Full Scale Color Scanner

Operator's Guide

Internet info:http://www.contexscan.com

Preface

The Contex Full Scale Color Scanners provide a complete solution for scanning drawings, maps and pictures for use with CAD, GIS, DTP, Color reproduction/Copying and Archival programs.

The built-in dedicated Color feature extraction hardware and high-speed Digital Signal Processor (DSP) perform image processing and enhancement in real time.

The fast industry standard SCSI I/F and WIDEimage software render the Full Scale Scanner truly multi-platform, allowing you to use the scanner with different computers and workstations.

The WIDEimage color scanning software is available in WINDOWS-95 and WINDOWS-NT editions for PCs and workstations.

This guide explains how to operate and maintain the Full Scale Color Scanner. It assumes a basic knowledge of your computer and operating system, ant it does not repeat material from their documentation.

SYSTEM REQUIREMENTS

- PC or supported workstation.
- WIDEimage color scanning software edition and SCSI interface kit matching your workstation.

RELATED PUBLICATIONS

The "OPERATIONS GUIDE" which came with your computer.

The "OPERATING SYSTEM USER MANUAL" for your workstation.

The "WIDEimage USER's GUIDE".

The "README.TXT" file on the distribution diskettes. Use your text editor to look for latest news and updates.

How To Use This Guide

This guide contains six chapters, and six appendices. Make sure you read the Chapter on: "Installation" , before attempting to install or use the Full Scale Scanner and software described in this guide.

Chapter 1. Is an introduction to the Full Scale Color Scanner and gives an overview of its use with different types of professional applications.

Chapter 2. Gives an overview of the Full Scale Color Scanner system and features.

Chapter 3. Describes the functions and the use of the Full Scale Color Scanner operator panel and indicators.

Chapter 4. Discusses the operating modes of the Full Scale Color Scanner.

Chapter 5. Describes the installation of the Full Scale Color Scanner onto your system.

Chapter 6. Describes how to perform user maintenance on the Full Scale Color Scanner.

Appendix A. Lists the Full Scale Color Scanner Specifications.

Appendix B.. Contains a glossary.

Appendix C. Contains the regulations applicable for the Full Scale Color Scanner.

Appendix D. Full Scale Color Scanner License Agreement.

Appendix E. Important safety information.

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1. Introduction

The Contex range of Full Scale Color Scanner x010 models are affordable solutions for large format, high volume color scanning:

- **FSC8010**^{DSP} Full Scale Color Scanner, scans originals up to E-Size(A0) Scan Width, and up to 800dpi resolution.
- **FSC6010**^{DSP} Full Scale Color Scanner, scans originals up to E-Size(A0) Scan Width, and up to 600dpi resolution.
- **FSC5010**^{DSP} Full Scale Color Scanner, scans originals up to E-Size(A0) Scan Width, and up to 500dpi resolution
- **FSC3010**^{DSP} Full Scale Color Scanner, scans originals up to E-Size(A0) Scan Width, and up to 300dpi resolution

The Full Scale Color Scanners double as both color scanners and fully featured B/W and graytone scanners for technical documents. JETstream accelerators provide vivid color copies matched to your inkjet plotter/printer. Built-in, dedicated Digital Signal Processor (DSP) performs image enhancement in real time, and the advanced Area Diffusion Logic scans and prints demanding B/W and graytone documents with shades of gray.

The Full Scale Color Scanner is produced by Contex, the leading manufacturer of large format scanners, with many thousands of installations world-wide.

The Full Scale Color Scanner is designed to work with many types of scanning applications:

1. **Reproduction (Large Format Color Copying)** The Full Scale Color Scanner scans large color maps, drawings and photos, for full color printing on e.g. large format ink-jet plotters.
2. **CAD (Computer Aided Design)** The Full Scale Color Scanner scans drawings and documents, in color or B/W into computers, and perform color feature extraction, so images can be used with CAD programs.
3. **Mapping/GIS (Geographic Information Systems)** The Full Scale Color Scanner scans maps and drawings for input and editing in GIS systems. The built-in color feature extraction lets you separate and combine map elements by their color.

4. **DTP (Desk Top Publishing)** The Full Scale Color Scanner scans large drawings and pictures to be used in documents laid out with DTP programs.
5. **Archival** The Full Scale Color Scanner scans large drawings, maps and pictures onto hard disks or CD-ROMs for on-line access by drawing database systems

Figure 1-1 Full Scale Color Scanner

1.1 Computer Aided Design

Offering CAD-Systems easy access to architectural, civil and mechanical drawings in both color and B/W, the Full Scale Color Scanner (FSC) bridges the gap between CAD and hard-copy drawing media.
The FSC and the WIDEimage program scans hard-copy originals directly into the workstation. Formats up to E-Size(A0) can be scanned, so you can capture drawings for modification, storage, or transmission, or bring your hardcopies on-line.

The FSC scans original line art, maps, color schematics, photos, blueprints, sepias, vellum and Mylar drawings in high resolution color, graytone or B/W. The Full Scale Color Scanner has a built-in spring-loaded background pressure platen.

The built-in color feature extraction hardware combines with the WIDEimage editor, to give easy classification and reduction of scanned colors to match those containing key information in the scanned original. This process can enhance clarity and quality of duplicated, faded or printed (color dithered) documents and improve detail in complex maps or drawings.

The real-time color feature extraction mode sorts the observed color features in the document into a set of color categories, by on-board mapping through a color LUT (Look Up Table). The color LUT filter is generated by the user once only for a whole class of documents using the tools in WIDEimage. The filter is thereafter downloaded into the scanner.

The scanner's on-board color mapping through a 16 or 256 color extraction LUT, enhances CAD drawings, increases scan speed and minimizes disk storage requirements, only requiring 4-bit or 8-bit per color pixel (compared with 24-bit in true color mode).

In a CAD drawing, the color features perceived by the human eye correspond to the 8 or so colors normally used when it was originally drawn. The scanner though, will see thousands of colors. For example, the edge pixels of a color on a white background will give many fading graduations of that color with a true colors scan. Similarly, a red and blue line crossing each other will become pixels that represent different mixtures of red and blue. The built-in feature extraction can automatically reduce the scanner output to the original 8 colors, and prepare files for easy editing and reprinting.

The unique two-dimensional 2D-Adaptive thresholding and built-in high-speed Digital Signal Processor provide clean crisp scans from poor quality drawings on-line without prescan by automatically adapting to the drawing, compensating for varying background, faded areas and stains.

CAD-systems such as AutoCAD, VersaCAD etc. can make full use of the Full Scale Color Scanner, either directly or together with raster-

editors, archiving, overlay or raster-to-vector conversion programs. The FSC is a time saving way to capture the machine-drawn or hand-drawn originals to an electronic medium.

Using the FSC and WIDEimage with an ink-jet or laser printer provides an inexpensive and convenient way to transform any large format technical drawing into a handy-sized copy for enclosure in reports or documentation; or you can use them with an inkjet or laserplotter for a full size copy.

1.2 Large Format Color Reproduction

The Full Scale Color Scanner together with a large format ink-jet plotter is the perfect large format digital color copier.
Copying of graphics, posters, photos or complex maps takes place in only a few minutes, with fully adjustable color parameters.

The Full Scale Color Scanner captures 30-bits of color data and selects the best 24-bits to pass to the computer, enhancing color fidelity and capturing even subtle changes of color in the image.

Excellent color quality and resolution are achieved with third party color RIP and color copying software, or with the RIP built into some ink-jet plotters. RIP (Raster Image Processor) packages perform the color dithering/processing for achieving full true color output on color ink-jet plotters.

The variable scan resolution, adjustable in 1 dpi increments, ensures exact and superior color copying results with any RIP color dithering cell size. Using the FSC for color copying of large formats ensures precision in scanned details - e.g. small type in maps and drawings, as well as gradual color changes are copied clearly.

The FSC also supports over-length copying, three meters or more dependent on the RIP, as there is no restriction on scanlength.

With the Full Scale Color Scanner (except FSC3010[DSP]), and the Contex JETimage color copying program you are able to make large format color copies to an inkjet printer/plotter via the PC, optimized by the built-in JETStream accelerator for high speed conversion of scanned color stream directly to vivid realistic matched color ink-jet printer output.

1.3 Mapping/GIS

Extracting features from maps e.g. roads, rivers, lakes, buildings and agricultural areas by their color, is easy with the FSC's built-in on-the-fly feature extraction hardware and the WIDEimage software.

From a scanned representative sample of a class of maps, in 24 bit color, you automatically generate and edit a down-loadable feature table (LUT) in WIDEimage, using it's rich set of easy to use tools.

With the feature table downloaded into the Full Scale Color Scanner, you can automatically perform the self-designed feature extraction on-the-fly when scanning other maps that belong to the same class. So instead of retouching each image individually after scanning, you get your refined and perfectly matching characteristics for the whole class during scanning time.

The FSC feature extraction copes with such problems as ink dispersion and variation, halftoning, line edge effects, color differences between different parts of a feature, and ink mixing in feature overlaps.

Feature extraction typically reduces the size of scanned color data by at least a factor of three, compared with full color (24 bit) scans. Furthermore, extraction of different features can be done to separate files, like for example, roads can be saved to one file and forests to another.

1.4 Desk Top Publishing Systems

With the FSC you can now scan originals of almost any size into your computer to include them as part of technical documents, user manuals, sales brochures, spare part catalogues, proposals, bids, and so on, using popular desk top publishing applications such as Aldus PageMaker or Windows Publisher.
Through WIDEimage, the FSC is compatible with most software, and standard DTP file formats. The FSC Window Scan feature allows you to cut isolated parts of interest out of larger drawings.
With its ease of use and flexibility with input sizes and file formats, the FSC addresses the scanning needs of any technical publishing office.

1.5 Drawing Archival and Management

An organization's wealth is held in its archives. Electronic Drawing Management Systems allows on-line access and control of company assets such as scanned mechanical drawings, electrical schematics and facility plans on hard- or optical disks. A single CD-ROM can store 800 to 1000 E-Size drawings, so your archives could contain several hundreds of thousands of drawings.

