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1 Introduction

1.1 Executive Summary

The DBE-1490 is Franklin's replacement for the DBE-1470U -- a handheld device containing an updated version of the Merriam-Webster Spanish-English Dictionary. Other new content includes: Merriam-Webster Pocket English Dictionary, 4,000 example sentences extracted from the current DBE-1470U Spanish/English database, 2,000 conventional phrases and the Grammar Guide and Quizzes from the BSI-1900. Additional features include: Verb Conjugations, Phonetic Spell Correction, FEP Crossword Solver, SAT Spanish Subject Test Word List and TOEFL Word List.

The device is housed in the same case as the DBE-1470U with new cosmetics, including a larger, curved-design keyboard, <UP> and <DOWN> keys located on the front of the device (as opposed to the side of the device), and an updated color scheme.

The DBE-1490 retains the BOOKMAN® III card slot on the back of the unit and features a serial port connection (kit sold separately) that can be connected to an USB port for downloads to a BOOKMAN flash card. Two AAA batteries power the DBE-1490. Batteries and custom carrying case are included with the device.

The DBE-1490 is based on the BOOKMAN III Bilingual Dictionary specification, which applies to an enhanced version of the DEVLIB system that incorporates a monolingual dictionary 'theme' override template. The enhanced DEVLIB system is a UNIX-based book development system that integrates compression, decompression, and user interface code to control project builds. Please refer to this specification for baseline and optional monolingual dictionary features and functions that can be implemented by using the DEVLIB system BOOKMAN III platform.

There are five general categories in the DBE devices: **Books, Learning, Exercises, Games, and Setup**. Based on the type of product content configuration, the number of and types of items defined in each category can vary. When a category is selected, the first menu item is always highlighted (or selected). The <UP> and <DOWN> arrows navigate the menu items within a category. The highlight moves to the *previous* or *next* menu item, respectively. The currently highlighted item can be selected by pressing the <ENTER> key. The <RIGHT> and <LEFT> arrow keys navigate through the *next* or *previous* category menu, respectively. In addition, an individual category menu can be directly accessed by its corresponding softkey. For more information see **Individual Category Menu items**.

All BOOKMAN III Bilingual dictionaries contain two main menus:

▶ **The Tools menu:** In the **Menu** state, the **Tools** menu is accessible from the **Main** icon menu by highlighting the **Tools** icon and pressing the <ENTER> key. The **Tools** menu allows users to access the **Settings** menu and view the **Tutorial** or the **Demo**.

▶ **The Settings menu:** In the **Menu** state, the **Settings** menu is accessible from the **Tools** menu by highlighting the option and pressing the <ENTER> key. The Settings menu allows users to set options related to the unit functions and the appearance of typeface, screen contrast, etc.

The following states are standard in all FEP's bilingual dictionaries:

- ▶ **Start Up state:** The initialization state that enables users to select the message and input language. This is the initial state that a bilingual dictionary enters when it is turned on for the first time, after batteries are charged, after the batteries are changed, after the unit is reset using the <**CLEAR**> + <**ON/OFF**> key combination, or when the input language is not set.
- ▶ **Menu state:** the basis for menus (icon-based and non-icon) and any submenus
- ▶ **List state:** the basis for all lists
- ▶ **Text state:** the state for displaying text on the screen
- ▶ **Dictionary WFS state:** the state, which enables users to create a word search query
- ▶ **Game state:** the states for playing games
- ▶ **Organizer state:** the state, which contains a clock (as an optional feature only), Databank, calculator, and various converters for weight, length, temperature, and currency
- ▶ **Card state:** the state for selecting a card or application

1.2 Product Overview

The primary target audience for the DBE-1490 is native English speakers who are at an intermediate level of Spanish learning. The device includes the following key features:

Key Features:

