V02 – DCS Opened Node Validation

ENGINEER: _____Sullivan_____

DATE: _____03/30/07_____

COMMENTS:

The following tests were one time design tests and are omitted for this pass:

Power Up Sequence Test
FLUKE Test
Bulkhead BER test

MARS
Org: WHOI
Engr: Fritz Sonnichsen
Date: 03/30/07

V02 – DCS Opened Node Validation (overview)

Just prior to loading and sealing the node the following BER tests on the OPEN subsea node and shore station should be performed.

This test is comprised of a physical layer and link layer (ISO-0,1) BER test to insure that the optical and electrical media are capable of conducting gigabit ethernet frames with an error rate of less than 1 error in 10^{12}.

On the following pages are shown diagrams of the network layout, IP scheme, and port allocation for the devices.

The required equipment for this test is:
1) Suiitable gigabit ethernet BER optical test set
2) MARS subsea node assembly completely fibered
3) A test fiber, VOA, or actual MARS fiber cable
4) MARS shore station or shore station simulator
5) Optical Power Meter
6) Optical attenuator per following text
7) Fiber Optical Cleaning Equipment

V02- DCS Opened Node Validation - Procedure

GENERAL PROCEDURE

This test is to be performed after the V01- Optical test. This will insure that all equipment is properly attenuated preventing damage. There are no recorded results for this test. The object is to adjust the system until all channels run cleanly without BER errors.

This test will be divided into 4 parts:

SFP BER Test
Testing the shore SFP's freeestanding to insure that they are error free

Optical BER Test
Testing that the fiber optic channels are running error free

Electrical BER Test
Testing that the electrical converted and fiber channels are running error free

Routed BER Test
Testing that the router, electrical converted and fiber optic channels are running error free

Current Test
Recording the current consumption of the sub sea node devices

Temperature Test
Recording the temperature of the sub sea node devices when running in air

> ***CAUTION! Be sure that you do not overdrive any of the optical recievers by injecting too much light into them. All attenuators should be properly installed for these tests.***

NOTEs:
1) We will use the phrases East .98 East .75 and East .32 as shorthand for East 1558.98 East 1555.75 and East 1549.32 channels
2) We will use the phrases West .98 West .75 and West .32 as shorthand for West 1558.98 West 1555.75 and West 1549.32 channels
3) The east side only is shown in the figures that follow. All tests should be mirrored for the West side.
4) We assume the use of an ANCOT Netminer BERT tester deployed with SFPs as the BER test unit.
5) There is an obvious preference to perform the test with the actual MARS cable and shore station, however should physical circumstances prevent this, the test may be performed with a fiber spool or VOA (variable optical attenuator), and with a mobile test shore station.
6) If a VOA is used, set it to 15dB loss to simulate the MARS cable plus termination assemblies.
7) If a VOA is used you may use the second port on the BER tester instead of using 2 BER testers since the sub sea node and shore station can be placed in close proximity. Testing from sea to shore with the actual cable will mandate the use of 2 BER testers.
6) Proper fiber handling and saftey techniques are assumed throughout and not further mentioned.
7) Use SM fiber for all loopbacks

V02 – DCS Opened Node Validation (adding an instrument/server)

You will need a test instument to perform some of these tests. Add an instrument of an equivalent laptop as follows:

1) plug the instrument ethernet RJ45 into either the mra01-01 or mra01-02 router (both if you have a Y connector) using the port list below.

2) give the instrument an address of 10.1.xx.yyy where
   a) xx is 11 thru 18 from the chart below
   b) yyy is your choice, from 2 thru 254

3) Use a netmask of 255.255.255.0

4) give the instrument a gateway of 10.1.xx.1

5) On the shore routers you will need to connect your 'server' (or laptop). Use any of ports on mra91-02 from 3 thru 18. Give the server a gateway of 10.91.128.1/255.255.255.0

6) You probably will have to issue a “noshut” CISCO command to start the ports which were configured in the steps above.

At this point you should be able to ping the instrument from the server.
During our test phase you should let WHOI know when you add anything to the network. We can add it to our monitor list.

Switch Ports	IP Range	Gateway
1/0/1 2/0/1	10.1.11.xxx	10.1.11.1
1/0/2 2/0/2	10.1.12.xxx	10.1.12.1
1/0/3 2/0/3	10.1.13.xxx	10.1.13.1
1/0/4 2/0/4	10.1.14.xxx	10.1.14.1
1/0/5 2/0/5	10.1.15.xxx	10.1.15.1
1/0/6 2/0/6	10.1.16.xxx	10.1.16.1
1/0/7 2/0/7	10.1.17.xxx	10.1.17.1
1/0/8 2/0/8	10.1.18.xxx	10.1.18.1

V02 – DCS Opened Node Validation – ports for mra91-01 and mra91-02 showing LANFORGE

01 SHORE 02

port	vlans	to	port	Desc
1/0/01	4T	Sia91-2	Gi0/1	Science switch
1/0/02	4	Lanf-sv1	eth0	10.91.4.101
1/0/03	128T	Sia91-1	Gi0/1	ops fac switch
1/0/04	128			
1/0/05	128	linksys	1	linksys
1/0/06	128			
1/0/07	128			
1/0/08	128T	sia91-2	Gi0/1	shore sta switch
1/0/09	128			
1/0/10	128			
1/0/11	128			
1/0/12	128			
1/0/13	128	Lanf eth2	eth2	10.91.128.22/65
1/0/14	128	PIX		10.91.128.12
1/0/15	128	GYDA		10.91.128.14
1/0/16	128			
1/0/17	128	ntp		10.91.128.55
1/0/18	128			
1/0/19				
1/0/20				
1/0/21				
1/0/22				
1/0/23				
1/0/24				
1/0/25	256	Mra01-01	1/0/23	etherchannel
1/0/26	256	Mra01-02	2/0/24	etherchannel
1/0/27				
1/0/28				

port	vlans	to	port	Desc
2/0/01	4T	Sia91-2	Gi0/2	Science switch
2/0/02	4	Lanf-sv2	eth 1	10.91.4.102
2/0/03	128T	Sia91-1	Gi0/2	ops fac switch
2/0/04	128			
2/0/05	128			
2/0/06	128			
2/0/07	128			
2/0/08	128T	sia91-2	Gi0/2	shore sta switch
2/0/09	128			
2/0/10	128			
2/0/11	128			
2/0/12	128			
2/0/13	128			
2/0/14	128			
2/0/15	128			
2/0/16	128			
2/0/17	128			
2/0/18	128			
2/0/19				
2/0/20				
2/0/21				
2/0/22				
2/0/23				
2/0/24				
2/0/25	256	Mra01-02	2/0/23	etherchannel
2/0/26	256	Mra01-01	1/0/24	etherchannel
2/0/27				
2/0/28				

LOGS are on /var/log/ciscl.log

V02 – DCS Opened Node Validation – ports for mra01-01 and mra01-02 showing LANFORGE

01 (A51) SEA 02 (A52)

port	vlans	to	port	Desc
1/0/01	11	ADCP		sci 10.11.1.10
1/0/02	12	Lanf-sp2	eth4	sci 10.1.12.101
1/0/03	13			science
1/0/04	14	Lanf-sp4	eth6	sci 10.1.14.101
1/0/05	15			science
1/0/06	16			science
1/0/07	17			science
1/0/08	18			science
1/0/09	128	Node pwr ctl		10.1.128.15
1/0/10	128			
1/0/11	128			
1/0/12	128			
1/0/13				
1/0/14				
1/0/15				
1/0/16				
1/0/17				
1/0/18				
1/0/19				
1/0/20				
1/0/21				
1/0/22				
1/0/23	256	Mra91-01	1/0/25	**A51J23 – B04**
1/0/24	256	Mra91-02	2/0/26	**A51J24 – B06**
1/0/25				
1/0/26				
1/0/27				
1/0/28				

port	vlans	to	port	Desc
2/0/01	11	Lanf-sp1	eth3	sci 10.1.11.101
2/0/02	12			science
2/0/03	13	Lanf-sp3	eth5	sci 10.1.13.101
2/0/04	14			science
2/0/05	15	Lanf-sp5	eth7	sci 10.1.15.101
2/0/06	16			
2/0/07	17			science
2/0/08	18			science
2/0/09	128	GYDA	**A52J09**	10.1.128.14 – B03
2/0/10	128			
2/0/11	128	cyclades	**A51J11**	10.1.128.20 – B02
2/0/12	128			
2/0/13				
2/0/14				
2/0/15				
2/0/16				
2/0/17				
2/0/18				
2/0/19				
2/0/20				
2/0/21				
2/0/22				
2/0/23	256	Mra91-02	2/0/25	**A52J23 – B07**
2/0/24	256	Mra91-01	1/0/26	**A52J24 – B05**
2/0/25				
2/0/26				
2/0/27				
2/0/28				

LOGS are on /var/log/ciscl.log

V02 – DCS Opened Node Validation

CONNECTING VIA OBC

There are two ways to connect to the backdoor (serial xbar switch), either via in-band using the Cyclades comms controller or going directly through the out-of-band system using the obc_shore computer and sail. The first method uses ethernet, the second via a serial port interface.