Electronically accessing, viewing, modifying, converting and printing or plotting your drawings will save you time and money.

The FSC supports the Computer Acquisition and Logistics (CALS) and ISO-ODA standard CCITT Group4 (MIL 28002) drawing archival formats.

1.6 Satellite Photo Scanning

Use the Full Scale Color Scanner graytone scanning capability of 256 levels, together with applications like CADOverlay GS, to directly overlay satellite photos in AutoCAD, with image correction facilities.

2. System Overview

The Full Scale Color Scanners, shown in the system overview overleaf, use 5000 RGB-triplet (15000 pixels), tri-linear color CCD cameras, with color balanced stabilized fluorescent lighting and individual adaptive light compensation of each pixel. The FSC scanners also include the following features:

- **FSC8010^{DSP}** Color Scanner, up to 800 dpi scan resolution at all original sizes in 24 bit RGB, 8-bit and 4-bit color feature extracted or indexed, graytone and raster modes. Triple color CCD cameras (15.000 RGB-triplets), max. scan width 36" (914mm.) in all modes up to 800 dpi .

- **FSC6010^{DSP}** Color Scanner, up to 600 dpi scan resolution at all original sizes in 24 bit RGB, 8-bit and 4-bit color feature extracted or indexed, graytone and raster modes. Triple color CCD cameras (15.000 RGB-triplets), max. scan width 36" (914mm.) in all modes up to 800 dpi .

- **FSC5010^{DSP}** Color Scanner, up to 500 dpi scan resolution at all original sizes in 24 bit RGB, 8-bit and 4-bit color feature extracted or indexed, graytone and raster modes. Dual color CCD cameras (10.000 RGB-triplets), max. scan width 36" (914mm.) in all modes up to 500 dpi.

- **FSC3010^{DSP}** Color Scanner, up to 300 dpi scan resolution at all original sizes in 24 bit RGB, 8-bit and 4-bit color feature extracted or indexed, graytone and raster modes. Dual color CCD cameras (10.000 RGB-triplets), max. scan width 36" or 914mm. in all modes up to 400 dpi.

- Connection to your computer via standard SCSI Interface

- Scanning area size ranges from A5 up to A0 and E-Size up to 36" wide (914mm.). Media size: 6" to 40" (152 to 1016 mm.)

- Individual tone adjustment for each color channel (R,G and B) through optional loading of three separate color tone tables (gamma), with independent user adjustable white and black point correction.

COLOR SCANNING SYSTEM

INKJET OR LASER PLOTTER

FULL SCALE COLOR SCANNER
MULTI-PLATFORM w. SCSI

PC or WORKSTATION

LASERPRINTER

Interface kits:

The I/F Card is delivered with the scanner:

SCSI I/F
BOARD

WIDEimage scanning software

Scanning /Image Enhancement
Color Feature Extraction
Conversion, De-speckling,
De-skewing, Rotation & Alignment
Viewing and Zooming
Printing and Plotting

PCX, JPEG	RLC, IG4, IGS	BMP-OUTP
BMP, RAS	G3-GTX, G4-GTX	PCL
RTL, PCL	RNL, SCN	VER
TIFF-LZW, TIFF-PACK, TIFF-UN	DXF-TR, DXB-TR	LTX
TIFF-G3, TIFF-G4, TIFFWW	PICT	CRF
EPS, CUT	CALS-1, CALS-2	JDL
IMG-CC, IMG-CM, IMG-GEM	HRF	RTL
PCXMU	GR4-AB,VIF-AB	TIFF-OUTP
RST, WPF	CIT-IN,RLE-IN	CALS-OUTP

File Formats:
More than 50 selectable.
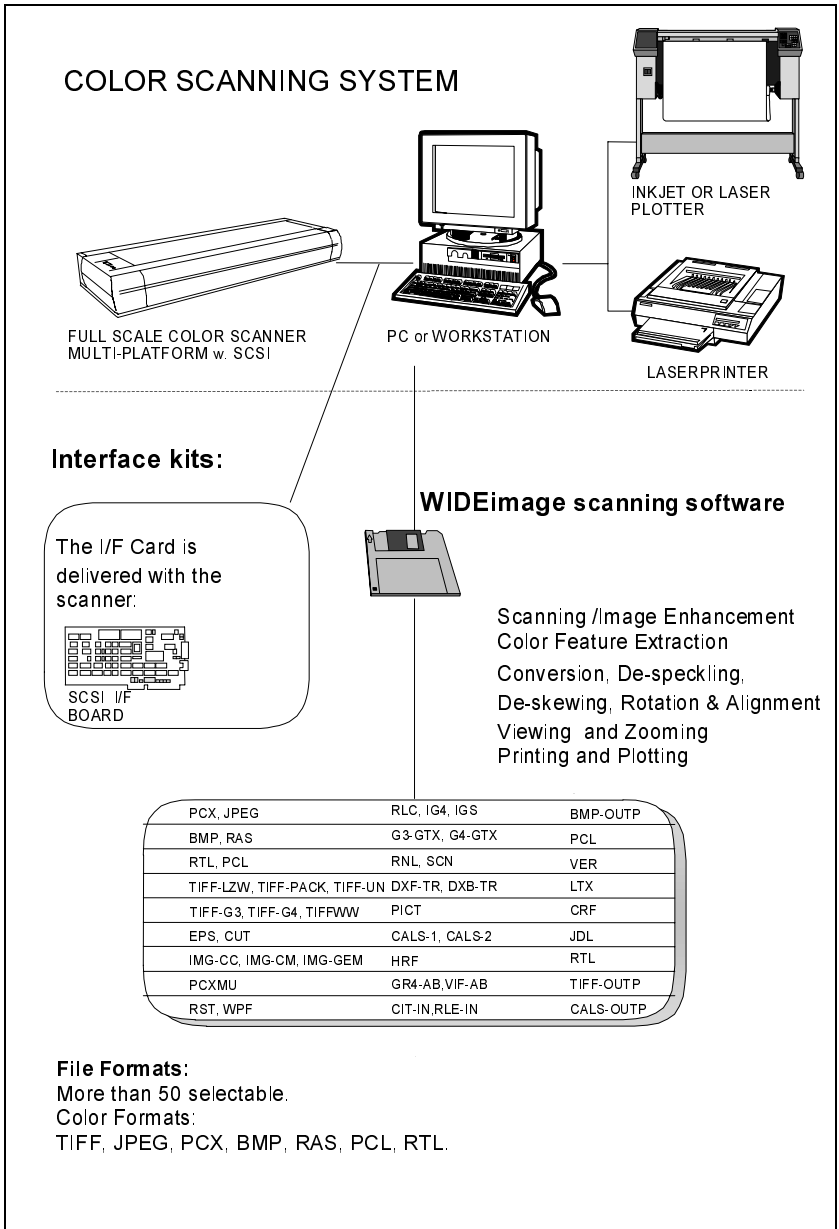Color Formats:
TIFF, JPEG, PCX, BMP, RAS, PCL, RTL.

Figure 2-1 Full Scale Color Scanner Overview

- Color calibration to international standards with the ANSI-IT-8 color reference card delivered with the scanner. Easy to perform calibration helps improve long term stability of the scanner's color balance, linearity and chromacity.

- The color scanners fully support Color Management Systems (CMS) by the international standard ICC profile (International Color Consortium: Kodak, Agfa, Apple, Microsoft, Adobe etc.)

- The color scanners are also outstanding as monochrome scanners providing clean crisp scans from poor quality drawings, blueprints etc. Image processing and enhancement options include: 2D-Adaptive thresholding, Gray-Adaptive and Auto-Photo modes with advanced "Area Diffusion Logic (ADL)", histogram analysis, on-line threshold variation, on-line deskewing and despeckling for high quality raster scans.

- Color feature extraction by built-in real-time hardware, without added overhead on scanning time. Extracts features from drawings and maps, enhances clarity and quality of duplicated, faded or printed (color dithered) documents, improves details in complex maps or drawings.

- Scanning modes: 16 million colors (24 bit RGB), 8 and 4 bit indexed color, 8 and 4 bit feature extracted color, 8 bit greytone, fixed and adaptive threshold black/white raster, and black/white dithered photo mode.

- 30-bits of color data capture with selection of the best 24-bits to pass to the computer. This enhances color fidelity and captures even subtle changes of color in the image.

- JETStream – Built-in accelerator for high speed conversion of a scanned color stream directly to vivid, realistic and matched colors for high quality ink-jet plotter/printer output (not available on the FSC3010^{DSP}).

WIDEimage: This professional scanning application enables the user to control all the Full Scale Color Scanner functions and image processing features.

The program produces a multitude of industry standard color, graytone and B/W output image file formats compatible with CAD, GIS, Raster-Editor, Raster-to-Vector, Digitize, Overlay, Color reproduction and copying, RIP, and Archiving programs for Editing, Storing, Conversion and Print/Plot of scanned drawings, maps etc. to be used with CAD, GIS, DTP and Color Copying systems.

WIDEimage supports electronic Rotation and Alignment, as well as Converting, Viewing, Zooming and Print/Plot of scanned originals.

WIDEimage can automatically generate and edit color look-up tables for downloading into the scanner's built-in feature extraction engine. The intuitive user interface includes Color Wheel and Color Histogram views, tools for merging marked or similar colors, explode color, removing marked, similar or minor colors, insert color, and import colors.

JETimage: This color copying program enables the user to make large format copies in vivid colors to an inkjet printer/plotter via the PC, accelerated by the JETStream color conversion system built into the Full Scale Color Scanners.
Includes automated calibration and adaptation to your inkjet plotter/printer and media types.

3. Operator Panel and Indicators

The Full Scale Color Scanner's Operator Panel layout shown overleaf is divided into two keys and four indicators. The two operating keys are positioned at the top: The *Paper Reverse key* (C), and the *Paper Feed/Forward key* (A) with a *Ready Indicator* (B) attached. Three indicators at the bottom: *Power on* (D), *Wait* (E), and *Diagnostic* (F). The detailed function of the keys and indicators are as follows:

A, B : Paper Feed/Forward Key and Ready indicator.

