

*NOAA SHIP OKEANOS EXPLORER R-337*  
*"America's Ship for Ocean Exploration"*

**EX0909 Mapping Field Trials**

**Leg 4**

**Papahānaumokuākea Marine National Monument (PMNM)**

**October 26, 2009 to November 15, 2009**

**Honolulu, HI to Honolulu, HI**

**CRUISE REPORT**

By

Elizabeth (Meme) Lobecker, Nicola Verplanck, Elaine Stuart, Colleen Peters, LTJG Megan Nadeau, Emily McDonald, Margot Bohan, and Karma Kissinger



## 1. Purpose

The purpose of the cruise report is to briefly describe the data acquisition and processing without going into very detailed setup of the multibeam and ancillary sensors. For details about setup of the various equipment / sensors please refer to 'NOAA Ship Okeanos Explorer Readiness Report' which can be obtained from the ship.

## 2. Participating personnel

Acting CO "Pat" Patana	Ship's Master
Elizabeth (Meme) Lobecker	Expedition Coordinator
LT Nicola Verplanck	Field Operations Officer
Elaine Stuart	Senior Survey Technician
Colleen Peters	Senior Survey Technician
LTJG Megan Nadeau (OER)	Mapping watch stander
Emily McDonald	Mapping watch stander
Margot Bohan	Mapping watch stander
Karma Kissinger	Mapping watch stander

## 3. Mapping sonar setup

NOAA Okeanos Explorer (EX) is equipped with a 30 kHz Kongsberg EM 302 multibeam sonar and a 3.5 kHz Knudsen sub-bottom profiler (SBP 3260). During this cruise EM 302 bottom bathymetric and backscatter data were collected. Additional water column data logging was turned on where interesting features were observed in the water column.

The ship used a POS MV ver. 4 to record and correct the multibeam data for any vessel motion. C-NAV GPS system provided DGPS correctors with positional accuracy expected to be better than 2.0m.

All the corrections (motion, sound speed profile, sound speed at sonar head, draft, sensor offsets) are applied during real time data acquisition in SIS ver. 1.04. XBT casts (Deep Blue, max depth 760 m) were taken every 6 hours (0030, 0630, 1230 and 1830 local time) and in between if needed. An 800m CTD cast was taken at 1230 as weather allowed. XBT cast data were converted to SIS compliant format using NOAA Velociwin ver. 8.92 Plus.

Previous to this cruise, TX36 transmit board #16 failed twice, and was replaced both times with new spare boards from Kongsberg. Most recently, TX36 transmit board #16 was replaced during the in port on October 21, 2009. A successful Built In System Test (BIST) test was run on October 21 while the ship was pierside in Pearl Harbor. (See Appendix B for results.) When the ship was outside of the harbor, two additional successful BISTs were immediately conducted on October 26 and October 27, 2009. See Appendixes C and D, respectively, for results.

On October 28, during transit to the survey working grounds, data quality was observed to degrade with little congruent change in weather, and an additional BIST was run. It was found that TX36 transmit board # 16 had failed again, for the third time this survey season. Data

quality deemed acceptable for the purposes of the cruise, and transit to the working grounds was not interrupted.

#### 4. Data Acquisition Summary

The survey area for EX0909 Leg 4 was selected as a survey site after soliciting information from the Papahānaumokuākea Marine National Sanctuary (PMNM) about areas where they lack high-resolution multibeam coverage. PMNM provided details on several boxes they were interested in. The survey working grounds for EX0909 Leg 4 was selected due to the presence of five unexplored seamounts: Tamana, Sovereign, Haaheo, Don Quixote, and Euphemia. Very little is known about these seamounts, other than the origins of their names. Each was named after a vessel of significance from the 1800's which had passed through or spent significant amounts of time in Hawaii.

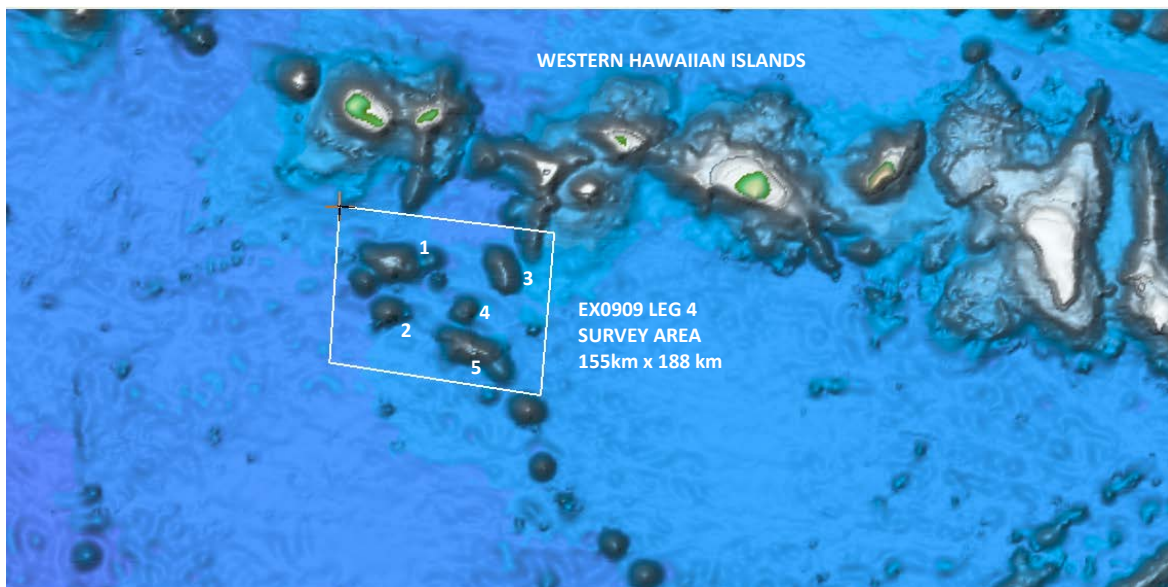


Figure 1. EX0909 Leg 4 survey area detail. Background data: satellite altimetry, source Sandwell and Smith. Expected water depths range from ~900m (atop Tamana Seamount) to ~5300m (on the seafloor between seamounts). KEY: 1) Don Quixote Seamount, 2) Euphemia Seamount, 3) Haaheo Seamount, 4) Sovereign Seamount, 5) Tamana Seamount.

Over the course of the three week cruise, a total of five distinct line plans were developed in an effort to work both efficiently and in the most favorable direction in the weather conditions.

At the commencement of the cruise, seas were expected to be a possible hindrance to ideal survey conditions, so two initial line plans were developed. The first had reciprocal azimuths of 6° and 186°, with mainscheme line spacing of 5800m, and three pairs of line splits over shoalest areas of the three highest seamounts (Don Quixote, Tamana, and Haaheo).

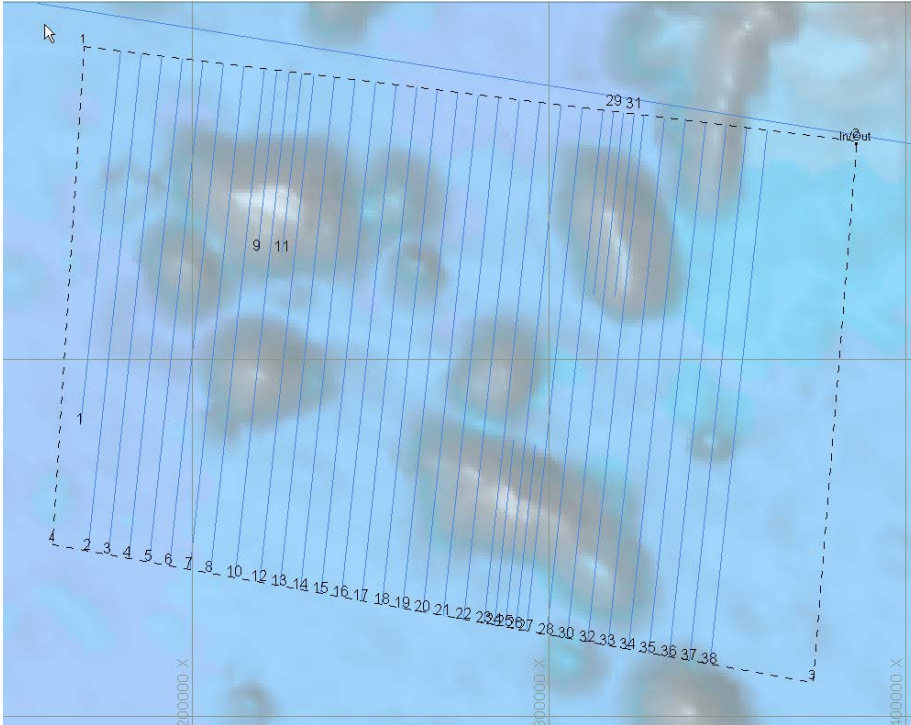


Figure 2: Initial line plan. Background data: satellite altimetry, source Sandwell and Smith. Image generated in Hypack 2009. Image credit: NOAA.

A second line plan was developed with 5800 meter line spacing and reciprocal azimuths of  $100^\circ$  and  $280^\circ$ . Due to prevailing weather conditions, it was never utilized. This line plan also had three pairs of line splits over the shoalest areas of three highest seamounts (Don Quixote, Tamana, and Haaheo).

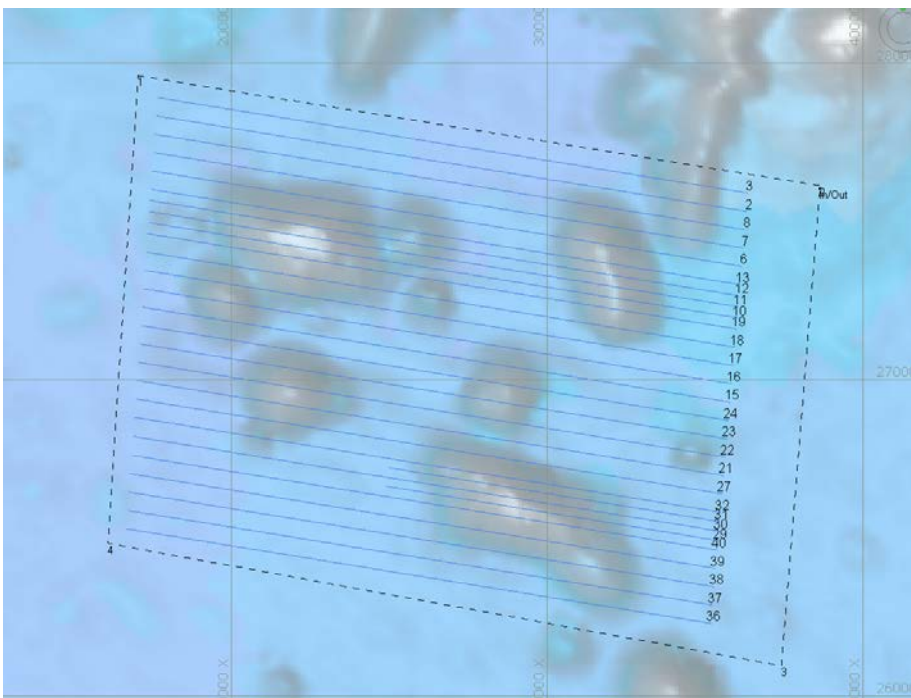


Figure 3: Second line plan. Background data: satellite altimetry, source Sandwell and Smith. Image generated in Hypack 2009. Image credit: NOAA.

A large, slow moving high pressure storm system surrounded the survey grounds early in the cruise, and from the evening of October 31<sup>st</sup> to the end of the cruise on November 15<sup>th</sup> we experienced heavy seas of up to 20 feet with sustained winds up to 35 knots. There was nowhere for the ship to hide from the geographically large storm in the small western Hawaiian Islands, we had no choice but to continually alter our line plans in an attempt to collect decent quality data under the circumstances.

On November 3<sup>rd</sup>, a third line plan was developed, when the seas made collecting acceptable data on the northerly lines of the initial line plan impossible. The third line plan was developed with reciprocal azimuths of 50° and 230°. The line spacing was reduced to 5000m, to increase line-to-line overlap to compensate for outer beam loss due to the heavy seas. The line plan focused on the northwestern section of the survey grounds in order to ensure collection of “interesting data” during the November 9 and 10 telepresence demonstrations at the Inner Space Center at URI for CBS 60 Minutes filming.