1) In-Band using the Cyclades comms controller
Using a web-browser, enter the following url
http://10.1.128.20/cgi-bin/obc_xbar

1 - N/C **5 - EDFA-E**
2 - N/C **6 - EDFA-W**
3 – CiscoA **7 - PwrCtl**
4 – CiscoB **8 - Loopback**

Select a port and then manually connect,
via telnet 10.1.128.20 7001

Note: the above can be done without a web-browser by running wget
wget -O /tmp/eraseme.txt -o/dev/null
http://10.1.128.20/cgi-bin/obc_xbar?port=5

2) Using Sail Driver via ttyS0 connected to OBC
su root
cd /home/stevel/sail_driver
./sail -s#S01A -x5

NOTE FOR TESTS AFTER 4/2007 CHECK WITH WHOI FOR PROPER OBC INTERFACE COMMANDS

Procedure for Diagnosis

1) For initial checkup, after connecting the East A&B and the West A&B shore fibers to their corresponding transponders in the sub-sea unit issue help commands to each device to check it's operation. Needless to say you wil need an RS232 connection to each port (East A,B and West A,B) on the shore stations.

Check Shore East or West A side
###CKAH

Check Shore East or West B side
###CKBH

Sub-sea East or West A side
###S01AH

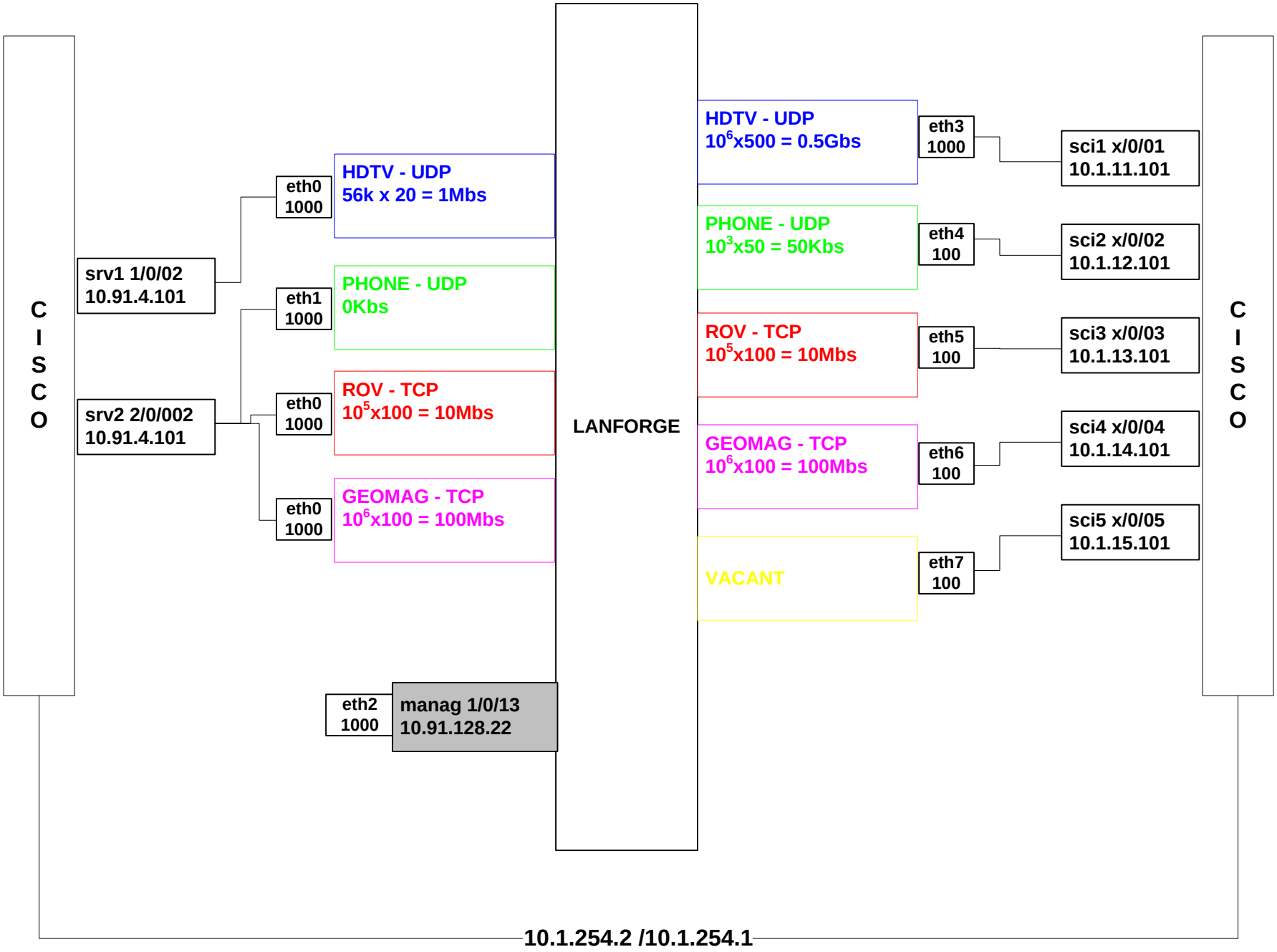
Sub-sea Esat or West B side
###S01BH

In the event or problems a simple optical test can be performed:
1) Insert an optical power meter (1550nm) at the fiber end which connects to a sub-sea transponder
2) From an ASCII terminal connected to the shore station send continiuous character strings
3) Expect about -35 to -45 dBm

LANFORGE PORTS

Shore

Sub Sea



V02- DCS Opened Node Validation - Powerup Sequence Test

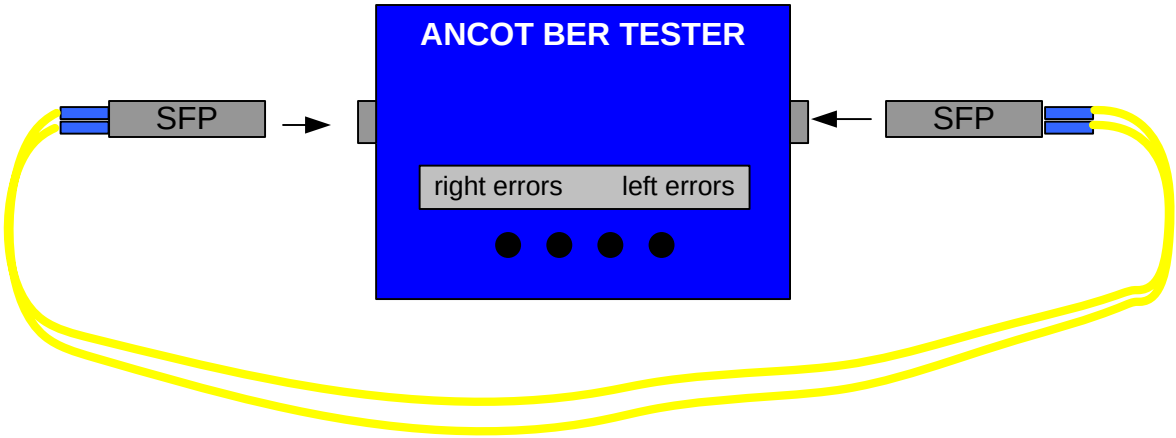
TEST for DEVICE POWER UP SEQUENCING

Power up the devices in the node in the various orders shown in the table.
Insure that Lanforge Data is flowing through properly after each sequence

Power Up Sequences								
LOAD PORT	Device	order	order	order	order	order	order	order
1	na							
2	na							
3	MRA01	4	3	4	1	2	1	1
4	MRA01	4	3	4	1	2	1	2
5	OE W 75	3	4	1	4	1	2	3
6	cyclades	5	5	5	5	5	5	4
7	OE E 75	3	4	1	4	1	2	5
8	OE E 98	3	4	1	4	1	2	6
9	OE W 98	3	4	1	4	1	2	7
10	NE West	1	1	2	2	3	3	8
11	EDFA W	2	2	3	3	4	4	9
12	na							
13	NE East	1	1	2	2	3	3	10
14	EDFA E	2	2	3	3	4	4	11
15	OBC	6	6	6	6	6	6	12
16	na							
RESULT	OK	OK	OK	OK	OK	OK	OK	OK

