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<u>Generated tests scripts</u>

In order to test the csl language and the csl compiler, small tests that are generated by Perl scripts are used. There are almost 250 scripts written by the test team, which can generate valid or invalid tests, and the scripts are created accordingly. One test generator can only have valid or invalid tests. The name of the script suggests what command(s)/object(s) are being tested in the current script. Each script creates a directory which will contain all the generated tests. This folder and the tests in it have a suggestive name also.

There are two ways to generate all the tests and then run them:

1. This is the classic method were you have to do it all manually. The first step is to delete everything you have in the directory test/csl_test_gen/ (because this is where the generated tests will stored). Then you have to run all the scripts in test/scripts/ (this is the location were all the scripts that generate tests are), one script at a time. The path with the generated tests is shown when the script is ran. Last step is to run the regression script run_regress.pl for the csl_test_gen directory:

   ```
   run_regress.pl -hdl csl_test_gen
   ```

2. The second method is to go in misc/scripts/ and run the script: run_all_gen_tests.pl . That's it! Simple, no? The script will do everything that is in the first method, which includes : delete the old generated tests from test/csl_test_gen/, run all the scripts in test/scripts/, compile the generated csl tests using the regression script and publish the results in test/report/.

The test matrices contain all the different cases that can be used as tests, and each cell in the matrix represents one of these cases. For every cell there is a test generated using the scripts. For example, in the connect_by_name matrix, a connection between a signal part select (rows) and an input port part select (columns) represents a legal test case that has a corresponding test which will be generated by a Perl script.
The test generators (Perl scripts) create csl code with all the cases in the test matrices.

If we want to generate the tests just for one script and compile them, we can consider the example above; in order to run the script that generates the test and then compile the generated csl code, the following must be done:

- in test/scripts/ :
  ```
  ./ar_conn_name_port_valid.pl
  ```
- in test/csl_test_gen/ :
  ```
  ./run_regress.pl -hdl   csl_test_gen -dir_filter ar_conn_name_port_valid
  ```
- the results are stored as HTML pages in : test/report/results_2008.09.20_13_41_55/

The script will only generate valid csl tests, which is suggested by the name of it. The created directory with the tests has the same name as the script and is used with the -dir_filter option in order to compile just the tests from it. The number of generated tests depends on how many cases are included in the script and each test has a unique but suggestive name (e.g. ar_conn_name_port93_legal.csl).
One of the generated tests for verifying the connection between signal part select with port part select, and port part select with port is :

```
//Generated by oanab

csl_bitrange br1(17);
csl_bitrange br2(15);
csl_bitrange br3(83);
csl_unit a13 {
  csl_port p_x388(input,32);
  a13 () { }
};
```

```
csl_unit b13 {
  a13 a13_0;
  b13 () {}
};

csl_unit c13 {
  b13 b13_0;
  csl_port p_c388(input,32);
  csl_port p_b388(input,br2);
  c13 () {
    b13_0.a13_0.p_x388[31:17].connect_by_name(p_b388);  // p.ps---port (CP)
  }
};

csl_unit d13 {
  c13 c13_0(.p_b388(s_d388[97-:15]));
  csl_signal s_d388(98);
  a13 a13_1;
  d13 () {
    s_d388[97:83].connect_by_name(c13_0.p_c388[31-:15]);  // sig.ps---p.ps (PC)
  }
};
```

Note that a script contains more than one test case, otherwise there would have been way too many scripts and running such a large number of test generators is not justified.

