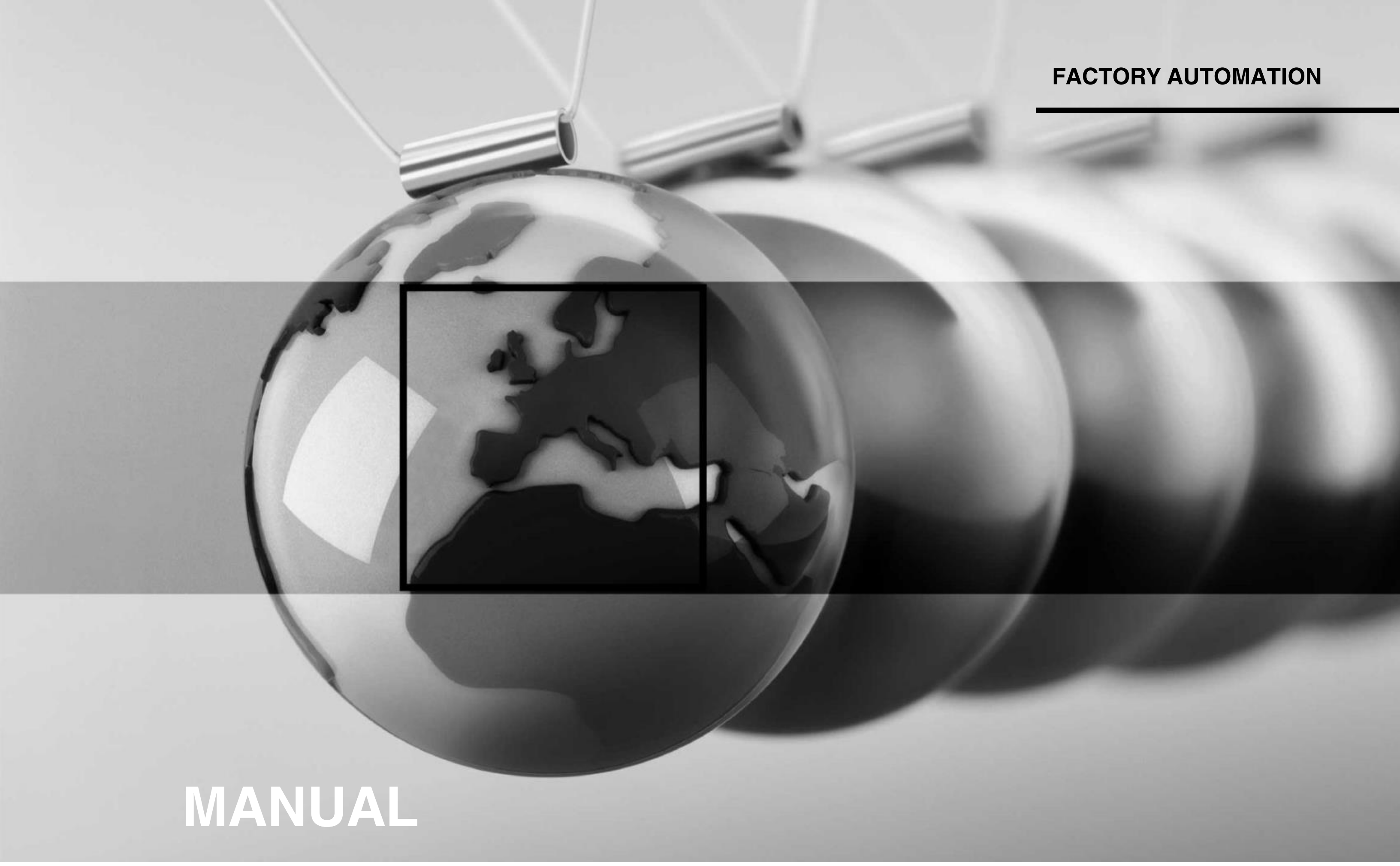
FACTORY AUTOMATION



JavaScript Programming Guide

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1 Introduction

This manual describes the application programming interface for OHV300 handhelds. It is assumed the user will have programming knowledge and familiarity with the JavaScript language.

- Handhelds read code and can be programmed to transmit code data over a selected communications link or to store data in reader memory (batch mode).
- The programming environment provides interfaces to:
  - Read and manipulate data in reader memory.
  - Display information on the OHV300 screen.
  - Retrieve data from reader hardware or OHV300 key pad.
  - Access data sent by host.
  - Transmit data to a host computer via communications link.
  - Select type of communications link.
  - Set, change, and retrieve reader configuration settings.

1.1 Document Organization

This document is organized as follows:

- Section 1, Introduction: gives a product description and describes how to use this document.
- Section 2, Programming Environment: identifies tools used to create and load application software into reader.
- Section 3, Programming Concepts: discusses how to accomplish various operations on the reader using the application programming interface.
- Section 4, Class Reference: presents classes, objects, methods, properties, and constructors that support application programs.
- Section 5 – 9: Appendix

1.2 Document and Coding Conventions

The JavaScript library uses the following naming conventions:

- identifiers: mixed-case with a capital letter where words join (soCalledCamelCase); acronyms and other initialisms are capitalized like words, e.g., nasaSpaceShuttle, httpServer
- variables and properties: initial lower case
- classes (i.e., constructors): initial capital
- functions: initial lower case
- unit of measure: suffix to name, separated from name by underscore, using correct case when it’s significant, e.g., offset_pixels, width_mm, power_MW, powerRatio_dB

1.3 Related Documents

- OHV manuals
- Interface Configuration Document

1.4 Related Utility

- Vision Configurator

Example!

Visit http://www.pepperl-fuchs.com to obtain this application.

2 Programming Environment

This document is not a JavaScript manual. The following sources are a few of the many JavaScript reference books and online documents:

- JavaScript: The Complete Reference, Second Edition
  by Thomas Powell, et al.
- JavaScript Demystified (Demystified)
  by James Keogh.
- JavaScript in 10 Simple Steps or Less
  by Arman Danesh.
- http://www.javascript.com/

2.1 Editor

You can use your favorite editing product to create and modify JavaScript code. Turn off any smart quote options in the editor. Smart quotes are not valid in JavaScript.

2.2 CodeViewer Application

The CodeViewer Application runs as a JavaScript application on the OHV300. The menu driven application has features for changing configuration settings and for defining the applications that run on the reader. JavaScript developers can make use of the following keywords in the CodeViewer Application:

Title – Displays the title of the JavaScript rather than the file name in CodeViewer's 'Application' menu. Add a comment to your script formatted as $Title: <title of script>$ to implement.

Revision – Displays the revision of the JavaScript from the CodeViewer's 'Application/<script>' submenu. Add a comment to your script formatted as $Revision: <revision of script>$ to implement.

2.3 Security

- Each handheld reader contains a unique reader ID.
- Select features of the reader are protected by license.
- A license file is required for each reader licensed to use protected features.
- Third party software licenses may also be protected using the encryption utility.

2.4 Debugging

The handheld reader contains a built-in error log that can be used when debugging scripts. To debug the script when an error has occurred, send the ‘(‘ command to the reader; the reader responds by sending the error log to the communications port. The error log may contain messages from the firmware that should be ignored. JavaScript errors in the log can be identified by the format: filename:lineNumber. If there are many error codes in the error log, send the ‘)’ command to clear the log and repeat the steps to create the error, leaving only one entry in the log.

Example:

```
X ap/gerror-log. storage_init: flMountVolume fail status 26,
formatting.storage_formatFilesystem: status 0.

temp.js:3: TypeError: gui.aler is not a function. X ap/dEOF.
```

This error log contains one firmware error and one JavaScript error. The JavaScript error description begins with temp.js:3: and tells us that on line three of the temp.js file, gui.aler is not recognized as a function. In this case, gui.alert has been misspelled (it is missing the t).

3 Programming Concepts

To help the developer create unique applications for the reader, we provide this JavaScript Programming Guide. The developer can create complex business applications with prompts and data entry through the OHV300 user interface features (keypad and display screen).

The features of the programming interface include:

- A graphical user interface
- Event handlers
- Symbol decoding
- Host communications
- Local data storage
- Handheld configuration

In support of these features, the environment defines the following objects:

- gui
- reader
- storage
- comm

Using these features, you can create robust, interactive, and sophisticated user applications.

A script can be made the default application using the configuration utility, or it may be run from the configuration utility without making it the default.

Note!
The default application allows scripts to be run by host command or configuration code scan; the command is “|run:scriptName.js” (using your own scriptName).

3.1 Simplicity

The “Hello World!” application is traditionally the first application presented in a programming guide. It is an easy to code and understand application that illustrates how the programming environment works.

In its simplest form, the “Hello World!” application in the OHV300 environment sends text to the display. With the following single line of code, you can display “Hello World!” in the screen defined by the standard OHV300 gui object (section 4.1).

```
gui.show(new gui.Text("Hello World!"));
```

Execution of this script displays the image shown in Figure 1.

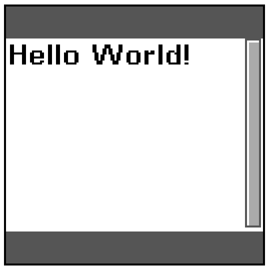

Hello World!

Figure 1 – Hello World Application

Note!

The text is displayed in a text box control with a scroll bar to the right as defined by the OHV300 gui object.

3.2 The OHV300 gui Object

The OHV300 application development environment defines a standard GUI display for application software (Figure 2). The display supports simple prompts and data entry.

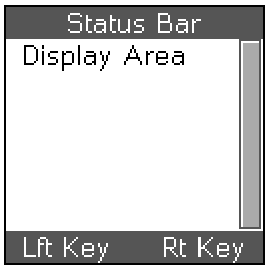


Figure 2 – The Standard GUI Display

The standard display consists of a status bar, a display area, and labels for the left and right software programmable keys (softkeys) at the top of the OHV300 key pad (see Figure 6).

The scroll bar on the right side of the screen indicates the relative position within the displayed object as the operator scrolls through forms, menus, or text using the up and down keys on the keypad. This scrolling feature allows the application to display objects larger than the display area.

Use the gui interface to develop forms and menus applications, and use the “show” methods to display them.

3.2.1 Softkey Implementation

Softkeys are general purpose, programmable keys. The softkeys are independent of the GUI display. The gui.showForm, gui.showMenu, and gui.showSubmenu methods include softkey definitions appropriate for the implementation.

The following example shows the basic approach to programming the softkeys and implementing their event handlers.

```
// define send-key functions used by common softkeys
function sendEnter()  { gui.sendKey(gui.key.enter); }
function sendEscape() { gui.sendKey(gui.key.escape); }
// create some common softkeys
var selectSoftkey = new gui.Softkey("Select", sendEnter);
var okSoftkey     = new gui.Softkey("OK",     sendEnter);
var backSoftkey   = new gui.Softkey("Back",   sendEscape);
var cancelSoftkey = new gui.Softkey("Cancel", sendEscape);
```

See section 0 (gui object) for more information.

3.2.2 Forms

Forms are the building blocks of your application. Each form represents a set of actions you want to present to the user on screen.

Use the gui.Form object (section 4.2.3.3) to define the forms for your application. Section 4.2.3 defines the form object and several constructors that you can use to create controls on your application form.

The following examples demonstrate how to create a form. The event handler functions need to be defined for your application.

```
// JavaScript Form Demo Script Document
// form event handlers
function myFormOnOk(){/* processing code (example: save the
Employee #) */}
function myFormOnCancel(){/* processing code (example: return to
main menu) */}
// create the form object
var myForm = new gui.Form(myFormOnOk, myFormOnCancel);
// create the edit control
var edit = new gui.Edit("");
// create the label control
var label = new gui.Label("Employee #:");
// position the controls on the form
```

```
myForm.append(label);
myForm.append(edit);
// Create the caption that will appear on the status bar
myForm.caption = "form demo";
// show the form
gui.showForm(myForm);
```

When the Form Demo Script runs, the OHV300 displays the following image:

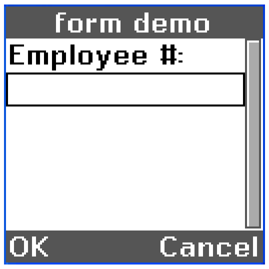


Figure 3 – Form Demo Display

The user enters an employee number into the edit control and presses the left button (OK) to submit the data.

3.2.3 Menus

Use the gui.Menu object (section 4.2.3.6) to define the menus for your application. Use the gui.MenuItem constructor to define the controls in the menu. Each control has an associated onClick property that defines the function of the OHV300.

