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Technology at a Glance

- Resides in Cognitive printer
- Uses familiar CPL commands
- Requires printer programming to configure
- Once configured, anyone can print with it

Take Data Direct to the Printer

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Abstract

Data Direct opens the doors of barcode printing to a whole new world of possibilities. The built-in functionality of Data Direct enables Cognitive printers to communicate with virtually any data source. Data Direct filters the incoming data from standard barcode scanners, host systems, keyboards, weigh scales and a diverse variety of other devices. The result is the Cognitive printer can print a label, receipt, or tag in virtually any format, printed from virtually any device. Data Direct makes use of the Cognitive printer's programmable intelligence and alleviates host-side programming or additional hardware costs.

Some applications for Data Direct include direct keyboard or scanner input printing, supplementing an existing laser, ink jet or impact printer in a forms-printing application, or drop-in replacement in an application using another printer's proprietary command language. Cognitive printers manufactured in 2001 or later years may be upgraded to use Data Direct firmware.

Technology Overview

Data Direct is an extension of existing menu features built-in to the firmware available for all Cognitive printers. To configure Data Direct requires:

- Some programming knowledge
- Cognitive Programming Language (CPL) knowledge
- Familiarity with the host software
- Exact knowledge of the data sent to the printer

Data Direct firmware resides in non-volatile printer memory. A technician first writes and stores a Data Direct "Boot" file and "Stored Format" file in the printer memory. Then the printer is connected to the host (unless it is a wireless printer) and the data is sent to the printer.

Data Direct Theoretical Overview

1. Filter Data

Data Direct acts like a filter for ASCII data. Select the important information you need and...



2. Format Data

The data is immediately placed in a label format until...

3. Print It

All the data is received and the printer prints the label. Super easy! Very fast!

Data Direct makes use of several new CPL commands, including:

- Keyboard_mode
- Dataskip
- Variable Feedbutton

The *Cognitive Printer Programmer's Guide* includes detailed information about these and other CPL commands, including programming examples.

Data Direct files typically require less than 2 kilobytes of printer memory and do not affect other objects stored in the printer memory, including fonts, barcodes and images. Data Direct will usually increase printer performance because the label format is stored in printer memory and only variable data needs to be sent to the printer. For further information, see *Maximizing Printer Performance*, left.

Maximizing Printer Performance

A user may take advantage of the Cognitive printer's available non-volatile memory to store non-variable data in the printer. This reduces the print file size and decreases the "time to print." Cognitive provides *Fontcache* memory management software and/or CPL command-line functionality to enable easy printer memory management.

Product Development History

Data Direct evolved from requests made by Cognitive customers for a product that could work in a variety of applications with a minimum of installation hassles.

Data Direct Versatility



Any Data

Data Direct filters ASCII data from any data source.

Any Format

Data is immediately formatted, useless data is discarded.

Any Printer

All Cognitive printers are compatible with Data Direct.

What's the Problem?

In most applications, barcode printers are used to print one or two types (or formats) of labels, tags or forms. Thermal printing technology evolved around the requirements of printing barcodes with limited design, graphic and layout requirements. Thermal printer manufacturers developed heterogeneous printing languages, making integration a "Pandora's Box" of challenges for Warehouse Management System (WMS), Point of Sale (POS), Enterprise Resource Planning (ERP) and countless other host software products. To print a barcode required expensive and time-consuming programming for the host hardware and/or software products.

Today, the barcode printer can be one of the least expensive parts of the AIDC solution; Cognitive printers certainly are competitively priced! For this reason, end users demand a programmable printer, not a product that requires custom host software and/or hardware products.

Boot and Format Files

Data Direct is stored in the printer memory and consists of two parts: The "Boot" file directs the printer what data to print and what data to discard. The "Format" file tells the printer how to layout and print the data.

Why Data Direct?

Data Direct is small, fast and efficient. The "Format" file stored in the printer memory may actually increase printer performance and substantially decrease the time to print. Additionally, Data Direct uses the familiar CPL programming language and does not require knowledge of Visual Basic or other programming languages to function properly.

Advantages for the System Integrator and/or VAR

In most cases, system integrators and Value Added Resellers (VARs) will install and configure Data Direct. VARs benefit from a further advantage: custom printer capability. The Data Direct "Boot" and "Format" files are written and owned by the integrator or VAR. The integrator or VAR is protected from the competition because only they have the Data Direct files. This creates greater customer loyalty, a more versatile product and enhanced ease-of-use.

Features

Data Direct offers leading-edge features.

Data Direct:

- Supports any host device that can send an ASCII character string
- Filters key information
- Discards unnecessary information (proprietary printer language, for example)
- Requires a small amount of memory, usually less than 2KB
- Prints fast
- Uses familiar CPL command language
- Eliminates host-side programming or custom software
- Can eliminate expensive PCs from the application

Benefits

Data Direct benefits are summarized below.

