Canon Printer Software
For The
Commodore-Amiga Personal Computer

Software and Manual
by
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Distribution
by
Canon Europe N.V.

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2. Support

Wolf Faust can be reached for technical support via InterNet (wfaust@venus.adsp.sub.org) and CompuServe (100116,1070). **Please speak to your printer dealer and Canon Hotline Service before writing to Wolf Faust about problems with the software!.** Questions that are not directly related to problems with the Software will not be answered.

Wolf Faust can be reached at the following address:

Wolf Faust
Am Dorfgarten 10
D-W-6000 Frankfurt 50
Germany

If you are making a bug report, don't forget to include your phone number. And make sure you have gone through the problems mentioned on page 79.

3. Welcome to the CanonDisk

CanonDisk is software for controlling Canon printers with the Commodore-Amiga personal computer with the purpose of creating high quality output. The CanonDisk is divided into two parts, a Canon driver and a Canon picture-printing program. CanonDisk's main qualities include:

CanonDisk's features

- Prints most IFF graphic pictures from disk (including HAM8, IFF24, IFF8 and EHB) using minimal memory. The output produced is either 24 bit(16.7 million colours) or 8 bit(256 shades of grey).
- Workbench printer drivers all currently support Canon printers. The drivers have been designed specifically for each printer and give several unique features.
- Allows you to print poster sized images spread over multiple pages.
- Definable dither patterns including preset patterns.
- 16-point colour adjustment for each colour component. This gives the user many features including gamma correction, and contrast and brightness adjustment.
- Ink compensation for the correction of ink impurities.
- Workbench 2/3 graphical user interface (GUI).
- ARexx support.
- The Canon drivers can print up to 256 shades of grey from normal Amiga applications. Standard Amiga drivers are limited to 16.
- Settings for page size, paper margins and the size of graphics to be printed.
- Settings for built-in printer typefaces.
- The software is very fast and automatically uses improved routines if the software is run on an Amiga with a 68020/30/40 CPU.
- Includes a very fast printer drivers for the PageStream DTP package.

These are not the complete capabilities of the CanonDisk, merely some of the highlights.

3.1 System Requirements

CanonDisk is compatible with the entire family of Amiga computers. These include the A500, A1000, A1200, A1500, A2000, A2500, A2500/30, A3000 and A4000. CanonDisk was designed to run under Workbench versions 2, 2.1 and 3. The Canon printer drivers also work under Workbench 1.3.2, but they must be controlled via the keyboard (CLI) because all Canon programs tha have a GUI require at least Workbench 2.

Printer	Switch Off	Switch On
BJ 10e	3, 6, 7, 9	5, 8, 10
BJ 130e	all	SW2-6
BJ 300	all	SW1-1 and SW1-2
BJ 20	all	5, 10, 11
BJ 200	all	1, 4, 10, 11

Table 3.1: Printer dip-switches.

It is a feature of the CanonStudio picture-printing program to be able to print using minimal memory requirements. CanonStudio can be run on every Amiga, even when memory is getting low.

3.2 Installing CanonDisk

CanonDisk is divided into two independent parts. During installation a user can choose just the required part, or both parts.

CanonStudio Program:

The purpose of the CanonStudio program is to print pictures. Pictures are printed directly from disk without the need for much memory. For instance you can print a huge 10 MBytes picture on an Amiga that is equipped with only 512 KBytes of memory.

If you have a colour printer you can print with 24 bitplanes of colour accuracy (16.7 million colours). If you have a monochrome printer you can print with 8 bitplanes of greyscale accuracy (256 greys). If you were not using CanonStudio's printing capabilities, the Amiga's own colour printing capacity is 12 bitplanes for colour (4096 colours), and 4 bitplanes for greyscales (16 greys). Printing pictures through CanonStudio does therefore give a user greater precision.

! → The CanonStudio picture-printing program works with every Amiga printer driver but this version is limited to just the Canon drivers. If you require a Version that supports all drivers purchase the "`Studio Printer Software`" package.

Canon Driver:

The Canon drivers are supplements to the Commodore supplied printer drivers. They are 100 percent Amiga compatible printer drivers, even though they offer many more functions than the standard printer drivers. The additional functions of the drivers are controlled by the preferences program included with CanonDisk.

Start Installation

The programs and drivers are described in detail later. Start the installation by double-clicking with the mouse button on the Install icon, found in the main drawer of the CanonDisk.

Follow the instructions below to install the Canon software:

- Configure and connect your printer as described in the printer's user manual and the Amiga system manual.
- Set your printers dip switches as described in the table 3.1.

Initial	Command	Layout
lp = Aus	ISO	Portrait
autoCR = Aus		autoNL = ON
autoLF = Aus		autoFF = ON
set = ISO_USA		
lines = 6 LPI		
columns = auto		

Table 3.2: LBP/BJC 880 Settings.

- Canon LBP and BJC 880 users should configure their printers with the settings described in table 3.2.
- Boot your Amiga with your usual system or Workbench disk.
- If you don't own a hard drive, prepare an empty floppy disk by using the system Format command.

  We anticipate that most Canon users will want to install the program on to a hard drive. If you do not have a hard drive then you must install some parts of CanonDisk onto an empty floppy, using the supplied installation program. You cannot run the Canon software directly from its installation disk because it is stored in a compressed format.

  If your system has only a single floppy drive (and no hard drive), the installation program will cause a large number of disk swaps while it gets things prepared for the main installation.
- Double click on the `Install` icon found in the main drawer of the CanonDisk. The installation process is automatic and uses the Commodore standard Installer program. The installation process has been designed to provide on-line instructions as you install the product. Any questions that you might have about the installation process should be answered by the on-line help contained in the installation program.
- Canon BJC800 users should note, that the Canon BJC800 printer is a single page printer. The printer does not support continuous form paper. Because of this the page length must be defined ! The driver can do this automaticly for you, in case you set the paper length in Workbench preferences to 250 lines. Select a paper type of `Wide Tractor` for printing on DIN A3 sized paper.
- Select a paper type of `Wide Tractor` for printing on DIN A3 sized paper on BJ 230 printers..
- After successfully running the Install program, try printing from the application with which you normally print. In most cases you should straight away notice major improvements in speed and quality, but you can do much better once you have adjusted all the settings of the driver to match your environment. The installation program is unable to adjust all the driver settings for your printer because every printer, paper and ink is different. It is your task now to use your experience with your software and printer to further adjust the settings made by the Install program. This will result

in further improvements in output quality.

Please share your printing experiences with other Canon users by sending your settings to Wolf Faust. This will allow future enhancements of CanonDisk. You can easily print your settings using the `Report` program mentioned on page 79. Please don't forget to mention the name of your printer, and the type of paper you are using.

3.3 How CanonDisk Is Documented

CanonDisk is very easy to use, but you do require at least a passing familiarity with general Amiga usage and practices. This manual assumes that you have such a familiarity. If more basic information is required about operating your Amiga than is provided in this manual, please consult the introductory manuals that came with your machine. We also strongly suggest that new Amiga owners contact their local Amiga user groups for basic training and help.

This manual includes notes in its margins. These have the following meanings :

! → = Attention! Read this part very carefully.

E → = For experts. These sections describe complex parts of the software which are important only to experienced users.

→ p. 101 = See also page 101 of the manual.

3.4 How This Manual Was Produced

This manual was created and typeset on a Commodore Amiga A3000 personal computer using AmigaTeX from Radical Eye Software. The text itself was created using ASDG's CygnusEd Professional. The master was printed full size on a Hewlett-Packard LaserJet IIIP printer.

In order to produce the best product possible the manual is routinely updated each time a new run is required. If you should find any technical, typographical, grammatical or any other type of error in your manual, please relay this information clearly to the developer.

3.5 Thanks to ...

I have been assisted by testers and those who have sent money, printer manuals and program suggestions. To all of you, I extend my appreciation.

Because of their extra efforts I would like to thank following people and companies:

Jeff Walker, the person who dragged me into the chaotic world of writing printer software (bah!), and who proof read most parts of this manual and re-worded parts of it.

Canon, surely the only printer manufacturer with major Amiga development and support.

Wolf Faust, December 1992.

4. The Workbench Printer Drivers

After installing a Canon driver you should be able to print from your normal application programs. In most cases you must further adjust the driver settings to your printer to get the best printer output possible. This chapter describes most of the functions for controlling the Canon drivers. But before describing each driver, here are some general things about printer drivers, and in paticular the Canon drivers.

4.1 How Printer Drivers Work

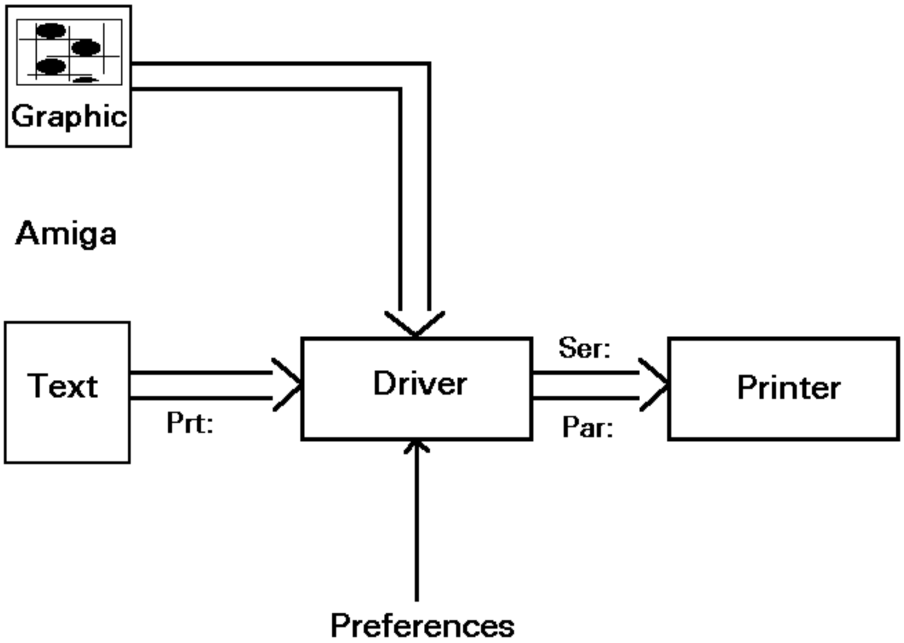

Figure 4.1: Functioning of a printer driver.

Printer drivers offer a way of sending configuration-independent output to a printer attached to the Amiga. A driver can be thought of as a filter that takes standard commands as input, and translates them into commands understood by specific printers (see figure 4.1). The commands sent to the printer via the `prt:` device are standardized on all Amigas so that programmers only have to write the software once and not for all possible printer emulations. It is the task of the printer driver to translate an Amiga printer command into the correct command for a particular printer. For each type of printer in use, a printer driver (or a driver for a compatible printer) should be present in the `devs:printers` directory.

If you want to print text in bold, you have to decide whether to use a standard Amiga command (also known as an escape sequence) via `prt:`, or the command

Density	X dpi	Y dpi	Comments
1	180	180	No Adjustments
2	360	360	No Adjustments
3	180	180	
4	180	180	
5	180	360	
6	360	180	
7	360	360	

Table 4.1: CanonBJ130 Densities

Density	X dpi	Y dpi	Comments
1	180	180	No Adjustments
2	360	360	No Adjustments
3	360	180	
4	120	360	
5	180	360	
6	240	360	
7	360	360	

Table 4.2: BJ5-230 and BJ300-330 Densities

mentioned in your printer manual via `par:`. Often people get confused about `prt:` and `par:`. Do not send commands mentioned in your printer manual to `prt:`. This will most likely fail, or cause wrong characters in your printer output. You should user `prt:` as opposed to `par:` because commands send to `prt:` can be used on every printer, not just the kind of printer you have. The `par:` device has even more shortcomings than `prt:`, but we're not concerned with them in this manual.

E → An argument often used by programmers using `par:` is the unlimited control over the printer. This is a fallacy. You can control every printer feature via the `prt:` device.

4.2 The Canon Printer Drivers

Density	X dpi & Y dpi	Comments
1	150/300	No Adjustments
2	300/600	No Adjustments
3	75	
4	100	
5	150	
6	300	
7	300/600	

Table 4.3: LBP Densities

Density	X dpi & Y dpi	Comments
1	180	No Adjustments
2	360	No Adjustments
3	180	
4	180	
5	180	
6	360	
7	360	

Table 4.4: BJC880 Densities

The Canon printer drivers automatically check for the processor being used (68000, 68010/68020, 68030, 68040) and optimize the print routines accordingly, so there is no need for a special 'turbo' version of the driver in order to get the most out of your Amiga.

The tables below show the graphics densities supported by all the Canon drivers. Density is set in Workbench preferences. With some programs you can also choose a density from within your application program.

Beside the density tables, tables with all driver-supported Amiga escape sequences[1] are shown.

[1] Use `prt:` not `par:` for these commands.

Name	Amiga-Sequence	Function
aRIS	ESCc	reset
aRIN	ESC#1	initialize
aIND	ESCD	lf
aNEL	ESCE	return,lf
aRI	ESCM	reverse lf
aSGR0	ESC[0m	normal char set
aSGR3	ESC[3m	italics on
aSGR23	ESC[23m	italics off
aSGR4	ESC[4m	underline on
aSGR24	ESC[24m	underline off
aSGR1	ESC[1m	boldface on
aSGR22	ESC[22m	boldface off
aSHORP0	ESC[0w	normal pitch
aSHORP2	ESC[2w	elite on
aSHORP1	ESC[1w	elite off
aSHORP4	ESC[4w	condensed fine on
aSHORP3	ESC[3w	condensed off
aSHORP6	ESC[6w	enlarged on
aSHORP5	ESC[5w	enlarged off
aDEN6	ESC[6"z	shadow print on
aDEN5	ESC[5"z	shadow print off
aDEN4	ESC[4"z	doublestrike on
aDEN3	ESC[3"z	doublestrike off
aDEN2	ESC[2"z	NLQ on
aDEN1	ESC[1"z	NLQ off
aSUS2	ESC[2v	superscript on
aSUS1	ESC[1v	superscript off
aSUS4	ESC[4v	subscript on
aSUS3	ESC[3v	subscript off
aSUS0	ESC[0v	normalize the line
aPLU	ESCL	partial line up
aPLD	ESCK	partial line down

Table 4.5: CanonLBP- und CanonBJC880-Befehle.

Name	Amiga-Sequence	Function
aFNT0	ESC(B	typeface 0: Courier
aFNT1	ESC(R	typeface 1: Line Printer
aFNT2	ESC(K	typeface 2: Pica
aFNT3	ESC(A	typeface 3: Elite
aFNT4	ESC(E	typeface 4: Swiss 721
aFNT5	ESC(H	typeface 5: Dutch 801
aFNT6	ESC(Y	typeface 6: Garland
aFNT7	ESC(Z	typeface 7: Humanist
aFNT8	ESC(J	typeface 8: Century
aFNT9	ESC(6	typeface 9: Symbol
aFNT10	ESC(C	typeface 10: User
aPROP2	ESC[2p	proportional on
aPROP1	ESC[1p	proportional off
aPROP0	ESC[0p	proportional clear
aTSS	ESC[n E	set proportional offset
aVERP0	ESC[0z	1/8" line spacing
aVERP1	ESC[1z	1/6" line spacing
aSTBM	ESC[Pn1;Pn2r	T and B margins
aSLRM	ESC[Pn1;Pn2s	L and R margins
aCAM	ESC#3	Clear margins
aHTS	ESCH	Set horiz tab
aVTS	ESCJ	Set vertical tabs
aTBC3	ESC[3g	Clear all htabs
aTBC4	ESC[4g	Clr all vtabs
aTBCALL	ESC#4	Clr all h and v tabs
aTBSALL	ESC#5	Set default tabs
aRAW	ESC[Pn"r	'Pn' chars are raw

Table 4.6: CanonLBP- und CanonBJC880-Befehle.

Name	Amiga-Sequence	Function
aRIS	ESCc	reset
aRIN	ESC#1	initialize
aIND	ESCD	lf
aNEL	ESCE	return,lf
aSGR0	ESC[0m	normal char set
aSGR4	ESC[4m	underline on
aSGR24	ESC[24m	underline off
aSGR1	ESC[1m	boldface on
aSGR22	ESC[22m	boldface off
aSHORP0	ESC[0w	normal pitch
aSHORP2	ESC[2w	elite on
aSHORP1	ESC[1w	elite off
aSHORP4	ESC[4w	condensed fine on
aSHORP3	ESC[3w	condensed off
aSHORP6	ESC[6w	enlarged on
aSHORP5	ESC[5w	enlarged off
aDEN6	ESC[6"z	shadow print on
aDEN5	ESC[5"z	shadow print off
aDEN4	ESC[4"z	doublestrike on
aDEN3	ESC[3"z	doublestrike off
aDEN2	ESC[2"z	NLQ on
aDEN1	ESC[1"z	NLQ off
aSUS2	ESC[2v	superscript on
aSUS1	ESC[1v	superscript off
aSUS4	ESC[4v	subscript on
aSUS3	ESC[3v	subscript off
aSUS0	ESC[0v	normalize the line
aPLU	ESCL	partial line up
aPLD	ESCK	partial line down
aFNT0	ESC(B	typeface 0: Courier
aFNT1	ESC(R	typeface 1: Line Printer
aPROP2	ESC[2p	proportional on
aPROP1	ESC[1p	proportional off
aVERP0	ESC[0z	1/8" line spacing
aVERP1	ESC[1z	1/6" line spacing
aSLPP	ESC[nt	set form length n
aPERF	ESC[nq	perf skip n (n>0)
aPERF0	ESC[0q	perf skip off
aSLRM	ESC[Pn1;Pn2s	L and R margins
aCAM	ESC#3	Clear margins
aTBC3	ESC[3g	Clear all htabs
aTBC4	ESC[4g	Clr all vtabs
aTBCALL	ESC#4	Clr all h and v tabs
aTBSALL	ESC#5	Set default tabs
aRAW	ESC[Pn"r	'Pn' chars are raw

Table 4.7: CanonBJ5-230-Befehle.

Name	Amiga-Sequence	Function
aRIS	ESCc	reset
aRIN	ESC#1	initialize
aIND	ESCD	lf
aNEL	ESCE	return,lf
aSGR0	ESC[0m	normal char set
aSGR3	ESC[3m	italics on
aSGR23	ESC[23m	italics off
aSGR4	ESC[4m	underline on
aSGR24	ESC[24m	underline off
aSGR1	ESC[1m	boldface on
aSGR22	ESC[22m	boldface off
aSHORP0	ESC[0w	normal pitch
aSHORP2	ESC[2w	elite on
aSHORP1	ESC[1w	elite off
aSHORP4	ESC[4w	condensed fine on
aSHORP3	ESC[3w	condensed off
aSHORP6	ESC[6w	enlarged on
aSHORP5	ESC[5w	enlarged off
aDEN6	ESC[6"z	shadow print on
aDEN5	ESC[5"z	shadow print off
aDEN4	ESC[4"z	doublestrike on
aDEN3	ESC[3"z	doublestrike off
aDEN2	ESC[2"z	NLQ on
aDEN1	ESC[1"z	NLQ off
aSUS2	ESC[2v	superscript on
aSUS1	ESC[1v	superscript off
aSUS4	ESC[4v	subscript on
aSUS3	ESC[3v	subscript off
aSUS0	ESC[0v	normalize the line
aPLU	ESCL	partial line up
aPLD	ESCK	partial line down

Table 4.8: CanonBJ300-Befehle.

Name	Amiga-Sequence	Function
aFNT0	ESC(B	typeface 0: Courier
aFNT1	ESC(R	typeface 1: Letter Gothic
aFNT2	ESC(K	typeface 2: Prestige
aFNT3	ESC(A	typeface 3: Script
aFNT4	ESC(E	typeface 4: Press Roman PS
aFNT5	ESC(H	typeface 5: OCR-A
aFNT6	ESC(Y	typeface 6: Olde World
aFNT7	ESC(Z	typeface 7: Prestige Symbol
aFNT8	ESC(J	typeface 8: Presentator
aFNT9	ESC(6	typeface 9: Orator
aFNT10	ESC(C	typeface 10: Gothic Symbol
aPROP2	ESC[2p	proportional on
aPROP1	ESC[1p	proportional off
aVERP0	ESC[0z	1/8” line spacing
aVERP1	ESC[1z	1/6” line spacing
aSLPP	ESC[nt	set form length n
aPERF	ESC[nq	perf skip n (n>0)
aPERF0	ESC[0q	perf skip off
aSLRM	ESC[Pn1;Pn2s	L and R margins
aCAM	ESC#3	Clear margins
aTBC3	ESC[3g	Clear all htabs
aTBC4	ESC[4g	Clr all vtabs
aTBCALL	ESC#4	Clr all h and v tabs
aTBSALL	ESC#5	Set default tabs
aRAW	ESC[Pn”r	’Pn’ chars are raw

Table 4.9: CanonBJ300-Befehle.