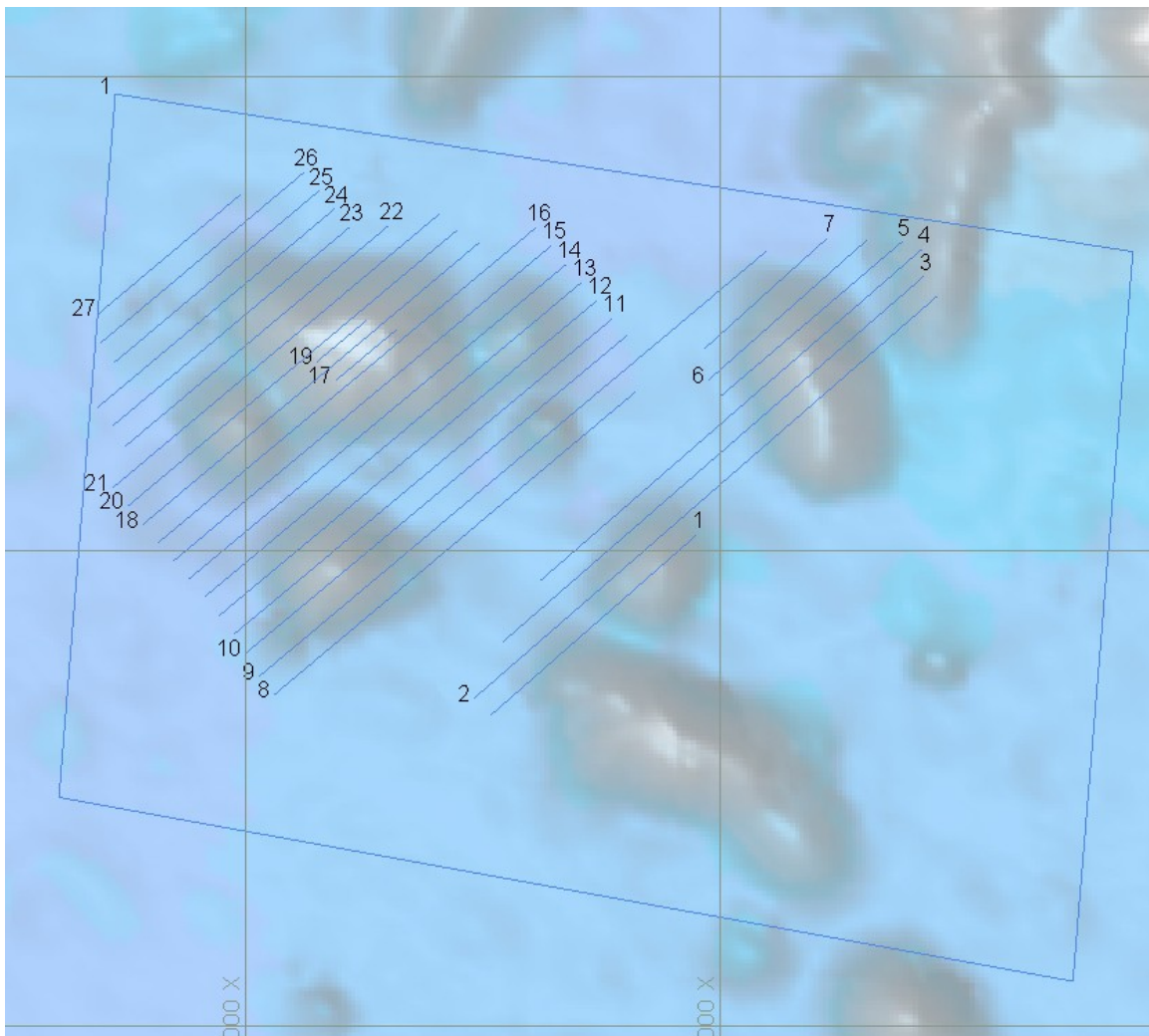




Figure 4. Third line plan (implemented November 3<sup>rd</sup>). Background data: satellite altimetry, source Sandwell and Smith. Image generated in Hypack 2009. Image credit: NOAA.

On November 4<sup>th</sup>, we had to develop a new, fourth line plan due to the heavy seas. The new line plan had 5000m line spacing and reciprocal azimuths of 30° and 210°. This line plan shifted focus of the survey grounds to the eastern side in the vicinity of the seamounts Tamana and Sovereign, in order to minimize transit in heavy seas.

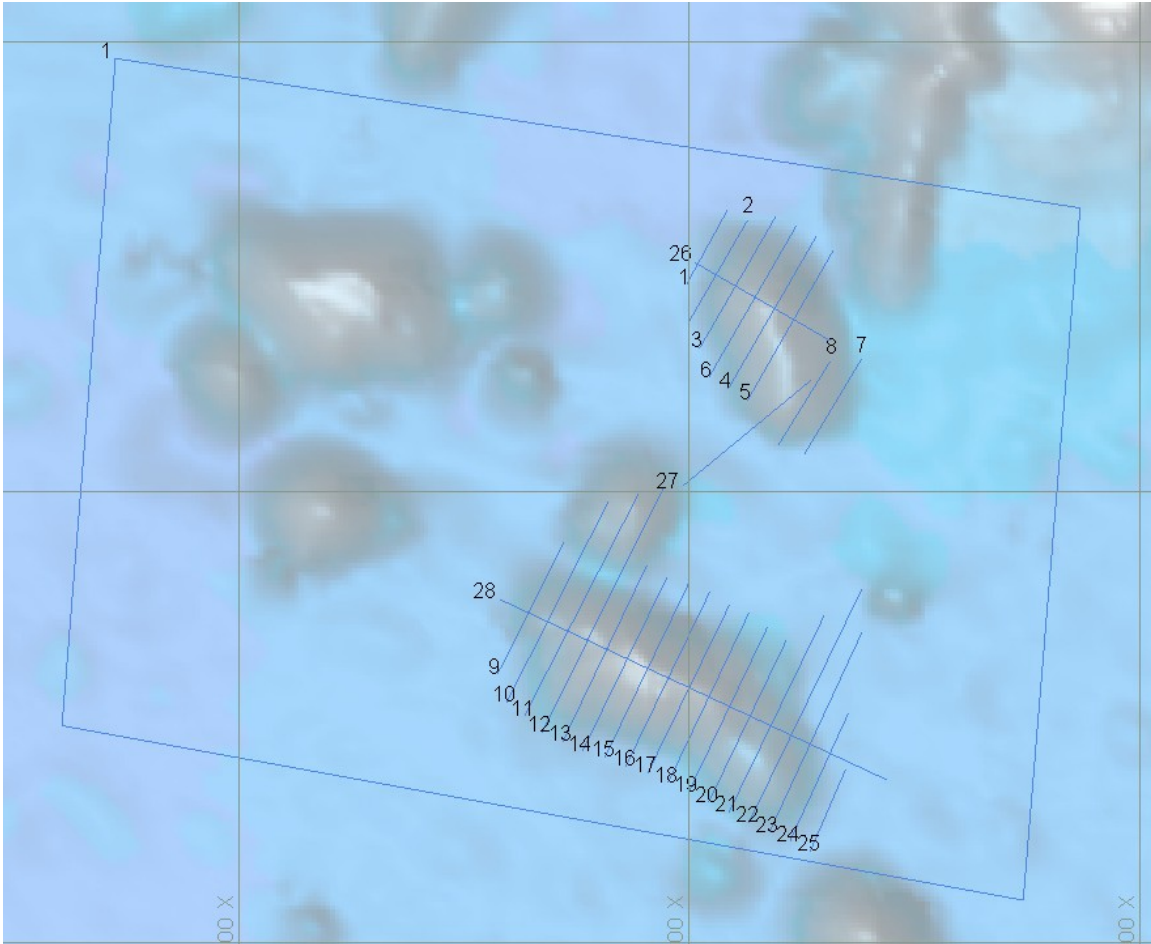


Figure 5. Fourth line plan, implemented November 5<sup>th</sup>. Background data: satellite altimetry, source Sandwell and Smith. Image generated in Hypack 2009. Image credit: NOAA.

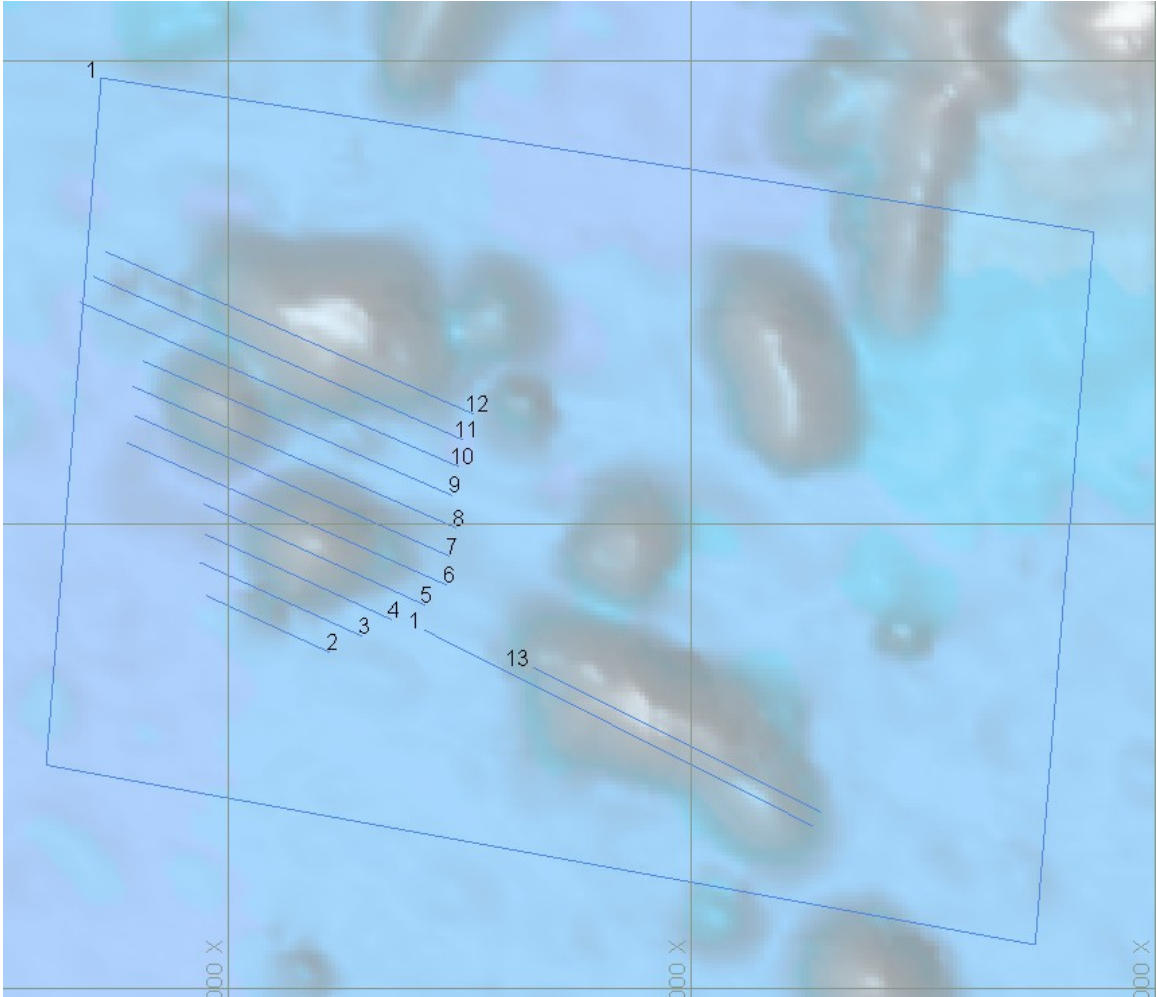


Figure 6. Fifth line plan, implemented November 7<sup>th</sup>. Background data: satellite altimetry, source Sandwell and Smith. Image generated in Hypack 2009. Image credit: NOAA.

Figure 6. Fifth line plan, implemented Nov 8<sup>th</sup>.

A 5 m – 6m ribbing artifact was observed in the multibeam data near the edges of the swath. This artifact is consistently seen in the data from throughout the survey season. We have not been able to identify the source.

## 5. Data processing:

Angular offsets are tabulated as below. For complete processing unit setup (PU Setup) utilized for the cruise, please refer to Appendix A.

	Roll	Pitch	Heading
Tx Transducer	0.0	0.0	359.98

Rx Transducer	0.0	0.0	0.03
Attitude	0	-0.7	0.0

Table 3: Angular offsets for Transmit (TX) and Receive (RX) transducer.

