

Direct Color Systems®

Best Practice Guide: Direct-to-Garment Printing with DCS UV LED Printers

The versatile Direct Jet UVMVP Series and 7200z printers (F4 Editions) from DCS can now be used to create durable and resistant prints, with high strength and durability, when printing to light and dark colored fabrics/garments utilizing the Multisolve IRF4 UV inks.

This latest innovation marks the first ever DTG (Direct-to-Garment) printer for cotton, cotton blends, and 100% polyester and synthetics **without the need for harsh chemical pretreatments.**

The DTG market has long struggled with printing to polyester and synthetic blend garments with and without harsh chemical pretreatments. The ability to print quickly and easily to cotton, polyester, and various synthetic blends, without the need to heat press a chemical pretreatment, combined with the ability for the printed image to stretch with any fabric, can radically increase product offerings and profits for those in the DTG market.



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Before You Begin

Testing Garments

Take note that all garments should be tested for image receptivity, adhesion, and durability with final acceptance and suitability determined by the customer. Applications that include use within washing machine environments should be tested for durability.

Recommended Garments

Throughout this guide, the garments that are mentioned refer only to the garments listed in the Appendix at the end of this guide. Note that while fabric makeup may be the same, garments can vary greatly from manufacturer to manufacturer or even within the same manufacturer.

DCS will continue to build a knowledge base with regards to various garments and manufacturers. However, it is important that all materials be tested prior to printing. If you have any questions, please contact a Direct Color Systems Representative.

Harness the Power of your Software

The DTG Software Device Package installs a very basic set of print queues/settings. Due to the wide variety of garments and materials, you may need to create custom queues with custom settings.

The Color Byte Software Assurance Program grants members access to factory direct training services for the Color Byte software. Through this program, you can take comfort in knowing that the DCS Software Assurance Team is available to assist you in harnessing the power of your software.

Contact & Document Information




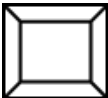



For the most current version of this and all other Direct Color Systems® documentation, visit www.DirectColorSystems.com, register your printer, and then access the Download Database.

DCS Corporate Contact Information
99 Hammer Mill Road
Rocky Hill, CT 06067 USA
Phone: +1 860-829-2244
Toll Free: 800-693-6376
Fax: +1 860-829-2255
Email: info@directcolorsystems.com
Technical Support Direct Dial: +1 860-829-1027
Tech Support Email:
techsupport@directcolorsystems.com

DCS EAA
Rua do Alto Das Torres
942, 4430-009
Vila Nova De Gaia, Portugal
Email:

Getting Started

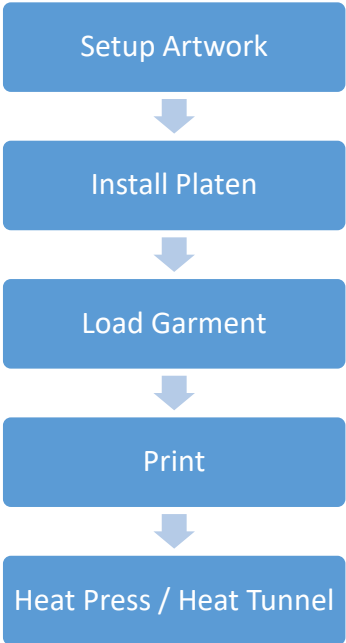
Here are some items you will need before you can start printing garments with your printer. See the Appendices at the end of this document for more information regarding ordering these components.

	GARMENTS (TESTED & APPROVED): DCS recommended or tested garments only
	F4 EDITION UV LED PRINTER: The IRF4 ink set is the only approved ink set for garment printing
	DTG SOFTWARE: Color Byte Version 10 or higher only . Updated LCF may be required
	GARMENT PLATEN: To hold various garments in place during printing
	HEAT PRESS: For performing post-print procedures
	DISTILLED WATER & SPRAY BOTTLE: To prepare certain types of garments
	PRESS PLATE: For preparing garments

