

XCOMM

MATLAB control system interface

2014-09-29

Sascha Meykopff

MATLAB client control system interface current status

Need a tool to communicate with my new optics server.

Send data and receive data types are different.

Need to define send data type and more options.

Full support for all MATLAB data types
(char,cell,double,float,un/signed int/16/32/64,bool)

Need full structures support.

No tool achieve my conditions.

XCOMM

- Common interface for all data types.
- Send and receive (nearly) all data types.
- Auto probing data type
- Set formats, array sizes and tag names
- Set operation modes (TCP/UPD, READ/WRITE, SYNC/ASYNC, TIMEOUT/POLLING)
- Embedded structures support
- Bulk operations
- Wildcard operations
- Convert some special data (JPEG, MDA)
- Timestamps in MATLAB format
- Browsing support
- Extensive tests

Basic operation

```
r = xcomm('/FLASH/LASER/LASER1/ONOFF')
```

```
r =   data: 0
```

```
      error: []
```

```
matlabtime: 7.3587e+05
```

```
  linkname: '/FLASH/LASER/LASER1'
```

```
linkproperty: 'ONOFF'
```

```
  timestamp: '29.09.14 11:58:07.186 CDT'
```

```
  arraytype: ''
```

```
r = xcomm('FLASH/LASER/LASER1[ONOFF]')
```

Complicated data types

```
r =  
xcomm('TEST/UnitServer/UnitDevice0/Nes  
tedStruct')
```

```
r = data: [1x1 struct]  
    error: []  
    matlabtime: 7.3587e+05  
linkname: '/TEST/UnitServer/UnitDevice0'  
    linkproperty: 'NestedStruct'  
    timestamp: '29.09.1412:06:55.502  
CDT'  
    arraytype: ''
```

```
r.data  
    StHdr: [1x1 struct]  
    StBod: [1x4 struct]
```

```
r.data.StBod  
ans =  
1x4 struct array with fields:  
    c  
    d  
    e
```

```
r.data.StBod(1)  
ans =  
    c: 5  
    d: 6  
    e: [1x1 struct]
```

Different send/receive type

```
r =  
xcomm('TEST/FOpticsInfoD/GENERIC/GetR12R34',{ 'DEFAULT','FLASH1',  
'Q10ACC1',' ','Q6UND6'}, 'SEND_FORMAT','NAME32')
```

```
r =
```

```
    data: [-0.8753 -2.5322]
```

```
    error: []
```

```
matlabtime: 7.3587e+05
```

```
    linkname: '/TEST/FOpticsInfoD/GENERIC'
```

```
linkproperty: 'GetR12R34'
```

```
    timestamp: '29.09.14 12:21:32.302 CDT'
```

```
    arraytype: ''
```

DOOCS wildcard

```
r = xcomm('TTF2/TOROID.ML/*/CHARGE.PULSE')
r =
    data: [1x17 struct]
    error: []
    matlabtime: 7.3587e+05
    linkname: '/TTF2/TOROID.ML/*'
    linkproperty: 'CHARGE.PULSE'
    timestamp: '29.09.14
12:24:47.759 CDT'
    arraytype: ''

r.data(1)
ans =
    ival: 0
    f1val: 0.6539
    f2val: 0
    tm: 1411986287
    str: '3GUN'
```

Wildcard

```
>> r =  
xcomm('FLASH/LASER/L*/ONOFF'  
)
```

```
r =  
1x2 struct array with fields:  
  data  
  error  
  matlabtime  
  linkname  
  linkproperty  
  timestamp  
  arraytype
```

```
>> r(1)
```

```
ans =
```

```
  data: 0  
  error: []  
  matlabtime: 7.3587e+05  
  linkname:  
  '/FLASH/LASER/LASER1'  
  linkproperty: 'ONOFF'  
  timestamp: '29.09.14  
12:31:55.073 CDT'  
  arraytype: ''
```


Bulk operation

```
>> r = xcomm( {  
'FLASH/LASER/LASER1/ONOFF' ;  
'FLASH/LASER/LASER1/SHOT' }  
)
```

```
r =  
1x2 struct array with fields:  
  data  
  error  
  matlabtime  
  linkname  
  linkproperty  
  timestamp  
  arraytype
```

```
>> r(1)  
  
ans =  
  
      data: 0  
      error: []  
  matlabtime: 7.3587e+05  
      linkname:  
'/FLASH/LASER/LASER1'  
  linkproperty: 'ONOFF'  
      timestamp: '29.09.14  
12:30:11.296 CDT'  
      arraytype: ''
```

XCOMM parameter (1)

```
result = xcomm( '<target address>'
[,<send data>]
['optionString',optionValue,...] )
```

Or:

```
result = xcomm( { '<target address>' ; 'target 2' }
[,<send data>]
['optionString',optionValue,...] )
```

XCOMM parameter (2)

| | |
|----------------------|---|
| 'FORMAT' | 'INT32', 'DOUBLE', 'SPECTRUM', ... |
| Alias: 'SEND_FORMAT' | 'RECV_FORMAT', 'INPUT_FORMAT', |
| 'OUTPUT_FORMAT' | |
| 'TAG' | tag name for CF_STRUCT or MDA data types |
| ('SEND_TAG' | 'RECV_TAG') |
| 'CONNECTION' | 'SYNC', 'ASYNC' |
| 'ACCESS' | 'R', 'W', 'RW', 'READ', 'WRITE', 'READ WRITE' |
| 'TIMEOUT' | numeric (milliseconds), default is 1000 ms |
| 'DEBUG' | default is 0 |
| 'RECV_ARRAY_SIZE' | alias: RECV_ARRAY_LEN 'OUTPUT_SIZE' |
| 'TRANSPORT' | 'TCP' or 'UDP' |

BROWSING support

```
r = xcomm('/')
```

```
r =
```

```
    data: {1x64 cell}
```

```
    error: []
```

```
    matlabtime: []
```

```
    linkname: ""
```

```
    linkproperty: ""
```

```
    timestamp: []
```

```
    arraytype: []
```

```
>> r.data
```

```
ans =
```

```
Columns 1 through 12
```

```
    'HERA'  'SERVICE'  'TTF'  'DESY2'  'LINAC2'  'DESY3'  'DORIS'  'PETRA'  'SITE'  
'TEST'  'TTF2'  'MHF'
```

```
....
```

Future plans

- Support (real) matlab callbacks