OMIT AFTER FIRST TEST

V02- DCS Opened Node Validation - SFP BER Procedure



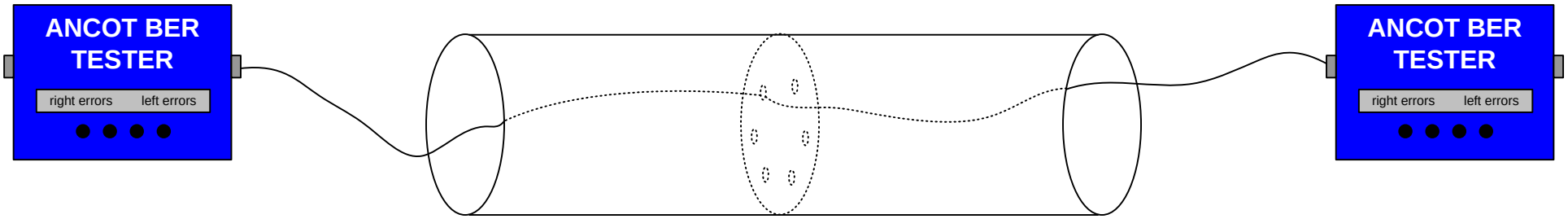
SFP BER TEST

1) Removing the SFP's from the shore station CISCO routes, two at a time, install them into the BER tester as shown.
2) Be sure to clean the fibers
3) Run a BER test for about 15 minutes

If there are right-side errors either the right-side receiver is failing or the left-side transmitter is failing
Swap out the right-side SFP with a spare
If the problem is fixed the right-side receiver is failing. Mark this SFP as damaged and replace.
If the problem persists swap out the left-side with a spare spare.
If the problem is fixed the left-side transmitter is failing. Mark this SFP as damaged and replace.
Re check the BER for the new SFP.

If there are left-side errors either the left-side receiver is failing or the right-side transmitter is failing
Swap out the left-side SFP with a spare
If the problem is fixed the left-side receiver is failing. Mark this SFP as damaged and replace.
If the problem persists swap out the right-side with a spare spare.
If the problem is fixed the right-side transmitter is failing. Mark this SFP as damaged and replace.
Re check the BER for the new SFP.

V02- DCS Opened Node Validation - Bulkhead BER Procedure



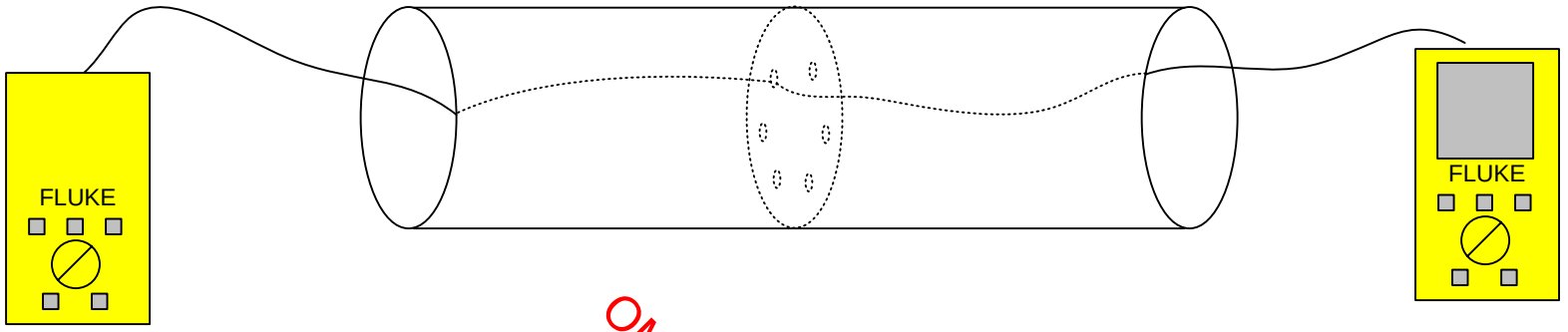
OMIT AFTER FIRST TEST

Bulkhead BER TEST

1) This test is much like the SFP test. However substitute electrical SFPs for the optical ones. You will need to use 2 BER testers due to cable length issues. Record the results for all 4 CAT5 cables passing thru the bulkhead, at the end of this document

Cables to be tested are B04 B05 B06 and B07
(B02 and B03 are 4 wire cables for GYDA and Cyclades and will not pass 1G BER test)

V02- DCS Opened Node Validation - Bulkhead Fluke Procedure



OMIT AFTER FIRST TEST

FLUKE CABLE TEST

The CAT5 cables through the bulkhead will need to be tested using Fluke cable testers.

1) Do an AUTOTEST for each of the 6 cables
2) Press the SAVE button after each test
3) After each test connect the Fluke master to a PC with the Fluke LinkWare Product and save the data by selecting:
   Utilities : DSP-4x00 : Detailed Test Data

Failure to save AFTER EACH test will cause loss of data from the prior test.

4) Record the results using the Fluke reporting software and save for future diagnosis at the end off this document

V02- DCS Opened Node Validation - BER Optical

NOTE: WHEN RUNNING BER TESTS, START THE ANCOT, WAIT 2 MINUTES WHILE IT RUNS, THEN RESET THE COUNTERS. AT THIS POINT YOUR TEST BEGINS. THIS WILL PREVENT RECORDING "ERRORS" THAT RESULT FROM LINK SYNCHRONIZATION

SUB SEA NODE OPTICAL BER TEST (Data Channels)

This test may be skipped if you are confident in the system, since the following test, BER Electrical, subsumes the optical test.

This test is done while the sea node is still opened. It is a final check on the optical portion of the DCS system using a BER tester. For this test you will disconnect the OE converters and route the BER test patterns directly into the optical system.

The setup for this test is shown on the next page. The magenta circles are points where the optical system is tapped into for insertion of the BER tester.

1) ON THE SHORE SIDE Remove the East .98 SFP with fibers from the CISCO 91-01 Router (The SFP at port 25) and place it in an SFP socket of the BERT tester.

2) Place another SFP in another BERT tester socket

3) ON THE SUBSEA NODE Remove the fiber from the East .98 DeMux and connect it to the receiver of the SFP on the BERT tester (You will need an adpator fiber for LC to SC)

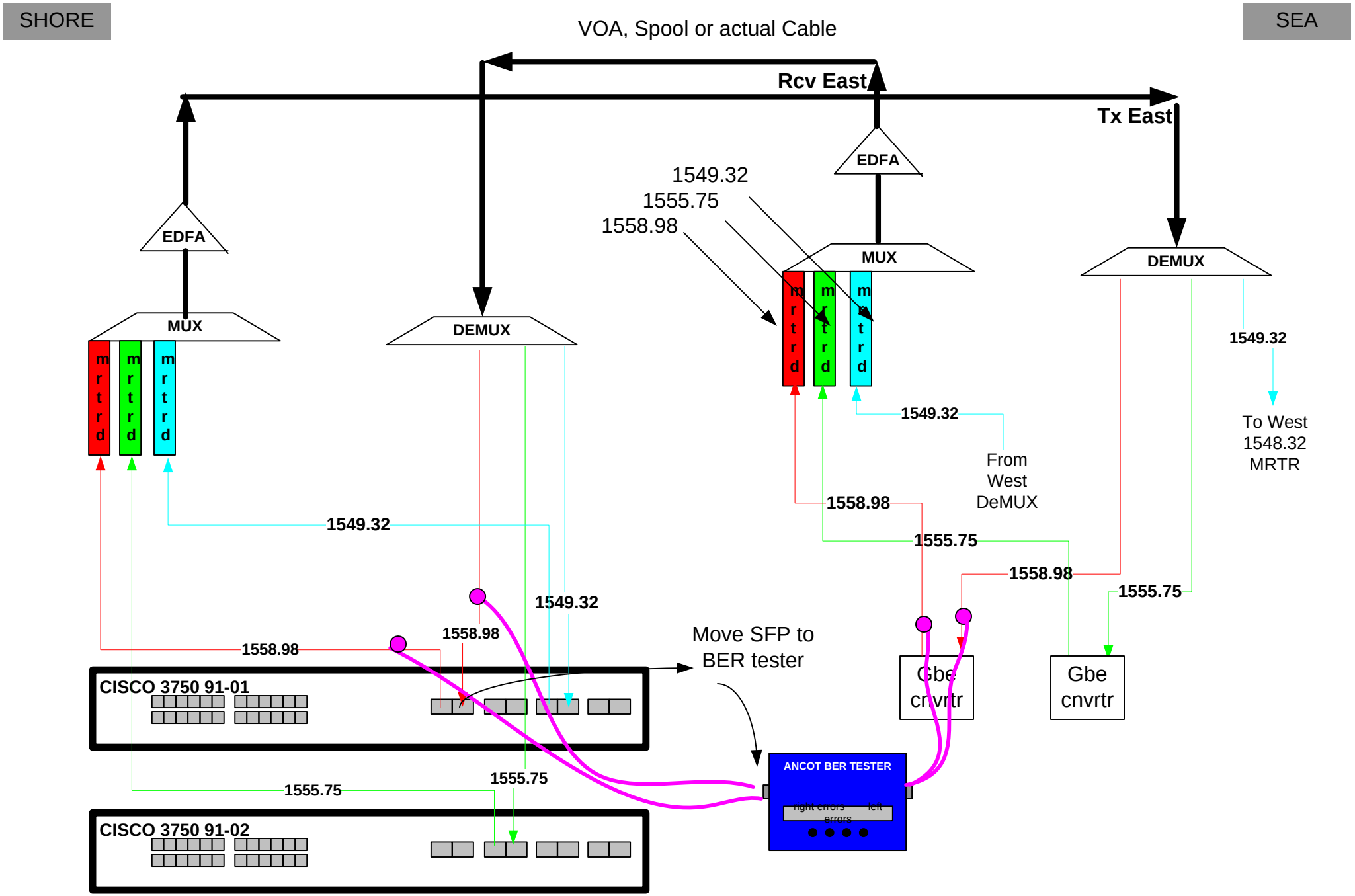
4) ON THE SUBSEA NODE Remove the fiber from the East .98 MRTR Receiver and connect it to the transmit of the SFP on the BERT tester (You will need an adpator fiber for LC to SC)