Workflow Overview

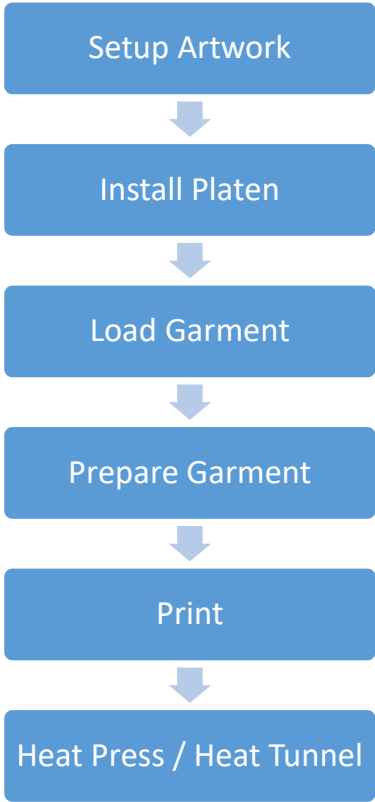
Garments without a white under base

Typically, white, or light colored garments i.e. light grey. By using white or light colored garments, you save on setup and print time as there is little to no preparation for printing to these types of garments and they do not require a white under base to be printed first.



Garments with a white under base

Darker colored or black garments that require a strong white under base to give the image vibrancy and accurate colors. These garments will require more setup time, which can vary depending on the type of shirt and the type of artwork design.

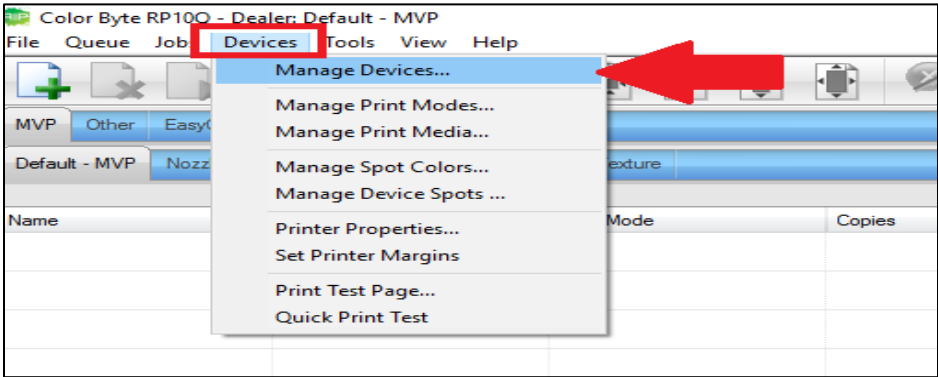


Detailed Workflow

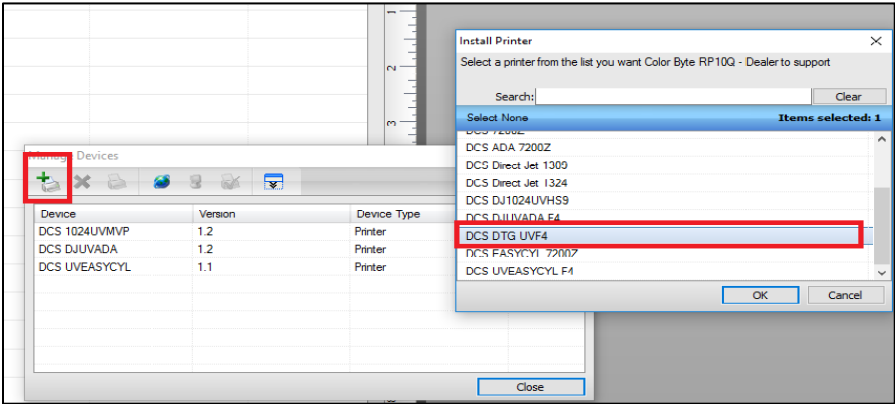
STEP 1: Setup Artwork

Install the DTG Device Package

Go to Devices > Manage Devices



Add the DCS DTG UVF4 Device for MVP



Choosing Queues

Six initial queues install with the DTG Software Device. These queues are setup to work with the DCS recommended garments listed in the appendix. Customers may need to create/design their own queues for optimal results.

Note: This “Choosing Queues” section refers to Device Package Version 3.102 Only, at this time. Always check the Online Updates or the DCS Monthly Newsletter for the most up-to-date device packages.

