IVI-3.12: Floating Point Services Specification

April 2008 Edition
Revision 1.0

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Floating Point Services Shared Component Specification

Revision History

This section is an overview of the revision history of the Floating Point Services Specification. Specific individual additions/modifications to the document in draft revisions are denoted with diff-marks, "|", in the right hand column of each line of text to which the change/modification applies.

Table 1. Floating Point Services Specification Revisions

Revision Number	Date of Revision	Revision Notes
Revision 0.1	December 12, 2000	Original draft.
Revision 1.0	June 27, 2001	Final draft ready for review
Revision 1.0	April 29, 2008	Editorial change to update the IVI Foundation contact information in the Important Information section to remove obsolete address information and refer only to the IVI Foundation web site.

1. Specification Section Layout

1.1 Introduction

This section gives an overview of the information presented for each method/function that this specification defines.

Each Function section is composed of the following subsections:

Description:

Describes the behavior and intended use of the function.

C Function Prototype:

Defines the prototype that an IVI-C driver uses for the function.

Parameters:

Describes each function parameter.

Return Values:

Defines the possible completion codes for the function.

1.2 References

Several other documents and specifications are related to this specification. These other related documents are as follows:

- *IEEE Std 754-1985: IEEE Standard for Binary Floating-Point Arithmetic*

1.3 Implementation

The current installation package for the IVI Foundation Common Components,
including the IVI Floating Point Services Shared Component, is available from the IVI Foundation website at http://www.ivifoundation.org.

2. Floating Point Services Shared Component

2.1 IVI Floating Point Numbers Overview

Instruments often return special floating point numbers, such as 9.9e+37, to represent over-range or under-range conditions. Different instruments sometimes return different values to represent the same measurement conditions. To process instrument responses correctly, application developers often have to account for these special numbers in their program. Instrument drivers provide an easier-to-use interface for the application developer by converting such special values to standard values that can be recognized easily regardless of the instrument being used.

IVI drivers use the IVI Floating Point Services Shared Component to return standard floating point values to user programs. The component contains functions that create and recognize IEEE 754-compliant floating point numbers that represent positive infinity, negative infinity, and not-a-number.

2.2 Get Type

Description

This function returns an enumerated value indicating whether a specific value is a finite floating point number, positive infinity, negative infinity, or a not-a-number.

C Prototype

```
ViInt32 IviFloat_GetType (ViReal64 Value);
```

Parameters

Input	Description	Data Type
Value	The floating point value for which to determine the value.	ViReal64

Return Values

Return Value	C Identifier	Description
0L	IVIFLOAT_VAL_TYPE_FINITE	The value is a normal ViReal64 value.
1L	IVIFLOAT_VAL_TYPE_POS_INF	The value is positive infinity.
2L	IVIFLOAT_VAL_TYPE_NEG_INF	The value is negative infinity.
3L	IVIFLOAT_VAL_TYPE_NAN	The value is not a number.

2.3 NaN

Description

This function returns a 64 bit floating point number that represents a quiet not-a-number value as defined by the IEEE 754 standard.

C Prototype

```
ViReal64 IviFloat_NaN (void);
```

Parameters

None.

Return Values

Returns a 64-bit floating point number that represents a quiet not-a-number value as defined by the IEEE 754 standard.

2.4 Negative Infinity

Description

This function returns a 64 bit floating point number that represents negative infinity as defined by the IEEE 754 standard.

C Prototype

```
ViReal64 IviFloat_NegInf (void);
```

Parameters

None.

Return Values

Returns a 64 bit floating point number that represents negative infinity as defined by the IEEE 754 standard.

2.5 Positive Infinity

Description

This function returns a 64 bit floating point number that represents positive infinity as defined by the IEEE 754 standard.

C Prototype

```
ViReal64 IviFloat_PosInf (void);
```

Parameters

None.

Return Values

Returns a 64 bit floating point number that represents positive infinity as defined by the IEEE 754 standard.