Assign matrix

	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS
	s	sq[+].s	s.ps	sq[+].s.p	sq[+]	ifc[+]	e	p – input	c – input	p – outp	c – outp	p – inout	c – inout	p – input	c – input	p – outp	c – outp	p – inout	c – inout	op expr	concat e	rep expr
s					illegal	illegal			illegal	illegal			illegal			illegal			illegal			
sq[+].s					illegal	illegal			illegal	illegal			illegal			illegal			illegal			
s.ps					illegal	illegal			illegal	illegal			illegal			illegal			illegal			
sq[+].s.ps					illegal	illegal			illegal	illegal			illegal			illegal			illegal			
sq[+]	illegal	illegal	illega	illegal			illega	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
ifc[+]	illegal	illegal	illega	illegal			illega	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
e					illegal	illegal			illegal	illegal			illegal			illegal			illegal			
p – input	illegal	illegal	illega	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
c – input					illegal	illegal			illegal	illegal			illegal			illegal			illegal			
p – output					illegal	illegal			illegal	illegal			illegal			illegal			illegal			
c – output	illegal	illegal	illega	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
p – inout					illegal	illegal			illegal	illegal			illegal			illegal			illegal			
c – inout	illegal	illegal	illega	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
p – input ps	illegal	illegal	illega	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
c – input ps					illegal	illegal			illegal	illegal			illegal			illegal			illegal			
p – output ps					illegal	illegal			illegal	illegal			illegal			illegal			illegal			
c – output ps	illegal	illegal	illega	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
p – inout ps					illegal	illegal			illegal	illegal			illegal			illegal			illegal			
c – inout ps	illegal	illegal	illega	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
op expr	illegal	illegal	illega	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
cc expr vars									illegal	illegal			illegal			illegal			illegal			
cc expr nums	illegal	illegal	illega	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
rep expr	illegal	illegal	illega	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal

Connect by name matrix

			RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS					RHS					RHS					RHS					RHS				
			s	Sg[+].s	s.ps	Sg[+].s.ps	Sg[+]	lfc[+]	p – input	C – input	p – output	C – output	p – input ps	C – input ps	p – output ps	C – output ps	op_expr					Cc_expr					Cc_expr_nums					Rep_expr					Rep_expr_nums				
																	Sig	P-in	P-out	C-in	C-out	Sig	P-in	P-out	C-in	C-out	Sig	P -ir	P-out	C-in	C-out	Sig	P-in	P-ou	C-in	C-oı	Sig	P -in	P-ou	C-in	C-out
LHS	s		illegal	illegal	illegal	illegal	illegal	illegal									illegal					illegal					illegal			illegal		illegal					illegal			illegal	
LHS	Sg[+].s		illegal	illegal	illegal	illegal	illegal	illegal									illegal					illegal					illegal			illegal		illegal					illegal			illegal	
LHS	s.ps		illegal	illegal	illegal	illegal	illegal	illegal									illegal					illegal					illegal			illegal		illegal					illegal			illegal	
LHS	Sg[+].s.ps		illegal	illegal	illegal	illegal	illegal	illegal									illegal					illegal					illegal			illegal		illegal					illegal			illegal	
LHS	Sg[+]		illegal	illegal	illegal	illegal	illegal		illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
LHS	lfc[+]		illegal	illegal	illegal	illegal			illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
LHS	p – input						illegal	illegal	illegal		illegal	illegal	illegal		illegal	illegal	illegal	illegal	illegal		illegal		illegal	illegal		illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal		illegal	illegal	illegal	illegal	illegal	illegal
LHS	C – input						illegal	illegal		illegal	illegal			illegal	illegal				illegal	illegal				illegal	illegal				illegal	illegal				illegal	illegal				illegal	illegal	
LHS	p – output						illegal	illegal	illegal	illegal	illegal		illegal	illegal	illegal			illegal	illegal	illegal			illegal	illegal	illegal		illegal	illegal	illegal	illegal			illegal	illegal	illegal		illegal	illegal	illegal	illegal	
LHS	C – output						illegal	illegal	illegal			illegal	illegal			illegal		illegal			illegal		illegal			illegal	illegal	illegal	illegal	illegal	illegal		illegal			illegal	illegal	illegal	illegal	illegal	illegal
LHS	p – input ps						illegal	illegal	illegal		illegal	illegal	illegal		illegal	illegal	illegal	illegal	illegal		illegal		illegal	illegal		illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal		illegal	illegal	illegal	illegal	illegal	illegal
LHS	C – input ps						illegal	illegal		illegal	illegal			illegal	illegal				illegal	illegal				illegal	illegal				illegal	illegal				illegal	illegal				illegal	illegal	
LHS	p – output ps						illegal	illegal	illegal	illegal	illegal		illegal	illegal	illegal			illegal	illegal	illegal			illegal	illegal	illegal		illegal	illegal	illegal	illegal			illegal	illegal	illegal		illegal	illegal	illegal	illegal	
LHS	C – output ps						illegal	illegal	illegal			illegal	illegal			illegal		illegal			illegal		illegal			illegal	illegal	illegal	illegal	illegal	illegal		illegal			illegal	illegal	illegal	illegal	illegal	illegal
LHS	op_expr	P	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
		C	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
		Sig	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
	c_expr var	P	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
		C	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
		Sig	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
	expr_nu	P	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
		C	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
	rep_expr	P	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
		C	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
		Sig	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
	expr_nı	P	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
		C	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal

Connect_by_pattern matrix

Combinations of LHS and RHS		RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS	RHS
		s	Sg[+].s	Sg[+]	Ifc[+]	p – input	C – input	p – output	C – output	Many p – input	Many C – input	Many p – output	Many C – output	op_expr	Cc_expr	Cc_expr_nums	Rep_expr	Rep_expr_nums
LHS	s	illegal	illegal	illega	illegal					illegal		illegal	illega	illegal	illegal	illegal	illegal	illegal
LHS	Sg[+].s	illegal	illegal	illega	illegal					illegal		illegal	illega	illegal	illegal	illegal	illegal	illegal
LHS	Sg[+]	illegal	illegal	illegal		illega	illegal	illega	illegal	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal
LHS	Ifc[+]	illegal	illegal			illega	illegal	illega	illegal	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal
LHS	p – input			illega	illegal	illega		illega	illegal	illegal		illegal	illega	illegal	illegal	illegal	illegal	illegal
LHS	C – input			illega	illegal		illegal	illegal		illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal
LHS	p – output			illega	illegal	illega	illegal	illegal		illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal
LHS	C – output			illega	illegal	illega			illegal	illegal		illegal	illega	illegal	illegal	illegal	illegal	illegal
LHS	op_expr	illegal	illegal	illega	illegal	illega	illegal	illega	illegal	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal
	cc expr vars	illegal	illegal	illega	illegal	illega	illegal	illega	illegal	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal
	cc expr nums	illegal	illegal	illega	illegal	illega	illegal	illega	illegal	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal
		illegal	illegal	illega	illegal	illega	illegal	illega	illegal	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal
	rep expr	illegal	illegal	illega	illegal	illega	illegal	illega	illegal	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal
	Rep expr nums	illegal	illegal	illega	illegal	illega	illegal	illega	illegal	illegal	illegal	illegal	illega	illegal	illegal	illegal	illegal	illegal

p – parent
c – child
Sig – signal
sg – signal group
ifc – interface
ps – part select
expr – expression
cc – concatenate
rep – replication