Name	Amiga-Sequence	Function
aRIS	ESCc	reset
aRIN	ESC#1	initialize
aIND	ESCD	lf
aNEL	ESCE	return,lf
aSGR0	ESC[0m	normal char set
aSGR3	ESC[3m	italics on
aSGR23	ESC[23m	italics off
aSGR4	ESC[4m	underline on
aSGR24	ESC[24m	underline off
aSGR1	ESC[1m	boldface on
aSGR22	ESC[22m	boldface off
aSFC	SGR30-39	set foreground color
aSHORP0	ESC[0w	normal pitch
aSHORP2	ESC[2w	elite on
aSHORP1	ESC[1w	elite off
aSHORP4	ESC[4w	condensed fine on
aSHORP3	ESC[3w	condensed off
aSHORP6	ESC[6w	enlarged on
aSHORP5	ESC[5w	enlarged off
aDEN6	ESC[6"z	shadow print on
aDEN5	ESC[5"z	shadow print off
aDEN4	ESC[4"z	doublestrike on
aDEN3	ESC[3"z	doublestrike off
aDEN2	ESC[2"z	NLQ on
aDEN1	ESC[1"z	NLQ off
aSUS2	ESC[2v	superscript on
aSUS1	ESC[1v	superscript off
aSUS4	ESC[4v	subscript on
aSUS3	ESC[3v	subscript off
aSUS0	ESC[0v	normalize the line
aPLU	ESCL	partial line up
aPLD	ESCK	partial line down

Table 4.10: CanonBJ-EC-Befehle.

Name	Amiga-Sequence	Function
aFNT0	ESC(B	typeface 0: Courier
aFNT1	ESC(R	typeface 1: Sans Serif
aFNT2	ESC(K	typeface 2: Roman
aFNT3	ESC(A	typeface 3:
aFNT4	ESC(E	typeface 4:
aFNT5	ESC(H	typeface 5:
aFNT6	ESC(Y	typeface 6:
aFNT7	ESC(Z	typeface 7:
aFNT8	ESC(J	typeface 8:
aFNT9	ESC(6	typeface 9:
aFNT10	ESC(C	typeface 10:
aPROP2	ESC[2p	proportional on
aPROP1	ESC[1p	proportional off
aJFY5	ESC[5 F	auto left justify
aJFY7	ESC[7 F	auto right justify
aJFY6	ESC[6 F	auto full justify
aJFY0	ESC[0 F	auto justify off
aJFY1	ESC[1 F	word fill(auto center)
aVERP0	ESC[0z	1/8" line spacing
aVERP1	ESC[1z	1/6" line spacing
aSLPP	ESC[nt	set form length n
aPERF	ESC[nq	perf skip n (n>0)
aPERF0	ESC[0q	perf skip off
aSLRM	ESC[Pn1;Pn2s	L and R margins
aCAM	ESC#3	Clear margins
aTBC3	ESC[3g	Clear all htabs
aTBC4	ESC[4g	Clr all vtabs
aTBCALL	ESC#4	Clr all h and v tabs
aTBSALL	ESC#5	Set default tabs
RAW	ESC[Pn"r	'Pn' chars are raw

Table 4.11: CanonBJ-EC-Befehle.

5. PageStream Printer Drivers

The CanonDisk includes special printer drivers for the PageStream 2.x desktop publishing program. These drivers offer print densities up to 600 dpi, and some compress the graphics output, which results in a major speed improvement compared to the normal PageStream driver.

The installation of the PageStream drivers is performed by the normal CanonDisk installation program. If you install a driver for a printer which might also work with the Canon PageStream drivers, the installation program will ask you whether you want to install the Canon PageStream drivers or not.

The PageStream BJ2xx driver supports the following settings in the printer requesters special utility: `letter`, `legal`, `a4` and `a3`.

The PageStream CaPSL drivers support the following settings in the printer requesters special utility: `letter`, `legal`, `a4`, `a5` and `b5`.

6. The Canon Preferences Programs

Apart from the functions mentioned in the section "The Canon Printer Drivers", there are more utilities unique to the Canon drivers. These utilities are managed using Commodore's standard environment variables and can be controlled by using the Shell `setenv` and `getenv` commands. As setting environment variables this way can be a very complex task, a Canon preferences program is available to make the job easier.

The CanonPref preferences programs provide an intuitive GUI and requires at least Workbench 2 to run. If you are not using at least Workbench 2 (V37 and above), you must use the Shell commands for controlling the driver variables (described in detail in an extra chapter on page 62).

The CanonPref preferences programs can be controlled by mouse and/or keyboard. Each option of the program corresponds with an underlined letter. Pressing that letter is equivalent to clicking on the option. In the case of circular options, you can use the upper case or lower case letter to cycle back and forth. See your system manual on how to control the file requester by keyboard or mouse.

Public Screens

All windows are opened directly under your mouse pointer, so you don't have to move or scroll the screen to control the program. All windows are opened on the default public screen. You may specify a special public screen by setting the Tool Type `PUBSCREEN=<screenname>` [1] and the CanonPref preferences program will open its windows on your application program's screen. You can specify a screen if you run the preferences program from a Shell with the `PUBSCREEN` option:

CanonPref PUBSCREEN <screenname>

For example, if you use the ASDG CEDPro text editor you may specify `CanonPref PUBSCREEN CygnusEdScreen1` and the CanonPref preferences program will open its windows on the CEDPro screen. Make sure the CEDPro screen is public before running the example. You need at least CEDPro version 2.12 for this example.

All CanonPref programs are font independent, which means they use any system font you have chosen in preferences for displaying the text in utilities and windows. You can force the preferences program to always use the topaz 8 font by defining a `TOPAZ` Tool Type. This is eqivalant to using a `TOPAZ` Shell argument.

After starting a preferences program, the main window opens. This contains several options which are equivalent to certain environment variables. The names and settings of these environment variables are covered in an extra chapter on page 62. This chapter covers all you need to know about controlling the Canon drivers via the CanonPref preferences programs.

[1] The screen name is case sensitive.

Figure 6.1: The BJ5-230 CanonPref program.

6.1 The CanonPref Preferences Program

The main window of the BJ-230 CanonPref program is shown in figure 6.1. All CanonPref program are very similar. All utilities in the CanonPref programs are described here in detail:

Color Mode Normal Workbench printer drivers are limited to 16 shades of grey. After brightening the graphics output, even fewer shades are available. Canon drivers do not have this limitation and can print colour pictures in up to 256 shades of grey using the Workbench color output mode. Some Canon drivers provide a `Supergrey` option allowing you to switch between real color output and `Supergrey` mode. This option is not needed by b/w BJ drivers.

With `Supergrey` enabled, every colour picture will be printed as a greyscale picture if you select colour instead of greyscale as the graphics output mode. With `Supergrey` it is the printer driver's task to convert the colour data into greyscale data. While this can be done by the printer device instead of the printer driver (as normal Workbench drivers do), the Canon printer driver colour-to-greyscale conversion routines are more precise. Because of this you can print a 4096 colour HAM picture in up to 256 shades of grey instead of the normal 16 shades. `Supergrey` will replace the normal colour dump of the driver.

! → If you want to print more than 16 shades of grey (and that's what Supergrey is all about!) you **must** define a custom dither matrix in the CanonPref program that enables you to print more than 16 shades. Defining a dither matrix using CanonPref is described on page 33.

`Supergrey` works with nearly every Amiga application simply by printing in Workbench's colour mode, even if your printer isn't a colour printer. Application programs that provide their own dither routines should not be used with

Function	Density	Workbench dither
Supergrey	> 2	ordered
Colour Adjustment	> 2	ordered
Ink compensation	> 2	ordered
Canon dither routines	> 2	ordered

Table 6.1: The necessary parameters for enhanced driver functions.

Canon's custom dither routines, and because of this should not be used with `Supergrey`. Programs with custom dither routines include Art Department Professional's PrefPrinter saver, TruePrint24 and PageStream. The CanonStudio picture-printing program also belongs to this category of programs, but it automatically detects whether you are printing in `Supergrey` or colour. The CanonStudio program automatically prints pictures as greyscales if `Supergrey` is enabled.

! → `Supergrey` can be disabled in several ways. Take care that none of the following special cases are in effect if you want to print pictures using `Supergrey`:

- Canon's custom dither and colour correction routines can be turned off by printing with a Workbench density below 3. Because of this, `Supergrey` works only with graphics densities above 2.
- Canon's custom dither and colour correction routines can be turned off by printing with a Workbench dither method other than `ordered`. Because of this, `Supergrey` works only with the `ordered` dither routine set in Workbench preferences. This does not mean that you cannot print a halftone dither with `Supergrey`. You just have to use the Canon dither routines set in CanonPref instead of the dither routines set in Workbench preferences, because only the Canon dither routines offer more than 16 shades of grey.
- `Supergrey` can always be turned off using CanonPref.

Table 6.1 shows all parameters that must be enabled for printing with `Supergrey`.

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Note: the number of printable shades of greys in `Supergrey` depends on the number of shades supported by the dither method set in CanonPref. Up to 256 shades are possible, and supported by the Canon dither routines. Often a dither method that produces 64 shades of grey gives the best results.

Separation You may print separations with the help of the separation utility in the upper right half of the window. Each primary colour that is checkmarked will be printed (C=cyan, M=magenta, Y=yellow, K=black). An example of the use of the separation function can be found on page 61.

Mirror If set to on (with a checkmark), graphics will be mirrored; especially useful if you want to print pictures intended for T-shirt art.

Strip Space The `Strip Space` checkmark can be used to turn off the BJ130 drivers white space striping during graphic dumps. If set to `ON` (checkmarked), the driver prints slower but on some printers the output quality may be slightly improved due to mechanical reasons. Some printers may not be able to handle white space striping due to the speed demands imposed on the printer and this could cause mechanical or over heating problems.

LineFeed Many printers exibit 'banding' unwanted horizontal stripes when printing graphics. This is often caused by mechanical inaccuracies in linefeeding - either slightly too much or too little, causing dark or white horizontal lines. `LineFeed` option allows you to adjust the driver to the mechanical inaccuracy of the printer. Set `LineFeed` to -1 if you have white lines in the output, or +1 if you have dark lines.

Textcolor With the `Textcolor` cycle gadget you may choose the default text colour for the printer.

Typeface The `Typeface` option allows you to define the printer's typeface (or 'font') selected by the `aFNT0` (see the tables on page 11). The typeface selected with `aFNT0` is your default typeface.

Orientation Use the `Orientation` option for selecting the required print orientation (portrait, landscape). This option is only available to CaPSL emulation printers and requires a printer equiped with enough memory to hold a page in the printers internal buffer.

Font Download If you set this option (checkmark on), the printer driver will automatically download fonts created by you or the FontShop program. In the event that you don't need the download feature, you can disable this feature without deleting or moving the font files.

Overlay Page Using the `Overlay` checkmark, you can enable or disable overlay page download without actually deleting the overlay page in your `ENV:` and/or `ENVARC:` directory. Set this variable to `OFF` (not checked) if you don't want any overlay page to be downloaded.

Compress Since Canon's CaPSL 4 supports graphic compression algorithems. These routines reduce the amount of data send to the printer and because of this, improve the printing speed.

Print Mode
Graphic Mode
Print Mode
Graphic Mode The `Graphic` and `Print Mode` option allow you to select the required text and graphic emulation for printing. Please refer to your printer manual to find the appropriate emulation supported by your printer.

Here are the main differences between the various graphics emulations:

- `Epson24` can be used with most currently available 24-pin printers. This emulation is also often known as LQ800/LQ1000 or LQ850/1050 emulation. Two passes of the printer head are needed for printing one line of graphics at 360 vertical dpi.
- `Epson48` can be used with most currently available 48-dot and 64-dot printers. This emulation is (for instance) supported by Brother HJ770 and Canon BJC-800 printers. The emulation is able to print 48 dots per printer line in 360 dpi resolution, enabling the printing of high density graphics in one pass per line.
- `CanonBJ`- or `Graphics Only` Emulation is an emulation supported by some Canon printers (BJC-800, BJ-200 and BJ-230). This emulation only supports graphic dumps. Different to the normal emulations, the CanonBJ emulation supports printing with 64 dots per line (on the BJ-200 and 230),

control over the print mode (on the BJC800) and graphic compression. The `CanonBJ`- or `Graphics Only`-Mode only supports printing graphics. Any text will not be printed and usualy an empty page is ejected.

! → Many printers support several graphics and text emulations. Please refer to your printer manual to find the emulation that fits your printer best. The CanonDisk installation program always sets the emulation that fits your printer best, though, sometimes there might be a requirement to choose a different emulation.

Timeout Most people know the "Printer trouble..." requester well. This system requester most often appears when you print a document that is several pages long. The requester is caused by the computer not transferring waiting data to the printer for a period of time (usually 30 seconds). If there is a 'timeout' the printer device assumes an error and the requester appears. A timeout may also appear without a real error happening if your printer is waiting for (or slowly feeding in) a new sheet of paper, for example. This operation often needs more than 30 seconds, and during this time no data is accepted by the printer.

With `Timeout` you can specify a higher timeout value, resulting in fewer timeout requesters. A value from 1 to 999 seconds is allowed (default 30 seconds).

E → Instead of defining a huge timeout value there is another solution available: use the `CMD` program (see your Workbench disk) to redirect the parallel/serial output to a file on disk. After this, use the Copy command or a printer spooler to copy the file to `par:`. This technique may also result in a better output quality, especially with inkjet printers. Note: If there is a real timeout error you will have to wait the number of seconds specified by `Timeout` until an error requester appears, thus allowing you to cancel the print job. So choose your `Timeout` value wisely.

Job End If the printer device closes after a dump, you can tell the driver to signal the end of the print job. This is especially useful on huge graphic dumps which might require some time. There are two kinds of signals. You can cause a beep (Ctrl-G) on the printer, a DisplayBeep on the Amiga, or both.

arXon Port All Canon drivers support the arXon parallel switch-box, an external 1 to 3 Centronics switch controllable by software. You can ask the printer driver to automatically switch to the required port for printing, and switch back to the previously used port after printing. This enables you to use a scanner, a digitizer and a printer from your Amiga's parallel port without having to switch between the devices manually. If you specify `Default` as the port, no switching will take place.

Information about the arXon switch-box may be obtained from:

arXon GmbH
Assenheimer Str. 17
D-W-6000 Frankfurt
Germany
Tel: (++49)-69-7896891
Fax: (++49)-69-7896878

! → The environment variable `sbox_active` must be specified before using the driver in order to enable the switch-box feature of the driver. This is because `sbox_active` is used to determine whether a switch-box is installed or not. `sbox_active` is defined by the arXon software.

Save — You may leave the CanonPref by clicking on the `Save` option. Changes made to the settings will be saved for permanent use.

Use — You may leave the CanonPref preferences program by clicking on the `Use` option. Changes made to the settings will be saved temporarily and will stay active until you reboot the computer or change the settings using CanonPref again.

Cancel — You may leave the CanonPref preferences program by clicking on the `Cancel` option. Changes made to the settings will not be recognised or saved.

More control windows — There are four utilities in the bottom half of the main CanonPref window. The ellipsis (three dots) in these icons means that another window will be opened when you select the utility. Here is a detailed description of each of the four windows.

Customize Tabulators...

The `Customize Tabulators...` window is shown in figure 6.2. The options in this window lets you customize the horizontal tab stop settings of your printer, useful for printing program listings and tables. Up to 32 tab stops may be defined with the Canon BJ-EC driver (BJ mode drivers normally allow up to 28 tab stops). All tab stops above the limit of 32 (28) are ignored, and a requester will tell you so. Horizontal tabs are usually selected and stored by the printer in characters, not inches. Thus, any change in the character spacing can change the physical locations of horizontal tabs, but the logical positions remain unchanged.

You can set or unset a tab stop by clicking on the option at the required position. A `T` is used for a tab stop. The `-` and `+` characters are used to help you find the correct position. Using the slider below the option you can scroll the 'tab stops' slide to the required position.

Clear Tabs — With Clear Tabs you can clear all tab stops.

Set every n chars — With the `n:` and `Set every n chars` option you can easily set tab stops with the same distance. Simply enter the distance into the `n:` option box and select `Set every n chars`.

Note: the printer driver uses a default distance of eight characters. If you want to reset your customized tabs stops settings to the printer default values, simply call up `Customize Tabs...` and the window will open with a default `n:` value of 8. Press `Set every n chars` to select the default value.

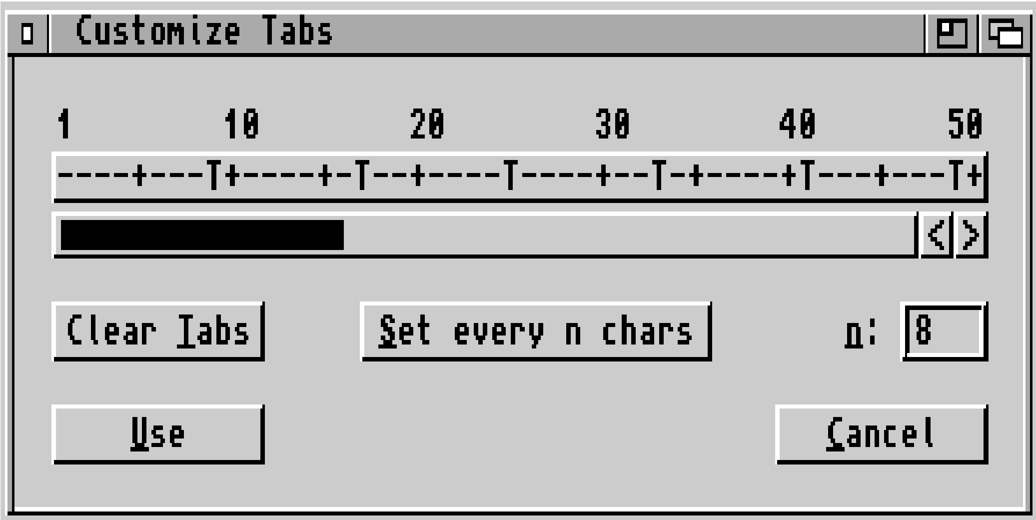

Figure 6.2: The `Customize Tabulators...` window.

Use
Cancel
You can leave the window with the `Use` or `Cancel` option. Changes made to the tab stops settings are accepted with `Use`. `Cancel` leaves the tab stops unchanged, and any changes made will be lost.

Note: `Use` does not save the changes made to your environment. This is done by using the `Use` or `Save` option in the main window.

Job Control...

The `Job Controll...` window is only available to CaPSL emulation drivers.

Job End If the printer device is closed after a print, you can tell the driver to signal the end of the print job. This is especially useful with huge graphic prints which might require some time. There are two kinds of signals. You can cause a beep on the printer, a DisplayBeep on the Amiga, or both.

arXon Port All Canon drivers support the arXon parallel switch-box, an external 1 to 3 Centronics switch, controllable by software. You can ask the printer driver to automatically switch to the required port for printing, and switch back to the previously used port after printing. This enables you to use a scanner, a digitizer and a printer from your Amiga's parallel port without having to switch between the devices manually. If you specify `Default` as the port, no switching will take place.

Information about the arXon switch-box may be obtained from:

arXon GmbH
Assenheimer Str. 17
D-W-6000 Frankfurt
Germany
Tel: (++49)-69-7896891
Fax: (++49)-69-7896878

! → The environment variable `sbox_active` must be specified before using the driver in order to enable the switch-box feature of the driver. This is because `sbox_active` is used to determine whether a switch-box is installed or not. `sbox_active` is defined by the arXon software.

Paper Feed The CaPSL drivers allow you to select a special paper feed. The LBP series printers are available as either single or double cassette models. With single cassette models only one paper cassette can be installed in the printer (LBP 4, LBP 8 A1/A2, II, Mark III). Double cassette models allow two paper cassettes (LBP 8 D, A1/A2, IIT, IIR, Mark IIIT, Mark IIIR). How the paper feed mode is set depends on the model and not all modes are allowed on a single cassette model.

Display The CaPSL driver normaly will bring up messages on the printers panel display for your information. These are:

"'JobT"' This means, text data is being transfered to the printer.

"'Font¡num¿"' This means, font data is being transfered to the printer.

"'OverPg"' This means, an overlay page is being transfered to the printer.

"'JobG"' This means, graphic data is being transfered to the printer.

"'Idle"' This means, the print job is finished and the printer/driver is ready for another job.

Some CaPSL printers (A1 and A2) do not allow display message and you must turn this feature off for those printers.

Page Size and Margins...

The `Page Size and Margins...` window is shown in figure 6.3. The options in this window let you customize the paper size and margins. This window contains many additional settings that are unknown to most normal printer drivers.

Enable Form If `Enable Form` is checkmarked, page length (as set in Workbench preferences), `Top Margin` and `Perforation Skip` will be enabled by the driver. In order to stay compatible with normal Workbench printer drivers, the default settings are not used. Some applications require well-defined paper sizes and margins for printing forms. The Canon driver provides you with these facilities by checkmarking `Enable Form`. It may require some experimentation (and paper) until you have found the correct values for a specific application.

