Acknowledgement – Accepted with Errors" is received, does the retailer expect a corrected ASN or just asking to prevent future errors?
- ✓ If error notifications are sent via email, create a process to synchronize the email address used by the retailers.
- ✓ Review the master data change process and verify those provisioned to make changes.

Root Cause Analysis - Error Notifications vs. Error Reporting

Traditional error notifications consist of a description of the error and the identification number of the associated document (e.g., the ASN number).

By aggregating additional ship notice and PO information, over time, it's possible to analyze the data to determine root cause for the errors. This data can include:

- Ship Notice Number
- Bill of Lading
- Serial Shipping Container Code
- Ship to
- Ship From
- Ship Date
- PO Number
- Standard Carrier Alpha Code
- Line Item data (GTIN, quantity, seasonal item, UoM)
- The error description

Once compiled we can use Business Intelligence (BI) tools such as pivot tables and data visualization to look at patterns in the information. Using twelve months of data we may see that labels that do not scan well seem to be coming from one of the supplier's ship-from locations which may indicate label stock, printer maintenance or printer settings are at fault. Trends or patterns may show issues associated with specific retailer ship-to locations, seasonal products, product categories, factories, retailers, or carriers.

While the immediate focus is to fix the errors so product can be received and on it's way to the store or customer, long term analysis is an important component to preventing future errors.

EDI 856 Ship Notice / Manifest Terms and Concepts

TERMS AND CONCEPTS - GENERAL

GS1 - The GS1 organization creates and maintains standards used world-wide to provide a common foundation for business by uniquely identifying, accurately capturing and automatically sharing vital information about products, locations, assets and more. This includes guidelines for identification, barcodes, RFID, package measurements, images, label formats and more. GS1 maintains the numbering syntax and rules for Global Trade Item Numbers (GTIN) including assigning a unique GS1 Company Prefix which is licensed by the brand owner. GS1 creates standards for over 100 member organizations (countries) for several industries. GS1 US is the member organization for the United States and they manage the assignment of company prefixes for US based companies. RVCF and GS1 US work together to help our members better understand and use the standards. GS1 standards, while significant in the retail industry, are voluntary.

GS1 Company Prefix –A unique number licensed to a company through GS1 US in the United States. It is used to create identifiers for a Global Trade Item Number (GTIN), Global Location Number (GLN), Serial Shipping Container Code (SSCC) and several other GS1 Identifiers. If a company "buys" single GTINs without going through GS1 US, they are not licensed to use the Company Prefix needed for other identification including the mandatory Serial Shipping Container Code (SSCC) in an EDI Ship Notice. Technically, the company prefix assigned in the US is called a *U.P.C. Company Prefix* and used to create a GTIN-12 encoded in a UPC barcode. Originally the US prefix was six digits, but now it is variable length and can be from six to nine digits. Adding a zero in the left most position of a *U.P.C. Company Prefix* creates the *GS1 Company Prefix* used to create other GS1 identifiers such as a Global Location Number (GLN) and Serial Shipping Container Code (SSCC). When a company acquires another company, the terms of sale may or may not include transferring the license to use the company prefix licensed by the acquired company. GS1 US must be notified of the transfer.

Global Trade Item Number (GTIN) – is used to identify a Standard Trade Item or Standard Trade item Grouping. The company prefix used to create a GTIN along with the unique item number assigned by the brand owner, makes the GTIN unique worldwide, however, it does not identify the country of origin for the item. A GTIN is either 8, 12, 13 or 14 digits. GTIN-8 and GTIN-13 are assigned by brand owners outside North America. All are approved for use at Point of Sale in retail except the GTIN-14 which can be used for general distribution on a standard trade item grouping. A GTIN-14 must start with 1-8. A GTIN that is 14 digits, and starts with a 0, is a GTIN-8/12/13 shown in a "GTIN 14 format" used in some barcode types. GS1 maintains GTIN Allocation Rules which spell out whether a change to a trade item requires the assignment of a new GTIN.

Standard Trade Item - Any item (product or service) for which there is a need to retrieve predefined master data and that may be priced, or ordered, or invoiced at any point in any supply chain. It is identified with a GTIN-8, GTIN-12 or GTIN-13. A standard trade item is considered a consumer unit and is intended for use at Point of Sale.

