



IntelliFill® i.v. Print Stream Interface Specifications



INTRODUCTION

IntelliFill i.v. operates with a simple data model in which there is only one item, a syringe. IntelliFill i.v. syringes contain a single drug in a specified dose and an optional final volume, which may be larger than the volume needed to contain the dose. Patient demographic information on syringe labels is optional.

Each syringe to be prepared by the IntelliFill i.v. is described within a *syringe order* describing one, and only one, syringe. The IntelliFill i.v. print capture interface assumes the pharmacy system prints out individual labels for each dose to be prepared; thus, each label is interpreted as a single syringe order.

IntelliFill i.v. presents itself to pharmacy information systems as a printer, intercepts a label print stream and attempts to parse that print stream into a series of syringe orders (one syringe order for each label it detects and parses). The pharmacy computer system instantiates the fixed IP address of the IntelliFill i.v. as that of a printer and prints to it exactly as it would to any label printer.

Each label must represent an order for one, and only one, drug. IntelliFill i.v. does not prepare multi-drug syringes and has no logic to determine which of several drugs it is supposed to make.

PRINT STREAM INTERFACE

The print stream interface takes one of two actions with each syringe order: it either passes the label to IntelliFill i.v. (enqueues it) or passes the label on to a designated printer for printing. Typically, the designated printer is the same printer for which the stream was originally intended. In effect, IntelliFill i.v. inserts itself between the pharmacy system and its label printer.

Use of print stream capture technology for syringe order transfer is designed to minimize or eliminate interface programming requirements. All pharmacy computer systems print labels that must, by law and practice, contain all the information required to prepare intravenous doses. By capturing and using that print stream, IntelliFill i.v. immediately establishes communication with a pharmacy information system without engaging in extensive (and expensive) dialog with another vendor.

Modifications to programming are generally not required, but can be handled by Baxa Technical Support, when necessary. The utilities that support implementation of the print stream interface include a wide variety of field-configurable tools, including the capacity for writing VB or Java Script, to handle variances in the data stream.

The capture utilities use the same stream originally intended for the label printer, permitting easy and rapid return to the prior method of dose preparation as a contingency plan. The print capture utilities are programmed to recognize and properly process a variety of printer control languages, including Zebra (ZPL II), Intermec (IPL), Sato and Datamax (DPL).

Because information received by the print capture utility is intended for printing, error processing passes unrecognized print stream content on to the intended printer. This minimizes the amount of intelligence required for the print stream interface. Labels with formatting or information the interface does not recognize get printed out for manual processing.

The specifications contained in this document do not require the data stream captured by these utilities to be printed on a label, however. As long as the stream can be split into individual syringe orders that ultimately can be parsed into the pending syringe list, this method adapts to virtually any data stream.

This print capture utility is currently designed to operate using TCP/IP communications or by the receipt of text files into a known directory path. The following specifications assume TCP/IP communications. Processing from that point is common.

Similarly, nothing in these specifications requires the output device to be a printer; it need only be a process that expects to receive a TCP/IP data stream.

RESPONSIBILITIES

It is the responsibility of the Baxa Chief Technology Officer or their designee to maintain this document.

It is the responsibility of the customer to provide Baxa with a sample label stream from which to configure the label receiving and parsing software.

It is the responsibility of the customer to alert Baxa before making any label formatting changes that affects the parsing rules associated with label capture.

FUNCTIONS

The interface is provided by a suite of programs consisting of the Label Processor, which handles the receipt and initial parsing of the print stream, and the Scheduler, which determines whether a given syringe order can be prepared on IntelliFill i.v. or must be passed through for manual preparation.

LABEL PROCESSOR

The Label Processor describes a series of channels, each of which represents a print stream it expects to receive from a specific sending system. The Label Processor can maintain and operate multiple simultaneous channels. Each channel contains information about the stream, including:

- Hosts – which hosts (by IP address or host name) are authorized to transmit to this channel
- Port – the port number on which transmission is accepted
- Printer language – which printer control language (including “none”) is used in the stream
- Collating – the relationship between the physical and logical labels printed on the system (in the case where a single logical label, representing one dose, may be printed across multiple physical labels)
- Parsing – the rules by which data are extracted from the label stream for each label

The Label Processor maintains the original print stream for each label so it can be sent directly to the intended printer when pass-through printing is required.