Onboard processing of bathymetric data was done in CARIS HIPS ver. 6.1 during which the data were cleaned in 'Swath Editor' and 'Subset Editor'. No tidal corrections were applied during post processing, however, no appreciable differences were observed between different lines by not applying tidal corrections. A nominal grid cell size of 50 m was chosen for the bathymetric grids.

The cross lines yielded a favorable comparison between main scheme lines and cross lines.

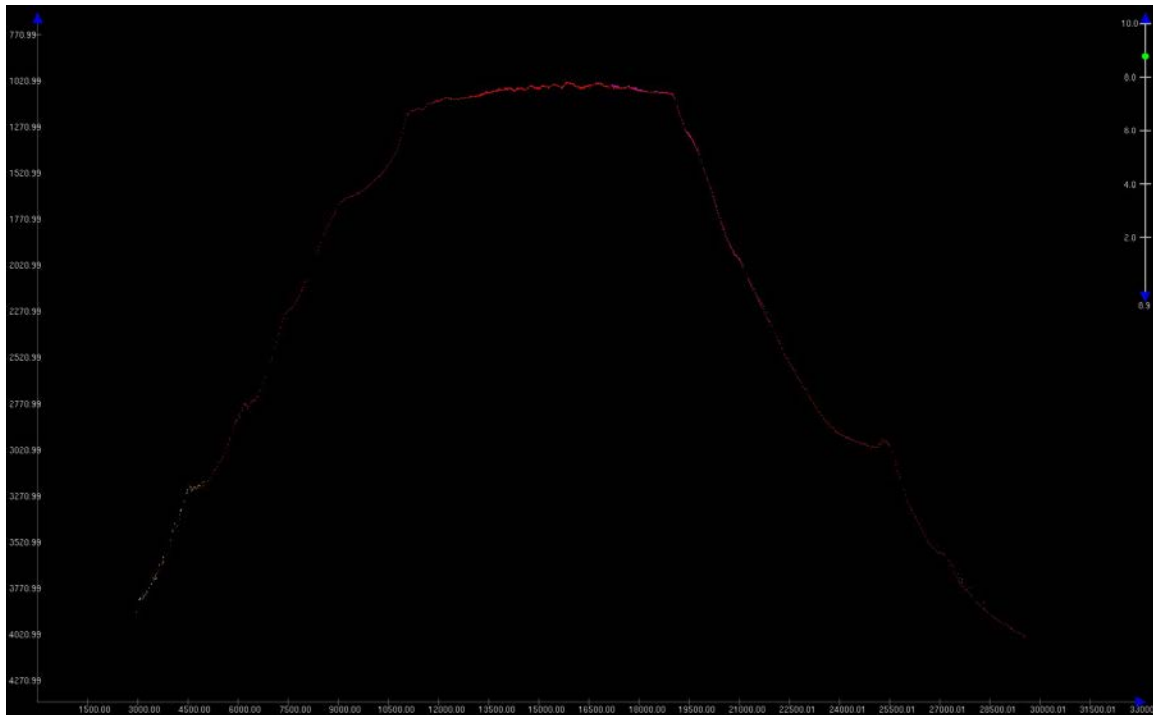


Figure X. Screenshot of along track view of crossline over Tamana Seamount, showing agreeable crossline comparison with mainscheme lines. Crossline data are shown as red points, mainscheme lines are shown as points in various other colors. Image generated in CARIS HIPS and SIPS v. 6.1. Image credit: NOAA.



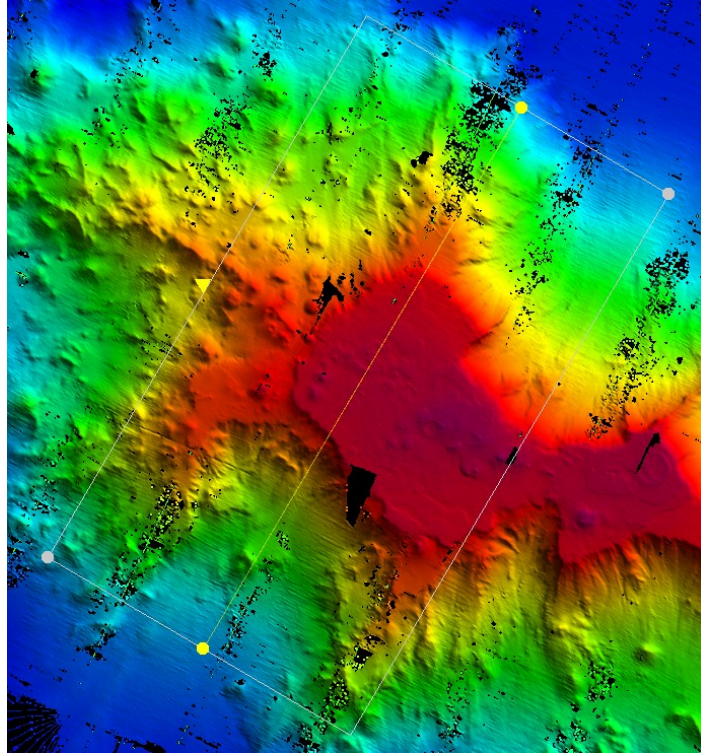


Figure X. Screenshot showing data of Tamana Seamount loaded into subset editor for along track crossline comparison shown in Fig. X above. Image generated in CARIS HIPS and SIPS v. 6.1. Image credit: NOAA.

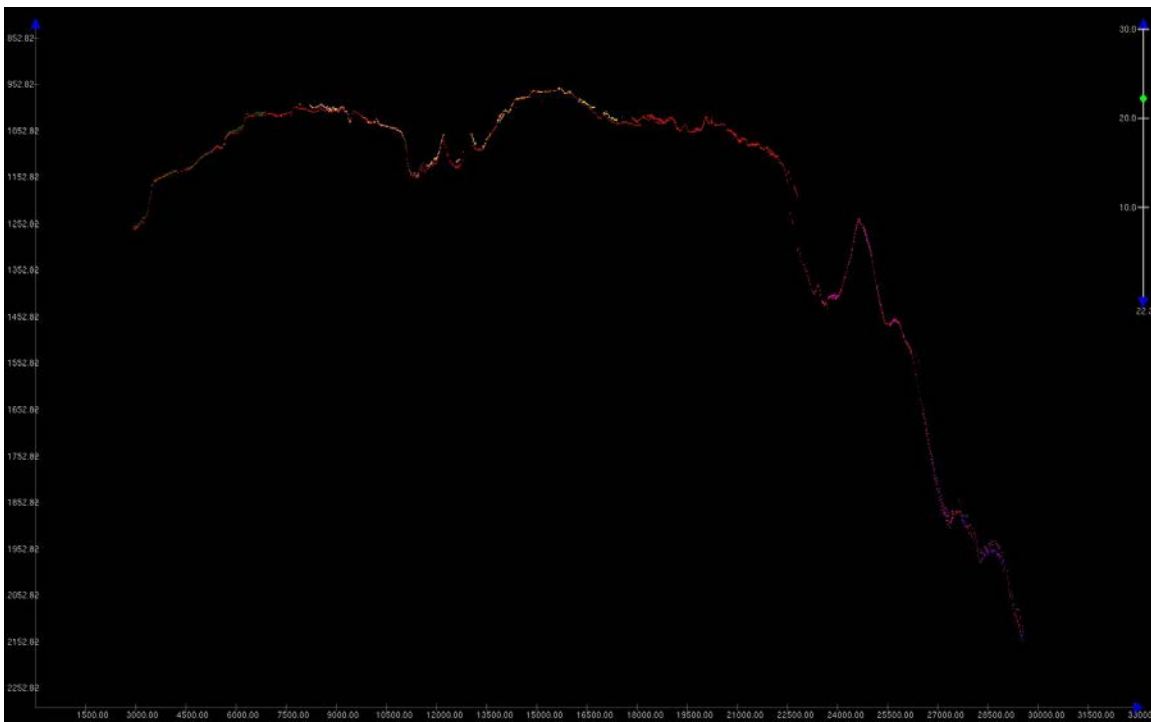


Figure X. Screenshot of across track view of crossline over Tamana Seamount, showing agreeable crossline comparison with mainscheme lines. Crossline data are shown as red points,

mainscheme lines are shown as points in various other colors. Image generated in CARIS HIPS and SIPS v. 6.1. Image credit: NOAA.

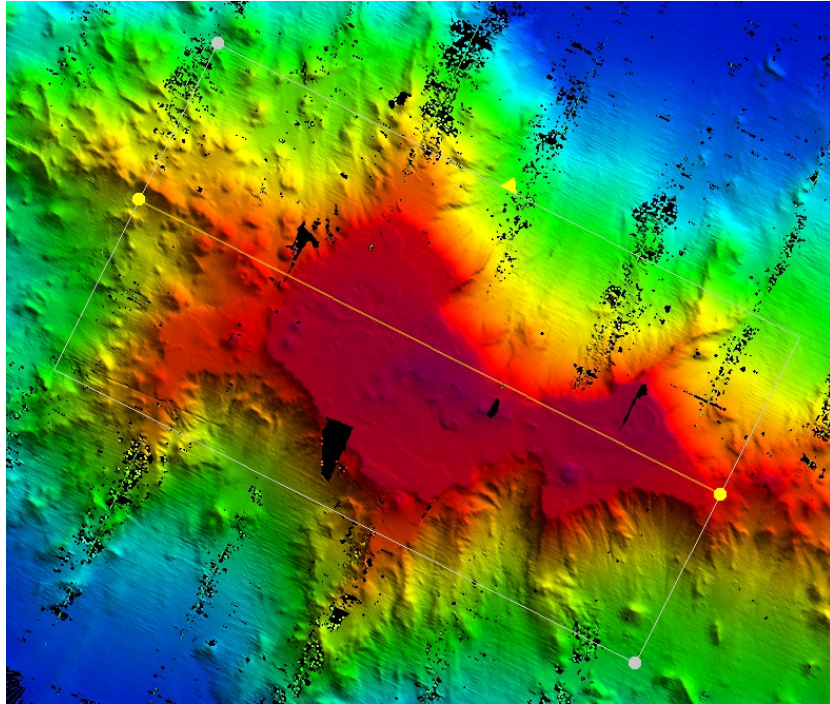


Figure X. Screenshot showing data of Tamana Seamount loaded into subset editor for across track crossline comparison shown in Fig. X above. Image generated in CARIS HIPS and SIPS v. 6.1. Image credit: NOAA.

Onboard processing of bottom backscatter data was conducted using UNH research tool 'Geocoder'. The results obtained during fair weather are encouraging but during the days when the weather was heavy, a lot of bubble sweep down issues degraded bottom backscatter data quality severely. At the time of filing of this report, we are not sure whether the weather effects can be taken care of during post processing. Also the ship is expected to contact Kongsberg, Inc regarding these backscatter artifacts. Also there were some degradation of backscatter data quality in the outer STBD beams (Figure 4).