Queue Name	Use When...	Description
Light Shirt – Fast (1 Pass Queue)	Printing to white or very light garments	Will output 2x faster than the Light Shirt – Quality queue but it is also half the resolution which may result in dull colors in some cases.
Light Shirt – Quality (1 Pass Queue)	Printing to white or semi- light garments	This queue will output at a higher resolution than the Light Shirt – Fast queue and will produce more vibrant colors in most cases.
Dark Shirt – Fast (2 Pass Queue)	Printing to semi-dark garments	Throughput speed will be faster than the production and quality queues. However, the opacity of the white ink layer and color layer may not be suitable for some applications.
Dark Shirt – Production (2 Pass Queue)	Printing to dark or black garments	The most frequently used dark shirt print queue. Throughput speed is between the fast and quality queue. A higher resolution is used to achieve an opaque white layer, followed by a fast color layer.
Dark Shirt – Quality (2 Pass Queue)	Printing to dark or black garments	The most opaque white and most vibrant colors will be achieved with this queue. However, you sacrifice speed for the quality of the print.
Black Shirt – Quality (2 Pass Queue)	Printing to 100% Polyester/Synthetic Black Garments ONLY	Setup the same as the <i>Dark Shirt – Quality</i> queue but has the Knock Black Out feature turned ON which will remove varying amounts of black from the artwork to allow the black of the garment to be used instead.

Importing Artwork

Artwork can be imported into the RIP software two ways; **Direct Import**, and **Send to RIP with Underbase**. Both of these methods produce the same output. It is user preference when it comes to deciding which method to use.

The important thing to note is that the queues in the DTG Software Device are setup to automatically underbase (add a white primer and/or clear ink when necessary).

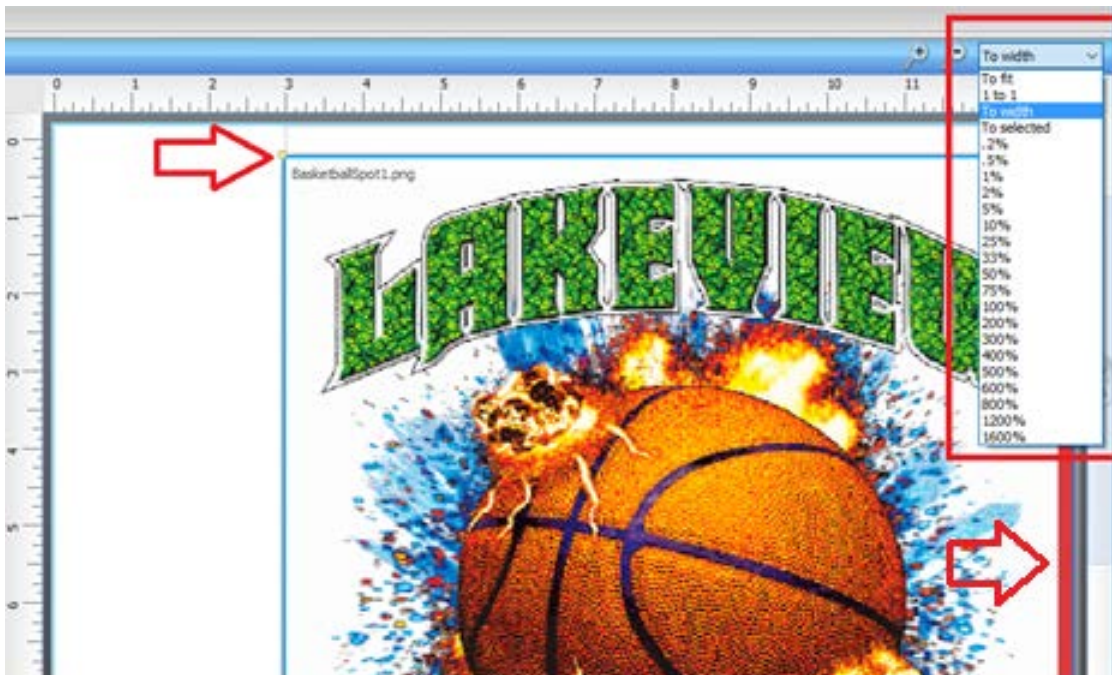
Direct Import

Current Direct Jet operators will find that this method is very different than the current workflow for printing DTS (direct to substrate). However, only certain files can be directly imported into the RIP. The recommended file types are; **PDF, PSD, PNG and TIFF** as these handle transparent layers. Transparent backgrounds are required; otherwise clear and/or white ink will be printed in those areas.

Images can be imported directly by either **File > Import File** or by simply dragging and dropping the file into the desired queue. Once the file is in the RIP, the RIP Tools can be used to manipulate the image for printing.

Adjust the orientation by dragging the image around the window. Use the drop down menu to adjust the magnification of the preview view.

