



Corporation
Software Engineering

Auto Data Serial Interface Specification v3.0

To: All Auto Data Users
 From: Rob D.
 Date: Monday, September 17, 2001
 Subject: Eagle Series Printer Auto Specification v3.0 – New! *Single Shot Mode.via TCP/IP*
 CC: John Bateson, Bill Smith

PROGRAMMING

Protocol Control Code

Control Character	Character Value (Hex)	Description
ESC	1B Hex	Command code to follow
ENQ	00 Hex	Get printer status
CAN	01 Hex	Cancel print job, Clear buffers
<i>SINGLE</i>	<i>04 Hex</i>	<i>Selects single mode/data..</i>
ST	07 Hex	Status code follows
PRON	06 Hex	Print Mode is on
PROFF	07 Hex	Print Mode is off
CR	0D Hex	End of Data String marker
XOFF	11 Hex	Suspend Host Data Xfer.
XON	13 Hex	Resume Host Data Xfer.

Command Code Table

CMD STR	Description	Eagle Function
ESC ENQ ENQ	Request printer status.	Returns ESC ST PRON or PROFF.
ESC CAN CAN <i>ESC SINGLE SINGLE</i>	Clear buffers. <i>Select the Single Shot mode of operation. This mode is reset upon a new message.txt.</i>	Clears the 10,000 byte job buffer. <i>The standard Sato/AutoData mode is suspended. Single shot AutoData is enabled. Or insert ^O in message line to enable.</i>
<i>SINGLE data data ... CR</i>	<i>Single Shot Auto Data stream.</i>	<i>Data is processed as original auto data string below but with immediate overwrite.</i>
data data ... data CR	Auto Data String. Full length or Tilde delimited fields are allowed. Note: Tilde '~' delimited fields provide robust print character selection to include the comma without wasted padding.	Confirm total received Auto Data field length. If valid, parse the individual fields and port the data into the selected message elements. RIP a new print image with the new data.

EAGLE PRINTER SPECIFICS

Eagle Printer Reset/Power on Sequence

1. Power is applied - the electronics are reset and the hardware initializes.
2. The ETS Kernel, "diskmon.bin" is booted from the Chip or Solid State Disk (SSD) V5.00+, SanDisk or floppy disk.
3. The ETS Kernel executes, "eagle.exe" from the boot disk.
4. Eagle.exe will identify and initialize all installed driver boards.
Display on the Eagle (H)and (H)eld (T)erminal:
Head 1 - Init
Head 2 - Init
Head 3 - Not Installed
Head 4 - Not Installed
5. Eagle.exe will identify and index all available text fonts.
Typically there are four bitmap font faces available: **Arial, Courier, Lucida and Outline.**
These font faces are available in multiple sizes to include: 16, 24, 32, 42, 64, 96, 128 and 128T jets.

Note: There is no minimum number of fonts that must be present to boot the Eagle.

6. Eagle.exe will prompt the user to load the last message that was used on the Eagle printer. If the user does not press a key on the HHT within 5 seconds the Eagle will automatically load the last message. This message data includes all printer setup information and message element data to include graphic components. *The Auto Data section of the message.txt file is scanned for graphic Auto Data target usage. If confirmed the Eagle software will attempt to load all graphic bitmap files found on the boot disk into memory! It is the users responsibility to clean unnecessary graphics files from the Eagle boot disk prior to executing the message.txt file with Graphic Auto Data targets.*
Display on the Eagle HHT:
Load – test1.txt ? (Y)es?
7. Eagle.exe will complete initialization and display the home screen.
Display on the Eagle HHT:
POSITION HEAD 1
DELAY: 2500 etc.
8. *To optimize the build time the Eagle printer is configured to build an Auto Data message ONLY upon receipt and not upon photocell or switch trigger. The repeat screen (^P) on the HHT is utilized to affect this mode of operation, just select the SATO or OEM1 repeat mode.*

The Eagle printer has completed the hardware and software initialization and is ready to accept and execute message print jobs across the serial communications connection to the host utilizing the Auto Data print language. The message.txt file must contain auto data information with regard to target message element data field and individual data length to allow reception and parsing of auto data command strings via this interface. Please refer to the Eagle printer operator manual for auto data setup specifics.