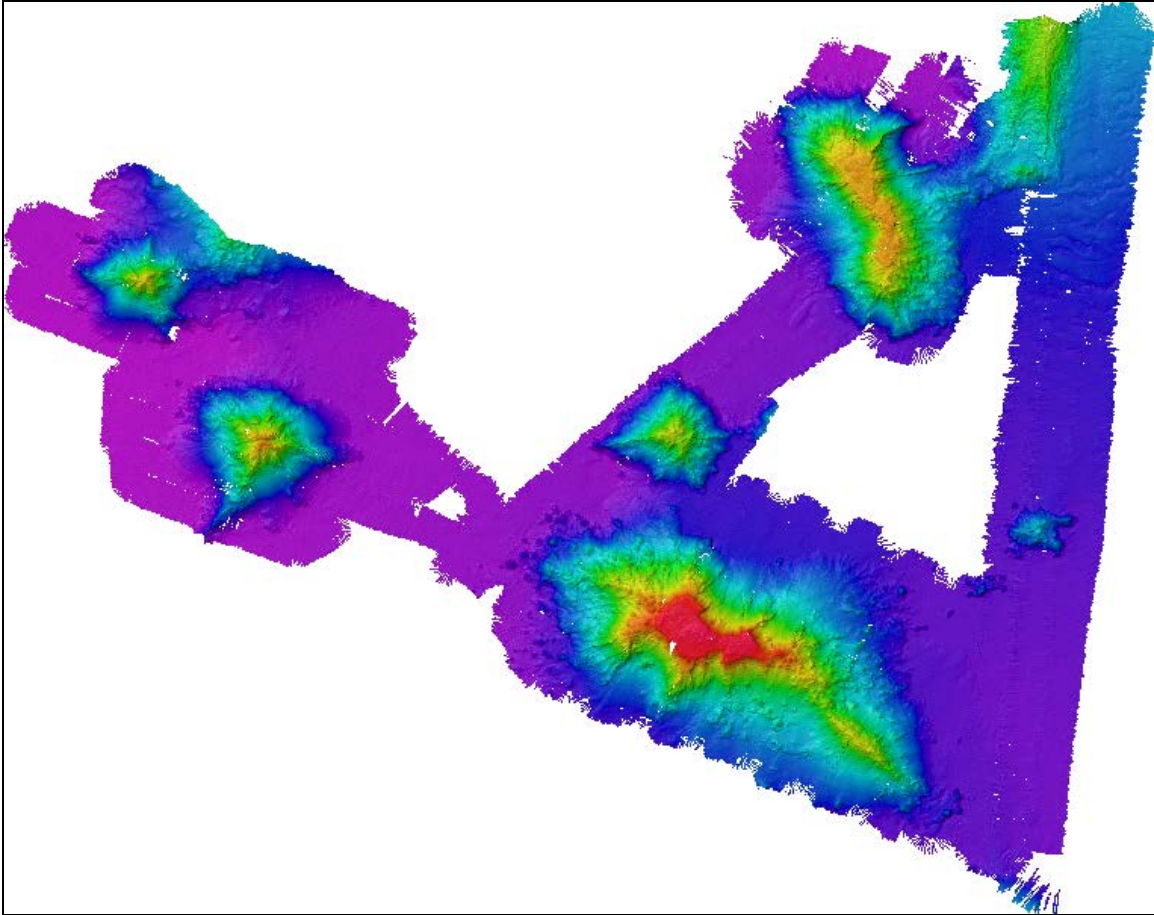


Figure X. 50 meter cell size grid showing total mapping completed with EM302 during cruise EX0909 Leg 4. Image generated in Fledermaus v. 6.7. Image credit: NOAA. **Make new map w/ scale, color bar, labels.**

### **7. Table of Cruise Statistics**

<b>Dates</b>	26 October 2009 – 15 November 2009
<b>Weather delays</b>	0
<b>Total non-mapping days</b>	2
<b>Total survey mapping days</b>	8.6
<b>Total transit mapping days</b>	6
<b>Line kilometers of PMNM survey</b>	2978 (1608 nm)
<b>Beginning draft</b>	15.0 inches(fwd)14.75 (aft)
<b>Average ship speed for survey</b>	7.8Kts

INSERT IMAGE OF BACKSCATTER

Figure 4: Backscatter mosaic results with 40 m grid cell size. Degradation of backscatter data in heavy seas clearly visible.

#### 4. Cruise Calendar

October 2009						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
				23 Lobecker boarded ship	24 NOAA non- mapping personnel (Russell, Carothers) boarded ship	25 Mission party, and Exploratorium personnel boarded ship.
26 Additional non- mapping NOAA personnel (Keener, Akamine) boarded the ship. Orientation and training for the mission party. Took on fuel. Transit to Exploratorium demo survey grounds.	27 Commence Exploratorium demo survey. Telepresence demo with UNH. Exploratorium and non- mapping NOAA personnel disembark. Commence transit to survey grounds outside of PMNM.	28 Transit to survey grounds outside of PMNM. Multibeam data continuously collected.	29 Transit to survey grounds outside of PMNM. Multibeam data continuously collected.	30 Transit to survey grounds outside of PMNM. Multibeam data continuously collected.	31 Arrive at survey grounds outside of PMNM 0645. Commence mapping PMNM priority area.	
November 2009						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
						1 Continue mapping PMNM priority area.
2 Continue mapping	3 Resume mapping	4 Resume mapping	5 Continue mapping	6 Continue mapping	7 Continue mapping	8 Continue mapping



PMNM priority area throughout the day. WX standdown at 1745.	PMNM at 0830. Stop mapping at 1530. Wx standdown overnight.	operations 0800.	PMNM priority area throughout the day.	PMNM priority area throughout the day.	PMNM priority area throughout the day.	PMNM priority area throughout the day.
9 Continue mapping PMNM priority area throughout the day.	10 Continue mapping PMNM priority area throughout the day. CBS 60 Minutes telepresence demonstration. Commence transit to Honolulu.	11 Continue transit to Honolulu. Discontinue mapping at 0954 due to weather.	12 Continue transit to Honolulu.	13 Continue transit to Honolulu.	14 Continue transit to Honolulu.	15 Continue transit to Honolulu. Arrive at dock on Ford Island, Pearl Harbor Naval Base, Honolulu.
16 Mapping team disembarks Okeanos Explorer.						

## 5. Daily cruise log

(ALL TIMES LOCAL HDT)

### 23 October 2009

Elizabeth Lobecker, cruise coordinator for this cruise, boarded the ship.

### 24 October 2009

NOAA non-mapping personnel (Craig Russell and Kyle Carothers) boarded the ship.

### 25 October 2009

Mapping personnel boarded the ship (Margot Bohan, Karma Kissinger, Emily McDonald). Exploratorium personnel boarded the ship. Conducted initial ship orientation, introduction to multibeam control room, and introduction to watchstander responsibilities.

### 26 October 2009

Additional NOAA non-mapping personnel (Paula Keener, Bradley Akamine) boarded the ship. The ship took on fuel in Pearl Harbor and departed for the Exploratorium demonstration survey

grounds in the vicinity of Penguin Bank. Arrived at demonstration survey grounds ~2100. Stood by overnight to commence survey ops in the morning. Data was collected overnight but was not processed.

Conducted in-depth mapping training: communications, XBT, watchstander duties. Successful BIST conducted after departing harbor.

Observed weather for the day: winds SE 10-15 kts, seas 3-4 foot swell with 1-3 foot seas.

### **27 October 2009**

Commenced survey operations at the Exploratorium demonstration survey grounds near Penguin Bank at 0745. Data was collected but not processed.

The Exploratorium/NOAA team continued with the orientation cruise on board the *Okeanos Explorer* in preparation for development of an *Okeanos* Web page by the Exploratorium. XBT and CTD casts were observed and videotaped, and a telepresence test was conducted with the ISC and the Exploratorium, switching among the different cameras on board the ship with audio to detail the description of imagery collected by the cameras. Conversations continued about possible approaches to Web page design and content, the ship's schedule, ideas for how the ECCs might operate, and how information might flow to the public as discoveries are made. The NOAA/Exploratorium personnel participated in the ship's daily Ops Meeting .

Exploratorium personnel and NOAA non-survey personnel disembarked *Okeanos Explorer* via small boat transfer at 1700 and 1815. Another successful BIST was conducted prior to commencement of transit to PMNM survey grounds at 1900.

Observed weather for the day: winds were SE 5-15 kts, seas were a 2-5 foot swell with 1-4 foot seas.

### **28 October 2009**

In transit to PNMN. Standard mapping watchstander procedures in effect. Weather started to degrade in the evening. Effects of weather seen in transit data. Data degraded to the point where it was appropriate to run a BIST. BIST results showed transmit board 16 failed again. The data are still acceptable, so we are continuing on to the survey working grounds.

Observed weather for the day: winds were SE 15-19 kts earlier in the day, and became NE 10-15 in the evening. Seas were a 3-6 foot swell with 4-7 foot seas.

### **29 October 2009**

In transit to PNMN. Standard mapping watchstander procedures in effect.

Observed weather for the day: winds were NW 10-15 kts, seas 6-8 foot swell with 2-4 foot seas.

### **30 October 2009**

In transit to PNMN. Standard mapping watchstander procedures in effect. A conference call was conducted with members of OER and the 60 Minutes production staff to discuss the plans for the exploration and telepresence demonstration on 11/09/09 and 11/10/09.

Observed weather for the day: Winds were NE 12-18 kts, seas were a 6-8 foot swell with 3-6 foot seas.

### **31 October 2009**

Arrived at survey grounds and commenced survey at 0645. Our line plan has azimuths of 6°/186°, which puts us approximately 60° off the direction of the swell. On the previous cruise (EX0909 Leg 3), a star pattern was run and determined that 60° off the swell is the best direction to run to give a combination of high quality data and tolerable working conditions for all onboard.

At approximately 1130, the weather came up and the data quality started to degrade. In the morning we were acquiring at upwards of 8km swath. Between 1130 and 1300 our swath coverage was ranging from 3.5km to 6.5km while in Very Deep and Extra Deep Mode. At 1300 swath was holding steady in Auto Mode (very deep) and upwards of 6.5km across track coverage. We slowed our speed to 7 kts on northerly line to maintain data quality. We increased speed back up to 9-10 knots on the southerly line.

1230 CTD was cancelled due to weather.

CNAV stopped sending data to the POSMV for approximately 45 minutes, despite the fact that it was seeing 10 satellites. We restarted CNAV three times, it started sending position data the third time.

We completed the first two easternmost survey lines today.

Observed weather for the day: Winds were NE 15-23 kts, seas were a 4-8 foot swell with 4-6 foot seas.

### **01 November 2009**

The weather has picked up significantly. Throughout the day we experienced XX foot seas, which significantly impacted data quality in the northerly direction. We finished our first line of the day all the way to the north end, then reran the same in the southerly direction to attain better coverage. Data was collected in the northerly direction but not processed due to extremely poor quality.

We are in the center of a very large high pressure system. There are no islands nearby to hide behind, and the storm system is too large to transit out of, so we have no choice but to continue to survey.

1230 CTD was cancelled due to weather

The bridge has restricted access to the weather decks.

TSG pump has been secured due to pitching of the ship, so we are no longer receiving sound speed at the sonar head.

Observed weather for the day: Winds were NE 25-30 kts, seas were a 14-16 foot swell with 4-6 foot seas.

## **02 November 2009**

Throughout the day we experienced a sea state of 8 on the Beaufort scale, with seas of up to 18 feet and winds of up to XX coming from the NE. We continue to collect mainscheme lines in both northerly and southerly directions, but we are not processing the northerly data. Bathymetry is acceptable in the southerly direction, but backscatter data is severely degraded.

TSG pump remains secured due to the constant pitching of the ship.

At 1715, while on a southerly line, the ship took a series of large rolls and the EM302 lost bottom for several minutes. Multibeam data quality continued to degrade beyond acceptable quality, and at 1745 we decided to stop collecting data and hove to in order to find a better ride. The EM302 TRU, SIS, and multibeam computer were all shut completely off to give the system a break. We expect to be in the worst part of the weather system at 0300 tomorrow. We will continue to assess when we can get back online in the upcoming days.

Observed weather for the day: Winds were NE 30-35 kts, seas were 18-20 feet.

## **03 November 2009**

With following seas, we turned the EM302 multibeam on at 0830 to see how the data quality looked. It was deemed acceptable and logging was started. A new line plan was developed to take advantage of the current weather conditions, with azimuths of 50° and 230°. This puts the seas directly astern and directly into the bow. At 1408 we completed our first line of the new plan, and turned to head into the seas. Data quality quickly became unacceptable, so we turned stopped EM302 logging and pinging. We took the opportunity to perform additional BIST testing requested by Kongsberg to troubleshoot the 3<sup>rd</sup> failure of TX36 board #16. We telnet'ed into the TRU and ran bist tests 30-34, then swapped TR36 board #'s 16 and 24, then ran BIST tests 30-34, the swapped boards 16 and 24 back, then reran BISTs 30-34. Results were sent to Kongsberg for analysis.

Observed weather for the day: Winds were NE 25-30 kts, seas were 14-16 feet.

## **04 November 2009**

We reached the north side of the survey area at 0800. We turned south and started acquiring data at that time. Data quality looked good so we ran a line south until noon, then headed north again. At 2000, we headed south for a smoother ride and data acquisition overnight.

At 1000 the multibeam froze and required a restart. SIS was giving an error message that it could not find the sounder. We restarted the TRU and the system came up normally. In the present weather conditions, it was deemed prudent to continue on in our current line rather than turn around and fill the 15 minute data gap created by the restart.

Observed weather for the day:

## **05 November 2009**

Weather decks opened, which greatly improved morale. The EM302 multibeam collected good data until approximately 0900, when the ship turned onto a North bound line. To limit poor data quality and to maximize surveying efforts, a new line plan was established with azimuths 30°/120°. The plan covers the seamounts Tamana, Sovereign, and Haaheao. This line plan

demonstrates the best direction to cut through the swells and give the most favorable data in the North bound direction. This line plan was implemented at ~1400.