Connect_by_name with parameter and part select

		ko				pmo				pmo with kps				ko with pps				pmo with pmps				op_expr_p				cc_expr_p				rep_expr_p			
		s	p	ifc	sg	s	p	ifc	sg	s.ps	p.ps	ifc.p.	sg.s.	s.ps	p.ps	ifc.p.p	sg.s.p	s.ps	p.ps	ifc.p.p	sg.s.p	s	p	ifc	sg	s	p	ifc	sg	s	p	ifc	sg
ko	s	illeg	lw=r	illega	illeg	illeg	lw=r	illeg	illeg	illega	lw=rv	lw=rv	illega	illega	lw=rv	lw=rw	illegal	illegal	lw=rv	lw=rw	illegal	illeg	lps	illeg	illeg	illeg	lpsv	illeg	illeg	illeg	lps	illeg	illega
	p	lw=r	lw=r	illega	illeg	lw=r	lw=r	illeg	illeg	lw=rv	lw=rv	lw=rv	lw=rv	lw=rv	lw=rv	lw=rw	lw=rw	lw=rw	lw=rv	lw=rw	lw=rw	lpsv	lps	illeg	illeg	lps	lpsv	illeg	illeg	lpsv	lps	illeg	illega
	ifc	illeg	illeg	lwi=r	lwi=	illeg	illeg	lwi=	lwi=r	illega	illega	illega	illega	illega	illega	illegal	illegal	illegal	illega	illegal	illegal	illeg	illeg	illeg	illeg	illeg	illeg	illeg	illeg	illeg	illeg	illeg	illega
	sg	illeg	illeg	lwi=r	illeg	illeg	illeg	lwi=	illeg	illega	illega	illega	illega	illega	illega	illegal	illegal	illegal	illega	illegal	illegal	illeg	illeg	illeg	illeg	illeg	illeg	illeg	illeg	illeg	illeg	illeg	illega
pmo	s	illeg	lw=r	illega	illeg	illeg	lw=r	illeg	illeg	illega	lw=rv	lw=rv	illega	illega	lw=rv	lw=rw	illegal	illegal	lw=rv	lw=rw	illegal	illeg	lps	illeg	illeg	illeg	lpsv	illeg	illeg	illeg	lps	illeg	illega
	p	lw=r	lw=r	illega	illeg	lw=r	lw=r	illeg	illeg	lw=rv	lw=rv	lw=rv	lw=rv	lw=rv	lw=rv	lw=rw	lw=rw	lw=rw	lw=rv	lw=rw	lw=rw	lpsv	lps	illeg	illeg	lps	lpsv	illeg	illeg	lpsv	lps	illeg	illega
	ifc	illeg	illeg	lwi=r	lwi=	illeg	illeg	lwi=	lwi=r	illega	illega	illega	illega	illega	illega	illegal	illegal	illegal	illega	illegal	illegal	illeg	illeg	illeg	illeg	illeg	illeg	illeg	illeg	illeg	illeg	illeg	illega
	sg	illeg	illeg	lwi=r	illeg	illeg	illeg	lwi=	illeg	illega	illega	illega	illega	illega	illega	illegal	illegal	illegal	illega	illegal	illegal	illeg	illeg	illeg	illeg	illeg	illeg	illeg	illeg	illeg	illeg	illeg	illega
pmo	s.ps	illeg	lw=r	illega	illeg	illeg	lw=r	illeg	illeg	illega	lpsw	lpsw	illega	illega	lpsw	lpsw=	illegal	illegal	lpsw	lpsw=	illegal	illeg	lps	illeg	illeg	illeg	lpsv	illeg	illeg	illeg	lps	illeg	illega
with kps	p.ps	lw=r	lw=r	illega	illeg	lw=r	lw=r	illeg	illeg	lpsw	lpsw	lpsw	lpsw	Alps	lpsw	lpsw=	lpsw=	lpsw	lpsw	lpsw=	lpsw=r	lpsv	lps	illeg	illeg	lps	lpsv	illeg	illeg	lpsv	lps	illeg	illega
	ifc.p.ps	lw=r	lw=r	illega	illeg	lw=r	lw=r	illeg	illeg	lpsw	lpsw	lpsw	lpsw	lpsw	lpsw	lpsw=	lpsw=	lpsw	lpsw	lpsw=	lpsw=r	lpsv	lps	illeg	illeg	lps	lpsv	illeg	illeg	lpsv	lps	illeg	illega
	sg.s.ps	illeg	lw=r	illega	illeg	illeg	lw=r	illeg	illeg	illega	lpsw	lpsw	illega	illega	lpsw	lpsw=	illegal	illegal	lpsw	lpsw=	illegal	illeg	lps	illeg	illeg	illeg	lpsv	illeg	illeg	illeg	lps	illeg	illega
ko with	s.ps	illeg	lw=r	illega	illeg	illeg	lw=r	illeg	illeg	illega	lpsw	lpsw	illega	illega	lpsw	lpsw=	illegal	illegal	lpsw	lpsw=	illegal	illeg	lps	illeg	illeg	illeg	lpsv	illeg	illeg	illeg	lps	illeg	illega
pmps	p.ps	lw=r	lw=r	illega	illeg	lw=r	lw=r	illeg	illeg	lpsw	lpsw	lpsw	lpsw	lpsw	lpsw	lpsw=	lpsw=	lpsw	lpsw	lpsw=	lpsw=r	lpsv	lps	illeg	illeg	lps	lpsv	illeg	illeg	lpsv	lps	illeg	illega
	ifc.p.ps	lw=r	lw=r	illega	illeg	lw=r	lw=r	illeg	illeg	lpsw	lpsw	lpsw	lpsw	lpsw	lpsw	lpsw=	lpsw=	lpsw	lpsw	lpsw=	lpsw=r	lpsv	lps	illeg	illeg	lps	lpsv	illeg	illeg	lpsv	lps	illeg	illega
	sg.s.ps	illeg	lw=r	illega	illeg	illeg	lw=r	illeg	illeg	illega	lpsw	lpsw	illega	illega	lpsw	lpsw=	illegal	illegal	lpsw	lpsw=	illegal	illeg	lps	illeg	illeg	illeg	lpsv	illeg	illeg	illeg	lps	illeg	illega
pmo	s.ps	illeg	lw=r	illega	illeg	illeg	lw=r	illeg	illeg	illega	lpsw	lpsw	illega	illega	lpsw	lpsw=	illegal	illegal	lpsw	lpsw=	illegal	illeg	lps	illeg	illeg	illeg	lpsv	illeg	illeg	illeg	lps	illeg	illega
with pmp	p.ps	lw=r	lw=r	illega	illeg	lw=r	lw=r	illeg	illeg	lpsw	lpsw	lpsw	lpsw	lpsw	lpsw	lpsw=	lpsw=	lpsw	lpsw	lpsw=	lpsw=r	lpsv	lps	illeg	illeg	lps	lpsv	illeg	illeg	lpsv	lps	illeg	illega
	ifc.p.ps	lw=r	lw=r	illega	illeg	lw=r	lw=r	illeg	illeg	lpsw	lpsw	lpsw	lpsw	lpsw	lpsw	lpsw=	lpsw=	lpsw	lpsw	lpsw=	lpsw=r	lpsv	lps	illeg	illeg	lps	lpsv	illeg	illeg	lpsv	lps	illeg	illega
	sg.s.ps	illeg	lw=r	illega	illeg	illeg	lw=r	illeg	illeg	illega	lpsw	lpsw	illega	illega	lpsw	lpsw=	illegal	illegal	lpsw	lpsw=	illegal	illeg	lps	illeg	illeg	illeg	lpsv	illeg	illeg	illeg	lps	illeg	illega