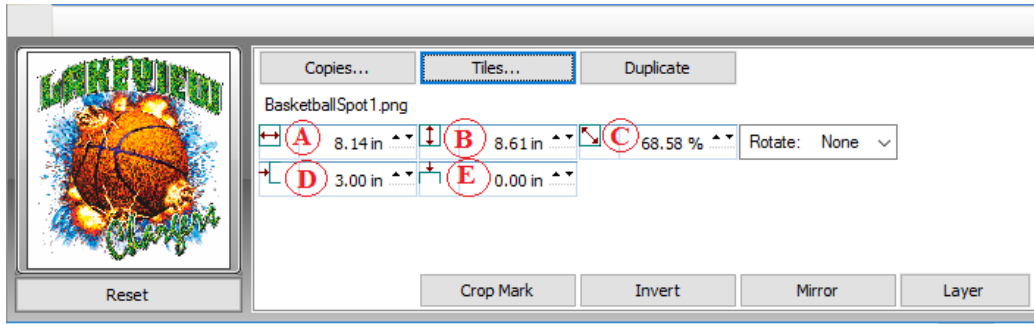
A red highlighted area may appear, indicating that the image exceeds the bounds of the media. Drag the image in the Media Preview Window until the image fits the print area and the red highlight disappears. Otherwise, this area will be cropped when the file is ripped.



When a job is selected, the job specific controls will show at the bottom of the Visual Print Manager.

A. Item Width **B.** Item Height **C.** Item Scale Factor **D.** Horizontal Position **E.** Vertical Position

The **Tiles** button can also be used to crop the image if necessary.



Send to RIP with Underbase

Important: *The workflow for sending files from the Front End of CB to the RIP is different from DTG printing to normal DTS printing.*

Once the artwork is designed and positioned properly, use **Send to RIP with Underbase** from the File drop down menu **for all queues; including queues that do not require a white underbase. Do Not** apply any primers/white underbase to any part of the artwork as the queues are setup to do this automatically. The default and recommended DPI setting when using **Send to RIP with Underbase** is 300.

STEP 2: Install Platen

Raise the Print Engine to its maximum height. Place the platen on a tacky mat on the media table. Use the zero fixture and edge guides to align properly. The adult platen is on a cantilever which must be oriented with the fixed end away from the front of the table. Print guide lines directly on the platen. These lines should be centered on the top and left side, at 1/8 wide and 1/2 in long.



STEP 3: Load the Garment



Load one layer of the shirt onto the top of the platen.



Line up the center of the collar with the guide line on the top or side.



Gently pull the top of the shirt, by the shoulders, off the platen and down until the collar meets the bottom of the platen.



Tuck the material into the rubber gaskets; start with the sides, then the bottom, and finally the neck. Do not stretch the fabric too tight across the platen as this may cause buckling.

STEP 4: Prepare Garment

Garments that do not require a white under base do not require any preparation move to: **Step 5: Print**

Garments that require a white under base



Spray the garment with distilled water, approximately 30 to 50 sprays. You want the entire print surface to be saturated.



Cover the saturated garment with the press plate.



Apply pressure evenly.



Remove the plate before printing.

STEP 5: Print

Raise print engine to its highest limit, send the platen to print home. Lower print engine to set print head height. For garments with a white under base turn on the auto-return option on the printer's control panel. Send your artwork to print.

STEP 6: Heat Press

1.

Place the White Nomex pad on the bottom plate of the heat press; cover it with the fitted Teflon Bottom Table Wrap.

2.

Place the single printed layer of fabric on the bottom plate.



3.

100% Cotton: Place the Teflon Sheet on top of the garment and apply heavy force at 300° F (149° C) for **2 minutes**.

100% Polyester/Synthetics: Place the Teflon Sheet on top of the garment and apply light force 300° F (149° C) for **10 seconds**.



4.

100% Cotton: Remove from heat press and hang or lay flat to air dry

100% Polyester/Synthetics: Let the top of the heat press Hover over the garment for **3 minutes**. **This will allow the liquid monomers to completely set and cure into the fabric.**



Note: *If using a Heat Tunnel instead of a Heat Press, it is the responsibility of the end user to determine the optimal settings.*

Appendix A: Fabric Guide

DCS Recommended Garments

Throughout this guide, we refer to working with 100% polyester and 100% cotton. Below are the details on the specific shirts that were used when making this guide. Remember that any deviation from the **exact** shirts listed below may need additional testing and/or custom queues.