Observed weather for the day: seas were 10 feet with a 6 foot swell, winds averaged NE 20 kts.

### 06 November 2009

At 0100, the ship entered a series of intense squalls that lasted intermittently throughout the night until 0700. Lightning was observed throughout the squall period.

Throughout the rest of the day, survey operations returned to normal with the seas continuing to lie down. We were able to complete mapping over Haaheao Seamount and transited south to continue mapping over the seamounts Sovereign and Tamana. CTD deployments are still on hold due to swells. We completed crossline over Ha'aheo Seamount today. Results were favorable, and are shown in screen grabs below.

Observed weather for the day: The seas were 7- 10 ft throughout the day. The winds averaged 20 kts from the NE.

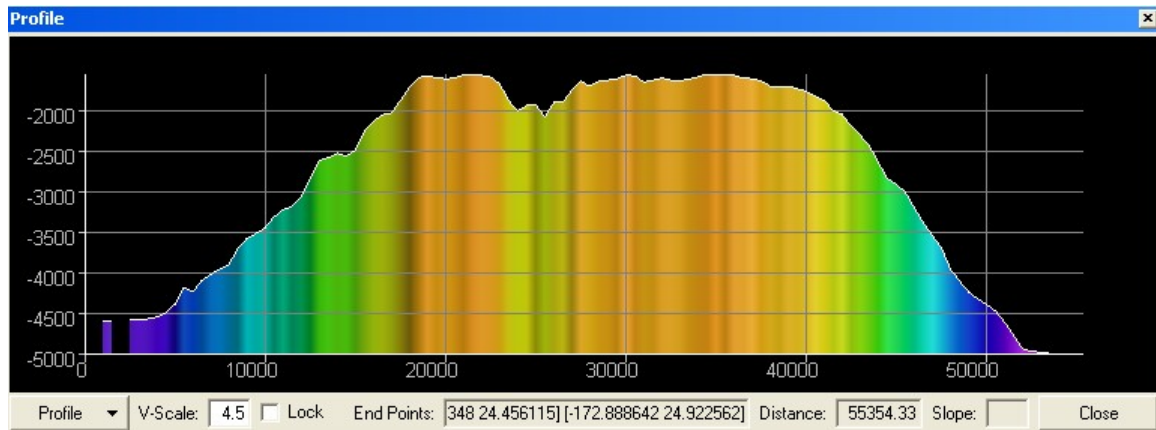


Figure X. Profile view of Ha'aheo Seamount. Units shown in meters. Height of Ha'aheo Seamount above surrounding seafloor = approx. 3200m.

Image generated in Fledermaus v. 6.7. Image credit: NOAA.



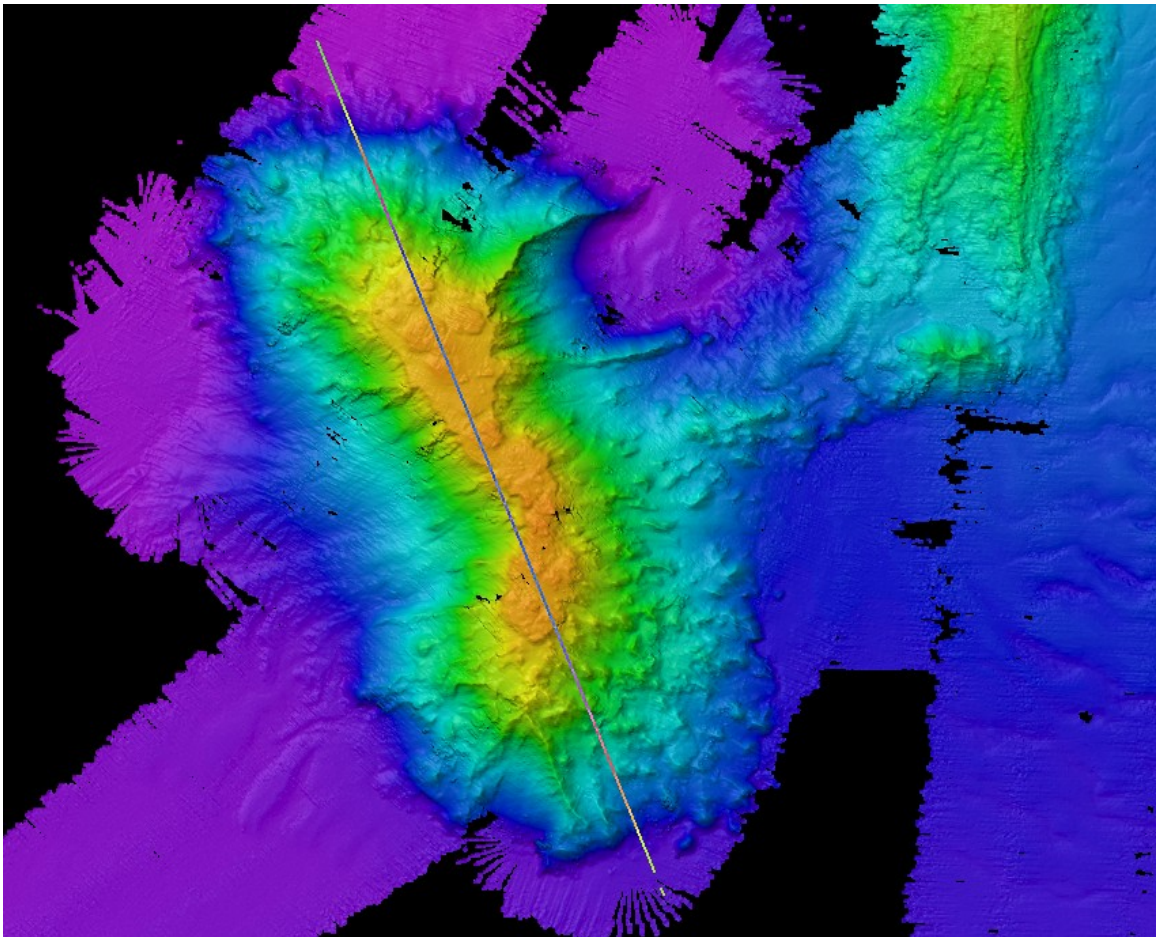


Figure X. Overview of Ha'aheo Seamount. White line indicates direction of depth profile shown in Fig. X above. Image generated in Fledermaus v. 6.7. Image credit: NOAA.

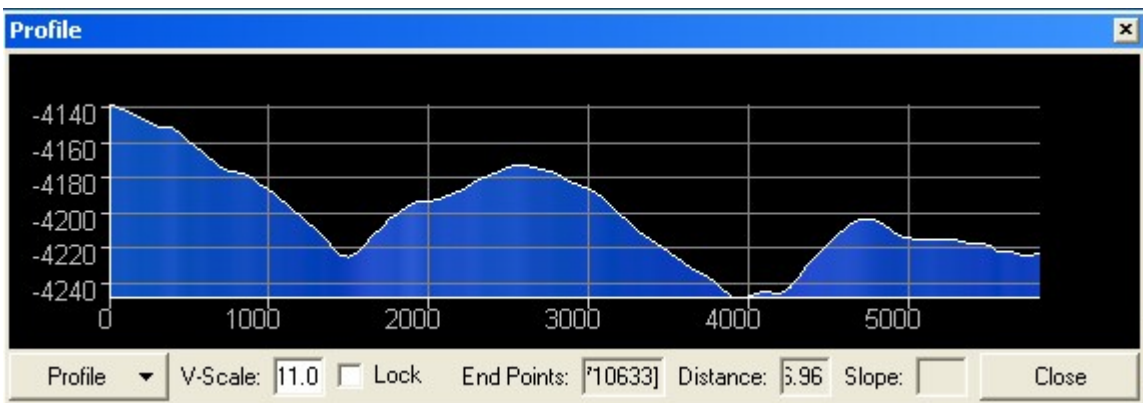


Figure X. Profile of interesting sediment or lava flow pattern at northeast corner of survey site near Ha'aheo Seamount and Northhampton Seamounts extension. Image generated in Fledermaus v. 6.7. Image credit: NOAA.

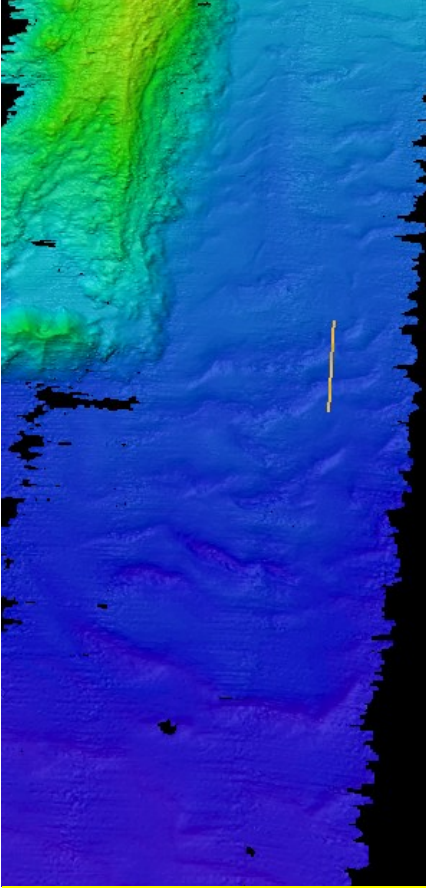


Figure X. Interesting sediment or lava flow pattern at northeast corner of survey site near Ha'aheo Seamount and Northhampton Seamounts extension. White line indicates profile in Fig. X above. Image generated in Fledermaus v. 6.7. Image credit: NOAA.

#### **07 November 2009**

We continued mapping over the seamounts Sovereign and Tamana today. The data quality is much improved with the seas laying down. A benefit of the sea state we experienced of the course of the last week is that improperly secured items, such as tv screens and broken storage cabinet drawers, came loose and were then made seaworthy. CTD deployment is still on hold due to lingering swells. The TSG pump was cleared and turned back on today, so we are now receiving sound speed at the sonar head.

Observed weather for the day: The seas were 4-6 ft throughout the day. The winds averaged 11 kts from the NE and became E.

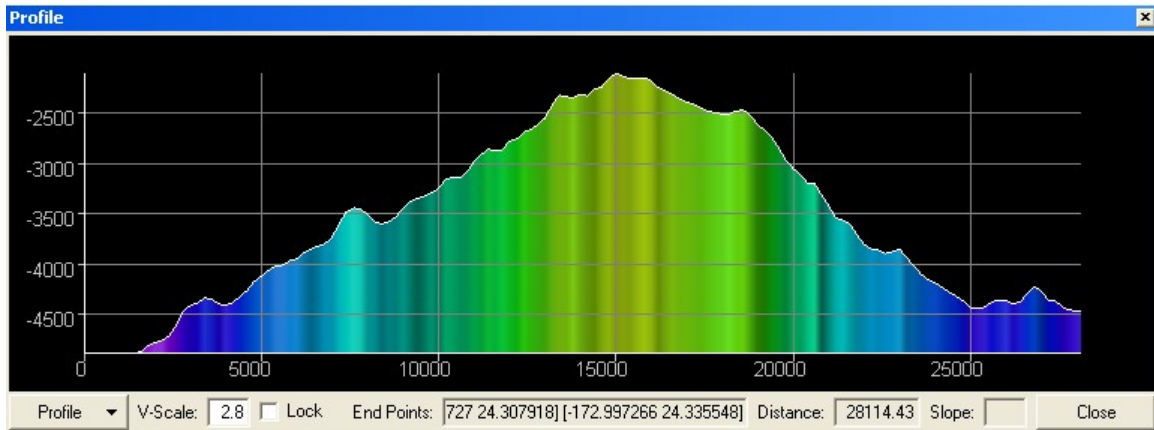


Figure X. Profile of Sovereign Seamount. Units shown in meters. Height of Sovereign Seamount above surrounding seafloor = approx. 2700m. Image generated in Fledermaus v. 6.7. Image credit: NOAA.