INTERFACE SPECIFICATIONS

Introduction

This section presents the auto data interface specifications for the Eagle printing system. These specifications include detailed information describing the host to printer interface. Initial versions of Auto Data supported Text and Barcode message element target types. *Graphic message element targets are now supported.*

Interface Types

The Eagle printing system provides support for both an **RS-232C Serial** and an **Ethernet TCP/IP** interface for connectivity to a host computer system. Mixed mode operation is not currently supported.

Serial Communication

The host computer or PLC must be programmed to the same serial port mode settings as described below. E.g., 19200, n, 8, 1. A NULL modem cable will provide connection between the two systems. Hardware handshaking is the default handshake protocol for Eagle Auto Data software v5.00+. Xon and Xoff handshaking is available upon request. Press ^K on the Eagle HHT to jump to the Serial communications port settings display. Any changes made to these settings are automatically saved and restored upon power cycle. Once a connection is established both Auto Data Commands and Auto Data strings or streams are transferred to the Eagle printer via this serial connection.

Ethernet TCP/IP Communication

Ethernet Auto Data support is supported via the use of the Leader TransEagle Network host software. This software is designed to execute on Win95/98 and WinNT. Eagle Auto Data support is provided by file drop detection and auto transfer of both message.txt and ???????.bin Auto Data binary files. Each Eagle printer folder contains an "Auto" sub-folder. Any message.txt or *.bin file dropped, created and or pasted into this folder is automatically transferred to the Eagle Printer. *Single shot AutoData is available via Ethernet TCP/IP via TransEagle v3.1.*

The Receive Buffer - Flow Control

The Eagle printer can receive and cache up to 9,000 chars of auto data inf. The receive buffer has a default size of 10,000 bytes of data. This buffer size should accommodate most Auto Data job requirements. In the event the receive buffer reaches 90% of its capacity the printer will indicate a buffer near full condition by clearing the CTS or Clear to Send RS-232C handshake signal or sending an X-OFF flow control protocol signal to the host system. The receive buffer will not be able to receive more data again until a "Buffer Available" condition occurs. This takes place when the receive buffer has emptied so that the buffer contains only 8000 bytes of data. The host will be notified of this buffer status change via the setting of the CTS RS-232C handshake line or by the transmission of the X-ON flow control protocol signal from the printer.

RS232C Serial Interface Settings

Asynchronous ASCII	Half-duplex communication X-On/X-Off Software Flow Control or <i>Hardware RTS/CTS Flow Control is default v5.00+</i> Bi-Directional Communication
Data Transmission Rate	19200 bps – default (9600 – 115200)
Character Format	1 Start bit 8 data bits No Parity 1 Stop bit

Electrical Specifications

Connector	DB-9 (male)
Cable	Null modem cable.

Pin Assignments

Pin	Direction	Signal Definition
1	To Printer	Data Carrier Detect
2	To Printer	Receive Data
3	To Host	Transmit Data
4	To Host	Data Terminal Ready
5	N/A	Signal Ground
6	To Printer	Data Set Ready
7	To Host	Request to Send
8	To Printer	Clear to Send
9	To Printer	Ring Indicator

Command and Data Streams

Overview

Data stream construction is very simple as there are only three types of data streams that the Eagle responds to when receiving and processing Auto Data. Two command strings and an Auto Data string. The Auto Data strings are cached in a receive buffer until the print trigger time. Command Strings are processed immediately upon receipt! All characters including the control characters, CR, ENQ, and ESC are in ASCII.

Cancel Job Command Stream

The Cancel job data stream is a simple three byte or character string. It is comprised of an Escape char followed immediately by two Cancel characters. This command stream is used as a synchronization command that effectively cancels any pending print job while clearing the Eagle Auto Data receive buffers.

