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S1D13A05 LCD/USB Companion Chip

13A05PLAY Diagnostic Utility

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13A05PLAY

13A05PLAY is a diagnostic utility which allows read/write access to all the registers and display buffer of the S1D13A05. Commands are received from the standard input device, and messages are sent to the standard output device. On Intel platforms the console provides standard input/output. For most embedded systems the serial device provides these functions.

Commands may be entered interactively by a user, or be executed from a script file. Scripting is a powerful feature which allows command sequences to be used repeatedly without re-entry.

Note

This program is a utility program for testing and evaluating Epson LCD controllers. It is not a display driver for any operating system but a utility program intended to aid in testing and evaluating Epson LCD controller hardware.

This user manual is updated as appropriate. Please check the Epson Research and Development website at www.erd.epson.com for the latest revision of this document before beginning any development.

We appreciate your comments on our documentation. Please contact us via email at documentation@erd.epson.com.

S1D13A05 Supported Evaluation Platforms

13A05PLAY is available as an executable for PCs running Windows® 9x/ME/NT/2000/XP and as C source code which can be modified and recompiled to allow 13A05PLAY to run on other platforms.

Note

In order to run 13A05PLAY on PCs running Windows, the device driver **13xxx.vxd** must be installed. For further information on this device driver, see the *S1D13XXX 32-Bit Windows Device Drivers Installation Guide*, document number X00A-E-003-xx.

The latest version of both the executable and source code is available on the Epson Research and Development website at www.erd.epson.com.

Installation

PC platform

Copy the file **13A05play.exe** to any directory (e.g. c:\s1d13a05).

Embedded platform

Download the program **13A05play** to the system.

Usage

PC platform

At the prompt, type:

```
13A05play [/?]
```

Where:

/? displays copyright and program version information.

Embedded platform

Execute **`13A05play`** and enter commands at the prompt. The "/?" command provides copyright and program version information.

Commands

The following commands are intended for use at 13A05PLAY command prompt. However, simple commands can also be executed from the command line (e.g. **13A05play f 0 14000 AB q**).

CLKI freq
Sets the frequency of CLKI.

Where:

freq	The desired frequency for CLKI (in MHz).

CLKI2 freq
Sets the frequency of CLKI2.

Where:

freq	The desired frequency for CLKI2 (in MHz).

D[8|16|32] [startaddr [endaddr|len]]
Displays a memory dump from the specified display buffer address range.

Where:

8|16|32	The unit size: 8-bit (bytes), 16-bit (words), 32-bit (dwords). If a unit size is not specified, this command uses the unit size from the last Dump command performed. If no previous Dump command has been issued, the unit size defaults to 8-bit.
startaddr	The starting address to read data from. Specifying a period (.) uses the same starting address as the last Dump command performed. Specifying a startaddr of two periods (..) will back the start address by the size of *len*.
endaddr|len	Determines how many units to continue dumping the contents of the display buffer. A number without a prefix represents a physical ending address. If an “L” prefix is used, the number that follows represents *len*, which is the number of bytes/words/dwords to be dumped. *Len* is based on the unit size. For example, 'L8' when the unit size is 16-bit would cause the Dump command to dump 8 words from the starting address.

F[8|16|32] startaddr endaddr|len data1 [data2 data3 ...]
Fills a specified address range in the display buffer with the given data.

Where:

8|16|32	The unit size: 8-bit (bytes), 16-bit (words), 32-bit (dwords). If a unit size is not specified, this command uses the unit size from the last Fill command performed. If no previous Fill command has been issued, the unit size defaults to 8-bit.
startaddr	The starting address to begin filling at. Specifying a period (.) uses the same starting address as the last Fill command performed.
endaddr|len	Determines how many units to fill the display buffer with. A number without a prefix represents a physical ending address. If a “L” prefix is used, the number that follows represents *len*, or the number of bytes/words/dwords to be filled. *Len* is based on the unit size. For example, 'L8' when the unit size is 16-bit would cause the Fill command to fill 8 words from the starting address.
data1 data2 ...	The value(s) used to fill the display buffer. If multiple values are given, the pattern repeats through memory. Values can be combinations of 'text' or numbers. Numbers are assumed to be hexadecimal values unless otherwise specified with the correct suffix (binary = i, octal = o, decimal = t, hexadecimal = h). For example, 101i = 101 binary. To specify text values, enclose text data inside quotes.