Insert the drawing face down into the scanner's insertion slot. The green *Ready Indicator* (B) turns on (lights) when the drawing is correctly positioned. Now press the *Feed Forward* key (A), and the drawing will move into the start-of-scan position. The *Ready Indicator* stays on (lighted), signifying that the scanner is ready to be controlled from the computer.

During scanning the *Ready Indicator* blinks.

At end of scanning the Ready Indicator is again tuned on (lighted without blinking) signifying that scanning can be repeated from the computer, or else terminated by the operator if the *Paper Feed/Forward* key is pressed to eject the drawing from the scanner.

Pressing the *Paper Feed/Forward* key during scanning, stops the current scanning process and feeds the original as long as the key is held down.

NOTE : If the drawing is removed from the scanner manually without pressing the *Paper Feed/Forward* key to eject, the *Ready Indicator* will stay on. This condition can be reset by pressing the *Paper Feed/Forward* key.

C : Paper Reverse Key.

The reverse key stops the current scanning process and reverses the original as long as the key is held down.

D : Power On Indicator

Lights up when the scanner power is on.
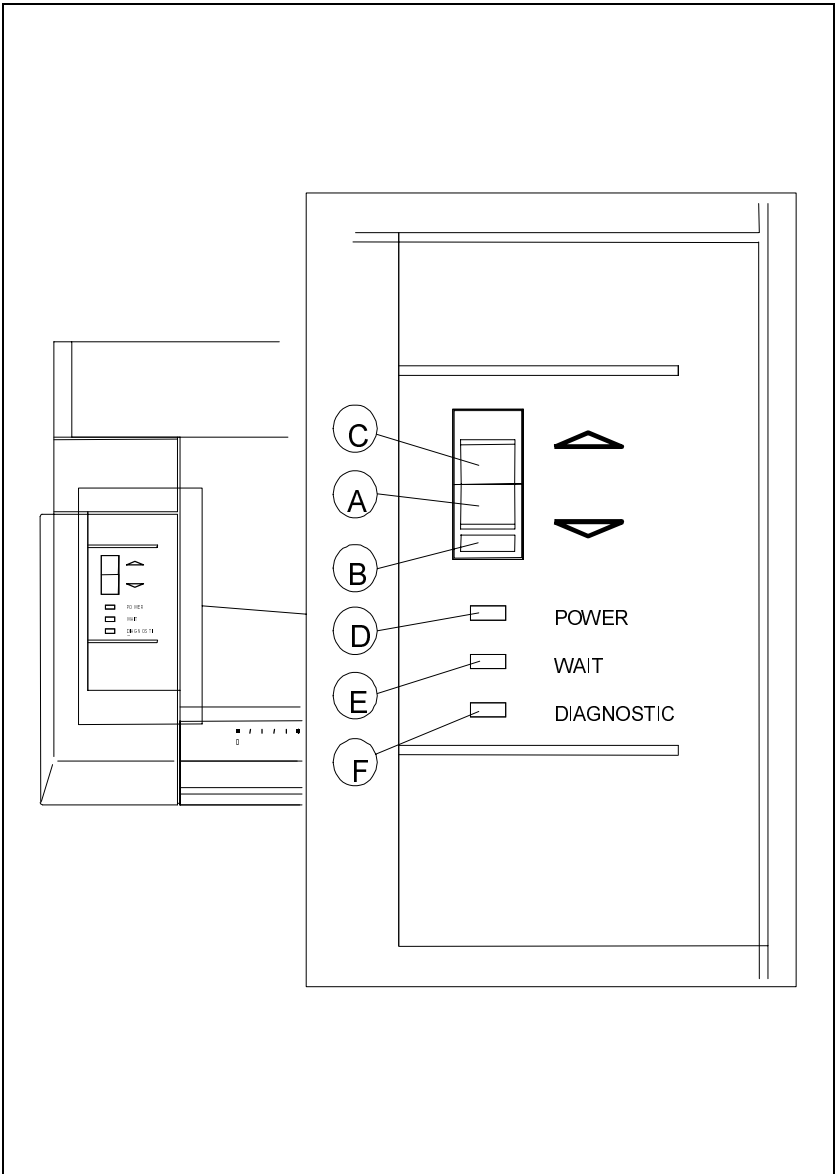
Figure 3-1 Operator Panel

E : Wait Indicator (Warm Up).

Lights up when the Full Scale Color Scanner's power is turned on. The light stays on during the internal diagnostic and stabilization phase. Keyboard input is prevented during this time.

F : Diagnostic Indicator.

Flashes if an error is detected by the built-in diagnostic.
If both the *Diagnostic* and the *Wait* (Warm Up) indicators flash then an inadequate amount of light is registered by the cameras. This is probably because the height of the camera brings it out of the light's range and must be adjusted. See the chapter: "Maintenance" for instructions.

Original's Insertion Slot and Ruler

The original's insertion slot shown below is marked with a measurement ruler from 0 to 8.5. The units correspond to the Scan-Width setup options in the WIDEimage scanning application dialogs (a second centered ruler is positioned on top, for optional centered paper feeding).
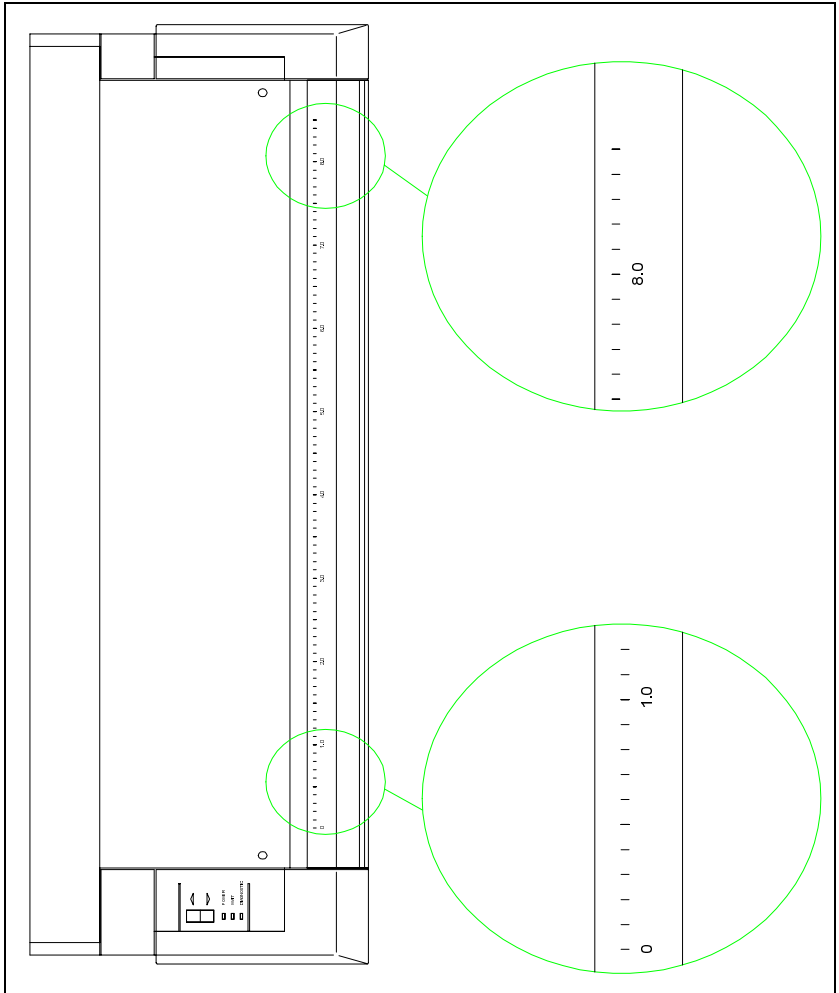

Figure 3-2 Original Insertion Slot and Ruler

4. Operating Modes

The Full Scale Scanners work in six operating modes:

- 24 bit RGB color mode.
- 8 and 4 bit indexed color mode.
- 8 and 4 bit feature extraction color mode.
- Graytone mode (256 graytones).
- Line mode (bitmapped, 2-level).
- Photo mode (halftone dither)

4.1 RGB Mode

24-bit true color mode for 16.8 million colors.

4.2 Indexed Color Mode

An effective method for scanning documents that show only a limited range of colors is done through mapping true colors to a selected color palette. The palette is generated automatically by an adaptive color optimizing prescan of the original.

The scanner on-board color transformation to a 16 or 256 color palette greatly reduces the data volume, increases scan speed and minimizes disk storage requirements, only requiring 4-bit or 8-bit per color pixel (compared with 24-bit in true color mode).

4.3 Feature Extraction (Classified) Color Mode

The real-time color classification mode sorts the observed color features in the document into a set of color categories, by on-board mapping through a classified color LUT (Look Up Table). The classified color LUT is user generated once for a whole class of documents using the tools in WIDEimage, and downloaded into the scanner.

The scanner on-board color mapping through a 16 or 256 classified color LUT, greatly enhances clarity and quality of duplicated, faded or printed (color dithered) documents, improves details in complex maps or drawings, increases the scan speed and minimizes disk storage requirements, only requiring 4-bit or 8-bit per color pixel (compared with 24-bit in true color mode).

4.4 Graytone Mode

In Graytone mode, the actual graylevel of each pixel is scanned; 256 levels are recognized, corresponding to 1Byte (8 bits) per pixel. This results in graytone files are 8 times larger than uncompressed files scanned in line mode at the same resolution, for example an E-Size drawing scanned in graytone mode at 300 dpi has a file size of 150 MByte, compared with typical 0.4 -1.0 MByte for a compressed file in Line mode).

4.5 Line Mode

In this mode, the Full Scale Scanner will output each scanned pixel as a single bit, either black (1) or white (0) depending on whether or not its greylevel is below or above the threshold level.
Both fixed level , 2-D adaptive thresholding, and Gray Adaptive (Area Diffusion Logic, ADL) is supported.

