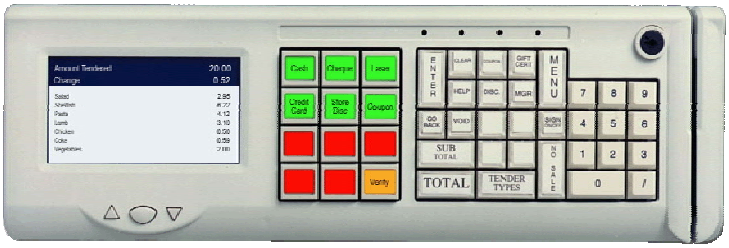
SCREENKEYS

ScreenKey Consoles for the IBM 46xx

Planning and Configuration Guide

Model SK-7510

Issue 1.7 March 2006



Purpose
The purpose of this document is to enable System Integrators to configure and install the ScreenKey Keyboard. This document is based on

Code Update (CDL) 1.12.00.00
SAC Editor version 2.54
Make Download Utility (MakeDnl) 1.7

www.ScreenKeys.com

SKI

ScreenKey Interfaces Ltd.

Planning and Configuration Guide for the SK-7510

Information in this document is subject to change without notice.

The latest revisions of the ScreenKey documents and software can be found on the ScreenKeys web site.

Web: www.ScreenKeys.com

Technical Support is available

via Email: support.products@ScreenKeys.com
via Web: www.ScreenKeys.com

DISCLAIMER:
SKI reserves the right to revise data file formats and functionality at any time.

Table of Contents

IMPORTANT INFORMATION for SAFE USE

This section contains important information about using this product in a safe manner. The product is designed, manufactured and tested to meet the highest international standards for information technology equipment. However, as with any other electrical apparatus, care must be taken in its use. You should make sure that all instructions in this section are adhered to when installing and using the system.

If you are in doubt about any information given in this publication, contact your supplier or maintenance authority.

SAFETY

Connection to a Host Equipment

The ScreenKey Keyboards SK7500 series must only be connected to equipment which provisions SELV interface with 12V dc @ 5A maximum.

ELECTROMAGNETIC COMPATIBILITY (EMC)

European Directive 89/336/EEC

This is a Class A equipment and suitable for installation in both an industrial and commercial/office environment. The product is designed to provide reasonable protection against harmful interference if installed correctly as instructed in this manual. Operation of this equipment in, or within close proximity of, a residential environment may cause radio interference in which case the user may be required to take adequate measures.

USA - Federal Communications Commission (FCC)

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 when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case, the users will be required to correct the interference at their own expense.

Canada - Industry Canada (IC)

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the Canadian Interference-Causing Equipment Regulations.
Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrite dans le Réglement sur le brouillage radioélectrique édict du Canada.

1 Introduction

The SK-7510 is a POS console for IBM 46xx terminals.

It is a standard keyboard plus a ScreenKeys keyboard (SKK), plus a display area that is divided into a number of areas.

The SKK may replace a number of peripherals that might already be found at the register. For examples, the ODA display area on the LCD Panel can replace a 2x20 operator display.

The SK-7510 is ideal for use with a thermal printer (no paper journal) and post printing. The operator can review a scrolling receipt on the SK-7510's TDA display area.

The SK-7510 is implemented by emulating existing 46xx POS devices. This has the benefits that

- it does not require any new device drivers - which has the benefit that it is using tried and tested device drivers and therefore does not risk breaking currently running systems by introducing new device drivers
- it does not require a change to the IBM configuration tools – for example we do not need to add the SK-7510 to the list of keyboard to choose from in the Terminal Device Group Configuration
- It uses the current experience of operators – if they are used to looking at the LED indicators on a standard 50-Key keyboard then they can continue to do so on the SK-7510.

The SKK is not one of the devices directly supported by the Terminal Device Group configuration program. This means that rather than selecting the keyboard type "SKK" from a list of keyboards we configure the SKK by selecting a number of devices that the SKK is equivalent to.

Device addresses are used in the SKK EEPROM configuration. Because of this you need to know what TDG settings will generate the corresponding device address in the TDG. This applies to the devices that are configured in the EEPROM - Display devices, keyboard devices and Serial device (Download channel).

Device addresses are not important when configuring standard IBM devices because the TDG configuration program does not allow a configuration which has a device address clash. For example, if you select a integrated keyboard with display on socket 5A that it will not allow a second operator display to be configured on socket 4A since this would clash.

The SK-7510 doesn't exist in isolation from the other devices attached to the terminal so we have to take into account the total mix of peripherals when planning the SK-7510 configuration.

Different terminals have different sockets on the backplane. Planning the SK-7510 installation must take account of this.

The SK-7510 is designed so that it is possible to run without any changes to the TSA or any additional software drivers running in the terminal. However, there are major benefits to be gained from integrating SK-7510 user exit code into the TSA.

Supporting Documentation

File Name Title	Product Version	Doc Issue	Document Date
SAC Editor User's Guide.pdf SAC Editor: Version 2.54: User's Guide	2.54	1.1	March 2001
MakeDnl User's Guide.pdf ScreenKey for IBM 46xx: MakeDnl Download Conversion Utility: Version 1.7: User's Guide	1.7	1.0	October 2001
ScreenKey File Download Utility for IBM 46xx.pdf ScreenKey for IBM 46xx: File Download Utility: Version 3.20: User's Guide	3.20	1.1	September 2001
ScreenKey User Exits Integration for IBM 46xx.pdf ScreenKey for IBM 46xx: User Exit Integration: Version 3.20: User's Guide	3.20	1.1	September 2001
Technical Reference Manual for the SK-7510.pdf ScreenKey for IBM 46xx: Technical Reference Manual: Model SK-7510	1.12.00.00	1.12	July 2001

2 Introduction to the Hardware

The SK-7510 connects to the 46xx Terminal via any 9 or any 4 socket. The reason that the SK-7510 plugs into the 9 or 4 sockets is that the SK-7510 requires 12v and these Sockets provide that.

The reason that it is possible to plug a keyboard into a Socket other than 5 is because all the traffic for all the devices is present on all the Sockets.

Plugging a device into, say 4A, would result is a different device address than plugging the same device into 4B. However, the SKK automatically adjusts so that there is no difference between plugging it into the A or B socket.

2.1 Programmability

2.1.1 Update Capability

The three elements in the keyboard that control its functionality are the Resident Code, Options and SAC files.

The device has the ability to replace these Resident file with updated files. This is achieved by downloading the file to the SKK by running the download code on the IBM 46xx terminal. The download code communicates with the SKK via the Download Channel – a serial port device emulation – and transfers the code from the file on the controller to the SKK.

The SKK stores the new file in non-volatile RAM so the download process need only be done when there is new file to be sent to the SKK.

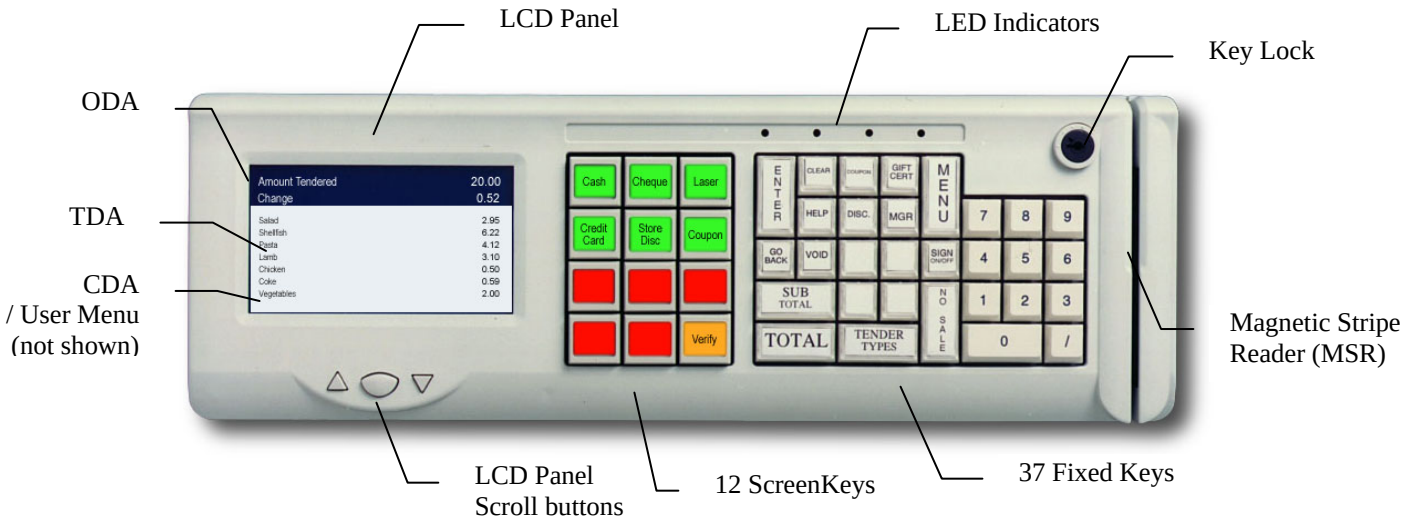
2.1.2 API Capability

There is an API channel whereby the Terminal Sales Application can issue commands to the SKK.

These commands allow the Terminal Sales Application (TSA) to display data on the TDA, or the CDA and to display the Splash Screen and to call up a ScreenKeys menu among other things.

2.2 SK-7510 Hardware

The SK-7510 is an addition to the range of keyboards that can be connected to IBM 46xx POS terminal systems.



Standard Features

- 12 ScreenKeys
- 37 Fixed Keys
- Key Lock
- 4 LED indicators
- Speaker
- Socket 9 / 4 Cable
- LCD Panel

Accessories

- Key Bunch

Options

- Single, Dual or Triple Track MSR
- Engraved and coloured key tops
  Spare double, singles fixed key

The LCD Panel is a 240 x 128 pixel monochrome display. It is divided into 3 areas.

The Operator Display area (ODA)

The ODA is the equivalent of a 2x20 Operator display device. It can be set to be the system display. The character set is configurable. It may be disabled but this section of the LCD panel cannot be reclaimed for other uses.

The Transaction Display Area (TDA)

The TDA takes up the remainder of the LCD panel. It is configured for 12 lines of 38 characters each. It is used to display text. It cannot display graphics other that the Splash Screen.

The Control Display Area (CDA) / User Menu Area

The CDA is a 1 x 20 popup area. It is under software control of the Terminal Sales Application.

The User Menu is a pop-up menu that allows the Contrast and brightness of the LCD panel to be adjusted. The User Menu is triggered by pressing the SELECT key – the middle key of the three keys located below the LCD panel – for 5 seconds. If enabled, the User Menu will popup.

The LCD panel scroll buttons located below the LCD panel are used to scroll up and down through the information displayed on the TDA.

2.3 Introduction to Firmware

SKI may occasionally issue a Code Updates to the SK-7510 which can be downloaded into the SKK to replace the Resident Code. The release will include a Revision History document that outlines the differences between versions of the code.

The features offered by the SKK depend on the code it is running. Code Updates are downloaded to non-volatile RAM. If the non-volatile RAM is wiped then control will revert back to the Resident Code.

Model 1 hardware has Resident Code 1.02.00.00. Model 2 hardware has Resident Code 1.04.00.01. Model 3 hardware has Resident Code 1.12.00.00.

The Resident Code contains, as well as the code, the Resident SAC file and resident Options file. Both Resident Code 1.02.00.00, Resident Code 1.04.00.01 and Resident Code 1.12.00.00 have the same resident SAC File and Options file.

2.3.1 The Resident Code

The Resident Code file is inserted into ROM in the SKK at manufacture. It is likely that it will be superseded by a later revision of code at some stage. When required the Resident Code will be replaced by a downloaded Code Update file. Downloaded Code Updates are stored in non-volatile RAM in the SKK.

This document presumes that the reader is on 1.12.00.00 release of Firmware (either as a Resident Code or Code Update). Functionality is dependent on Firmware Revision. Some major releases include…

1.12.xx.xx	Add N50-key emulation with corresponding resident SAC file Return different EC byte for 50-key and N50-key emulation for the SK-7510
1.04.xx.xx	Add User Menu and CDA Support LCD brightness, contrast and back-light adjustments New API commands
1.02.xx.xx	“Goto Menu” extension to the API command set The Resident SAC file now includes a diagnostics menu key that allows entry to diagnostics “on the fly”. Resident SAC file amended to include numeric ‘calculator’ and ‘telephone’ keypad screens.

For the complete list see the Revision History document that accompanies the software release.

2.3.2 The resident Options File

The Options file defines the device emulation to be enabled, device addresses to use, character sets for the display and ScreenKeys, and other keyboard specific parameters.

Option	***Factory Default Value***
Magnetic Card Reader	DISABLED
BarCode Channel	DISABLED
Printer Monitor	DISABLED
API Channel	DISABLED
CDA\UserMenu	ENABLED UserMenu as white text on black background API text as black text on white background
ScreenKeys Character Set	Use Resident ScreenKeys Character set
ODA / CDA Character Set	Use Resident ODA / CDA Character set
TDA Character Set	Use Resident TDA Character set
KAT	
Execution times	All set to 0 seconds
Barcode STEM Conversion	DISABLED
Power-on Indication	One beep at 1400Hz for 2000 millisecs
Start-up Splash Screen	DISABLED
Keypress Beep	Good → 2000Hz for 10 milliseconds Bad → 2000Hz for 200 milliseconds
LCD Panel ScreenSaver	Timeout set to 20 minutes, uses NORMAL brightness and does not display splash screen

Although the Resident Options file is sufficient to get started it will be updated by a downloaded Options file. This Options file is created using the MAKEDNL utility and Downloaded to the SKK where is replaces the Resident Options file. It resides in non-volatile RAM.

See the Technical Reference Manual for details.

2.3.2.1 The Resident ODA / CDA Character Set

A 64-character set is provided and all lower-case characters are automatically converted to uppercase for display. The SKK displays text on the upper segment of the large-panel LCD display panel to emulate a two-line operator/system display.
The Options file can download a 256-character set, otherwise the SKK Resident Code will use a default hard-coded 64-character set. A 256-character ODA font file using code page 850 is shipped with the MakeDnl utility. Downloaded fonts allow the SKK to support the Euro symbol, £ symbol and any User Defined Symbols required.