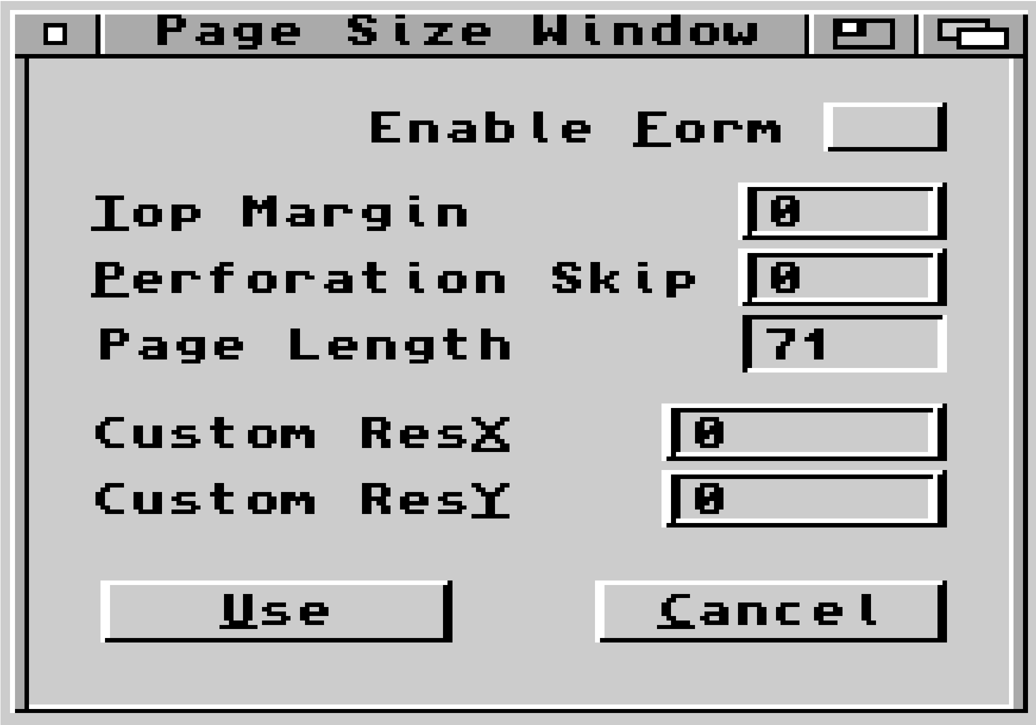

Figure 6.3: The `Page Size and Margins...` window.

Top `Top Margin` specifies the top margin as a number of lines. The top margin defines the vertical distance between the top of the printable area of the page and the the first line of text on the page. Using this option, together with the preference settings for left margin, right margin and page length, you have total freedom to define the margins of a page. Using the default value of zero disables the `Top Margin` function. The `Top Margin` is only enabled if `Enable Form` is checkmarked.

! → `Top Margin` can be set to 0 for CaPSL drivers (LBP and BJC880), though, you can't print text on the first line because the text is out of the printers unprintable area. A `Top Margin` of 0 is only of interest for a maximum printable graphics area (this requires the use of the `CanonResX` and `CanonResY` settings).

Perforation Skip `Perforation Skip` specifies the number of lines that the printer skips over at the end of each page. This causes the printer to skip the perforation between pages of continuous forms. If zero lines is specified, perforation skip will be disabled. If the specified value is greater than or equal to the form length (as defined in the Workbench preferences program), the skip perforation is cancelled and the top and bottom margins become inactive. The `Perforation Skip` is only enabled if `Enable Form` is checkmarked.

Page Length `Paper Length` is a read-only option showing the paper length as defined in Workbench preferences. You can use the value as a guide to setting your perforation skip and top margin values. Changes made to the paper length preferences are automatically detected by the CanonPref program, and the option is updated immediately without the need for exiting CanonPref. The `Paper Length` is only enabled if `Enable Form` is checkmarked.

Custom ResX
Custom ResY If the selected paper format in preferences (Workbench 2.0: "Printer") is CUSTOM, this option allows you to specify the width of the printable area of paper in $\frac{1}{360}$ inch wide dots (LBP uses $\frac{1}{360}$ inch) . The size is used only for graphic prints and does not affect text printouts. For example, if you are using Workbench 1.3 (which doesn't have a DIN A4 option) you can specify an X resolution of 2804 dots (19.78cm, 7.8in), which is equal to the DIN A4 size used by most Commodore printer drivers. If you specify zero (the default) as the X resolution, the US-LETTER resolution of 2880 dots (20.3cm, 8in) will be used. The allowed range is 0 to 65535 dots.

! → Different to the BJ300 and BJ130 drivers, the Canon CaPSL drivers (BJC880 and LBP) and the new Canon BJ5-230 driver use `Custom ResX` for defining the paper size including unprintable margins (0.5 inch).

Similar to `Custom ResX`, `Custom ResY` defines the height of the printable paper size.

Use
Cancel You can leave the window with the `Use` or `Cancel` option. Changes made to the settings are accepted with `Use`. `Cancel` leaves the settings unchanged and any changes made will be lost.

Note: `Use` does not save the changes made to your environment. This is done by using the `Use` or `Save` option in the main window.

Color Adjustments...

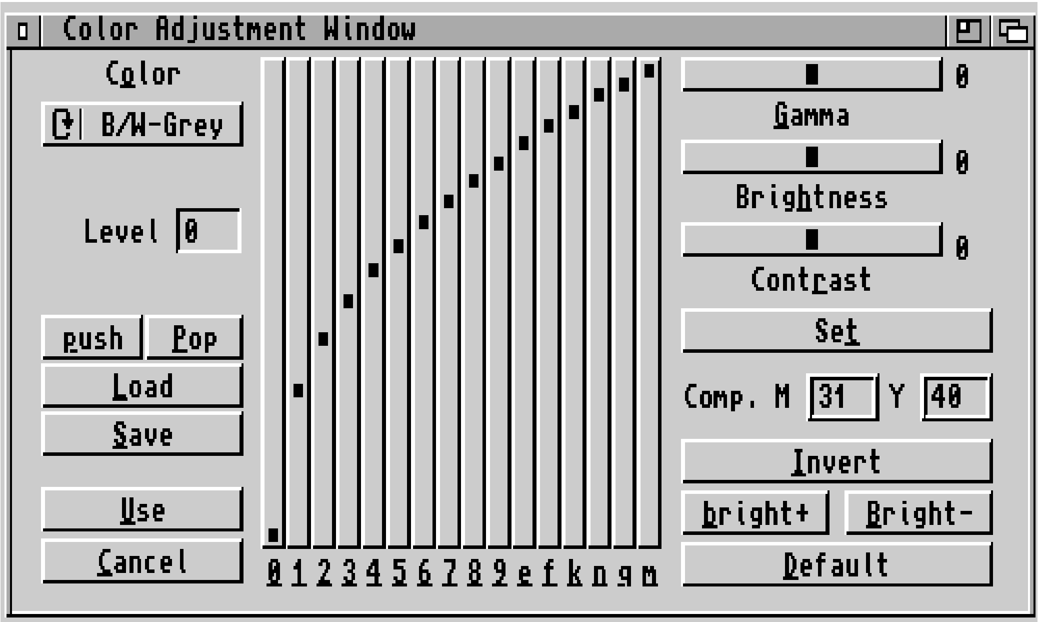

Figure 6.4: The `Color Adjustments...` window.

The `Color Adjustments...` window is shown in figure 6.4. The options in this window ebable you to make colour adjustments and compensate for ink impurities. But why are colour adjustments and ink compensation needed?

- Most colour printer users will have come across the problem of graphic prints being too dark, or the output containing too much red. Using the colour adjustment you can easily correct this.

- The output quality of printers depends ultimately on the ink and type of paper being used. Inkjet printers are very sensitive to the type of paper used. Using the colour adjustment you can easily alter the driver to various ink and paper types.
- The colour adjustment allows you to do image processing by controlling the contrast, gamma correction and brightness of each primary print colour. You can even filter out unwanted colours.
- Printer inks are not completely pure materials. For example there is some yellow mixed into the magenta ink, and there is some magenta in the cyan ink. The ink compensation values will correct for these impurities allowing blues, for example, to be printed as blues rather than purples.

Colour adjustment is only one of several processes needed for printing graphics (see figure 6.5). You can control the graphics output of the Canon drivers for each of these processes.

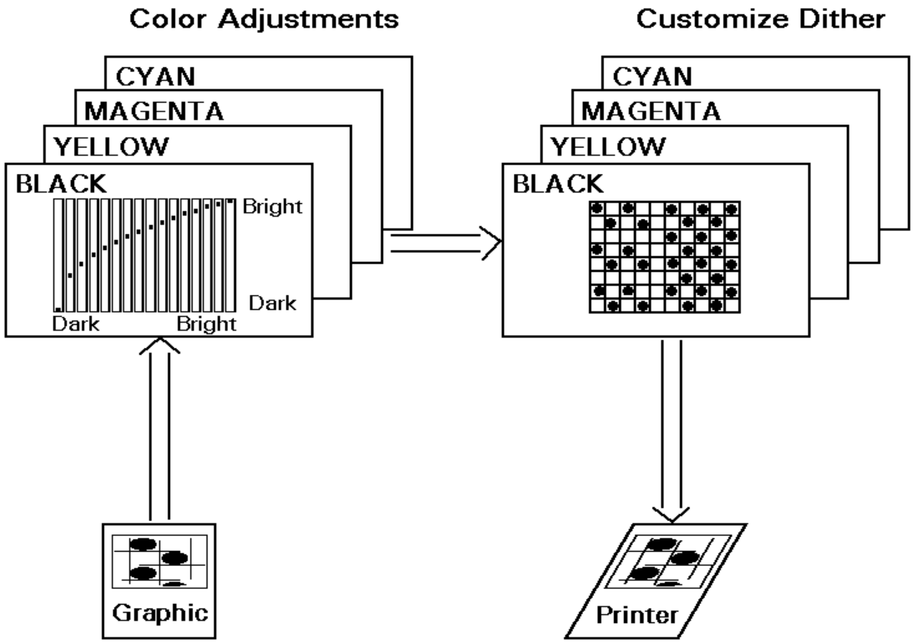

Figure 6.5: The processes required for printing graphics.

Before the printer driver can process a picture for printing, it must separat it into its primary printing colours. Each primary printing colour can be adjusted by the Canon printer driver using 16 sliders which describe a conversion function. Colour adjustment is needed because the colour values displayed on computer monitors and the colours printed by printers are different. A bright red on the monitor, for example, usually is printed as dark red; blue is often printed as violet; and the printer output is often too dark.

Most printers cannot print two adjacent dots without overlapping them slightly. This problem is known as 'dot gain', causing muddy and dark output. You can avoid dot gain problems by printing with a lower resolution (for instance 180 dpi on a 360 dpi printer) or by using a special dither matrix and colour adjustment which is not affected by dot gain problems.

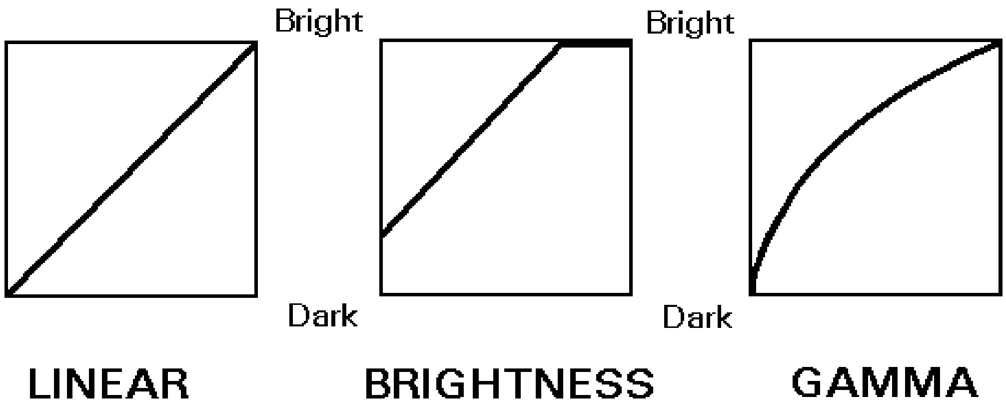

Figure 6.6: The colour adjustment sliders.

You can control the colour adjustment sliders in several ways. There are three sliders in the upper right half of the `Color Adjustments...` window. These provide global control over all 16 sliders that describe the conversion function.

Brightness The brightness adjustment globally modifies the general brightness of a colour component. It does this by uniformly shifting the colour map upwards or downwards. This is demonstrated in figure 6.6. All input intensities of one primary printing colour will be shifted upwards (made brighter) by the colour map. If you brighten all the primary printing colours, the whole picture becomes brighter.

The brightness adjustment is not without its drawbacks. Notice that the darkest input value (bottom left) is brightened, leaving no darker colours for printing. This means that the darkest intensity in the image will also be brightened, which may not be acceptable. Also note that most of the brighter levels now have exactly the same intensity levels, meaning that all details which had intensity levels in that range are lost. The brightness control in CanonPref ranges from -50 to 50, with zero being the neutral value. Setting the brightness control to a positive value uniformly shifts the colour map upwards, towards a brighter colour component. Similarly, a negative value causes the colour to be shifted towards darkness.

Contrast The contrast adjustment globally modifies the general contrast of a colour component. Contrast adjustments can be visualized by thinking of the neutral colour map being pivoted around its centre point. At one extreme the colour map becomes flat, which means that all input intensities map to the same output intensity (no contrast). The other extreme is a vertical line for a colour map, which produces a primary colour with exactly two intensities (maximum contrast).

Notice again that contrast loses some amount of visual detail, just as the brightness adjustment does. This may or may not be acceptable for any given image.

The contrast control in CanonPref ranges from -50 to 50, with zero being the neutral value. Setting the contrast control to a positive value uniformly pivots the colour map around its centre in an anti-clockwise direction (towards the vertical), which increases visible contrast.

Gamma — The gamma adjustment provides a way to significantly brighten a colour component without losing that much detail. It does this by introducing a curve into the colour map, whereby the colour map is shifted upwards or downwards (made brighter or darker respectively) but no portion of the colour map gets clipped to the maximum or minimum values.

Figure 6.6 shows an example colour map which has a positive gamma adjustment. The gamma adjustment also affects the contrast of the colour component. In the darker part of the spectrum contrast is increased; in the lighter part of the spectrum contrast is decreased.

The gamma control in CanonPref ranges from -50 to 50, where zero represents no gamma adjustment. The overall effect of gamma adjustment is usually quite satisfactory and we recommend its liberal use. There are several reasons for this. The gamma function provides an easy way to brighten a picture without losing detail. Also, monitor tubes show a computer picture using a non-linear conversion function, and this function is very similar to the gamma function. Using the gamma function allows you to more easily adapt the printer output to the monitor picture.

Set — `Set` globally sets all 16 adjustment sliders of the active colour component to the values defined by the `Gamma`, `Brightness` and `Contrast` sliders.

Invert / Bright+/- / Default — Beside `Set` there are more options providing global control over the 16 adjustment sliders. `Invert` inverts all 16 sliders. The two `Bright` options allow you to increase or decrease the brightness of all 16 sliders. `Default` resets all 16 sliders to the default values used by most Commodore printer drivers (no colour adjustment).

Adjustment sliders — The 16 colour adjustment sliders in the middle of the window give you precise control over the colour adjustment function of the driver. Each slider can be set to one of 256 shades. A higher level means less of the currently selected primary colour. A lower level means more colour, causing a darker picture. All 16 sliders describe a conversion function. Dark input values are adjusted by the sliders to the left, bright colours are adjusted by the sliders to the right. As soon as you click on one of the sliders, the value represented by the slider is shown in the `Level` option on the left-hand side of the window.

Colour pictures are printed by most printers using three or four primary colours. Usually these colours are cyan, magenta, yellow and black. All 16 colour adjustment sliders are applied to one primary colour. You can choose which primary colour to adjust using the `Color` option in the upper left-hand corner of the window.

Color

But what if you want to use the gamma function to brighten a greyscale picture? For this purpose select `B/W-Grey` as the colour and use the gamma slider to select the required gamma setting. Apply the gamma setting to the 16 adjustment sliders by clicking on the `Set` option. After leaving the CanonPref program using `Use` or `Save`, the gamma function is active.

! → While each of the 16 colour sliders provides 256 levels, this does not necessarily mean you can print 256 shades of each colour. The number of colours or shades printed depends upon the number of colours or shades supported by the dither matrix being used. The Canon installation program installs an ordered dither method with 64 shades as the default dither routine. More information about setting up a dither matrix can be found on page 33.

Push & Pop Now, say you want to apply a specific gamma function to each primary colour. You could use the same technique for installing the gamma function as described in the example above for every primary colour. But this technique can be a slow process if you have adjusted some sliders by hand. This is why the `Push` and `Pop` options have been introduced. `Push` saves all your current slider settings on to the stack. After changing the colour component you can easily `Pop` the settings from the stack. Using `Pop` for every colour component is fast and easy.

Load & Save You can save the your colour adjustment function to a file for later use. You could save your adjustment settings for various kinds of paper, for example, and reload them when needed. `Save` will cause the system file requester to appear and you can choose a path and filename for saving. `Load` will cause the file requester to appear and you can choose the file for loading. Note that `Save` and `Load` only affect the currently selected colour component.

Comp M
Comp Y The integer option `Comp. M` and `Comp. Y` can be used to adjust the ink compensation of the printer driver. Printer inks are not completely pure materials. For example there is some yellow mixed into the magenta ink, and there is some magenta found in the cyan ink. The ink compensation values will correct for these impurities allowing blues, for example, to be printed as blues rather than purples.

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`Comp. M` defines the percentage of magenta ink in the cyan ink. `Comp. Y` defines the percentage of yellow ink in the magenta ink. Canon's custom dither and colour correction routines can be turned off by printing with a Workbench dither method other than `ordered`, or a density below 3. Because of this, colour adjustment and ink compensation work only with the `ordered` dither routine set in Workbench preferences and densities above 2. Colour adjustment works with nearly every Amiga application. Application programs with their own colour adjustment routines should not be used with Canon's routines enabled. Programs with their own colour adjustment routines include Art Department Professional's PrefPrinter saver, TruePrint24 and PageStream. Use density 1 or 2 when printing with these programs. The CanonsStudio picture-printing program also belongs to this category of programs, but it automatically disables the CanonStudio driver's colour adjustment routines.

Use
Cancel You can leave the window with the `Use` or `Cancel` option. Changes made to the settings are accepted with `Use`. `Cancel` leaves the settings unchanged and any changes made will be lost.

Note: `Use` does not save the changes made to your environment. This is achieved by using the `Use` or `Save` option in the main window.

Customize Dither...

Most printers print pictures using a 'binary coding', or to put it more simply: a dot can either be printed, or not. There is no way to control the brightness of a single dot. A monochrome printer can only print one colour: black. Colour printers support the printing of three or four primary colours: cyan, magenta, yellow and black.

A special technique is needed for printing more shades. Dither routines provide such a technique. Dither routines print dots of a primary colour in various patterns, creating the impression of different shades, thanks to the fact that the human eye can't distinguish adjacent dots from a distance. Each pixel of a picture produces a pattern of printed dots. The pattern is described by a dither matrix. There are almost no limits to the size of the dither matrix. Workbench dither matrices (ordered and halftone) are of the size 4×4, which is equal to printing $4 \cdot 4 = 16$ shades[2]. A matrix consists of threshold values. Each matrix value is compared with the picture's pixel value. If the value of the pixel is higher than the matrix value, a dot gets printed.

Let's demonstrate an ordered dither matrix by an example:

$$\begin{array}{rrrr} 0 & 128 & 32 & 160 \\ 192 & 64 & 224 & 96 \\ 48 & 176 & 16 & 144 \\ 240 & 112 & 208 & 80 \end{array}$$

Figure 6.7 shows the patterns caused by the dither matrix above. Dither patterns allow you to print a huge number of shades. The number of printable shades mainly depends on the size of the dither matrix used and the quality of the printer.

Many printers have problems with inks running or overlapping dots. These problems have a huge influence on the decision as to which dither matrix to use. There is also a strong relationship between a dither matrix and the colour adjustment required. A change of print density often requires a change of the dither matrix and/or colour adjustment, and changing the dither matrix usually requires the colour adjustment also to be changed.

Canon gives you the facilities to define the dither matrix used for printing. Many dither matrices are included with the CanonDisk. These are handled in an extra chapter on page 54; this chapter covers only the use of the `Customize Dither...` window shown in figure 6.8. This window allows you to edit the current dither pattern. Instead of editing a pattern, you may quickly load a pattern using the window shown in figure 6.9.

The theoretical aspects of digital halftoning are complex, and are way beyond the scope of this manual. If you are interested in more detailed information, a very good book can be recommended:

---

[2]A normal 4×4 matrix produces 17 shades. This is not true in case of the Workbench dither matrix.

