respectively. For the IEEE "Double Extended" formats, MPI specifies a Format Width of 16 bytes, with 15 exponent bits, bias = +16383, 112 fraction bits, and an encoding analogous to the "Double" format. All integral values are in two's complement big-endian format. Big-endian means most significant byte at lowest address byte. [For Fortran `LOGICAL` and C++ `bool`, `0` implies false and nonzero implies true. Fortran `COMPLEX` and `DOUBLE COMPLEX` are represented by a pair of floating point format values for the real and imaginary components.] For C `_Bool`, Fortran `LOGICAL` and C++ `bool`, `0` implies false and nonzero implies true. C `float _Complex`, `double _Complex` and `long double _Complex` as well as Fortran `COMPLEX` and `DOUBLE COMPLEX` are represented by a pair of floating point format values for the real and imaginary components. Characters are in ISO 8859-1 format [4]. Wide characters (of type MPI_WCHAR) are in Unicode format [11].

All signed numerals (e.g., MPI_INT, MPI_REAL) have the sign bit at the most significant bit. MPI_COMPLEX and MPI_DOUBLE_COMPLEX have the sign bit of the real and imaginary parts at the most significant bit of each part.

According to IEEE specifications [3], the "NaN" (not a number) is system dependent. It should not be interpreted within MPI as anything other than "NaN."

Advice to implementors. The MPI treatment of "NaN" is similar to the approach used in XDR (see ftp://ds.internic.net/rfc/rfc1832.txt). (*End of advice to implementors.*)

All data is byte aligned, regardless of type. All data items are stored contiguously in the file (if the file view is contiguous).

Advice to implementors. All bytes of `LOGICAL` and `bool` must be checked to determine the value. (*End of advice to implementors.*)

Advice to users. The type MPI_PACKED is treated as bytes and is not converted. The user should be aware that MPI_PACK has the option of placing a header in the beginning of the pack buffer. (*End of advice to users.*)

The size of the predefined datatypes returned from MPI_TYPE_CREATE_F90_REAL, MPI_TYPE_CREATE_F90_COMPLEX, and MPI_TYPE_CREATE_F90_INTEGER are defined in Section **??**, page **??**.

Advice to implementors. When converting a larger size integer to a smaller size integer, only the less significant bytes are moved. Care must be taken to preserve the sign bit value. This allows no conversion errors if the data range is within the range of the smaller size integer. (*End of advice to implementors.*)

Table 1.2 specifies the sizes of predefined datatypes in "external32" format.

1.5.3 User-Defined Data Representations

There are two situations that cannot be handled by the required representations:

1. a user wants to write a file in a representation unknown to the implementation, and
2. a user wants to read a file written in a representation unknown to the implementation.