4.6 Photo Mode

In Photo mode, the graylevels of the scanned pixels are converted into halftones by dithering. This results in very high density line mode files, that are many times larger than uncompressed files scanned in line mode at the same resolution

4.7 Resolutions, Pixel Distance and Scanwidth

For CAD applications:
Below is listed the distance (both horizontal and vertical) between each pixel at different resolutions* :

200 dpi:	0.1270 mm.
300 dpi:	0.0846 mm.
400 dpi:	0.0635 mm.
600 dpi:	0.0423 mm.
800 dpi:	0.0317 mm.

*Full Scale Color Scanner resolutions can be set in 1 dpi increments.

The resolution, in dpi, is always set from the WIDEimage application just before scanning.

Scan-width is also set from WIDEimage. Use the units of the ruler printed at the original insertion slot on the Full Scale Color Scanner to determine the value. See the Chapter: "Operator Panel and Indicators."

The user can select through WIDEimage the preferable insertion method for the original. Either left (side) aligned loading or centered loading can be selected. The front ruler is used with left aligned insertion (zero at the left side), and the upper ruler, with its standard size markings, is used with centered insertion.

The following table shows the number of pixels (RGB triplets) per scan line resulting from various combinations of resolution and scan-width on the left side aligned ruler:

| Resolution:	600 dpi	400 dpi	300 dpi	200 dpi
Scan-width:				
8.5	21,600	14,400	10,800	7,200
8.0	20,352	13,568	10,176	6,784
6.0	15,240	10,160	7,620	5,088
4.0	10,176	6,784	5,088	3,392
3.0	7,620	5,080	3,810	2,544
2.0	5,088	3,392	2,544	1,696

The following table shows some common drawing widths and their required scan-width settings:

Scan-width:	Original Drawing Width*:	
	Minimum media size of the FSC	6.0"/152mm.
1.4	Minimum Scan Width (A5)	6.0"/152mm
2.0	A-Size (letter) and approx. A4	8.5"/216mm
2.6	B-Size (11")	11.0"/280mm
2.8	A3 (297mm)	11.9"/302mm
3.0	Approx. A3 and approx. B-Size	12.7"/323mm
3.9	A2 (420mm)	16.5"/420mm
4.0	C-Size and approx. A2	17.0"/430mm
5.2	D-Size (22")	22.0"/560mm
5.5	A1 (594mm)	23.3"/592mm
6.0	Approx. A1 and approx. D-Size	25.4"/646mm
7.8	A0 (841 mm)	33.1"/840mm
8.0	E-Size and approx. A0	34.0"/862mm
8.5	Maximum scanWidth of the FSC	36.0"/914mm
	Maximum media size of the FSC	40.0"/1016mm

*The required setting for a drawing can be measured on the printed ruler in front of the Full Scale Color Scanner, when the original is inserted. Standard sizes, instead of widths can also be set from WIDEimage.

5. Installation

The Full Scale Color Scanner should be placed on a table in such a way that the front of the machine overhangs the table's edge by approximately 1 cm. This ensures that the scanned original can hang freely from the exit slot at the front of the machine. The table should be placed a few centimeters from the wall, to allow large sized originals to hang down freely behind the table. You can also place the FSC on the specially designed stand-alone floor stand which can be purchased separately.
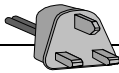
Important: Before connecting the power cord to an electrical outlet, ensure that the voltage selector switch (just above the mains inlet) is set to the correct voltage.

Make sure that power is turned off, and connect the SCSI cable that came with your interface kit to one of the two SCSI connectors found at the back of the Full Scale Color Scanner.

If the scanner is the last device on the SCSI bus, turn on the built-in active SCSI terminator (see Scanner SCSI DIL-switch setup), otherwise make sure it is turned off.

You must install the SCSI interface board on your PC. The SCSI interface board is part of your interface kit that came with your scanner. Read carefully the following sections and the documentation that came with interface kit. If your PC already has a built in ASPI compatible SCSI board you might be able to use that instead. For best performance, we strongly recommend that you use the board delivered with the Full Scale Color Scanner.

For UNIX workstations with a built-in SCSI interface, simply turn power off and connect the scanner SCSI cable.

Set up the SCSI address of your scanner. See instructions on SCSI DIL-switch setup at the end of this chapter.

Install the WIDEimage scanner software. Installation instructions are described in the WIDEimage User Manual.

5.1 Installation of the SCSI board in the PC.

1. Set the PC-system unit power switch to OFF.

2. Set any external option power switches to OFF (such as printers, displays etc.).

3. Unplug the PC-system unit and all other options from the wall outlet.

4. Remove the cover of your computer to expose the expansion slots.

5. Align and insert the SCSI host adapter board into an empty slot, and use the expansion slot panel screw to secure the host adapter to the computer frame.

6. Connect the SCSI cable from the FSC Scanner to the connector on the SCSI board back panel.

7. Set the scanner DIL Switch as described overleaf in the section: "Scanner SCSI address setup ".

For further installation description and installation of SCSI driver* please see the documentation that came with your interface kit.

*Note: SCSI driver installation will be dependent on your operating system e.g. Windows 95 or NT.

5.2 Installation Verification

Install the WIDEimage program as described in the WIDEimage User Guide that came with the software package.

Run the Height Adjustment of the CCD Cameras as described in this guide's Chapter 6 on "Maintenance" to verify the above installation.

5.3 Scanner DIL-switch Setup

The DIL-switch is used for setting up the scanner's SCSI connection port, and for selection of the "Scanner test" modes and the "Scanner forced boot start up" mode.

Turn off the power to the computer and scanner when setting the SCSI device number, as the switch settings are only read from the DIL-switch during the scanner's power up.

Set up the SCSI device no. on the DIL-switch found besides the SCSI connectors on the scanner to an unused SCSI device address no. according to the table below:

Switch no:	1	2	3	4	5	6	7	8
SCSI device no. 0	ON	ON	ON	X	X	X	X	X
SCSI device no. 1	OFF	ON	ON	X	X	X	X	X
*SCSI device no. 2	ON	OFF	ON	ON	OFF	OFF	OFF	OFF
SCSI device no. 3	OFF	OFF	ON	X	X	X	X	X
SCSI device no. 4	ON	ON	OFF	X	X	X	X	X
SCSI device no. 5	OFF	ON	OFF	X	X	X	X	X
SCSI device no. 6	ON	OFF	OFF	X	X	X	X	X
SCSI device no. 7	OFF	OFF	OFF	X	X	X	X	X
Built-in SCSI termination	X	X	X	ON	X	X	X	X
No Synchronous transfer	X	X	X	X	OFF	X	X	X
No disconnect	X	X	X	X	X	OFF	X	X
Force boot start up	X	X	X	X	X	X	OFF	X
Continuous test mode	X	X	X	X	X	X	X	OFF

* Factory Default   X: Insignificant

If the scanner is the last device on the SCSI bus, make sure the built-in active SCSI termination is turned on (switch 4 above). If it is not the last device make sure switch 4 is turned off (see following section on SCSI termination for details).

Important : Make sure that none of the troubleshooting and test switches are on (switches 5, 6, 7 and 8). See information on the troubleshooting switches below.

Turn on power to the computer and the scanner, and verify the installation.

Description of the troubleshooting and test switches:

Switch 5. No synchronous transfer: Disables SCSI synchronous transfer mode (reverts to asynchronous transfer). Use this mode only for tests as it slows the scanner down.

Switch 6. No disconnect: Disables the SCSI disconnect command. Use this mode only for tests as it slows the scanner down.

Switch 7. Force boot start up: If a malfunction occurred during an update of the scanner firmware, this switch forces the scanner into firmware boot mode, enabling you to download the firmware again.

Switch 8. Continuous test mode: The continuous test mode is only used for maintenance and renders the scanner inaccessible.

5.4 SCSI Termination on FSC Scanners

The FSC scanners have a built in active SCSI termination that works better than a passive terminator at the high transfer rates such as performed by this scanner.

The built in active termination is enabled by setting switch 4 on the SCSI switch to ON and disabled by setting it to OFF.
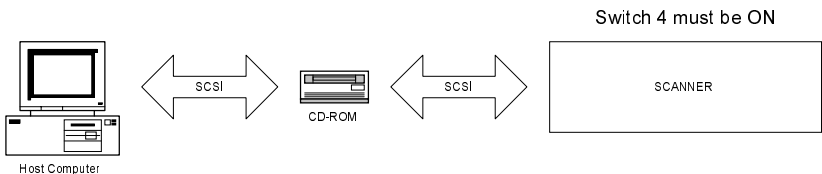
Note: Never set switch 4 to ON and use a terminator block at the same time.

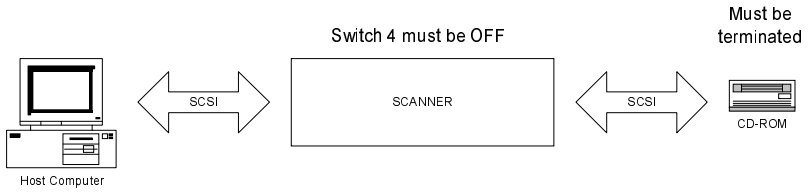The following 3 scenarios shows how to terminate the SCSI bus correctly:

A. The Scanner is the only external device on the SCSI bus
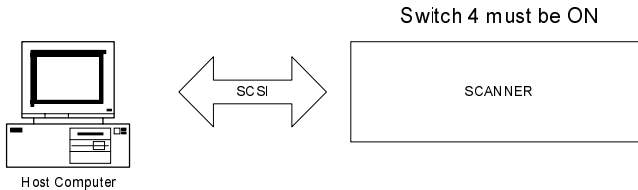
B. The Scanner is the last device on the SCSI bus

C. The Scanner is *not* the last device on the SCSI bus

Note: If the scanner is connected to an existing SCSI controller board
       that is used together with an internal SCSI device (f.ex. a hard
       disk), make sure that the on-board SCSI termination is removed
       before attaching the scanner.

6. Maintenance

Clean the original's scanning area, and adjust the height of the CCD-cameras at regular intervals.