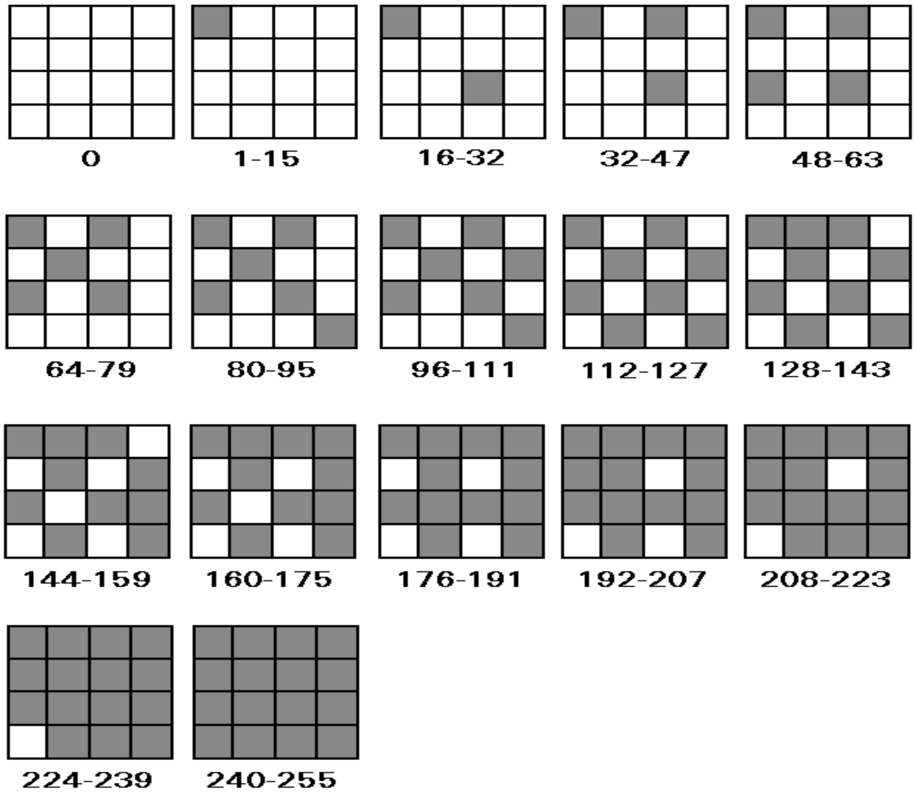

Figure 6.7: Patterns caused by a dither matrix.

Robert Ulichney
Digital Halftoning
MIT Press
ISBN 0-262-21009-6

The book is easy to understand and comes with lots of examples. Most of the dither routines used in the Canon driver are described in detail in this book.

Load & Save Using the `Customize Dither...` window is very similar to using the `Color Adjustments...` window. The `Load` and `Save` options allow you to load and save the required dither matrix for a particular colour component. Only the currently selected `Color` component is saved or loaded.

Push & Pop Let's assume you want to print a colour picture using the halftone dither. There are two ways you can enable the halftone dither in CanonPref. You can either load the dither matrix from disk for each primary colour, or you can use the stack. The stack can be controlled using the `Push` and `Pop` gadgets on the left-hand side of the window.

All you have to do to install the required dither matrix is to load the dither. Afterwards click on the `Push` option and the dither is saved on to the stack. Now switch the primary colour and `Pop` the matrix from the stack. Enable the matrix for all primary colours by using the stack. You can switch between the

Color primary colours by using the `Color` cycle option.

A Canon dither matrix may be any rectangular shape and can consist of up to 512 values. Up to 64 values can be included on each row (X) or column (Y).

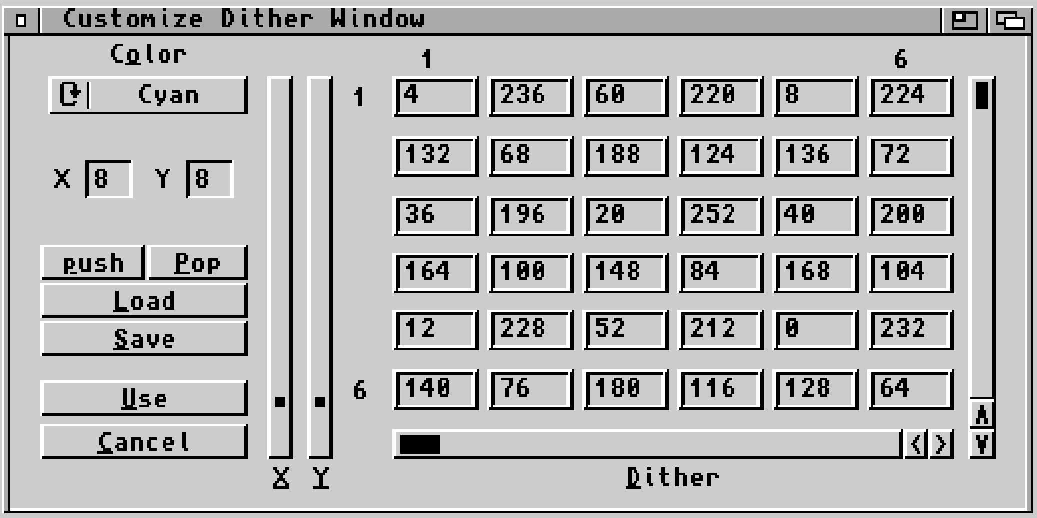

Figure 6.8: The `Customize Dither...` window

You can use the `X` and `Y` sliders to define the size of the matrix. The current size of the matrix is shown on the left-hand side of the window.

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Canon's custom dither routines can be turned off by printing with a Workbench dither method other than `ordered`, or a density below 3.

The custom dither routines work with nearly every Amiga application. Application programs that provide their own dither routines should not be used with Canon's routines enabled. Programs that do not work include Art Department Professional's PrefPrinter saver, TruePrint24 and PageStream. Use density 1 or 2 when printing with these programs. The CanonStudio picture-printing program also belongs to this category of programs, but it automatically disables the Canon driver's dither routines.

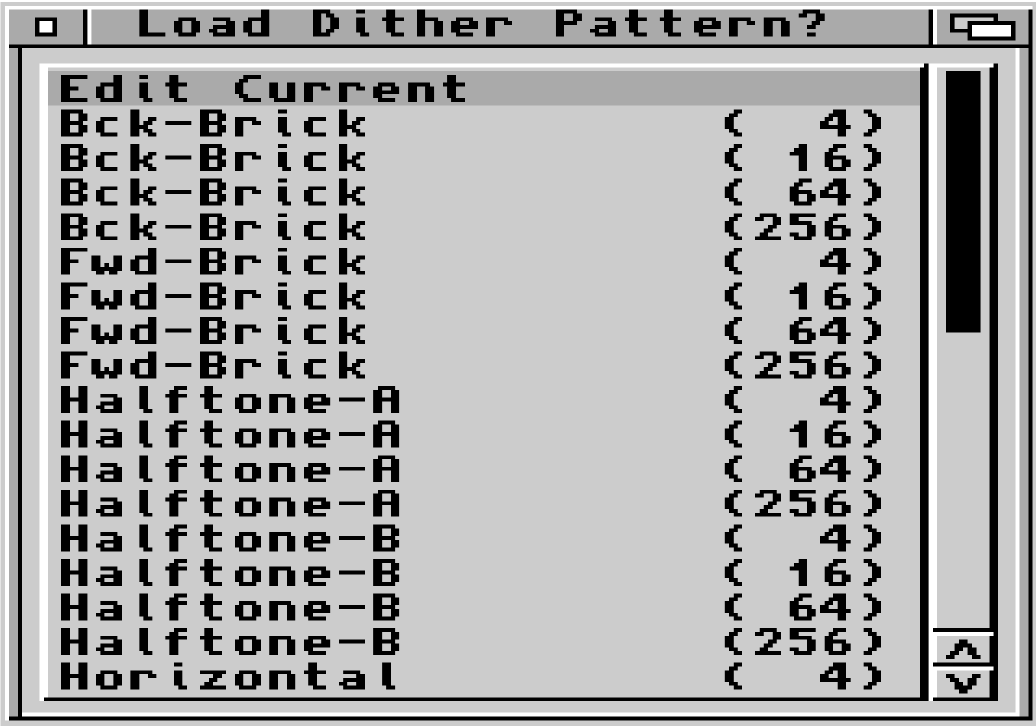

Figure 6.9: Load or edit a dither pattern.

7. The CanonStudio Program

CanonStudio?

There are two CanonStudio versions available: a limited and an unlimited version. The limited version included on the CanonDisk does not support ARexx programs and poster sized printing.

You can use the limited version for printing, though, some functions have been disabled forcing you to register and get the latest full featured version. This Program is included as free offer to all Canon users and is not part of the main Canon drivers. Canon is not responsibel for any support, update or warranty regarding CanonStudio.

In case you use CanonStudio register the program or this product will most likely not be supported in the future (programs do cost more than time to develop). Also, your shareware fee is a motivation for enhancements.

Registered users get an update service and an unlimited CanonStudio version for all Canon drivers. Don't get confused! The "Studio Printer Software" sold by dealers was made for non Canon printers (though, except the drivers included, it does work with Canon printers) and does work with all Amiga printer drivers and because of this, costs more than CanonStudio.

The price for registering is USD 25 plus and additional USD 15 if paid by cheque. Send the money to following address:

Wolf Faust
Am Dorfgarten 10
W-6000 Frankfurt 50
Germany

Note: begining with 1 July use "60435 Frankfurt" instead of "W6000 Frankfurt 50"!

In England you may register for $15 and get updates at/from:

JAM
75 Greatfields Drive
Uxbridge, UB8 3QN
Tel: 08952-74449 (GMT)

CanonStudio is a program intended for use with all Amiga printer drivers, though, it is limited to Canon drivers. You can buy the "Studio Printer Software" package for other printers. It prints IFF ILBM graphics with up to 24 bits of colour accuracy, in any size (poster function). CanonStudio is not limited to 4096 colours, as are normal Amiga printer drivers, though it does work with all correctly written Amiga printer drivers. The pictures are printed `from disk`, which means that you don't need a lot of memory to be able to print, for example, a 10Mb 24-bit graphic in high quality.

CanonStudio supports most of the latest IFF ILBM file formats. Even the HAM8, HAM6, EHB, 256 colour, IFF24 and IFF8 formats are supported.

CanonStudio includes a spooler which allows you to specify multiple print jobs while the program is already printing in the background. The program provides a 'click-and-drag' graphical user interface and ARexx support for controlling CanonStudio from other programs.

7.1 Starting the CanonStudio program

CanonStudio may be run from either the Workbench or a Shell. When it starts, it looks for a file in its directory called `CanonStudio.prefs` which contains your last used and saved settings for printing. If the settings file cannot be found, CanonStudio uses its default internal settings.

! → If the settings file could not be read, CanonStudio sets the dither method to `CUSTOM` with the 'Ordered-A-256' dither method installed. So the first time you run CanonStudio, Ordered is installed as `Custom` dither.

CanonStudio can be launched from the Workbench by double clicking on its icon. The CanonStudio icon has a tool type to specify the path and name of its settings file.

The tool type is

`SETTINGS=<settingsfile>,`

where `<settingsfile>` is the name of a configuration file for CanonStudio preferences. The default configuration file is `CanonStudio.prefs` in the directory that contains the CanonStudio program. There are several tool type options which allow you to override the settings of the settings file. These options are named the same way as the Shell options and described below in detail.

From a Shell, CanonStudio is invoked by typing "CanonStudio". CanonStudio has the following command template for its arguments:

CANONSTUDIO PUBSCREEN/K, TOPAZ/S, REXX/S, NOFILEREQ/S, SCALE/S, NOSCALE/S, SETTINGS/K, PRI=PRIORITY/K/N, UNIT/K/N, FILES/M,

PUBSCREEN <name>

allows CanonStudio to be opened on a public screen named <name>.

TOPAZ

CanonStudio is font independent. All text displayed in requesters is done using the system font. If `TOPAZ` is specified, only the topaz 8 font is used for text.

REXX

CanonStudio will open an ARexx port after `FILES/M` is processed.

! → If `REXX` is specified you can quit CanonStudio only by using the `QUIT` or `CONTINUE` commands (see the ARexx Interface chapter).

NOFILEREQ

If files are specified during startup, these will be processed. No file requester appears after this, and – unless `REXX` has been specified – CanonStudio is terminated.

FILES <name1> <name2> ... Allows you to specify the files for processing and printing.

SCALE|NOSCALE (default: SCALED)

If `SCALE` is used a check is made as to whether the IFF CMAP (colormap) chunk of a file is 'shifted' or 'scaled'. Some application programs (Deluxe Paint 4.1, for example) write their colour values shifted (0xF0) instead of scaled (0xFF), causing colours to printed too dark. By default you should start CanonStudio with the `SCALE` option and save the settings. Newer programs write their colour values scaled (Art Department Professional, for example). In general, don't worry about this setting too much unless you get light greys printed in areas that should be white.

PRI=PRIORITY <num> (default: -1)

Defines the process priority of the main printing process. By default a value of -1 is set. This results in better multitasking behaviour, as you may do more while CanonStudio is printing in the background. Most Amiga processes have a higher priority of 0. The priority for CanonStudio must be in range -50 to 50.

! → If there is another task with higher priority running in the background, CanonStudio may appear to be disabled or to have crashed. This is not the case – it is due to CanonStudio not being given any computing time because of its lower priority compared to the other task(s). In this case quit or halt the other task while CanonStudio is running, or increase CanonStudio's priority using the `PRIORITY` option.

UNIT <num> (default: 0)

Future Workbench printer preferences programs may allow you to specify a printer port to print to. Also, most of the current multiport cards allow you to specify a port to print to using a unit number (0 = internal port, 1 = external port A, 2 = external port B ...). Using the `UNIT` tool type or Shell keyword you can define a unit (port) to print to. By default unit 0 is used. Once specified, you can save the unit in the CanonStudio settings file.

7.2 CanonStudio for beginners

Selecting pictures

After starting CanonStudio a file requester opens asking you to select IFF files for printing. You can avoid the file requester by specifying files as arguments on Shell startup, and/or by using the `NOFILEREQ` option described above.

If you start CanonStudio from Workbench the file requester can be avoided by multi-selecting the picture icons. See your Amiga system manual for more information about multi-selection.

In either case, Shell or Workbench, a file requester does not appear if you have already specified a picture file upon startup. If no file is given, the file requester opens and you can multiselect files for printing. Again, see your system manual for multiselection.

If you are not sure about whether you want to print a particular file, don't worry, unless you have specified the NOFILEREQ option, on startup the file requester will appear again after processing the selected files.

7.2.1 The Main CanonStudio Windows

After successfully selecting the file(s), the two main process windows open. One window is sized as large as your monitor allows (see figure 7.1). This window gives you an overview of the size of the printing page, the picture size, and the position for printing. You can use the mouse to position and size the picture on the page.

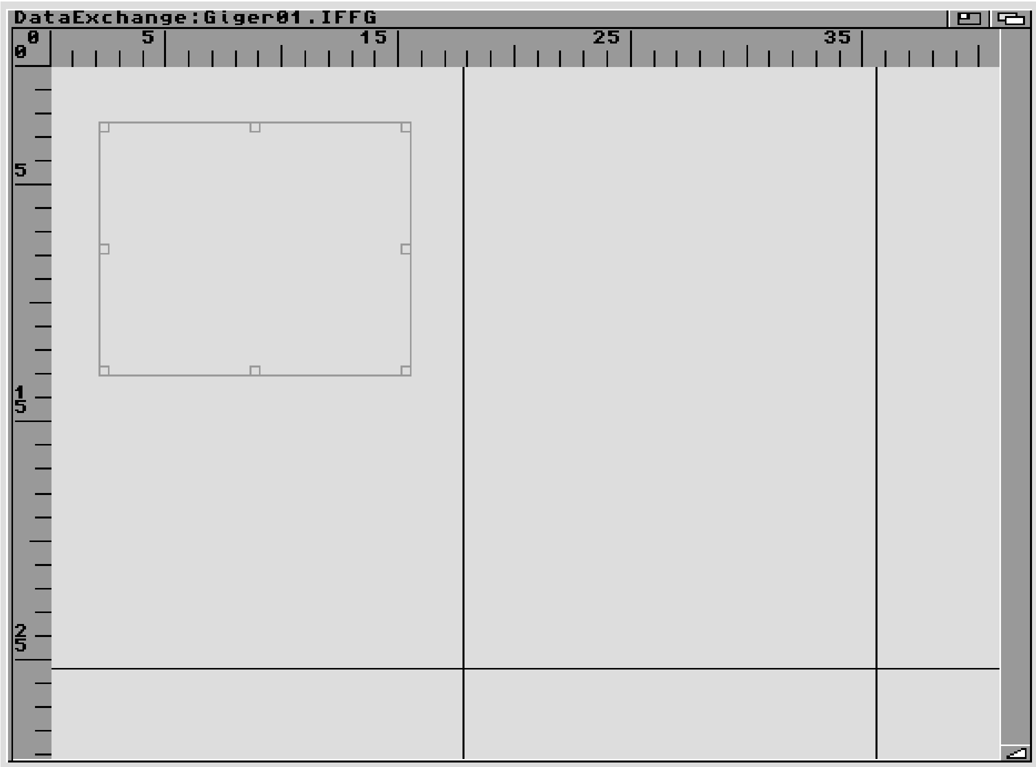

Figure 7.1: The huge main window.

The smaller window (see figure 7.2) contains all the tools you need to control colour, dithering method, etc. While dragging the picture in the large main window by mouse, the values shown in the tools are updated accordingly. Most of the tools don't need a great deal of explanation. (But let's do it anyway.)

Paper Dimension These are two options. One is showing you the width of the maximum printable area of your printer, as specified by the printer driver[1] (see figure 7.3). This option is read-only. The other option defines the height of the maximum printable area of your printer. This setting is defined as the physical area of the page that can be printed on. For instance, if you have DIN A4 paper with a size of 21.0cm $\times$ 29.7cm and your printer always leaves a top and bottom border of 1cm, you should enter 27.7cm here.

[1] Canon drivers allow you to specify this width as Custom ResX.

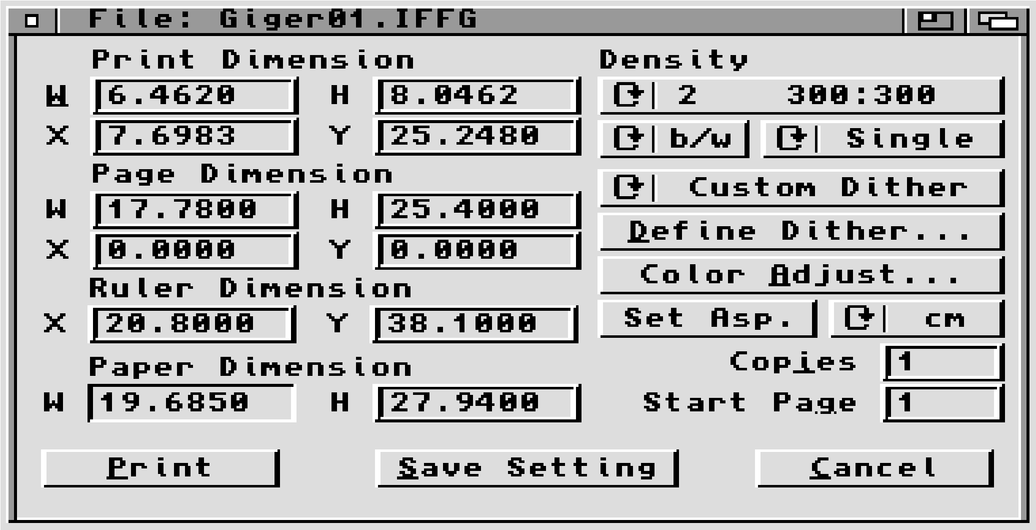

Figure 7.2: The smaller main window.

Ruler Dimension `Ruler Dimension` defines the area shown in the large main window. The number of pages shown in the window depends upon the `Ruler Dimension` setting. You should try to adjust the aspect of the `Ruler Dimension` to the aspect of the paper being used and the screen mode. This avoids possible mistakes while choosing a `Print Dimension`.

Page Dimension Now that you have defined the maximum print area of your printer for a given paper size, you may define the required subpage size. For example, you may want to decrease the printable size if you have a DIN A4 sized paper with logo at the top which should never be overprinted. Let's say the logo is at the top border position and is 2cm in height. Now you should reduce the print height from `Paper Dimension` by 2 (that is, to 25.7cm) and define a border of 2cm at the top (`Page Dimension Y` = 2cm).

Print Dimension Lastly we have the actual print size of the picture (again, see figure 7.3). There is almost no limit to the size that can be specified here. Just be sure the upper left-hand corner of the picture will be printed on the first page[2]. The `Print Dimensions X` will be applied to all of the left-most pages in a poster print. All of the top-most pages of a poster print will be affected by the `Print Dimensions Y` setting.