Standard Trade Item Grouping - A predefined composition of trade item/s. The Grouping is not intended for point-of-sale scanning but may be used for ordering, shipping, receiving, etc. It is identified with a GTIN-14, GTIN-13, or GTIN-12. Examples of a Standard Trade Item Grouping include inner pack, case pack or unit load (pallet) when the configuration is standardized for the contained Trade Item, and, again, not intended for Point of Sale. If an inner pack or case can be seen at Point of Sale, then it must be marked with a GTIN-8, GTIN-12, or GTIN-13.

Carton Configuration – The carton configuration is the quantity of items in an inner-pack or a standard pack, and, if applicable, the number of inner-packs in a carton This data is part of the master data for the item and can be communicated in an EDI PO4 Segment in a PO, PO Acknowledgement or an ASN. Even if the right quantity of items is shipped to a retailer, if the carton configuration is not what they are expecting, the shipment, and the ASN, will be in error. Master data may also include the minimum order quantity for an item which should reflect the standard carton configuration so shipping partial cartons can be avoided whenever possible.

Master Data Synchronization – Item and location data must be accurate, up-to-date, and synchronized in the supplier and retailer's systems. This data includes product information such as GTIN, description, price, minimum order quantities; package/carton measurements; inner pack quantities; images; substitution rules; and ship-from location. Customer and location master data includes store numbers, addresses, contact information, and so on. Master data is exchanged when a new item or location is set up, and all adds, changes and deletions must be communicated and updated in a timely manner. Non-synchronized data is a major source of errors in purchase orders, invoices, shipping notices, and ecommerce consumer data.

TERMS AND CONCEPTS - EDI / SHIP NOTICE (ASN)

ANSI X 12 – is a sub committee of the American National Standards Institute assigned with maintaining Electronic Data Interchange (EDI) maps for over seventy electronic business documents in the US.

The EDI 856 Ship Notice / Manifest is also known as an Advance Ship Notice **(ASN).** It is the EDI transaction used by a supplier to convey the ship-to address, PO information, packaging and carrier information and the contents and structure of a shipment. It conveys the configuration of a shipment in varying levels of detail and provides an ordered flexibility for different types of shipments (replenishment, direct to consumer, mark for store, etc.) using Hierarchical Levels.

The shipment is automatically received when the individual carton Serial Shipping Container Code on the shipping label is scanned and matched with the information about the PO and carton contents in the ASN.

Serial Shipping Container Code (SSCC) – The Serial Shipping Container Code is an eighteen-digit, unique license plate number put on each logistics unit (carton, pallet load, tote, etc.). It is comprised of an Extension Digit, GS1 Company Prefix, a Serial Number for that logistics unit and a Check Digit. It appears in a GS1-128 barcode on the *GS1 Logistics Label*. When scanned and matched to the EDI Ship Notice, the logistics unit is linked to data about the PO and carton contents for automatic receiving. The SSCC goes in the MAN segment of an ASN (Markings and Numbers).

Hierarchical Levels – HL's are a way to "sort" the contents of the ship notice in a logical order. The HL's themselves do not denote the type of data in them (Shipment / Order / Case / Item), they just indicate the order in which the ship notice data should be processed. In retail the first HL is the Shipment, the second HL contains information about the PO. The following HL's depend on whether the ASN has a *Pick and Pack* or a *Standard Pack* structure. The type of structure is called out in the first segment of the ASN. The two structures may never be combined in one ship notice.

Standard Pack Structure: An example of the *Standard Pack Structure* may be: HL1 is Shipment; HL2 is Order; HL3 is Item (GTIN); HL4 is Pack Level (SSCC) with all of the Carton SSCC's containing that Item (GTIN) listed under the Item Level. That may be followed by another GTIN and the carton SSCC's which contain that item. That may be followed by the next Order Level if the ASN covers more than one PO, and so on. The structure may also include a Pallet Load level if used. **If any of the cartons in the shipment are partial or a non-standard mix, the *Pick and Pack Structure* must be used.**

Pick and Pack Structure: The Pick and Pack structure lists the Shipment (HL1); then Order (HL2); then the Carton (SSCC) level followed by the Item (GTIN) level, listing the GTINs and Quantity in that carton. That can be followed by the next carton and the items contained in that carton, and so on. Another Order HL may be used if the shipment covers multiple orders. The structure may include a Pallet Load level if used. The *Pick and Pack Structure* will work for any shipment configuration, including one with only *Standard Packs*. If any of the cartons are partial or a non-standard mix, the *Pick and Pack Structure* must be used. The *Pick and Pack Structure* will accommodate a non-standard mix when a number of random items are ordered and simply put in a carton or tote for shipping.