5) Run a BERT test for 30 minutes

6) Repeat this test for the following channels
   - East .75 (The SFP at port 26 on CISCO router 91-01)
   - West .98 (The SFP at port 25 on CISCO router 91-02)
   - West .75 (The SFP at port 26 on CISCO router 91-02)

7) If there are errors you will need to
   - a) clean fibers
   - b) Check power levels per V01 - Optical Validations
   - c) Swap NE Cards
   - d) Swap SFPs

V02- DCS Opened Node Validation -Testing East 0.98 Optical Channels (East Side Shown Only)



V02- DCS Opened Node Validation - BER Pass Through Channel

SUB SEA NODE OPTICAL BER TEST (Pass Through Channels)

This test is done while the sea node is still opened. This allows for corrective action at the node if required. It can be repeated after the node is closed up and installed.

The setup for this test is shown on the next page. The magenta circles are points where the optical system is tapped into for insertion of the BER tester.

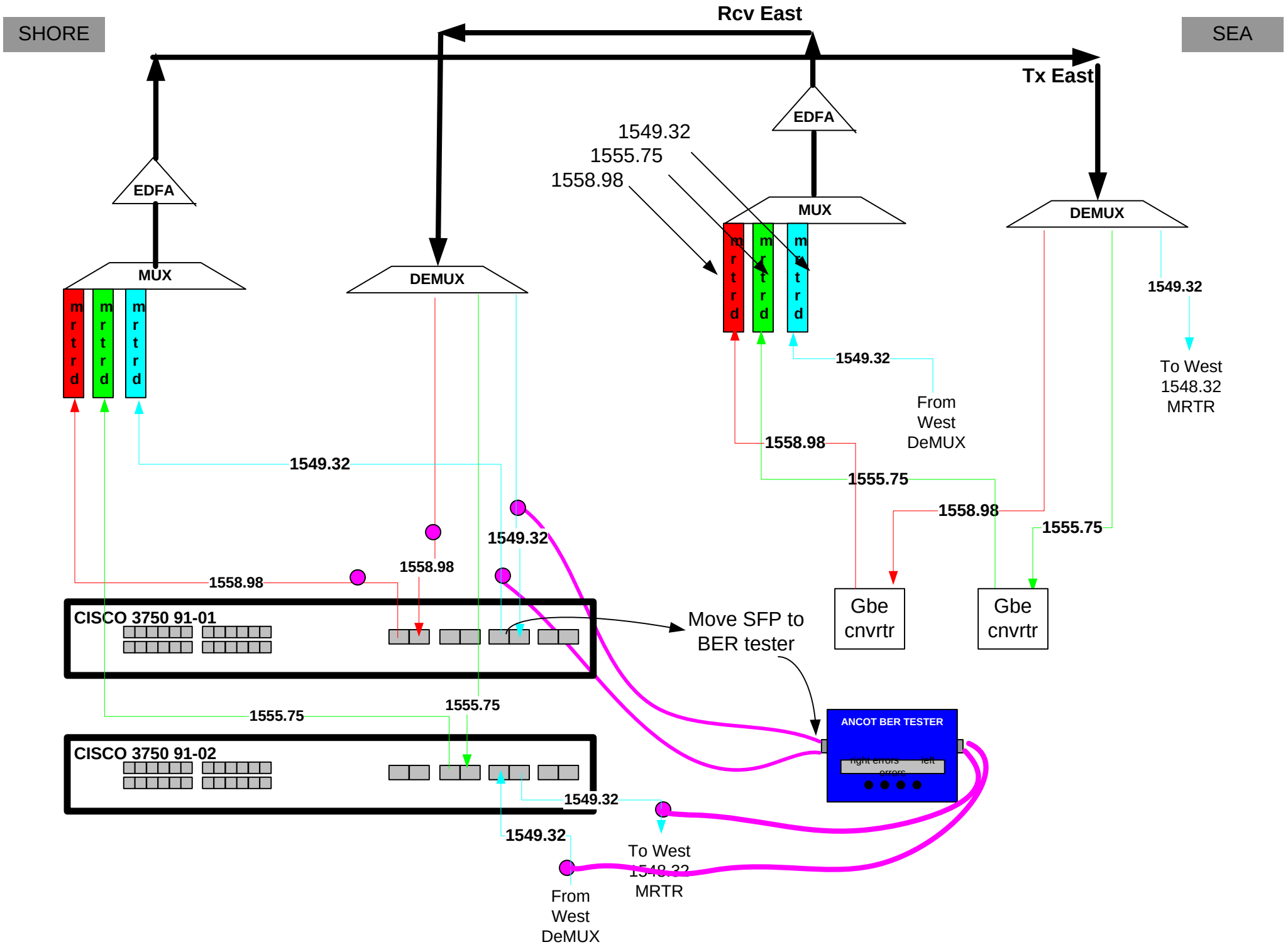
1) ON THE SHORE SIDE Remove the East .32 SFP with fibers from the CISCO 91-01 Router (The SFP at port 27) and place it in an SFP socket of the BERT tester.

2) ON THE SHORE SIDE Remove the West .32 SFP with fibers from the CISCO 91-02 Router (The SFP at port 27) and place it in an SFP socket of the BERT tester.

3) Run a BERT test for 30 minutes

7) If there are errors you will need to
   a) clean fibers
   b) Check power levels per V01 - Optical Validations
   c) Swap NE Cards
   d) Swap SFPs

V02- DCS Opened Node Validation -Testing Passthrough Channel (East Side Shown Only)



V02- DCS Opened Node Validation - BER Electrical

NOTE: WHEN RUNNING BER TESTS, START THE ANCOT, WAIT 2 MINUTES WHILE IT RUNS, THEN RESET THE COUNTERS. AT THIS POINT YOUR TEST BEGINS. THIS WILL PREVENT RECORDING “ERRORS” THAT RESULT FROM LINK SYNCHRONIZATION

This test is done while the sea node is still opened so that corrections can be made if necessary. It is a final check on the electrical portion excluding the sub sea routers, of the DCS subsea system using a BER tester.

The setup for this test is shown on the next page. The magenta circles are points where the optical system is tapped into for insertion of the BER tester.

1) ON THE SHORE SIDE Remove the East .98 SFP with fibers from the CISCO 91-01 Router (The SFP at port 25) and place it in an SFP socket of the BERT tester.

2) Place an electrical SFP in the other BERT tester socket

3) ON THE SUBSEA NODE Attach the ethernet output of the 0.98 East OE converter to the BER tester with a straight thru ethernet cable. The .98 converters are the ones to the rear of the node as it faces you.