The following example demonstrates how to build and display menus and submenus.

```
// JavaScript Menu Demo Script Document
// menu event handlers
function onTimeCard(){alert(postAlertFunc, "TimeCard");}
function onInventory()
{
    gui.showSubMenu(subMenu, myMenu);
}
function onCapital(){alert(postAlertFunc, "capital");}
function onStock(){alert(postAlertFunc, "stock");}
// create menu objects
var myMenu = new gui.Menu();
var subMenu = new gui.Menu();
// create menu entries
var timeCardApp =
    new gui.MenuItem("Time Card", onTimeCard);
var inventoryApp =
    new gui.MenuItem("Inventory", onInventory);
var separator =
    new gui.Separator(1, gui.separatorStyle.horizontalLine);
myMenu.caption = "menu demo";
subMenu.caption = "subMenu demo";
// create subMenu entries
var capital =
    new gui.MenuItem("Capital", onCapital);
var stock =
    new gui.MenuItem("Stock", onStock);
// position the controls on the menus
myMenu.append(separator);
myMenu.append(inventoryApp);
myMenu.append(timeCardApp);
subMenu.append(capital);
subMenu.append(stock);
//Specify a child to be selected when the menu is displayed
(optional)
myMenu.setActiveChild(inventoryApp);
subMenu.setActiveChild(capital);
// set the caption text for the status bar
myMenu.caption = "menu demo";
// show the menu
gui.showMenu(myMenu);
```

When the Menu Demo application is initiated, the OHV300 displays the following image:

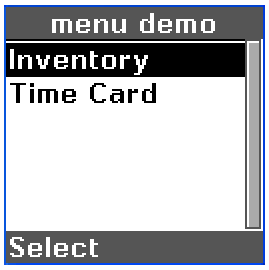


Figure 4 – Menu Demo Display

The Select button sends gui.softkey.enter to run the highlighted application. In this example, the Inventory option is selected. The script then displays the Inventory submenu shown in Figure 5.

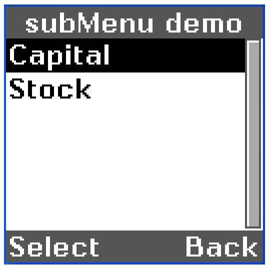


Figure 5 – Sub Menu Demo Display

3.2.4 Text

Use the gui.Text object (section 4.2.3.11) to show text. Text may exceed the display area, toggling the arrow buttons to view all data. This should not be used to control text within menus or forms.

3.3 Event

The JavaScript environment is event driven. The reader firmware waits for an event such as a pressed key. The application gains control of an event by setting an object's event properties to functions. Events include:

- send and receive of communications packets
- decode operations
- pressed keys
- command execution
- change of reader mode (idle, standby, and power down)

An application gains control only when:

- The reader application defines an event property.
- The application creates a function and assigns it to the event property.
- The event occurs.

The application can disable an event by setting the event property to null.

3.3.1 Decode Events

The reader object defines an event onDecode. Section 4.3.2.3 discusses decode events.

Example:

```
var numDecodes = 0;
var numDecodesProcessed = 0;
reader.onDecodeAttempt = function(count)
{
    numDecodes = count;
    numDecodesProcessed = 0;
}
reader.onDecode = function(decode)
{
    if( ++numDecodesProcessed < numDecodes )
    {
        // process individual decode, save in variables, etc.
    }
    else
    {
        // process the whole set, using saved variables, etc.
    }
}
```

3.3.2 Key Events

The clear, enter, and left and right buttons (softkeys) can be programmed to seamlessly integrate with user specific events.

The possibilities are shown in Table 1. The GUI objects are documented in section 4.2.3.

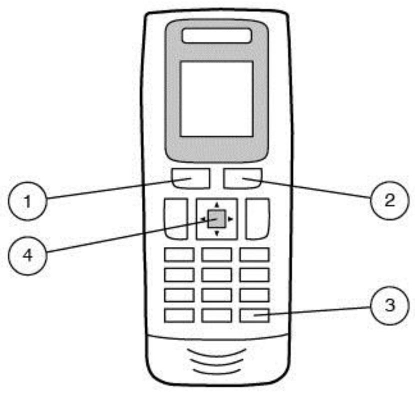


Figure 6 – OHV300 Keypad

1. Left Softkey
2. Right Softkey
3. Clear/Escape Button
4. Enter Button

Table 1 – Keys to Event Mapping

Key	Object	Event Handler Property

Enter – button located in the center of the arrow keys	`gui.Form`
	`gui.Menu`
	`gui.Text`
	`gui.Button`
	`gui.MenuItem`
		`onOk`
		`onOk`
		`onOk`
		`onClick`
		`onClick`

Clear – bottom right button	`gui.Form`
	`gui.Menu`
	`gui.Text`
		`onCancel`
		`onCancel`
		`onCancel`

Left Button – top left soft key	`gui`	`onClick`
Right Button – top right soft key	`gui`	`onClick`

Key	Object	Event Handler Property

Any Other Buttons	`gui.Form`
	`gui.Menu`
	`gui.Text`
		`onKey`
		`onKey`
		`onKey`

3.3.3 Command Execution

The reader application defines a number of commands that can be sent to the firmware from the host or by reading codes. The reader (section 4.3) defines an event by the onCommand function. If onCommand is set, the reader finds the specified event before running the command and transmitting the data.

3.4 Reader Configuration

The configuration settings define the active capabilities of the handheld. The application development environment defines the `reader` object (section 4.3), which contains methods for manipulating handheld settings. The Interface Configuration Document defines the configuration items and the values that can be set for each item.

The application developer can dynamically change the active settings by using the `reader.writeSetting` method. This method changes the operational value of the setting, but that value is lost when the reader is turned off. The current values of all settings can be saved by using the `reader.saveSettings` method, which writes the current values of the settings to flash memory from where they are restored on power up.

Example:

```
reader.writeSetting(0x1b, 4);
gui.confirm( yesFunc, noFunc, "Setting changed.\n\nSave now? ",
"Setting Change")
//This function will be called if user presses Yes softkey
yesFunc = function() {
if ( !reader.saveSettings() )
      alert(postAlertFunc, "Error Saving Settings");
}
```

Retrieve the current value of a setting by using the `reader.readSetting` method. Restore factory default settings by using the `reader.defaultSettings` method.

3.5 Symbol Decoding

The primary function of the OHV300 is scanning, decoding, and processing one-dimensional and two-dimensional barcodes. The reader can read a wide range of code types, or symbologies, and provide access to the data after decoding. The reader decodes in one of two ways:

- Pressing the read key on the key pad.
- A decode command from the `reader.processCommand` method.

The `reader.onDecode` defines an event that allows the application to access data.

To program the OHV300 to scan and transmit data, follow the below commands.

```
function onDecode(decode)
{
    // Processing
}
reader.onDecode = onDecode;
```

There are four basic options for decoding scanned data:

- Process the data in the script, such as fill in form fields, and return null.
- Let the data be further processed by the handheld firmware, typically for sending and/or storing, by returning decode.
- Transform the data and let the handheld firmware process the changed data by setting decode.data as necessary and returning decode.
- Invalidate the decode by returning false. The handheld will act as though the decode never occurred.

The following pseudocode presents an example of decode processing addressing the four options. The example transforms decode data based on certain symbologies. Then the example checks the format of the decode data to determine the next processing steps.

Subsections following the pseudocode discuss the processing steps in the following example.

Example:

```
function onDecode(decode)
{
    data = decode.data;
    if (decode.symbology == some-special-symbology)
    {
        data = transformed decode.data;
    }
    else if (decode.symbology
                == some-other-special-symbology)
    {
        data = differently transformed decode.data;
    }
    if (data matches employee-badge format)
    {
        loginForm.employeeField.text = decode.data;
        loginForm.pinField.text = "";
        gui.showForm(loginForm);
        return null;
    }
    else if (data matches part-number format)
    {
        stockForm.partField.text = decode.data;
        gui.showForm(stockForm);
        return null;
    }
    else if (data matches shelf-number format)
    {
        stockForm.shelfField.text = decode.data;
        gui.showForm(stockForm);
        return null;
    }
    else if (data matches wrong formats)
    {
        warning.text = "bad code for this application";
```

```
            gui.showForm(warning);
            return null;
        }
        else if (data matches format that is to be ignored)
        {
            return false;  // invalidate the decode
        }
        else // code should be processed by handheld firmware
        {
            if ( code should be processed
                  with transformed data)
            {
               decode.data = data; // replace the data field
                                   // with transformed data
            }
            return decode;
        }
}
```

3.5.1 Transform Data by Symbology

Barcodes read by the handheld are encoded in unique symbologies. Particularly within two-dimensional codes, common data items may be present in different locations within the decode depending on the encoding symbology. In the example, line 5 checks the value of decode.symbology and transforms the decode data to a common format. To check symbology, compare decode.symbology against the symbology codes documented in the Interface Configuration Document.

Note!
Sometimes symbology is used to distinguish otherwise like-formatted data; for example, shelf tags may have the same number of digits as UPC codes for the products on the shelves, but have different barcode symbologies that can be used to determine whether the decode is a shelf tag or a product UPC code.

3.5.2 Evaluate Data Format

After the data is converted into a common data format based on the symbology, the application determines the data format and processes according to data content.

```
if (data matches employee-badge format)
{
    loginForm.employeeField.text = decode.data;
    loginForm.pinField.text = "";
    gui.showForm(loginForm);
    return null;
}
else if data matches part-number format
{
    stockForm.partField.text = decode.data;
    gui.showForm(stockForm);
    return null;
}
else if (data matches shelf-number format)
{
    stockForm.shelfField.text = decode.data;
    gui.showForm(stockForm);
    return null;
}
```

The previous statements from the example demonstrate the processing of data within the decode handler. Based on the data format, the application program extracts data from the decode and displays appropriate forms.

These examples execute a return null statement to consume the decode for the specified data formats.

3.5.3 Detect Format Errors

If the format matches a known format that should not be used in the current application context, the application can send a warning message, which is displayed in "warning" form.

```
else if data matches wrong formats
{
    warning.text = "bad code for this application";
    gui.showForm(warning);
    return null;
}
```

In this case, the example returns a `null` to consume the decode.

Note!

Do not code `alert`, `confirm`, or `prompt`, either as functions or as gui methods, in an onDecode or onCommand event handler. The events originate in the handheld firmware, resulting from decodes, commands, or communication events. While the event handler is running, the main application is held idle until the event handler returns. If the event handler is waiting for the user to finish with `alert`, `confirm`, or `prompt`, the main application will be forced to wait as well, resulting in timeout errors.

3.5.4 Let the Handheld Process the Decode

If you want the handheld to process the decode, set the decode as the return statement parameter. If you have changed decode data and want the changes available to the handheld, set the appropriate data field in the decode to the changed value before returning the decode.

```
else // code should be processed by handheld firmware
{
    if ( code should be processed
          with transformed data)
    {
       decode.data = data; // replace the data field
                           // with transformed data
    }
    return decode;
}
```

3.5.5 Ignore the Decode

You can ignore a particular format by exiting the function with a return value of false as shown in the following code segment from the example.

```
else if (data matches format that is to be ignored)
{
    return false;  // invalidate the decode
}
```

Note!
Normally, the handheld will sound a good-decode beep at the end of decode processing. If you do not want invalidated decodes to cause the usual good-decode beep in the handheld firmware, you must configure the reader to process the decodes via JavaScript *before* beeping. Then the handheld will only beep if there is at least one decode that is not invalidated. For more information, refer to the Interface Configuration Document.

If your `reader.onDecode` function returns `false`, you should configure the handheld to beep upon decode error.

3.5.6 Determine the Orientation of the Decode

You can determine the orientation of a code by using the bounds array. The bounds array has four elements that can be used to give the coordinates of the four corners of the code (the origin is the center of the decode field):

- (decode.bounds[0].x, decode.bounds[0].y) = coordinates of top right corner
- (decode.bounds[1].x, decode.bounds[1].y) = coordinates of top left corner
- (decode.bounds[2].x, decode.bounds[2].y) = coordinates of bottom left corner
- (decode.bounds[3].x, decode.bounds[3].y) = coordinates of bottom right corner

These designations (e.g. top left) refer to the corners of the symbol, *not* as it appears in a particular image, but rather as it appears (most often) in its symbology specification. For example, for Data Matrix, array element 2, which contains the coordinates of the bottom left vertex of the symbol boundary, will *always* be proximate to the intersection of the two lines which form the “L” of the symbol, regardless of the actual orientation (or mirroring) of the symbol in the image submitted to the decoder.

In normal orientation, we would expect the signs of the coordinates to be:

- decode.bounds[0].x (-), decode.bounds[0].y (+)
- decode.bounds[1].x (-), decode.bounds[1].y (-)
- decode.bounds[2].x (+), decode.bounds[2].y (-)
- decode.bounds[3].x (+), decode.bounds[3].y (+)

A code that is not “right side up” could be rejected by exiting the function with a return value of false as shown in the following example.

```
if (decode.bounds[0].x > 0 && decode.bounds[0].y < 0 &&
decode.bounds[1].x > 0 && decode.bounds[1].y > 0 &&
decode.bounds[2].x < 0 && decode.bounds[2].y > 0 &&
decode.bounds[3].x < 0 && decode.bounds[3].y < 0)

{

    return false;  // invalidate the decode

}
```

Note!

Normally, the handheld will sound a good-decode beep at the end of decode processing. If you do not want invalidated decodes to cause the usual good-decode beep in the handheld firmware; you must configure the reader to process the decodes via JavaScript *before* beeping. Then the handheld will only beep if there is at least one decode that is not invalidated. For more information, refer to the Interface Configuration Document.