Logistics Unit – A logistics unit is a carton, tote or pallet load used to move goods. A *Standard Trade Item Grouping* may be a logistics unit. A logistics unit may also be a non-standard carton, tote or pallet load, put together for a shipment, and may contain a random assortment of trade items and/or partial cases / inner packs.

PRO Number – is a unique number assigned by a Less Than Truckload (LTL) carrier to a single shipment. It is used by the carrier to track the shipment, and is also known as the carrier invoice number. Each carrier in a multi-carrier shipment will assign its own PRO number, but the shipper may request status from the first carrier using the original PRO number at any point in the delivery. It is sent in the REF Segment of the ASN at the Shipment Level (HL 1).

GS1 Bill of Lading – The *GS1 Bill of Lading* is both a number and a document format. The BOL number uses the GS1 Company Prefix to create a unique ID number for the shipment. The standardized form provides the shipper, carrier, and retailer with the information needed in a common format, including legal / liability verbiage. It's used for Less Than Truck Load (LTL) and Truck Load (TL) ground transport within the U.S. The BoL number goes in the REF segment of an ASN, at the Shipment Level, although some suppliers use the BoL number as the unique Ship Notice Number in the BEG segment. When this is the case, the BoL number should also appear in the REF segment so it can be identified as such by the retailer.

Standard Carrier Alpha Code (SCAC) - The Standard Carrier Alpha Code (SCAC) is a unique two-to-four character coding system used to identify transportation companies. The National Motor Freight Traffic Association, Inc., (NMFTA) assigns SCAC codes. They have an annual subscription to allow access to the most current list of codes. (https://nmfta.org/scac/). The SCAC code goes in the Shipment Level of the ASN, in the TD5 Segment (used for transportation information).

Barcode and Label Errors

Common label issues include the inability to read the Serial Shipping Container Code (SSCC) barcode and label placement on the carton.

Barcode / Label Terms

The GS1 Logistics Label – Information about the GS1 prescribed label format can be found at GS1.org by searching for the "*GS1 Logistics Label Guideline*". The document provides guidance for logistics labels worldwide. The concept behind the structure is to provide flexibility and functionality while still adhering to convention. The label has various zones or building blocks which can be mandatory or optional. Within the zones, data attributes may also be mandatory or optional. Blocks of information commonly requested by US retailers include "From", "To", "Carrier", "Store", "Contents", and the mandatory SSCC in both a barcode and human readable at the bottom of the label. There are guidelines about font size, placement of the Human Readable Interpretation (HRI) and Zone Titles. Retailers in the US have settled on a fairly common format. However, it is unlikely that one label format will work for all retailers and all channels. Good label printing software provides for retailer-specific templates and the ability to create, modify and save formats.

Human Readable Interpretation (HRI) – GS1 standards say the HRI should go below the barcode on the *GS1 Logistics Label*, but in standards parlance, "should" means, while it is highly suggested, it is acceptable to put the HRI above the barcode if there is a good reason. Ensure it is clear the human readable data is associated with the correct barcode.

Barcode Verifier - Technical issues such as using the wrong symbology, bars and spaces not printed to specification, insufficient quiet zone before and after the barcode, can all be identified with a barcode verifier. A verifier is different from a scanner in that it measures, tests and grades the barcode. It must be maintained and recalibrated at regular intervals. The SSCC barcode on the *GS1 Logistics Labels* should be verified on a regular basis. Problems with using incorrect label stock, or stock that is dirty, wet or uses recycled paper (which may not be uniformly white), can be identified with a verifier.

Serial Shipping Container Code (SSCC) – The Serial Shipping Container Code is an eighteen digit, unique license plate number put on each logistics unit (carton, pallet load, tote, etc.). It is comprised of an Extension Digit, GS1 Company Prefix, a Serial Number for that logistics unit and a Check Digit. It appears in a GS1-128 barcode on the *GS1 Logistics Label*. When scanned and matched to the EDI Ship Notice, the logistics unit it linked to data about the PO and shipment contents for automatic receiving.