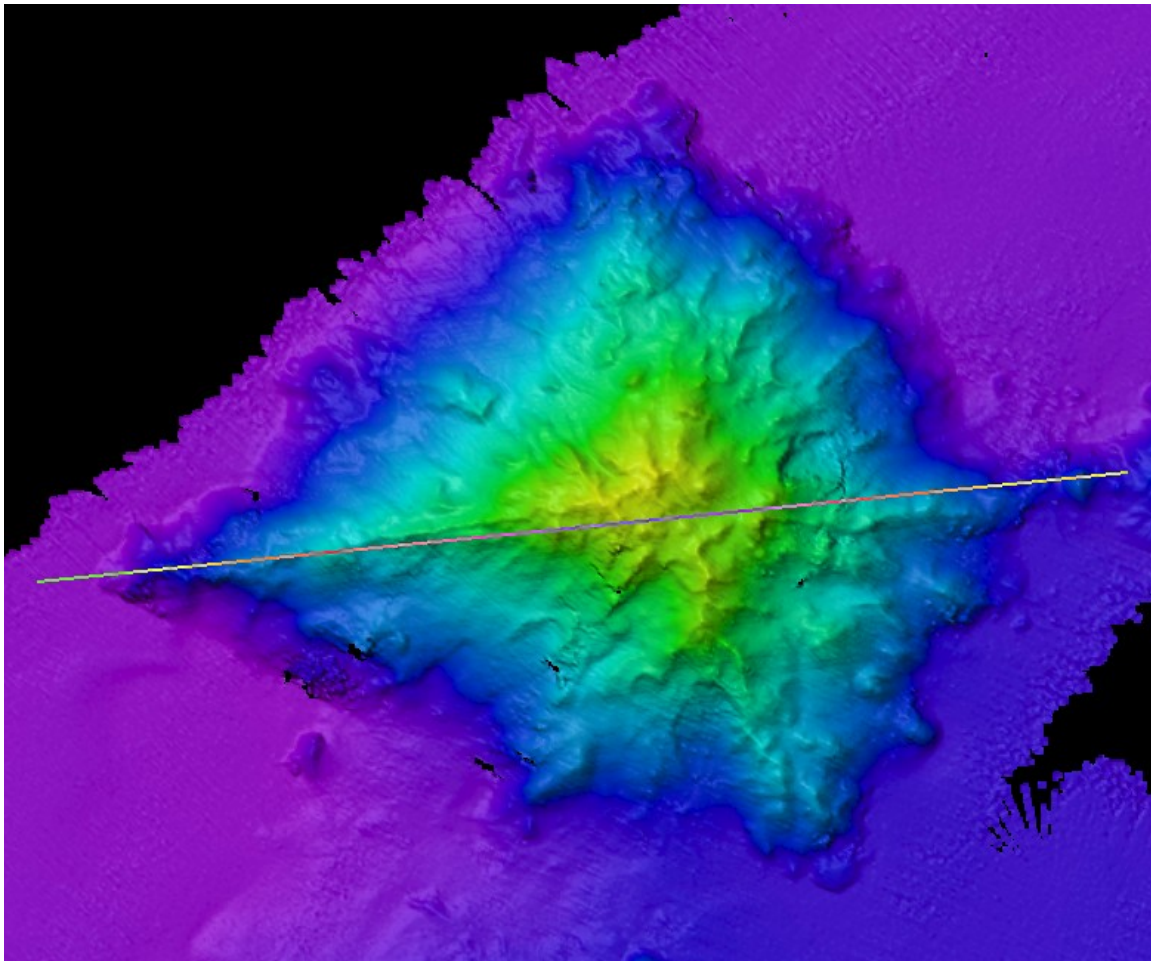


Figure X. Sovereign Seamount. White line indicates profile trace shown above in Fig. X. Image generated in Fledermaus v. 7. Image credit: NOAA.

### 08 November 2009

We completed mainscheme mapping lines over Tamana Seamount at 1005 in the late evening, at which point we started on a crossline / transit line over to Euphemia Seamount. See Line plan #5 in Figure X above.

In the morning the mapping team went over the protocols and expectations for the telepresence demonstration for CBS 60 Minutes taking place on November 9<sup>th</sup> and 10<sup>th</sup> between the ship and the Inner Space Center at URI.

At 1230 we completed a successful CTD cast to 800 meters, the first CTD cast of the cruise due to weather constraints. We conducted a simultaneous XBT (Deep Blue model) to 760 meters. The comparison results were acceptable and are shown below.

Observed weather for the day: The seas were 2-5 feet throughout the day from the E. Winds were between 10-13 kts from the E.

Figure X. 08 November 2009 CTD to XBT comparison cast results.

### 09 November 2009

Today we mapped all of Euphemia Seamount and started mapping the southern flank of Don Quixote seamount. We further prepared for the CBS 60 Minutes telepresence demonstration at the Inner Space Center.

Observed weather for the day:

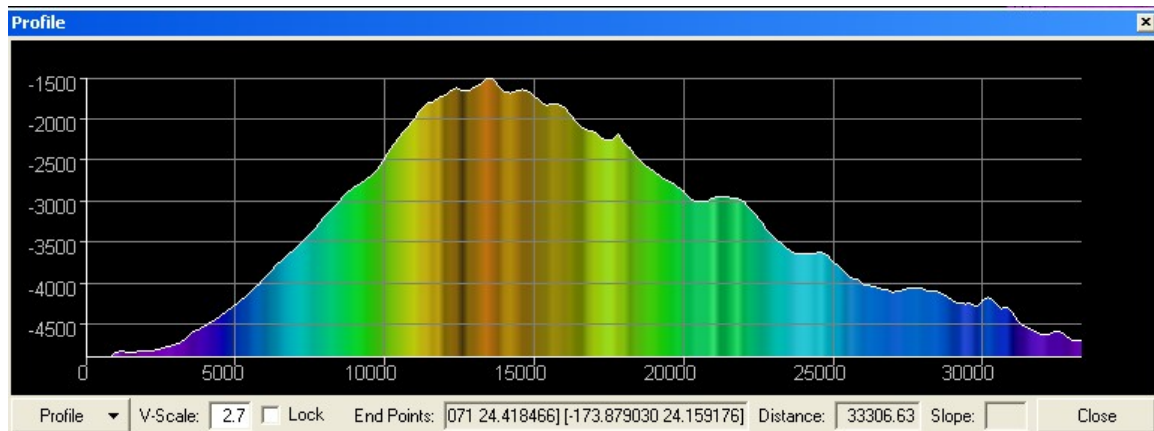


Figure X. Profile view of Euphemia Seamount. Height of Euphemia Seamount above surrounding seafloor = approx. 3200m.

Photo credits: Image credit: NOAA. Profile created in Fledermaus v. 7.



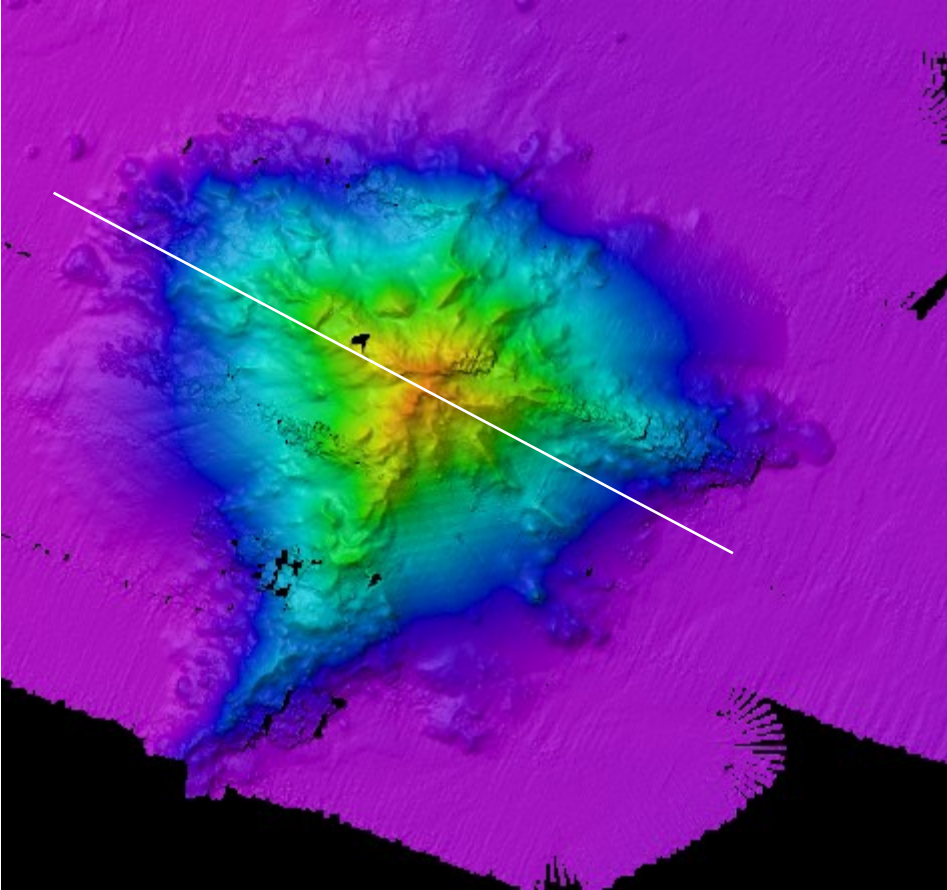


Figure X. Overview of Euphemia Seamount. White line indicates direction of profile shown in Fig. X above. Image generated in Fledermaus v. 6.7. Image credit: NOAA.

#### 10 November 2009

In the morning we conducted a telepresence demonstration for a CBS 60 Minutes broadcast to be aired November 29 this year. We completed what we could of mapping over Don Quixote seamount before departing at 1130 for the southern portion of the survey working grounds. At 1740 we started on the final survey line for the survey, a crossline/holiday line over Tamana Seamount.

Observed weather for the day: The seas were 5-9 feet throughout the day, with swells from the E. Winds were between 20-25 kts from the E. Seas started picking up around 2000.

Figure X. Overview of Sovereign Seamount. White line indicates direction of profile shown above in Fig. X. Image generated in Fledermaus v. 6.7. Image credit: NOAA.



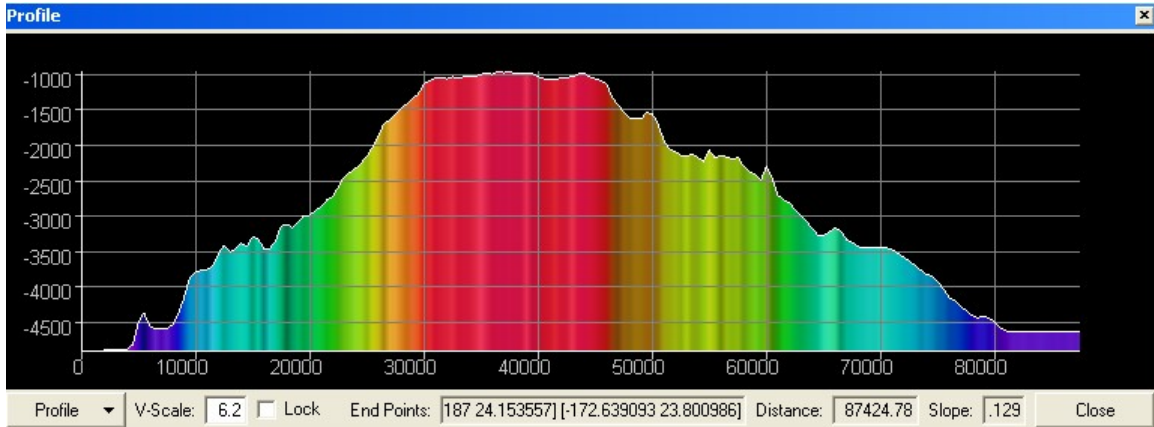


Figure X. Profile of Tamana seamount. Units shown in meters. Height of Tamana Seamount above surrounding seafloor = approx. 3600m. Image generated in Fledermaus v. 6.7. Image credit: NOAA.