Labels are pre-parsed into a series of lines, each of which can be further parsed by rules configured in the utility. The utility permits parsing by character or word position in the line, by the use of regular

expressions or even by the creation of VB Script or Java Script for more complex parsing rules. Such rules can include the use of lookup tables maintained by the site.

The final output of the Label Processor is the Pending Syringe List, which contains a list of syringe orders that either can be passed through or enqueued on IntelliFill i.v.

SCHEDULER

The Scheduler periodically queries the Pending Syringe List for syringe orders to be processed. When it finds such orders, it sorts them by parameters dictated in its setup, queries the IntelliFill i.v. Formulary and, based on what it finds there, determines whether any given syringe order can be prepared on IntelliFill i.v. or must be printed for manual preparation.

SYRINGE ORDER SCHEMA

Each syringe order contains the following data:

| Field | Required | Comments |
|--------------------------|----------|---|
| BarcodeID | Optional | If supplied, contains the information to be placed in the bar code on the label IntelliFill i.v. places on each syringe it prepares. |
| DrugID | Required | May be acquired by lookup based on the received drug name. |
| DrugName | Required | |
| Dose Amount | Required | The scalar number portion of a dose. |
| Dose Units | Required | The unit of measure that qualifies the dose amount. |
| FinalVolume | Optional | The final amount of fluid (in mL) in the dose. If not specified, IntelliFill i.v. computes the final volume to be the amount of fluid required to deliver the dose. |
| Administration Date Time | Optional | The date/time at which the dose is due to be administered. |
| PatientID | Optional | A unique identifier for the patient – often an account number or a medical record number. |
| PatientName | Optional | The name of the patient. |
| PatientOrderID | Optional | A unique identifier for the order under which the dose is prepared. |
| PatientLocation | Optional | The patient nursing unit, room, bed. |
| Expiration | Optional | The number of hours after preparation within which the dose must be used. |
| STAT | Required | A Boolean expression indicating that the dose does, or does not require immediate preparation. |
| DC | Optional | A Boolean expression indicating whether or not the label represents a request to discontinue therapy. If the order is a DC order, the software looks for other orders for that patient and order ID and deletes them from the pending syringe list and/or the syringe queue if preparation has not begun. |
| Aux1 | Optional | A text field that can contain user-defined data to be extracted from the label |
| Aux2 | Optional | A text field that can contain user-defined data to be extracted from the label. |
| Aux3 | Optional | A text field that can contain user-defined data to be extracted from the label. |
| Aux4 | Optional | A text field that can contain user-defined data to be extracted from the label. |
| Aux5 | Optional | A text field that can contain user-defined data to be extracted from the label. |

DEFINITIONS

DATABASE

Information for the interface is stored in a Microsoft®JET Database in a variety of tables.

STREAMS

Configuration of the interface permits users to elect whether or not to include any non-required item, as well as the starting line, starting character position and fixed length of each field. Required items must be present except for the STAT flag, which interprets the absence of any valid entry as being not STAT. The delimiter between dose and final volume is also configurable. Items at the end of a line can be of variable length.

CHANNELS

A table contains each set of channel definitions as an XML definition stream.

LABELS

The list of labels extracted from streams with pointers back to the original stream.

PRINT PROTOCOL

The current print stream capture technology requires the print stream to be communicated over a TCP/IP connection. The feed may be either a raw data feed or may be brokered using Line Printer Daemon protocol as specified in RFC 1179 (<http://www.faqs.org/rfcs/rfc1179.html>).

PASS-THROUGH PRINTING

Pass-through printing occurs in one of three instances:

- The Label Processor encounters an error in the processing of a label. In this case, the portion of the original feed for that label is passed directly to the printer.
- The Scheduler determines a label represents a dose that cannot be prepared on IntelliFill i.v. In this case, either the portion of the original feed for that label is passed directly to the printer or a feed generated through Crystal Reports is sent. The latter occurs when the customer wishes more control over the formatting and content of the label than is possible with the original feed.
- IntelliFill i.v. discovers it is out of a required drug when it begins to prepare a dose.

Pass-through printing presumes a final destination as printed output, but does not require it. Any TCP/IP connection can be configured as a Generic/Text Only printer and can, therefore, be used to output a stream across that connection.

IntelliFill i.v. is manufactured for Baxa Corporation by FHT, Inc.