2.3.2.2 The Resident TDA Character Set

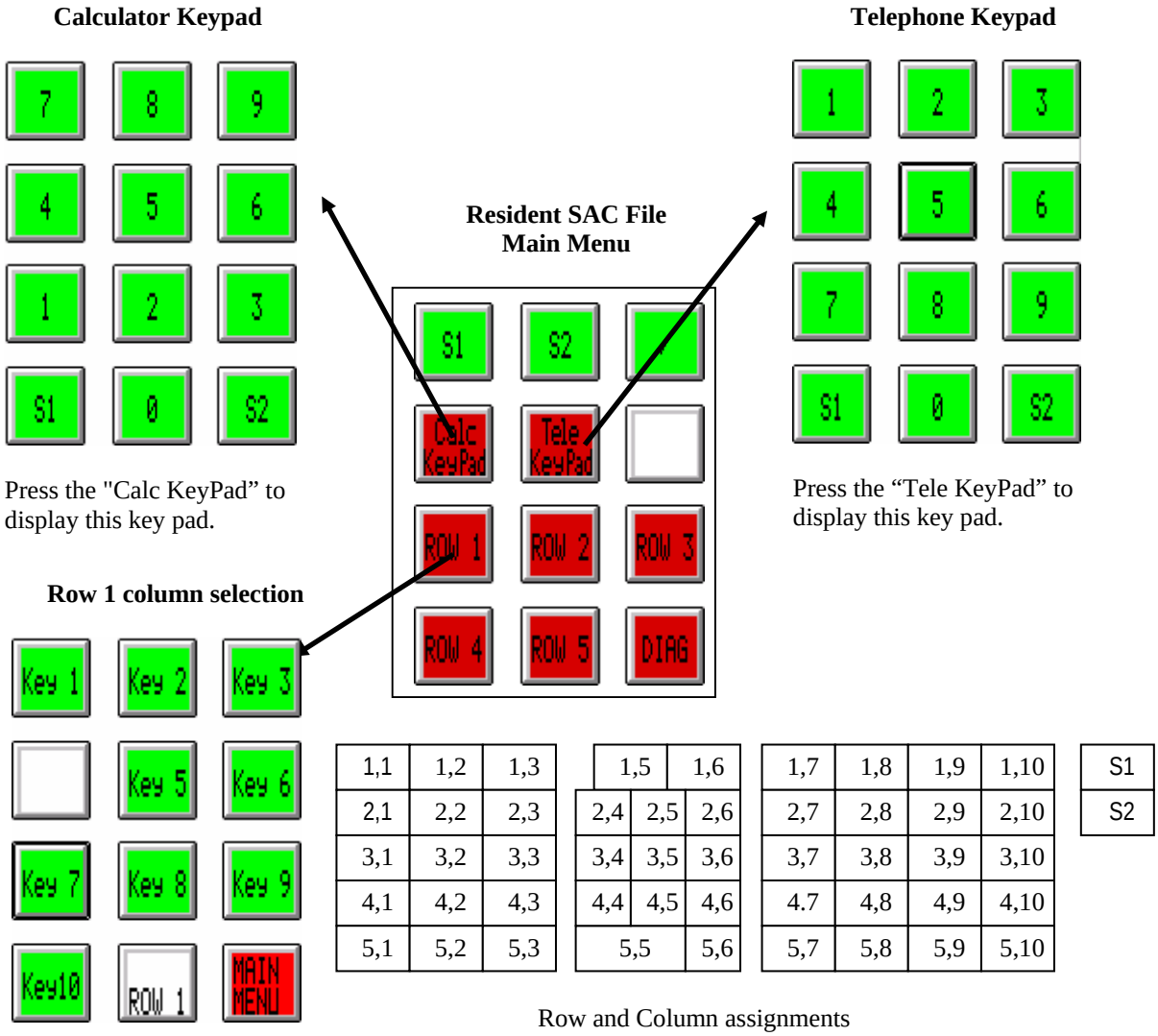
A 128-character set is provided including both lower- and upper-case characters
The SKK displays text on the lower segment of the large-panel LCD display panel. Referred to as the Transaction Display Area (TDA), it may be used to display data sent to a Model 3/4 or 4610 printer, or to display data as sent via the API Channel.
The Options file can download a 256-character set, otherwise the SKK Resident Code will use the default onboard 128-character set. A 256-character TDA font file using code page 850 is shipped with the MakeDnl utility. Downloaded fonts allow the SKK to support the Euro symbol, £ symbol and any User Defined Symbols required.

2.3.2.3 The Resident ScreenKeys Character Set

The SKK displays text on the ScreenKeys using a 256-character font file. The Options file can download this, otherwise the SKK Resident Code will use a hard-coded default set.

2.3.3 The resident SAC File

The contents of the resident SAC file have been chosen to enable a SKK to configure the Terminal from scratch if required i.e. to set the terminal number etc… The keys required for this job are the S1 and S2 keys and the numeric keypad.



1,1	1,2	1,3		1,5	1,6		1,7	1,8	1,9	1,10		S1
2,1	2,2	2,3	2,4	2,5	2,6		2,7	2,8	2,9	2,10		S2
3,1	3,2	3,3	3,4	3,5	3,6		3,7	3,8	3,9	3,10		
4,1	4,2	4,3	4,4	4,5	4,6		4.7	4,8	4,9	4,10		
5,1	5,2	5,3	5,5		5,6		5,7	5,8	5,9	5,10		

Row and Column assignments

Only the ScreenKeys are active in the Resident SAC file. Pressing a fixed key has no effect other than return to the Menu above.

Although the Resident SAC file is sufficient to get started it will be updated by a downloaded SAC file. This SAC file is created using the SAC Editor, converted to downloadable format using MakeDNL and downloaded to the SKK where it is held in non-volatile RAM.

3 Tools

A number of Software Tools are used to configure the ScreenKey Keyboard.

The SAC Editor and MAKEDNL utility are installed on a Windows PC and are used to create the .SDL and .ODL download files. You will need both of these tools.

The File Download Utility is a standalone 46xx program that downloads the .SDL, .ODL and .CDL files into the SKK.

The User Exits Kernel does this same download job when integrated into the Terminal Sales application – either SA or GSA. In addition it also provided an API feature that enables the TSA to send commands to the SKK.

It is important that the download files are store in the SKK so you will need to use one or other of these approaches to get them down there. Typically, what happens is that the File Download Utility is used in Labs and pilots and once proven the User Exit Kernel is integrated into the TSA.

3.1.1 PC/Windows based Tools

These tools are programs that run on a PC under Windows. They create files that are then transferred to the 46xx Controller.

- SAC Editor for IBM 46xx
- MAKEDNL Utility (Options File Editor and SAC file conversion)

3.1.2 46xx Tools / User Exits

These include a .286 program and a package of User Exits

- File Download Utility (.286 program for downloading files to the SKK)
- User Exits Kernel

3.1.3 SKK Built-in Tools

The SKK has a number of built-in programs that can be used to configure it.

- SKK Diagnostics
- User Menu

3.1.4 IBM 46xx Configuration Tools

The IBM 46xx “Installation & Update Aids” program is used to configure the Terminal and Controller to support the SKK.

- Terminal Configuration
  - Terminal Device Group Configuration
  - Keyboard Layouts
  - Terminal Load Definitions

- Controller Configuration
  - Logical File Names

3.1.5 Terminal Sales Application Personalisation

The IBM 46xx Terminal Sales Application’s “Application Personalisation” program is used to configure the application to activate the Terminal and Controller to support the SKK.

3.2 SAC Editor

The SAC Editor is installed and run on a PC running Windows. The resulting SAC File (file extension .PKF) is converted to a SAC Download file (.SDL) format by MakeDNL and then copied onto the IBM 46xx Controller. From there it is downloaded to the ScreenKey keyboard.

The SAC Editor can produce SAC files for either the Windows Open System target environment (the SK-2000 series ScreenKey products) or the IBM 46xx target environment (the SKK ScreenKey products). When installing the Editor, remember to make sure to install the Editor for IBM 46xx.

See the README file that comes with the Install for details.

3.3 MAKEDNL Utility

The MAKEDNL utility is installed and run on a PC running the Windows O/s. It will convert a SAC File (.PKF) produced by the SAC file Editor into a SAC Download file (.SDL) and also prepare an Options file for downloading.

Both the SAC Download (.SDL) and Options file (.ODL) are downloaded to the ScreenKey keyboard.

The items in the installation include…

MakeDnl.EXE	Utility to edit/create Options file and to convert a SAC file to download format
SFont.PLF	TDA Character set – Code Page 850 Multilingual
LFont.SDF	ODA Character set – Code Page 850 Multilingual
SK_Char.SKF	Character set for ScreenKeys – SKI standard
Kat.KAT	The KAT file supplied is an exact copy of what is hardcoded in the SKK
splash.spl	A sample Splash Screen

See the README file that comes with the Install for details.

3.4 File Download Utility

Standalone File Download Utility as .286 program. There is no installation for this file. It is simply copied to the 46xx controller. It downloads the SAC, Options and Code Updated files to the SKK.

A number of configuration files control the operation of the File Download Utility. These are the Download Control files – RTIKB000, RTITERMS.DAT and RTISESSN.DAT. In addition, the File Download Utility uses User Logical File Names to access these file and the download files (.SDL, .ODL and .CDL). The User Logical File Names must be activated in the controller.

3.5 User Exits Kernel

Like the File Download Utility, there is no installation for the Kernel. It is integrated into the Terminal Sales Application. Again, like the File download Utility it downloads the SAC, Options and Code Updated files to the SKK. In addition, the Kernel enables the TSA to issue instructions to the SKK via the API Channel.

3.6 Built-in Diagnostics

The Built-in Diagnostics and configuration tool allows the following to be configured:

- Download Channel Device address
- Keyboard Device address
- Display Device address
- Contrast setting
- Brightness setting

You can get access to diagnostics either by…

- holding any key down while powering on the SKK
- assigning the special function “GoTo Diagnostics” to a ScreenKey, Fixed Key or Key Lock

3.7 Built-in User Menu

The User Menu is a facility that provides easy access for users to configure Contrast and Brightness settings, without requiring access to onboard diagnostics.

The User Menu is only applicable to the SK-7510 keyboard. The menu is not normally visible. It shares its display area with the CDA and operates on the same principles, i.e. it operates as a pop-up display and uses the ODA large-font on a 1x20 grid.

If the CDA is currently being used to display text sent via the API the user menu cannot be activated.

To activate the menu, the user must press and hold the SELECT key for 5 seconds. If enabled, the user menu will display the first menu item on the CDA. If not enabled, the keyboard will generate an error beep.

By default the user menu is enabled. However, it can be disabled using the Options File thus preventing users from being able to change settings.

3.8 Installation & Update Aids

The Installation & Updates program on the Terminal enables the Terminal side to be configured.

3.8.1.1 Terminal Configuration

Terminal configuration includes configuring the:

- Terminal Device Group Configuration
- Keyboard Layouts
- Terminal Load Definitions

3.8.1.2 Controller Configuration

Controller configuration includes configuring the

- Logical File Names

3.9 Application Personalisation Tools

The Terminal Sales Application can be configured in a number of ways.

3.9.1.1 User Exit Integration Tools

User Exit Integration involves making code change to the User Exits and using the programming tools (Compiler and linker etc…) to rebuild the application.

3.9.1.2 Application Personalisation

The Terminal Sales Application may also be configured without the need to make code changes. Personalisation includes:

- Activating User Exits
- Select line types that go to the Journal

4 Planning

Careful planning can maximise the benefits of the SKK.

The SKK can be viewed as just a collection of existing IBM peripherals gathered together. Thinking of the SKK in these terms will help you to decide how best to combine the SKK with the other components in your particular IBM 46xx Environment.

4.1 The IBM 46xx Environment

The SKK is designed to be able to accommodate as wide a mix of peripherals and terminals as possible. The SKK will co-exist in whatever environment it finds itself in. The Environment is defined by the following…

The IBM Terminal
There are more than a dozen types of 46xx terminals. These range from the older 4683 models to the newer 4693 models. Each has its own characteristics (number of sockets, processing power…). The SKK is designed to be compatible with all of 46xx Terminal types. However, the ScreenKey Keyboard is not compatible with the IBM SurePOS range.

Other Peripherals
The SKK will not be the only peripheral attached to the Terminal. Other likely peripherals include the Cash Drawer, Printer, Customer Display, Debit Card Device and Scanner/Scales.

The O/S
The SKK is designed to run with 46xx O/s. However, since the SKK is "a collection of IBM devices" it is not restricted to running with this O/s.
The support tools such as the User Exit Kernel and Download Utility are however dependent on the application / O/s and so you will have to devise your own equivalents for these if you go with some other O/s. As long as the SKK is attached to the SIO channel via a RS485 connection it will run with any O/S.

The Terminal Sales Applications
The SKK is intended to be used in an IBM 46xx environment running the standard Supermarket Application, General Sales Application and Chain Sales Application. However, since the SKK is "a collection of IBM devices" it is not restricted to running with these applications. The support tools such as the User Exit Kernel is however dependent on the application and so you will have to devise your own equivalents for these if you go with some other application.

4.2 ScreenKey Keyboard Integration Planning

There are a number of ways to tackle the issue of integrating the SKK into the IBM Terminal environment.

a) Configure the SKK off line and simply plug it into the Terminal without further configuration of the Terminal or Controller
b) Configure the Terminal to enable it to download to the SKK but using the Download Utility so as to avoid changes to the TSA User Exits.
c) Configure the Terminal and Integrate the User Exits into the Terminal Sales Application.

The recommended approach is c). b) is a good approach to take in the Lab as the features of the SKK can be shown with minimal change to the Terminal in the Lab. a) is only suitable for demonstrating the SKK.

4.2.1 50-key or N50-Key Emulation

ScreenKey Keyboard with Resident Code 1.12 or later are able to operate as either a 50-Key (4683 keyboard) or N50-Key (4693 Keyboard). Keyboards with earlier versions of the Resident Code are able to operate only as a 50-Key. It is not sufficient to run Code Update 1.12 or later – must be Resident Code 1.12 or later.

The current version of the Resident Code can be determined by running the Built-in Diagnostics. See the Technical Reference Manual for Details.