6.1 Cleaning the Original's Scanning Area

When cleaning the original's scanning area, turn the power switch OFF and disconnect the power plug.

1. Open the scanner front cover by gently pulling at its top .
2. Remove the original guide fixture and gently wipe the glass plate and the white platen on the original guide fixture until they are clean.
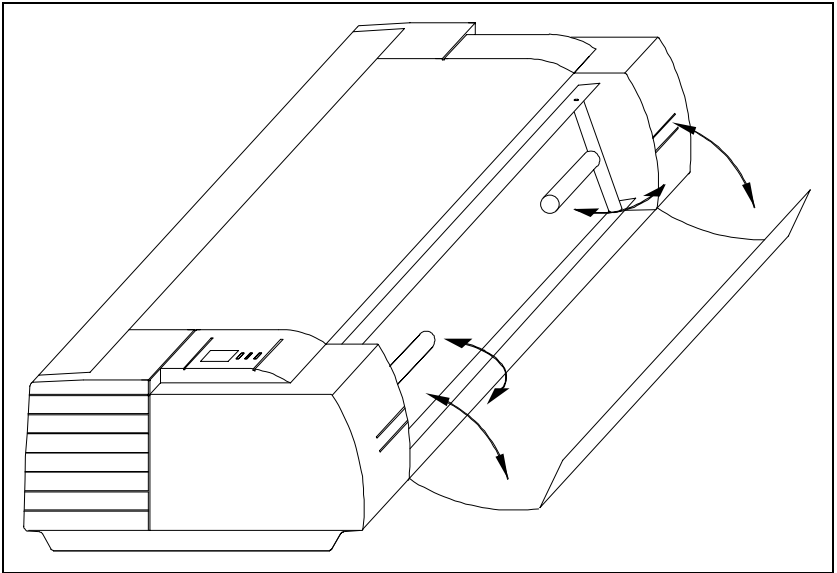

Figure 6-1 Opening the front cover

6.2 Color Calibration Platen

When you start a color calibration of the scanner through the WIDEimage software on your PC, you will be asked by the calibration wizard to insert the Color Calibration Platen, and shortly afterwards, you will be asked to remove it again (before inserting the ANSI IT8 color patch calibration target).

Note: Insertion of the Calibration Platen is optional, but recommended as it is not worn down by repeated scanning.

Caution: Handle the Color Calibration Platen with care at all times. The Color Calibration Platen is very fragile.

Figure 6-2 Take Color Calibration Platen from storage sleeve
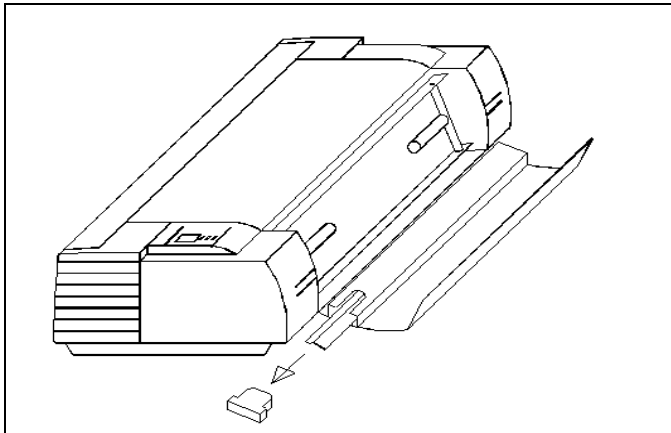
Follow the following steps to insert the Color Calibration Platen during calibration:

1. Open the scanner front cover by gently pulling at its top.
2. Remove the original guide fixture and put it, with the white pressure plate upwards, on a table.
3. Gently wipe clean the white pressure platen on the original guide fixture and the glass plate on front of the scanner.

4. Carefully remove the Color Calibration Platen from it's protective storage sleeve as shown above.
5. Position the Color Calibration Platen on top of the white pressure plate, inserting the top edge as shown in the figure below.
6. Reinsert the original guide fixture with the Color Calibration Platen into the scanner and close the cover, and proceed with the calibration wizard.
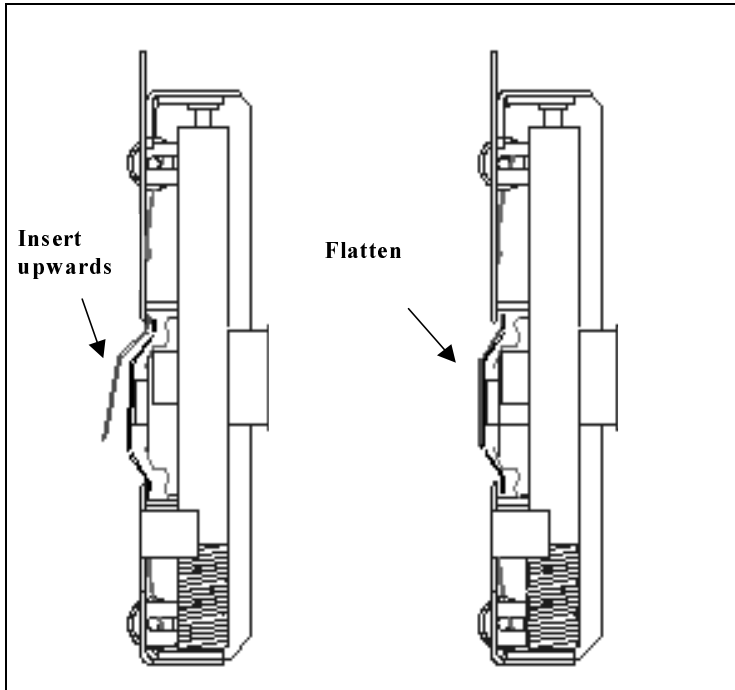
Figure 6-3 Insertion of Color Calibration Platen

When requested by the color calibration wizard to remove the Color Calibration Platen:

1. Open the scanner front cover by gently pulling at its top.
2. Remove the original guide fixture and lay it with the Color Calibration Platen upwards on a table.

3. Gently remove the Color Calibration Platen and return it to it's protective storage sleeve behind the cover (close the sleeve, so the platen can't slide out).
4. Re-insert the original guide fixture into the scanner and close the front cover. Proceed to the next calibration step as indicated by the calibration wizard.

6.3 Height Adjustment of the CCD Cameras

The following adjustment procedures apply to the different FSC x010 models:

FSC5010 and FSC3010 models:

1. Insert the Height Alignment Chart delivered with the scanner into the insertion slot and press the "Paper Feed/Forward key". In the WIDEimage application, select a Scan-Width size of 8.5, and start a prescan with the *Forward* button. Press *Halt* to stop the prescan over the horizontal lines in the chart, and horizontally set the "detail window" so as to be in the middle of the "overview window". The "detail window" should show a picture similar to one of the three overleaf.

2. Use a slim screw-driver to turn the heigth adjustment screw through the hole (1) on the top of the FSC (see figure overleaf) clockwise or counter-clockwise so that the lines from the left and right CCD-Cameras make a continuous line on the "down-scans" on the screen:

Clockwise: Line at right side of screen moves down.
CounterClockwise: Line at right side of screen moves up.

Note: Judge the camera height adjustment using only the repeated "down-scans" shown on the screen to omit angle errors.
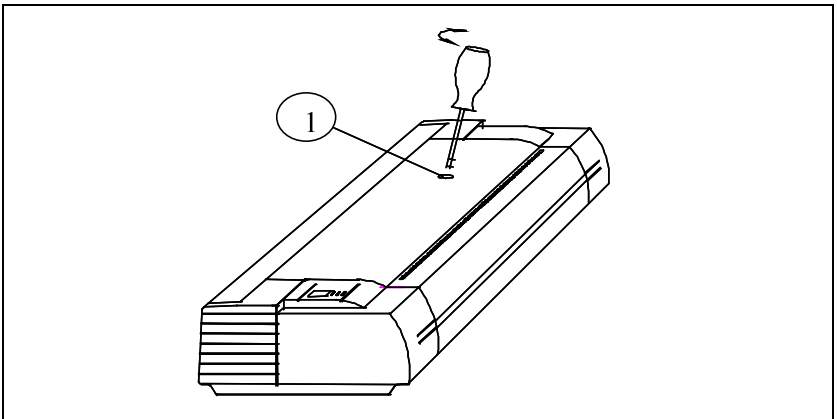
Figure 6-4 Camera Height Adjustment
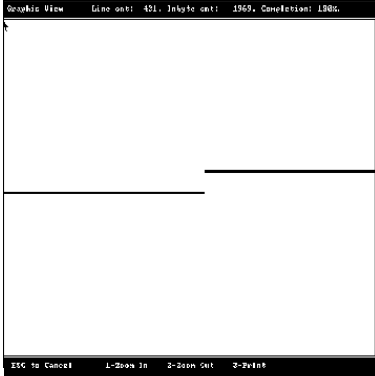
Figure 6-5 Height adjustment (turn clockwise)
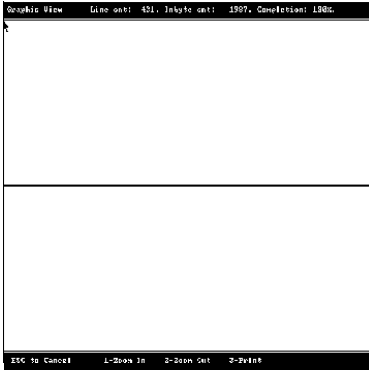
Figure 6-6 Height Adjustment (correctly aligned)
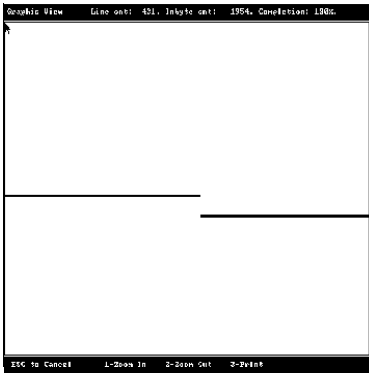
Figure 6-7 Height Adjustment (turn counter clockwise)

FSC8010 and FSC6010 models:

1. For adjusting the left CCD Camera (seen from the front of the scanner), follow the procedure given above for the FSC5010 model, but select a "detail window" centered about one-third from the left in the "overview window".
   Clockwise: Line at Left side of Screen moves Down.
   Counterclockwise: Line at Left side of Screen moves Up.

