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Specification Syntax

This section presents syntactic conventions that are adhered to throughout this specification.

General Syntax

In general, the extension package follows the X11 protocol syntax conventions. Additions to this syntax are as follows:

- The syntax (. . .) encloses a set of alternative values.
- The syntax [. . .] encloses a set of structure components.
- Within definitions the following prefixes are used:
  - **XieReq**: Protocol request/reply (for example, **XieReqCreatePhotoflo**)
  - **XieFlo**: **Photoflo** element (for example, **XieFloConvolve**)
  - **XieEvn**: Protocol event (for example, **XieEvnPhotofloDone**)
  - **XieErr**: Protocol error (for example, **XieErrPhotospace**)
  - **XieTyp**: Protocol type (for example, **XieTypProcessDomain**)
  - **XieVal**: Alternative value (for example, **XieValBandByPixel**)

- Outside of definitions the prefixes are generally not used:
  - Alternative values are italicized and bold (for example, ***BandByPixel***)
  - All others are capitalized and bold (for example, **CreatePhotoflo**)

- Core X types are displayed in upper-case (for example, `COLORMAP`, `WINDOW`)

Request Syntax

Requests without a Reply:

XieReq*RequestName*

arg-1: type-1 1st argument for *RequestName*

. . .

arg-N: type-N N-th argument for *RequestName*

Errors: none or list of errors specific to *RequestName* (for example, ***FloID***)
Events: none or list of events generated by *RequestName* (for example, ***PhotofloDone***)

Overview Describes the basic function of the request.

Parameters Lists the parameters and gives a brief description of each.

Semantics Interrelationships between input data, parameters, and output results.

Errors Table of errors that can be generated and their causes, for example:

Error	Cause
error-1	Circumstances that generate error-1
. . .	
error-N	Circumstances that generate *error-N*

Requests with a Reply:

XieReq*RequestName*

arg-1: type-1 1st argument for *RequestName*

. . .

arg-N: type-N N-th argument for *RequestName*

→

result-1*:* type-1 1st reply result from *RequestName*

. . .

result-M*:* type-M M-th reply result from *RequestName*

Errors: none or list of errors specific to *RequestName* (for example, ***Photomap***)
Events: none or list of events generated by *RequestName* (for example, ***EventName***)

Overview Describes the basic function of the request.

Parameters Lists the parameters and gives a brief description of each.

Reply data Lists the parameters and gives a brief description of each.

Semantics Interrelationships between input data, parameters, and output results.

Errors Table of errors that can be generated and their causes, for example:

Error	Cause
error-1	Circumstances that generate *error-1*
. . .	
error-N	Circumstances that generate *error-N*

Syntax of Photo Elements

PhotoElements occur within XIE pipelines (see following chapters for clarification). The syntax of these elements is as follows:

Photo Elements:

XieFlo*ElementName*

src-1: src-type-1	1st source for *ElementName* (if required)
. . .	
src-N: src-type-N	N-th source for *ElementName* (if required)
param-1: param-type-1	1st parameter for *ElementName*
. . .	
param-M: param-type-M	M-th parameter for *ElementName*

Errors: none or list of errors specific to *ElementName* (for example, ***FloAlloc***)
Events: none or list of events generated by *ElementName* (for example, ***ExportAvailable***)

Attributes Table of **PhotoElement** output attributes, for example:

Attribute	Value	
class	**DataClass** of output data	
	SingleBand	achromatic or index
	TripleBand	trichromatic
type	**DataType**:	
	Constrained	quantization levels is ***levels*** (integer data)
	Unconstrained	quantization levels is unknown (may be float data)
width	Width of output data (in pixels per band)	
height	Height of output data (in pixels per band)	
levels	Depends on ***type***:	
	Constrained	number of quantization levels (per band)
	Unconstrained	unknown

Overview Describes the basic function of the photo element.

Parameters Lists the parameters and gives a brief description of each.

Semantics Interrelationships between input data, parameters, and output results.

Errors Table of errors that can be generated and their causes, for example:

Error	Cause
error-1	Circumstances that generate *error-1*
. . .	
error-N	Circumstances that generate *error-N*

Syntax of Events

Events generated by Photo Elements:

XieEvn*EventName*

instance: XieTypExecutable	< **Photoflo** *instance* generating *EventName* >
phototag: XieTypPhototag	< event **Phototag** (0 for general **Photoflo** event) >
type: `CARD16`	< element type (0 for general **Photoflo** event) >
value-1: type-1	< 1st value returned by *EventName* >
...	
value-N: type-N	< N-th value returned by *EventName* >

Overview Description of the event.