If your current terminal configuration uses a 50-Key then choose 50-Key emulation. If your current terminal configuration uses a N50-Key then choose N50-Key emulation. This way you can reduce the amount of Terminal Device Group / Keyboard layout work required.

Keep in mind the procedure for replacing a N50Key IBM keyboard with a SKK emulating a 50-Key keyboard requires that the Terminal device group be amended to select the new keyboard type.

There is a specific sequence that this job must be done in. First, make and activate the changes in the controller. Then issue a Load terminal Configuration command to tell the terminal to get it to take down the changed configuration. Do this while the N50-key keyboard is still attached to the terminal. The terminal IPL will not be successful if you plug in the SKK before this because the terminal will not IPL if either the Keyboard or the System Display cannot be found. And if it doesn't IPL we can't download the net terminal configuration to tell it that the keyboard / System Display has changed

If the terminal stops at U007 it won't respond to the "Load terminal Configuration Data" command.

Other than this there is usually no reason to choose one over the other. Unless, of course, you are actually using the 2nd layer of keys to provide 100 keys on a 50 key keyboard. In which case you will need to choose the N50-Key.

The choice has an impact on the SAC file. When you create the SAC file you decide if it is for 50-key or N50-key. A SAC file prepared for a 50-key cannot be used with an N50-key emulation.

Must the ScreenKey keyboards in the store be either all 50-key or all N50-key?
No, it's acceptable to mix N50 and 50-key ScreenKey keyboards. However, it is not very practical. It means maintaining a 50-key version and an N50-key version of the SAC file.

4.3 Keys and Key Lock Functionality Planning

Deciding how to best use the ScreenKeys and Fixed Keys is the most important decision to be made.

Do I want to activate Security levels?
Do I want to allow access to SKK built-in Diagnostics via Keystroke?
Must all ScreenKey keyboards in a store have the same layout?
Do I need to introduce delays into some of my key sequences?
Do I need to avoid buffer overflow problems?
Do I want to enable the Keypress Beep?

4.3.1 Planning the Fixed Keys Functionality

The SKK is delivered without legends on the Fixed keys. The first job is to arrange the fixed keys into the desired layout using Singles, Doubles and Quads. Also, select the place for the Numeric keypad.

The optional accessories available with the SKK include some Doubles and Singles and the glass to go with them. Legends are simply printed on paper and cut out with a scissors as normal. An alternative to putting pieces of paper with text on them under glass on the fixed keys is to special order Engraved Keys. These can be colour coded. Engraved and coloured keys are available in large quantities.

The Fixed Keys layout decisions are:

How should the function keys be distributed between Fixed Keys and ScreenKeys?
Where to position the keys on the keyboard?
When to use double or quad or single fixed keys?
Whether to use a colour scheme for the fixed keys?

4.3.2 Planning the ScreenKeys Functionality

The ScreenKeys decisions are:

What functionality should be on Fixed Keys and what on ScreenKeys?
What should appear on the "Initial Menu"?
How menus are reached – directly from a fixed key, or via another ScreenKey?
Do I want to be able to issue a "Goto a ScreenKeys Menu" command from the TSA?
What colour scheme to use for the ScreenKeys?
Do I want to change the default ScreenKey character set?
Where can I get pictures to use in ScreenKey graphics?
Should I use any special menu type such as Select&Confirm menus?
Do I want to use flashing on ScreenKeys?
Do I want to activate ScreenKey Sleep Mode?

NOTE: Scrolling text on ScreenKeys is not supported in SKK, although it is in the SAC EDITOR for 46xx Parameters panel.

4.3.3 Planning the Key Lock Functionality

The Key Lock decisions are:

Do I want to use the Key Lock for setting the Security Level?
Do I want to GoTo a menu when the Key Lock is changed?
Do I want to return a keystroke(s) when the Key Lock is changed?

4.4 LCD Panel Functionality Planning

4.4.1 Planning the use of the LCD Panel

The main purpose of the LCD Panel is to show Operator Display Information in the ODA area and a Scrolling Receipt in the TDA area. In addition, Special Messages or features, under the control of the TSA (using the API channel) can be displayed on the Pop-up CDA area. Finally the user can trigger the Pop-up User Menu to do jobs such as set the contrast and brightness of the LCD Panel.

Brightness should be set to normal to prolong the lifetime of the backlight bulb.

LCD Panel Contrast and Brightness
The Contrast and Brightness settings is provided as a means of optimising the readability of the LCD Panel. The Contrast and Brightness can be set using the Built-in Diagnostics, the API commands or the User Menu.

Allowing the operator to set the Contrast and Brightness via the built-in diagnostics is probably not a good idea because incorrect use of the built-in diagnostics could cause problems. A much more user friendly and less dangerous option is to allow the operator access to the Contrast and Brightness via the User Menu. The TSA may control the Contrast and Brightness via API commands.

The Contrast and Brightness adjustment described here applies to the Model 2 and later hardware. Model 1 hardware does not have a Brightness adjustment and the contrast is adjustable through a potentiometer accessed through a hole in the case.

LCD Panel ScreenSaver Mode
The ScreenSaver Mode is provided as a means of extending the lifetime of the LCD Panel by controlling the brightness. The brightness is automatically set to the current Brightness setting at IPL and thereafter it is controlled by either the TSA via API channel or the ScreenSaver Mode settings held in the Options file.

Screensaver Made cannot be disabled. However, the timeout can be set and what happens in ScreenSaver Mode can be configured.

On entry to ScreenSaver Mode the Brightness is set and the Splash Screen is displayed on the TDA, if requested. On exit from ScreenSaver Mode the Brightness is restored as are the TDA contents, if they have been overwritten by the Splash Screen.

In addition to the Screensaver Mode for the LCD Panel there is also a Sleep Mode for ScreenKeys. These are separate features.

4.4.2 ODA – Operator Display Area

The ODA is the equivalent of a 2x20 Display. The configurations options are limited to whether to activate the ODA or not. Having decided to activate the ODA the decisions are

Do I want it to act as the ANDISPLAY or ANDISPLAY2 device?
Do I want it to also be the System Display?
Do I want to change the default character set - shared with the CDA?

NOTE: even if the ODA is not activated it still takes up the same space on the LCD panel and will display the message “ODA Disabled”.

See page 46 for details of how to configure the ODA.

4.4.3 TDA - Transaction Display Area

The TDA is a 12 line x 38 character display. The configurations options are limited to whether to activate the TDA or not.

What happens if I decide not to activate the TDA?
You may decide not to use the TDA for anything. In that case the TDA will display the message "Transaction Display area Disabled". NOTE: even if the TDA is not activated it still takes up the same space on the LCD panel.
Alternatively, you may decide to use the TDA to do Printer Monitoring - echoing data sent to the Journal or Receipt station on the Printer. The keys beneath the LCD Panel may be used at any time to Scroll up and down through the order. Depending on how much memory has been allocated to hold TDA lines the scroll keys can scroll back through previous orders.

Having decided to activate the TDA the decisions are:
Do I want it to echo data sent to the printer – Printer Listening?
Do I want the TSA to control what is displayed on the TDA using the API?
Do I want the Splash screen to appear on the TDA, and if I do, when?
What amount of memory do I want to assign to the TDA (no of lines)?
Do I want to change the default character set?

Can I mix Printer listening generated lines and API generated lines on the TDA?
In addition to, or instead of Printer listening, the TSA application may use the API channel to issue commands to display data on the TDA. This requires that the API channel is configured and that the necessary User Exit changes have been made to the TSA.

The factors influencing the decision include
a) whether Post Printing is in operation – if so then receipt information is printed at the end of the order only so it will not appear on the TDA until the end of the order – this is usually not the desired effect
b) some lines types may not be sent to the journal
c) Printer listening is available for a Model 3, Model 4 or 4610 printer but not a Model 2 printer.

4.4.4 CDA - Control Display Area

The Control Display Area (CDA) is a pop-up 1x20 display that uses the same large font as the ODA. The CDA is used for two purposes. It is available under API control for users to programmatically assign text to be displays, e.g. a running total. Additionally, the CDA is used by the SK-7510 User Menu to display options and make changes to onboard settings.

What happens if I decide not to activate the CDA?
If you decide not to use it for anything it doesn't take up any space on the LCD panel.

Having decided to add code to the TSA to send data to the CDA the decisions are:

Do I want it black on white or white on black?
Do I want to change the default character set – shared with the ODA?

4.4.5 User Menus

The User Menu allows the Contrast and Brightness of the LCD Panel to be adjusted. The same function is available via the built-in Diagnostics and also via the API commands. Holding the Select key pressed for 5 seconds will activate the User Menu.

You may decide to disable the User Menu so that holding the Select Key has no effect.

Since the User Menu and CDA share the same section of the LCD Panel display area the User Menu will not pop up if the CDA is being used by the API commands.

4.5 MSR – Magnetic Stripe Reader Planning

4.5.1 Planning the use of the MSR

In a lot of cases there will already be a debit card device attached to the terminal. This may mean that there is no need for the MSR on the SKK. However, the Debit Card Device is typically positioned for the Customer to swipe a card and enter pin numbers. It is not convenient for the Operator to use.

By contrast, the MSR device on the SKK is intended for Operator use. It could enable – with TSA program changes – the operator to sign-on via a card swipe, for example. Or to activate Phone Cards.

Having decided to use the SKK's MSR the decisions are:

What to use the MSR for?
Do I want a single, dual, or triple track reader?

NOTE: the triple track reader can only be configured if the SKK is configured to emulate an N50-Key keyboard.

4.6 Bar Code Channel Planning

4.6.1 Planning the use of the Bar Code Channel

Typically when a key is pressed the SKK sends one or more key strokes to the TSA via the Keyboard Channel. The Bar Code Channel enables the key strokes to be sent to the TSA as if they came from scanning a bar code.

The Bar Code Channel was introduced was to overcome the "Buffer Overflow" problem.

What is the "Buffer Overflow" Problem?
When a operator keys a 10 digit bar code manually it takes them some time. When an operator keys a single key that triggers 10 keystrokes to be sent it happens much faster. Some slower terminals cannot cope with the increased throughput and the result is that the keyboard input buffer overflows. This does not seen to be such a problem on faster terminals.

The SKK implements two solutions to the Buffer overflow problem. The Bar Code Channel is one. Execution Times is the other. With Execution Times it is possible to insert delays into the string of 10 digits thus slowing down the throughput and allowing the Terminal time to process the stream of input from the Keyboard.

The execution Times are also valuable in another context. Say, for example, that TSA allows the order to be cashed out without keying in the amount tendered. Typically, the sequence is CASH CASH. However, if we assign the CASH CASH sequence to a key then it may be that the Terminal will not see the second CASH key because it was busy getting into cash tendering mode and discarded the second CASH key. Execution Times can help here.

How can I tell if it will affect me?
Slower 4683 terminals are likely to exhibit the problem when handling a series of keystrokes each of which in turn is a series of keystrokes. It may appear on the faster 4693 terminals but this is unusual.

Is it any use on fast terminals that don't exhibit the buffer overflow problem?
The main reason that the Bar Code Channel was introduced was to overcome the "Buffer Overflow" problem. However, since it is more efficient to send 10 digits via the Bar Code Channel as compared to the Keyboard channel the Bar Code Channel can improve throughput.

What restrictions are there on use of the Bar Code channel?
The main issue to be addressed is that the TDG configuration allows, at most, two bar code devices to be configured. Typically, this is a bench scanner and a hand held scanner. If there are already two bar code devices in use the bar code channel cannot be configured.

Is there any way around this?
SKI have created a utility that enables a third bar code device to be configured by directly editing the configuration file produced by the TDG Configuration program. This utility is called "7510TDG.286". This is not a recommended approach. However, it does provide an option where all else fails.

4.7 Download Channel Planning

4.7.1 Planning the use of the Download Channel

The Download channel is used to download the SAC file, Options file and Code Updates to the SKK.

The Download Channel is implemented as a combination of Serial Port device and User Exit Code. Alternately the Download Channel may be implemented using the FDU.

Download to the SKK offsite.
This is possible due to the fact that the SKK stores the downloaded files in Non-volatile RAM.

Download to the SKK in the Store using the Download Utility.

Download to the SKK in the Store using the User Exit code integrated into the TSA.
How do I avoid a clash with the existing code? One important issue is Session Numbers. It is difficult to find out which session numbers are already used in the TSA and which are free for the SKK user exit code to use.

4.8 API channel

The API channel is a means for the TSA to send commands to the SKK Keyboard. The Commands that are available via the API channel are…

LCD Panel Commands

^\SD	Set LCD Panel to Dark (back-light OFF)
^\LPB<n>	Adjust LCD panel brightness, HIGH or NORMAL
^\LPC<d><nn>	Adjust LCD panel contrast by <nn> steps:
^\LPS (1)	Save changes made to LCD panel to EEPROM
^\LPR	Do Not Save changes made to LCD panel. Restore previous settings

TDA\CDA Commands

<none>	Defaults to display text on the TDA/CDA if there is no ESC sequence
^\SB	Display Splash Screen on TDA
^\SN	Set LCD Panel to Normal Mode – turn OFF CDA, restore back-light, turn OFF splash, restore TDA text
^\CT	Clear the TDA display and buffer
^\P<xx><yy><nn>	Print (nn) bytes of next line at (xx, yy) co-ordinate on TDA e.g.
^\LF <nn>	Linefeed <nn> lines, e.g. ^\LF03 to print 3 blank lines
^\D<n>	Direct all following text messages to TDA (n1 = 0) or CDA (n1 = 1)

ScreenKey Commands

^\M<name>	Goto Menu <name> on ScreenKeys

Keyboard Commands

^\QM	Request Manager Status return via Keyboard channel

4.8.1 Planning the use of the API Channel

The issues to be considered when planning the API channel include:

Why would I bother with the API channel?
What's involved in getting it going?
Is it difficult to add it in later?
What sort of things can I do with the API channel?
What sort of features can I add using the GoTo Menu command?