pmo	-parametrized object
kps	- constant part select (not parametrized)
pmps	- parametrized part select
ko	-constant object (no parametrized)

lw	– LHS width
rw	– RHS width
lwi	– LHS object i-th component width
rwi	– RHS object i-th component width
lpsw	– LSH partselect width
rpsw	– RHS partselect width

op_expr_p	– operator expression with parameter
cc_expr_p	-concatenation expression with parameter
rep_expr_p	– replication expression with parameter

Extra test cases for connect with parameter:

Illegal cases:

1. Different width
2. Wrong directions
3. Wrong range for part select
4. Different names for ports and signals for ifc and sg connections

Formal to actual matrix

Actual errors		
FORMALS	s	illegal
FORMALS	sg.s	illegal
FORMALS	sg.sg.s	illegal
FORMALS	s.ps	illegal
FORMALS	sg.s.ps	illegal
FORMALS	sg.sg.s.ps	illegal
FORMALS	sg	illegal
FORMALS	sg.sg	illegal
FORMALS	ifc	
FORMALS	ifc.ifc	
FORMALS	e	illegal
FORMALS	p – input	illegal
FORMALS	c – input	
FORMALS	p – output	illegal
FORMALS	c – output	
FORMALS	p – inout	illegal
FORMALS	c – inout	
FORMALS	p – input ps	illegal
FORMALS	c – input ps	illegal
FORMALS	p – output ps	illegal
FORMALS	c – output ps	illegal
FORMALS	p – inout ps	illegal
FORMALS	c – inout ps	illegal
FORMALS	op expr	illegal
FORMALS	cc expr vars	illegal
FORMALS	cc expr nums	illegal
FORMALS	rep expr	illegal

Combinations of formals and actuals that are errors																					
F2A		Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
		s	sg.s	sg.sg.s	s.ps	sg.s.ps	sg.sg.s.ps	sg	sg.sg	ifc	ifc.ifc	e	p – input	p – output	p – inout	p – input ps	p – output ps	p – inout ps	op expr	concat ex	rep exp
FORMALS	ifc	illegal	illegal	illegal	illegal	illegal	illegal					illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
FORMALS	ifc.ifc	illegal	illegal	illegal	illegal	illegal	illegal					illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal	illegal
FORMALS	c – input							illegal	illegal	illegal	illegal										
FORMALS	c – output							illegal	illegal	illegal	illegal										
FORMALS	c – inout							illegal	illegal	illegal	illegal										