<ESC><CAN><CAN> - Cancel the print job and empty the job buffer.

Request Status Command Stream

The Request Status (ENQ) command string is similar to the Cancel job command string as it also starts with an escape character followed by two ENQ commands. Upon receipt of this command the Eagle printer determines if any installed heads are disabled. If any installed head is disabled the Eagle status response will be PROFF or printer off. If all installed print heads are enabled the Eagle status response will be PRON.

<ESC><ENQ><ENQ> - Request print status.

Status Response

Upon receipt of the above ENQ command string, the printer immediately responds with three bytes of status information.

Example:

<ESC><ST><PRON> or <PROFF>

Auto Data Stream

The data streams must be of Total Auto Data length and be terminated with the CR control character. The Total Auto Data length is the sum the lengths of selected auto data field lengths as described in the message.txt file. Use WinEagle or any text editor to view the message.txt files of your choice to confirm Auto Data and default message data settings.

E.g.,

```
[AUTO DATA 1]
Field ID=T1
Field Length=20
[AUTO DATA 2]
Field ID=B2
Field Length=11
[AUTO DATA 3]
Field ID=G1
Field Length=2
...
[AUTO DATA 12]
Field ID=
Field Length=
... Total Auto Data length = 33
```

In this example we have targeted the Text one data field as the first Auto Data field of 20 characters or bytes. The second target field is Barcode 2 at 11 bytes. The third target field is Graphic 1. Text and barcode data consists of the live replacement data for their respective fields. Graphics data consists of an *.bmp graphic file name. The file extension .bmp is not to be included in the Graphic file name component. We have selected two characters of file name data as we elect to name our graphic files with a two digit numeric name. E.g., 00.bmp, 01.bmp ... 99.bmp. The default data that is printed upon receipt or selection of this message *Prior to the receipt of Auto Data*, is the actual text 1 data, the actual barcode 2 data and the graphic file selected in graphic 1. Unlimited printing of the default data is permitted prior to the receipt of the first valid Auto Data string.

Auto Data Stream Examples

A typical data string for the above Auto Data settings would be:

Example 1 - full length fields:

AAAAAAAAAAAAAAAAAAAAAA000000000055<CR>

Text 1 replacement data = AAAAAAAAAAAAAAAAAAAAAA

Barcode 2 replacement data = 0000000000

Graphic 1 file name = 55

Example 2 – Tilde delimited and full length fields:

Case # ^N1~22222~77<CR>

Text 1 replacement data = Case # ^N1

Barcode 2 replacement data = 22222

Graphic 1 file name = 77

Note: Text 1 now references counter 1 in it's data string. The actual data for Text 1 will be built using the above live text plus the current counter value.

Auto Data Stream Summary

Auto Data Streams received from either an RS-232C serial connection or via the Ethernet TCP/IP connection are all stored in the order received. The first Auto Data stream received after message.txt loading is automatically built and ready to print on the next print trigger. Subsequent Auto Data Streams are queued in the Eagle printer receive buffer. Queued Auto Data streams are de-queued and built upon print completion of the previous Auto Data Stream to utilize a larger build window. This Auto Data stream mechanism is utilized in our Text Consumer/Provider OLEDB Database applications. Auto Data streams or *.bin files, transferred by TransEagle network will be modified to reduce white space overhead with the use of the tilde delimiter.

The Auto Data receive cache is capable of storing approximately 170, or our Database 6 x 45 Auto Data strings.

Auto Data Build or Raster Image Processing (RIP)

The first Auto Data string will be built upon receipt – the HHT should beep. The following Auto Data strings will be cached and no further builds will be performed until a print trigger is received. Upon print trigger detection the Eagle printer will complete a single print of the previously built Auto Data and immediately upon print completion the Eagle printer will de-queue and build the next Auto Data string if one is found in the receive cache.

Eagle Auto Data Process Flow

Start – The Eagle printer is powered up.