4.9 Connection to the Terminal

4.9.1 Planning the Physical Connection

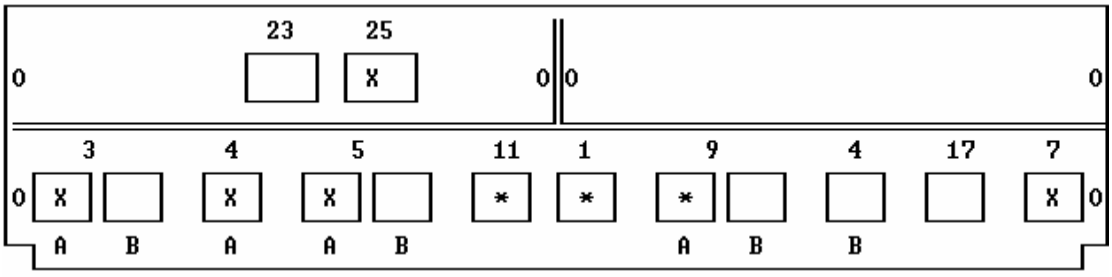
The SKK plugs into any Socket 9 or any Socket 4.

There are a limited number of Sockets on the IBM 46xx Terminal's backplane and this varies from Terminal model to Terminal model. It is important to consider which Socket to use for the SKK. The standard IBM 50-key keyboard uses Socket 5A. Removing the 50-Key keyboard will free up this Socket.

However, the SKK plugs into any available Socket 9 or Socket 4 - not Socket 5A. Even though Socket 5A becomes available when the 50Key keyboard is removed this does not help the SKK. The reason that the SKK plugs into any available Socket 9 or Socket 4 rather than Socket 5A is because the SKK runs on 12 volts. Socket 5A supplies 5 volts whereas Sockets 9 and 4 supply the required 12 volts.

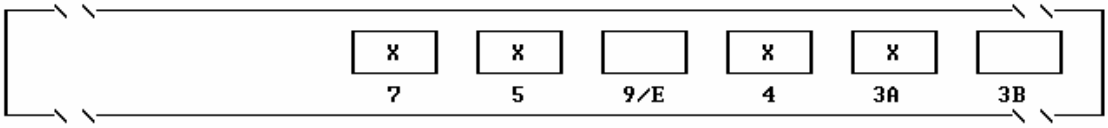
Although the polarity of the signals in Socket 4A are the reverse of those in Socket 4B the SKK will adjust automatically.

Model 4683



* These sockets are not included in the terminal device definition.

Model 4694-0x4/1x4



4.9.2 Planning the Logical Connection

The SKK is only one of the peripherals that will be connected to the Terminal. As such it has to co-exist with all the other peripherals.

Each Terminal Model has it's own set of available sockets and Terminal Device Group Configuration Options. The available options must be used to allow both the SKK and the other peripherals to work together.

Sometimes however, there may be a conflict. For example, if there are already two bar code reader devices attached to the terminal then we cannot activate the Bar Code Channel (unless we use the 7510TDG.286 utility). Some versions of IBM's Full Screen Scrolling Receipt will not allow the ODA to become the System display.

Fortunately, such conflicts are rare.

5 Configuration Overview

Having thought about how to maximise the benefits of the SKK in this particular installation it is now time to look at configuration.

5.1 Configuration Tasks

A number of tasks must be carried out to configure the 46xx Terminal and SKK to work together.

5.1.1 SKK configuration tasks

- EEPROM Configuration
- SAC File Configuration & Download
- Options File Configuration & Download
- Code Update Download
- setup the SKK keyboard layout

5.1.2 IBM terminal configuration tasks

- Terminal Device Groups Configuration
- Keyboard Layout Configuration
- Terminal Load Definition

5.1.3 Terminal Sales Application configuration tasks

- User Exit code Integration
- Application Personalisation

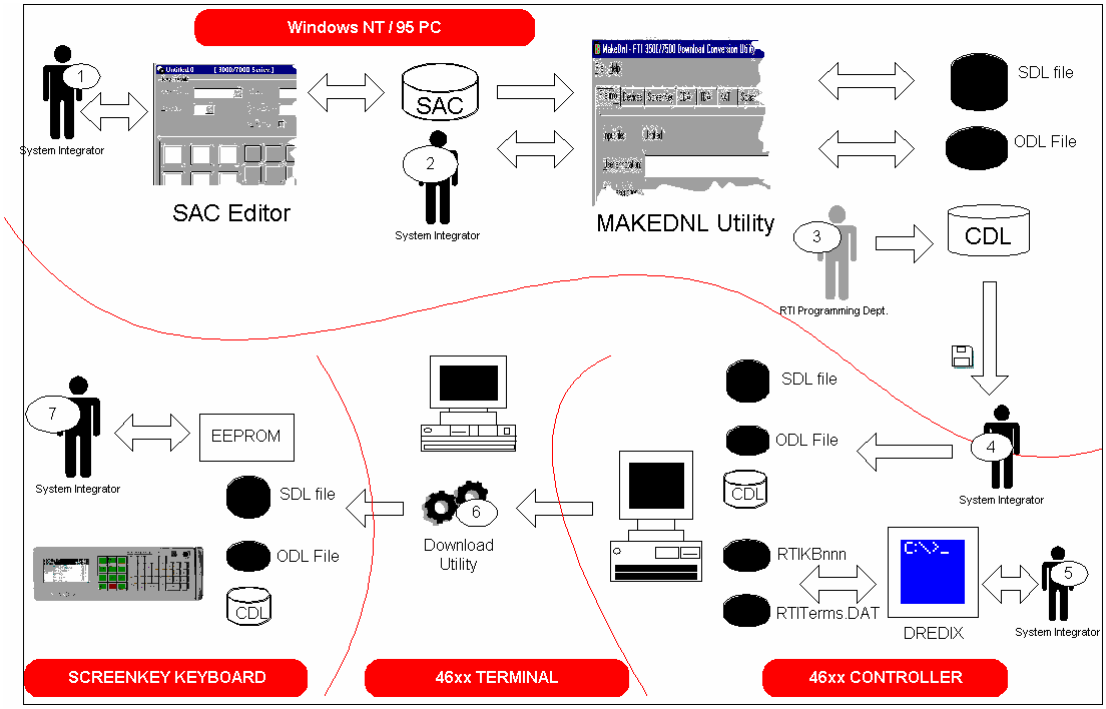
5.1.4 Physical Configuration

- installing the ScreenKey Keyboard at the Cash Wrap

5.2 The SKK configuration tasks

All information required by the SKK is stored in the SKK in either EEPROM or backed up RAM. The job of SKK configuration is to prepare this information and get it into the SKK.

The following diagram shows an overview of the steps involved. This diagram does not include the steps required to configure the Terminal.



The SKK configuration is complete when

- the SAC File has been created, converted to and SDL file and downloaded into the SKK's non-volatile RAM
- the Options File has been created and downloaded into the SKK's non-volatile RAM
- the latest Code Update has been downloaded into the SKK's non-volatile RAM
- the EEPROM Configuration is complete
- the Fixed keys layout is prepared

5.2.1 SAC File (.PKF) Preparation

Use the SAC File Editor to create a new or edit an existing SAC File. The Editor runs on Windows operating systems. SAC files have a file extension of .PKF. See the "SAC Editor User's Guide" for details.

SAC files themselves are not directly downloaded to the ScreenKey Keyboard. MakeDNL is used to convert the SAC file (.PKF) to a format suitable for downloading. Downloadable SAC files have the file extension .SDL.

Before working with the SAC file you must make up a Legend file - .LEG - template to match the keyboard layout specified in the IBM Terminal Load Definition.

The SAC file contains information that affects the way the SKK is presented to the operator. It may change frequently.

5.2.2 Options File (.ODL) Preparation

Use the MAKEDNL utility to create a new or edit an existing Options file. The Options File is prepared during SKK installation and is unlikely to change.

Once Options file configuration is complete the information is in a file on the Windows Machine. It must be moved to the 46xx controller and then downloaded via the 46xx terminal to the SKK. Once in the SKK it is held in backed up RAM.

The items configured in Options File include…

- Activate Printer Monitoring
- Activate MSR emulation
- Activate Bar Code Channel
- Activate API Channel
- Define ScreenKey Character Set
- Define ODA Character Set
- Define TDA Character Set
- Define Keyboard Attribute Table
- Define Splash Screen
- Define Command & Barcode Execution times
- Define Barcode to Stemcode Conversion
- Define Power-On Beeps
- Define Key Press Beeps
- Define CDA display format and User Menu enable
- Define ScreenSaver setup

A new Option file can be created with the command “New Option File”. A default set of Option records will be generated, and the user can start editing them by selecting the desired tabs. The default data will be the same as the built in factory setting in the SKK keyboard.

5.2.3 SAC File Conversion

Use the MAKEDNL utility to convert the Editable form of the SAC file into the downloadable form.

1. Open (load) a SAC file using the “Open SAC file” command.
   The file will be loaded and the name and size of the file will be displayed in the main dialog.
2. Type your “User annotation” in the edit filed. This should describe the contents of this file.
3. Use the command “Save SAC Download file” to perform the conversion and save the file. The file will have the same name as the SAC file, but with the file extension .SDL. This file is the one that has to be copied to the 46xx system.

5.2.4 Code Update File (.CDL) Preparation

From time to time SKI will issue Code Update files for the SKK. The file will be in a ready to download form. The Code Update enables new functionality to be added to the SKK. It removes the need to physically replace the Resident Code in the SKK.

5.2.5 Download Preparation

Move the downloadable form of the SAC file, the Options File and the Code Update file to the 46xx controller.
From here they will be downloaded via the 46xx terminal to the SKK. Once in the SKK it is held in backed up RAM.

The download is controlled by a number of text files then must be configured. These are the…

RTITERMS.DAT file
RTIKB000 file
RTISESSN.DAT file
RTIMSG.DAT File

For details about the purpose of these file and how they need to be setup refer to the ScreenKey for IBM 46xx: File Download UtilityUser's Guide or the ScreenKey for IBM 46xx: User Exit Integration User's Guide

5.2.6 Downloading to the SKK

The actual task of deciding whether a download is necessary and doing the download is done by either the Download Utility – RTIFDU.286 - running in the terminal or the TSA which has had the SKK User Exits Integrated.

For details refer to the ScreenKey for IBM 46xx: File Download Utility User's Guide or the ScreenKey for IBM 46xx: User Exit Integration User's Guide

5.2.7 EEPROM Configuration

The SKK has space to store a small number of software configurable items in EEPROM. These are held in non-volatile EEPROM memory.

The EEPROM configuration utility is built into the SKK. It is accessed through the SKK Diagnostics menu. SKK Diagnostics are triggered by powering the SKK with any key held down. Follow the instructions displayed on the ScreenKeys and LCD panel. See the "*ScreenKey for IBM 46xx: Technical Reference Manual*" for details.

The items configured in EEPROM are…

- Keyboard Device Address
- Download Channel Device Address
- ODA device address
- LCD Panel Brightness setting
- LCD Panel Contrast setting

Once EEPROM configuration is complete the information is in the SKK and will stay there until reconfigured.

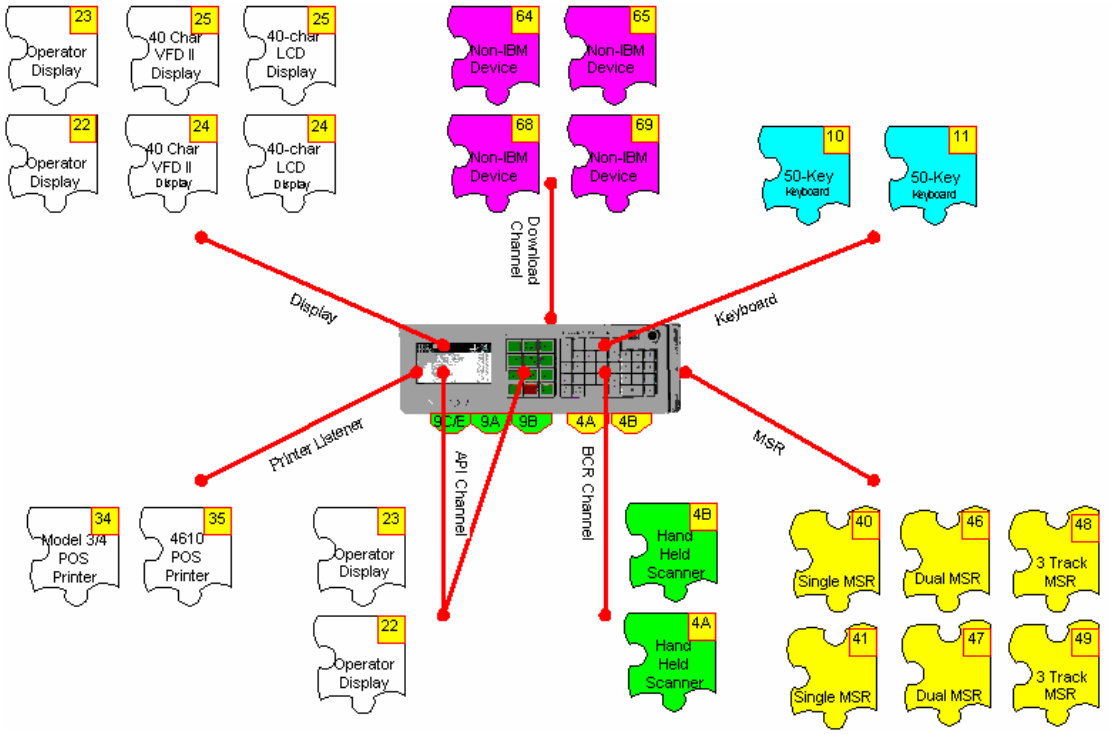
5.3 IBM Terminal Configuration tasks

The Terminal Device Group may need to be reconfigured to reflect the options available in the SKK.

- Terminal Device Groups configuration
- Keyboard Layout configuration
- Terminal Load Definition

5.3.1 Terminal Device Groups Configuration

It will be necessary to create a new Terminal Device Group Configuration for the SKK. It is possible that an existing Device Group may be reusable but this is the exception rather than the rule. The need for a serial device to provide the Download Channel will mean that a new device group is required.



The Terminal writes to the ANDISPLAY device. The SK-7510 is configured to act as the display that has been assigned the ANDISPLAY name. The SK-7510 displays the data on the ODA part of the SK-7510's LCD panel. The SK-7510 is told which display device it is by setting the EEPROM.