3.6 Host Communication

The handheld application development environment defines a host communication `comm` object (section 4.4.2.3) to support communications with a host resident application. For example, Vision Configurator (section 1.4) is a host resident utility that communicates with the handheld reader for downloading files to the handheld.

From the host computer’s view, the handheld is a serial device accessible through a serial or USB port, or through Bluetooth Radio Frequency (RF) communications. Handheld configuration settings define the active host communications port.

The handheld host communications implementation supports two basic styles of communication: raw text and packets. It also supports a set of native protocols.

The application program transfers data to the host by writing to the handheld host communications port using methods defined by the hendheld reader `comm` object (section 4.4.2.3). Applications gain access to data sent by the host by implementing `onCommand` (and optionally `onCommandFinish`) event handlers defined by the handheld's `reader` object properties (section 4.3) and parsing the “|” command.

Example:

```
reader.onCommand = function(type, data)
{
    // intercept | command with app-data: prefix
    if( type == '|'  &&  data.match(/^app-data\:/) )
    {
        return false;  // Suppress the command
    }
    return true;
}
```

For more information on host communications, refer to the Interface Configuration Document.

3.7 Data in Handheld Local Storage

The application development environment provides program access to handheld local storage through the `storage` object (section 4.3.2.18). Data is maintained in storage as named objects called files. Vision Configurator can transfer host data into a handheld reader file. The handheld application can also store data in files.

The name of a handheld file may be 1 - 200 printable ASCII characters.

Use the `erase` and `write` methods of the `storage` object to manage files. Use the `findFirst` and `findNext` methods to locate files. Use the `read` method to access a file or the `upload` method to send it to the host.

3.8 Demo Programs

Many of the concepts discussed in this section can be found in the source code of the demo programs.

4 Class Reference

The built-in objects described in this section enable a JavaScript program to receive data from the handheld and control its behavior.

4.1 decode

The `decode` object provides data and metadata on the currently decoded barcode. Since the `decode` object is passed from the decode engine to the JavaScript engine, any valid variable name can be used to hold the data. For reasons of clarity, we will use the name `decode`. Other common uses seen in existing JavaScript code are `d` or `obj`.

The properties of the `decode` object define the raw output of the handheld decode engine.

4.1.1 Properties

The following section documents the properties defined for the `decode` object.

4.1.1.1 data

The `decode.data` property is a read/write value representing the payload of the barcode that has just been decoded. This data may also include data processing, checksum information, or data formatting based on settings made by the user for the decode engine. If the decode engine has no special handling settings applied, this information should match the string that was used to encode the barcode before the barcode was printed or displayed.

If the current JavaScript program makes a change to the data, it can be stored back into the `decode.data` object in order to pass it downstream.

Example:

```
//remove all Group Separator characters

decode.data = decode.data.replace(/%1D/g, "");

return decode;
```

4.1.1.2 symbology

The `decode.symbology` property is a read only property that contains the symbology of the barcode decoded by the decode engine.

Valid values for `symbology` are defined in 9.

Example:

```
//Code Symbology Identifier (38 is PDF417)

if (decode.symbology == 38)

{

//Perform action on PDF417

}
```

4.1.1.3 symbology_ex

The `decode.symbology_ex` property is a read only property that contains extended symbology information for the barcode decoded by the decode engine.

Valid values for `symbology_ex` are defined in 9.

This property is seldom used, but is used in the same way as `symbology`.

4.1.1.4 symbologyModifier

The `decode.symbologyModifier` property is a read only property that contains symbology modifier information for the barcode decoded by the decode engine.

Valid values for `symbologyModifier` are defined in 9.

Example:

```
//UPC-E
if (decode.symbology == 49 && decode.symbologyModifier == 66)
{
decode.data = "\x02E" + decode.data;
}
```

4.1.1.5 symbologyModifier_ex

The `decode.symbologyModifier_ex` property is a read only property that contains extended symbology modifier information for the barcode decoded by the decode engine.

Valid values for `symbologyModifier_ex` are defined in 9.

This property is seldom used, but is used in the same way as `symbologyModifier`.

4.1.1.6 symbologyIdentifier

The `decode.symbologyIdentifier` property is a read only property that contains the full AIM (Automatic Identification and Mobility) information for the barcode decoded by the decode engine. read-only string; this is the AIM identifier ("]cm").

4.1.1.7 x

The `decode.x` property is a read only property that defines the horizontal position, in pixels, of the barcode that was just decoded in relation to the entire image captured by the reader and analyzed by the decode engine. The value for `decode.x` can be positive or negative based on the fact that 0 is the center of the image.

4.1.1.8 y

The `decode.y` property is a read only property that defines the vertical position, in pixels, of the barcode that was just decoded in relation to the entire image captured by the reader and analyzed by the decode engine. The value for `decode.y` can be positive or negative based on the fact that 0 is the center of the image.

4.1.1.9 time

The `decode.time` property is a read only property that defines the amount of time, in milliseconds, it took the decode engine to decode the barcode that was just analyzed.

4.1.1.10 quality_percent

The `decode.quality_percent` property is a read only property that defines an internally-defined image quality value determined by the decode engine while analyzing the captured image. This is not the quality of the printed or displayed barcode but rather the quality of the captured image for use in decoding.

4.1.1.11 qrPosition

The `decode.qrPosition` property is a read only property that gives the index of a QR Code in a set of QR Codes that have been linked via Structured Append. More information can be found in the QR Code specification (ISO/IEC 18004). This property is only defined if the `decode.symbology` is QR Code.

4.1.1.12 qrTotal

The `decode.qrTotal` property is a read only property that gives the count of QR Code in a set of QR Codes that have been linked via Structured Append. More information can be found in the QR Code specification (ISO/IEC 18004). This property is only defined if the `decode.symbology` is QR Code.

4.1.1.13 qrParity

The `decode.qrParity` property is a read only property that gives parity information for QR Code in a set of QR Codes that have been linked via Structured Append. More information can be found in the QR Code specification (ISO/IEC 18004). This property is only defined if the `decode.symbology` is QR Code.

4.1.1.14 linkage

The `decode.linkage` property is a read only property that gives information about the linking code between the segments that make up a composite barcode, if a composite barcode was just decoded by the decode engine. This property is `null` if the decoded barcode was not a composite barcode.

4.1.1.15 bounds

The `decode.bounds` property is an array of four sets of x and y coordinates that give information about the position of the last decoded barcode. The four points (x, y) indicate the position in pixels of the four corners of the barcode from the upper left (0, 0) position in the captured image as integers. Be aware, in some readers the image is rotated 90°.

```
//The x and y coordinates of the top right corner of the barcode
in the image:

pos.tR = (decode.bounds[0].x, decode.bounds[0].y)

//The x and y coordinates of the top left corner of the barcode in
the image:
```

```
pos.tL = (decode.bounds[1].x, decode.bounds[1].y)

//The x and y coordinates of the bottom left corner of the barcode
in the image:

pos.bL = (decode.bounds[2].x, decode.bounds[2].y)

//The x and y coordinates of the bottom right corner of the
barcode in the image:

pos.bR = (decode.bounds[3].x, decode.bounds[3].y)
```

4.1.1.16 numExtraFields

This property is for internal use only.

4.1.1.17 decoderType

The `decode.decoderType` property is a read only property that gives information about the decoder that was used to capture data from the last barcode decode process. This property is only relevant if a 3rd party decoder has been implemented.

A `decode.decoderType` value of 1 indicates that the decoder decoded the last barcode. A value of 0 indicates that the decoder is unknown. Other values may be introduced at any time.

4.1.1.18 aimSymbology

The `decode.aimSymbology` property is a read only property that gives the first character of the AIM (Automatic Identification and Mobility) symbology determined by the decode engine of the barcode that was just decoded. More information on AIM Standards can be found at the Association for Automatic Identification & Mobility web site: http://www.aimglobal.org/

The following example illustrates a translation from the AIM standard to a different system used in-house by a customer:

```
var newSymbol;

aimSymbol = String.fromCharCode(decode.aimSymbology);

switch( aimSymbol )

{

case "E":

newSymbol = "A";

break;

case "A":

newSymbol = "B";

break;

case "F":

newSymbol = "C";

break;
default:
newSymbol = aimSymbol
}
return newSymbol + decode.data;
```

4.1.1.19 aimModifier

The `decode.aimModifier` property is a read only property that gives the AIM (Automatic Identification and Mobility) Modifier determined by the decode engine of the barcode that was just decoded. More information on AIM Standards can be found at the Association for Automatic Identification & Mobility web site: http://www.aimglobal.org/

4.1.1.20 decodeOutputFormat

The `decode.decodeOutputFormat` property is a read only property that gives the type of output the JavaScript should expect.

Value	Definition
0	Raw output – no formatting applied by the decoder
1	Customer formatted data – This is formatting applied from a customer-supplied .parse file.
2	JSON formatted data – This is data formatted in JavaScript Object Notation (JSON). Currently, only DL/ID data can be formatted in JSON by the decoder. For more information about JSON, see JSON.org

4.2 gui

The `gui` object provides application programming access to the OHV300 display screen. The OHV300 application development environment defines a standard software GUI format (section 4.2.3) consisting of a status bar, a display area, and labels for the left and right software programmable keys (softkeys) on the OHV300 key pad.

The properties, methods, and classes of the `gui` object support the development of graphical user interfaces in custom software applications.

4.2.1 Methods

The following section documents the methods defined for the OHV300 `gui` object.

4.2.1.1 alert

The gui.alert function displays text in the display area of the standard GUI display. Do not call this function within onDecode and onCommand event handlers.

Format:

```
gui.alert(func, text, title);
```

Where:

`func` – function name; function to be called after displaying the alert. This function does not take any arguments and returns void.

`text` – string; text to display as the alert.

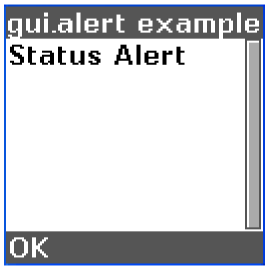
`title` – string; text to display in the gui object status bar; defaults to “Alert.”

Processing suspends until the operator presses an enter key – either the enter key or the left softkey defined as OK. Once the operator presses the enter key, it calls the provided function to continue processing.

Example:

```
gui.alert(samplefunction, "Status Alert", "gui.alert example");
```

Displays the alert shown in Figure 7 and waits until the operator presses the enter key or the left softkey (OK). Once the operator presses a key, it calls samplefunction() to continue.


gui.alert example

Status Alert

OK

Figure 7 – gui.alert Example

4.2.1.2 confirm

The gui.confirm function displays text in the display area of the standard GUI display and returns a value based on the key pressed. Do not call this function within onDecode and onCommand event handlers.

Format:

```
gui.confirm(yesFunc, noFunc, text, title,
                    leftSoftkeyLabel, rightSoftkeyLabel);
```

Where:

`yesFunc` – function name; function to be called when the confirm receives left softkey. This function does not take any arguments and returns void.

`noFunc` – function name; function to be called when the confirm receives right softkey. This function does not take any arguments and returns void.

`text` – string; text to display for confirmation.

`title` – string; text to display in the gui object status bar; defaults to “Confirm.”

`leftSoftkeyLabel` – string; text to use as label for the left softkey (default is "Yes").

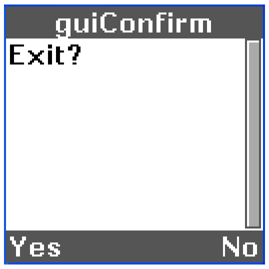
`rightSoftkeyLabel` – string; text to use as label for the right softkey (default is "No").

Processing suspends until the operator presses an enter key or cancel key.

Example:

```
gui.confirm(onYesClick, onNoClick, "Exit?", "guiConfirm");
```

Displays the confirm dialog shown in Figure 8 and waits until the operator presses the enter key or the left softkey. If operator presses Yes key, it calls onYesClick function. If operator presses No key, it calls onNoClick function to continue processing.


guiConfirm

Exit?

Figure 8 – gui.Confirm Example

4.2.1.3 prompt

The gui.prompt function displays text in the display area of the standard GUI display and returns a value based on the key pressed. Do not call this function within onDecode and onCommand event handlers.

Format:

```
gui.prompt(func, text, initial, title);
```

Where:

`func` – function name. Function to be called when prompt receives an enter key. The function takes one argument named `result` and returns void.

`result` – string; This is the argument to the function. It provides contents of the edit control if the prompt receives an enter key (either the enter key or the left softkey defined as `OK`); null if the prompt receives the right softkey defined as `Cancel`.

`text` – string; text to display as a label above a `gui.Edit` control.

`initial` – string; the initial string to display as the contents of edit control; default is an empty string.

`title` – string; text to display in the gui object status bar; defaults to “Prompt”.

Processing suspends until the operator presses an enter key or `Cancel` key. The operator can key new data into the edit control before pressing enter or the left softkey.

Example:

```
 gui.prompt(postPromptFunc, "Enter login ID", "None",
"guiPrompt");
```

Displays the prompt shown in Figure 9 – gui.Prompt Example.