- ▶ 8-line display plus extra line for soft keys
- ▶ Merriam Webster Spanish/English Dictionary (latest edition)
- ▶ Merriam Webster Pocket English Dictionary (latest edition with 40,000 entries)
- ▶ 4,000 example sentences (proper word usage) extracted from the current DBE-1470U Spanish/English database. See **Example Sentence Menus**.
- ▶ 2,000 conventional phrases from the DBE-1470U
- ▶ 4 Interactive Grammar Guides and Quizzes from the BSI-9000
- ▶ Learning Exercises (Spelling Bee and Flashcards using SAT Spanish Test Words or My Vocabulary List words)
- ▶ Games from the DBE-1470U (including Hangman, Conjunmania, Gender Tutor, Word Train, and Guess the Word)
- ▶ SAT Spanish Subject Test Word List
- ▶ Organizer (calculator, world clock, and currency converter)
- ▶ TOEFL® Test Word List
- ▶ BOOKMAN III card slot
- ▶ Desktop Manager to sync BOOKMAN content (sold separately)

1.2.1 Independent Content

BOOKMAN III card slot (supporting BOOKMAN I, II, and III cards). Device is compatible with BCD-4 Version 1.3 Desktop and above.

1.2.2 System Requirements for Connectivity

The minimum system requirements for the DBE-1490 Desktop CD are:

- ▶ Windows 2000 (Service Pack 4 or higher), Windows XP
- ▶ An USB port for Web content access and downloads
- ▶ 25MB free hard disk space
- ▶ USB 1.1 interface (or higher) or serial port
- ▶ Monitor supporting greater than 256 colors

1.2.3 Performance/Specifications

1.3 Hardware Description

Hardware requirements key to the design and functionality of the DBE-1490 are described in this section.

Table 1: Hardware Features

Component	Specification
Keyboard	<ul style="list-style-type: none">• 48 total keys including <ON>/<OFF> and 4-way directional navigational keys• Support for two keys simultaneously pressed (e.g., <FN> + letter)• Reset switch access from bottom of unit
Display	<ul style="list-style-type: none">• LCD type: 159+1+64+8, STN• Resolution:
Batteries	<ul style="list-style-type: none">• AAA batteries• Batteries are user accessible• Battery door switch
CPU	<ul style="list-style-type: none">• SNK-5
Memory	<ul style="list-style-type: none">• 32K RAM, 2 or 4 MB NOR Flash ROM on BOOKMAN I, II, III card (sold separately)
External Memory	<ul style="list-style-type: none">• BOOKMAN III
Connectivity	<ul style="list-style-type: none">• Serial Port
Housing	<ul style="list-style-type: none">• Dimensions: 3.4" x 4.4" x 0.87"
Reset	<ul style="list-style-type: none">• Reset switch access on the bottom of the DBE-1490. Reset + Clear restores factory defaults without any menu or specific user interface.
Materials	<ul style="list-style-type: none">• All components and materials used in the DBE-1490 shall meet RoHs requirements for hazardous materials

1.3.1 Electrical

The DBE-1490 electrical hardware is based around the ASIC. A block diagram overview of the DBE-1490 hardware is shown in the figure below.