H [lines]
Sets the number of lines of data that are displayed at a time. The display is halted after the specified number of lines. Setting the number of lines to 0 disables the halt function and allows the data to continue displaying until all data has been shown.

This command is useful when large blocks of the display buffer or the contents of the LUT are being viewed.

Where:

lines	Number of lines that are shown before halting the displayed data (decimal value).

I
Initializes the S1D13A05 registers with the default register settings as configured by the utility 13A05CFG. To initialize the S1D13A05 with different register values, reconfigure 13A05PLAY using 13A05CFG. For further information on 13A05CFG, see the *13A05CFG User Manual*, document number X40A-B-001-xx.

Note
13A05PLAY must be configured using 13A05CFG before using the “I” command. If the “I” command is used before 13A05PLAY is configured, an error message is displayed and no further action is taken.

L index [red green blue]
Reads/writes the red, green, and blue Look-Up Table (LUT) components. If the red, green, and blue components are not specified, the LUT for the given index is read and the RGB values are displayed.

Where:

index	Index into the LUT (hex).
red	Red component of the LUT (hex).
green	Green component of the LUT (hex).
blue	Blue component of the LUT (hex).

Note
Only bits 7-2 of each color are used in the LUT. The least significant two bits of the colors are discarded. For example, the command **L 0 1 2 3** will set each RGB component of LUT index 0 to 0, as the values 1, 2, an 3 use only the least significant bits.

LA
Reads and displays all LUT values.

M [bpp]
Sets the color depth (bpp). If no color depth is provided, information about the current settings are displayed.

Where:

bpp	Color depth to be set (1/2/4/8/16 bpp).

Note
This command reads and interprets the S1D13A05 control registers. To function correctly the registers must have been initialized using the ‘I’ command.

N
This option sets the display format for register reads/writes. When the “N” option is selected, register reads/writes are displayed in a simple value format. The “V” option selects a more graphical representation of the register structure and values. The “N” option is the default setting.

Q
Quits the program.

R[8|16|32] [addr1 addr2 addr3 ...]
Reads the display buffer at the address locations given.

Where:

8|16|32	The unit size: 8-bit (bytes), 16-bit (words), 32-bit (dwords). If a unit size is not specified, this command uses the unit size from the last Read command performed. If no previous Read command has been issued, the unit size defaults to 8-bit.
addr	The address to read data from. Multiple addresses can be given.

Run scriptfile
This command opens the file scriptfile and executes each line as if it were typed from the command prompt. For more information on script files, see **Section , *"Script Files"* on page 12**.

Where:

scriptfile	A file containing 13A05PLAY commands

S[8|16|32] startaddr endaddr|len data1 [data2 data3 data4 ...]
Search the display buffer for the given data.

Where:

8|16|32	The unit size: 8-bit (bytes), 16-bit (words), 32-bit (dwords). If a unit size is not specified, this command uses the unit size from the last Search command performed. If no previous Search command has been issued, the unit size defaults to 8-bit.
startaddr	The starting address to begin the search from. Specifying a period (.) uses the same starting address as the last Search command performed.
endaddr|len	Determines how many units of the display buffer will be searched through. A number without a prefix represents a physical ending address. If a "L" prefix is used, the number that follows represents *len*, or the number of bytes/words/dwords to be searched through. *Len* is based on the unit size. For example, 'L8' when the unit size is 16-bit would cause the Search command to search 8 words from the starting address.
data	The value(s) to search the display buffer for. Values can be combinations of 'text' or numbers. Numbers are assumed to be hexadecimal values unless otherwise specified with the correct suffix (binary = i, octal = o, decimal = t, hexadecimal = h). For example, 101i = 101 binary. To specify text data, enclose the search string inside quotes.

Show
Shows a test pattern on the display. The test pattern is based on current register settings and may not display correctly if the registers are not configured properly.

Use this command to display an image during testing. After adjusting a register value, use the show command to view the effect on the display.

U index [data]
Reads/writes data to the USB register at index. If no data is specified, the command reads and displays the contents from the USB register at index.