GS1-128 Symbology – A type of linear barcode used to encode alpha-numeric data. GS1-128 is one type of 128 symbology. It can be used to concatenate a GS1 Key (e.g. Global Trade Item Number), and attributes for that GTIN (Serial Number, Expiry Date, Batch, etc.). This is done with a system of GS1 Application Identifiers (AI). The symbol is identified with a Symbology Identifier indicating it is a 128 barcode, plus a special "Function One" character in the beginning of the barcode indicating it is a GS1-128 symbol.

Application Identifier (AI) - A numeric system that identifies the attributes in a string of data encoded in some types of barcodes including GS1-128, GS1-Data Matrix and GS1-QR. For instance (00) is the AI for Serial Shipping Container Code, (01) is GTIN and (21) is Serial Number. The parenthesis character is present in the HRI for readability, but it is not encoded in the barcode itself. GS1 maintains the list and the rules for using AIs in the *GS1 General Specifications* found at GS1.org.

Logistics vs Carton Content Labels – Calling the *GS1 Logistics Label* a "GS1-128" or "UCC-128" label may cause some confusion. There can be more than one label on a carton using GS1-128 symbology, including those the supplier may use for internal purposes, such as a Carton Content label which contains the GTIN assigned to that standard trade item at the case level.

Barcode / Label Quality

Printers, Ink and Label Stock. For a high first-pass read rate on any barcode it is important to select the right printer for the application. There are several types of label printing technologies from which to choose for logistics labels. Printers must be maintained, cleaned and calibrated. It's imperative that the manufacturer's recommendations are followed for the type of ink or ribbon, heat and speed settings, etc. Also follow the printer manufacturer's guidance regarding the type of label stock to use. Labels should be stored in a dry place; moisture can cause the barcode to feather when printed. Labels should be clean and white. If using recycled labels make sure they are not gray or speckled. The whiter the white, the blacker the black and the sharper the edges on the bars, the better the barcode will read. The economy of purchasing cheaper label stock may be offset by issues with label quality. Barcode verification will signal when label stock or printer conditions are causing an issue.

The biggest barcode label issue, based on RVCF member feedback, is torn or missing labels. With today's supply chain, often starting off-shore, going through multiple consolidation / deconsolidation steps, and using more than one intermodal method, a more robust label stock or print method may be needed.

Technical Specifications and Verification. GS1, in concert with the International Standards Organization (ISO), maintains technical specifications for each barcode type. They can be found in the *GS1 General Specifications* on GS1.org. Technical specs include using the right symbology, Start/Stop Digits, Guard Bars, Symbology Identifiers, Check Digits, and Application Identifiers. Barcode dimensions are also critical. The width of the bars and spaces, the height, magnification, contrast, reflectivity, and quiet space (white space before and after a barcode) must be within spec for a quality barcode. **Again, good label printing software, a well maintained printer and the right label stock will ensure high quality, as does using a barcode verifier which measures and grades these requirements.** Verification should be used at regular intervals in the printing process to catch problems before the shipment is out the door. GS1 guidance is that a label used in retail is verified as a grade "C". Scanning a stationary barcode with an image scanner (i.e. a mobile phone) doesn't "prove" the barcode is acceptable. It doesn't replicate the environment in which a moving barcode will be scanned, including ambient light, dirt, speed, type of scanner used, and so on. An original barcode must be verified – not a photographed copy.

Troubleshooting Barcode Errors. Fortunately many linear barcode issues with the SSCC can be identified with a trained eye. They include white lines, voids or feathered edges on the black bars or specs in the white spaces. Labels which are torn or wrinkled when applied, or printed with a wrinkled ribbon are obvious, as are those going around the carton edge or too close to the edge. Insufficient quiet space and bars that are not dark enough are relatively easy to identify. Be sure to reward employees when they stop to fix the errors. Often speed is encouraged and they may not feel they can stop the line to fix a problem. Have procedures in place to quickly reprint a torn label or swap out a printer that needs maintenance. Invest in barcode training for employees so they become valuable internal consultants to your business.