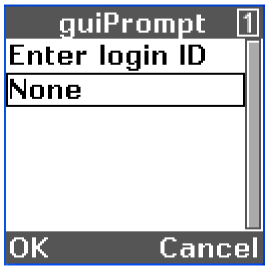


Figure 9 – gui.Prompt Example

The postPromptFunc would be defined as follows

```
postPromptFunc = function(string) {
 //Continue after prompt…
   }
```

The value of `string` depends on the operator action.

- If the operator presses the right softkey (Cancel), the value of `string` is `null`.
- If the operator presses the "enter" key or the left softkey (OK) the value of `string` is:
  - <new content> if the operator changes the contents of the edit control
  - "None" if the operator does not change the content.

4.2.1.4 putBox

The gui.putBox method allows graphical boxes to be painted to the display.

Format:

```
gui.putBox(x, y, xEnd, yEnd, backgroundColor, type);
```

Where:

x – defines the starting x coordinate.

y – defines the starting y coordinate.

xEnd – defines the width of the box

yEnd – defines the height of the box

backgroundColor – defines a color represented in RGB565 format to fill the box region.

type – defines the type of box.

Following box types are supported:

1. Flat
2. Raised
3. Lowered
4. Half Lowered
5. Ridged
6. Scribed

Example:

```
red        = 0xF800;
green      = 0x01E0;
gui.putBox(0, 14, 120, 14, red  , 1);   //box type flat
gui.putBox(0, 28, 120, 14, green, 2);   //box type raised
```

4.2.1.5 sendKey

The gui.sendKey method sends a “pressed key” indication to the OHV300 firmware as though it came from OHV300 keypad.

Format:

```
result = gui.sendKey(key);
```

Where:

`key` – number constant; the key to send. Use number constants defined in section 0.

`result` – Boolean; `true` if successful; `false` if not, which usually means the keypad is locked but can also mean that the key buffer is full.

Example:

```
gui.sendKey(enter);
```

Sends the enter key event to the OHV300 firmware as though the operator had pressed the enter key.

4.2.1.6 sendText

The gui.sendText method sends a text string to the OHV300 gui object as though it had been entered from the keypad.

Format:

```
result = gui.sendText(text);
```

Where:

`text` – string; the text to send.

`result` – Boolean; `false` if all specified text could not be sent to the GUI (in which case, none of it will have been sent); otherwise, `true`.

Example:

```
reader.onDecode =
function(decode) { gui.sendText(decode.data); }
```

Sends all decode data to the `gui` object as though it had been entered from the keypad.

4.2.1.7 show

The `gui.show` method instructs the OHV300 to write the specified form, menu, or text object to the OHV300 display as a standard `gui` object (section 4.2.3).

This low level approach is not recommended for use in most applications. Instead, we recommend that you use the `gui.showForm`, `gui.showMenu`, and `gui.showSubMenu` methods.

Format:

```
gui.show(object);
```

Where:

object – object to show on the display. The object must be a gui.Form, gui.Menu, or gui.Text object (section 4.2.3).

Note: This method does not return a value.

4.2.1.8 showForm

The `gui.showForm` method instructs the OHV300 to display the specified form on the OHV300 display as a standard `gui` object (section 4.2.3).

Format:

```
gui.showForm(yourForm);
```

Where:

yourForm – form object to show on the display; the object must be a gui.Form object (section 4.2.3.3).

Note: This method does not return a value.

To insert a caption into the status bar, set the yourForm.caption property.

By default, the left software programmable key is set to gui.okSoftkey (section 4.2.4.3). You may also define a custom leftSoftkey for your form object, e.g., yourForm.leftSoftkey = yourSoftkey, in which case gui.showForm will use your softkey.

By default, the right software programmable key is set to gui.cancelSoftkey (section 4.2.4.2). You may also define a custom rightSoftkey for your form object.

4.2.1.9 showMenu

The `gui.showMenu` method instructs the OHV300 to display the specified menu on the OHV300 display as a standard `gui` object (section 4.2.3). This menu is the top level menu; sub-menus can be created using the `gui.showSubMenu` method.

Format:

```
gui.showMenu(yourMenu);
```

Where:

yourMenu – menu object to show on the display. The object must be a gui.Menu object (section 4.2.3.6).

Note: This method does not return a value.

To insert a caption into the status bar, set the yourMenu.caption property.

This method sets the left software programmable key to gui.selectSoftkey (section 4.2.4.4).

This method sets the right software programmable key to gui.backSoftkey (section 4.2.4.1) if the yourMenu.onCancel property is set; otherwise, null.

4.2.1.10 showSubMenu

The `gui.showSubMenu` method instructs the OHV300 to display the specified menu on the OHV300 display as a standard `gui` object (section 4.2.3).

Format:

`gui.showSubMenu(yourMenu, parentMenu);`

Where:

`yourMenu` – menu object to show on the display. The object must be a `gui.Menu` object (section 4.2.3.6).

`parentMenu` – parent menu to display in response to `gui.backSoftkey`.

Note: This method does not return a value.

To insert a caption into the status bar, set the `yourMenu.caption` property.

This method sets the left software programmable key to `gui.selectSoftkey` (section 4.2.4.4).

This method sets the right software programmable key to `gui.backSoftkey` (section 4.2.4.1) and sets the menu object's `onCancel` property to a function that shows the parent menu.

4.2.1.11 splash and clearSplash

The `gui.splash` method displays an image on the OHV300 screen. The `gui.splash` function should be used in conjunction with the `setTimeout` function. The `setTimeout` function will suspend execution for a provided timeout value. Once the timeout specified in the `setTimeout` function expires, it will call the function specified in the `setTimeout` to continue execution.

Format:

`gui.splash(imageName, stringText);`

`setTimeout(func, timeout_ms);`

Where:

`imageName` – string; the name of the image file to display (section 4.2.3.4).

stringText – string; the text string to be displayed below the image in the softkey area of the display.

`func` – function; the name of the function to be called after timeout.

`timeout_ms` – number; the number of milliseconds to wait before timeout of the splash display.

Example:

```
gui.splash("CorpLogo.img", "Version 1");
setTimeout(postSplashfunc, 2000);
```

displays a corporate logo image and the text “Version 1” on the display. Then, it sets a timeout of 2 seconds. Once, the timer expires, `postSplashfunc` is called to continue execution.

The first thing you need to do in the `postSplashfunc` is to call `gui.clearSplash` method. This function will clear the image from the OHV300 screen. The `gui.clearSplash` method should only be called after calling `gui.splash` method.

The OHV300 supports only its native format, which uses the extension .img. The image must be 128x128 pixels (for splash screen only). Images are not cropped; they will either display in their entirety or will not display at all.

4.2.1.12 sync

The gui.sync method causes the display to be updated immediately.

Format:

```
gui.sync();
```

Where:

`result` – no return, GUI display is updated.

4.2.2 Properties

The following section documents the properties defined for the OHV300 `gui` object.

4.2.2.1 inputMode

The `gui.inputMode` object contains constants that define input modes for the OHV300.

The constant definitions are:

```
gui.inputMode.numeric
gui.inputMode.caps
gui.inputMode.lowerCase
gui.inputMode.symbols
```

The character sets defined for these modes are described in 6.

4.2.2.2 key

The `gui.key` property is a read-only object containing number constants specifying keys for use with the `gui.sendKey` method. The constants are named:

- `up`
- `down`
- `left`
- `right`
- `enter`
- `back ("CLEAR" on the keypad)`
- `escape`
- `home`
- `end`
- `leftSoftkey`
- `rightSoftkey`

Constants `escape`, `home`, and `end` have no keypad counterpart.

Constants `leftSoftkey` and `rightSoftkey` represent the left and right software programmable keys on the OHV300.

4.2.2.3 leftSoftkey

The `gui.leftSoftkey` property identifies an event handler for the `onClick` property of a `gui.Softkey` object and the key label, associated with the left programmable key on the OHV300. The application program defines a `gui.Softkey` object. See the example in section 0

Setting `gui.leftSoftkey` to null disassociates the softkey object from the property (removing the event handler and the softkey label).

When menus and forms are shown using the `gui.showMenu`, `gui.showSubMenu`, and `gui.showForm` methods, the `gui.leftSoftkey` property is set automatically.

4.2.2.4 rightSoftkey

The `gui.rightSoftkey` property identifies an event handler for the `onClick` property of a `gui.Softkey` object and the key label, associated with the right programmable key on the OHV300. The application program defines a `gui.Softkey` object. See the example in section 0.

Setting `gui.rightSoftkey` to null disassociates the softkey object from the property (removing the event handler and the softkey label).

When menus and forms are shown using the `gui.showMenu`, `gui.showSubMenu`, and `gui.showForm` methods, the `gui.rightSoftkey` property is set automatically.

4.2.2.5 statusText

The `gui.statusText` property is a string that specifies text for display in the status bar at the top of a OHV300 GUI screen. When `gui.status` is null, the OHV300 displays status icons in the status bar. Note: The input mode icon will always be displayed in addition to the status text when an edit control is active.

With menus and forms, use the `caption` property (section 4.2.6.1) to automatically set `gui.statusText` when the menu or form is shown.

4.2.3 Objects

The OHV300 application development environment provides the user classes described in this section for use in building forms for the OHV300 gui object. The instances of these classes are referred to as `controls` in this document.

4.2.3.1 gui.Button

The `gui.Button` constructor creates a button control for a GUI form. The `onClick` event handler is called when the enter key on the OHV300 keypad is pressed and the button control is active. Program the function to return Boolean `true` if the control's default processing of the key should continue. Otherwise, program the function to return `false`; the control will act as if not clicked.

Format:

```
var <button_name> =
new gui.Button(text, onClick);
```

Where:

`<button_name>` – program-provided button control.

`text` – string; a label for the button. This property can be changed after the object is created.

`onClick` – function for handling the button click event. The OHV300 calls this function when the operator presses the OK enter key on the OHV300 keypad when the GUI button is the active control.

Example:

```
// button control event handler
function rFOnClick(){reader.writeSetting(0x1b, 4);}
function rs232OnClick(){reader.writeSetting(0x1b, 1);}
// create the form object
var myForm = new gui.Form();
// create the button
var rfButton = new gui.Button("RF Comm", RFOnClick);
var rs232Button = new gui.Button("RS232 Comm", RS232OnClick);
```

```
// position the controls on the form
myForm.append(rfButton);
myForm.append(rs232Button);
// Place text on the status bar
gui.statusText = "button demo";
// show the form
gui.showForm(myForm);
```

Displays the form shown in Figure 10.

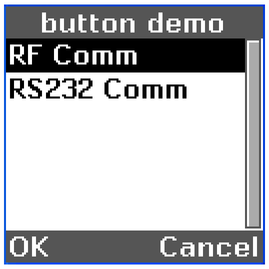


Figure 10 – Button Demo

When the operator presses the left softkey or the enter key when the control labeled “RF Comm” is active, the script executes a `reader.writeSettings` method to set the communications mode setting to RF (Bluetooth). When the “RS232 Comm” control is active and the operator presses the key, the script executes a `reader.writeSettings` method to set the communications mode setting to RS232.

Note: The active control is highlighted.

4.2.3.2 gui.Edit

The gui.Edit constructor creates an edit control for a GUI form. The OHV300 operator can enter data into the edit control.

Format:

```
var <edit_name> =
new gui.Edit(text, defaultInputMode, validInputModes, onChar,
readOnly);
```

Where:

`<edit_name>` – program-provided edit control.

`text` – string; the initial value for the edit control. The control contains text when it is first displayed on the `gui` object. This property can be changed after the object is created.

`defaultInputMode` – number; the input mode that is selected when the user navigates to the edit control and enters data. Modes are defined by `gui.inputMode` (section 4.2.2.1).

Note: The user can change to another input mode using the shift key.

`validInputModes` – number; a bitwise combination of input modes as defined by `gui.inputMode` (section 4.2.2.1); defines the input modes that are valid in the edit control.

`onChar` – function; the function to run when a character is entered into an edit control.

`readOnly` – Boolean; false allows the text to be changed by the user, true prevents the text from being changed.

Example:

```
function quit() { reader.runScript(".default.js"); }
var form = new gui.Form(null, quit);
form.Caption = "Input Modes";
form.append(new gui.Edit("Num, any",
                          gui.inputMode.numeric));
form.append(new gui.Edit("CAP, any",
                          gui.inputMode.caps));
form.append(new gui.Edit("Num, only",
                          gui.inputMode.numeric,
                          gui.inputMode.numeric));
form.append(new gui.Edit("CAP, U/l Case",
                          gui.inputMode.caps,
                          gui.inputMode.caps
                          | gui.inputMode.lowerCase));
gui.showForm(form);
```

Displays the form shown in Figure 11.

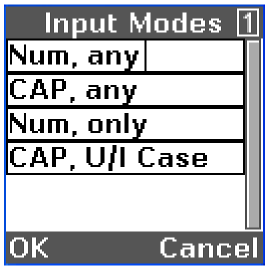


Figure 11 -- Input Modes Example

Example: The following example shows how to use onChar property of the Edit control. The onChar property specifies a function which will run every time a character is entered. The function returns either TRUE or FALSE. The user input is appended to the edit control ONLY if the specified function returns FALSE.