All shirts can be ordered from SanMar® @ www.sanmar.com

COLOR	FABRIC	DESCRIPTION	PRODUCT CODE
White	100% COTTON	Gildan® Heavy Cotton™ 100% Cotton T-Shirt	5000
White	100% POLYESTER	Gildan® Gildan Performance® – T-Shirt	42000
White	50% COTTON/ 50% POLY BLEND	Gildan® – DryBlend® 50 Cotton/50 Poly - T-Shirt	8000
Black	100% POLYESTER	Sport-Tek® – PosiCharge® Competitor Tee®	ST350
Black	100% COTTON	District® – The Concert Tee®	DT5000

Polyester/Synthetic

The term polyester does not actually refer to one type of fabric but to a class of many which are made out of long polymer chains. The fabrics are generally synthetic, making the fabric and fibers extremely strong. The IRF4 UV Inks print very well to 100% Polyester and Synthetic materials because of their plastic like characteristics and their strong fibers. Although there is a lack of fibers, distilled water is still used to prepare dark garments.

Cotton

While UV Ink bonds well to cotton, cotton fabrics typically have fibers sticking up from the surface. This is fine for white cotton garments. However, for dark cotton garments that need a strong white underbase, the shirt needs to be prepared with distilled water. The distilled water helps to keep the fibers down, preventing the ink from sticking to them; resulting in a gritty/flaky feel after printing. Distilled Water has to be used carefully though. Too much and a weak bond is formed between the fabric and ink. Too little and the white will not be opaque and the colors will be dull.

With that being said, there are some cotton garments that will perform much better than others. For example, a Ring-Spun Cotton garment is going to be ideal if you require a white underbase. Ring-spun cotton is made by twisting and thinning the cotton strands to make a very fine, strong, soft rope of cotton fibers. When it comes to printing, the tighter and finer the rope of cotton fibers, the better.

Appendix B: DTG Accessories

Platens

Product Code	Description
DG-10X18ASP	DCS TucLoc Adult Cantilevered 10"X18"(254X457mm)
DG-10X13YSP	DCS TucLoc Youth 10"X13"(254X330mm)
DG-7-5X10TP	DCS TucLoc Toddler 7.5"X10"(191X254mm)
DG-7-5X10DTP	DCS TucLoc DUAL TODDLER 7.5"X10"(191X254mm)
DG-6X6-5CP	DCS TucLoc Chest 6"X6.5"(152X165mm)
DG-6X6-5 3UPCP	DCS TucLoc 3-UP CHEST 6"X6.5"(152X165mm)
DG-4-25X16-5SLP	DCS TucLoc SLEEVE 4.25"X16.5"(108X419mm)
DG-4-25X16-5DSL	DCS TucLoc DUAL SLEEVE 4.25"X16.5"(108x419mm)
DG-HP-SF	DCS HAT PLATEN with STANDARD PROFILE fixture
DG-LPF-HP	LOW PROFILE fixture, 2.875"(73mm) Tall (must include DCS HAT PLATEN to use)
DG-LLPF-HP	LOW PROFILE fixture, 2.625"(67mm) Tall (must include DCS HAT PLATEN to use)
DG-VF-HP	VISOR fixture (must include DCS HAT PLATEN to use)
DG-4x4-5POCKR	DCS POCKET RISER for Youth and Adult TS Platens 4"X4.5"(102X114mm)
DG-5-75x10HR	DCS Hoodie Risers for Youth and Adult TS Platens, 5.75"X10"(146X254mm)
DG-10x13POLOR	DCS Polo Riser for Youth and Adult TS Platens, 10"X13"(254X330mm)

Heat Presses

Product Code	Description
DG-DK7-110V	Digital Cap Press 110V (incl Std Cap Form)
DG-DK7-220V	Digital Cap Press 220V (incl Std Cap Form)
DG-DKA-47BF	DK7 Standard Curved Cap Form 4X7" (102X178mm)
DG-DKA-EURO	DK7 Medium Curved Cap Form 3.5X6.5" (89X165mm)
DG-DK20A-110V	Digital Shirt Press 16X20" (406X508mm) Clam Auto Pop Up 110V
DG-DK20A-220V	Digital Shirt Press 16X20" (406X508mm) Clam Auto Pop Up 220V
DG-DK20S-110V	Digital Shirt Press 16X20" (406X508mm) Swinger 110V
DG-DK20S-220V	Digital Shirt Press 16X20" (406X508mm) Swinger 220V

Heat Press Accessories

Product Code	Description
RMN-1/2 NOM1620	1/2" 16x20" (406X508mm) White Nomex pad
DG-TRM-SM1620	Teflon Press Sheet 16x20" (406X508mm)
DG-CTW-1620	Teflon Bottom Table Wrap 16x20" (406X508mm)