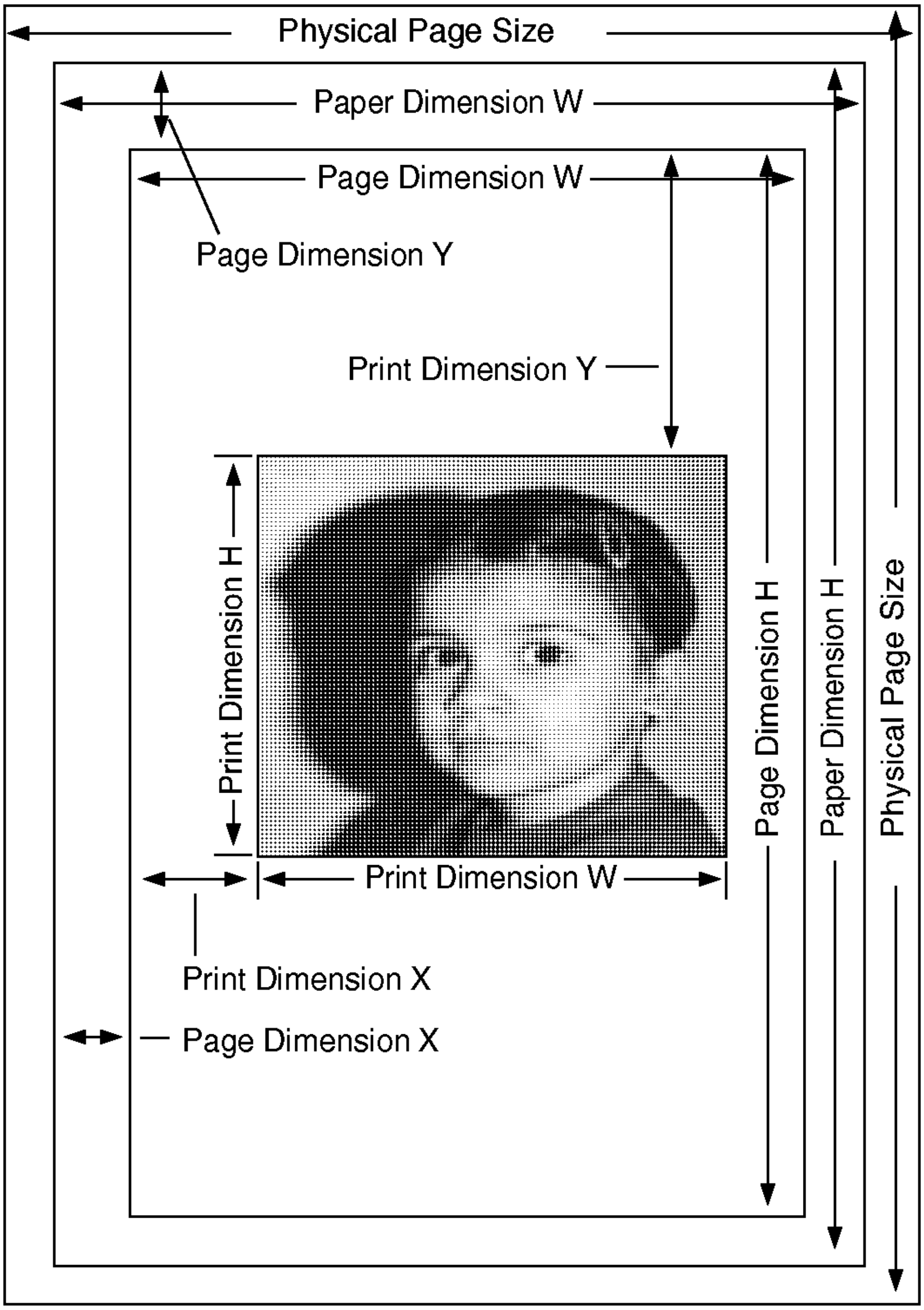

Figure 7.3: Dimensions used for printing.

Density This option in the upper right of the window shows you the densities supported by the printer driver. Select the required density by clicking with the mouse on the option. If you are using the Canon printer drivers, try using Density 1 and/or 2 instead of 6 and/or 7. This ensures that the colour adjustments and dither routines of the driver are not used.

Col|B/W Below the `Density` option you'll find the Color and B/W option. This allows you to select the output of a colour picture as greyscale or colour. If you select colour and your printer driver does not support colour, greyscale is used automatically. Only greyscale output is allowed if `Supergrey` is enabled. CanonStudio automatically forces you to use `b/w` in this case.

Single|Fanfold This option does the same as the Workbench preferences `Paper Type` option. If `Single` is selected, a formfeed is sent after each page. `Fanfold` should be used for uncut (rolled, fanfold, continuous...) paper.

If you have a single-sheet printer (like a laser printer) you can use `FanFold` to print multiple pictures on one page. Just be sure to set the `Page` and `Paper Dimension` accordingly. If you are printing a multi-column poster on to continuous paper (fanfold or roll) then you would enable `Fanfold` and define a top margin (`Print Dimension Y`) so that the columns of your print will be separated. When printing posters on to continuous paper you should set the `Page Definition Y` to zero so that there is no gap between individual pages of a column.

Custom Floyd Stucki Jarvis BlueNoise 30 % Blue Noise 50 % This options switch allows you to select the required dither method. The dither methods themselves are discussed in detail later. Print times increase with the dither methods listed in the order below. (Blue Noise, for example, usually requires twice the print time of any Custom dither.)

- `Custom` allows you to define any required dither matrix using the `Define Dither...` option. Many preset dither matrices are provided and explained in detail later.
- `Floyd Steinberg` is a very popular error diffusion dither method. This dither method provides a good compromise between speed and quality.
- `Stucki` is also an error diffusion dither method. Different to Floyd Steinberg, this dither requires more computing time as it takes more pixels into account.
- `Jarvis` is an error diffusion algorithm with nearly the same output as the Stucki dither. The extra computation time of the Jarvis and Stucki dithers results from incorporating a greater number of pixels into each dithering computation.
- `Blue Noise 30%` is an error diffusion algorithm with perturbation and a serpentine raster using the Floyd Steinberg filter with 30% random weights. This dither method is slow but provides very good results with colour pictures.
- `Blue Noise 50%` is an error diffusion algorithm with perturbation and a serpentine raster using the Floyd Steinberg filter with 50% random weights.

[2] If not, you'll get an error requester anyway.

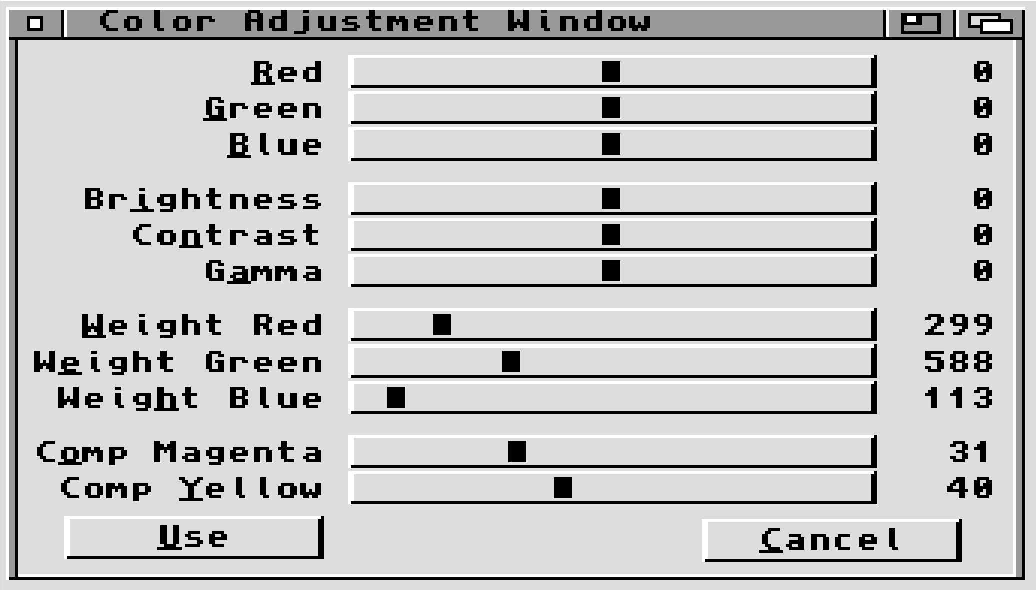

Figure 7.4: The `Color Adjust...` window.

This dither method is slow but provides very good results with colour pictures.

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If you want to learn more about dither routines and digital halftoning (beside the chapter on page 54), here is a very good book to look at:

Robert Ulichney
Digital Halftoning
MIT Press
ISBN 0-262-21009-6

The book is easy to understand and comes with lots of examples. Most of the dither routines used in the Canon drivers are described in detail in this book.

Color Adjust... A window will open when you click on this option. This window (see figure 7.4) contains many sliders that enable you to control the colour, brightness, and more, of your picture. While most functions are simple to use, some notes should be made:

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- The gamma slider allows you to brighten a picture without losing too much detail. Owners of printers with dot gain problems (most "cheap" printers $<$ USD 3000 have dot gain problems!) should use this slider to increase the brightness of the output. Generally you should select a value in the range 20 to 30 to increase the brightness.
- The `Weights` sliders are important for printing colour pictures on monochrome printers. The colour components of the colour picture are weighted according to the slider settings. What are weights good for? Well, a red and green pixel, both with the same colour value of 50, do not have the same luminance when they are displayed on a colour monitor. Most likely the green will appear brighter, due to the way monitor tubes are built. Because of this, when converting a colour picture displayed on a monitor to a greyscale picture for printing, you have to consider the different weights (luminances) of the tube colours. By default CanonStudio uses the weights

as defined by the NTSC and PAL standards. If you have scanned a picture with an RGB scanner, the colours are not weighted to these standards and are most likely weighted equally. In this case all sliders should be set to 3333 (that is, 33.33%) resulting in a total weight of 100%. The total weighting may exceed 100 per cent.

- CanonStudio offers you complete control over its ink compensation function. Printer inks are not completely pure materials. For example there is some yellow mixed into the magenta ink, and some magenta is found in the cyan ink. The ink compensation values will correct for these impurities. With magenta compensation you define the percentage of magenta that is in the cyan ink.

  The ink compensation function can be completely disabled by defining 0%. You will notice that without the ink compensation function a blue sky will print as purple. With the ink compensation function set to 10–30%, blue skies are usually blue again.

Set Aspect When you click on this option CanonStudio automatically sets the print height of your picture to a value so that your printed picture has the correct aspect ratio. This requires a correct aspect ratio or `DPI` chunk saved in your picture. After setting the correct aspect ratio, a circle would be printed as circle and a square would be printed as square, no matter what the physical aspect of the printer's dots are.

! $\longrightarrow$ See page 80 for possible problems caused by pictures saved with Art Department Professional.

cm/inch Every value shown in the windows can be defined in centimetres or inches. This option shows the measurement system currently in use, and when you click on it all values are converted to the other measurement system.

Copies Allows you to define the number of copies of the picture you wish to print. CaPSL Driver users should note that the `Copies` value set in CanonPref is faster, but the pages are printed in a different sequence.

Starting Page If you are printing a poster you may define the page to start printing with. This is especially useful if you had some trouble with the printer in the middle of the print job (out of paper?), and you wish to restart the printing with the page that aborted.

7.3 Printing Pictures

After all settings have been made in the main process window, you can click on the `Print` button. A small status window (see figure 7.5) will appear, telling you the number of pages, copies and (after some seconds) the estimated printing time. The estimated printing time is not very precise at the beginning of a print. It may require a little while before the remaining time shown is more accurate.

CanonStudio includes a printer spooler of its own. Because of this you can keep selecting pictures for printing while the printer is still actually printing. If you selected multiple pictures on startup, the main window will appear with the next picture file. After defining the print size of all previously specified pictures, the file requester appears again.

Figure 7.5: The status window.

There is almost no limit to how many print jobs can be defined! You can define the priority of the printing process on startup of CanonStudio and save all setting by clicking on the `Save Setting` option. If you set this priority to less than zero (the default is -1), printing is done in the background there by enabling you to use your Amiga as desired for other tasks. (Except powering off, of course.)

7.4 Quit CanonStudio

You can terminate CanonStudio by clicking on the file requester's close option or the Quit option. If CanonStudio was started with the `REXX` option, a `QUIT` (or `CONTINUE`) must be used to quit CanonStudio.

7.5 The Status Window

The status window (see figure 7.5) appears on startup of CanonStudio and remains open until you quit CanonStudio. While printing, the window is sized to its maximum size, and shrunk to a small bar when not printing. The status window displays the current print job in progress and estimated printing time. Two options exist in this window and both are active if a picture is being printed:

`Abort` the printing of all pictures.

`Skip` skips the current picture, and printing will start with the next picture. A requester appears to make sure your printer is ready for the next picture in case there was a problem printing the previous picture.

7.6 CanonStudio And Printer Drivers

CanonStudio was designed to work with all proper written Amiga printer drivers, though, CanonStudio is limited to Canon drivers only. If you want a version that works with every driver, get the commercial `Studio Printer Software` from your dealer. If the printer driver supports its own kind of colour adjustment or dither routines, turn them off! If you are using one of the CanonStudio drivers this can be easily done by printing using density 1 or 2.

7.7 ARexx Interface

By using the powerful ARexx scripting language, CanonStudio can be controlled for automatic print jobs. Nearly every aspect of CanonStudio can be controlled from ARexx using simple English-like commands. This chapter describes the operation of CanonStudio from ARexx.

Note that you must own ARexx in order to use the facilities described in this chapter. If the program cannot locate the library `rexxsyslib.library` then it will not respond to any ARexx style requests. Also, CanonStudio must be started with the `REXX` option (Shell or tool type) to enable the ARexx interface.

In order to access CanonStudio from ARexx you must tell ARexx how to make contact with CanonStudio. Specifically, you must tell ARexx the name of the message port which CanonStudio creates for the purpose of ARexx interaction.

The port name of the program is called '`PRTSTUDIO.n`', where `n` is an extension, starting with '1', making each port unique.

You can make the connection from ARexx to CanonStudio using the following ARexx command:

```
address "PRTSTUDIO.1"
```

ARexx will generate an error condition should CanonStudio not be found. Note that the port name is case sensitive.

7.7.1 Results

After every command directed to CanonStudio from ARexx is executed, CanonStudio will set the standard ARexx result variable, "RC", with a return value. If this value is zero, then the previous command has executed without error. If the value of "RC" is not zero, then it contains an error severity indicator.

In order to receive additional error indications, or to receive non-error status information back from CanonStudio, you must request additional status information from ARexx using the following command:

```
OPTIONS RESULTS
```

This command should be one of the first executable instructions in your ARexx program.

If an `OPTIONS RESULTS` command has been issued, CanonStudio will load additional information into the ARexx variable `PRTSTUDIO_RESULT`. `PRTSTUDIO_RESULT` can be consulted whenever `RC` is non-zero to gain additional information about the nature of an error.

When `RC` is returned with a zero value (indicating no error occurred), `PRTSTUDIO_RESULT` will be set to command-specific information. Note that this means you must check `RC` before depending on the data in `PRTSTUDIO_RESULT` since `PRTSTUDIO_RESULT` may contain either additional error information or the status information you requested.

The `PRTSTUDIO_RESULT` variable is available only to true ARexx programs. If you are sending ARexx style commands to CanonStudio from a non-ARexx program, then results which normally would be passed back in PRTSTUDIO_RESULT will instead be passed back in the rm_Result2 field in the ARexx message structure.

When CanonStudio is started with the REXX option it will set up a database of your default values for printing. The values of the database can then be altered by using ARexx commands. Once you have set up the values, you may call the PRINT command from ARexx and CanonStudio will print the selected picture with the settings in the database. You can continue with your ARexx script while CanonStudio prints the picture in the background. You may even specify an unlimited number of pictures for printing while CanonStudio is still printing the first picture. CanonStudio contains a printer spooler for keeping control of what has been printed.

The database you have read and/or write access to from ARexx contains information like:

PRINTDX: print dimension X position.

PRINTDY: print dimension Y position.

PRINTDW: print dimension width.

PRINTDH: print dimension height.

PAGEDX: page dimension X position.

PAGEDY: page dimension Y position.

PAGEDW: page dimension width.

PAGEDH: page dimension height.

PAPERDW: printer page dimension width — read only!

PAPERDH: printer page dimension height.

RULRERDW: ruler dimension width.

RULRERDH: ruler dimension height.

COPIES: number of copies.

STARTPAGE: starting page.

DENSITY: printer device density setting for printing (1–7).

DITHERMETHOD: dither method to use for printing.

COLOR CONTROLS: control over the colour adjustments.

Each dimension must be defined in the actual measurement set by CM or INCH.

7.7.2 Commands

GETFILE
GETFILE 'DEFAULTFILE'

Opens the file requester and returns the selected file in `PRTSTUDIO_RESULT`. If the user aborts the requester without selecting a file, `RC` will be set to 10 and `PRTSTUDIO_RESULT` will contain the currently selected file.

SETFILE
SETFILE 'PRINTFILE' The first syntax returns the file set in the database. The second syntax allows you to define a new picture for printing. The old selection will be returned in `PRTSTUDIO_RESULT`. In both cases no error is returned.

QUIT

Quits CanonStudio.

SCREENTOFRONT

Brings the CanonStudio screen to the front. This command does not return an error.

PANEL

Opens the main processing window and allows the user to set up the parameters for a picture. CanonStudio returns 10 in `RC` and "`Aborted`" in `PRTSTUDIO_RESULT` if the user aborted the panel window with Cancel. If an error appears or the selected file was not a valid IFF file, `RC` contains 20 and `PRTSTUDIO_RESULT` "`Illegal file`".

PRINTDW
PRINTDW `SIZE`
PRINTDH
PRINTDH `SIZE`
PRINTDX
PRINTDX `SIZE`
PRINTDY
PRINTDY `SIZE`
PAGEDW
PAGEDW `SIZE`
PAGEDH
PAGEDH `SIZE`
PAGEDX
PAGEDX `SIZE`
PAGEDY
PAGEDY `SIZE`
PAPERDW
PAPERDH
PAPERDH `SIZE`
RULERDW
RULERDH

Using these commands you can ask or set a size parameter for printing. `SIZE` must be defined in the actual measurement `CM` or `INCH`. Make sure you set the measurement beforehand. If `SIZE` is illegal, `PRTSTUDIO_RESULT` returns "`Illegal value`" with `RC` set to 10. If there was an error, the size parameters in the database are altered to a legal value. While you may alter a setting with these commands, it is not recommended to set all parameters. Use the `SETSIZE` command instead.

SETSIZE `PRINTDW PRINTDH PRINTDX PRINTDY PAGEDW PAGEDH PAGEDX PAGEDY PAPERDH`

With this command you can set multiple print parameters in one go. You may specify as many arguments as you need, as long as you conform to the order above. This command avoids possible errors that might appear with the single-size set commands (`PRINTDW`, etc.) because of temporary invalid parameters. As a result, this command returns the previous settings of:

`PRINTDW PRINTDH PRINTDX PRINTDY PAGEDW PAGEDH PAGEDX PAGEDY PAPERDW PAPERDH`

Note that you also get `PAPERDW` as a result. You may use the ARexx parse command to assign each value to a particular variable in ARexx scripts.

If there was an error, `RC` returns 10 and `PRTSTUDIO_RESULT` "`Illegal value`".

CM

Sets the measurement system to centimetres and automatically converts the values in the database to centimetres. The previous setting "INCH" or "CM" is returned in PRTSTUDIO_RESULT. No error is reported.

INCH Sets the measurement system to inches and automatically converts the values in the database to inches. The previous setting "INCH" or "CM" is returned in PRTSTUDIO_RESULT. No error is reported.

FANFOLD

Sets the paper type to fanfold. The previous setting, "FANFOLD" or "SINGLE", is returned in PRTSTUDIO_RESULT. No error is reported.

SINGLE

Sets the paper type to single. The previous setting, "FANFOLD" or "SINGLE", is returned in PRTSTUDIO_RESULT. No error is reported.

DITHER

DITHER CUSTOM|FLOYD|JARVIS|STUCKI|BNOISE30|B NOISE50

Sets the requested dither method. The previous setting is returned in PRTSTUDIO_RESULT. If there was an error, RC is set to 10 and PRTSTUDIO_RESULT to "Illegal value".

VERSION

Returns the current version of CanonStudio ("1").

COPIES
COPIES 'NUMBER'

Sets the number of copies to print. The previous setting is returned in PRTSTUDIO_RESULT. If there was an error, RC is set to 10 and PRTSTUDIO_RESULT to "Illegal value".

STARTPAGE
STARTPAGE 'PAGE'

Sets the page to start printing with. The previous setting is returned in PRTSTUDIO_RESULT. If there was an error, RC is set to 10 and PRTSTUDIO_RESULT to "Illegal value".

DENSITY
DENSITY 1-7

Sets the required print density. The previous setting is returned in PRTSTUDIO_RESULT. If there was an error, RC is set to 10 and PRTSTUDIO_RESULT to "Illegal value".

MAGENTA
MAGENTA 0 - 100
YELLOW
YELLOW 0 - 100

Sets the ink compensation percentage. The previous setting is returned in PRTSTUDIO_RESULT. If there was an error, RC is set to 10 and PRTSTUDIO_RESULT to "Illegal value".