For example, if you want the user input to not exceed 100, you could do it as shown below:

```
var usr_input = "";
var Quantity = new gui.Edit("", gui.inputMode.numeric,
                            gui.inputMode.numeric, maxValue);
function maxValue(data)
{
usr_input += data;
if ( parseInt(usr_input) > 99 )
{
      reader.beep(3);
      Quantity.text = "";
      usr_input = "";
      return true;
}
return false;
}
```

The text in each edit control identifies the default input mode of the control and the modes which are enabled for the shift key.

4.2.3.3 gui.Form

The `gui.Form` constructor creates a `Form` object for the OHV300 GUI. The `gui.Form` constructor defines three event handlers for key events. Event handlers are null if not specified.

The following controls can be used in a form:

- `gui.Button`
- `gui.ToggleButton`
- `gui.Edit`
- `gui.Image`
- `gui.Label`
- `gui.Separator`

Form controls must be appended (section 4.2.5.1) or prepended (section 4.2.5.2) to the form object.

Format:

```
var <form_name> = new gui.Form(onOk, onCancel, onKey);
```

Where:

`<form_name>` – program-provided form control.

`onOk` – function for handling the enter key. The OHV300 calls this function when the operator presses the enter key on the OHV300 keypad and the active control is not a button.

`onCancel` – function for handling the `CLEAR` key. The OHV300 calls this function when the operator presses the key on the OHV300 keypad and the active control is not an `edit` control. This function is also called when the escape key is issued as a softkey.

`onKey` – function for handling any key, soft or real, not consumed by the active control (section 4.2.6.2).

To add a label to the form in the status area, set the form's `caption` property to a string containing the label.

Example:

See section 3.2.2.

4.2.3.4 gui.Image

The `gui.Image` constructor creates an image object that can be displayed in the OHV300 GUI form.

Format:

```
var <image_name> = new gui.image(name);
```

Where:

`<image_name>` – program-provided image control.

`name` – string; the name of an image file in file storage (section 4.2.3.4).

Example:

```
var myForm = new gui.Form();
var image = new gui.Image("MyImage.img");
myForm.append(image);
gui.showForm(myForm);
```

The image can be up to 128x128 pixels depending on the form. Images are not cropped; they either display in their entirety or do not display at all.

The image file format is specific to the OHV300.

4.2.3.5 gui.Label

The `gui.Label` constructor creates a label control that can be displayed in the OHV300 GUI menu or form.

Format:

```
var <label_name> = new gui.Label(text);
```

Where:

`<label_name>` – program-provided label control.

`text` – string; the text to be displayed as a label. This property can be changed after the object is created.

Example:

See the form example in section 3.2.2.

4.2.3.6 gui.Menu

The gui.Menu constructor creates a menu object for the OHV300 GUI. The gui.Menu constructor defines three event handlers for key events. Event handlers are null if not specified.

The following controls can be used in a menu:

- `gui.MenuItem`
- `gui.Separator`
- `gui.ToggleButton`

Menu controls must be appended (section 4.2.5.1) or prepended (section 4.2.5.2) to the menu object.

Format:

```
var <menu_name> = new gui.Menu(onOk, onCancel, onKey);
```

Where:

`<menu_name>` – program-provided menu.

`onOk` – function for handling the enter key. The OHV300 calls this function when the operator presses the enter key on the OHV300 keypad when the active control is not a button.

`onCancel` – function for handling the `CLEAR` key. The OHV300 calls this function when the operator presses the `CLEAR` key on the OHV300 keypad and the active control is not an `edit` control. This function also is called when the escape virtual key is issued (typically by a softkey).

`onKey` – function for handling any key, soft or real, not consumed by the active control (section 4.2.6.2).

Example: See the menus example in section 3.2.3.

4.2.3.7 gui.MenuItem

The `gui.MenuItem` constructor creates a `MenuItem` control for display in a OHV300 GUI menu. The `onClick` processing function is called when the enter key on the OHV300 keypad is pressed and the `MenuItem` control is active.

Format:

```
var <menuItemItem_name> =
new gui.MenuItem(text, onClick);
```

Where:

`<menuItem_name>` – program-provided `MenuItem` control.

`text` – string; a label for the `MenuItem`.

`onClick` – function for handling the `MenuItem`. The OHV300 calls this function when the operator presses the enter key on the OHV300 keypad when the `MenuItem` is the active control. Code the function to return Boolean `true` if the control's default processing of the key should continue. Otherwise, code the function to return `false`; the control will act as if not clicked.

Example:

See section 3.2.3.

4.2.3.8 gui.MultiLineEdit

The `gui.MultiLineEdit` constructor creates a multiple line edit control for the GUI screen. The OHV300 operator can enter data into the multiple line edit control. The `gui.MultiLineEdit` constructor consumes the entire GUI screen, so it cannot be appended/prepended to a menu or form. To access a multiple line edit control from a menu

Format:

```
var <multiLineEdit_name> =
new gui.MultiLineEdit(text, defaultInputMode, validInputModes,
onChar);
```

Where:

`<edit_name>` – program-provided multiple line edit control.

`text` – string; the initial value for the multiple line edit control. The control contains `text` when it is first displayed on the `gui` screen. This property can be changed after the object is created.

`defaultInputMode` – number; the input mode that is selected when the user navigates to the edit control and enters data. Modes are defined by `gui.inputMode` (section 4.2.2.1).

Note: The user can change to another input mode using the shift key.

`validInputModes` – number; a bitwise combination of input modes as defined by `gui.inputMode` (section 4.2.2.1); defines the input modes that are valid in the edit control.

`onChar` – function; the function to run when a character is entered into a multiple line edit control.

Other Functionality:

`insert` – function, arg: string; this function inserts a string where the cursor is when the function is called.

Format:

```
<multiLineEditControlName>.insert(string);
```

Where

`< multiLineEditControlName>` – program- provided multiple line edit control.

`string` – string; text to insert into multiLineEdit control.

Example:

```
var main = new gui.Menu

main.append(new gui.Button("Notes", function() {
gui.showDialog(captureNotes); }));

gui.showMenu(main);

storage.write("saveNotes.txt","");

var captureNotes = new gui.MultiLineEdit("", gui.inputMode.caps)

captureNotes.leftSoftkey = new gui.Softkey("Save", function()
{storage.append("saveNotes.txt", captureNotes.text);
captureNotes.text = ""; gui.showMenu(main); });

captureNotes.rightSoftkey = new gui.Softkey("Cancel", function() {
captureNotes.text = ""; gui.showMenu(main); });
```

4.2.3.9 gui.Separator

The gui.Separator constructor creates a separator control for display in a OHV300 GUI menu or form. Use the separator to insert white space or lines into a form to increase separation between controls.

Format:

```
var <separator_name> =

new gui.Separator(height, style);
```

Where:

`<separator_name>` – program-provided separator control.

`height` – number; the height in pixels of the separator; minimum 1 pixel.

`style` – number; the style of the separator. `style` must be selected from one of the following numeric constants:

- `gui.separatorStyle.blank`
- `gui.separatorStyle.horizontalLine`
- `gui.separatorStyle.horizontalGroove`
- `gui.separatorStyle.horizontalRidge`

The `gui.separatorStyle.horizontalLine` style adds a line in the approximate center of the separator space as shown in Figure 12.

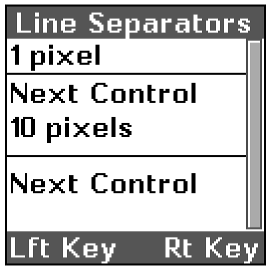


Figure 12 – gui.Separator Lines

Example:

See the menu example in section 3.2.3.

4.2.3.10 gui.Softkey

The `gui.Softkey` object provides processing control of the programmable or “soft” keys on the OHV300 just below the display screen.

Format:

```
var <softkey> = new gui.Softkey(text, onClick);
```

Where:

`<softkey>` – program-provided softkey object.

`text` – string; a label for the softkey; displays on the GUI.

`onClick` – function; the function to be executed when the softkey is pressed.

Set the `gui.leftSoftkey` or `gui.rightSoftkey` property to `<softkey>` as appropriate. The OHV300 JavaScript library defines a set of useful softkey objects (section 4.2.4).

Example:

```
function leftSoftkeyOnClick()
{
/* processing code */
}
function rightSoftkeyOnClick()
{
/* processing code */
}
var left = new gui.Softkey("Ok", leftSoftkeyOnClick);
var right =
new gui.Softkey("Cancel", rightSoftkeyOnClick);
gui.leftSoftkey = left;
gui.rightSoftkey = right;
```

4.2.3.11 gui.Text

The `gui.Text` constructor creates a text object that can be displayed in the OHV300 GUI display area. Text length can exceed the capacity of the display area. The `Text` control includes a scroll bar to indicate relative position within the text when the operator presses the up and down arrow keys.

Format:

```
var <text_name> =
new gui.Text(text, onOk, onCancel, onKey);
```

Where:

`<text_name>` – program-provided text control.

`text` – string; text data to display on the OHV300 GUI. To display multi-line text, insert the new-line character (“\n”) in the text string. This property can be changed after the object is created.

`onOk` – function for handling the enter key. The OHV300 calls this function when the operator presses the enter key on the OHV300 keypad.

`onCancel` – function for handling the `CLEAR` key. The OHV300 calls this function when the operator presses the `CLEAR` key on the OHV300 keypad. This function also is called when the escape key is issued (typically by a softkey).

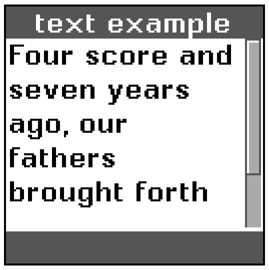
`onKey` – function for handling any key, soft or real, not consumed by the active control (section 4.2.6.2).

Note: The `gui.Text` constructor should be used only to display text, not as a control within a `gui.Form` or `gui.Menu`.

Example:

```
gui.statusText = "text example";
gui.show(new gui.Text
("Four score and seven years ago, our fathers brought forth upon
this continent, etc ..."));
```

displays the screen shown in Figure 13.



```
text example
Four score and
seven years
ago, our
fathers
brought forth
```

Figure 13 – gui.Text Example

Note: The scroll bar indicates that there is more text to display than is currently on the screen.

4.2.3.12 gui.ToggleButton

The `gui.ToggleButton` constructor defines a button control for a GUI form. When a toggle button is clicked, an indicator in the button is alternately displayed or suppressed.

Format:

```
var <togglebutton_name> =
new gui.ToggleButton(text, initiallyChecked, onToggle);
```

Where:

`<togglebutton_name>` – program-provided toggle button control.

`text` – string; a label for the toggle button.

`initiallyChecked` – Boolean; `true`, the button displays the checked indicator when first shown; `false`, the button does not display the checked indicator when first shown.

`onToggle` – function for handling the button click event. It passes a single Boolean parameter; `true`, the button is checked; `false`, the button is not checked. The OHV300 calls this function when the operator presses the `OK` enter key on the OHV300 keypad when the GUI button is the active control.

Other Functionality:

`checked` – Boolean; current state of toggle button.

`toggle` – function; toggles the toggle button as if activated by the GUI screen.

Example:

```
// form event handlers
// button control event handler
function toggleOnClick(checked)
        {reader.writeSetting(0xa7, checked);}
// create the form object
var myForm = new gui.Form();
// create the button
var toggle =
    new gui.ToggleButton("Vibrate", false, toggleOnClick);
// position the controls on the form
myForm.append(toggle);
// Place text on the status bar
myForm.caption = "toggle demo";
// show the form
gui.showForm(myForm);
```

Initially shows the form in Figure 14.

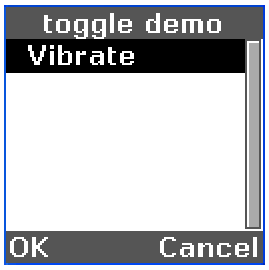


Figure 14 – Toggle Not Selected

Pressing the left softkey (OK) toggles the indicator, as shown in Figure 15, and turns on the vibrate feature of the OHV300. Pressing OK again turns off the indicator and the vibrate feature.

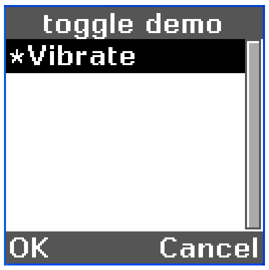


Figure 15 – Toggle Selected

4.2.4 Predefined Softkey Objects

The softkey objects described in this section are defined by the OHV300 JavaScript library.

4.2.4.1 backSoftkey

The `gui.backSoftkey` object defines a softkey object. It labels the softkey “Back” and sends the escape key when the softkey is clicked.

Example:

```
gui.rightSoftkey = gui.backSoftkey;
```

4.2.4.2 cancelSoftkey

The gui.cancelSoftkey object defines a softkey object. It labels the softkey “Cancel” and sends the escape key when the softkey is clicked.

Format:

```
gui.rightSoftkey = gui.cancelSoftkey;
```

4.2.4.3 okSoftkey

The `gui.okSoftkey` object defines a softkey object. It labels the softkey “OK” and sends the enter key when the softkey is clicked.