The data on the TDA can come from
a) the data sent to the Printer
b) TDA output commands sent to the SK-7510 via the API Channel

The information displayed on the ScreenKeys and the information returned to the TSA when any key is pressed comes from the SAC file that is resident in the SKK. Use the Download Channel to get a SAC file downloaded into the SKK. The operation of the ScreenKeys can also be controlled by ScreenKey commands sent by the API Channel.

The SKK can be configured to *emulate* any or all of the following devices..

IBM Device	Device Address	Description
50-key keyboard	10, 11	Key presses, key lock, Speaker, LED indicators
N50-key keyboard	1C, 1D	Key presses, key lock, Speaker, LED indicators
Magnetic Stripe Reader	40,41, 46,47, 48,49	Single, Dual or Triple track
Operator Display	22,23,24,25	ODA 2 lines of 20 characters (applies to SK-7510 only)
RS232 Serial Device	64, 65, 68, 69	Download Channel
Bar Code Scanner	4A, 4B	Bar Code Channel - Buffer overflow problem workaround
Operator Display	23,22	API Channel

The SK-7510 can be configured to *monitor* the following devices from the range of available IBM devices. Monitoring means that the SK-7510 listens in on the conversation between that device and the terminal – the SK-7510 and that device must both be connected at the same time.

IBM Device	Device Address	Description
Model 3/4	34	Printer Monitoring
4610 Thermal	35	Printer Monitoring

5.3.2 Keyboard Layout Configuration

It is possible that one of the existing keyboard layouts can be used with the SKK. /however, sometimes it make more sense to create a new Keyboard layout.

5.3.3 Terminal Load Definition Configuration

Due to the changes to the Keyboard layout and the creation of a new Terminal device group the Load definition will have to change.

5.4 Terminal Sales Application Configuration

5.4.1 User Exits Integration

The reason for modifying the Terminal Sales Application is to

- Download the SAC, Option and Code Update files
- API calls.

5.4.1.1 Downloads

Code must be added to the Terminal Sales Application, compiled and linked. The Terminal Sales Application modification allows the SAC, Options and Code Update files to be downloaded from the controller to the SKK keyboard as and when they are needed.

SKI supply the appropriate User Exit code for the standard IBM Supermarket Application (SA) and General Sales Application (GSA). Users who do not use the SA or GSA applications can use this code as the basis for designing and implementing their own version.

The user exit code is triggered at appropriate intervals and requests the current status from the SKK. If the SAC, Code or Options file currently resident in the SKK is not the same as that on the controller, then the SKK downloads the file from the controller to the SKK and the SKK resets.

The alternative to User Exits is to run a separate File Download Utility.

5.4.1.2 API Calls

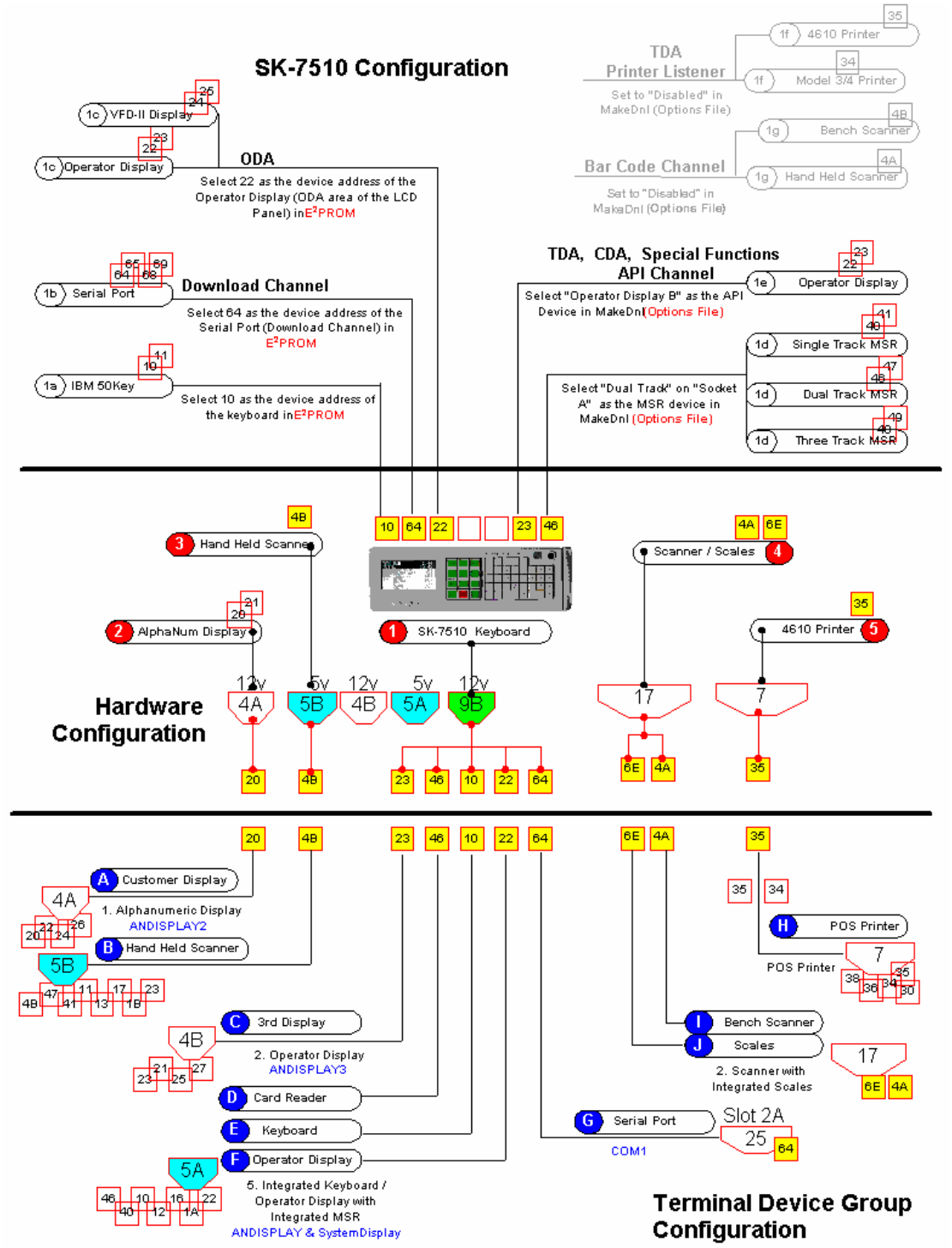
Code must be added to the Terminal Sales Application, compiled and linked. The Terminal Sales Application modification allows the issuing of command to the SKK.

The API calls allow the Terminal Sales Application to control the TDA area of the SK-7510's LCD Panel. The API is implemented as a "3rd display" so the programming is equivalent to sending display information to "ANDISPLAY3".

5.4.2 Application Personalisation

Application Personalisation may be required. For example, Model 3 / 4 Printer Monitoring may have been activated in the Options file and set to monitor the Journal printer. However, the information we want to see on the LCD Panel may not be going to the Journal Station. Application Personalisation can be used to control this.

5.5 Sample Configurations



5.5.1 The Minimum SK-7510 Configuration

The SK-7510 must be configured to at least emulate the IBM 50-key Keyboard. This will work but is severely limited and is probably not viable.

- Since the SK-7510 is not, by default, configured for RS232 serial port emulation there is no way to download a SAC File or Options File or Code Update file. It will run with the resident SAC file and resident Options Files. The resident SAC and Options files are intended for installers and engineers to use and is not suitable for store use.

- Since the SK-7510 is not, by default, configured for Operator display emulation the upper section of the LCD panel will be disabled and will display "Display Disabled". NOTE: whichever display is configured in the Terminal Device group Configuration as the System Display must be active or else the terminal will not IPL. Since the SK-7510 is not emulating a display device another display device must be connected to the Terminal and must be configured as the System Display.

- Since the SK-7510 is not configured for Model 3 / 4 printer monitoring or API enabled the lower section of the LCD panel will be disabled and will display "Transaction Display Area Disabled".

- The SK-7510 will not, by default, support a MSR, or the virtual Bar Code Reader device.

5.5.2 The Typical SK-7510 Configuration

The SK-7510 will be configured to emulate the IBM 50-key Keyboard, RS232 Serial, Operator display, MSR and API support will be active. This configuration will make use of all of the hardware components of the SK-7510 including the both the upper and lower sections of the LCD panel and the MSR.

The RS232 emulation will allow the SAC, Options and, if required, Code file downloads to take place.

- Since the SK-7510 is not configured for Bar Code Reader emulation, the barcode to stemcode translation table must be used. When using product codes/barcodes with the 468x terminals, the barcode execution times should be defined to prevent the SK-7510 from sending the key codes too fast.

5.5.3 The Maximum SK-7510 Configuration

The SK-7510 will be configured to emulate the IBM 50-key Keyboard, RS232 Serial port emulation, Operator display, MSR and Bar Code Reader and monitor the Model 3 /4 printer or API active. This configuration will make use of all of the hardware components of the SK-7510 including the both the upper and lower sections of the LCD panel and the MSR.

- Since the SK-7510 will emulate a bar code reader there is no need for the barcode to stemcode conversion table nor the barcode execution times.

6 Keyboard Configuration

6.1 Functionality

Hardcoded	4
EEPROM	4
Options	4
SAC	4
Terminal Device Group	4
Application Personalisation	

The ScreenKey Keyboard consists of the 12 ScreenKeys, 37 Fixed Keys, Speaker, 4 LED indicator lights, Key Lock.

The ScreenKey Keyboard emulates all the functionality of the IBM 50-Key Keyboard (also known as the 4683 Keyboard) or the IBM N50-Key keyboard (also known as the 4693 keyboard).

Strictly speaking it is possible to run the Keyboard on a terminal where the User Exits have not been integrated with the TSA. This is because we can download the necessary SAC, Options and Code Update files into non-volatile RAM on the SKK either on another terminal or using the Download Utility on this terminal.

The other feature that the User Exit integration gives us is the ability to issue “GoTo Menu” type commands from the TSR. However, if we do not need this feature either then User Exit Integration is not strictly necessary.

However, it is recommended that User Exit Integration is done.

Some Fixed key or ScreenKey definitions may have been setup in the SAC file to use the Bar Code Channel. Just because they have been setup to use the Bar Code Channel doesn’t mean that there will be a Bar Code Channel available to them. See the discussion of the Bar Code Channel below.

The SKK also uses the LED indicators to report error conditions in the SKK itself. At startup, if the Debug flag is set in EEPROM, the Led Indicators flash to indicate that the keyboard is waiting to make contact with the terminal. Once contact is made, they operate as normal. In the event of a device error in the keyboard they flash to indicate the error.

6.2 Device Configuration

The SKK Keyboard emulates an IBM device so it must be configured at the SKK end (via EEPROM settings) and the Terminal end (via Terminal Device Group configuration).

The SKK must know the device address of the Keyboard to emulate BEFORE it communicates with the Terminal. This is because the Terminal will not IPL if the keyboard is not responding to the polling loop.

6.2.1 EEPROM

The EEPROM asks for a device address. The device addresses for a 50-Key Keyboard are '10' and '11' and for an N50-Key Keyboard, '1C' and '1D'.

6.2.2 Terminal Device Group

The Terminal Device Group configuration asks us to select from a list of options. Whatever we choose here must correspond to the EEPROM selection. It is not always obvious which option to choose when presented with a selection such as:

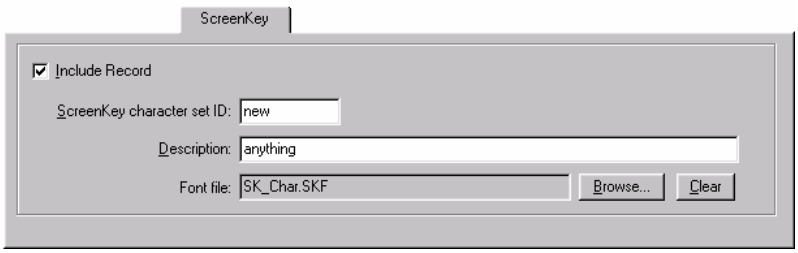
```
CSCDS034           CHANGE 4683 TERMINAL DEVICE GROUP RTIGRP01

                            SOCKET 5A

        Type the information to describe the keyboard.    5

     1 = 50-Key keyboard                  5 = Integrated keyboard/operator
     2 = Alphanumeric keyboard                display with integrated MSR
     3 = Matrix keyboard                  6 = Alphanumeric point-of-sale
     4 = Integrated keyboard/operator         keyboard (ANPOS)
         display                          7 = ANPOS keyboard with
                                              integrated MSR
```

6.3 Option File Configuration

A number of Keyboard characteristics are configurable via the Options File.

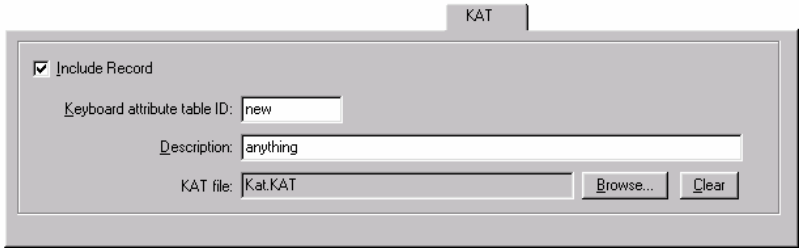
6.3.1 ScreenKey Character Set

The default ScreenKey Character Set is hardcoded. A user defined Character Set file may be downloaded to the SKK by including it in the Option File using the ScreenKey tab in the MakeDnl utility:



See the MakeDnl User's Guide for details.

6.3.2 Keyboard Attribute Table (KAT)



The default KAT table is hardcoded.

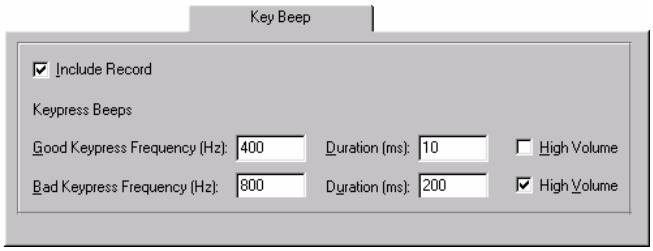
The KAT table is a file containing per key attributes, like repeat, Active/Inactive, Key press Beep, Buffer key presses and Send open/close.

See the MakeDnl User's Guide for details.

6.3.3 Key press beeps

The SKK can be configured to beep/click when a key is pressed. It is possible to separate 'Good' key presses from 'Bad' ones, by defining different frequency, duration and volume levels.