RED
RED `-50 - 50`
GREEN
GREEN `-50 - 50`
BLUE
BLUE `-50 - 50`
GAMMA
GAMMA `-50 - 50`
CONTRAST CONTRAST `-50 - 50`
BRIGHT BRIGHT `-50 - 50`

Sets the colour adjustment values. The previous setting is returned in `PRTSTUDIO_RESULT`. If there was an error, `RC` is set to 10 and `PRTSTUDIO_RESULT` to "`Illegal value`".

REDWEIGHT
REDWEIGHT `0 - 20000`
GREENWEIGHT
GREENWEIGHT `0 - 20000`
BLUEWEIGHT
BLUEWEIGHT `0 - 20000`

Sets the colour weights for the colour-to-greyscale transformation in $\frac{1}{100}$ per cent. The previous setting is returned in `PRTSTUDIO_RESULT`. If there was an error, `RC` is set to 10 and `PRTSTUDIO_RESULT` to "`Illegal value`".

CONTINUE

After sending this command the CanonStudio ARexx port is removed and the program will open the file requester as if it was started from the Shell or Workbench without the `REXX` parameter. If at this point you quit the file requester, you also quit CanonStudio.

! → Do not send further messages to the invalid CanonStudio port after sending this command or your computer will crash.

PRINT
PRINT WAIT

With PRINT the currently selected file will be placed in the printing queue with the parameters set in the database. Control is returned to ARexx directly after specifying this command, which means that the ARexx program may continue while CanonStudio prints in the background. Because of this you will never receive a error message, whether the file was successfully printed or not. But you may get an error in RC and a proper explanation in PRTSTUDIO_RESULT because of illegal settings in the database.

Different to PRINT, PRINT WAIT halts your ARexx program until the specified picture has been printed. If the printing was aborted for some reason, RC is set to 10 and PRTSTUDIO_RESULT to "Aborted". Note: skipping the picture does not set RC to 10.

SETASPECT

Sets the print dimension height PRINTDH according to the aspect of the selected picture.

Note: to find the aspect of a picture CanonStudio has to scan the picture file. Because of this, floppy users may have to wait some seconds until the ARexx program is further executed. Also, a valid picture file must be given. SETASPECT returns the previously selected PRINTDH in PRTSTUDIO_RESULT.

8. Dither Routines

Many dithering methods are supplied with the CanonDisk, and these are described below. In each case a larger dither mask size produces a printout which can represent a wider range of colours, but will produce less spatial information per unit area of paper. Conversely, a smaller dither mask size can reproduce fewer colours (or shades) but more closely approximates the true resolution of your printer.

Another way of expressing this is simply that there is a tradeoff between printing "lots" of colours and printing in high resolution. Given a specific printer with a specific DPI capability, asking for "lots" of colours means using a larger dither mask size. A larger dither mask size cuts down on your effective resolution. For instance, using a dither mask of 16×16 on your 360 dpi printer will result in $360/16 = 22.5$ dpi[1] with full colour information.

Note that this can work to your advantage when enlarging a picture. Enlarging means that there are more dots to work with, which offsets the loss in resolution caused by a larger dither mask size. This, added to the benefits to be had by being able to reproduce more colours (or shades), means that your enlarged posters will look quite good. Also note that many printers, including most laser printers and dot-matrix printers, have considerable dot gain problems. For example, a 300 dpi laser printer does not actually print dots which are $\frac{1}{300}$ of an inch in size. Rather, its dots will be much larger. This causes some dithers, such as the Floyd-Steinberg and Ordered dithers, to produce intensely over-saturated or 'muddy' prints. Other dithers, such as the two halftone dithers, overcome this problem with low-end printers.

If you want to learn more about dither routines and digital halftoning, here is a very good book to study:

Robert Ulichney
Digital Halftoning
MIT Press
ISBN 0-262-21009-6

The book is easy to understand and comes with lots of examples. Most of the dither routines used by CanonDisk are described in detail in this book.

→ p. 33

With the exception of the Floyd, Jarvis, Stucki and Blue Noise dithers, all dither routines described below are supported by the Canon printer drivers. See page 33 for information on how to enable a required dither routine for a Canon printer driver.

OK, now let's discuss the dither routines in detail:

[1] This values is often described as l/inch (lines per inch) or 'screen frequency'.

Custom (free defineable)

If the `Custom` dither method is selected in the CanonStudio program you can define or load any ordered dither matrix by clicking on the `Define Dither...` option. If you are using one of the Canon printer drivers, click on the button marked `Customize Dither...` for using one of the dithers described below. Several popular ordered dither methods are provided with the CanonDisk and saved in files. These files can be loaded and enabled with the `Load` option.

→ p. 33 See page 33 for more information about the `Define Dither...` and `Customize Dither...` window.

The number of printable colours is usually directly related to the size of the dither matrix. Most of the ordered dither routines described below exist in several sizes. You can distinguish between them by their filenames. For instance a filename of "Halftone-A-4" means the Halftone A dither routine for 4 shades; while "Halftone-A-256" means the Halftone A dither routine for 256 shades.

Each dither described below is shown as a greyscale ramp with nine levels. Each level is an increment of 10%, beginning with 10%. In the case of the error diffusion dithers (Floyd-Steinberg, Jarvis, Stucki, Blue-Noise), a 256 level greyscale ramp is shown.

Halftone-A - <number of colors>

Halftone-B - <number of colors>

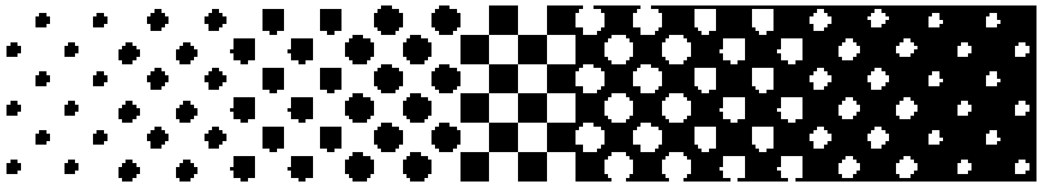

Figure 8.1: Halftone-A-256 dither.

The halftone dithers (Halftone-A and Halftone-B) differ in how they place a halftone matrix.

This is the classic clustered halftone method used by most book publishers, and PostScript (see figure 8.1). To improve the dither output the halftone matrix is rotated by 45 degrees. Halftone-A causes the halftone matrix for each of the primary colours to be centred about the same point. This means that the primary colours will overlap completely, leaving a lot of white paper showing through. This may be appropriate for some better dye-sublimation type printers, or other colour printers with good registration where the inks mix well.

Halftone-B, on the other hand, staggers the halftone matrix of each primary colour so that they do not overlap. This is similar in concept to traditional colour offset printing. Halftone-B may produce better results on printers whose inks do not mix well, and on printers with less than perfect registration.

The halftone dithers can produce some extremely good results and compensate for the dot gain problems outlined above. Try both halftone dithers to see which one is better for your particular task. If you are going to photocopy your printouts, using Halftone results in a much better copy.

Halftone-B is somewhat different to the other dither matrices. You have a special dither matrix for each colour. Because of this, each dither filename includes the abbreviation of the color (C = cyan, Y = yellow, M = magenta, K = black or greyscale).

! → If you are using Halftone-B with one of the Canon printer drivers, you must increase the brightness of the black colour component by 50%. Use the `bright+` option in the appropriate Canon driver preferences programs for increasing brightness.

Halftone-B is a good example of the relationship between colour adjustment and dither routines. You have to consider both settings.

PrtDevice-Halftone-16

PrtDevice-Ordered-16

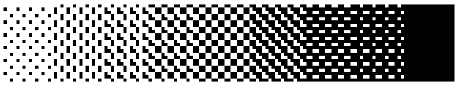

Figure 8.2: PrtDevice-Halftone-16

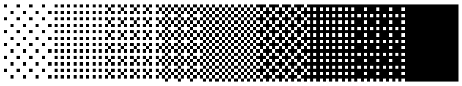

Figure 8.3: PrtDevice-Ordered-16

This dither matrix is the one used by the Workbench printer devices `Halftone` or `Ordered` dither.

Ordered-A - <number of colors>

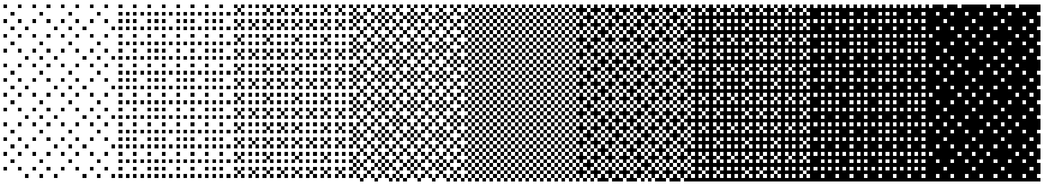

Figure 8.4: Ordered-A-256 dither.

The dispersed ordered dither produces a regular repeating pattern which is often used for printing computer graphics. The ordered dither is particularly vulnerable to over-saturation due to dot gain in high resolutions. But you will get good output if you don't use the maximum print density of your printer (for instance, by using 180 dpi on a 360 dpi printer).

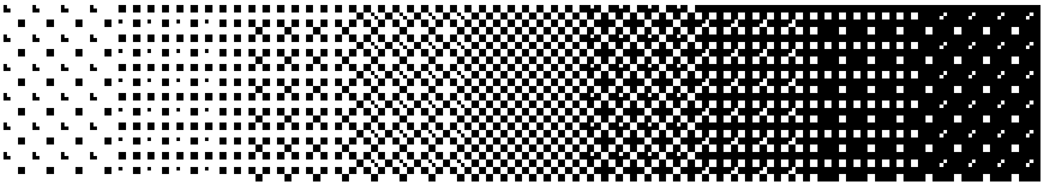

Figure 8.5: Ordered-B-64 dither.

Ordered-B - <number of colors>

This dither is a mixture of a dispersed dither like Ordered and a clustered dither like Halftone. The dither is meant specially for high resolution printers with dot gain problems. For instance, if you print a picture with 360×360 dpi using Ordered-B-64, you get a picture that appears to be printed at 180×180 dpi. But while colours are printed emulating 180×180 dpi, all the black parts of the picture are printed using 360×360 dpi. Don't be confused, the printed picture is still better than a picture in real 180×180 dpi resolution. The Ordered-B dither is especially useful for colour DTP because you can combine good colour pictures with fine high quality text.

Spiral-Dot-Screen - <number of colors>

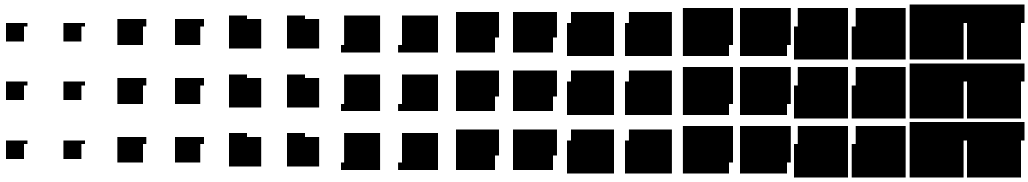

Figure 8.6: Spiral-Dot-256 dither.

A wide range of special effects clustered-dither matrices are available in the graphic arts industry, and all are easily simulated digitally. Spiral-Dot is such a dither. The spiral-dot dither is essentially half of the classical 'screen', with dark squares growing to fill the plane without the alternating light squares. Spiral-Dot looks quiet similar to the Halftone-A matrix, zero degree rotated.

Horizontal - <number of colors>

Vertical - <number of colors>

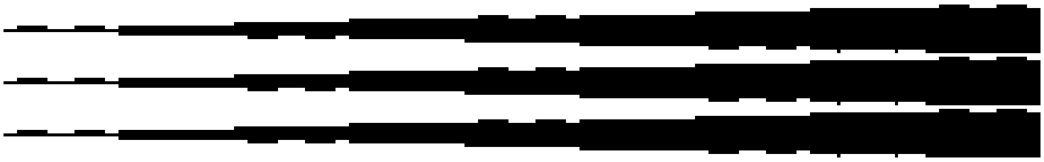

Figure 8.7: Horizontal-256 dither.

A wide range of special effects clustered-dither matrices are available in the graphic arts industry, and all are easily simulated digitally. The Line dithers are such dithers.

The horizontal (as well as the vertical) dither overcomes many of the dot gain problems that the error diffusion, Blue Noise and Ordered dithers have with low-end printers. These dithers (particularly the diagonal dithers) are especially good for enlarged pictures.

Fwd-Brick- <number of colors>

Bck-Brick- <number of colors>

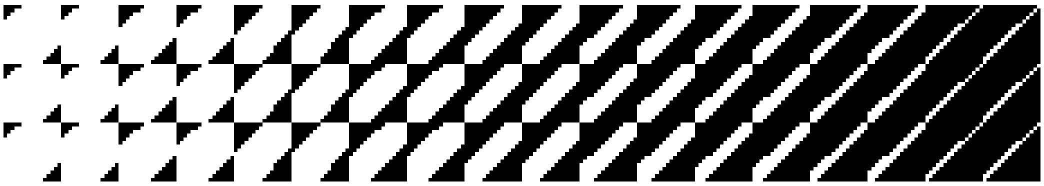

Figure 8.8: Fwd-Brick-256 dither.

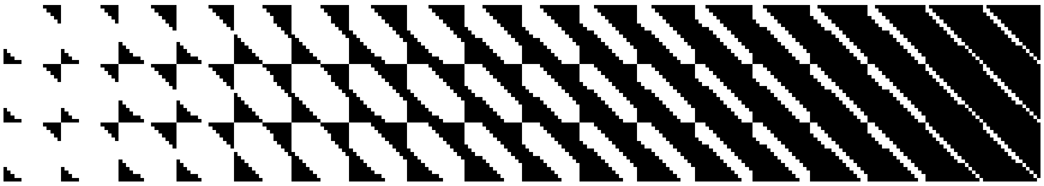

Figure 8.9: Bkw-Brick-256 dither.

A wide range of special effects clustered dither matrices are available in the graphic arts industry and all are easily simulated digitally. The Brick dithers are such dithers.

The Forward-Brick (as well as the Backward-Brick) dither overcomes many of the dot gain problems that the error diffusion, Blue Noise and Ordered dithers have with inexpensive printers. These dithers are especially good for enlarged pictures.

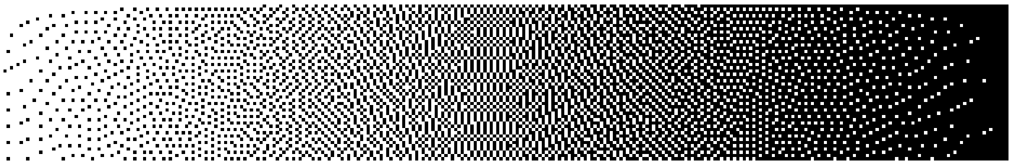

Figure 8.10: Floyd-Steinberg error diffusion dither.

Floyd Steinberg

This is a very popular error diffusion dither method first suggested by Floyd and Steinberg. They argued that a filter with four elements was the smallest number that could produce 'good' results. The values were chosen to particularly ensure a checkerboard pattern at the middle grey or shade of colour. This dither method provides a good compromise of speed and quality. The reason for the popularity of this algorithm is clear – several colour shade levels are represented by pleasingly isotropic, structureless distributions of dots. But there are some shortcomings:

1. Correlated artifacts in many of the colour shade level patterns. This can be easily seen by printing a greyscale ramp.
2. Directional hysteresis due to the raster order of processing. This artifact is most apparent in very light and very dark patterns.
3. Transient behaviour near edges or boundaries.

Jarvis, Judice und Ninke

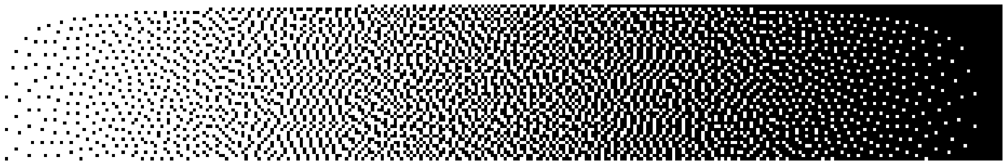

Figure 8.11: Jarvis, Judice and Ninke dither.

In 1976 Jarvis, Judice and Ninke documented an error filter with 12 elements. The large filter size reduces some of the artifacts seen with the 4-element filter of Floyd and Steinberg, but directional hysteresis in the very dark and light regions are increased, and pixels are clustered together more in the middle of colour shade regions. It also sharpens the pictures.

Stucki

The Stucki filter provides nearly the same output as the Jarvis filter, though you may notice differences in sharpness.

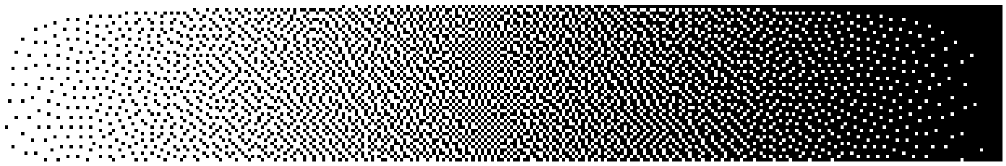

Figure 8.12: Stucki dither.

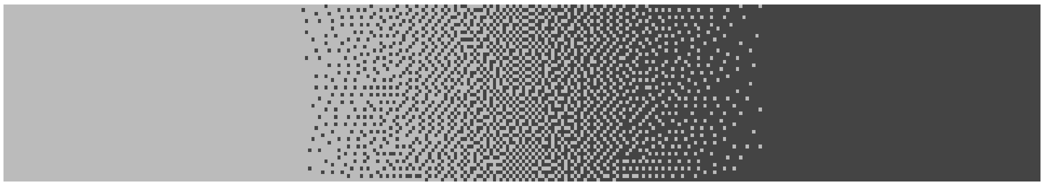

Figure 8.13: Blue-Noise dithers.

Blue-Noise 30 %-50 %

In trying several combinations of deterministic values in a 4-element error filter, none proved better than the famed filter of Floyd and Steinberg. Two variations of this basic filter are the Blue Noise dithers included with the CanonStudio program. Both are processed with serpentine rasters. The serpentine raster used in processing is responsible for much of the directional artifact elimination. The noisy threshold (30% or 50% white noise) breaks up most of the remaining stable texture patterns, yielding good radial symmetry at the expense of adding some low frequency energy.

Blue noise is especially useful when printing light shades and fading colours.

All error diffusion dithers, including Blue Noise, can produce very good results on colour printers that have little dot gain and very good registration. If it produces a washed-out print or particularly bad patterns, then try another dither (see the custom Ordered-B or Halftone, for instance).

9. Tips & Tricks

Colour printing with b/w printers

You are able to print colour graphics on monochrome printers by manually switching colour ink cartridges or ribbons. Colour printing can be achieved by using the separation function of the Canon drivers:

- Use the `Separation` option of the CanonPref preferences program to turn off all primary print colours except yellow. Put a yellow ribbon/ink cartridge into your printer.
- Print a colour picture from your application using the Workbench colour mode.
- Repeat the steps above for each primary colour, using the same sheet of paper.

Note that reinserting the sheet of paper usually causes mechanical problems that result in a loss of print quality.

Most likely, the colour and brightness of the output will be wrong. Changing the dither method may improve the output quality dramatically. Try both a dispersed Ordered and a clustered Halftone dither, and use the one that fits your printer best.

Also, start printing with the brightest primary colour. This avoids the possible corruption of brighter colour ribbons.

10. Environment Vars

If you have never heard of 'environment variables', this chapter is not for you. But don't panic, you won't be missing anything unless you are still using Workbench 1.3.

This chapter is mainly of interest to experienced users. It covers controlling Canon drivers from ARexx, Shell or batch files.

You may set options for the Canon drivers by using the `setenv` and `getenv` Shell commands instead of the CanonPref preferences program. `Setenv` saves your option in a file in the `ENV:` directory. See your system manual for a complete description of the `setenv` and `getenv` commands. The driver will read in the arguments upon opening the printer device. If you don't have enough memory, the driver will not open.

! → Note: setting options does not always mean they take effect immediately. So if you make changes by using `setenv`, flush the driver out of memory (`AVAIL FLUSH`) or run `InitPrinter` in order to let the driver know about your changes. The CanonPref preferences programs will do this for you automatically.

Remember that environment variables (which are stored in the `ENV:` directory) are normally erased by re-booting. If you don't want to set the environment variables every time you boot, you can place them in `ENVARC:` (Workbench 2/3) or assign `ENV:` to a non volatile disk (Workbench 1.3). Make sure you use the Commodore `setenv` command to set environment variables. Environment variable names are not case sensitive.

Most of the Canon drivers are very different from each other. This is not true of the environment options. Basic driver functions can be controlled using the same environment variable names for each driver.

OK, now a description of every environment variable in detail:

sbox_printer: <**0**|**1**|**2**|**3**> **(default: 0)**

All Canon drivers support the arXon parallel switch-box, an external 1 to 3 Centronics switch controllable by software. You can ask the printer driver to automatically switch to the required port for printing, and switch back to the previously used port after printing. This enables you to use a scanner, a digitizer and a printer from your Amiga's parallel port without having to switch between the devices manually. If you specify `Default` as the port, no switching will take place.