4) Run a BERT test for 30 minutes

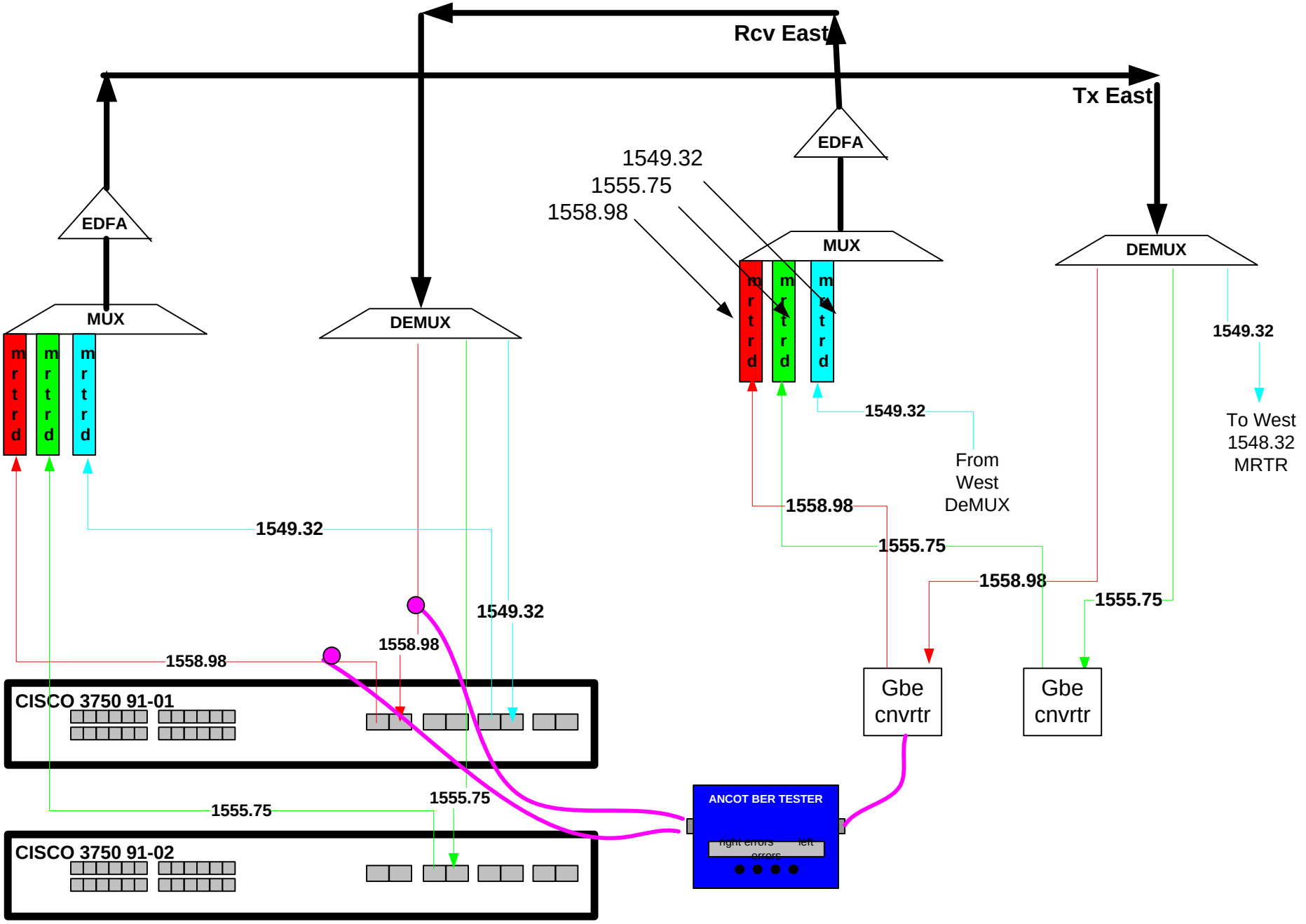
6) Repeat this test for the following channels
   East .75 (The SFP at port 26 on CISCO router 91-02)
   West .98 (The SFP at port 25 on CISCO router 91-02)
   West .75 (The SFP at port 26 on CISCO router 91-01)

7) If there are errors you will need to
   a) clean fibers
   b) Check power levels per V01 - Optical Validations
   c) Swap NE Cards
   d) Swap SFPs

V02- DCS Opened Node Validation -Testing Electrical BER (East Side Shown Only)

SHORE

SEA



V02- DCS Opened Node Validation - Test Router Failover

This test is done both before and in a limited form, after the Node is closed. Data is passed from the science wet port to the shore using a Lanforge data generator. The basic physical setup is shown on the next page. The following pages show schematics which demonstrate disconnecting various paths on the Shore station to isolate and test individual data paths.

PRELIMINARY TEST

Before beginning, we will test the link propagation function of the four etherchannel links.
From the shore Routers, disconnect each of the following links, Watching the subsea router note the corresponding port LED and insure that the LED goes out. Then re-attach the shore link and insure that the LED relights to green.
Now repeat the process, this time disonnecting the four links, listed below, on the subsea node.

SHORE SIDE TEST

Pull this port		Check this LED	
Shore Router	Shore Port	Subsea Router	Subsea Port
mra91-01	25	mra01-01	23
mra91-01	26	mra01-02	24
mra91-02	25	mra01-02	23
mra91-02	26	mra01-01	24

SubSEA SIDE TEST

Pull this prot		Check this LED	
Subsea Router	Subsea Port	Shore Router	Shore Port
mra01-01	23	mra91-01	25
mra01-02	24	mra91-01	26
mra01-02	23	mra91-02	25
mra01-01	24	mra91-02	26

V02- DCS Opened Node Validation - Test Router Failover

This test is done both before and after the Node is closed. Data is passed from the science wet port to the shore using a Lanforge data generator of the WHOI Ethernet BER software (see next page). The basic physical setup is shown on the next page. The following pages show schematics which demonstrate dissconnecting various paths on the Shore station to isolate and test individual data paths.

1) ON THE SHORE SIDE Place a Lanforge cable into one of the science VLAN ports of one of the CISCO routers

2) ON THE SUB SEA SIDE Using a WET ethernet connector connect a Lanforge port to one of the subsea science ports. Depending upon circumstances you may connect directly to the sub-sea router.

3) Run continuous pings from virtual devices from the shore to the sea and vice versa. Clock and interuptions in the pings while perfroming the folllowing actions:

4) On the SHORE SIDE remove the fibers one at a time from:

CISCO 91-01 port 26.
CISCO 91-02 port 25
CISCO 91-02 port 26

This cuts off the the other paths so that only the East-East .98 channel is being tested. Use Figure set_finalE98 to help understand the setup. Record any interuption in data and the length of the time to resume.

5) Repeat this test for the following channels (see set_data1 and set_data2 pages)

East .75 - remove the fiber from CISCO 91-01 port 25 and CISCO 91-02 port 25, 26.
West .98 - remove the fiber from CISCO 91-02 port 26 and CISCO 91-01 port 25, 26.
West .75 - remove the fiber from CISCO 91-02 port 25 and CISCO 91-01 port 25,26.

6) Repeat this test for the following channels on the sub-sea side.

East .75 - remove the fiber from CISCO 01-01 port 25 and CISCO 01-02 port 25, 26.
East .98 - remove the fiber from CISCO 01-01 port 25 and CISCO 01-02 port 25, 26.
West .98 - remove the fiber from CISCO 01-02 port 26 and CISCO 01-01 port 25, 26.
West .75 - remove the fiber from CISCO 01-02 port 25 and CISCO 01-01 port 25,26.

7) Using the listing in page “set_data3” disable each device and record the time to recover.