Data Direct Benefits

Benefit	Description
Less Expensive Peripherals	Smarter printer works with inexpensive scanners, wands and keyboards, reducing the over-all price.
Lower Installation Costs	A little time spent programming a printer is less expensive and faster than re-programming a host software and/or hardware system.
Lower Media Cost	Standard thermal media costs less than complicated label/plain paper business forms.
Drop-in Replacement	Data Direct printer can supplement or replace out-dated printers, even other print technologies.
Supplement Existing Printers	Printer can supplement an existing ink jet, laser jet or impact printer.
Redundancy	Multiple printers <i>distributed</i> to multiple points of application means less down-time, higher reliability.
Faster Printing	Multiple printers print more labels simultaneously than even the most expensive big box printer.
Less Hardware	May eliminate the need for a PC, PDT or other expensive data input device.

Data Direct also provides additional benefits for VARs/Integrators, including:

- Custom products configured by the VAR/Integrator
- Increased customer loyalty
- Eliminates competition, they cannot replace a Data Direct printer

Peripheral Control

Data Direct enables Cognitive printers to communicate with a wide variety of peripheral devices. The possibilities are limitless but some peripherals include:

- Inexpensive hand scanners
- Barcode wands
- Weigh scales
- Keyboards
- PDTs

- Operating System independent; compatible with DOS, UNIX, Linux, Windows and other OS
- XML and future data formatting structures (requires consistent data formats between labels)

Data Direct development stems from Cognitive's many years of integration, technical and sales support in a wide variety of application environments. No two applications are exactly alike and Data Direct enables the customization necessary to make any printer a custom printer.

Example Application

Data Direct works seamlessly with Cognitive's existing print technology and use the familiar CPL command language. Once configured, Data Direct printers are transparent to the end-user.

As the following example illustrates, Data Direct may be used to print a complicated label format from a diverse array of data sources. This example illustrates a vial tracking solution used in a health care environment. The Cognitive printer supplements an outdated impact printer that had been printing expensive label/plain paper combination forms. By using a thermal printer for labels, the end user was able to save hundreds of dollars for every printer, every year!

Note: this example format file is complicated and produces no less than 22 labels! Most Data Direct Format files are easier to implement. Data Direct offers the versatility to print even complicated label formats like the one shown here.

Example Format File

The following file is 2KB in size and is stored in printer memory. This code formats the 22 labels shown under *Example Output Labels*.

```

!S~ 3 F EXAMPLE
WIDTH 380
VARIABLE DARKNESS 10
DELIMIT $
KEYBOARD_MODE HIDE
KEYBOARD_MODE LINE

DATASKIP UNTIL 10
DATASKIP 1
R90 18x23(1,3,1,1) 1085 45 $LINE$
R90 18x23(1,3,1,1) 1055 0 $LINE$
R90 18x23(1,3,1,1) 1025 0 $LINE$
R90 18x23(1,3,1,1) 995 0 $LINE$
R90 18x23(1,3,1,1) 965 0 $LINE$
R90 18x23(1,3,1,1) 925 0 $LINE$
R90 18x23(1,3,1,1) 895 0 $LINE$
R90 18x23(1,3,1,1) 865 0 $LINE$
R90 18x23(1,3,1,1) 835 0 $LINE$
R90 18x23(1,3,1,1) 805 0 $LINE$
R90 18x23(1,3,1,1) 755 0 $LINE$
R90 18x23(1,3,1,1) 725 0 $LINE$
R90 18x23(1,3,1,1) 695 0 $LINE$
R90 18x23(1,3,1,1) 665 0 $LINE$
R90 18x23(1,3,1,1) 635 0 $LINE$
R90 18x23(1,3,1,1) 575 0 $LINE$
R90 18x23(1,3,1,1) 545 0 $LINE$
R90 18x23(1,3,1,1) 515 0 $LINE$
R90 18x23(1,3,1,1) 485 0 $LINE$
DATASKIP UNTIL 91 2
DATASKIP 2
KEYBOARD_MODE FIELD
BARCODER CODE39-(4:9) 150 60 50
$BARDATA$
DATASKIP UNTIL 91 2
DATASKIP 2
BARCODER CODE39-(4:9) 150 750 50
$BARDATA$
DATASKIP UNTIL 91 2
DATASKIP 2
BARCODER CODE39-(4:9) 150 1430 50
$BARDATA$
KEYBOARD_MODE LINE
DATASKIP UNTIL 10
R90 18x23(1,3,1,1) 342 67 $LINE$
R90 18x23(1,3,1,1) 312 0 $LINE$
R90 18x23(1,3,1,1) 282 0 $LINE$
R90 18x23(1,3,1,1) 252 0 $LINE$
DATASKIP UNTIL 91 2
DATASKIP 2
KEYBOARD_MODE FIELD
BARCODER CODE39-(4:9) 363 60 50
$BARDATA$
DATASKIP UNTIL 91 2
DATASKIP 2
BARCODER CODE39-(4:9) 363 750 50
$BARDATA$
DATASKIP UNTIL 91 2
DATASKIP 2
BARCODER CODE39-(4:9) 363 1430 50
$BARDATA$
KEYBOARD_MODE LINE
DATASKIP UNTIL 10 2
R90 18x23(1,3,1,1) 90 67 $LINE$
R90 18x23(1,3,1,1) 60 0 $LINE$
R90 18x23(1,3,1,1) 30 0 $LINE$
R90 18x23(1,3,1,1) 0 0 $LINE$
DATASKIP UNTIL 10
END
    
```