2. For adjusting the right CCD Camera follow the procedure given above for the FSC5010 model, but select a "detail window" centered about two-thirds from the left in the "overview window".
   Clockwise: Line at Right side of Screen moves Down.
   Counterclockwise: Line at Right side of Screen moves Up.

**Note:** Judge the camera height adjustment using only the repeated "down-scans" shown on the screen to omit angle errors.

6.4 Camera Out of Light Error

If both of the "Diagnostic" and "Warm Up (Wait)" indicators start blinking on the Operator Panel, then one of the CCD cameras has moved out of range while making adjustments   or during transportation. This means that the camera is receiving an inadequate amount of light and must be moved back.

The "Wait (Warm Up) " indicator displays which camera is suffering the "out of light error". The camera number is indicated by the number of flashes per period. Camera numbers are counted from the left side of the machine:

        Camera 1: 1 flash per period.
        Camera 2: 2 flashes per period.
        Camera 3: 3 flashes per period.

Before proceeding with the CCD camera height adjustment, perform the following for the camera that has the out of light error:

1. Turn the height adjustment screw completely clockwise.
2. Turn the height adjustment screw one quarter of a turn counterclockwise.
3. Turn the FSC power off, and then on. If the error still shows, repeat step 2 and 3.

FSC5010 and FSC3010: First Camera (1), not user adjustable.
FSC8010 and FSC6010: Middle Camera (2), not user adjustable.

After clearing the "Camera out of light error", proceed with the CCD Camera Height Adjustment procedure described previously.

7. Appendix A: FSC Specifications

Model	FSS8010^{DSP}	FSS6010^{DSP}
Sensors(trilinear color):	Triple CCDs	Triple CCDs
	15.000 pixels	15.000 pixels
	30 bits color capture	30 bits color capt.
Image Resolution (dpi):		
	Set-able in 1 dpi	Set-able in 1 dpi
	increments from	increments from
	50 dpi to 800 dpi.	50 dpi to 600 dpi .
Scan Modes:		
	24 bit RGB color mode (16.8 million colors).	
	4-bit and 8 bit indexed color mode.	
	4-bit and 8-bit feature extraction color mode.	
	8-bit graytone mode.	
	B/W: Line, 2D-Adaptive & advanced ADL.	
	Photo, B/W dithered mode.	
Color Adjustment:		
	3x3 Matrix Multiplier.	
	R,G and B tone curves (Gamma).	
	Independent white and black point settings.	
Image Size:		
Media Width:	6.0 to 40.0"	6.0 to 40.0"
	(1016mm.)	(1016mm.)
Scan Width:	36 Inches	36 Inches
(max.)	(914 mm)	(914 mm.)
Scanner Measurements (inches/mm):		
Width:	49.25"/1200	49.25"/1200
Depth:	15.0"/380	15.0"/380
Height:	7.9"/200	7.9"/200
Power:		
Consumpt.:	180W	180W
Voltage:	100/115/220/240V-50/60Hz	
Weight:	46 kg.	46 kg.
Light Source:	Color balanced, stabilized fluorescent lamps	
Optics:	Compact optical path, torsion stabilized for portability. Apochromatic color lenses.	
Interface:	Industry standard SCSI-2 I/F	

Image Processing:

Single pass scanning for high speed and fine pitch color registration.

Color calibration by standard ANSI - IT8 color reference card.

Color Management Systems support by standard ICC profile.

Individual color tone adjustments of R,G&B, and White/Black points.

On-board, real time color feature extraction.

JETstream – accelerator for high speed conversion of scanned color stream to matched realistic colors on inkjet printer/plotter output.

Digital Signal Processor, 2D-Adaptive and Gray-Adaptive (advanced Area Diffusion Logic, ADL), deskewing, despeckling and real-time compression of scanned data.

Individual pixel adaptive ampl. correction and graytone interpolation.

On-screen view, zoom, rotation, alignment, mirroring and reverse.

More than fifty Industry standard image file formats supported.

Model	FSS5010^{DSP}	FSS3010^{DSP}
Sensors(trilinear color):	Dual CCDs	Dual CCDs
	10.000 pixels	10.000 pixels
	30 bits color capture	30 bits color capt.
Image Resolution (dpi):		
	Set-able in 1 dpi	Set-able in 1 dpi
	increments from	increments from
	50 dpi to 500 dpi.	50 dpi to 300 dpi .

Scan Modes:

24 bit RGB color mode (16.8 million colors).
4-bit and 8 bit indexed color mode.
4-bit and 8-bit feature extraction color mode.
8-bit graytone mode.
B/W: Line, 2D-Adaptive & advanced ADL.
Photo, B/W dithered mode.

Color Adjustment:

3x3 Matrix Multiplier.
R,G and B tone curves (Gamma).
Independent white and black point settings.

Image Size:		
Media Width:	6.0 to 40.0"	6.0 to 40.0"
	(1016mm.)	(1016mm.)
Scan Width:	36 Inches	36 Inches
(max.)	(914 mm)	(914 mm.)

Scanner Measurements (inches/mm):

Width:	49.25"/1200	49.25"/1200
Depth:	15.0"/380	15.0"/380
Height:	7.9"/200	7.9"/200

Power:		
Consumpt.:	180W	180W
Voltage:	100/115/220/240V-50/60Hz	

Weight:	45 kg.	45 kg.

Light Source:	Color balanced, stabilized fluorescent lamps
Optics:	Compact optical path, torsion stabilized for portability. Apochromatic color lenses.
Interface:	Industry standard SCSI-2 I/F

Image Processing:

Single pass scanning for high speed and fine pitch color registration.

Color calibration by standard ANSI - IT8 color reference card.

Color Management Systems support by standard ICC profile.

Individual color tone adjustments of R,G&B, and White/Black points.

On-board, real time color feature extraction.

JETstream – accelerator for high speed conversion of scanned color stream to matched realistic colors on inkjet printer/plotter output (except FSC3010^{DSP}).

Digital Signal Processor, 2D-Adaptive and Gray-Adaptive (advanced Area Diffusion Logic, ADL), deskewing, despeckling and real-time compression of scanned data.

Individual pixel adaptive ampl. correction and graytone interpolation.

On-screen view, zoom, rotation, alignment, mirroring and reverse.

More than fifty Industry standard image file formats supported.

8. Appendix B: Glossary

Adaptive thresholding
Advanced 2-D Adaptive Thresholding estimates the background gray level in a window area around each pixel. The difference between the actual pixel value and the background is then compared to the adaptive settings to determine if a pixel is thresholded as a black or a white pixel.

Additive Colors
The additive primary colors are red, green and blue. These additive primaries represent the three main components of white light. Used individually or together, these three colors of light can be mixed to create nearly all colors. When these three primary colors are mixed in equal parts they produce white. Additive color is used in scanners and computer displays.

Area Diffusion Logic, ADL
Two dimensional adaptive half-tone diffusion, converts significant graytone areas in monochrome documents to B/W shades of gray, while simultaneously sharpens and enhances the line areas and eliminates the background clutter.

Bitmapped Image
A bitmapped image is a computer file representing a line-art image that was scanned with a scanner. Refers to the pattern (map) of bits that are either black or white.

Black Point Adjustment
An adjustment made that will determine the amount of shadow detail in an image. It is considered proper to set the black point so that the darkest part of an image will only just have zero detail.

Blueprint
A process of photographic printing used mainly for copying architectural and mechanical drawings , produces blue lines on a white/bluish background.

Blur
The averaging of pixel elements.

Brightness Adjustment
An adjustment on a scanner that allows the user to compensate for a light or dark original.

Calibration
Adjusting equipment so that it performs in accordance with an established standard e.g scanner calibration, minimizing color deviation between scanned ANSI IT8 reference color patches and the known color reference values.

Cals

Computer-aided Acquisition and Logistics Support (CALS) standard, a U.S. Defense Department and industry initiative that addresses the design, manufacture, and support issues of generation, access, management, and use of technical data in digital form.

CCD

Charge Coupled Device, the CCD is the image sensor in the scanner that converts light to voltages. These voltages are converted by the scanner into the image.

CCITT Group 3

Standard runlength compression format used with FAX transmission. It utilizes modified Huffman coding to further compress the runlength numbers. Most scanner file formats are dialects of this format.

CCITT Group 4

Two-dimensional compression format, giving very compact image files. Standardized by CALS (MIL 28002) and ISO-ODA for Drawing Archival and Interchange.

CIE

Centre Internationale dEclairage (CIE) is an international organization that establishes methods for measuring color. These color standards for colormetric measurements are internationally accepted specifications that define color values mathematically. The first color space model, the CIE xyz, was developed in 1931. CIE defines color as a combination of three axes: x, y and z. The two color spaces released in 1978 are CIE Lab and CIE Luv. The goal was to provide an accurate and uniform reference of visual perception.

CIE LAB

A device independent color space specified by CIE, used in modern color management software to facilitate conversion of data from a scanner to a display, or from a display to an output device.

CMYK

The subtractive printing colors. Cyan, Magenta, Yellow, Black.

Color

Electromagnetic energy that exists in the form of wavelengths creates the perception of color. There is a huge difference between the visible spectrum we can see with our eyes and the colors which can be reproduced on a computer screen and then printed on a color printer. The total number of colors that a device can produce is called its color gamut. The visible spectrum is larger than the color gamut of a color monitor, which in turn is larger than that which can be reproduced by a color printer. No system can produce all the colors visible to the human eye.

Color bit depth

The simplest pixel has two options: black or white. (A pixel with two choices is known as a one-bit image, or two raised to the power of one). Adding more bit

information increases the number of color options. The number of potential color options for a pixel is called color bit depth. For example a four-bit pixel would have 16 color options, and an eight-bit pixel would have 256 color options, while a 24-bit pixel would have 16,777,216 color options.