To configure key press beeps select the 'Key Beep' tab. The range for the key press beeps frequency is from 100 Hz to 2000 Hz, and the duration from 1 millisecond to 250 milliseconds. The volume can be either high or low. If no Key press beep record is wanted, uncheck the 'Include record' box. The keyboard defaults will be 2000 Hz at low volume and 10 ms duration for a good key press, and 2000 Hz at low volume and 200 ms duration for a bad key press.



6.4 SAC File Configuration

The SAC file is the main keyboard definition.

As well as the ScreenKey, Fixed key and Key Lock definitions it also includes the following configuration items:

- Enabling/disabling of Global Keypress Beep
- Enabling/disabling of ScreenKey Sleep mode, including Sleep timeout delay
- ScreenKey Flashing On and Off times

6.4.1 ScreenKeys Definition

The SAC file contains all ScreenKey definitions including

- is the key active or not
- what text / graphic to display on the key
- what colour to use on the key
- is the key flashing
- what should happen when this key is pressed

6.4.2 Fixed Keys Definition

The SAC file contains all Fixed Key definitions including

- is the key active or not
- is it a single, double, or quad key
- what should happen when this key is pressed

6.4.3 Key Lock Definition

The mode lock key position on the IBM 50-key keyboard is reported continuously to the 46xx terminal. This feature is emulated by the SKK keyboard, in addition to the functionality in the SAC files, such as security level, goto menu and key press assignment. Each mode lock position can from the SAC file editor be set up to report an IBM-mode to the terminal. There are four modes available:

- System
- Inactive
- Operator
- Manager

Only Operator and Manager are applicable when emulating the 50-key keyboard.

6.5 Terminal Configuration

The main object to keep in mind when configuring the terminal is that the chosen configuration must match the chosen configuration at the SKK end – EEPROM, option files, SAC file..

6.5.1 Terminal Device Group

We've already seen above how the terminal device group keyboard selections must match the setting in the EEPROM.

If we intend to use the Download Channel then we must also configure a Download Channel both here in the terminal device group and also in the EEPROM. We will also need to do User Exit Integration work.

If we intend to use the API commands to issue "GoTo Menu" or "Request Manager Key Status" commands then we then we must also configure an API Channel both here in the terminal device group and also in the Options file.

Some Fixed key or ScreenKey definitions may have been setup in the SAC file to use the Bar Code Channel. We may also have to configure a Bar Code channel. See the discussion of the Bar Code Channel below.

6.5.2 Keyboard Layout

The SAC file must be created with a particular Keyboard layout in mind. Changing this layout after the SAC file has been created will necessitate the review of all keys definitions to check that the changed layout has not caused them to change from their original meaning.

6.5.3 TSA User Exit Integration

User Exit integration is necessary if we wish to issue API channel commands to the Keyboard or use the Download channel to download SAC, Options and Code Update files.

6.5.4 Terminal Sales Application Personalisation

Since the SKK is emulating an IBM POS keyboard it can be expected that all Application personalisation type work has already been done – e.g. the I/O processor. There is no personalisation issues inherent in the SKK.

7 ODA Configuration

Hardcoded	4
EEPROM	4
Options	4
SAC	
Terminal Device Group	4
Application Personalisation	

7.1 Functionality

The ODA (Operator Display Area) emulates a two-line Vacuum Fluorescent Display Type II or Operator Display in large characters on the top section of the SK-7510's LCD Panel against a dark background.

The Resident Options File contains a 64-character font. Full 256-character fonts may be downloaded via the Options File.

The Display Device must be configured at the SK-7510 (via EEPROM settings) end and the Terminal end (via terminal Device Group configuration). No User Exit Integration work is required.

7.2 Device Configuration

The ODA emulates an IBM device so it must be configured at the SK-7510 end (via EEPROM settings) and the Terminal end (via Terminal Device Group configuration).

If the OIDA is configured in the Terminal Device Group to be the System Display then the SK-7510 must know the device address of the display to emulate BEFORE it communicates with the Terminal. This is because the Terminal will not IPL if the system display device is not responding to the polling loop.

7.2.1 EEPROM

The EEPROM asks for a device address. The device addresses supported are 22 or 23 for an Operator Display and 23 and 24 for a VFD II type display. If the ODA device address is set to 00 in EEPROM then the message "Display DISABLED" will be displayed on the ODA. It is not possible to recover the area used by the ODA for use by the TDA.

7.2.2 Terminal Device Group

The Terminal Device Group configuration asks us to select from a list of options. Whatever we choose here must correspond to the EEPROM selection. It is not always obvious which option to choose when presented with a selection such as:

```
CSCDS034           CHANGE 4683 TERMINAL DEVICE GROUP RTIGRP01

                            SOCKET 5A

        Type the information to describe the keyboard.    5

     1 = 50-Key keyboard                   5 = Integrated keyboard/operator
     2 = Alphanumeric keyboard                 display with integrated MSR
     3 = Matrix keyboard                   6 = Alphanumeric point-of-sale
     4 = Integrated keyboard/operator          keyboard (ANPOS)
         display                           7 = ANPOS keyboard with
                                               integrated MSR
```

7.3 Option File Configuration

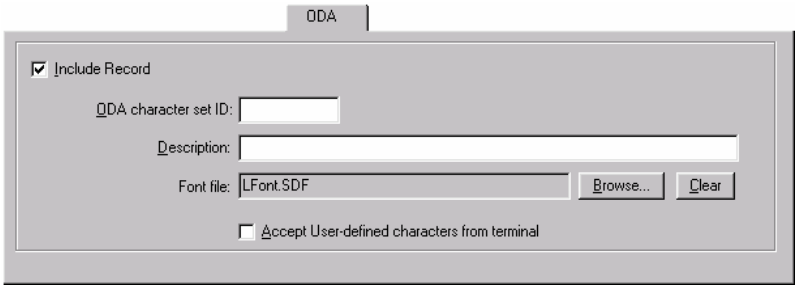
A number of ODA characteristics are configurable via the Options File.

7.3.1 ODA Character Set

The Options file can include replacement 256-character font file for download to the SK-7510 to replace the 64 character resident multilingual character set.

The CDA, User Menu and ODA share the same default Character set.

The character set for Code page 850 Multilingual is part of the MAKEDNL install.



The checkbox 'Accept User-defined characters from terminal' specifies if the keyboard should accept characters downloaded from the 46xx terminal. There are 8 User defined characters downloaded from the terminal, characters 0-7. Since the VFD has less resolution than the SK-7510's Operator Display Area, these have to be stretched to fit the display. The default Operator Display Area font files contains these characters with a resolution matching the display. If the user defined characters are not altered on the terminal, the SK-7510 should be set up not to accept user defined characters because the characters in the font file looks better than the stretched downloaded characters.

7.4 Terminal Configuration

The main object to keep in mind when configuring the terminal is that the chosen configuration must match the chosen configuration at the SK-7510 end – EEPROM

7.4.1 Terminal Device Group

The ODA emulates either an Operator Display or a VFD II display. The TDG must configure one of these types of display for use by the ODA. Typically this display will be ANDISPLAY and the System Display. It is possible to set it to one of the other ANDISPLAY2 and to not the System Display or any combination of these.

Remember that Display Devices can be configured on Socket 5 and 9 as well as on Socket 4.

If we intend to use the Download Channel then we must also configure a Download Channel both here in the terminal device group and also in the EEPROM. We will also need to do User Exit Integration work.

7.4.2 TSA User Exit Integration

There is no need for any code integration. Whatever would be displayed on a standard IBM device will appear on the ODA.

7.4.3 Terminal Sales Application Personalisation

There is no need for any application personalisation. Whatever would be displayed on a standard IBM device will appear on the ODA.

8 TDA Configuration

8.1 Functionality

The TDA is the 12 line by 38 character area that takes up the remainder of the LCD Panel after allowing for the ODA. The data on the TDA comes from one of two sources:

Hardcoded	4
EEPROM	
Options	4
SAC	
Terminal Device Group	
Application Personalisation	

Printer Monitoring — this is where the traffic sent to the printer is listened in on by the SK-7510 and displayed on the TDA – see discussion on Printer Listening below.

API Commands — this is where code is included in the TSA to send display commands to the TDA via the API Channel - see the discussion on API Channel below.

If neither the API Channel nor Printer Listening is active then the message “Transaction Display Area Disabled” is displayed on the TDA. The API Channel is considered “active” if the “API device” is set in the “Devices” tab of the Options file - see discussion on Printer Listening below. Similarly, Print Monitoring is considered “active” if the “Print Monitor” is set in the “Devices” tab of the Options file - see the discussion on API Channel below.

It is Ok for both Printer Listening and the API TDA display commands to display data on the TDA at the same time.

8.2 Device Configuration

The TDA does not emulate an IBM device so there is no need for device configuration. However, it does need either or both the API channel and the Print Monitoring. Print Monitoring does not need device configuration – because a printer is already typically configured. However, Print Monitoring is not support on a Model 2 printer.

The API channel does need device configuration. Device configuration for the API Channel is defined in the API channel discussion below.

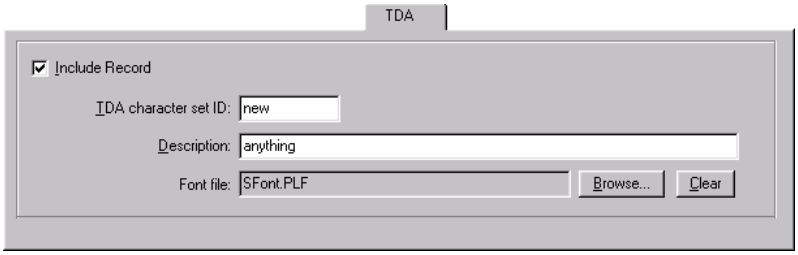
8.3 Option File Configuration

If the TDA is using Printer Monitoring then the Option file must be configured as defined below in the discussion on Print Monitoring. Similarly, if TDA is using API channel then the Option file must be configured as defined below in the discussion on API Channel

In addition to this Options File configuration, a number of TDA characteristics are configurable via the Options File.

8.3.1 TDA Character Set

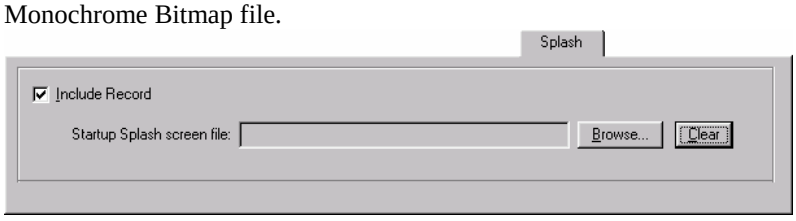
The default Character Set used on the TDA is hardcoded. This can be replaced by a downloaded character set.



The Options file can include replacement 256-character font for download to the SK-7510 to replace the Resident character set. This facility should also be used to provide downloadable character support in the SK-7510 – see Printer Monitoring for details.

8.3.2 TDA Splash Screen

The Splash Screen file is a bitmap file for showing on the TDA screen. This file can be customised to contain any picture fitting on the TDA screen. The splash file can be created from a Windows Monochrome Bitmap file.



The file can be created with e.g. Microsoft Paint. The bitmap has to be defined as a “Black and white” bitmap, 240 pixels wide and 97 pixels high.

8.4 Terminal Configuration

If the TDA is using Printer Monitoring then the Terminal must be configured as defined below in the discussion on Print Monitoring. Similarly, if TDA is using API channel then the Terminal must be configured as defined below in the discussion on API Channel

8.4.1 Terminal Device Group

If we intend to use the Download Channel then we must also configure a Download Channel both here in the terminal device group and also in the EEPROM. We will also need to do User Exit Integration work.

8.4.2 TSA User Exit Integration

There is no need for any code integration if we go the Print Monitoring route. Whatever would be printed on the Receipt / Journal on a standard IBM printer will appear on the ODA.

8.4.3 Terminal Sales Application Personalisation

If the TDA is using Printer Monitoring then there may be a need to configure which line types we want to print and which we don’t. See the discussion on Print Monitoring below.

9 CDA Configuration

9.1 Functionality

Hardcoded	4
EEPROM	
Options	4
SAC	
Terminal Device Group	
Application Personalisation	

The CDA is a pop-up, 1x20, large font area on the bottom of the LCD Panel. It is used to display data on the LCD Panel under control of the TSA.

The data on the CDA comes from API Commands. This is where code is included in the TSA to send display commands to the CDA via the API Channel - see the discussion on API channel below.

If the CDA is displayed then the User Menu will be temporarily inactive.

9.2 Device Configuration

The CDA does not emulate an IBM device so there is no need for device configuration. However, it does need the API channel. The API channel device configuration is defined in the API channel discussion below.

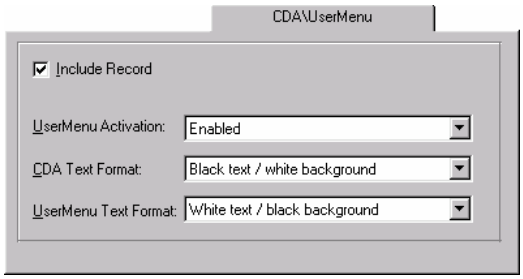
9.3 Option File Configuration

If the CDA is using API channel then the Option file must be configured as defined below in the discussion on API Channel. In addition, a number of TDA characteristics are configurable via the Options File.

9.3.1 CDA character Set

The CDA, User Menu and ODA share the same default Character set. So, whatever Character set is selected for the ODA will be used on the CDA.

The display format of text on the CDA may be configured differently for both User Menu text and API specified text.



9.4 Terminal Configuration

The CDA uses the API channel so the Terminal must be configured as defined below in the discussion on API Channel

9.4.1 Terminal Device Group

If we intend to use the Download Channel then we must also configure a Download Channel both here in the terminal device group and also in the EEPROM. We will also need to do User Exit Integration work.

9.4.2 TSA User Exit Integration

See the discussion below on API channel for details of the User integration work required to support the API Channel

9.4.3 Terminal Sales Application Personalisation

Data displayed on the CDA comes exclusively from API commands issues by the TSA. No personalisation is required other than that necessary to enable the API commands to be issued at the appropriate times. This may require, for example, activation of user exits.