Barcode Application and Placement

There are general industry guidelines about **label placement** on the carton. The *GS1 Logistics Label Guidelines* suggest symbol placement should be at least 1.25 inches from the natural base and .75 inches from the side. Retailers may have more specific guidelines on label placement. Labels too close to an edge or corner can be effected by carton crush. If a carton is overpacked with soft goods, labels toward the center of the carton may be subjected to abrasion if the carton bulges.

There are common sense rules about not placing the label so the barcode goes around the edge of the carton and not placing another label over the logistics label.

New Capability - GS1 Scan4Transport - GS1 has developed and piloted an addition to the *GS1 Logistic Label.* A two-dimensional barcode (QR or Data Matrix), placed in the upper right-hand corner of the label can carry critical information for all parties along the supply chain, especially transportation carriers. The information can be available with or without internet access. Transportation partners don't always have access to the shipper or receiver's systems to get the information they need for delivery. *Scan4Transport* is not a new barcode type, but a new application standard for existing two-dimension (2D) barcodes and the GS1 system of Application Identifiers (AI). Currently, there are no plans to use it as a replacement for GS1-128 linear barcodes on the logistics label.

Some examples of the data include measurement and weight for that logistics unit, authority to leave, temperature to maintain, do not deliver before / after, hazardous materials, and deliver-to phone number. It can include a machine readable Ship-to name and address so it can be automatically transferred to the carrier's GPS system. Provisions have been made to include latitude and longitude for construction site or rural delivery. Altitude is added for drone delivery. For more information go to GS1.org and search for *Scan4Transport*.

The first data element in the *Scan4Transport* 2D barcode is the SSCC. Since a 2D barcode contains redundant data and highly effective error correction routines, it can often be read, even when damaged. The retail industry may consider adding the 2D barcode to the shipping label as there is no additional cost and it is easily added with label printing software. It provides a backup for capturing the SSCC if the GS1-12 barcode at the bottom of the label doesn't scan successfully.

Supplier Check List:

- ✓ Create routine schedules for printer maintenance, including verifying printer settings, cleaning and calibration.
- ✓ Ensure the labels are the proper type for the printers used and are quality labels (not necessarily the cheapest available).
- ✓ Make sure labels are stored properly so they remain dry and clean. If recycled paper is used for labels it needs to be sufficiently white and not contain dark specs.
- ✓ Labels bought in bulk may deteriorate over time when they get dirty, absorb moisture, lose adhesiveness, etc.
- ✓ Labels coming off the line should be tested and graded with a barcode validator at regular intervals.
- ✓ Put efficient processes in place to allow employees to swap out printers that are not working properly; reprint a label if torn or mis-applied; adjust ASN data if a shortage is found during picking and packing. Encourage employees to stop the line and fix the issues.

Disclaimer

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Appendix A - EDI Basics - Format, Translation, and Control Numbers

The Technical Components for an EDI message include:

- The ISX record is an optional component which indicates that the transmission contains qualifiers from other EDI versions, a foreign language or special characters.
- An EDI transaction is made up of the Interchange, Group, and Document (Transaction) sections.
- Control numbers are assigned to each section so it can be tracked.
- The outer Interchange envelop (ISA) indicates who the transmission is from and to.
- The Group component indicates the start and stop section for a group of like Documents.
- The Document component includes Header, Detail and Summary sections for each document.
- They are made up of **segments** of data such as Date/Time or Item Information.
- Within the segments are individual **elements** of information such as Item Description, Unit of Measure, Price and Global Trade Item Number (GTIN).
- Segments and Elements can be **mandatory, conditional or optional**.
    - **Mandatory** data includes segments of data that, according the ANSI standards, must be present in a transaction, such as the segment providing the Line Item Detail in a PO.
        - While segments of data might be optional, elements within those segments may be mandatory.
        - For instance, if you use an optional Date / Time Segment, it is mandatory to qualify the date sent (identify it as the PO Date, Ship Date, etc.).
    - **Conditional** data is information that must be present when certain data elements are used, whether those elements are mandatory or optional.
        - An example is a measurement (height or width) which, when used, must also include the Unit of Measure.
    - **Optional** data is information that is not required by ANSI EDI standards. It may, however, be required by a retailer. The Standard Carrier Alpha Code (SCAC) is an example.