Color Cast

An image is said to have a color cast if its colors are not true. A color cast will usually be described by stating the particular color predominant in the image e.g. the grass appears to have a red color cast.

Color Correction

Correcting for, and eliminating an unwanted color cast.

Color Management System

Color Management System (CMS) software increases the accuracy of color interchange between scanners, displays and printers based on profiles for each device. The CMS is a layer of software resident on the computer that negotiates color reproduction between the application and color devices. The CMS performs the color transformations necessary to exchange accurate color between diverse devices. The Color manager needs access to characterization data for the device, the format and content of such device profiles is standardized by the International Color Consortium (ICC.)

Color Separation

Converting an RGB color image into CMYK color image. Color separation is a technical function during which critical settings such as GCR, black ink limit and total ink limit are applied to the image.

Color Space

A color space is a particular language used to describe color. Examples of color spaces are: RGB, CMYK, HSV, CIE LAB.

Compressing

Reducing file sizes of images by encoding the data (see also Run Length Encoding and CCITT Group 3 and 4).

Contrast

The range between light and dark in an image. Proper contrast is important for an image to appear realistic.

Density

The light stopping ability of a film. Density is inversely proportional to the amount of light reflected or transmitted by an image.

Density units

Photographers and printers measures transmission in base-10 logarithmic density units, where transmission of unity corresponds to a density of 0, transmission of 0.1 corresponds to a density of 1, transmission of 0.01 corresponds to a density of 2 and so on.

Device Dependent Color Space

For example RGB. A device dependent color space e.g the same scan file will appear different when viewed on different computer displays.

Device Independent Color Space

For example CIE LAB. A device independent color space is one in which color values are absolute e.g defined by CIE standard. CIE LAB is the central color space in color management systems (CMS) and is used to translate between different device dependent color spaces such as scanner RGB and display RGB.

Device Profile

A file used as part of a Color Management System (CMS). A device profile contains information about the characteristics of a scanner, computer display or printer. The format for device profiles (Win95, Colorsync. Etc.) is standardized by ICC (International Color Consortium).

Display

Also called Graphic display or Monitor. The computer screen attached to your computer, or to the portion of a drawing image, menu, etc. shown on the screen

Dithering

A printing or display device may have only a small number of greyscale or color values for each device pixel. However if the viewer is sufficiently distant from the printed page or display, the value of neighboring pixels can be set so that the viewer's eye integrates several pixels to achieve an apparent improvement in the number of levels or colors that can be reproduced.

DPI

Dots Per Inch, equivalent to Pixels Per Inch. An expression of resolution of a scanned image.

DSP

Digital Signal Processor, does image enhancement in real-time while scanning

Dynamic Range

A measurement of scanner quality, the density difference between highlights and shadows.

Equalizing

Distributing all color or tone equally along a density range.

File

Image, text or program information stored on a computer disk, with a file name for retrieval (an extension to the name is often added to distinguish between different types of files).

Folder

An organizational aid on a hard disk. Like office folders it allows a user to group related files together.

Foreground

Foreground when scanning raster data (black and white, or monochrome data) refers to the pixels that represent data of interest (background refers to everything else). Typically, lines and shapes are represented by black pixels (foreground) and empty space is represented by white pixels (background).

When scanning grayscale data, background means the gray level of a region of pixels that surrounds some desired foreground data.

Gamma Adjustment

An adjustment that makes the tone distribution lighter or darker in an image.

Gamut

The color range scanable, printable or displayable by a device e.g. if some of the displayable colors are outside of the gamut of the printer they cannot be printed.

Gamut Transformation

Color Management System function, where out of gamut colors are converted to colors within the gamut of the targeted device e.g a printer.

GCR

Grey component replacement. A color separation setting used on color photographs where cyan, magenta and yellow inks are replaced by black ink (in a balance that would yield a grey value). The advantages are a reduction in overall ink usage and some increase in image detail.

Gigabyte

Computer storage equal to 1024 megabytes

Grayscale

A term for a black and white photographic image or a scanner setting. Refers to the range of 256 grey tones that make up the image.

Gray Balance Adjustment

A color correction adjustment to insure that gray elements within a scanned image appear as a neutral gray. It is generally considered proper technique to adjust the image so that neutral gray elements appear neutral gray. If this is done, it will usually be true that other elements within the image will also have true color reproduction.

Gray-Adaptive

See Area Diffusion Logic, ADL..

Halftoning

The processes of offset printing and laser printing are intrinsically bilevel. However, these devices can reproduce a range of tone levels by halftoning e.g. an array of widely spaced dots produces the perception of light gray, and an array of tightly spaced dots produces dark gray. Halftone dots are usually placed in a regular grid. In color printing it is conventional to use cyan, magenta, yellow and black grids that have exactly the same dot pitch but different carefully-chosen screen angles.

Histogram

A bar graph representing the statistical distribution of graytones or colors in an image. Each column represents the number of pixels at that gray level or color.

HLS

A color space with the three variable of Hue, Lightness, Saturation.See HSV.

HSV

A color space with the three variables of Hue, Saturation Value. Hue means color (as in the color wheel.) Saturation is an indication relating to the richness or vibrancy of the color. Value is a term best related to the intensity of light illuminating the object.

Hue

A measurement of color as can be related by pointing towards a certain color on the color wheel. Hue indicates the relative redness, blueness, greenness, yellowness, etc. of a color.

ICC

The International Color Consortium (ICC) was formed to address the need for a common color framework. The ICC has developed a standard device profile that contains information about how various devices render color. This concept is supported by Apple (Colorsync), Microsoft for Windows 95, Sun for Solaris, and by Silicon Graphics for Irix.

ICS

Integrated Component Scanner, integrates copying function into an existing plotting environment.

Indexed color

Indexed color (or pseudo-color), is the provision of a relatively small number, say 256, of discrete colors in a colormap or palette. For each pixel in the image the index number of a color is then stored. When retrieving the image, a lookup table uses the index to retrieve red, green and blue components that are then sent to the display. In graphic file formats such as PCX of TIFF, an indexed color image is accompanied by its colormap.

Ink-Jet Plotter/Printer

Inkjet Plotters/printers transfer color to a page by squirting cyan, magenta, yellow and black liquid ink onto the page. The ink dries on the paper through evaporation.

Interpolation

Using the interpolation method of resampling, generates values for points in between the actual pixels by looking at the surrounding colors or intensities. In a scanner resolution is increased beyond the actual number of CCD cells. As each line of pixel data arrives from the cameras, new interpolated pixels are added between original pixels. The added pixels enhances line edge definition.

JPEG Compression

Joint Photographic Experts Group Compression. A method to save storage space by compressing files. JPEG achieves a high degree of compression by discarding non-important picture detail.

Kilobyte

Computer storage equal to 1024 bytes of computer information.

Laser/LED Plotter/Printer

Laser/LED plotters/printers transfer toner to a page by discharging an electrostaticcally charged drum by the information modulated light from a laser or LED (Light Emitting Diodes) array. Toner then attaches to the remaining charged areas of the drum, and is subsequently transferred to the paper

Lossless Compression

File compression and subsequent de-compression without any loss of data.

Lossy Compression

File compression that will compress data to a high degree. When subsequently un-compressed data will have been lost.

LZW

Method of lossless compression used with many file formats, developed by Lempel, Zev and Welch.

Megabyte

Computer storage equal to 1024 kilobytes.

Monochrome

An image composed of a single color.

Neutral

An area of no color; white, gray or black.

Noise

A term used to describe the occurrence of pixels within an image that contain random colors

Palette

The set of colors available for an image.

Pixels

The word pixel is a combination of the two words picture and element, it is the smallest building block within a scanned line-art or photographic image. A pixel is the small square picture element that is filled with a color, black or white.

The value of a pixel depends of the luminance of the area and is either a single bit for a black and white image, or multi-bit for a color or gray-tone image.

Pixels come in various sizes and their size is expressed in terms of resolution. Resolution is measured in pixels per inch (ppi) or the equivalent dots per inch (dpi)

Plotter

A physical device that receive information of a digital image and reproduced it on paper (see also Inkjet and Laser/LED plotter).

Printable Color

A color that falls within the gamut of a particular output device.

A printable color will output as expected. Compared to a color that falls outside the gamut which will print as an unexpectedly different shade. See also Gamut.

Printer

A physical device that receive information of a digital image and reproduce it on paper (see also Inkjet and Laser/LED printer).

PROM

Programmable Read Only Memory

RAM

Random Access Memory. RAM is a computer resource, having more RAM in a computer makes it faster and more capable.

Raster File

Also called Raster Image or Bitmapped Image. A picture composed of individual dots (picture elements, pixels) the way a scanner perceives it. The rows in a high-resolution raster file typically contain 200 or 300 dots per horizontal inch of the original drawing, and there are typically 200 or 300 rows per vertical inch. As each of these dots is defined by location, and by whether it is on or off, raster images generally have large data files.

Resolution

Defines the level of detail that can be captured or shown by a scanner, display, or output device. For scanners, the resolution is defined by the number of dots (pixels) per inch (dpi) that can be captured horizontally and vertically, e.g. 300 dpi equals 90,000 pixels per square inch.

Resolution of a Scanner

Expressed as dpi (dots per inch) or the equivalent ppi (pixels per inch) The higher the resolution of a scanner, the smoother the scanned images.

RGB

Red, Green, Blue. These additive primary colors are the basic elements of white light. By mixing them on a computer monitor or in a scanned image file, other colors can be created. For instance, Red and Green produces Yellow, and equal amounts of all three produces grey.

RIP

Raster Image Processor. A RIP is a special software that converts scanned images into a color dithered (halftone) image that can be output directly. An image must be 'ripped' before it can be output on a CMYK device e.g. a inkjet plotter.

Runlength Encoding

A method of compressing raster or bitmap data by representing "runs" of white or black dots along a scanned line as the number of dots in each run. Many variations exist of this scheme, with varying compression efficiency. Typically runlength compression formats yield a file 20-25% the size of an uncompressed file.