10 User Menu Configuration

Hardcoded	
EEPROM	
Options	4
SAC	
Terminal Device Group	
Application Personalisation	

10.1 Functionality

Holding the SELECT button for 5 seconds activates the User Menu.
The User Menu allows LCD Panel Contrast and Brightness to be set without the need to go into the Built-in diagnostics.

The User Menu may be enabled or Disabled via the Options file.

The CDA, User Menu and ODA share the same Character set.

The User Menu and the CDA share the same space on the LCD panel. If the CDA is displayed then the User Menu will be temporarily inactive.

10.2 Device Configuration

The User Menu is entirely under the control of the SK-7510. It is not implemented by emulating an IBM device so there is no need for device configuration.

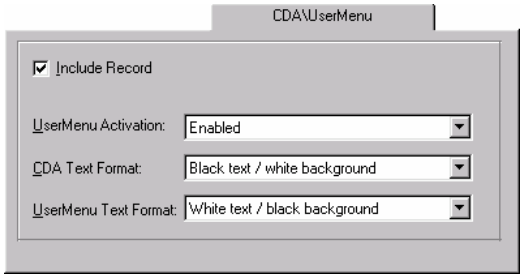
10.3 Option File Configuration

A number of TDA characteristics are configurable via the Options File.

10.3.1 User Menu character Set

The CDA, User Menu and ODA share the same default Character set. So, whatever Character set is selected for the ODA will be used on the CDA.

The display format of text on the User Menu may be configured as black on White or White on Black.



10.4 Terminal Configuration

The usr Menu is entirely self contained within the SK-7510 and there is no need for terminal configuration.

10.4.1 Terminal Device Group

Not applicable to User Menus..

10.4.2 TSA User Exit Integration

Not applicable to User Menus..

10.4.3 Terminal Sales Application Personalisation

Not applicable to User Menus.

11 MSR Configuration

Hardcoded	
EEPROM	
Options	4
SAC	
Terminal Device Group	4
Application Personalisation	4

11.1 Functionality

The SK-7510's MSR emulates the IBM MSR.

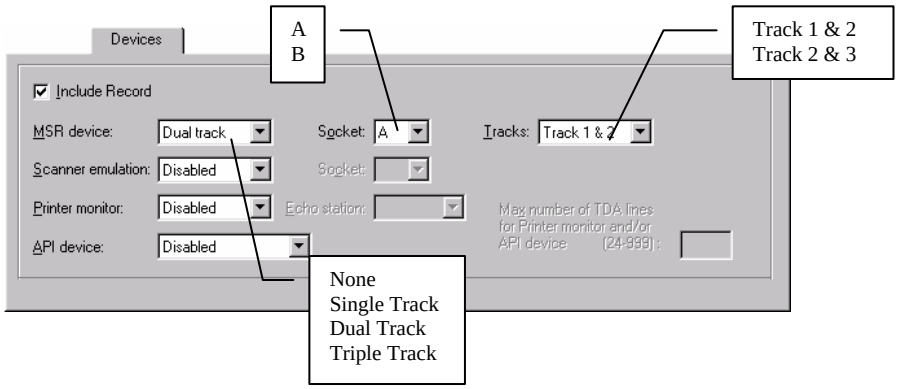
The Terminal Sales Application may enable and disable the MSR. When disabled, card swipes are ignored. When enabled the data is passed to the Terminal. The SKK passes only the tracks requested by the terminal.

11.2 Device Configuration

The MSR emulates an IBM device so it must be configured at the SKK end (via Options File settings) and the Terminal end (via Terminal Device Group configuration).

11.2.1 Options File

To configure the Magnetic Stripe Reader device select the 'Devices' tab. The device address can be selected with the MSR device and Socket dropdown lists.
If Dual Track reader is defined, the tracks to read must also be specified.



Although not strictly necessary it is useful to know the device addresses that correspond to the option file selections above. Single Track, socket A is 0x40, Socket B is 0x 41. Dual track on A is 0x 46, on B is 0x 47. Triple Track on A is 0x 48, on B is 0x 49.
Apart from the Devices tab above there are no other MSR configurable items in the Options file.

11.2.2 Terminal Device Group

The Terminal Device Group configuration asks us to select from a list of options. Whatever we choose here must correspond to the Options File selection.

50-key keyboard selection allows only a single or dual track reader to be specified. If dual track, the user must specify whether tracks 1 and 2, or tracks 2 and 3 are required. There is an additional option to only require track 2 data to be returned from a two track reader (this does not change the device ID selection nor MSR type).

The N50-key keyboard is required to support three track MSRs.

```
CSCDS034          CHANGE 4683 TERMINAL DEVICE GROUP RTIGRP01

                            SOCKET 5A

       Type the information to describe the keyboard.    5

    1 = 50-Key keyboard                  5 = Integrated keyboard/operator
    2 = Alphanumeric keyboard                display with integrated MSR
    3 = Matrix keyboard                  6 = Alphanumeric point-of-sale
    4 = Integrated keyboard/operator         keyboard (ANPOS)
        display                          7 = ANPOS keyboard with
                                             integrated MSR
```

```
CSCDS037           CHANGE 4683 TERMINAL DEVICE GROUP RTIGRP01


                             SOCKET 5A

               Type the information to describe the
               integrated dual track magnetic stripe reader.

             MODEL              2       1 = Reads tracks 1 and 2
                                        2 = Reads tracks 2 and 3

             TRACKS             2       1 = Emulate a single track reader
                                        2 = Read two tracks
```

11.3 Terminal Configuration

The main object to keep in mind when configuring the terminal is that the chosen configuration must match the chosen configuration at the SKK end – option files.

11.3.1 Terminal Device Group

If we intend to use the Download Channel then we must also configure a Download Channel both here in the terminal device group and also in the EEPROM. We will also need to do User Exit Integration work.

11.3.2 TSA User Exit Integration

User Exit integration is necessary if we wish to use the Download channel to download the Options file.

In addition, if the only card swipe currently in operation is a separate Debit Card Device situated so that the customer can use it then we will may need to do some work in the TSA to activate a second card swipe for the operator to use.

11.3.3 Terminal Sales Application Personalisation

Application Personalisation is required to activate the Card Reader.

12 Download Channel Configuration

Hardcoded	
EEPROM	4
Options	
SAC	
Terminal Device Group	4
Application Personalisation	4
Download Control files	4

12.1 Functionality

The Download Channel provides a means of communicating between the application running in the Terminal and the ScreenKey Keyboard. In theory any data may be communicated via the Download Channel. However, the ScreenKey Keyboard will accept only those commands that are to do with downloading the SAC, Options and Code Update files. These files are held in non-volatile RAM in the keyboard.

The Download Channel emulates a non-IBM (RS232 Device).

12.2 Device Configuration

The Download Channel emulates a non-IBM device (RS232 Serial Port device) so it must be configured at the SKK end (via the EEPROM settings) and the Terminal end (via Terminal Device Group configuration).

12.2.1 EEPROM

The Serial port device address (this is not the same as the Serial Port number) must be set in the EEPROM section via SKK built-in Diagnostics. The allowed values are 0x64, 0x65, 0x68 and 0x69.

12.2.2 Terminal Device Group

The Terminal Device Group configuration asks us to select from a list of options. Whatever we choose here must correspond to the EEPROM selection.

12.3 Terminal Configuration

The Device Configuration only makes the Channel available. In order to use the Channel to do the download we must run some code in the terminal that issues the appropriate commands to the ScreenKey Keyboard via the channel. This code can be in a standalone .286 application whose only task is to do the Download or the code can be integrated into the Terminal Sales Application.

It is recommended that the code is integrated into the Terminal Sales application.

The main object to keep in mind when configuring the terminal is that the chosen configuration must match the chosen configuration at the SKK end and also the chosen options in the RTIKB000 Download Control file.

12.3.1 Download Control Files

The User Exit kernel provided will do the Download. It uses a number of files to control the download.

RTITERMS.DAT	the download will not proceed unless the terminal is listed here
RTIKB000	names the SAC, Options and Code Update files and also specifies the Serial Port number (not the same as the serial port device address)
RTISESSN.DAT	lists the session numbers that the download code is allowed to use. It is vital that the session numbers chosen do not clash with session numbers already in use.

The Download Code uses User Logical File names to access these files so these names need to be created and activated.

12.3.2 TSA User Exit Integration

The code to carry out the download is provided in the form of a library of routines that are called from within the TSA User Exits. Details on how to integrate this library are provided in the User Exit Integration User's Guide.

The alternative to Integration is to use the standalone Download Utility – RTIFDU.286. See File Download Utility User's Guide for details.

If neither of these options is appropriate then you my write your own version of the download code based on the Download Channel commands information in the Technical Reference Manual.

12.3.3 Terminal Sales Application Personalisation

As part of the User Exit integration in may be necessary to activate some user exits that may not be currently active.

12.3.3.1 SA Application Operation

The Download check will be triggered at step 5 of "Loading Options Data" and a SAC, Options and Code Update file will be sent to the SKK, if necessary. The non-volatile RAM in the SKK will preserve the contents of RAM so you only need to download the file if they have changed – e.g. a new code Update release or a modified SAC file.

13 API Channel Configuration

Hardcoded	
EEPROM	
Options	4
SAC	
Terminal Device Group	4
Application Personalisation	4
Download Control files	4

13.1 Functionality

Like the Download Channel, the API Channel provides a means of communicating between the application running in the Terminal and the ScreenKey Keyboard. In theory any data may be communicated via the API Channel. However, the ScreenKey Keyboard will accept only those commands that are allowed.

The API Channel emulates a display device – specifically the ANDISPLAY3 Device. ANDISPLAY3 is mandated by the fact that "ANDISPLAY3" is hardcoded into the User Exit code that implement the API Channel.

Command sent from the TSA via the API Channel include

- display text / Splash Screen on the TDA
- pop-up the CDA, display text on the CDA
- GoTo a particular SAC menu on the ScreenKeys
- return Key Lock status

Also, we need to integrate the User Exit kernel into the TSA and include API commands at appropriate places throughout the TSA.

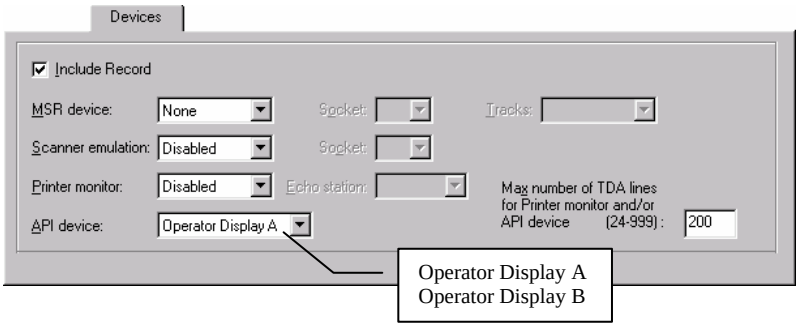
13.2 Device Configuration

For the API Channel to be operational we need to configure a display device at the SKK end (via the Options file) and the Terminal end (via the TDG configuration).

13.2.1 Options File

It can be 'Operator Display A' or 'Operator Display B', using device address 0x22 and 0x22 respectively.

If an API device is configured, the maximum number of lines for the TDA also has to be specified. This is because the API Channel is typically used to send scrolling receipt data to the TDA to be displayed. This may be between 24 (which is two TDA screens full) and 999.



13.2.2 Terminal Device Group

The Terminal Device Group configuration asks us to select from a list of options. Whatever we choose here must correspond to the options selection.

13.3 Terminal Configuration

13.3.1 Download Control Files

The User Exit kernel provided will do the API. It uses a number a file to control the API Channel.

RTISESSN.DAT	lists the session numbers that the code is allowed to use for the API Channel (ANDISPLAY3 device). It is vital that the session numbers chosen do not clash with session numbers already in use.

The Code uses User Logical File names to access this file so these names need to be created and activated.

13.3.2 TSA User Exit Integration

To send commands via the API Channel requires that we add code to the TSA. Issuing a command is simple – just "display" the command on ANDISPLAY3 device. However, since there a re a few rules that must be followed as to how this data if formatted we provide a library of code that is called instead of directly "displaying" on ANDISPLAY3. This code formats the data as required and then it "displays" it on ANDIAPLAY3

13.3.3 SA Application Personalisation

Include API calls code.

The User Exits expects the API channel to be the ANDISPLAY3 device. Opening the ANDISPLAY3 device requires a session number (via the RTISESSN.DAT file). In order for the RTISESSN.DAT file to be accessible the Logical File Names must be activated and the file must be found on the controller. It is important that the Session Number assigned to the API channel is not already in use. See "ScreenKey for IBM 46xx: User Exit Integration: Version 3.20: User's Guide" for details.

See "ScreenKey for IBM 46xx: User Exit Integration User's Guide" for details.

14 Bar Code Channel Configuration

14.1 Functionality

Hardcoded	
EEPROM	
Options	4
SAC	4
Terminal Device Group	4
Application Personalisation	

The Bar Code Channel provides a means of sending item data to the Terminal without using the Keyboard channel. This is a solution to the keyboard "Buffer Overflow" issue and can help improve throughput where a lot of bar code type item codes are used.

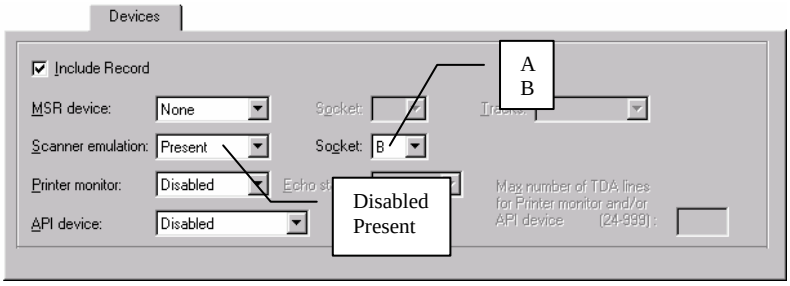
The Bar Code Channel emulates a hand held scanner or bench scanner device.

14.2 Device Configuration

For the Bar Code Channel to be operational we need to configure a scanner device at the SKK end (via the Options file) and the Terminal end (via the TDG configuration).