8) Record the results in the RESULTS section of this document

V02- DCS Opened Node Validation - Test Router Failover

To use the WHOI Ethernet BER software:
1) Attach 1 server containing the software one to the shore side and one to the sea side. The present setup mentioned in this doc assumes that the LANFORGE is connected to both the sea and shore routers. If you configure down all shore connections the lanforge can be used as the subsea test server:

ifconfig eth***x*** down where ***x*** is the number of the ethernet port (0-7) connected to the shore

2) Insure that each server has a route to the other.

from subsea (lanforge):

route add -host 10.91.128.58 eth3

ping 10.91.128.58

from shore (marsdcs)

ping 10.1.11.101

UDP TEST:
3) Start the ethernet receive software on the shore side:

/home/stevel/NetworkBER/pr -p1234 -S -D

4) Start the ethernet transmit software on the subsea side:

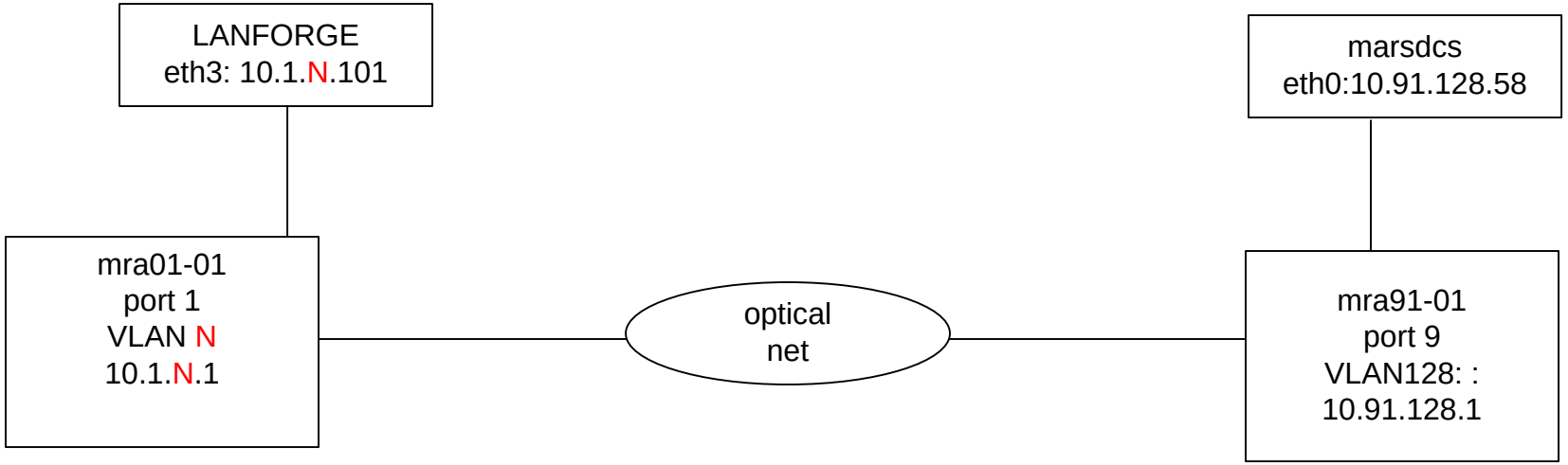
/home/stevel/NetworkBER/pw -h10.91.128.58 -p1234 -B52000 -r200 -s -P0

TCP TEST:
3) Start the ethernet receive software on the shore side:

/home/stevel/NetworkBER/pr -p1234 -S -B52000 -D -ttcp

4) Start the ethernet transmit software on the subsea side:

/home/stevel/NetworkBER/pw -h10.91.128.58 -p1234 -B52000 -r200 -s -P0 -ttcp



NOTES for BER Test

> The servers are connected as shown.

> On the shore all traffic coming from the sea is routed to mra91-01 via VLAN128 at 10.91.128.1

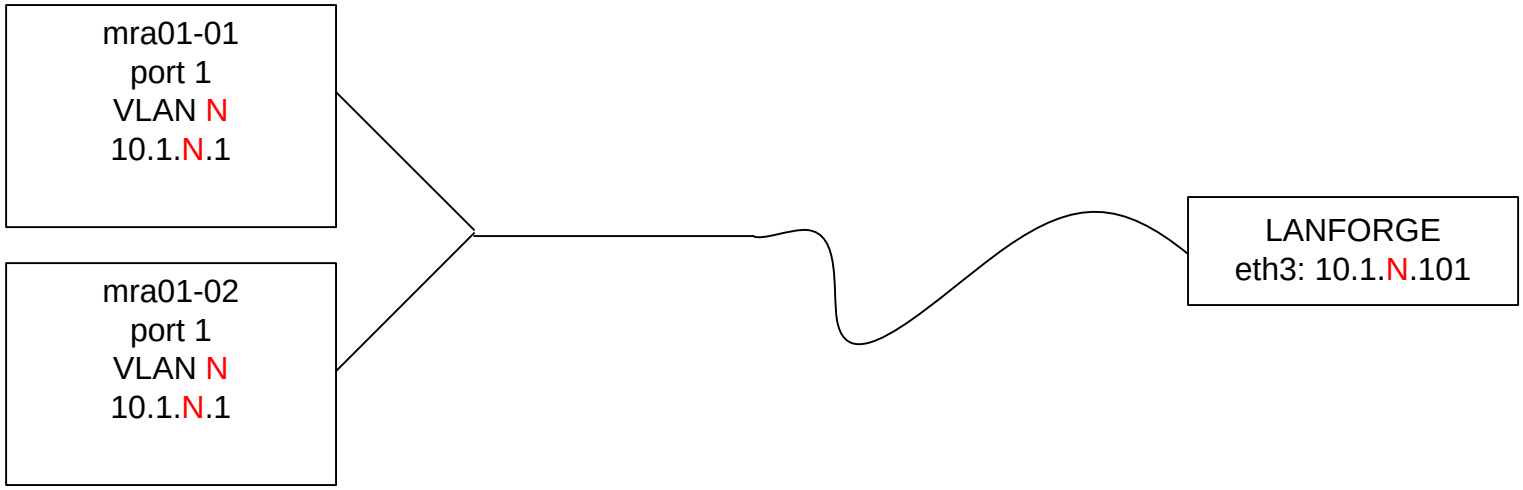
> On the subsea you must be careful of the VLANs. Each SCIENCE port N is mapped to VLAN N at 10.1.N.1

>If you move the lanforge to science port N, you MUST change the address of the lanforge port eth3 to the new address at 10.1.N.101

>Always make sure that you can ping 10.91.128.58 from the lanforge

>Always make sure that you can ping 10.1.N.101 from marsdcs

>If you can't do this you have a configuration problem



Two Router ports are Y cabled to each science port. The router mra01-01 port should be “up” at power up and the mra01-02 should be “administratively down”

The commands that follow will help to check and control this

SHOW THE PORT STATUS on mra01
it should be up

mra01-01>sh ip in g1/0/1
GigabitEthernet1/0/1 is up, line protocol is up
  Inbound access list is not set

SHOW THE PORT STATUS onmra02
it should be down

mra01-01>sh ip in g2/0/1
GigabitEthernet2/0/1 is down, line protocol is down
  Inbound access list is not set