EDI Translation Software translates the sender's internal data into X12 EDI format and performs editing and control functions including generating the required transmission envelope and control numbers. It verifies that the file meets X12 specifications. On the incoming, receiving side the software, it validates the transmission, and does a compliance check on the format received based on the version used. It generates the 997 Functional Acknowledgement back to the sender. EDI Translation may be in-house, software as a service (SAS), or outsourced.

Control numbers are assigned by the outbound translator at the Interchange, Group and Document level. Each level has a "record" with indicates the start and stop for that level. The Interchange (the whole EDI envelope for that transmission) has an ISA / IEA (start and stop) record. The same is true for the GS and GE records for the Group Level, and the individual documents are indicated by an ST record at the start of an individual document (e.g. an invoice) and SE indicating the end of that invoice.

While ISA Control Numbers are likely sequential, for various reasons they may not be received in sequential order (timing, location from which the transaction was sent, etc.). It is critical, however that they are unique within the trading partner relationship, indicated by the Party ID in the header of the interchange level. Individual document control numbers within a group always start with 001. It is the combination of the ISA, Group and Document Control Number that identifies an individual document.

EDI Structure and Control Numbers

ISX	O	Indicates use of qualifiers from other versions; foreign language; special characters. Control Number is unique.
ISA	M	Start of the Interchange; sender/receiver ID; dates; times. Control Numbers are assigned sequentially but may not be received sequentially.
GS	M	Start of a Group of individual transactions. Control numbers are unique for each transmission within each trading partner relationship.
First Document		Control Number 001
ST	M	Start of the first transaction, e.g. PO or Invoice. Control numbers start with 001 and assigned sequentially for the group.
Heading	M/O	The segment name for the beginning segment is different for each transaction type. Indicates ID number (PO or Invoice #), Date of transaction, etc. Will contain at least one mandatory segment; may contain other optional segments.
Detail		Line item detail; at least one mandatory segment; may contain optional segments. Each Segment contains elements belonging to that segment. Examples are Item ID # and Quantity. Qualifiers before an element Indicate type of ID# (GTIN or Model) and the UoM.
Summary		CTT segment gives a total unique to that document; e.g. Total Line numbers in a PO. Repeats the Control Number from the Heading of this transaction.
SE	M	End of first Transaction.
Additional Documents		Control Numbers assigned sequentialy: 002, 003, 004
GE	M	End of the Group. Repeat GS control number.
IEA	M	End of the Interchange; sender/receiver ID; dates; times. Repeat ISA control number.
IEX	O	End of the outer exchange envelope. Repeat ISC control number.

Appendix B – Functional Acknowledgements

The **EDI 997 Functional Acknowledgement** (FA) is a transaction sent by the receiver of a transaction to the sender. It indicates receipt of transaction and syntactical acceptance or rejection by indicating to the sender any technical problems encountered by the translator. It is not intended to serve as an approval of the actual data content.

An FA may be sent at the transmission group level, especially if it is an "Accept" FA. For example it may accept a group of ASN ship notices rather than each individual ship notice.

- **An FA checks compliance for t**he correct envelope structure which includes the outer Interchange data. Nested within that level is a Group of like transactions, e.g. ASN Ship Notices, and nested inside the Group are the individual documents or transactions.
    - The correct indicators are needed to determine where each level starts and stops.
    - Each level is given a unique control number which is used in the FA.
- An FA indicates if mandatory data is missing
    - Within a transaction there are mandatory segments of data, such as the segment in the ASN which provides information on the items shipped.
    - Within a segment, (whether the segment itself is mandatory or optional), there are mandatory data elements, such as a PO number.
    - Within a segment there may be optional data elements, but when used they require additional information (e.g. a date may be optional but when given, must be qualified by the type of date – Ship Date or Receive By Date, etc.).

When an ASN transaction is not acknowledged:

- Contact the retailer or EDI service provider to determine the problem.
- Based on the process outlined by the retailer, fix and resend the ASN/s.
- Determine cause of failure.

When ASN transactions are Rejected, Identify and fix the errors:

- The FA will indicate the position of the errant data, a code for the type of error and a copy of the data in error.
- Some retailer's EDI systems will reject an ASN when it finds the first error and some systems will go on to find additional errors in the ASN. Understand how the retailer processes a rejected FA.
- Fix the error/s in the source data (see "Fixing Errors").
- Use different control numbers so the resends can be tracked (acknowledged).
- Timing is critical; try to resend the ASN before the shipment arrives.
- Determine the root cause of the error.