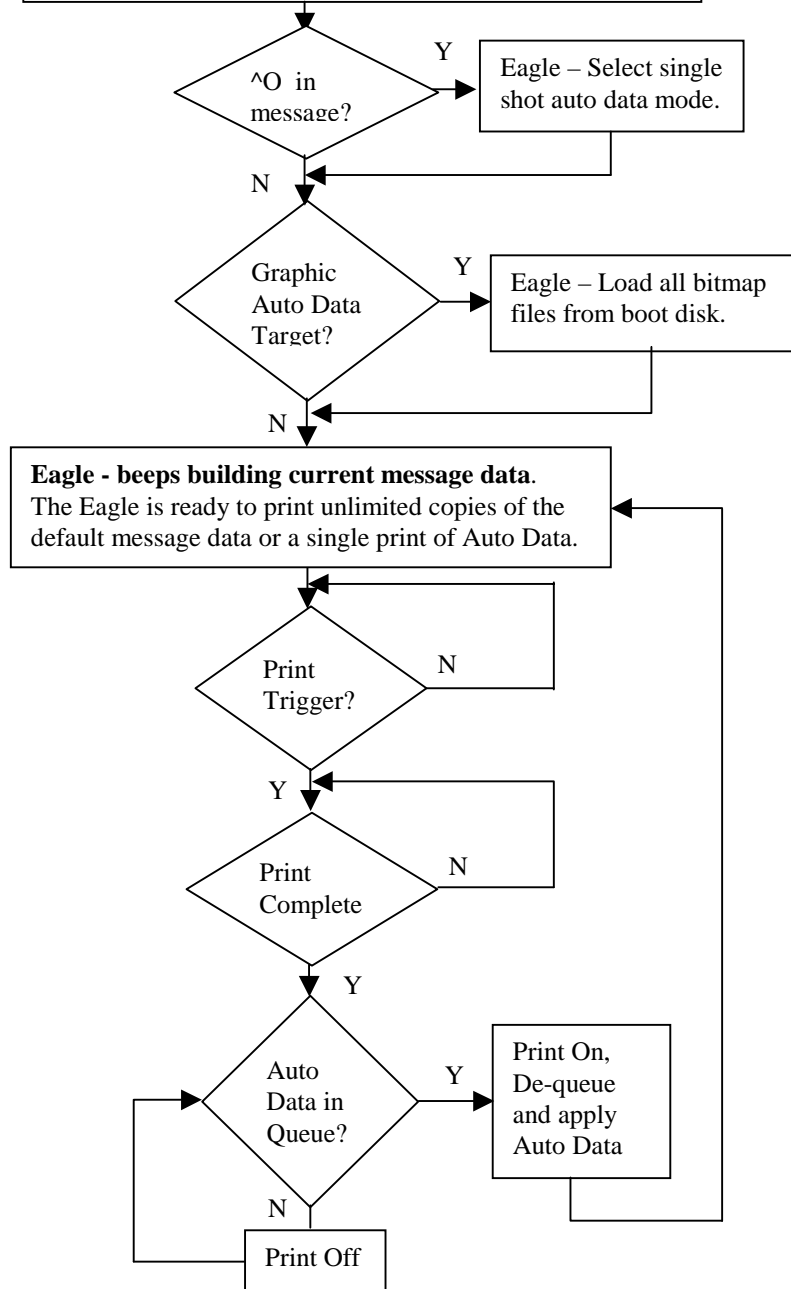
1. Serial and Ethernet TCP/IP communication channels are initialized.
2. Receive buffer is initialized and cleared.
3. Ready to load message.txt file.

Process
Serial
Data.