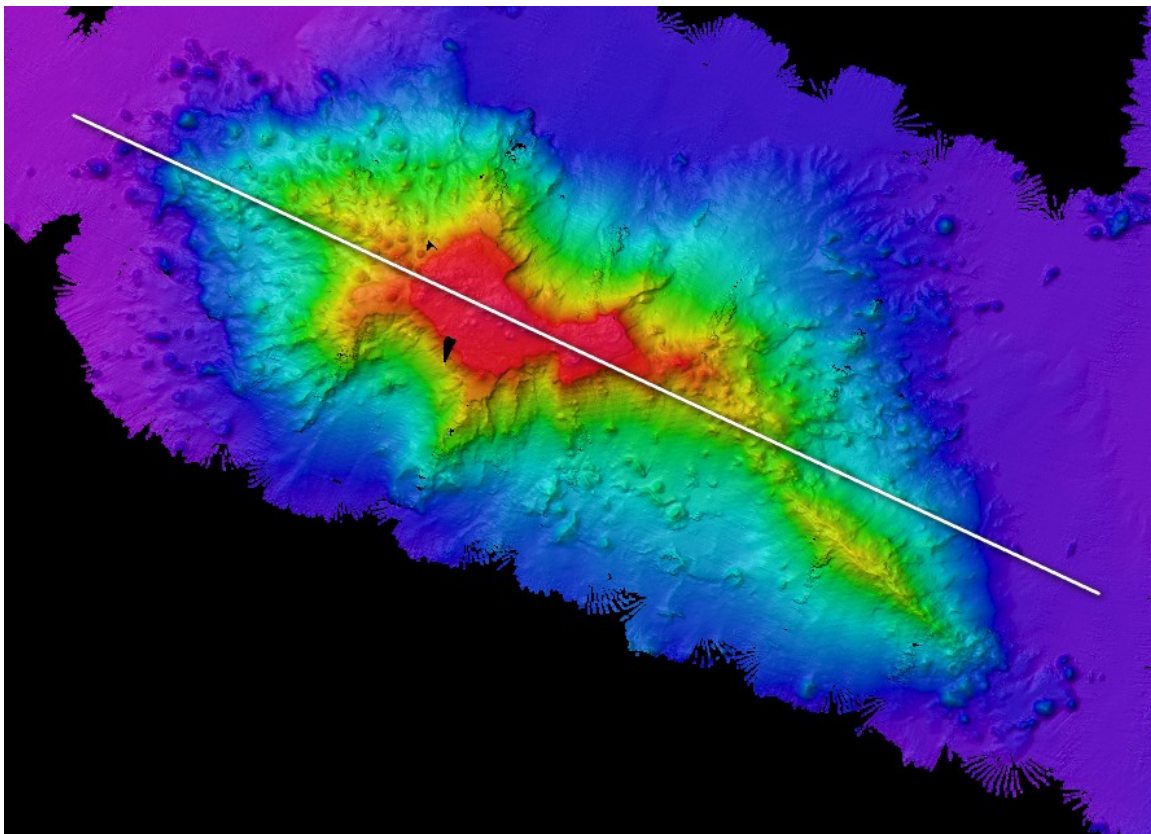


Figure X. Overview of Tamana Seamount. White line indicates direction of profile shown above in Fig. X. Image generated in Fledermaus v. 6.7. Image credit: NOAA.

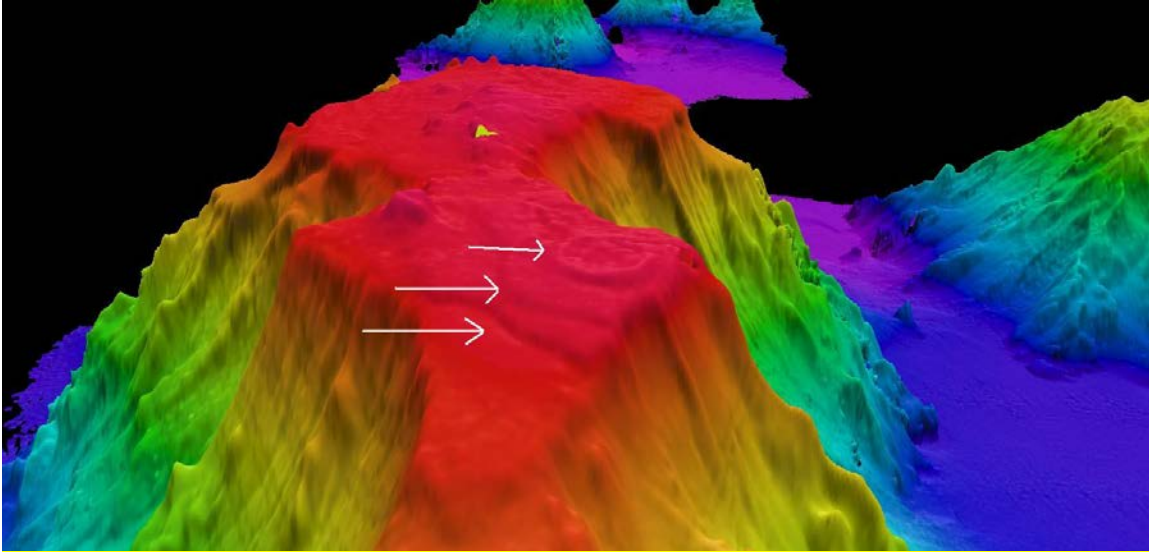


Figure X. Looking west over Tamana Seamount. Possible extinct coastlines or coral reefs indicated by white arrows. Image generated in Fledermaus v. 6.7. Image credit: NOAA.

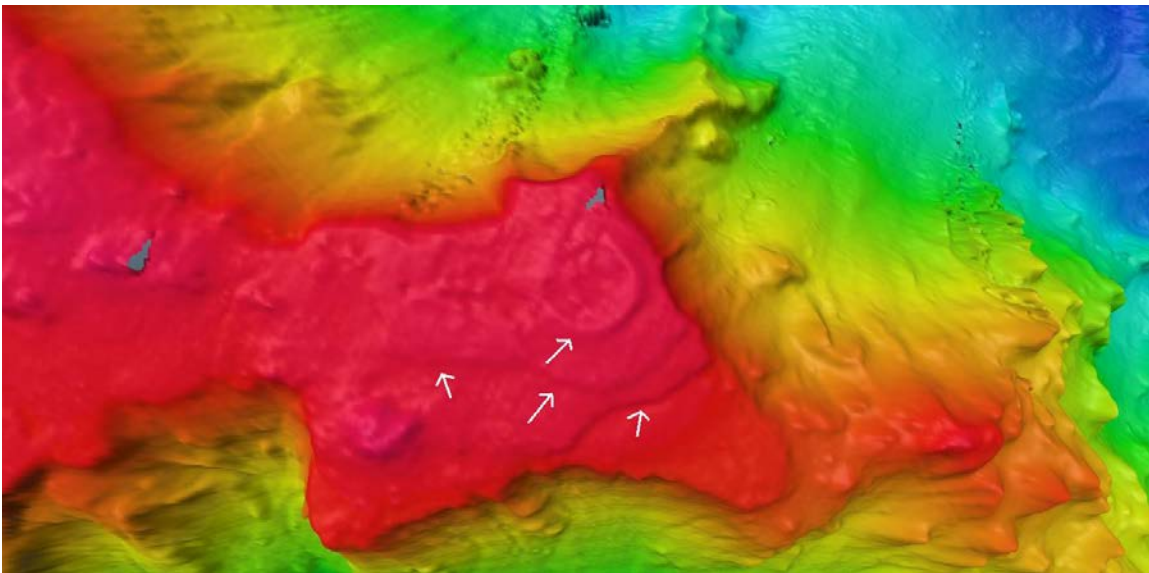


Figure X. Overview of eastern section of planed top of Tamana Seamount. Possible extinct coastlines or coral reefs indicated by white arrows. Image generated in Fledermaus v. 6.7. Image credit: NOAA.

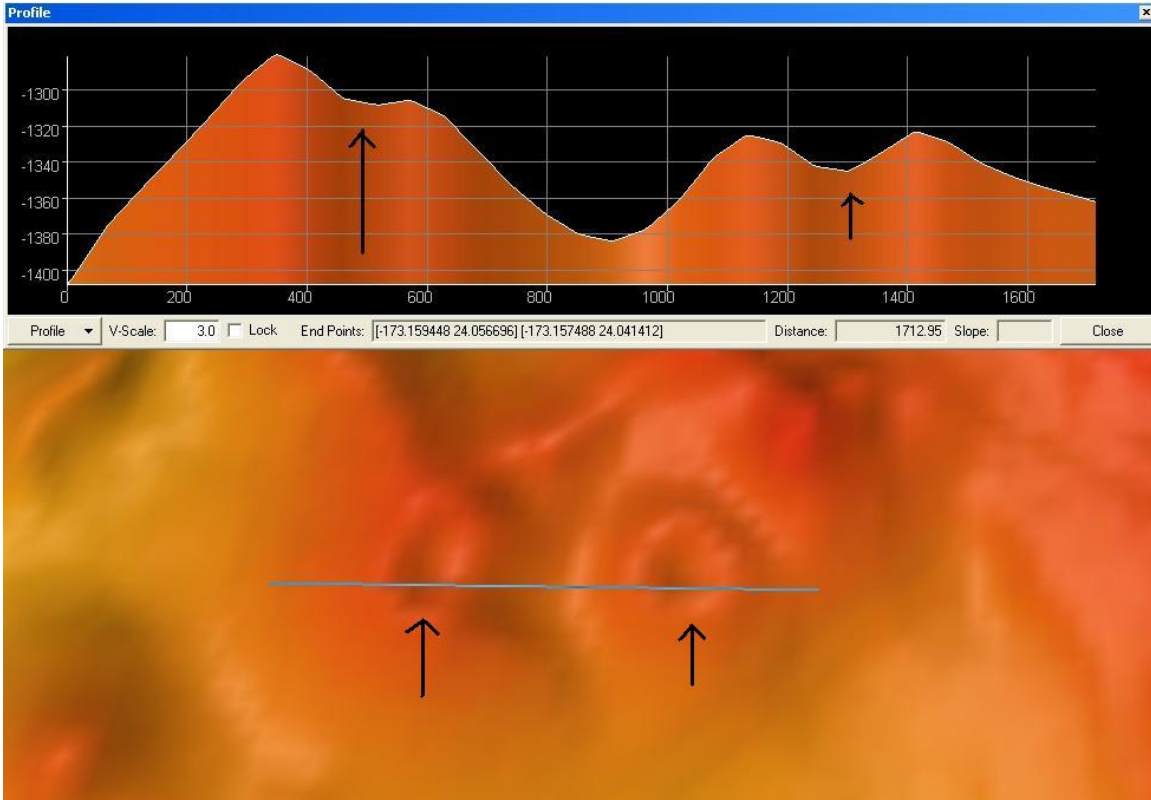


Figure X. Parasitic cones, indicated by black arrows, found on western flank of Tamana Seamount. White line indicates direction of profile. Parasitic cone centers found to 20m deep or less. Image generated in Fledermaus v. 6.7. Image credit: NOAA.

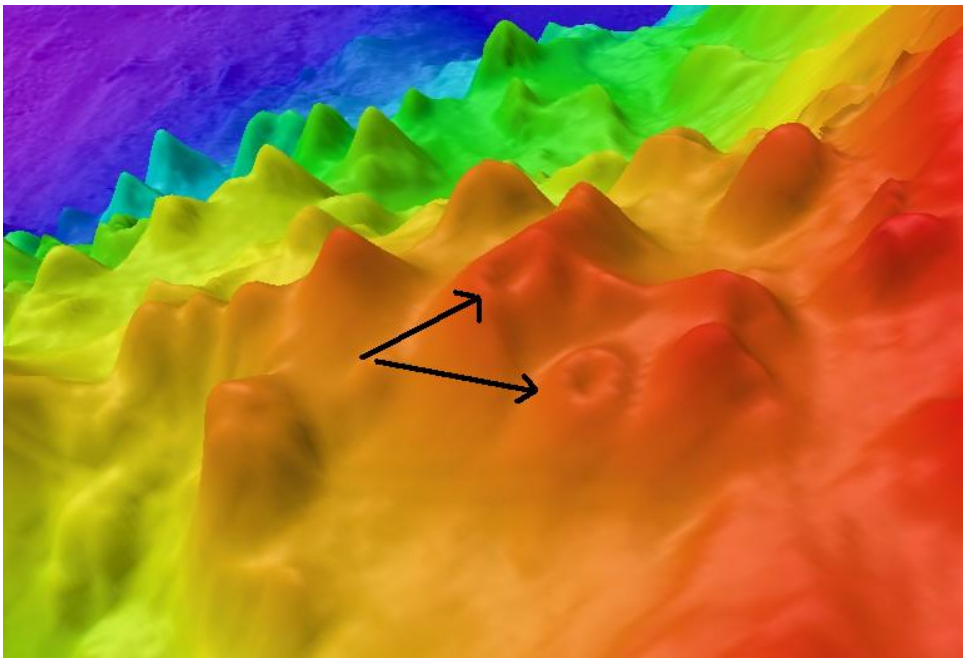


Figure X. Parasitic cones, indicated by black arrows, found on the western flank of Tamana Seamount. Image generated in Fledermaus v. 6.7. Image credit: NOAA.