Where:

index	Index into the USB registers (hex).
data	The value to be written to the register. Numbers are assumed to be hexadecimal values unless otherwise specified with the correct suffix (binary = i, octal = o, decimal = t, hexadecimal = h). For example, 101i = 101 binary.

UA
Reads and displays the contents of all the USB registers.

UX index [data]
This command automates the writes/reads into the indexed USB registers located at REG[4038h] and REG[403Ah]. Index represents the value that would be written into REG[4038h] if separate operations were done to access the index and data registers. If no data is specified, the command reads and displays the contents of the specified extended USB register.

Where:

index	Index into USB registers at REG[403Ah] (hex).
data	The value to be written to the indexed data register. Numbers are assumed to be hexadecimal values unless otherwise specified with the correct suffix (binary = i, octal = o, decimal = t, hexadecimal = h). For example, 101i = 101 binary.

V
This option sets the display format for register reads/writes. When the “V” option is selected, register reads/writes are displayed using a graphical representation of the register structure and values. The “N” option selects a simple value format.

W[8|16|32] [startaddr [data1 data2 data3 data4 ...]]
Writes the given data sequence to the display buffer starting at startaddr location.

Where:

8|16|32	The unit size: 8-bit (bytes), 16-bit (words), 32-bit (dwords). If a unit size is not specified, this command uses the unit size from the last Write command performed. If no previous Write command has been issued, the unit size defaults to 8-bit.
startaddr	The starting address to write data to. Specifying a period (.) uses the same starting address as the last Write command performed.
data	Values to write to the display buffer. If no data is given, then this function enters MODIFY mode. This mode prompts the user with the address and it's current data. While in this mode, the user can type any of the following. - new values (in hex) - ENTER or SPACE - moves to the next memory location (if data is specified the previous memory location is updated, if no data is specified no change is made) - "-" - moves to the previous memory location - "Q" or "." - exits MODIFY mode

X[8|16|32] [index [data]]
Reads/writes data to the register at index. If no data is specified, the register is read and the contents are displayed.

Where:

8|16|32	The unit size: 8-bit (bytes), 16-bit (words), 32-bit (dwords). If a unit size is not specified, this command uses the unit size from the last X command performed. If no previous X command has been issued, the unit size defaults to 8-bit.
index	Index into the registers (hex).
data	The value to be written to the register. Numbers are assumed to be hexadecimal values unless otherwise specified with the correct suffix (binary = i, octal = o, decimal = t, hexadecimal = h). For example, 101i = 101 binary.

XA
Reads and displays the contents of all the S1D13A05 registers.

?
Displays the help screen. The help screen contains a summary of all available commands.

13A05PLAY Example

1. Configure **13A05PLAY** using the utility **13A05CFG**. For further information on 13A05CFG, see the *13A05CFG User Manual*, document number X40A-B-001-xx.
2. Type **13A05PLAY** to start the program.
3. Type **?** for help.
4. Type **i** to initialize the registers.
5. Type **xa** to display the contents of the registers.
6. Type **x 80** to read register 80h.
7. Type **x 80 10** to write 10h to register 80h.
8. Type **f 0 ffff aa** to fill the first 10000h bytes of the display buffer with AAh.
9. Type **d 0 ff** to read the first 100h bytes of the display buffer.
10. Type **show** to display a test pattern.
11. Type **m** to display current mode information.
12. Type **m 2** to set the color depth to 2 bpp.
13. Type **show** to display a test pattern.
14. Type **q** to exit the program.

Script Files

13A05PLAY can be controlled by a script file. This is useful when:

- there is no display to monitor command keystroke accuracy.
- various registers must be quickly changed to view results.

A script file is an ASCII text file with one 13A05PLAY command per line. Script files can be executed from within 13A05PLAY using the Run command (e.g. = run dumpregs.scr). Alternately, the script file can be executed from the OS command prompt. On a PC platform, a typical script command line might be:

13A05PLAY run dumpregs.scr > results

This causes the file **dumpregs.scr** to be interpreted as commands by 13A05PLAY and the results to be redirected to the file **results**.

Example 1: Create a script file that reads all registers.

```
; This file initializes the S1D13A05 and reads the registers.
; Note: after a semicolon (;), all characters on a line are ignored.

; Initialize the S1D13A05
i

; Read all registers
xa
```