When a transaction is Accepted with Errors

- Contact the retailer to determine if a new transaction should be sent.
- If the errors should be fixed and the ASN resent, see "Rejected", above.
- If the retailer is notifying you of the error for future reference and does not want a resend, determine and fix root cause.

Appendix C - Retailer ASN Checklist

It may be useful to document the following information for each Retail Customer:

	Corporate Information	
Corp	Retailer Name	
Corp	Main Phone	
Corp	Address	
Contact	EDI Name	
Contact	Phone	
Contact	email	
Contact	ASN Name	
Contact	Phone	
Contact	email	
Contact	EDI Testing Name	
Contact	Phone	
Contact	email	
Contact	PO Changes Name	
Contact	Phone	
Contact	email	
Contact	Label Testing Name	
Contact	Phone	
Contact	email	
Contact	Transportation Name	
Contact	Phone	
Contact	email	
Contact	Other Description	
Contact	Other Name	
Contact	Phone	
Contact	email	
Contact	3rd Party Testing Name	
Contact	Phone	
Contact	email	
Contact	Ret. EDI Service Bureau	
Contact	Phone	
Contact	email	
ASN Timing	Pickup time M - F	
ASN Timing	Pickup time S/S/H	
ASN Timing	Retailer Time Zone	
ASN Timing	Time from Send / Receive	
ASN Timing	From Receive / Process	
Documents	Ret Guide - Packaging	
Documents	Ret Guide - EDI	
Documents	Ret Guide - Shipping	
Documents	Ret Guide - Labeling	

What is the Process for:
ASN's
Testing / Retesting EDI
Report a late ASN
Report an incorrect ASN
Accept multiple ASN per shipment?
Use same BoL in multiple shipments?
If Replacement indicate in BSN?
PURCHASE ORDER
Report incorrect PO
Ask for a PO change
Supplier / Retailer PO >< match
PO closed after one shipment?
Unshipped items on backorder?
Substitutions allowed?
GS1 LOGISTICS LABELS
Testing / retesting labels
Location on carton for label
TRANSPORTATION BOOKING
Retailer's Carrier?
Reporting late arrival of carrier
Reporting insufficient capacity
Pallet requirements?
Different for Sat/Sun/Holiday?
Delivery instructions
SHIPMENTS
Report a late shipment
Report an incorrect shipment
Accept partial shipments?
PACKAGE CARRIER SHIPMENTS
One ASN per multiple carton shipment?
One ASN per individual carton?
GS1 BILL OF LADING
Required for BoL form?
Required for Bol Number?
Preferred for BoL Form?
Preferred for BoL Number?
EDI FUNCTIONAL ACKNOWL.
FA finds first error?
FA finds all errors?
Process for FA rejected ASN
Process for no FA per ASN
Resend FA "Accept w/ Errors"?

Appendix D – Resources

Introduction and Background on the RVCF Business Process Guidelines:

https://cdn.ymaws.com/www.rvcf.com/resource/resmgr/docs/RVCF_Business_Process_Guidel.pdf

The following resource links do not go directly to the document, as over time, the links may change or not bring back the most recent version. Go to the main website for the organization and search for the document title.

- Barcode quality and verification see the *RVCF All About Retail Compliance (AARC)* document found at RVCF.com.
- The *GS1 Logistic Label Guideline* can be found in found at GS1.org.
- *An Introduction to the Serial Shipping Container Code (SSCC)* can be found at GS1US.org
- The most comprehensive GS1 guide to their standards, including a Glossary of Terms, can be found in the *GS1 General Specifications* which is updated annually and can be found at GS1.org.
- For more information on print quality and verification see the Association for Automatic Identification and Mobility (AIM) document *The Layman's Guide to ANSI, CEN and ISO/IEC Linear Bar Code Print Quality* at AIMGlobal.org
- More information on *Scan4Transport* can be found at GS1.org
- For information on the GS1 Bill of Lading number format and forms, go to GS1US.org and search for *GS1 US Bill of Lading Guideline*. There is also a GS1 US BoL FAQ document.
- For information on ANSI EDI standards in the US, go to American National Standards Institute - ANSI Home.