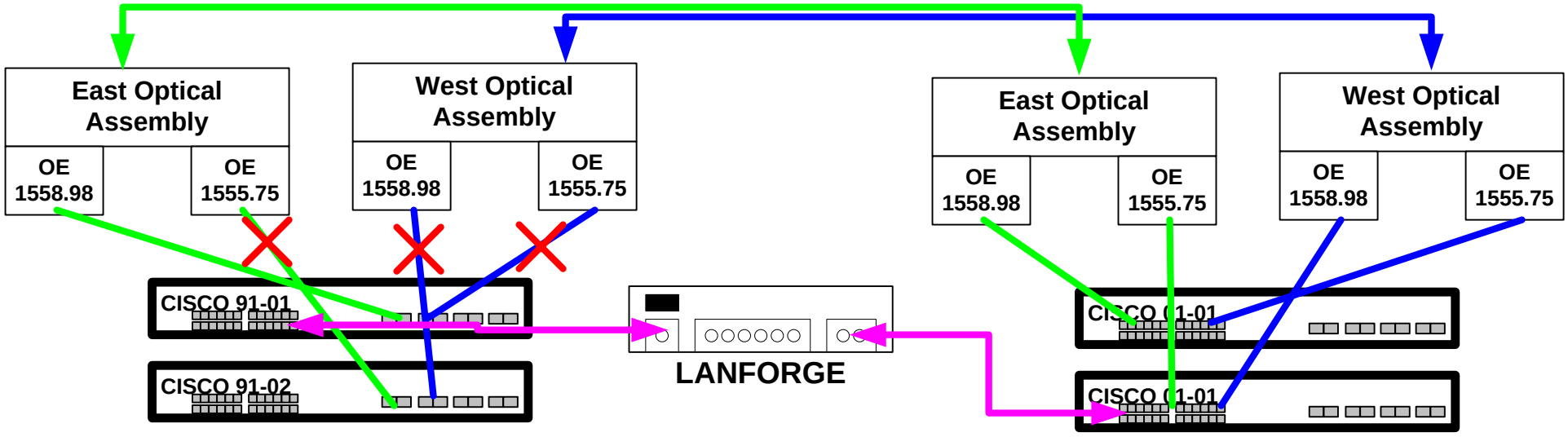
TO TURN THE PORT on mra01 ON

conf t
in g1/0/1
shut
no shut
exit

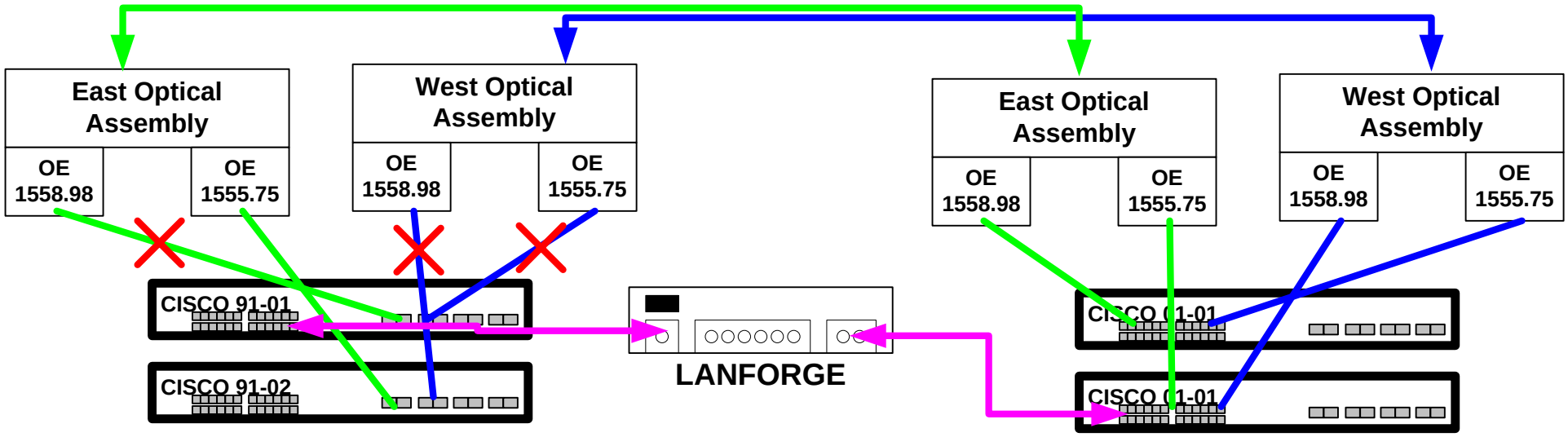
TO TURN THE PORT on mra02 OFF

conf t
in g2/0/1
shut
exit

V02- MARS BER OPEN Test-Link Outage Handling

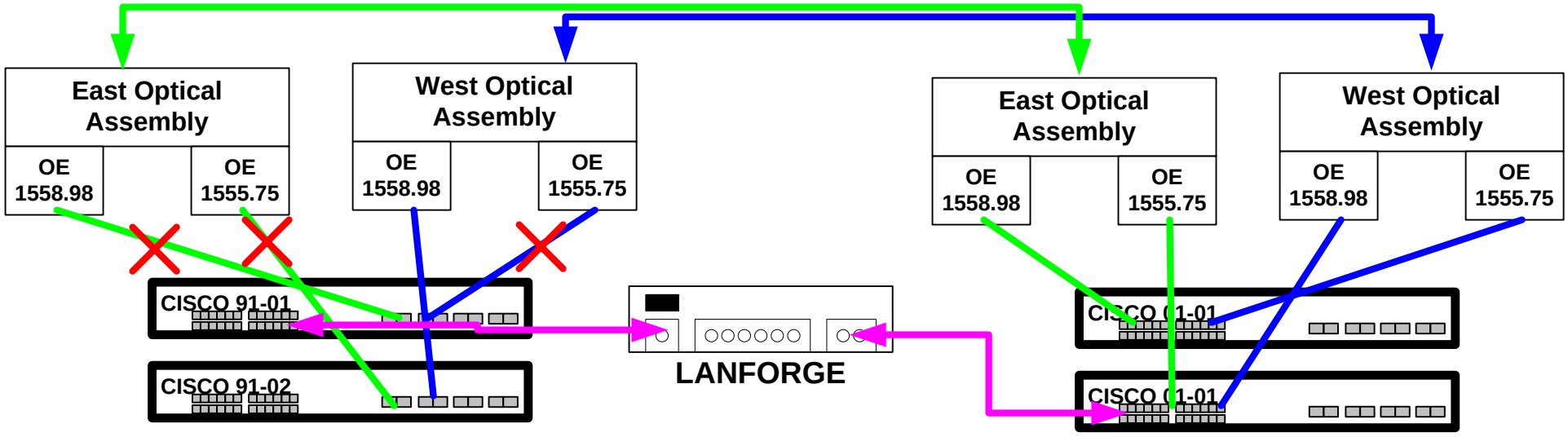


CHECKING EAST 1558.98 CHANNEL

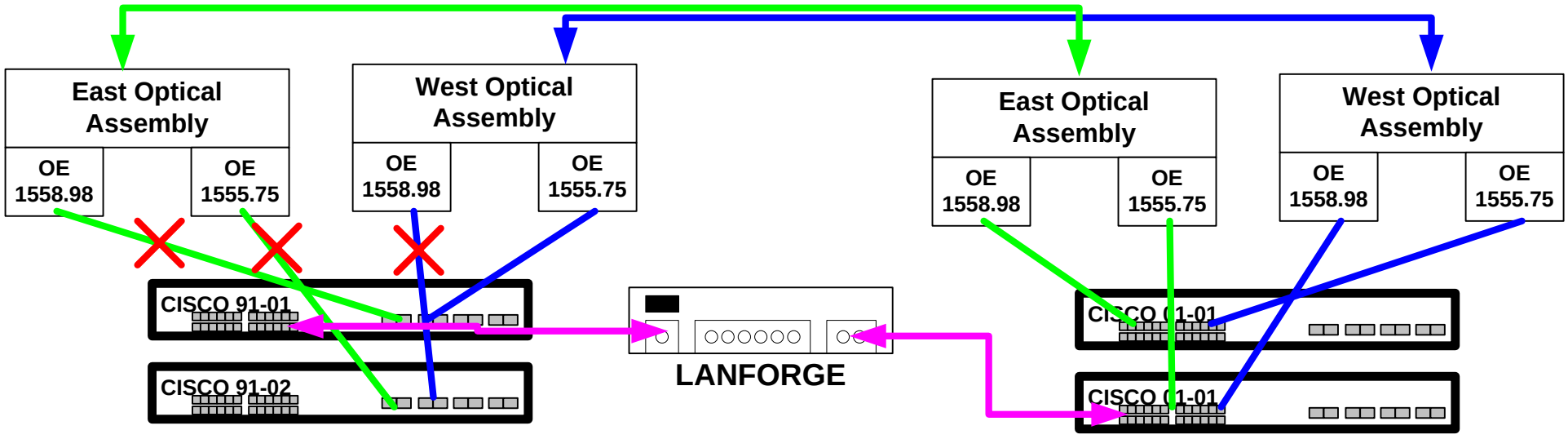


CHECKING EAST 1555.75 CHANNEL

V02- MARS BER OPEN Test-Link Outage Handling

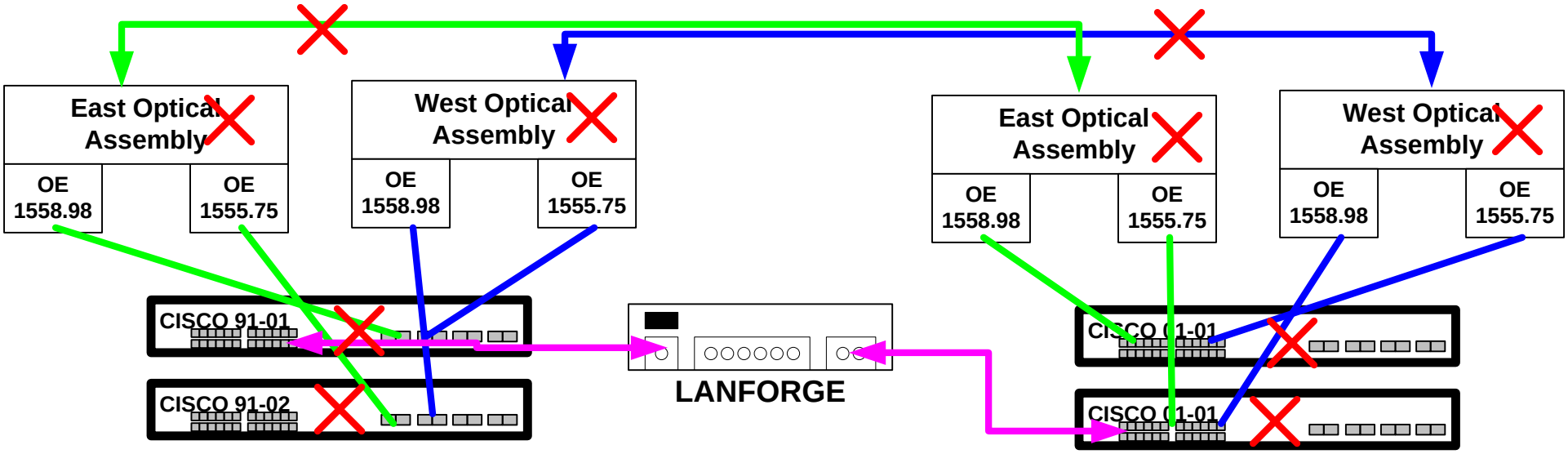


CHECKING WEST 1558.98 CHANNEL



CHECKING WEST 1555.75 CHANNEL

V02- MARS BER OPEN Test-Link Outage Handling



CHECKING FAILOVER OF ROUTES DUE TO VARIOUS DEVICE FAILURES

East Optical Assembly – SEA
West Optical Assembly – SEA
East Optical Assembly – SHR
West Optical Assembly – SHR