14.2.1 Options File

To configure the Bar Code Reader Emulation select the 'Devices' tab. The device address can be selected with the "Scanner emulation" and socket dropdown lists. Scanner emulation can be either 'Disabled' or 'Present'.



If it is present the socket has to be defined, which can be either A or B. A scanner on socket A has a device address of is 0x4A and on B it has a device address of 0x4B.

14.2.2 Terminal Device Group Configuration

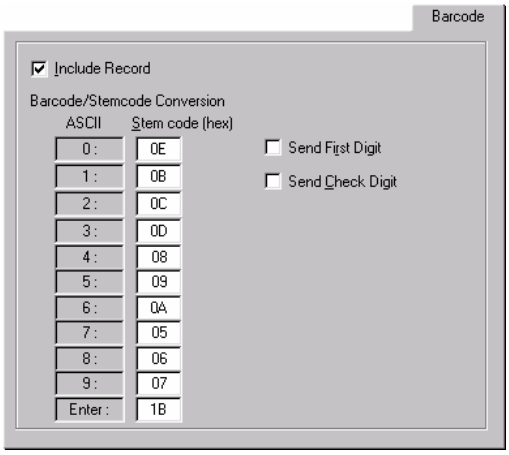
Configure for a BCR using Terminal Device Group configuration.

14.3 Option File Configuration

A number of Bar Code Channel characteristics are configurable via the Options File.

14.3.1 Barcode/Stemcode conversion table

If a bar code reader device channel is not available to the SKK keyboard and the SAC file references barcode data, the SKK can send the barcodes as ordinary keystrokes via the keyboard channel. To do this the keyboard needs a Barcode to Stem code conversion table. A barcode is represented (entered) in the editor as a series of ASCII values followed by a Carriage Return (ASCII 0xD), and these have to be replaced by the corresponding Stem codes.



Select the 'Barcode' tab to define the conversion table. In the 'Barcode' tab, enter the Stem code for each ASCII value. The corresponding Stem code can be found in the actual keyboard's documentation, and is NOT dependent on the 46xx terminal setup.

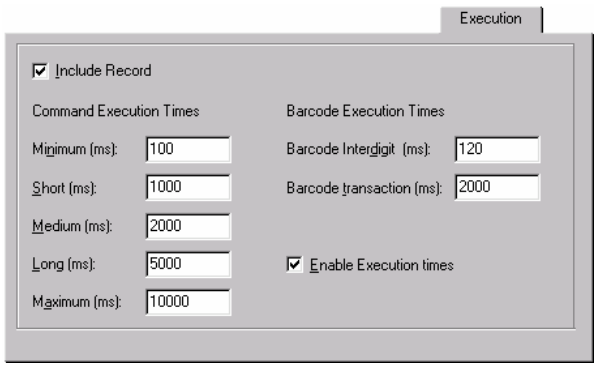
The options to 'Send First Digit' and 'Send Check Digit' are provided to personalize the SKK to suit store specific operations.

For example, when an operator encounters an unreadable bar code, he or she will enter the bar code data via the keyboard.
Often, this data is entered without the first printed bar code digit or the last printed digit. The last bar code digit is referred to as the *check digit*. These settings **do not** alter bar code handling when a bar code channel is available. They only apply when bar code data is uploaded automatically to the terminal via the keyboard channel.

The above example matches the IBM 50-Key keyboard.

14.3.2 Execution times

When sending the bar codes to the terminal as Stem codes, it may be necessary to define Execution Times to slow down the transfer of Stem codes to the terminal. This is because the keyboard can send these much faster than an operator is able to press the numeric keys on the keyboard, which is what the terminal was designed for. The 'Barcode Interdigit' number is the delay in milliseconds between each digit in a barcode.



The 'Barcode transaction' number is the delay in milliseconds the keyboard has to wait for the 46xx terminal to process the sent barcode. Normally the 'Barcode transaction' will be a few seconds, while the 'Barcode Interdigit' will be a few hundred milliseconds. The Execution Time configuration is done in the 'Execution' tab.

Since some terminals will need these delays, and some not, it is possible to enable and disable these with a separate checkbox called 'Enable Execution times' without having to exclude the record and therefore also loose the defined contents.

The ‘Execution’ tab also contains delay definitions for other commands than barcodes. Some commands may be time consuming, and it should not be possible to send new commands while the terminal is working with a command. There are five categories of execution times, which can be used from the SAC file editor. The delays have to be defined in ascending order.

The optimum execution delays will generally be determined on a “trial and error” basis. A 4683 terminal is obviously slower than a 4694 terminal and requires more time to process the stem codes.

The terminal has a limited input buffer size and it seems that it is periodically read by a relatively low priority process and can easily overflow on a 4683 terminal. An example of this, is when the printer is working during which time it seems the comm input buffer is not read.

Testing to date on a 4683 terminal has shown that a good value for the barcode inter-digit delay to be 140 milliseconds and 2 seconds for the barcode transaction time. If long sequences of digits (> 6) are associated with menu keys then once again for slower terminals a delay of 140 milliseconds should be inserted between the digits.

14.3.2.1 Hardcoding Execution Times in the SAC File

The delays can be inserted in the SAC file from the SAC file editor as if they were Stem codes. In the SAC file editor they are defined as Execution time categories, category 1 to 5, and converted to actual delays through this table.

Example:
If a key has been assigned to send the keystroke for “Total” calculation, succeeded by a tender key, an Execution time category 4 (Long) key may be inserted between them to make the keyboard wait a certain time, which in this case will be 5 seconds, before the tender key can be sent.

The decision is taken at the time the SAC file is created. If you enter codes in the scan codes box and later decide to user the buffer overflow workaround than you will have to manually delete the codes from the scan codes box and enter them in the Item Number box.

what are my options? – manually enter execution delays in the scan codes or enter as item numbers and use the bar code channel.

What does “Send first Digit”, “Send Check Digit” mean? – used when code is entered in item number but no bar code channel is available so we fall back to keyboard channel by converting digits in the item number to stem codes and then deciding, based on store policy, whether to include the first digit of the item number – which is the ??? – or the check digit – which we calculate????

14.4 Terminal Configuration

14.4.1 TSA User Exit Integration

The Bar Code channel is emulating an existing IBM device so there is no need for special code to be integrated into the TSA.

14.4.2 SA Application Personalisation

There may be a need to update the tables that define the barcode handling..

15 Printer Monitoring Configuration

Hardcoded	
EEPROM	
Options	4
SAC	
Terminal Device Group	
Application Personalisation	4

15.1 Functionality

The SK-7510 can 'listen' to data sent to printers attached via the device channel. The SK-7510 currently supports IBM Model 3, Model 4 and IBM 4610 Thermal printers operating in native modes. It does not support the Model 2 Printer

With the Model 3 and 4 printers, the SK-7510 may be configured to 'listen' to either the 'Cash Receipt' station or the 'Summary Journal' station. The 4610 has a 'Cash Receipt' station only.

The Model 3 and 4 printer supports up to 40 downloadable characters which are stored in the printer. The SK-7510 does not have this level of non-volatile memory to store such information 'semi-permanently'. To overcome this problem, user modified characters should be defined as a new TDA character set and downloaded to the SK-7510 via the Options file. The same principle applies to 4610 printer support.

The SK-7510 ignores logo commands when listening to the cash receipt station. Logo commands are not sent to the journal station.

The printer works as before but with the added feature that either the Journal or Receipt station contents are also echoed on the TDA area of the LCD panel. The 3 buttons below the LCD Panel are used to Scroll up (Previous), GoTo end (last), Scroll Down (next).

The middle button is also used to trigger the User Menu if it is enabled.

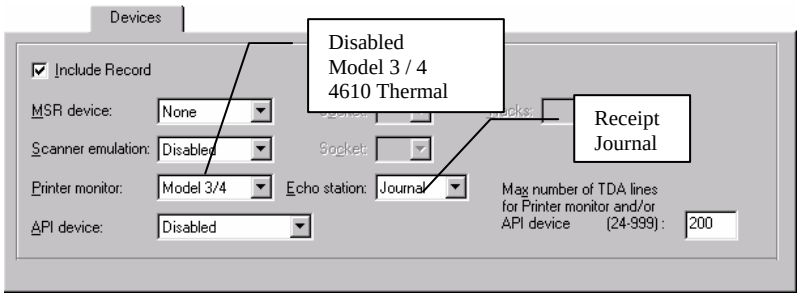
Printer output is displayed on the Transaction Display Area (TDA) of the SK-7510's LCD Panel against a bright background.

15.2 Device Configuration

For the Printer Monitoring to be operational a printer must already be configured (via the TDG configuration), present and operational. All we need to configure is the SK-7510 end (via the Options file) to listen in to the traffic that is already there.

15.2.1 Options File

The Options file must specify which printer and which print station the SK-7510 will listen to, i.e. 4610 or Model 3/4 and summary journal or cash receipt station.



Two printers are supported in native mode, Model 3/4 and 4610 Thermal. Model 3 / 4 printer have a device address of 0x34 and 4620 printers have a device address of 0x35. If Model 3 / 4 is selected, the station to echo must also be specified, this can be either the Summary Journal or the Cash Receipt station. With the 4610 Thermal printer, only the Cash Receipt station is available.

The maximum number of lines on the TDA also has to be defined. This may be between 24 (which is two full pages) and 999.

15.3 Terminal Configuration

15.3.1 Terminal Device Group Configuration

For Print Monitoring to work there must already be a printer configured.

15.3.2 SA Application Personalisation

It may be necessary to make changes in order to display item sales on the Summary Journal Station.

APPENDIX A Documentation Control

A.1 Change Control

This document is the responsibility of the author and is subject to formal change control after the initial approved release (i.e. issue 1.0).

A.2 Abbreviations Used/Terms of Reference

API	Application Programming Interface
IPL	Initiate Program Load (IBM 46xx)
KAT	Keyboard Attribute Table
LCD	Liquid Crystal Display
Menu	A Menu is a collection of ScreenKey records that are treated as a single unit.
MSR	Magnetic Stripe Reader
ODA	Operator Display Area
TDA	Transaction Display Area
TSA	Terminal Sales Application – either the Supermarket Application, General Sales Application or Chain Sales Application.
SKK	ScreenKey Keyboard – the abbreviation used in this document to refer to the model SK-7510 ScreenKey Keyboard.

A.3 Historical Change Reference

Issue	Date	Author	Changes Made
1.0	29th April 1999	UC, BL	Initial Release
1.1	14th May 1999	UC, BL	Corrections and updated MakeDnl information
1.2	27th, July 1999	TMM, MMcD	Added safety notice
1.3	24th September 1999	BL, MMcD	4610 Support and barcode handling
1.4	1st December, 1999	MMcD	CDA\User Menu support
1.5	23rd November, 2000	MMcD	S&C Menus
1.6	7th February, 2002	UC	Removed S&C Menus and general rework
1.7	15 March 2006	JBB	Removed references to discontinued SK-3510

A.4 Change Summary

1.1	Reorganised sections Added user information for MakeDnl information Corrected technical information and spelling errors
1.2	Added safety notice (EMC, FCC, IC)
1.3	Include 4610 native mode monitoring Additional options for Barcode-Stemcode conversion
1.4	Include details on User Menu and pop-up CDA
1.5	Add Select & Confirm menu information with BACK key support Fix error in API Operator Display address
1.6	Removed S&C Menus and general rework
1.7	Removed references to discontinued SK-3510

APPENDIX B SK-7510 Hardware Models

There are 3 released versions (Model 1, Model 2 and Model 3) of the SK-7510 Hardware. The Model of SK-7510 Keyboard hardware can be identified by the serial number printed on the identification label. For units running firmware release 1.10.00.00 (Resident Code or Code Update) and later the hardware model number can also be found in the hardware section of the Diagnostics Information page.

Model 1	Model 2	Model 3
General Description		
12Mhz CPU	24Mhz CPU	24Mhz. Uses FPGA technology
Serial Number Format		
"sssssssssssV1.02-nn"	"sssssssssssV2.0-nn"	"sssssssssssV3.0-nn"
Cable		
some long cable, some short cable attached to the keyboard with separate cable to connect to the terminal	short cable attached to the keyboard with separate cable to connect to the terminal	short cable attached to the keyboard with separate cable to connect to the terminal
Socket		
Any 4 or any 9 socket	Any 4 or any 9 socket	Any 4 or any 9 socket
LCD Panel		
Manual contrast adjustment No brightness control No backlight on/off control	Digital contrast and brightness control and Back-light on/off capability – via diagnostics, API command and User Menu	Digital contrast and brightness control and Back-light on/off capability – via diagnostics, API commands and User Menu
Fixed Keys		
Tipro	Clover	Clover
MSRs Supported		
Track 1 & 2	Track 1 & 2	Track 1, 2 & 3
Resident Code file*		
1.02.00.00	1.04.00.01	1.12.00.00
Device Emulation		
• 50Key • MSR • Serial Port device • 2x20 Operator Display • VFD II Display • POS Printer (Listening) • Hand Held Scanner • Bench Scanner	• 50Key • MSR • Serial Port device • 2x20 Operator Display • VFD II Display • POS Printer (Listening) • Hand Held Scanner • Bench Scanner	• 50Key • MSR • Serial Port device • 2x20 Operator Display • VFD II Display • POS Printer (Listening) • Hand Held Scanner • Bench Scanner • N50Key**
Note: Device Emulation depends on the version of code that is running. The above tables show which devices are emulated by the Resident Code File.		
Resident Options file		
standard	standard	standard
Resident SAC file		
Calc & Tele Keypads	Calc & Tele Keypads	Calc & Tele Keypads
Factory default EEPROM		
10, 64,22, Debug OFF	10, 64,22, Debug OFF	10, 64,22, Debug OFF

* This is the minimum Resident Code revision that will be in this Model. Models may have later revisions of Resident Code depending on when they were manufactured.
** only supported by Models that have Resident Code 1.12 or later – Code Updates do not count.

When changes are saved, the LCD adjustment values are stored in the EEPROM. However, terminal communications are disabled whilst EEPROM data is written on model 1.02 and 2.0 keyboards. To overcome potential problems in this area, the EEPROM write operation is queued until communications are ‘quiet’. The EEPROM write duration is approximately equivalent to two terminal device channel scans. IBM 46xx hardware can accommodate this inactivity period without notifying errors.

If Printer Monitoring is in use, printer commands issued during this period will be missed.