Values returned Description of the values returned.

Syntax of Errors

Errors can be associated with core X11 resources or XIE resources. In the case of XIE specific error conditions, a distinction is made between errors related to a **Photoflo** and those that are not.

Core X errors

Normal X errors (with XIE major/minor opcodes) are used where appropriate (for example, ***Alloc***).

XIE non-Photoflo errors:

XieErr*Name*

xie-error: XieErr*Name*	< error code of *Name*, offset from *first-error* >
resource-id: `XID`	< resource to blame, for example, **Photomap** >
detail	< 21 bytes available for additional error detail >

Overview Description of the error.

Values returned Description of the values returned.

XIE Photoflo related errors:

XieErrFlo*Name*

flo-error: XieErr*Name*	< error code for ***Flo***, offset from *first-error* >
flo-id:`CARD32`	< executable *flo-id*>
flo-code: XieErrFlo*Name*	< specific error type >
name-space: `CARD32`	< executable *name-space*>
phototag: `CARD16`	< erring **Phototag** (0 for general **Photoflo** error) >
type: `CARD16`	< element type (0 for general **Photoflo** error) >
detail	< 12 bytes available for additional error detail >

Overview Description of the error.

Values returned Description of the values returned.

Syntax of Protocol Encodings

Requests

# of Bytes	Value	Description
1	`CARD8`	XIE major opcode
1	`CARD8`	XIE minor opcode
2	`CARD16`	Request length (total bytes divided by 4)
N		Parameters required by the minor opcode
< 4		Pad (if required)

Requests consist of four (4) bytes of header followed by zero (0) or more additional bytes of data. If additional bytes of data are needed the entire request is padded to a multiple of four (4) bytes. The common fields (major/minor opcode and length) are not included in **XieReq** request definitions. Bytes not used by a specific minor opcode are not guaranteed to be zero.

Replies

# of Bytes	Value	Description
1	1	Reply
1		Available for reply data
2	`CARD16`	Sequence number of corresponding request
4	`CARD32`	Reply length (extra data bytes divided by 4)
24		Available for reply data
N		Extra data beyond standard reply packet
< 4		Pad (if required)

Replies consist of thirty-two (32) bytes followed by zero (0) or more extra bytes of data. If extra bytes of data are needed the entire reply is padded to a multiple of four (4) bytes. The common fields (Reply, sequence number, and length) are not included in **XieReq** reply definitions. Bytes not used by the reply from a specific request are not guaranteed to be zero.

PhotoElements

# of Bytes	Value	Description
2	`CARD16`	Element type
2	`CARD16`	Element length (bytes divided by 4)
multiple of 2	XieTyp(Phototag|Tile)	Element's data source(s) (if required)
N		Parameters as required by element type
< 4		Pad (if required)

A photo element consists of four (4) bytes of header followed by zero (0) or more bytes of element input connection definitions and by zero (0) or more bytes or additional data. The entire element definition is padded to a multiple of four (4) bytes. The common fields (element type and element length) are not included in **XieFlo** element definitions. Bytes not used by a specific element type are not guaranteed to be zero.

Note: PhotoElements are not protocol requests but, rather, *subpackets* within another protocol request (that is, **ExecuteImmediate**, **CreatePhotoflo**, **ModifyPhotoflo**, or **RedefinePhotoflo**).

Events

# of Bytes	Value	Description
1	`CARD8`	XIE event code
1	<varies>	<event-specific>
2	`CARD16`	Sequence number
4	`TIMESTAMP`	Time
24	<varies>	<event-specific>

Events consist of thirty-two (32) bytes. The common fields (event code, sequence number, and time) are not included in **XieEvn** definitions. Bytes not used by a specific event code are not guaranteed to be zero.

Errors

# of Bytes	Value	Description
1	0	Error
1	`CARD8`	XIE error code
2	`CARD16`	Sequence number
4	<varies>	<error-specific (often a resource-id)>
2	`CARD16`	Minor opcode
1	`CARD8`	Major opcode
21	<varies>	<error-specific>

Errors consist of thirty-two (32) bytes. Bytes not used by the specific error code are not guaranteed to be zero.