Format:

```
gui.leftSoftkey = gui.okSoftkey;
```

4.2.4.4 selectSoftkey

The `gui.selectSoftkey` object defines a softkey object. It labels the softkey “Select” and sends the enter key when the softkey is clicked.

Example:

```
gui.leftSoftkey = gui.selectSoftkey;
```

4.2.5 Form and Menu Common Methods

4.2.5.1 append(control)

The `append` function places the specified `control` as the last control in the specified menu or form.

Format:

```
<MenuOrForm_name>.append(control);
```

Where:

`control` – the control to append.

Note: A control cannot be used more than once in a form or menu.

Example: See section 3.2.2.

4.2.5.2 prepend(control)

The `prepend` function places the specified `control` as the first control in the specified menu or form.

Format:

```
<MenuOrForm_name>.prepend(control);
```

Where:

`control` – the control to `prepend` to the menu.

Note: A control cannot be used more than once in a menu or form.

Example:

See forms example in section 3.2.2.

4.2.5.3 setActiveChild(control)

The setActiveChild selects (but does not activate) the specified control when the menu or form is displayed. This method is optional.

Format:

```
<MenuOrForm_name>.setActiveChild(control);
```

Where:

`control` – the control to `select` when the menu is displayed.

Example:

See forms example in section 3.2.2.

Note: You must show the form/menu after setting the active child in order for this function to work properly.

4.2.6 Form and Menu Common Properties

The properties and methods described in the following section are common to the `gui.Menu` and `gui.Form` objects.

4.2.6.1 caption

The `caption` property is a string that is used by `gui.showForm`, `gui.showMenu`, and `gui.showSubMenu` to display a caption in the status bar of the OHV300 `gui` object.

Format:

```
<MenuOrForm_name>.caption = "<caption_string>";
```

Example:

See forms example in section 3.2.2.

4.2.6.2 onKey

The `onKey` property is a property of type function that is used by `gui.Form`, `gui.Menu`, and `gui.Text` to provide control for any key not consumed by the active control. Key constants are defined in section 0.

Format:

```
function processKey(key)
{
/* processing code */
}

<MenuOrForm_name>.onKey = processKey;
```

4.3 reader

The `reader` object models the handheld hardware and firmware. Use the methods and properties of the reader object to command the behavior of the handheld such as:

- Executing commands on the handheld
- Running a JavaScript on the handheld
- Reading and changing handheld settings
- Obtaining data decoded from bar codes

4.3.1 Methods

This section documents the methods defined for the handheld's `reader` object.

4.3.1.1 beep

The `beep` method causes the handheld to beep.

Format:

```
reader.beep(numBeeps);
```

Where:

`numBeeps` – number; number of beeps.

Note: This method does not return a value.

Example:

```
reader.beep(3);
```

Cause the reader to beep 3 times

4.3.1.2 defaultSettings

The defaultSettings method resets selected handheld settings to manufacturing defaults; it is equivalent to sending the 'J' command using the reader.processCommand method (section 4.3.1.3).

Format:

```
reader.defaultSettings();
```

Note: This method has no arguments and no return value. Default settings may vary by unit depending on the configuration purchased.

4.3.1.3 getKeyboardStatus

The getKeyboardStatus method takes no arguments and returns a read only Integer bitmapped value containing the keyboard state of the handheld hardware. Possible keyboard states include:

Bit	Key	Value
0	Numlock	0: Disabled 1: Enabled
1	Caps/Shift Lock	0: Disabled 1: Enabled
2	Scroll Lock	0: Disabled 1: Enabled
3	Compose	0: Disabled 1: Enabled
4	KANA	0: Disabled 1: Enabled

Example:

```
keyboardStatus = reader.getKeyboardStatus();
```

A `keyboardStatus` value of 5 would indicate that the Scroll Lock key and the Numlock key were both enabled.

4.3.1.4 processCommand

The processCommand method instructs the handheld to execute a command.

Format:

```
result = reader.processCommand(commandType, data);
```

Where:

`commandType` – string, 1 character; the command to be processed on the handheld.

`data` – string; data as required to process the command.

`result` – depending on the command, either:

- a Boolean value
- a data string

For `commandType`, `data`, and resulting values, refer to the Interface Configuration Document.

Example:

```
reader.processCommand('$', "\x03"); // read a code
reader.processCommand('P', "(26)32"); //change beep volume to 50
```

Sends a "$" command code (post event) with a one-byte value of 3 (event type = read near and far fields) to the handheld firmware.

4.3.1.5 readSetting

The `readSetting` method returns the current value of the specified configuration setting.

Format:

```
value = reader.readSetting(settingNumber);
```

Where:

`settingNumber` – number; integer value representing the setting to be read.

For `settingNumber` values, refer to the Interface Configuration Document.

Example:

```
value = reader.readSetting(0x1b);
```

Returns the current value of the handheld setting hex 1b (communications mode).

4.3.1.6 runScript

The `runScript` method instructs the handheld to schedule the load, compile, and execution of the specified JavaScript. The handheld schedules execution of the script immediately after the currently executing event handler or main script completes. The `runScript` method does not include a mechanism to return to the calling script.

Format:

```
result = reader.runScript(scriptName);
```

Where:

`scriptName` – string; the name of the JavaScript to be run. The script must first be loaded into handheld flash by name. See Vision Configurator (section 1.4).

`result` – Boolean; true if the script was loaded successfully; `false` otherwise. A return of `false` usually means that the script could not be found.

Example:

In the forms example (section 3.2.2), the onTimeCard function could be defined as follows:

```
function onTimeCard()
    {reader.runScript("TimeCardApp.js");}
```

The operator, at the end of a work shift, could press the "TimeCard" button to access a time card application.

4.3.1.7 saveSettings

The `saveSettings` method writes the current values of the handheld configuration settings into flash memory. Operational setting values are loaded from flash memory when the handheld reader initializes. Any changed configuration settings will be lost at reader shutdown unless saved in flash memory.

Format:

```
result = reader.saveSettings();
```

Where:

`result` – Boolean; `false` if the flash write fails; `true` otherwise.

Note: There are no arguments to this method.

4.3.1.8 setDisplayLed

The `setDisplayLed` method activates the LED of the OHV300 above the display.

Format:

```
reader.setDisplayLed(color);
```

Where,

`color` – must be `reader.green`, `reader.red`, `reader.amber` or `reader.none`.

Note: Setting 0x014d should be set to false for setDisplayLed to work properly.

4.3.1.9 setInterval

The `setInterval` method calls a function or evaluates an expression at specified intervals in seconds.

The `setInterval` method will continue calling the function until `clearInterval` is called, or the window is closed.

The ID value returned by `setInterval` is used as the parameter for the `clearInterval` method.

Format:

```
intervalId = reader.setInterval(function, interval_sec);
```

Where:

`intervalId` – program provided interval ID.

`function` – program provided function to run at the specified interval.

`interval_sec` – amount of time (in seconds) to delay before running the function again.

4.3.1.10 clearInterval

The `clearInterval` method removes the instance of `setInterval` that has the handle `intervalId`.

Format:

```
reader.clearInterval(intervalId);
```

Where:

`intervalId` – program provided interval ID.

4.3.1.11 setTimeout

The `setTimeout` method calls a function or evaluates an expression after a specified number of seconds. The function cannot be an object method.

The `setTimeout` method will call the function passed to it after the set amount of time unless `clearInterval` is called, or the window is closed.

The ID value returned by `setInterval` is used as the parameter for the `clearInterval` method.

Format:

```
timeoutId = reader.setTimeout(function, timeout_sec);
```

Where:

`timeoutId` – program provided timeout ID.

`function` – program provided function to run after the specified timeout.

`timeout_sec` – amount of time (in seconds) to delay before running the function.

4.3.1.12 clearTimeout

The `clearTimeout` method removes the instance of `setTimeout` that has the handle `timeoutId`.

Format:

`reader.clearTimeout(timeoutId);`

Where:

`timeoutId` – program provided timeout ID.

4.3.1.13 shiftJisToUnicode

The `shiftJisToUnicode` method converts a string from Shift-JIS encoding to Unicode encoding.

Format:

`unicodeString = reader.shiftJisToUnicode(text);`

Where:

`text` – String; text encoded as JIS.

`unicodeString` – String; text encoded as Unicode.

Example:

`myUnicodeString = reader.shiftJisToUnicode(myString);`

Sets myUnicodeString to the Unicode encoded equivalent of myString.

4.3.1.14 writeSetting

The `writeSetting` method changes the operational value of a single handheld configuration setting.

Format:

`writeSetting(settingNumber, value);`

Where:

`settingNumber` – decimal integer; the setting to be changed.

`value` – decimal integer; the value to be written to the configuration setting.

For the possible values of settingNumber and value, refer to the Interface Configuration Document.

Note: This method does not return a value.

Note: Use 0x to denote hex values

Example:

`reader.writeSetting(0x1b, 4);`

Sets the reader communications mode to Bluetooth RF. See also the `gui.Button` example in section 4.2.3.1.

Example:

```
reader.writeSetting(2, 0x7FFFFFFF);
```

Sets the reader Battery Trigger Confirmation Time to 0x7FFFFFFF milliseconds or ~596 hours (effectively infinite time).

4.3.1.15 unicodeToShiftJis

The `unicodeToShiftJis` method converts a string from Unicode encoding to Shift-JIS encoding.

Format:

```
shiftJisString = reader.unicodeToShiftJis(text);
```

Where:

`shiftJisString` – String; text encoded as JIS.

`text` – String; text encoded as Unicode.

Example:

```
myShiftJisString = reader.unicodeToShiftJis(myString);
```

Sets `myShiftJisString` to the Shift-JIS encoded equivalent of myString.

4.3.2 Properties

This section documents the properties defined for the handheld's `reader` object.

4.3.2.1 onCommand

The `onCommand` property of the handheld calls the specified function when the reader:

- Receives a configuration command from a communication port.
- Decodes a configuration command from a code read by the handheld.

The application uses this property as an event handler to:

- Receive notification of command processing.
- Prevent execution of a command.

The function will not be called in response to a `reader.processCommand` call or commands within a stored-code (“performance strings”). Performance strings are documented in the Interface Configuration Document.

Return Boolean `true` to instruct the reader to process the command. Return Boolean `false` to suppress the command. When a command is suppressed, the firmware will not send any response to the host, but the JavaScript application may provide its own response to the host.

Format:

```
function filterCommand(commandType, commandData)
{
var shouldSuppressCommand = false;
/* Processing statements */
return !shouldSuppressCommand;
}
reader.onCommand = filterCommand;
```

Where:

`commandType` – string; 1 character; specifies the command being processed.

`commandData` – string; data to be process by the command.

Example:

```
function notifyErase(commandType)
{
if ( commandType == ')' )
     print("Erasing Error Log...");
}
reader.onCommand = notifyErase;
```

Sends a debugging message to the host to show that the erase command was detected.

4.3.2.2 onCommandFinish

The `onCommandFinish` property of the `reader` object provides processing control upon completion of a command.

Format:

```
function finishedCommand(commandSuccess,
responseType,
responseData)
{
/* Processing statements */
}
reader.onCommandFinish = finishedCommand;
```

Where:

`commandSuccess` – Boolean; contains the return status of the command: true = success, false = failure.

`responseType` – string; 1 character; specifies the response type.

`responseData` – string; the response data.

Example:

```
function finishedCommand(commandSuccess,
responseType,
responseData)
{
if( !commandSuccess )
      alert(postAlertFunc, "Command failed ("
              + responseType + ":" + responseData + ")");
}
reader.onCommandFinish = finishedCommand;
```

sends an alert when a command fails.

4.3.2.3 onDecode

The `onDecode` property of the `reader` object provides processing control to the application program at the completion of a decode action. The handheld firmware passes the decode object to the function through the calling argument.

Code the function in your script and return a code as follows:

`null` – the decode has been consumed by the JavaScript application; there should be no further processing of it by the handheld firmware.

`false` – invalidate the decode; if the handheld firmware is so-configured, it will act as if there had not been a decode; the good-decode-beep will be suppressed.

`decode` – object (modified or unmodified) – the handheld firmware will continue to process the modified or unmodified decode data.

Format:

```
function onDecode(decode)
{
var valid       = true;
    /* set to false below if decode is to be invalidated */
var passthrough = true;
    /* set to false below if decode is consumed here */
/* processing statements, which may modify decode.data,
   valid, and/or passthrough */
if( !valid )
    return false;
if( !passthrough )
```

```
    return null;
return decode;
}
reader.onDecode = onDecode;
```

See the discussion of the `decode` object in section 4.1

Example:

See the discussion of symbol decoding in section 0.

4.3.2.4 onDecodeAttempt

The `onDecodeAttempt` property of the `reader` object provides processing control to the application program at the completion of a decode action, before any of the decoded symbols are passed to `reader.onDecode`.

Format:

```
function onDecodeAttempt(count)
{
/* processing statements */
}
reader.onDecodeAttempt = onDecodeAttempt;
```

Where:

`count` – number; a count of the number of symbols that were read by a single decode request.

Note: This method does not return a value.