Information about the arXon switch-box may be obtained from:

arXon GmbH
Assenheimer Str. 17
D-W-6000 Frankfurt
Germany

Tel: (++49)-69-7896891
Fax: (++49)-69-7896878

! → The environment variable `sbox_active` must be specified before using the driver in order to enable the switch-box feature of the driver. This is because `sbox_active` is used to determine whether a switch-box is installed or not. `sbox_active` is defined by the arXon software.

CanonGAdj:
CanonCAdj:
CanonMAdj:
CanonYAdj:
CanonKAdj: <**Num**> **(default: 0 17 34 51 68 85 102 119 136 153 170 187 204 221 238 255)**

You may define a colour adjustment function using 16 values for each primary print colour (G=grey, C=cyan, M=magenta, Y=yellow and K=black). Each of the 16 values must be in the range 0 (black) to 255 (white). The brightness of the input values increases from left to right (0 to 255).

CanonBeep: <**0**|**1**|**2**|**3**> **(default: 0)**

If the printer device is closed after a print, you can tell the driver to signal the end of the print job. This is especially useful with huge graphic prints which might require some time. There are two kinds of signals. You can cause a beep (Ctrl-G) on the printer, a DisplayBeep on the Amiga, or both:

0 = No signal (default)
1 = Beep
2 = Flash
3 = Beep & Flash

CanonMirror: **ON**|**OFF** **(default: OFF)**

If set to `ON`, graphics will be mirrored. Especially useful if you want to print pictures intended for T-shirt art.

CanonNoStrip: **ON**|**OFF** **(default: OFF)**

`CanonNoStrip` can be used to turn off the BJ130 drivers white space striping during graphic prints by setting the variable to `ON`. If set to `ON`, the driver prints slower but on some printers the output quality may be slightly better due to mechanical limitations. Some printers may overheat if forced to print to fast using white space striping.

CanonGDit:
CanonCDit:
CanonMDit:
CanonYDit:
CanonKDit: <**X**> <**Y**> **a11, a12,... etc** **(default: Workbench Dither)**

These variables allow you to define the required dither matrix for each primary print colour (G=grey, C=cyan, M=magenta, Y=yellow and K=black). Several dither matrices are included with CanonDisk (Ordered, Halftone, Spiral, Line, etc.). These matrices are stored in a directory named '`dither-settings`' which can be found in your system's '`Prefs`' drawer. You may copy these matrices directly to `env:`, or define a matrix of your own. See page 33 for more information about the Canon dither routines.

CanonResX: **<Num>** **(default: 0 dots)**

If the preferences paper size is `CUSTOM`, this option allows you to specify the horizontal resolution (width) for graphic dumps. The size is specified in 360 dpi dots (BJ/BJC drivers) or 300 dpi dots (LBP driver). If you specify zero (the default) as the resolution, the `US LETTER` resolution of 2880/2400 dots will be used. The allowed range for <Num> is 0 to 65535 dots.

! → Different to the BJ300 and BJ130 drivers, the Canon CaPSL drivers (BJC880 and LBP) and the new Canon BJ5-230 driver use `Custom ResX` for defining the paper size including unprintable margins (0.5 inch).

CanonResY: **<Num>** **(default: 0 dots)**

If the preferences paper size is `CUSTOM`, this option allows you to specify the vertical resolution (height) for graphic dumps. The size is defined as 360 dpi dots (PinDriver) or 300 dpi dots (LaserDriver and DeskDrivers). If you specify zero (the default) as the resolution, the `US LETTER` resolution will be used. The allowed range for <Num> is 0 to 65535 dots.

! → Different to the BJ300 and BJ130 drivers, the Canon CaPSL drivers (BJC880 and LBP) and the new Canon BJ5-230 driver use `Custom ResX` for defining the paper size including unprintable margins (0.5 inch or 0.6 inch for BJ5-230).

CanonSep: **C|M|Y|K** **(default: CMYK)**

With this option you can print a CYMK colour component of a picture. For example, if you want to print the cyan component of a picture set `CanonSep` to `C`. The combination of following characters, in any order, is allowed:

C = Cyan
M = Magenta
Y = Yellow
K = Black

CanonGFeed: **<Num>** **(default: 0)**

Some printers have problems with their internal mechanics causing unwanted horizontal stripes in the graphic output. Often the linefeed is a bit too much or too little, causing dark or white horizontal lines. This problem is called 'banding'. `CanonGFeed` allows you to adjust the driver to the mechanical inaccuracy of the printer. Set `CanonGFeed` to 1 if you have white lines in the output, or 2 if you have dark lines:

0 = Normal linefeed
1 = Decrease linefeed
2 = Increase linefeed

CanonTab: **<Num>,...** **(default: 9, 17, 25,...)**

This environment variable allows you to customize the horizontal tab stops settings of your printer. This may be useful for printing program listings and tables. Up to 32 tab stops may be defined for Epson- and 28 for BJ-emulation.

CanonTime: <Num> **(default: 30 seconds)**

If huge amounts of data are being transferred to the printer, the actual printing of the image happens much faster than the transfer of the data. A requester may appear on the screen saying 'Printer trouble...'. This appears because the printer device thinks no data has been transferred due to a hardware or software failure. With CanonTime you can specify the time that should pass before the printer device puts up the error requester.

With Timeout you can specify a higher timeout value, resulting in fewer timeout requesters. A value from 1 to 999 seconds is allowed (default 30 seconds).

E → Instead of defining a huge timeout value there is another solution available: use the CMD program (see your Workbench disk) to redirect the parallel/serial output to a file on disk. After this, use the Copy command or a printer spooler to copy the file to par:.

Note: if a real error occurs, you will have to wait the number of seconds specified by CanonTime until an error requester appears, thus allowing you to cancel the print job. So choose your CanonTime value wisely.

CanonTop: <Num> **(default: 0 or 2 lines)**

CanonTop specifies the top margin as a number of lines. The top margin defines the vertical distance between the top of the printable area of the page and the the first line of text on the page. Using this option, together with the preference settings for left margin, right margin and page length, you have total freedom to define the margins of a page. Using the default value of zero disables the CanonTop function. The Top Margin is only enabled if Enable Form is checkmarked.

! → Top Margin can be set to 0 for CaPSL drivers (LBP and BJC880), though, you can't print text on the first line because the text is out of the printers printable area. A Top Margin of 0 is only of interest for a maximum printable graphics area (this requires the use of the CanonResX and CanonResY settings).

CanonPerf: <Num> **(default: 0 lines)**

If CanonForm is set to ON, CanonPerf specifies the number of lines that the printer skips at the end of each page. This causes the printer to skip the perforation between pages of continuous forms. If zero lines are specified, perforation skip will be disabled. If the specified CanonPerf value is greater than or equal to the form length (as defined in the Workbench preferences program), the skip perforation is cancelled and the top and bottom margins become inactive.

CanonForm: **ON|OFF** **(default: OFF)**

If CanonForm is ON, page length (as set in Workbench preferences), Top Margin and Perforation Skip will be enabled by the driver. In order to remain compatible with normal Workbench printer drivers, the default settings are not used. Some applications require a well-defined paper size and margins for printing forms. The Canon drivers provide you with these facilities by setting CanonForm to ON. It may require some experimentation (and paper) until you find the correct values for a specific application. CanonForm is only available to Canon BJ and BJ-EC drivers.

CanonFont: **ON|OFF** **(default: ON)**

Using this switch, you can enable or disable font download without actually deleting the download fonts in your `ENV:` and/or `ENVARC:` directory. Set this var to `OFF` if you don't want any fonts to be downloaded. `CanonFont` is only available to the CaPSL and the BJ5-230 drivers.

CanonFontDat: **¡fontdata¿** **(default: undefined)**

If you generate fonts with the BJ-FontShop program for automatic font download, the fonts will be saved in the `ENV:` and, if `Prefs (save)` was selected, `ENVARC:` directory as `CanonFontDat` var.

CanonType: **<Num>** **(default: 0)**

Specifies the typeface to be selected on `aRIS`, `aRIN` and `aFNT0`. See your printer manual for the values used for selecting a required typeface on your printer. Following values can be used for the BJ300/330:

0 = Courier
1 = Letter Gothic
2 = Prestige Pica
3 = Script
4 = Press Roman
5 = Boldface
6 = Thesis
7 = OCR-A
8 = OCR-B
9 = Olde World
10 = Prestige Symbol
11 = Presentor
12 = Orator
13 = Essay PS
14 = Gothic Symbol

On the BJ130 printer use following values:

0 = printer default internal typeface
1 = RAM CG
2 = Font Cartridge 1
3 = Font Cartridge 2

CaPSL printers support following values:

0 = printer default typeface
1 = Line Printer
2 = Pica
3 = Elite
4 = Courier
5 = Swiss 721
6 = Dutch 801
17 = Garland
18 = Humanist 801
24 = Century 702
138 = Symbol
201-256 = User defined Typefaces

BJC800 printers support:

0 = printer default typeface
1 = Roman
2 = Sans Serif
3 = Courier

CanonFeed: <**Num**> **(normal: 0)**

`CanonFeed` defines the paper feed tray. The BJ300/330 supports fllowing settings:

0 = Disabled
1 = Manual
2 = Top Bin 1
3 = Top Bin 2
4 = Envelope

Canon CaPSL printers support:

Single cassette
0 = Off (printer setting)
1 = Cassette feed
2 = Manual feed
Double cassette
0 = Off (printer setting)
1 = Cassette feed
2 = Manual feed
3 = Upper cassette feed
4 = Lower cassette feed
5 = Envelope feeder

CanonCompress: <**Num**> **(default: 1)**

When `CanonCompress` is set to 1, the LBP and BJC880 driver support graphic compression thus improving the printing speed. `CanonCompress` requires CaPSL 4 and is automaticly disabled for CaPSL 3 and below.

CanonOverPage: <**Overlay**> **(normal: n.d.)**

You can save an overlay page as `CanonOverPage`. For more information about creating overlay pages see chapter "Overlay Pages". `CanonOverPage` is only supported by CaPSL printers.

CanonOver: **ON|OFF** **(default: ON)**

Using this switch, you can enable or disable overlay page download without actually deleting the overlay page in your `ENV:` and/or `ENVARC:` directory. Set this var to `OFF` if you don't want any overlay page to be downloaded. `CanonOver` is only supported by CaPSL printers.

CanonFont0: <**FontData**> **(default: unused)**
CanonFont1: <**FontData**> **(default: unused)**
CanonFont2: <**FontData**> **(default: unused)**
CanonFont3: <**FontData**> **(default: unused)**
CanonFont4: <**FontData**> **(default: unused)**
CanonFont5: <**FontData**> **(default: unused)**
CanonFont6: <**FontData**> **(default: unused)**
CanonFont7: <**FontData**> **(default: unused)**
CanonFont8: <**FontData**> **(default: unused)**
CanonFont9: <**FontData**> **(default: unused)**
CanonFont10: <**FontData**> **(default: unused)**

If you generate fonts with the CaPSL-FontShop program for automatic font download, the fonts will be saved in the `ENV:` and, if `Prefs (save)` was selected, `ENVARC:` directory. The names of the fonts will be named according to the `Printer Font` setting in the FontShop program. `CanonFont0` is the filename for the default font. `CanonFont1` is the filename for font 1 and so on.

Instead of font download, you can use the `CanonFont<n>` vars to customize the printer driver. Because it's not required to save a font file as a `CanonFont<n>` var, you may save text or any other CaPSL command. `CanonFont0` is however special. As opposed to the other `CanonFont<n>` vars, the text will be printed with the preference selected attributes. During `aRIN` or `aRIS` fonts are downloaded in following way:

1. Initialise initial values.
2. Download `CanonOverPage`.
3. Download `CanonFont(10-1)`.
4. Select the font specified by preferences.
5. Download and select `CanonFont0` if font was downloaded.

For instance, you can create an overlay page and save it as `ENV:CanonFont0`. The overlay page will be download on every `aRIN` and `aRIS` command. Using an overlay page through any of the `ENV:CanonFont<n>` vars is possible, but different to the normal `CanonOverPage` var, it won't be downloaded for graphics. Note: before printing text for the first time after loading the driver, an `aRIN` command is automicly sent. This automaticly makes sure everthing is set up right and you don't need to start `InitPrinter` to do so.

CanonOrient: <**Num**> **(default: 0)**

`CanonOrient` defines the printing orientation and is only supported by the Canon CaPSL drivers (LBP and BJC880):

0 = Portrait (default)
1 = Landscape

CanonCopy: <**Num**> **(default: 0)**

`CanonCopy` defines the number of copies to print of each page. `CanonCopy` may range from 0 to 99.

CanonNoDisp: **ON|OFF** **(default: OFF)**

If you own a CaPSL emulation printer wich is unable to display text messages (for instance Canon LBP A1 or Canon LBP A2), you must set this option to `ON` to avoid such messages.

CanonMagenta: <**Num**> **(default: 0%)**

Printer inks are not completely pure materials. For example there is some yellow mixed into the magenta ink, and some magenta in the cyan ink. The ink compensation values will correct for these impurities. With magenta compensation you specify the percentage of magenta in the cyan ink.

The ink compensation function can be completely disabled by specifying 0%. You will notice that without the ink compensation function a blue sky will print as purple. With the ink compensation function set to 10–30%, blue skies are usually blue again.

`CanonMagenta` defines the percentage of magenta in the cyan ink, and may range from 0% to 100%.

CanonYellow: <**Num**> **(default: 0%)**

Printer inks are not completely pure materials. For example there is some yellow mixed into the magenta ink, and some magenta in the cyan ink. The ink compensation values will correct for these impurities. With magenta compensation you specify the percentage of magenta in the cyan ink. The ink compensation function can be completely disabled by specifying 0%. You will notice that without the ink compensation function a blue sky will print as purple. Usualy the ink compensation function should be set to value between 10–30%.

`CanonYellow` defines the percentage of yellow in the magenta ink and may range from 0% to 100%.

CanonMode: <**Num**> **(default: 0)**

In 800 mode (see `CanonEmu` option), you can set the BJC800 printer mode with `CanonMode`. Following options are allowed:

0 = printer default mode. 1 = Mode A. 2 = Mode B. 3 = Mode C. 4 = Mode D. 5 = Mode E.

See your BJC 800 User Manual on how to choose a mode for a special purpose.

CanonColor: <**Num**> **(default: 0)**

`CanonColor` defines the default text printing colour:

0 = Black (default)
1 = Magenta
2 = Cyan
3 = Blue
4 = Yellow
5 = Red
6 = Green

CanonEmu: **24|48|800** **(default: 24)**

This Canon BJ-EC driver supports up to 3 different emulations:

- If set to 24 (default), the printer driver will use the normal Epson 24 pin graphic command as most Epson compatible printers do. This emulation is slow and does not provide the best quailty, because 360 ydpi graphics are printed in two passes causing "wet" muddy printing. For instance, this emulation may be used on a BJ10ex, BJ20, BJ300 and BJ330 in Epson mode.
- If set to 48, the driver supports additional 48 pin graphic commands. In most cases these 48 pin commands (for instance ESC-*-72...) are only supported by new 48 or 64 pin printers (like the BJC800). The commands offer a faster and better graphic dump, because 48 pins are printed on each pass. Also, line gaps are greatly reduced. The driver will use the printers 48 pin mode only in density 1,5 (180*360dpi) and 2,7 (360*360dpi). On all other density settings the driver behaves like the 24 pin emulation above.
- If set to 800, the driver will print graphics using the extended mode of the BJC 8xx and BJ2xx printers. This setting is **STRONGLY** recommended for all BJC users and BJ 2xx users who do print using the graphic mode. This emulation (extended mode) does offer some special advantages: Data send to the printer is compressed, resulting in much less data being transferred. The time saved by sending less data through the slow centronics port may be considerable. So it decrease the print time significantly (usualy 2-4 times compared to the 48 mode, which also does some basic compression).

  In the 800 mode BJC printers may use a "halfline" print system, causing no gaps between printing lines to appear.

  In the 800 mode you are also able to control the printers mode through the driver using the `CanonMode` option (BJC only).

  In the 800 emulation you have a smaller top margin, allowing you to print a bigger sized pictures (BJC only).

  In the 800 emulation, the BJ2xx and BJC printers must be set to a specific page height by the driver. You are not able to print on non cut sheet paper.

  Appart from all the positive advantages in the 800 mode, there is an importent drawback: you are not allowed to print text using the printers internal fonts after you have printed graphics. Also no printer fonts and graphics may appear on the same page. Therefore you can use the driver for normal text prints, but as soon as you have printed a graphic, you must switch emulation to print text or flush the driver out of memory by using `AVAIL FLUSH` from CLI/Shell (WShell users may simply use `FLUSH`). This limitation should not be a major problem for as you can switch back to the 48 or 24 pin mode everytime you want. This mode is mainly for nice and fast graphic dumps and this is what the BJC printers are built for.

Note: `CanonForm` is automaticly `OFF` in the 800 mode. The page size may be altered by using the `CanonResX` and `CanonResY` options instead. Also a `Beep` as job end signal (see `CanonBeep`) is ignored in 800 mode.

CanonSuper: **ON|OFF** **(default: OFF)**

Normal Workbench printer drivers are limited to 16 shades of grey. After brightening the graphic output, even fewer shades are available. Canon drivers do not have this limitation and can print colour pictures in up to 256 shades of grey.

With `CanonSuper` enabled, every colour picture will be printed as a greyscale picture if you select colour instead of greyscale as the graphics output mode. With `Supergrey` it is the printer driver's task to convert the colour data into greyscale data. While this can be done by the printer device instead of the printer driver (as normal Workbench drivers do), the Canon printer driver colour-to-greyscale conversion routines are more precise. Because of this you can print a 4096 colour HAM picture in up to 256 shades of grey instead of the normal 16. `Supergrey` will replace the normal colour dump of the driver.

11. Overlay Pages

The CaPSL drivers support the use of overlay pages. Fixed forms such as invoices are a frequently used example. It is recommended that such forms be registered in the printer instead of preparing the data for individual pages. The desired forms can be specified when needed. The form is then overlaid on the pages. This function is called Overlay Printing. Use of overlay printing eliminates the necessity of transferring print data such as box lines for tables and shading patterns for the individual pages. This reduces the quantity of print data, and improves the efficiency of processing. Also, more complex data can easily be prepared.

An overlay page can be created with nearly every Amiga application. Here is an example of how to create an overlay page:

- It is not necessary in general to disable the printer display messages, but it is recommended for creating an overlay page. Whether you disable the the display function or not, the `OverPg` message will not be displayed.
- Start your application program with which you intended to creating the overlay page.
- Run `InitPrinter`. This loads the driver into memory and causes an `aRIN` to be sent.
- Use the `CMD` program to redirect the printer output to a file.
- Now print your overlay page. Because of `CMD` the program will print to a file instead of to the printer. You `must` print the page without a Form Feed, `aRIN` or `aRIS` command. In most cases `aRIN` and `aRIS` can be avoided by starting `InitPrinter` before printing from the application program (see item above). Form Feed can be controled from most applications (for instance PPage or DPaint IV) or from preferences by choosing the `FANFOLD` papertype.
- Now start the supplied `Overlay` program. `Overlay` needs as an argument the path and name of the file generated by `CMD`. `Overlay` will save the final overlay page as `ENV:CanonOverPage`. Next time an `aRIN` or `aRIS` command is sent, the overlay page will be downloaded and used.

You can disable the overlay page printing by setting `ENV:CanonOver` to `OFF` or deleting `ENV:CanonOverPage` and sending another `aRIN` or `aRIS` command. The sizes of the overlay page paper and the paper used for printing must be the same. Overlay printing is not performed if the sizes are different.

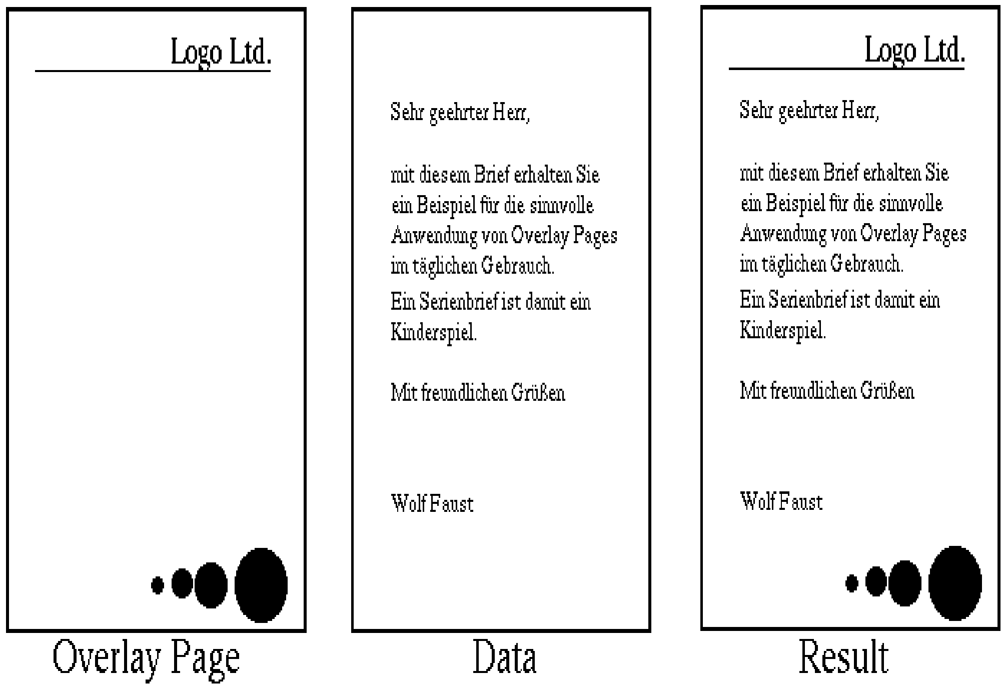

Figure 11.1: Overlay example.