Example Incoming Data Stream

```

[120; G [0m [:60 G [120; G [0m [:60 G [120; G [0m [:60 G
H2595 BLC C: 01/27/00 1634 H2595 H2595 H2595 H2595 H2595
HELPER,HELP R: 01/27/00 1704 HELPER HELPER HELPER HELPER HELPER
8882567 2WST 17Y M BLC BLC BLC BLC BLC
AD: BLUD BLUD BLUD BLUD BLUD
DX:
SDES: BLOOD H2595 H2595 H2595 H2595 H2595
HELPER HELPER HELPER HELPER HELPER
BLC BLC BLC BLC BLC
SREQ: NONE BLUD BLUD BLUD BLUD BLUD
SMEAR: WBC ___ EPI ___ GPC ___ GPR ___ H2595 H2595 H2595 H2595 H2595
HELPER HELPER HELPER HELPER HELPER
GMR ___ GNC ___ YST ___ NOS ___ BLC BLC BLC BLC BLC
OTHER _____ BLUD BLUD BLUD BLUD BLUD
MEDIA: H2595 H2595 H2595 H2595 H2595
EMB BAP CHOC HELPER HELPER HELPER HELPER HELPER
BLC BLC BLC BLC BLC
BLUD BLUD BLUD BLUD BLUD
[4;3;0;2;5;2;5;2;0}
[3tH2595 [0t [3tH2595 [0t [3tH2595 [0t
H2595 BLC H2595 BLC H2595 BLC
8882567 8882567 8882567
HELPER,HELP HELPER,HELP HELPER,HELP
[4;3;0;2;5;2;5;2;0}
[3tH2595 [0t [3tH2595 [0t
H2595 BLC H2595 BLC H2595 BLC
8882567 8882567 8882567
HELPER,HELP HELPER,HELP HELPER,HELP
    
```

Any incoming ASCII data may be filtered for essential information and printed on a Cognitive printer.

Using the Format file at left, Data Direct filters the incoming information and prints the very complicated medical labels shown hereafter.

Example Output Labels



This example shows one label format that prints 22 labels at once; each line indicates a cut between labels. For this health care application, duplicate labels are essential to tracking samples.

How Does it Work?

Data Direct requires some programming for the initial configuration, but once configured the Data Direct printer may be used by anyone.

Before beginning, the technician should be prepared with:

- Printed sample of the form/label to print
- Personal computer and necessary cables
- Text editing software
- Terminal communications software
- Data Direct firmware available from cognitive.com
- Cognitive Printer Programmer's Guide

For an experienced technician, the procedures are straightforward and predictable. They are:

1. Upgrade the printer to Data Direct firmware.
2. Trap the data sent to the printer using terminal communications software.
3. Using a text editor, determine the parts of the incoming data stream to filter and the parts to discard.
4. Design the Data Direct "Boot" file, enabling Data Direct in the Cognitive printer.
5. Design the Data Direct "Format" file., telling Data Direct what lines and characters to print and what data to discard.
6. Save the files to the printer memory using CPL Variable commands or *Fontcache* software included with every Cognitive printer.
7. Cable the printer to the host and send the data. Test and modify as necessary.

Summary

Data Direct is a value-added feature available for every Cognitive printer that enables integration into a limitless array of possible environments and applications. The initial configuration requires some programming knowledge, but the benefits are substantial, including owning a custom product for a custom application, distributed printing capabilities, lower printing costs, lower associated hardware costs, and no host-side programming required. Data Direct opens doors to a whole new world of barcode printing opportunities. For further information, contact Cognitive at the addresses listed on the back of this document.

Alternate Ways to Design Labels

Cognitive offers two ways to design label formats: label design software or command-line (CPL). Technicians not familiar with CPL may find the graphical label design software easier to use. Choose "Print to File" to save the CPL commands in a standard text file. For integrators familiar with CPL, CPL commands can be created using any standard text editor.

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