Example:

```
var ok = false;
reader.onDecodeAttempt = function(count)
{
    ok = count >= 2;
}
reader.onDecode = function(decode)
{
    if( !ok )
        return false;
    return decode;
}
```

Ensures there at least two decodes per attempt; otherwise, invalidates the single decode. Each decode found in the field of view will be decoded only once per attempt, so this example ensures there are two distinct symbols in the field of view. The reader must have been configured (section 3.8) to support multiple reads per attempt.

4.3.2.5 onIdle

The `onIdle` property of the `reader` object provides processing control to the application program whenever the reader is idle; i.e., no events (such as button presses) are active or queued. This event is posted when the JavaScript has nothing else queued and is not related to the handheld active time (setting hex 32).

Format:

```
function onIdle()
{
/* processing statements */
}
reader.onIdle = onIdle;
```

Note: This method does not return a value.

Example:

```
function onIdle()
{
    reader.processCommand('.', "\x22\x05\x32\x64");
}
reader.onIdle = onIdle;
```

Flashes both LEDs on the OHV300 green 5 times, with LEDs on for ½ second and off for 1 second.

4.3.2.6 onStandby

The `onStandby` property of the `reader` object provides processing control to the application program whenever the reader is about to enter the standby mode.

Format:

```
function onStandby()
{
/* processing statements */
}
reader.onStandby = onStandby;
```

Where:

`return` – Boolean; `true` if the reader should be allowed to enter the standby mode; `false` to prevent it.

Example:

```
function onStandby()
{
    if (comm.isConnected) return false;
    else return true;
}
reader.onStandby = onStandby;
```

Prevents the reader from entering standby if it is connected and allows it to enter standby otherwise.

4.3.2.7 batteryLevel

The `batteryLevel` property of the `reader` object contains a read only integer specifying the battery charge level. Possible battery charge levels are:

`reader.green` – not low.

`reader.amber` – somewhat low.

`reader.red` – very low.

Example:

```
batteryLevel = reader.batteryLevel;
```

4.3.2.8 red

The `red` property of the `reader` object contains a read only constant for use with `reader.batteryLevel` and `reader.setDisplayLed`.

4.3.2.9 green

The `green` property of the `reader` object contains a read only constant for use with `reader.batteryLevel` and `reader.setDisplayLed`.

4.3.2.10 amber

The `amber` property of the `reader` object contains a read only constant for use with `reader.batteryLevel` and `reader.setDisplayLed`.

4.3.2.11 none

The none property of the `reader` object contains a read only constant for use with `reader.batteryLevel` and `reader.setDisplayLed`.

4.3.2.12 cabled

The `cabled` property of the `reader` object contains a read only Boolean value containing the cabling state of the handheld hardware. The value will be `true` if cabled and `false` if not cabled.

Example:

```
cabled = reader.cabled;
```

4.3.2.13 charging

The `charging` property of the `reader` object contains a read only Boolean value containing the charging state of the handheld hardware. The value will be `true` of charging and `false` if not charging.

Example:

```
charging = reader.charging;
```

4.3.2.14 hardwareVersion

The `hardwareVersion` property of the `reader` object contains a read only string containing the version number of the handheld hardware.

Example:

```
hwVersion = reader.hardwareVersion;
```

4.3.2.15 oemId

The `oemId` property of the `reader` object contains a read-only string containing the handheld unique OEM identifier from the locked flash memory.

Example:

```
oemId = reader.oemId;
```

4.3.2.16 readerId

The readerId property of the reader object contains a read-only string containing the handheld unique ID from the locked flash memory.

Example:

```
rid = reader.readerId;
```

4.3.2.17 softwareVersion

The `softwareVersion` property of the `reader` object contains a read only string containing the version number of the firmware currently running in the handheld reader.

Example:

```
swVersion = reader.softwareVersion;
```

4.3.2.18 bdAddr

The `bdAddr` property of the `reader` object contains a read only string containing the Bluetooth address of the radio installed in the handheld.

Example:

```
bdAddrString = reader.bdAddr;
```

4.4 storage

The `storage` object provides application software access to handheld file storage. Files are written to storage by the `storage.write` method and by downloading from the host (see section 3.7).

Note!
Names of files can be 1 - 200 printable ASCII characters. For compatibility with host file systems, we recopmmend that you do not use characters that are reserved by host operating systems: /, \, :, ?, *, [,], ', ", etc. Files should be kept to a maximum length of 32K bytes. Files are stored in UTF8 format, which encodes Unicode characters in one or more bytes each.

4.4.1 Methods

The following section documents the methods defined for the handheld `storage` object.

In this section, the examples use elements of a time card application that assumes time card records are maintained as files organized by employee number. The naming convention for the time card records is `TimeCard<employee_number>`.

4.4.1.1 append

The `storage.append` method adds data to the end of a file.

Format:

```
result = storage.append(name, data);
```

Where:

`name` – string; the name of the object to append.

`data` – string; the data to add to the end of the file.

`result` – Boolean; `true` if the append succeeded; `false` if the append failed.

Example:

```
storage.append("TimeCard" + employeeNumber, tcRecord);
```

Adds the time card record to the end of the time card record that already exists for the employee specified by `employeeNumber`.

4.4.1.2 erase

The `storage.erase` method erases a file.

Format:

```
result = storage.erase(name);
```

Where:

`name` – string; the name of the object to erase.

`result` – Boolean; `true` if the file existed (the object is deleted); `false` if the file did not exist.

Example:

```
storage.erase("TimeCard” + employeeNumber);
```

Erases the time card record for the employee specified by `employeeNumber`.

4.4.1.3 findFirst

The `storage.findFirst` method locates the first file where the name matches a regular expression specified in the call parameter.

Format:

```
name = storage.findFirst(expression);
```

Where:

`expression` – regular expression (not a string); a regular expression used by the handheld to match against names of stored objects.

`name` – string; the name of the first matching file; `name` is `null` if no file matches the `expression`.

Example:

```
name = storage.findFirst(/^TimeCard.*/);
```

Sets `name` to the name of the first time card record file.

4.4.1.4 findNext

The `storage.findNext` method locates the next file where the name matches the regular expression specified in the `expression` parameter of a previous `storage.findFirst` call. The matching names are not ordered, but they will not be repeated; a `findFirst - findNext` sequence will return all matching files, provided that there are no other intervening storage method calls. (You can put the files into an array and use JavaScript’s sort method when you need them ordered.)

Format:

```
name = storage.findNext();
```

Where:

`name` – string; the name of a file; `name` is `null` if no remaining file matches the previous regular expression.

Example:

```
name = storage.findNext();
```

Sets `name` to the name of the next time card record file.

4.4.1.5 read

The storage.read method reads a file.

Format and Example:

```
data = storage.read(name);
```

Where:

`name` – string; the `name` of a file.

`data` – string; the contents of the file; `null` if there was no file with that name.

Sets `data` to the contents of the time card record specified by `name`.

4.4.1.6 rename

The `storage.rename` method renames a file.

Format and Example:

```
ok = storage.rename(oldName, newName);
```

Where:

`oldName` – string; the name of a file to rename.

`newName` – string; the name of the file after rename.

`ok` – bool; success or failure of the renaming.

Sets `ok` to true or false. The file `oldName` is renamed to `newName` if return is `true`.

4.4.1.7 size

The storage.size method returns the size of a file in bytes.

Format and Example:

```
nameSize = storage.size(name);
```

Where:

`name` – string; the name of a file.

`nameSize` – integer; the size of the file in bytes.

Sets `nameSize` to the size of the time card record specified by `name`.

4.4.1.8 upload

The `storage.upload` method uploads a file to the host over the current active host comm port.

Format:

```
result = storage.upload(name, withHeaderAndFooter);
```

Where:

`name` – string; the name of a file.

`withHeaderAndFooter` – Optional boolean; If set to `false` the file is uploaded without the header (ap/g(file size))and footer (ap/d(checksum)). If the parameter is not included the header and footer will be included with the upload.

`result` – Boolean; `false` if there was a failure on the communications port; otherwise, `true`. If the current communications mode is a 2-way mode, `true` indicates that the data has been sent to and acknowledged by the host.

Note: The upload protocol is documented with the "^" command in the Interface Configuration Document.

Example:

```
name = storage.findFirst(/TimeCard.*/);
while (name)
{
if ( !storage.upload(name) )
      alert(name + " upload failed!");
name = storage.findNext();
};
```

Uploads all time card records to the host. If a time card record fails to upload, the operator is alerted.

4.4.1.9 write

The `storage.write` method writes a file to storage. If the file does not exist, the handheld creates it. If there was an existing file of the same name, it is replaced.

Format:

```
result = storage.write(name, data);
```

Where:

`name` – string; name of a file.

`data` – string; data to be written.

`result` – Boolean; `true` if the file was successfully written; otherwise, `false`.

Note: When replacing an existing file, if there is insufficient storage space to hold the new file, it will not be written; however, the old file will be erased.

Example:

```
result = storage.write("TimeCard" + employeeNumber, tcRecord);
```

Writes a time card record to a file.

4.4.1.10 getHeader

The storage.getHeader method returns the first multiline comment block from a JavaScript file. This includes encrypted files if the proper developer key is installed.

Format and Example:

```
data = storage.getHeader(name);
```

Where:

`name` – string; the name of a file.

`data` – string; the first multiline comment block of the file.

Sets `data` to the first multiline comment in the file.

4.4.1.11 saveOffsetWindow

The `storage.saveOffsetWindow` function will use the last decode to determine the origin and bounding box within the last image and save the rotated box defined by the offset point, width and height to filename. The function will return a `bool` indicating success or failure. Failure will usually mean the file could not be saved.

Format:

```
result = storage.saveOffsetWindow(xOffset, yOffset, width,_
height, filename)
```

Where:

`xOffset -`

`yOffset -`

`width -`

`height -`

`filename` – The body of the file name. The appropriate extension will be added by the system based on the JPEG compression settings in the registry.

4.4.2 Properties

The following section documents the properties defined for the handheld `storage` object.

4.4.2.1 fullness_percent

The `storage.fullness_percent` property is a read-only integer containing the percent of storage in use.

4.4.2.2 isFull

The `storage.isFull` property is a read-only Boolean value; `true` if storage is full and cannot be added to; otherwise, `false`.

4.4.2.3 logFullness_percent

The `storage.fullness_percent` property is a read-only integer containing the percent of storage in use.

4.5 comm

The `comm` object models the host commutation feature of the handheld reader. Use the methods and properties of the `comm` object to send either packet or text data to the host.

4.5.1 Methods

The following section documents the methods defined for the handheld `comm` object.

4.5.1.1 connect

The `connect` method instructs the handheld communication driver to attempt to establish a connection.

Format:

```
result = comm.connect(try_until_timeout);
```

Where:

`try_until_timeout` – Boolean; if `true`, the reader will attempt to try connecting for the number of seconds defined in connectionTime_sec (register 0xd9). If `false,` reader will try to connect once

`result` – Boolean; `false` if there was a failure to connect; otherwise, `true`.

4.5.1.2 disconnect

The `disconnect` method instructs the handheld communication driver to disconnect from the host.

Format and Example:

```
comm.disconnect();
```

Causes the reader to disconnect from the host.

4.5.1.3 sendPacket

The `sendPacket` method instructs the hanheld reader to send a data packet to the host via the communications port currently specified by the active handheld communication settings. The handheld creates a packet formatted according to the active handheld packet protocol configuration setting.

For a discussion of data packets, see the Interface Configuration Document.

Format:

```
result = comm.sendPacket(type, data);
```

Where:

`type` – string, length 1; the type of packet to send. The packet types are documented in the Interface Configuration Document.

`data` – string; data to be inserted into the packet.

`result` – Boolean; `false` if there was a failure on the communications port; otherwise, true. If the current communications mode is a 2-way mode, `true` indicates that the data has been sent to and acknowledged by the host.

Example:

```
reader.onDecode =
function(decode) {comm.sendPacket('z', decode.data)};
```

Sends a packet containing results of a decode to the current comm port.

4.5.1.4 sendText

The `sendText` method instructs the handheld reader to send arbitrary text (which may include NULL characters) to be sent via the active communication port; the text will be sent "raw" regardless of the reader `comm` mode settings. This method buffers the data until the USB packet size limit is reached or a 'z' packet is sent. For an immediate response, send the data as a 'z' packet using `comm.sendPacket`.

Format:

```
result = comm.sendText(data);
```

Where:

`data` – string; data to be sent via the active communication port.

`result` – Boolean; `false` if there was a failure on the communications port; otherwise, true. If the current communications mode is a 2-way mode, `true` indicates that the data has been sent to and acknowledged by the host.

Example:

```
reader.onDecode =
function(decode) {comm.sendText("decode.data"); }
```

Sends the raw text "decode.data" via the active communications port.

4.5.2 Properties

The following section documents the properties defined for the handheld `comm` object.

4.5.2.1 isConnected

The `isConnected` property of the `comm` object contains a read-only boolean specifying the host connection status. Possible connection values are:

`true` – reader is connected to the host.

`false` – reader is not connected to the host.

Example:

```
connected = comm.isConnected;
```

4.6 Functions

The following section documents functions that enhance the application development environment.