12. BJ-FontShop

The FontShop program allows you to generate and download fonts from your Amiga to the BJ printer (except for BJ130, BJ300 and BJ330). As a font source it uses standard Amiga fonts. If you use a font with a high resolution (ie. size) you can get the best print quality out of your printer.

FontShop can be controlled similarly to the CanonPref programs described above. It has the same font independent user interface and startup arguments.

If you don't use Workbench 2 (V37 or above), you may generate download font files on a Workbench 2.0/2.1 machine and copy them.

Select a font... After starting, the main window will show up containing several options described later in detail. With `Select a font...` you can invoke the system font requester and choose a font for downloading. The printer can fully understand all fonts with up to 48 dots. If you don't have such a large font available, simply enter the 48 point size into the option box and the system will scale a font, so that it fits 48 points. A font size of 48 points is recommended for the best output quality. If you choose a font greater than 48 point, character may be cut of at the bottom (only the 48 upper rows will be printed). If you select a font size with a baseline of 48, you may print all upper case characters in large sizes (for instance 8 CPI). After selecting the font you return to the main window with `OK`.

Now you can download the font to the printer by clicking on the `Download` option.

! → **MAKE SURE YOUR PRINTER DIP SWITCHES ARE SETUP CORRECTLY FOR DOWNLOAD FONTS.** There are several things you can alter in the main window. These are in most cases only for experienced users and will be discussed in the following list of possibilities:

Font: This is a readonly field and shows you the currently selected font.

CPI: This is a readonly field and shows you the characters per inch (cpi) of the selected font. The cpi number depends on your selected font, font width, InterSpace and font mode (Proportional or Mono Spaced characters).

Select a font... This option will bring up the systems font requester. Select a required font and style (underlined, italics, bold, or invers) for downloading. Note: the printers normal font height is 48 dots (and high 36 dots wide). You may download a smaller or greater fonts, but a font greater than 48 dots will most likely be cut of at the bottom. If you only want to use the upper case characters of a downloaded font, you may use a font heigher than 48 dots with a baseline of up to 48 dots. If all upper case characters are above the baseline, everything should work fine and you get "super" characters. The default baseline of a selected font is shown in the "Baseline" option after selecting a font.

There are several commercial and public domain font collections available, offering you large 48 dot high fonts in high quality. Also, you may use Intellifonts

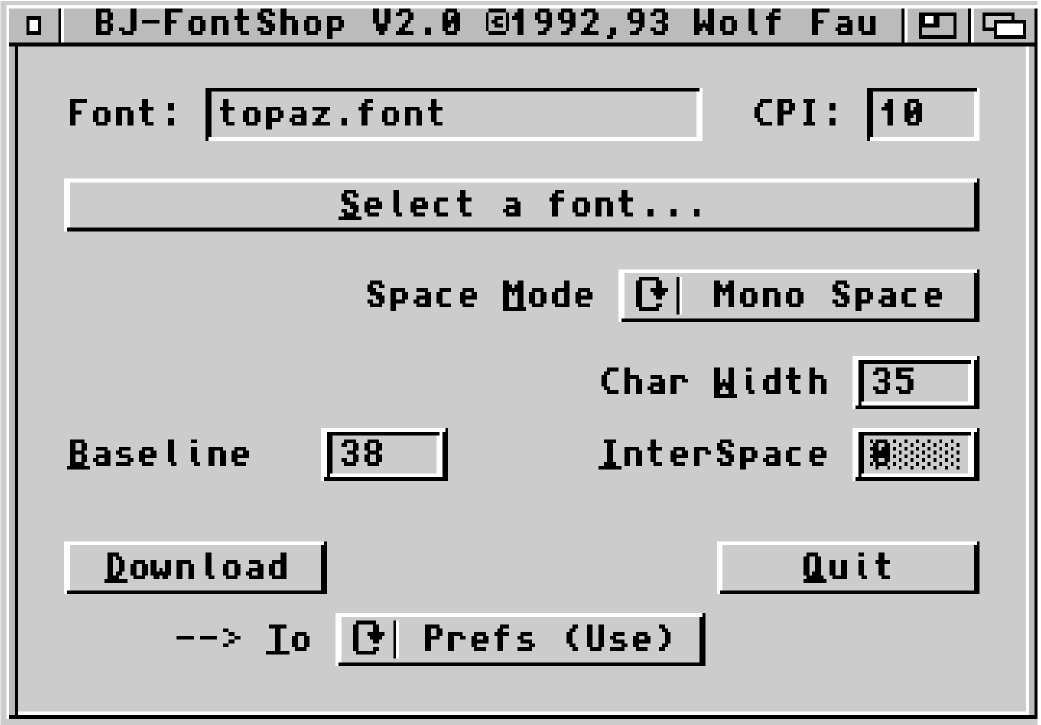

Figure 12.1: BJ-FontShop.

(CompuGraphic) from Agfa Corporation if you have installed the right diskfont library (see your Kickstart 2 manual for more information). Over 250 Intellifonts are available offering you high quality output at variable sizes and styles.

Also, if you wish to make your own downloadable chars or alter existing fonts, there are several nice and easy to use font editors available on the Amiga (public domain and commercial). Ask your dealer for advice.

To: This is a cycleable option. If `Prefs (Use)` is selected, the font is downloaded directly to `ENV:` directory. The printer driver will download the saved font the next time you send an `aRIN` or `aRIS` command. If you want to save the font permanently instead of temporarily, use `Prefs (Save)`. This will save the font in the non volatile `ENVARC:` directory. You may also download the font directly to a file for later use by selecting `File`. These font files can be quickly downloaded from your application program or batch file in quantities. If `File` is selected and the download is started, a file requester will ask you for a filename. Note: the font files must be copied to `PAR:` not `PRT:`!

Space Mode: This is a cycleable option. You may download a font to the printer in a fixed width (`Mono Space`) given in the `Char Width` option. Or you may download the font with proportional spaced chars. You may define a special space (`InterSpace`) between two proportional chars giving a lighter font impression. Note, the given mode reflects the downloaded font mode, not the Amiga font mode. You may download a mono spaced Amiga font as a proportional printer font (ie. kerning is used). Even if the downloaded font is mono spaced, the printer regards the font as a proportional spaced font (even though it isn't). After selecting a new font with `Select a font...` this option is altered to the mode of the newly selected font.

Char Width: This integer option can only be activated, if `Mono Space` mode is active. With this option you may define the width of all characters in dots. After selecting a new font, the value of the option will be set to the default width of the selected font. In the event you selected a proportional font, the option reflects the width of the widest character of that proportional font.

InterSpace: This integer option can only be activated, if `Proportional` mode is active. With this option you can define a microspace between downloaded proportionally spaced characters.

Baseline: With this integer option you specify the number of dots between the baseline and the top border. After selecting a new font, the Baseline will automatically be set to the system baseline of that font.

Download After clicking on this option, the downloading is started. Please be patient, the download may take some time. During downloading, all options are ghosted.

Quit Clicking on this option (or the CloseWindow option) quits the program.

General information about BJ-FontShop and points to note:

FontShop supports accented characters. Note however that some accents are generated by combining two chars (for instance ø = o + /). When downloading such chars in a small size and proportional mode, there may be slight misalignments (for instance causing a o/ instead of ø). You can avoid such problems by altering the size of the special chars or downloading the font in mono space mode.

Although the Amiga has a very large font table, the BJ is not capable of holding so many downloadable characters in its printer memory at once. Because of this, only "commonly used" characters are downloaded to the printer. The few characters not downloaded will be printed in the normal resident font of the printer.

The program assumes you have 32KB of download RAM in your printer. If you select a large font, this RAM may not be big enough causing some char definitions to be ignored by the printer (accents are the first chars which are lost in this case, therefore make sure they are actually required)

13. CaPSL-FontShop

The CaPSL-FontShop program for LBP and BJC880 printers is very similar to the BJ-FontShop program described above. Additional functions are described below. The 48 dot size limitation does not exist for CaPSL fonts.

Printer Font `Printer Font` is a cycleable option. You may download up to 11 fonts at the same time to your printer. The only existing limitation is your printers download RAM. Each font has it's own ID and may be selected by using the amiga standard escape sequence aFNT0-10.

If you generate fonts with the FontShop program for automatic font download, the fonts will be saved in the `ENV:` and, if `Prefs (save)` was selected, `ENVARC:` directory. The names of the font files will be named according to the above listed environment names.

`CanonFont0` is special. Instead of a font download, you can use the variable to customize the printer driver. See "Environment Options" for more information. All font downloads are done during an `aRIN` or `aRIS` command. The `aRIN` or `aRIS` command can be divided into four seperate steps:

1. Initialise initial values.
2. Download `CanonOverPage`.
3. Download `CanonFont(10-1)`.
4. Select the font specified by preferences.
5. Download and select `CanonFont0` if available.

So if you download fonts with ID's in the range from 10 to 1, they may be selected in step 3 because they fit best the requested font attribute. The font with ID 0 will always be selected after `aRIN` or `aRIS` until you request a font attribute where an other font is better suited.

Memory FontShop downloads all country specific ISO character sets with all its characters. For big font sizes this requires large amounts of printer RAM. For this purpose you can set the Memory option to `Economy`. This will force the FontShop program to download only those chars of a character set, wich are really needed by the driver and not the full character set. You can save a lot of printer RAM this way. The memory option doesn't have any effect on the time needed for downloading a character set.

Adjust Line Spacing With this checkmark option you can specify, whether the line spacing will be adjusted to the font size or not. With the preference given a line spacing of 1/8" or 1/6" you run into problems when printing with very large or very small fonts. For instance a 100 dot high font with 1/8" line spacing will overprint the contents of the previous line. If you checkmark this option, the line space will be adjusted to the font size whenever you select the downloaded font.

Space Mode This is a cycleable option. You may download a font to the printer in a fixed width (Mono Space) given in the "Char Width" option. Or download the font with proportionally spaced chars (or kerned mono spaced fonts). You may define a special space (InterSpace) between two proportional/kerned chars giving you a lighter font impression. Note, the given mode reflects the downloaded font mode, not the Amiga font mode. You may download a mono spaced Amiga font as a proportional printer font (ie. kerning is used). Even if the downloaded font is mono spaced, the printer regards the font as a proportional spaced font (even though it isn't). After selecting a new font with `Select a font...` this option is altered to the mode of the new selected font.

! → Each font is selected from the printer's internal memory, or an accessory font product, by specifying the font characteristics such as pitch, height and typeface. The printer **selects the best fitting font from those available**, which means that only those fonts that are available can be selected, and the selected font **must** match the specified font characteristics in the following descending order of priority:

- Orientation
- Character set (ISO is supported by the driver)
- Proportional spacing versus fixed spacing
- Print pitch (for non-proportional fonts only)
- Character height (point size)
- Character style (upright versus italic)
- Stroke weight (medium, bold)
- Typeface family
- Quality (draft, letter)

Because of this, a typeface specified by CanonPref is not made active until all the characteristics with higher priorities match the selected typeface.

14. Errors and Fixes

For experienced computer and printer users, it's a known fact: Everything possible that can go wrong, will go wrong. Especially when it comes to printing and there are many places were one can make mistakes.

If you can't solve a problem with Canon drivers, a `Report` program can be found on the CanonDisk. `Report` prints all driver settings to the screen. You can easily redirect the output to the printer using the Shell command `CanonDisk:Report >prt:`. Please make sure that you have this information handy when asking for help. Without the output of `Report` it is nearly impossible to track down problems, and thus supply solutions.

If you find a problem with a Canon printer driver, please send a description which makes it possible to reproduce the problem. For this purpose, you should provide the following information:

- A `Report` output.
- Which application program are you using, and which version of it?
- Which Workbench revision are you using?
- Include a dump of the program, as a file (use the `CMD` program from the Workbench disk for this) and in printed form also.

Par: & Prt:?
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Data should be sent to the printer only via parallel.device (`par:`) or printer.device (`prt:`), and not both at the same time as this may confuse the printer.

Empty pages before dump?

BJ users with a cut sheet feeder and BJ emulation (for instance BJ200) should not set a top margin as this causes an empty page to be fed before the actual printing.

White graphic dumps

In the event that stripes or empty lines appear in graphic dumps check your printer margins (DIP switches, preference settings, settings within the program you use,...). Make sure your printers ink cartridge is full. Also make sure your computer has enough memory. In particular Art Department (TM) Professional 2 users should use the `MAXMEM` option to make sure the driver does have enough memory for printing or ADPro will simply print trash or empty lines. About 100 kb memory should be available before starting to print!

Another reason for empty pages on BJC 880 users is an uninitialised printer. Do not reset the BJC 880 printer or turn it on/off after a first dump. In case you are forced to reset the printer because of whatever reason, run "Initprinter" afterwoods or flush the driver out of memory. You can find the Initprinter program on your system disks.

No text dumps There is one reason causing white pages instead of text dumps. After printing graphics using the BJ 2x0 and BJC native mode (or `Graphics Only`), the printer is unable to print text. You must flush the driver out of memory for printing text again. You can flush the driver by using `Avail Flush` from CLI or by selecting `Use` or `Save` in the CanonPref program.

No dump? If the printer device `immediately` reports an error while trying to print a graphic, check that you have selected the correct Canon printer driver in Workbench preferences.

No way for Kickstart 2 & 3 Your printer doesn't work under Kickstart 2 or 3, while with Kickstart 1.3 it works fine? Check the "on-line" and "out of paper" lines in the printer cable. Make sure they are connected correctly. If your cable is wired correctly then, check the two Amiga port chips named 8520. There have been major changes in Kickstart 2 regarding the use of the port chips. Ask your dealer for help if these tips are too technical for you!

Empty pages? Empty pages is a known problem of Amiga printer drivers with page orientated printers (like laser printers). After graphics dumps an empty page is printed. So far there is no 100% cure for this problem. Some application programs don't cause an empty page if you enable the `Continuous` paper type in preferences. Also, some Canon drivers do have a special feature avoiding empty pages, though, it may not allways work.

Printer trouble... `Printer trouble...` requester? Have a look at the `TimeOut` setting of the Canon drivers. Setting a longer `Timeout` can avoid such requesters. Note: clicking on the `Resume` button continues printing without loss of data.

No Formfeed If a page is not ejected, check your paper type preferences. Make sure `Single` is selected as the paper type. Deluxe Paint users may run into the problem of an endless graphic dump – the Deluxe Paint print requester won't disappear, and the printer doesn't eject the page. This is a known bug in Deluxe Paint and can be easily cured by a mouse click in the Deluxe Paint print requester.

Differences between KS 2&3 and KS 1.3? After switching from Workbench 1.3 to 2/3 your graphic dumps are of different size? This most likely will happen to users using the `DIN A4` paper size. For instance, under Workbench 1.3 you used the `Letter` size, and after switching to Workbench 2/3 you used the `DIN A4` size. Because all Canon drivers support the new paper sizes (DIN A4, A5 ...), you get a different printout under Workbench 2.0/2.1. Simply switch back to the `Letter` size to get the same result as under Workbench 1.3.

Patching drivers There are several programs that allow you to 'patch' printer drivers in order to alter specific commands or parameters like the `Timeout` value. Do not use these programs!

`Set Aspect` doesn't work? This problem will most likely happen to CanonStudio users with pictures saved by Art Department Professional. Clicking on `Set Aspect` does not set the correct aspect ratio of the image for printing. Usually the width of the image is too small, or the picture is too tall to put it another way. Make sure Art Department Professional saves the correct aspect ratio by using its `Set Pixel Aspect` operator[1].

[1] The `dpi` values saved by Art Department Professional are imported for the `Set Aspect`

To dark pictures? If your graphic dumps are too dark or wrongly coloured, it is most likely caused by the disabled colour adjustment routines of the Canon driver. For more information see table 6.1 on page 21.

CanonPref and FontShop doesn't startup? All CanonPref and FontShop programs require at least Kickstart 2.04. They also work fine under Workbench 2.1 and 3.

11 Tray Paper If you get the message "11 Tray Paper" from your printer, check the `CanonFeed` setting.

Printing trash? Some printers do have problems when connected to the Amiga with an incorrectly wired cable even though the cable might work fine with some other printers and or computers. When printing, strange graphic characters appear on the output. These characters often only appear under special conditions (graphics only). Note you should not use a cable longer than 1.5 meters!

1yJobG? In case your printer prints "1yJobG", "1yJobT", "1yIdle", "1yOverPg" or "Font <n>", you must disable the Display option of the driver because you printer does not support the display comment command needed by the driver.

Out of Memory? There are some things that may help you out of this trouble:

1. In case your printer is not equiped with very much memory and you download fonts, use FontShops `Economy` mode.
2. In case your printer shows `No Memory`, check your printers paint mode!
3. If the Amiga runs out of memory, then check your `ENV:` directory. If `ENV:` is assigned to ram: and contains large font files, move `ENV:` to a non volatile disk. FontShops font files may be large and because of this, require much memory.
4. In case your Amiga runs out of memory, the drivers special features will be disabled! In this case free some memory by quiting unneeded applications. Also flush the driver out of memory (WShell users may use "Flush"; Commodore shell users may use the "Stack 40000000" command in order to do this). After this retry printing.

Printer hangs during aRIN? If your BJ printer immeaditly hangs after starting to print and you have to reset the printer for further printing, you should check, if the printer has a problem with the drivers init commands by sending an `aRIN` command. On extreamly rare occasions some BJ printer may hang up when initialised and the printer has to be reset manualy to proceed (with an unitialised printer). In this case ask your dealer for further help (it's the ESC-[-K-0-1 command that is causeing the problem).

! → Again note: This problem is extreamly rare and before contacting your dealer, check your printer and computer thoroughly first.

Page size is wrong Specialy Canon BJC800 users should note, that the Canon BJC800 printer is a single page printer. The printer does not support non cut sheet paper paper. Because of this you `must` define a page length! The way this is done depends on what emulation you are useing:

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function.

In Epson mode the page length can be defined by setting `CanonForm` to ON and defining the number of lines per page in preferences as 250 or the real page length. Setting page length to 250 is recommended. In this case the printer driver itself chooses the optimal page length for your selected paper size. For instance if you select DIN A4 and a page length of 250 lines, the driver automaticly chooses 65 lines per page at 6 lines per inch. Note: the Canon BJ-EC Epson emulation stores the page length in inches. Because of this, small changes to the page length might not affect the output.

In Canon BJ mode, the driver automaticly sets the page length similar to the Epson modes "250" lines mode. In Canon BJ mode, the printer is able to print on a greater area. Also the page length can be defined in 1/10" accuracy. Again: use the Canon BJ mode for graphic prints.

Note: setting paper size to FANFOLD (or continues) automaticly defines the maximum page length of 22 inch.

15. Glossary

Default A value used in place of a user-selected value. A factory default is a value programmed into the device at the factory; this value is stored in read-only memory (ROM) and cannot be changed by a user or operator. A user default is a default that is selectable via the control panel.

Dot A dot is the smallest thing a printer can print. The number of dots printed per inch is referred to as the printer's resolution (dpi).

Download The process of transferring soft fonts, macros or raster data from a host computer to the printer's user memory is called downloading.

DPI See `Dot`.

ENV: & ENVARC: The Amiga operating system and the Canon drivers store their environment settings in two special directories named `ENV:` and `ENVARC:`. Settings saved in `ENV:` are only for temporary usage and are lost when turning the computer off.

Parallel I/O An input/output interface that transmits more than one bit of information simultaneously. `Centronics` is an industry-wide standard form of a parallel interface.

Pitch Pitch describes the number of characters printed in a horizontal inch. Pitch only applies to fixed-spaced fonts since the number of characters per inch varies for proportionally-spaced fonts. See `Spacing`

Printable Area The printable area is the area of the physical page on which the printer is able to place a dot, wheras the physical page refers to the actual size of the paper installed in the printer.

Raster Images composed of groups of dots are called raster images.

Spacing Fonts have either fixed or proportional spacing. Fixed-spaced fonts are those for which the inter-character spacing is constant. Proportionally-spaced fonts are those for which the inter-character spacing varies with the natural shape of a character.

Symbol Set A symbol set is a unique ordering of the characters in a font. Each symbol set is defined with a unique set of applications in mind. Symbol sets are created for many purposes.

Typeface Typeface is a generic name for graphics symbols having common design features. Each typeface has unique and distinguishing characteristics.