East Switch – SEA
West Switch– SEA
East Switch– SHR
West Switch– SHR

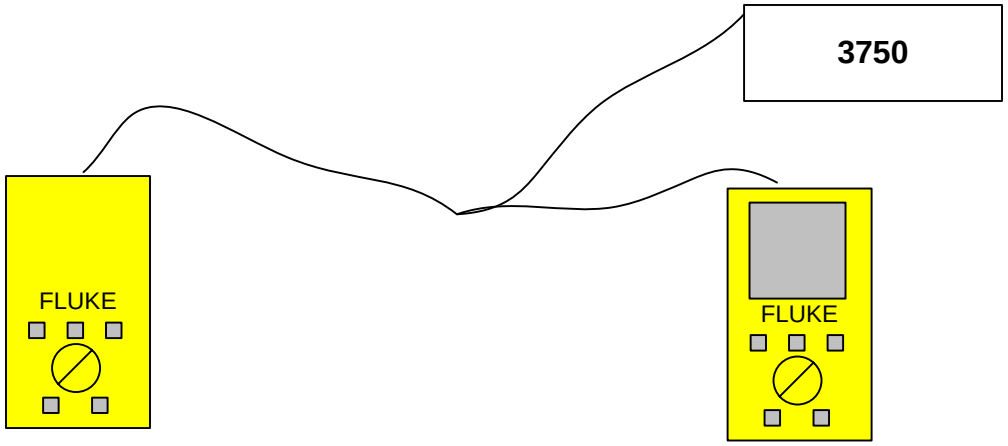
East Cable
West Cable

V02- DCS Opened Node Validation - Current Test

Record the current of the subsea node devices in the results section.

Record the temperature of the subsea node devices in the results section.

V02- DCS Opened Node Validation - Science Y Cable Fluke Procedure



FLUKE CABLE TEST

The Y cables for Science connections will need to be tested using Fluke cable testers.

1) Do an AUTOTEST for each of the 8 cables
2) Press the SAVE button after each test
3) After each test connect the Fluke master to a PC with the Fluke LinkWare Product and save the data by selecting:
   Utilities : DSP-4x00 : Detailed Test Data

Failure to save AFTER EACH test will cause loss of data from the prior test.

4) Record the results using the Fluke reporting software and save for future diagnosis at the end off this document

V02 – DCS Opened Node Validation – Science Cable Tests

This test is done both before the Node is closed. Data is passed from the science wet port to the shore using a Lanforge data generator.

1) Run 100 Mbs data through a science cable and record any errors at the lanforge.

2) This test is to be repeated with each science cable

3) This test is to be repeated with heavy and undulating electrical power drawn through the cable being tested. See MBARI for details.

4) Record any error results in the RESULTS section of this document

V02 – DCS Opened Node Validation SPF-Test and BER-Test

SFP TEST			
SFP1	SFP1	Duration	Errors
E.98	W.98		
E.75	E.75		
E.32	E.32		

Optical Pass Through Channel Test		
Test	Duration of Run	# Errors
CST		
CJT		
CRT		

Electrical Data Test **EAST 1558.98**		
Test	Duration	# Errors
CST		
CJT		
CRT		

Electrical Data Test **EAST 1555.75**		
Test	Duration	# Errors
CST		
CJT		
CRT		

Electrical Data Test **WEST 1558.98**		
Test	Duration	# Errors
CST		
CJT		
CRT		

Electrical Data Test **WEST 1555.75**		
Test	Duration	# Errors
CST		
CJT		
CRT		

	Bulkhead BER Test (errors reported as sea/shr)							
	B06 W75		**B04 E98**		**B05 E75**		**B07 W98**	
Test	Duration	# Errors	Duration	# Errors	Duration	# Errors	Duration	# Errors
CST								
CJT								
CRT								

V02 – DCS Opened Node Validation Temperature & Current

System Current Readings	
Device	amps
EDFA east	
EDFA west	
NE East	
NE West	
OE East .98	
OE East .75	
OE West .98	
OE West .75	
OBC	
node comms controllers	

System Termperature Readings	
Device	deg C
EDFA east	
EDFA west	
NE East	
NE West	
OE East .98	
OE West .98	
OBC	

System Bulk Current Readings			
Device	volts	amps	watts (IxE)
WEST SIDE DOWN	48		
		total	
EAST SIDE DOWN	48		
	12		
		total	
ALL SIDES UP	48		
	12		
		total	

V02 – DCS Opened Node Validation – FAILOVER TESTS

COMMENTS	Test under 50% load.

LANFORGE SETUP -- Science Ports Used									
Local Port	Remote Port	Tx Load	Rx Load	Type	Local Port	Remote Port	Tx Load	Rx Load	Type
eth0	eth3	200M	56k	TCP	eth1	eth7	50M	56k	TCP
eth1	eth4	50M	56k	TCP					
eth1	eth5	50M	56k	TCP					
eth1	eth 6	50M	56k	TCP					

ETHERCHANNEL FAILOVER TEST							
Shore Ports Down				SEA Ports Down			
PATH Left Open	Test Start	Failover Time	Comment	PATH Left Open	Test Start	Failover Time	Comment
E98 1/25				E98 1/23			
E75 1/26				E75 2/24			
W98 2/25				W98 2/23			
W75 2/26				W75 1/24			

DCS DEVICE FAILOVER TEST							
Data Failover Test SHORE Devices Down				Data Failover Test SEA Devices Down			
Device Off	Test Start	Failover Time	Comment	Device Off	Test Start	Failover Time	Comment
NE East				NE East			
NE West				NE West			
mra91-01				mra01-01			
mra91-02				mra01-02			
West Cable				E75 OE			
East Cable				E98 OE			
				W75 OE			
				W98 OE			

V02 – DCS Opened Node Validation – Y Cable TESTS

DO NOT FORGET TO SAVE THE OUTPUT FROM THE Y CABLE FLUKE TESTS WITH THIS DOCUMENT

V02 – DCS Opened Node Validation – Science Cable Tests

COMMENTS	Test under 100% data load. No power load on cables

LANFORGE SETUP -- Science Ports Used			
Local LF Port	Remote LF Port	Router loca	Router remote
eth0	eth4	g1/0/9	g1/0/2-8

Science Cable	Test Duration	Errors	Tx Load	Rx Load	Type
S1			100M	56k	TCP
S1			100M	56k	UDP
S2			100M	56k	TCP
S2			100M	56k	UDP
S3			100M	56k	TCP
S3			100M	56k	UDP
S4			100M	56k	TCP
S4			100M	56k	UDP
S5			100M	56k	TCP
S5			100M	56k	UDP
S6			100M	56k	TCP
S6			100M	56k	UDP
S7			100M	56k	TCP
S7			100M	56k	UDP
S8			100M	56k	TCP
S8			100M	56k	UDP

V02 – DCS Opened Node Validation – Science Cable Tests- Under power load

COMMENTS	Test under 100% data load. Perform with power load on cables (e.g. motor of similar per MBARI)

LANFORGE SETUP -- Science Ports Used			
Local LF Port	Remote LF Port	Router loca	Router remote
eth0	eth4	g1/0/9	g1/0/2-8

Science Cable	Test Duration	Errors	Tx Load	Rx Load	Type
S1			100M	56k	TCP
S1			100M	56k	UDP
S2			100M	56k	TCP
S2			100M	56k	UDP
S3			100M	56k	TCP
S3			100M	56k	UDP
S4			100M	56k	TCP
S4			100M	56k	UDP
S5			100M	56k	TCP
S5			100M	56k	UDP
S6			100M	56k	TCP
S6			100M	56k	UDP
S7			100M	56k	TCP
S7			100M	56k	UDP
S8			100M	56k	TCP
S8			100M	56k	UDP