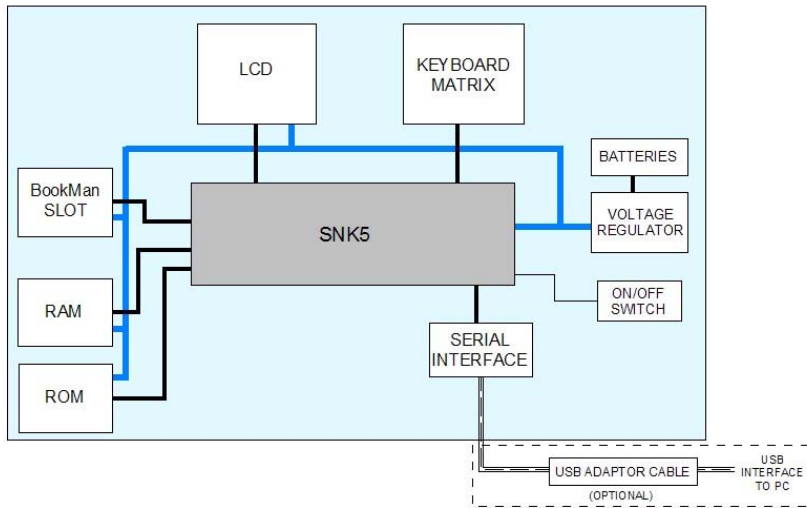


Figure 1: DBE-1490 Hardware Block Diagram

1.3.1.1 Power

- ▶ Two AAA batteries power the DBE-1490.
- ▶ Operating voltages required by the ASIC, LCD, and other peripheral devices are generated within the DBE-1490.

1.3.1.2 Interfaces

The DBE-1490 provides the following user and peripheral interfaces:

- ▶ Keyboard (48)
- ▶ LCD
- ▶ On/Off switch
- ▶ Reset Switch
- ▶ Serial Port
- ▶ BOOKMAN III Card Slot

1.3.1.3 Memory

- ▶ SNK-5
- ▶ ASIC
- ▶ Internal SRAM
- ▶ NOR Flash or ROM
- ▶ BOOKMAN Card

1.3.1.4 Mechanical

The DBE-1490 employs a 'portrait' style design. Batteries are accessible through a door on the bottom of the unit. BOOKMAN cards are accessible through an open slot on the bottom of the unit.

1.3.1.5 Unit Cosmetics and Markings

FEP shall provide all cosmetic files. These drawings will identify:

- ▶ All plastic colors
- ▶ Key colors
- ▶ Key top label text and colors
- ▶ Unit silkscreen text label positions and colors
- ▶ Logo and insignia test positions and colors

A spec plate label containing the model number, license information, patent and trademark information, and regulatory agency approval logos shall be located on the bottom of the unit. FEP will provide actual spec plate label artwork.

1.3.1.6 Platform Perspectives



Figure 2: DBE-1490 Front, Front View



Figure 3: DBE-1490 Front, Back, and Side Views

1.4 Software Descriptions

Key software features include the following:

- ▶ Merriam-Webster Spanish/English Dictionary (copyright 2003)
- ▶ Merriam-Webster Pocket English Dictionary (latest edition, 40,000 entries)
- ▶ Franklin Translator Database: Spanish/English 4,000 example sentences extracted from the current DBE-1470U. See **Example Sentence Menus**.
- ▶ Verb Conjugations
- ▶ Phonetic Spell Correction
- ▶ 2,000 conventional phrases from DBE-1470U
- ▶ 4 Grammar Guides and Quizzes
- ▶ Crossword Solver
- ▶ My Vocabulary List with storage for 40 words
- ▶ Learning Exercises including: My Word List, English Grammar Lessons, Spanish Grammar Lessons, Spelling Bee, Flashcards, and SAT Word List
- ▶ Games including: Hangman, Conjunmania, Gender Tutor, Word Train, and Guess That Word.
- ▶ Organizer including: Calculator, Local/World Clock, and Currency/Metric Converter

1.5 Content Descriptions and Updates

Users can add customized content via PC download of memory card. Data content to be supported by the DBE-1490 is defined below. Many forms of content are updated on a regular basis.

Table 2: Data Content Overview

Data Item	Version/Model #, Copyright Year, Database #
Merriam Webster Spanish/English Dictionary	
Merriam Webster Pocket English Dictionary	
Grammar Guides with Quizzes	

SAT Word List	
TOEFL Word List	
Spelling Bee and Flashcard Games	
Example Sentences from DBE-1470U Spanish/English database	
Verb Conjugations	
Phonetic Spell Correction	
Learning Exercises	
Conversational Phrases	
Games	
Crossword Solver	

1.6 User Interface

1.6.1 Main Icon Menu Group

The **Main Icon** menu is a group of icons, which enable the user to select a function of the device. The main icon menu includes the **Dictionaries** (one for each language), **Learning Exercises**, **Games**, **Conjugations** (one for each language), **Phrases** (one for each language), **My Vocabulary List**, and **Tools** icons.