4.6.1 Dialog

The handheld JavaScript Engine provides the following functions like those defined by JavaScript in Web browsers:

- alert
- confirm
- prompt

These functions interact with the OHV300 standard GUI display. The OHV300 displays the name of the function in the GUI status bar and the text associated with the function, and then waits until a key is pressed. The following subsections describe the operation of each function in the OHV300 environment.

Similar but more flexible functions are provided in the `gui` object (see section 4.1). For example, if you want to change the caption on these displays use the `gui` object functions.

4.6.1.1 alert

The alert function displays text in the display area of the standard GUI display. Do not call this function within onDecode and onCommand event handlers.

Format:

```
alert(func, text);
```

Where:

`func` – function name; function to be called after displaying the alert. This function does not take any arguments and returns void.

`text` – string; text to display as the alert.

Processing suspends until the operator presses an enter key – either the enter key or the left softkey defined as OK.

Example:

```
alert(samplefunction, "Status Alert");
```

Displays the alert shown in Figure 717 and waits until the operator presses the enter key or the left softkey (OK). Once the operator presses a key, it calls `samplefunction()` to continue.

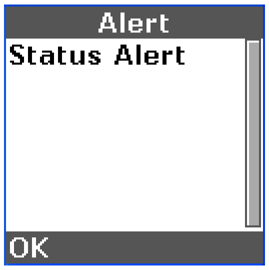


Figure 16 – Alert Example

4.6.1.2 confirm

The confirm function displays text in the display area of the standard GUI display and returns a value based on the key pressed. Do not call this function within onDecode and onCommand event handlers.

Format:

```
result = confirm(yesFunc, noFunc, text);
```

Where:

`yesFunc` – function name; function to be called when the confirm receives left softkey. This function does not take any arguments and returns void.

`noFunc` – function name; function to be called when the confirm receives right softkey. This function does not take any arguments and returns void.

`text` – string; text to display for confirmation.

`result` – Boolean; `true` if the confirm receives an enter key (either the enter key or the left softkey defined as `OK)`; `false` if the confirm receives the right softkey defined as `Cancel`.

Processing suspends until the operator presses a suitable key.

Example:

```
result = confirm(onYesClick, onNoClick, "Exit?");
```

Displays the confirm dialog shown in Figure 818 and waits until the operator presses the enter key or the left softkey. If operator presses Ok key, it calls onYesClick function. If operator presses Cancel key, it calls onNoClick function to continue processing.

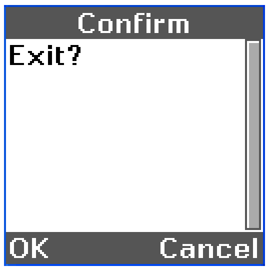


Figure 17 – Confirm Example

If you want softkey labels other than OK and Cancel (for example, Yes and No), use the `gui.confirm` method (section 4.2.1.2).

4.6.1.3 prompt

The `prompt` function displays text in the display area of the standard GUI display and returns a value based on the key pressed. Do not call this function within onDecode and onCommand event handlers.

Format:

```
result = prompt(func, text, default);
```

Where:

`func` – function name. Function to be called when prompt receives an enter key. The function takes one argument named `result` and returns void.

`text` – string; text to display as a label above a `gui.Edit` control.

`default` – string; a default string to display as the contents of edit control.

`result` – string; contents of the edit control if the prompt receives an enter key (either the enter key or the left softkey defined as `OK)`; null if the prompt receives the right softkey defined as `Cancel`.

Processing suspends until the operator presses an enter key or `Cancel` key. The operator can key new data into the edit control before pressing enter or the left softkey.

Example:

```
string = prompt(postPromptFunc, "Enter login ID", "None");
```

Displays the prompt shown in Figure 18.

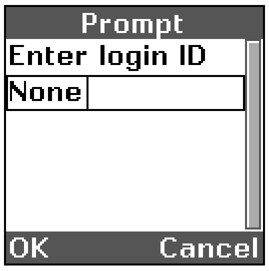


Figure 18 – Prompt Example

The value of `string` depends on the operator action.

- If the operator at any time presses the right softkey (Cancel), the value of string is null.
- If the operator changes the contents of the edit control to <new content> and presses the left softkey (OK), the value of string is <new content>.
- If the operator presses the left softkey (OK) without changing the contents of the edit control, the value of string is “None” (the value entered as the second call parameter).

4.6.2 Other Functions

4.6.2.1 gc

The `gc` function cleans up memory that has been allocated but is no longer needed by the runtime environment. This function is processor intensive, so its use can degrade performance.

Format:

```
gc();
```

4.6.2.2 include

The `include` function executes the included script inline.

Format:

```
result = include(scriptName);
```

Where:

`scriptName` – string; the name of the script to be included.

`result` – Boolean; `true` if the script could be loaded and executed; otherwise, `false`.

Example:

```
include("myScript.js");
```

adds the definitions in `myScript.js` to the application. The definitions become part of the “including” script.

4.6.2.3 print

The print function sends text to stdout (the active communication port), not to the OHV300 display. Limit the use of the print function to debugging. Use the comm object methods for normal data output to communication ports.

Format:

```
print(text);
```

Where:

`text` – string; debugging data to be sent to the active communications port.

4.6.2.4 setStandbyMessage

The setStandbyMessage allows you to create a custom standby message to display when the reader enters standby mode.

Format:

```
setStandbyMessage(text);
```

Where:

`text` – string; message to display when the reader enters standby mode.

4.6.2.5 wdt

Long processes may require the firmware watchdog to be petted during the operation. If the watchdog times out during a processor intensive operation, the reader will reboot and an error will be logged in the error log (see section 0). To prevent the reader from rebooting during a processor intensive section, the firmware watchdog timer needs to be petted.

Format:

```
wdt(seconds)
```

Where:

`seconds` – number; number of seconds for which the watchdog should be petted. Valid values are 1 to 300.

5 Glossary and Acronyms

Term	Definition
Control	User Class object instantiated in a OHV300 GUI form.
OHV300	Handheld reader with Bluetooth for all standard 1-D and 2-D codes with LC display and keyboard
RF	Radio Frequency
Code Data	Data resulting from the decode process after data capture or bar code read
Smart Quote	Previously formatted quotation marks, usually found in a word processing program
Softkey	User programmable key found on the OHV300
Consume	Used with no return value by the user defined application or firmware

6 Input Modes

The input mode determines the character set that is active for the OHV300 keypad. The modes are described in Table 2.

Table 2 – Keypad Input Modes

inputMode	characters
numeric	0123456789
caps	A-Z, 0-9 and all ASCII non-alphanumeric symbols: '!', '"', '#', '$', '%', '&', '\'', '(', ')', '*', '+', ',', '-', '.', '/', ':', ';', '<', '=', '>', '?', '@', '[', '\\', ']', '^', '_', '`', '{', '|', '}', '~'
lower	a-z, 0-9 and all ASCII non-alphanumeric symbols
symbols	All ASCII and ISO-8859-1 non-alphanumeric symbols

7 Format Specifiers

The control string of the format function accepts the following codes from the standard C library:

%d	signed decimal integers
%i	signed decimal integers
%e	lowercase scientific notation
%E	uppercase scientific notation
%f	floating point decimal
%g	uses %e or %f , whichever is shorter
%G	uses %E or %f, whichever is shorter
%o	unsigned octal
%s	character string
%u	unsigned decimal integers
%x	lowercase unsigned hexadecimal
%X	uppercase unsigned hexadecimal
%%	insert a percent sign

Flag, width, and precision modifiers are the same as in the standard C library definition.

8 Supported JavaScript Core

Objects, Methods, and Properties

Array

Boolean

Date

Function

Math

Number

Object

Packages

RegExp

String

sun

Top-Level Properties and Functions

decodeURI

decodeURIComponent

encodeURI

encodeURIComponent

eval

Infinity

isFinite

isNaN

NaN

Number

parseFloat

parseInt

String

undefined

Statements

break

const

continue

do...while

export

for

for...in

function

if...else

import

label

return

switch

throw

try...catch

var

while

with

Operators

Assignment Operators

Comparison Operators

Arithmetic Operators

% (Modulus)

++ (Increment)

-- (Decrement)

- (Unary Negation)

Bitwise Operators

Bitwise Logical Operators

Bitwise Shift Operators

Logical Operators

String Operators

Special Operators

?: (Conditional operator)

, (Comma operator)

`delete`	`new`
`function`	`this`
`in`	`typeof`
`instanceof`	`void`

9 Symbology ID & Modifier Information

There are several elements of the decode object that describe properties of the symbology read by the handheld reader. These elements are:

- decode.symbology – Main Symbology Identifier (ID)
- decode.symbology_ex – Extended Symbology Identifier (ID_EX)
- decode.symbologyModifier – Symbology Modifier (Mod)
- decode.symbologyModifier_ex – Extended Symbology Modifier (Mod_EX) (where this value is blank in the table below, no Extended Symbology Modifier is defined)
- decode.decoder – Which decoder was used in the decode process. For example: “cd”

Symbology Name	ID	ID_EX	Mod	Mod_EX
UPC_A	49	0	65	
UPC_E0	49	0	66	
UPC_E1	49	0	67	
EAN_JAN_8	49	0	68	
EAN_JAN_13	49	0	69	
UPC_D1	4†	N/A	N/A	
UPC_D2	5†	N/A	N/A	
UPC_D3	6†	N/A	N/A	
UPC_D4	7†	N/A	N/A	
UPC_D5	8†	N/A	N/A	
UPC_A_plus2	49	0	97	
UPC_A_plus5	49	0	48	
UPC_E0_plus2	49	0	98	
UPC_E0_plus5	49	0	49	
UPC_E1_plus2	49	0	99	
UPC_E1_plus5	49	0	50	
EAN_JAN_8_plus2	49	0	100	

EAN_JAN_8_plus5	49	0	51	
EAN_JAN_13_plus2	49	0	101	
EAN_JAN_13_plus5	49	0	52*	
EAN Bookland	49	0	52*	
EAN_UCC 14	17	0	48*	
Interleaved_2_of_5 (Full symbol decoded)	17	0	48*	0
Interleaved_2_of_5 (Partial left-half symbol issued)	17	0	48*	+1 (add one to existing value)
Interleaved_2_of_5 (Partial right-half symbol issued)	17	0	48*	+2 (add two to existing value)
ITF-14	17	0	48*	
Code39 (Full symbol decoded)	18	0	48	0
Code39 (Partial left-half symbol issued)	18	0	48	+1 (add one to existing value)
Code39 (Partial right-half symbol issued)	18	0	48	+2 (add two to existing value)
Code128 (Full symbol decoded)	19	0	48	0
Code128 (Partial left-half symbol issued)	19	0	48	+1 (add one to existing value)
Code128 (Partial right-half symbol issued)	19	0	48	+2 (add two to existing value)
Codabar	20	0	48	
Code93	21	0	48	
UCC_EAN_128	19	0	49	
UPC_A_w_Code_128_Supplemental	23†	N/A	N/A	
UPC_E_w_Code_128_Supplemental	24†	N/A	N/A	
EAN_JAN_8_w_Code_128_Supplemental	25†	N/A	N/A	

EAN_JAN_13_w_Code_128_Supplemental	26†	N/A	N/A	
num_IBM_symbologies	28†	N/A	N/A	
Australia Post	29	0	50	
Aztec	30	0	51	
Data Matrix	31	0	49	
Straight_2_of_5_2_Bar_Start_Stop	32†	N/A	N/A	
Straight_2_of_5_3_Bar_Start_Stop	33	0	48	
Japan Post	34	0	49	
KIX	35	0	53	
MSI_Plessey	36	0	48	
Maxi	37	0	49	
PDF417	38	0	48	0
Micro PDF417	38	0	48	1
PLANET	39	0	51	
POSTNET	40	0	48	
QR	41	0	49	0
Micro QR	41	0	49	1
Royal_Mail_4_State_Customer	42	0	52	
RSS_Expanded	43	0	48	
RSS_Expanded_Stacked	44	0	48	
RSS_Limited	45	0	48	
RSS_14	46	0	48	
RSS_14_Stacked / RSS_14_Stacked_Omni	47	0	48	
GoCode	48	0	N/A	

Codablock F	50	0	52
Code11	51	0	51
Pharmacode	52	0	49
Telepen	56	2	48
Hong Kong 2 of 5	0	64	57
Matrix 2 of 5 (checksum not checked)	0	1	50
Matrix 2 of 5 (Checksum checked and included in output string)	0	1	51
Matrix 2 of 5 (Checksum checked and stripped from output string)	0	1	52
NEC 2 of 5 (checksum not checked)	0	4	53
NEC 2 of 5 (Checksum checked and included in output string)	0	4	54
NEC 2 of 5 (Checksum checked and stripped from output string)	0	4	55
Trioptic Code 39	0	8	56
Royal Mail InfoMail A	0	4096	57
Royal Mail InfoMail B	0	4096	58
Korea Post	0	16384	N/A
UPU (57-bar)	?	N/A	54
UPU (75-bar)	?	N/A	55
USPS 4CB	?	N/A	56

? Unknown *Symbology ID + Modifier Conflict † Not tested yet

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