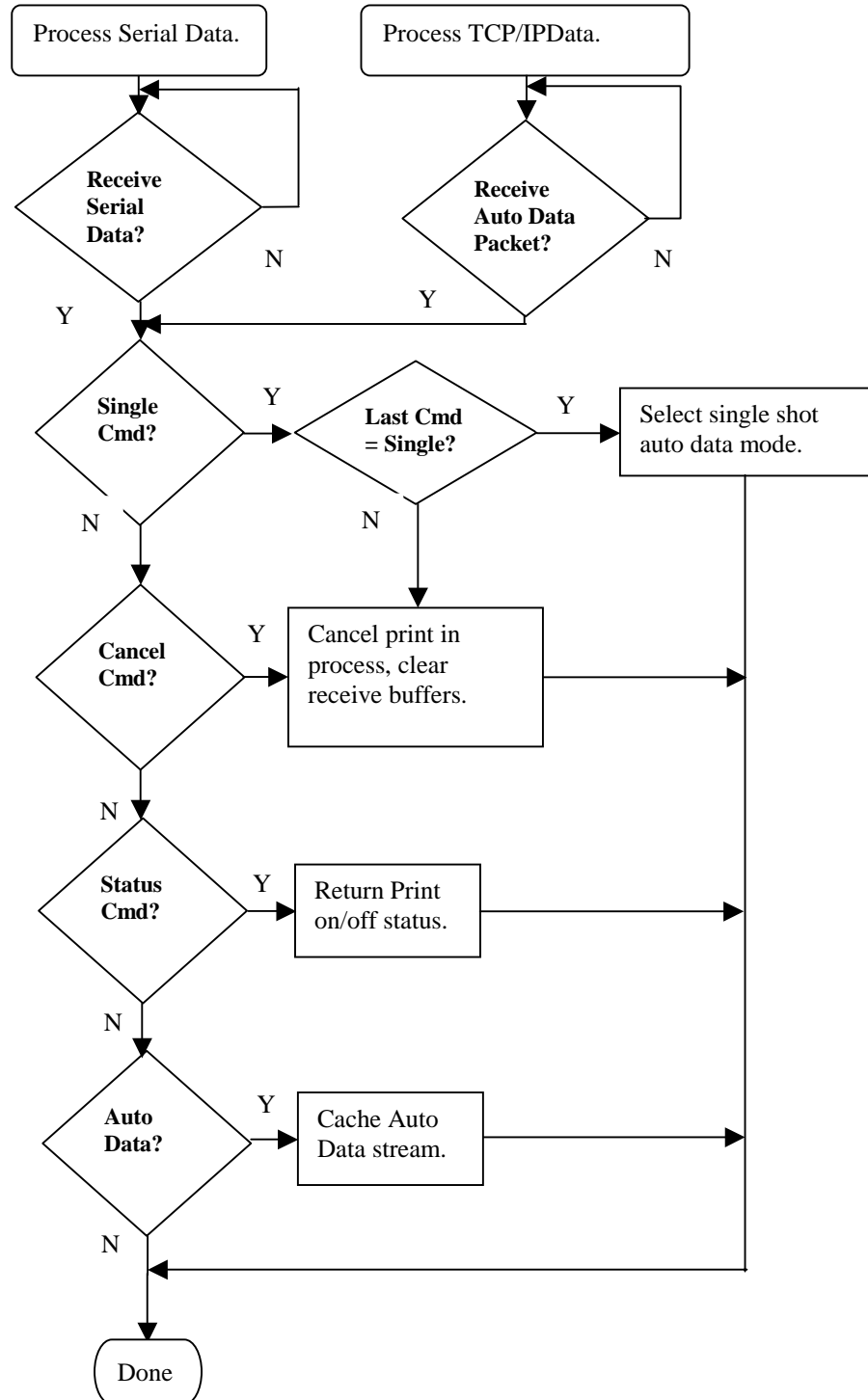
Eagle – Load message.txt file by:

1. Auto load last message.
2. Select to load from Eagle HHT.
3. Transferred to the Eagle via TransEagle Network.

Process
TCP/IP
Data.



Ethernet TCP/IP and Serial Auto Data Process Flow



Test files are available from Leader to help ease the implementation of Auto Data with your Eagle Printer installation. These files will soon be available from our web site at www.leadercorp.com.

Please feel free to contact Leader at the following for additional information:

Tel: 817.640.4610

Email: leader@leadercorp.com

WWW: www.LeaderCorp.com

Best Regards,

Rob D.
Software Engineer