1.6.2 The Tools Menu

The **Tools** menu allows the user to access the Settings menu and view the Tutorial or Demo.

1.6.3 The Settings Menu

The **Settings** menu allows the user to set options related to the device's functions as well as the appearance of the typeface, screen contrast, etc.

1.6.4 Individual Category Menu items

The following is a list of the Individual **Category Menu Items**. This list is subject to change.

- ▶ **Books:** English/Spanish Dictionary, Spanish/English Dictionary, English Conjugations, Spanish Conjugations, English Phrases, Spanish Phrases, and the Pocket Merriam-Webster Dictionary.
- ▶ **Learning:** My Vocabulary List, English Grammar Guide, Spanish Grammar Guide, SAT Word List, English Sentences, and Spanish Sentences.
- ▶ **Exercises:** English My Spelling Bee, Spanish My Spelling Bee, SAT Words Spelling Bee, English My Flash Cards, Spanish My Flash Cards, and SAT Words Flash Cards.
- ▶ **Games:** Hangman, Conjumania, Gender Tutor, Word Train, Guess the Word, Word Auction, Word Blaster, and Game Setting.
- ▶ **Setup:** Settings, Tutorial, and View Demo.

1.6.5 Example Sentence Menus

The **Example Sentence Menus** are accessed through the **Learning Category Menu**. Within the main menu are two submenus: **English Example Sentences** and **Spanish Example Sentences**. There are three levels of hierarchy with each **Sample Sentence Menu** item:

▶ **The Keyword Menu:** Contains all the **Searchable Words** (keywords) for the **Example Sentences**. The Keyword Menu is alpha-searchable. The first menu item is always highlighted when the menu is accessed. Pressing the <ENTER> key on a keyword displays the **Example Sentences** corresponding to the *selected* keyword. Pressing the <BACK> button from the **Keyword Menu** returns the user to the **Learning Category Menu** (with the corresponding **Learning Category Menu** item highlighted.)

▶ **The Example Sentence Menu:** Contains all the **Example Sentences** corresponding to the selected keyword. The **Example Sentence Menu** is alpha-searchable. The first menu item is always highlighted when the menu is accessed. Pressing the <ENTER> key on an **Example Sentence** displays the translation corresponding to the selected example. Pressing the <BACK> key from the **Example Sentence Menu** returns the user to the **Keyword Menu** (with the corresponding **Keyword Menu** item highlighted).

▶ **The Translation Menu:** Displays the translation corresponding to the selected **Example Sentence**. **Note:** There is only one translation for an **Example Sentence**. Pressing the <ENTER> key on a translation displays the dictionary entry containing the selected translation (corresponding to the *initial* keyword). Pressing the <BACK> button from the **Translation Menu** returns the user to the **Example Sentence Menu** (with the corresponding **Example sentence Menu** item highlighted).

▶ **Dictionary Word Entry:** This is the normal dictionary entry view state. The dictionary entry displayed contains the selected translation and corresponds *exactly* to the initially selected keyword. Pressing the <BACK> key from the **Dictionary Word Entry Menu** returns the user to the **Translation Menu** (with the corresponding **Translation Menu** item highlighted).

1.6.6 Alpha Search

Alpha Search enables the user to locate a menu item by typing the first few letters of the item name. This feature is available for the TOEFL Test Word List menu, Travelers' Phrases, and Cultural Notes submenus.

1.6.7 Help View

Help View displays information that describes the functions available in the current state and suggests how to accomplish certain tasks.

1.6.8 The Databank

The Databank stores a collection of contact data such as names, telephone numbers, and address (e-mail included). The storage capacity is 100 entries with a limit of 50 characters per field.