Saturation

Saturation is one attribute of color in the color space called HSV (Hue Saturation, Value). Saturation is a characteristic indicating the
vibrancy or intensity of a hue. A color with high saturation will appear more intense than the same color with less.

Scanning

The process of running a hardcopy original through an optical scanner. The scanner produces a digital image (raster image) of the hardcopy drawing, which is then stored in RAM or on a disk.

SCSI

Small Computer System Interface specification of interface to computer equipment like disks, printers, scanners etc.

Shadow Detail

The amount of detail contained in the dark parts of an image. It is desirable to maintain shadow detail but there is a risk of decreasing overall contrast if one lightens the shadow too much in an attempt to expose additional detail. If an image is scanned without shadow detail, it will be impossible to regain detail using an image editing program.

Sharpness

An attribute of a scanned image and also an attribute of scanner quality.

Stitching

In large format multiple CCD camera scanners, electronic stitching adjusts for overlap in the field of view of adjacent cameras. Automatic stitching at start of scan, ensures that each camera captures the correct number of pixels independently of mechanical and thermal changes.

Subtractive Colors

The subtractive primary colors: cyan, magenta, yellow. As ink applied to a piece of paper by a printer, these colors absorb light and alter the colors seen by looking at the printed paper. Cyan ink absorbs the red third of the spectrum, magenta ink absorbs the green third, and yellow ink absorbs the blue third. This should theoretically cause the viewer to see a black color, but due to unavoidable impurities in the inks, there is still light reflected and the viewer sees a muddy brown. The absence of CMY pigments results in white.

TIFF File Format

Tagged Image File Format. One of the most common graphic file formats for line-art and photographic images.

Tonal Distribution

Tonal Distribution describes the distribution of various bright or dark tones within an image. During the scanning or image editing stage, tones can be redistributed lightening a dark image or darkening a light one.

Tone

Any color or neutral that is denser than white.

Tone Compression

A term used in scanning and image editing that refers to compressing the broad range of tones and colors in an image down to the narrower range available on a printer.

Tone Curves

The shape of the tone transfer curves can be adjusted by the user to alter color or tone correction. The lower left end of the curve typically represents the dark portions of a picture and an upward bend will typically lighten the shadows. Similar capabilities exist by working with the middle or highlight parts of the curve. In this way it is possible to alter only certain tonal ranges of an image without making un-wanted changes to other parts of the image.

True color

True color systems provide eight bits for each of the three components (red, green and blue). Therefore true color is often referred to as 24-bit color.

UCR

Under Color Removal. A color separation setting used on color photographs where cyan, magenta and yellow inks are removed from dark, neutral areas and substituted by black ink. The advantages are a reduction in overall ink usage. See also GCR.

Vector file

Also called Vector drawing. Consists of mathematically defined elements, such as "Line from A to B", "Circle with center and radius", etc. CAD systems use vector drawings because of their accuracy, relatively low memory requirement and data-file sizes compared to raster images.

Vectorization

Also called raster-to-vector conversion (RTV). The process of automatically converting a raster (bit-mapped) image into a vector (CAD) drawing.

Video Card

Expansion card installed inside the computer. Different types of video cards support varying monitor sizes and number of displayable colors.

Viewing Conditions

Different light sources affect the colors that you see. For instance, a color viewed under fluorescent light will look radically different when viewed under incandescent light. Fluorescent light adds green to colors while incandescent light adds red. For this reason the printing industry developed a standard viewing condition known as the D50 (5000 Kelvin) light source in addition to a neutral gray background surround. This light source replicates daylight with equal parts of red, green, and blue.

White Point Adjustment

An adjustment made that will determine the amount of highlight detail in an image. The white point should be set so that the lightest part of an image will only just have zero detail

XYZ

The CIE system is based on the description of color as a brightness (luminance) component Y (as described above), and two additional components X and Z. The spectral weighting curves of X and Z have been standardized by the CIE, based on statistics from experiments involving human observers. XYZ tri-stimulus values can describe any color.

Zoom

Changing the size of the viewing area, to examine a larger or smaller area in greater detail.

9. Appendix C: Regulations

9.1 FCC Regulations

This equipment has been tested and found to comply with the limits for a class A digital device. Pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can generate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.
- You may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.

9.2 EU Regulations

DECLARATION OF CONFORMITY

Manufacturer's Name: CONTEX A/S

Manufacturer's Address: Svanevang 2
                              DK-3450 Allerod
                              Denmark

Declares that the products:

Category: Large Format Color Scanners

Model/Type: FSC 8010, FSC 6010, FSC 5010 and
                              FSC 3010

Conforms to the following standards:

EMC: EN55022(1987)-Class A
                              EN50082(1994)
Safety: EN60950

Following the provisions of Council Directive 89/336/EEC (EMC)
and Council Directive 73/23/EEC (Low Voltage).

           Allerod 980223   Asbjorn Smitt, Mng.Director

Supplementary Information:

Warning
This is a class A product. In a domestic environment this product may
cause radio interference in which case the user may be required to
take adequate measures.

10. Appendix D: Program License Agreement

You should carefully read the following terms and conditions before opening the diskette package. Opening the diskette package indicates your acceptance of the terms and conditions. If you do not agree with them you should promptly return the package unopened, and your money will be refunded.

Contex provides this program and licenses its use. You assume responsibility for the selection of the program to achieve your intended results, and for the installation, use and results obtained from the program.

License:
1. You may use the program on a single machine.
2. You may modify the program and/or merge it into another program for your use on the single machine.
3. You may copy the program into any machine readable or printed form for backup or modification purposes in support of your use of the program on the single machine.
4. You may not use, copy, modify or transfer the program, or any copy, modification or merged portion, in whole or in part, to another party, except as expressly provided for in this license. If you do so you terminate your license.

Term:
The license is effective until terminated. You may terminate it at any time by de¬stroying the program together with all copies. The license will also terminate upon conditions set forth elsewhere in this Agreement or if you fail to comply with any term or condition of the Agreement. You agree upon such termination to destroy the program together with all copies, modifications and merged portions in any form.

Limited Warranty:
This program is provided as is, without warranty of any kind, either stated or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. The entire risk as to the quality and performance of the program is with you. Should the program or hardware provided with the program prove defec¬tive, you (and not Contex or an authorized dealer) assume the entire cost of all necessary servicing, repair or correction.

Some states do not allow the exclusion of implied warranties, so the above exclusion may not apply to you. This warranty gives you specific legal rights; you may also have other rights which vary from state to state. Contex does not warrant that the functions or the operation of the program will be uninterrupted or error free.

However, Contex warrants the diskette on which the program is furnished to be free from defects in materials and work¬manship under normal use for a period of one (1) year from the date of delivery to you, as evidenced by a copy of your receipt.

Limitations of Remedies:
Contex's entire liability and your exclusive remedy shall be:

The replacement of any diskette not meeting the Contex "Limited Warranty" and which is returned to Contex or an authorized Contex dealer with a copy of your receipt, or

If Contex or the dealer is unable to deliver a replacement diskette which is free of defects in materials or workmanship, you may terminate this Agreement by returning the program and your money will be refunded.

In no event will Contex be liable to you for any damages including any lost profits, lost savings, or other incidental or consequential damages arising out of the use or inability to use such program, even if Contex or an authorized Contex dealer has been advised of the possiblity of such damages, or for any claim by any other party. Some states do not allow the limitation or exclusion of liability for incidental or concequen¬tial damages, so the above limitation or exclusion may not apply to you.

General:

You may not sublicense, assign or transfer the license of the program except as expressly provided in this Agreement. Any attempt otherwise to sublicense, assign or transfer any of the rights, duties or obligations hereunder is void.
This Agreement will be governed by the laws of Denmark. Should you have any questions concerning this Agreement, you may contact Contex.
You acknowledge that you have read this Agreement, understand it, and agree to be bound by its terms and conditions. You further agree that it is the complete and exclusive statement of the agreement, oral or written and any other communications between us relating to the subject matter of this Agreement.

CONTEX

11. Appendix E: Important Safety Instructions

Read all of these instructions and save them for later use. Please follow all warnings and instructions marked on the scanner.

A. Do not place the scanner on an unstable surface, stand, cart, or table. Serious damage can be caused if the unit falls.

B. Turn off all power to the unit before cleaning. Do not use liquid cleaners or aerosol cleaners.
Use a damp cloth for cleaning.

C. The scanner should be operated from the type of power source indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.

D. The scanner is equipped with a three-wire grounding type plug. This plug will fit only into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat or ignore the purpose of the grounding-type plug.

E. Do not allow anything to rest on the power cord. Do not locate the scanner where people may walk over or step on the cord.

F. If an extension cord is used with the scanner, make sure that the total of the ampere ratings of the products plugged into the extension cord does not exceed the extension cord ampere rating. Also, make sure that the total of all products plugged into the wall outlet does not exceed 15 amperes.

G. Slots or openings in the cabinet at the back or bottom are provided for ventilation. These are to ensure reliable operation of the product and to protect it from overheating. The openings must never be blocked or covered. The openings should never be blocked by placing the unit on a bed, sofa, rug, or other similar soft surface. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.

H. Never push objects of any kind into the scanner through cabinet slots since they may touch dangerous voltage points or short out parts that could result in a fire or electrical shock. Avoid spilling liquid of any kind on the scanner and keep liquids far from the unit.

I. Do not attempt to service the scanner yourself. Any covers that require tools to get opened or removed, may expose you to dangerous voltage points or other risks. Refer all servicing in those compartments to authorized service personnel.

J. Unplug the scanner from the wall outlet and refer servicing to authorized service personnel under the following conditions:

- When the power cord or plug is damaged or frayed.
- If liquid has been spilled into the scanner.
- If the scanner has been exposed to rain or water.
- If the scanner does not operate normally when operating instructions are followed. Adjust only those controls that are covered by the operating instructions since improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore this product to normal operation.
- If the scanner has been dropped or the cabinet has been damaged.
- If the scanner exhibits a distinct change in performance, indicating a need for service.

12. Appendix F: Index