1.6.9 DBE-1490 Special Features

- ▶ Function keys with soft key labels
- ▶ <CARD> key should present title(s) currently burned on Flash

- ▶ Learn-a-Word feature via **Tools** menu (provides a new word and definition each time the unit is turned on with opening graphic.
- ▶ Learning Exercises (via <LEARN> key or icon)
- ▶ Spelling Bee and Flashcards games using SAT words or **My Vocabulary List** words.
- ▶ Main Menu consists of 6 icons
- ▶ Thesaurus **Word Entry** screen (via <THES> key)
- ▶ Word Builder should allow the user to use “?”
- ▶ No BOOKMAN II-style keys soft keys for second application (via <FN> key when in card application)
- ▶ Numbers and letters should be allowed in **Databank Address** field.
- ▶ Support for @, underscore, comma, slash
- ▶ Wrap all 3 fields. 50 characters per field maximum

1.6.10 User Adjustable Settings:

- ▶ **Shutoff Time:** 1, 2, 3, or 5 minute (default 2)
- ▶ **Adjustable fonts:** small, medium, and large (default large)
- ▶ **Contrast Adjust:** bar
- ▶ **Graphics:** On (default), Off
- ▶ **Learn-a-Word:** On, Off (default)

2 Test/Qualification

2.1 Factory Tests/BIT

The keyboard test displays a keyboard layout that is a rough approximation of the physical keyboard, optimized for factory testing. As the tester presses each key, the corresponding key in the display is removed. The test continues until all keys are removed from the display, or the <CLEAR> key is pressed consecutively five times.

- <A> Audio
- : Battery
- <C> Backlight
- <D> Display
- <E> ASIC Regs
- <H> H/W
- <I> Information
- <K> Keyboard
- <L> Loopback
- <R> RAM/ROM

The **ROM/RAM test** tests volatile (RAM) and non-volatile (ROM) memory continuously until there's an error or the tester presses the <CLEAR> key. The display shows a count of the number of test cycles and what type of memory is currently being tested.

The **ASIC register test** is information/diagnostic only. It does not test anything. It displays the contents of some of the ASIC registers.

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The **LOOPBACK test** is used to test the serial interface. It requires a special 'loopback' device plugged into the serial/USB port.

The **DISPLAY test** displays various test patterns on the LCD. Each key press advances to the next test display. The test ends after all the test displays have been shown.

The **H/W test** is used to test ASIC signals available through the external card slot. It requires a special 'diag card' plugged into the card slot.

The **BATTERY test** continuously displays the current state of the battery low signal and the external power signal until the tester presses the <**CLEAR**> key.

The **AUDIO test** is used to test the audio circuitry, speaker, and headphone jacks on platforms that support audio. If a platform does not support audio (like the 1490) the test reports 'no audio here'. On platforms that support audio, the audio phrase 'apple pie' is spoken.

The **BACKLIGHT test** is used to test the LCD backlight on platforms that have backlight capability. If a platform does not support a backlight (e.g., 1490) the test reports 'no backlight here'. On platforms that support a backlight, pressing a key turns the backlight on and off, and the display reports its current state.

2.2 QA Requirements

2.2.1 Hardware/Software Integration Tests

These tests, based on set check off lists, must be performed prior to release to production.

2.2.2 SQA Test Plan Outline/Test Case Documents

The **Test Plan** is required for testing. The **Test Plan Outline** should cover all necessary resources (hardware/software) as well as a plan and schedule for testing.

2.3 QC Requirements

The DBE-1490 shall meet the requirements of FEP Quality Criteria Document FEP-xxxx-00 (will be provided by FEPO). This document specifies the physical, environmental, survivability, safety, and regulatory requirements for the products.

2.4 Regulatory Requirements

FCC: Class B

CE: CE EN55022, EN61000 (-3-2, -3-3), EN55024