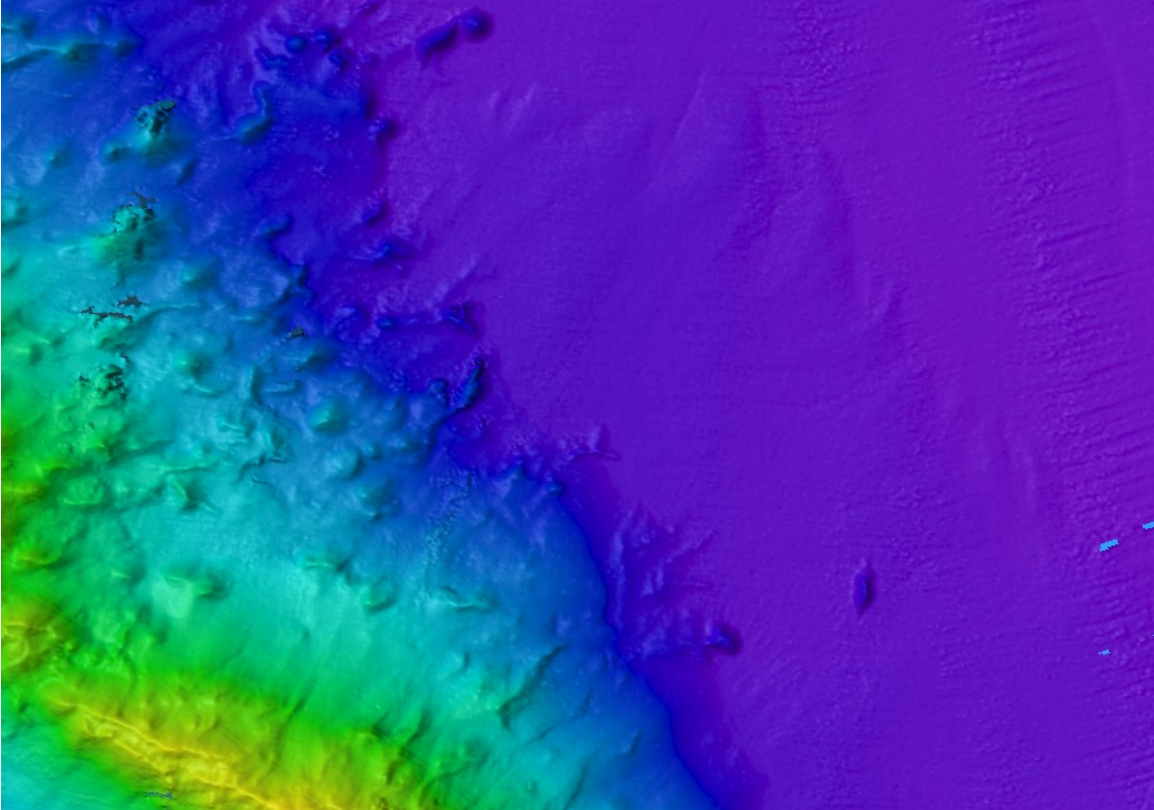


Figure X. Interesting lava or sediment flow off of eastern flank of Tamana Seamount. Image generated in Fledermaus v. 6.7. Image credit: NOAA.

#### **11 November 2009**

We commenced transit from the southeast corner of the survey working grounds to Honolulu at 0015. The seas have picked up significantly due to another large high pressure system to our north. Our transit direction puts the weather almost directly at our bow.

At 0945 the multibeam system was secured. Data quality had degraded quickly throughout the morning with the building seas. The mapping team worked on finalizing data processing.

Observed weather for the day: The seas averaged 10 feet throughout the day from the E. Winds were between 30kts from the E. Weather decks were closed at 1215.

#### **12 November 2009**

We continued transit back to Honolulu. The mapping team is finalizing data processing and developing mapping products for the cruise. Weather decks remained closed.

Observed weather for the day: Seas averaged 10-15 feet throughout the day from the NE. Winds averaged 28 kts from the east.

#### **13 November 2009**

We continued transit back to Honolulu. The mapping team is finalizing data processing and developing mapping products for the cruise. Weather decks remained closed.

Overnight last night the VSAT dome lost two hatches due to the heavy seas we have experienced throughout the trip. Due to the continuing heavy seas, the ETs cannot go up the pedestal and secure the holes left by the missing hatches. Personnel are not allowed on the boat deck due to possibility of falling debris from the VSAT dome.

Observed weather for the day: Winds were from the east at 20 kts in the early part of the day, and became 15 kts in the evening. Seas were an 8-10 foot swell from the NE.

#### 14 November 2009

For approximately one hour, we fired up the Knudsen 3260 subbottom profiler and the Kongsberg EA600 Singlebeam as a final test of the systems before the winter inport. Both systems performed adequately in 3500-4000 meters of water.

The engineering department performed a 6 hour DP test to look for potential overheating of the bow thrusters.

We arrived at the Pearl Harbor seabuoy at XXX.

Observed weather for the day:

### 6. Tables of data files collected

Table 6a: XBT / CTD locations

Date (GMT)	Time (GMT)	XBT/CTD Filename	Latitude	Longitude	Remarks
10/27/2009	04:26:09	XBT_102709_01	21 4.59448N	157 45.44629W	Training
10/27/2009	18:05:23	XBT_102709_02	21 1.96289N	157 43.55566W	Exploratorium Demo Survey
10/27/2009	22:44:07	CTD_102709_01	20 54.32 N	157 46.95 W	Exploratorium Demo Survey
10/28/2009	05:41:18	XBT_102809_03	21 14.178 N	158 0.136 W	Transit
10/28/2009	10:31:30	XBT_102809_04	21 14.212 N	157 59.938 W	Transit
10/28/2009	16:29:47	XBT_102809_05	20 59.006N	157 44.025W	Transit
10/28/2009	22:38:46	XBT_102809_06	21 12.56372N	160 58.34766W	Transit
10/28/2009	04:37:24	XBT_102809_07	21 24.68042N	161 59.18262W	Transit
10/29/2009	10:29:22	XBT_102909_08	21 36.663 N	162 59.423 W	Transit



10/29/2009	16:29:05	XBT_102909_09	21 49.511N	164 4.096W	Transit to Haaheo Seamount
10/29/2009	22:24:36	XBT_102909_10	22 3.7312N	165 4.74219W	Bad XBT
10/29/2009	22:37:15	XBT_102909_11	22 3.8125N	165 5.18555W	Transit
10/30/2009	04:34:28	XBT_103009_12	22 14.76099N	166 5.74609W	Transit
10/30/2009	10:30:33	XBT_103009_13	22 27.801 N	167 5.963 W	Transit
10/30/2009	16:29:00	XBT_103009_14	22 41.675N	168 7.059W	Transit
10/30/2009	22:32:57	XBT_103009_15	22 56.67896N	169 13.26367W	Transit
10/31/2009	04:29:55	XBT_103109_16	23 11.4873N	170 19.4629W	Transit
10/31/2009	10:28:29	XBT_103109_17	23 24.34N	171 21.879W	Transit
10/31/2009	16:26:22	XBT_103109_18	23 37.347N	172 27.222W	Transit
10/31/2009	22:32:34	XBT_103109_19	24 32.46411N	172 25.3457W	PMNMSeamounts Survey
11/01/2009	04:29:08	XBT_110109_20	24 41.13965N	172 27.88477W	PMNMSeamounts Survey
11/01/2009	10:26:19	XBT_110109_21	23 45.723N	172 33.705W	PMNMSeamounts Survey
11/01/2009	16:31:22	XBT_110109_22	24 12.942N	172 34.295W	PMNMSeamounts Survey
11/02/2009	00:44:58	XBT_110209_23	24 56.26733N	172 29.55469W	PMNMSeamounts Survey
11/02/2009	04:42:19	XBT_110209_24	24 18.54346N	172 33.53516W	PMNMSeamounts Survey
11/03/09	01:09:48	XBT_110309_25	24 58.47485N	172 32.97266W	PMNMSeamounts Survey
11/03/09	19:28:51	XBT_110309_26	24 25.7771N	173 0.75977W	PMNMSeamounts Survey
11/04/09	18:23:11	XBT_110409_27	24 46.42407N	172 33.44336W	PMNMSeamounts Survey
11/05/09	04:33:22	XBT_110409_28	24 43.69653N	172 40.33594W	PMNMSeamounts Survey
11/05/09	18:52:39	XBT_110509_29	24 18.33008N	173 19.08398W	PMNMSeamounts Survey

11/06/09	04:35:05	XBT_110609_30	24 56.48438N	172 47.9668W	PMNMSeamounts Survey
11/06/09	10:30:55	XBT_110609_31	24 53.582N	172 53.146W	PMNMSeamounts Survey
11/06/09	18:29:31	XBT_110609_32	24 41.6128N	172 46.92969W	PMNMSeamounts Survey
11/07/09	00:39:27	XBT_110609_33	24 40.53296N	172 40.32422W	PMNMSeamounts Survey
11/07/09	04:39:43	XBT_110709_34	24 37.43677N	172 41.7207W	PMNMSeamounts Survey
11/07/09	10:30:11	XBT_110709_35	24 1.171N	173 17.148W	PMNMSeamounts Survey
11/07/09	16:29:21	XBT_110709_36	24 4.344N	173 18.699W	PMNMSeamounts Survey
11/07/09	22:37:48	XBT_110709_37	24 4.41479N	173 18.66211W	PMNMSeamounts Survey
11/08/09	04:33:05	XBT_110709_38	24 6.42944N	173 1.59766W	PMNMSeamounts Survey
11/08/09	10:29:33	XBT_110809_39	23 57.936N	173 59.300W	PMNMSeamounts Survey
11/08/09	16:30:28	XBT_110809_40	23 48.709N	172 75.14W	PMNMSeamounts Survey
11/08/09	22:41:10	CTD_110809_2	23 47.79N	172 47.90W	PMNMSeamounts Survey
11/08/09	22:58:42	XBT_110809_41	23 47.94604N	172 47.95508W	PMNMSeamounts Survey
11/09/09	04:37:22	XBT_110909_42	23 43.19019N	172 44.14844W	PMNMSeamounts Survey
11/09/09	10:27:31	XBT_110909_43	23 55.942N	172 57.926W	PMNMSeamounts Survey
11/09/09	16:44:34	XBT_110909_44	24 19.3N	174 0.25W	PMNMSeamounts Survey
11/09/09	23:11:10	XBT_110909_45	24 25.38745N	174 0.72656W	PMNMSeamounts Survey
11/10/09	04:31:16	XBT_111009_46	Bad cast	Bad cast	Bad cast
11/10/09	04:31:16	XBT_111009_47	24 23.21045N	173 46.83789W	PMNMSeamounts Survey
11/10/09	10:28:11	XBT_111009_48	24 22.944N	173 38.283W	PMNMSeamounts Survey
11/10/09	16:28:56	XBT_111009_49	24 33.530N	173 50.001W	PMNMSeamounts Survey

11/10/09	22:44:09	XBT_111009_50	24 37.28784N	173 51.8457W	PMNMSeamounts Survey
11/11/09	04:30:45	XBT_111109_51	24 3.99536N	173 11.38672W	PMNMSeamounts Survey
11/11/09	10:31:48	XBT_111109_52	23 33.678N	172 25.980W	Transit to Honolulu

**Table 6b: Multibeam files collected during the cruise:**

Julian Day No.	Date (GMT)	File Name	Location	Survey Name	Remarks
300	102709	0000_20091027_054015_EX	Penguin Bank	Exploratorium_Demo	Transit to Exploratorium demo site – does not need to be processed
300	102709	0001_20091027_114015_EX	Penguin Bank	Exploratorium_Demo	Transit to Exploratorium demo site – does not need to be processed
300	102709	0002_20091027_174016_EX	Penguin Bank	Exploratorium_Demo	Transit to Exploratorium demo site – does not need to be processed
300	102709	0003_20091027_180219_EX	Penguin Bank	Exploratorium_Demo	Exploratorium Demo Survey
300	102709	0004_20091027_193115_EX	Penguin Bank	Exploratorium_Demo	Exploratorium Demo Survey
300	102709	0005_20091027_193804_EX	Penguin Bank	Exploratorium_Demo	Exploratorium Demo Survey
300	102709	0006_20091027_205710_EX	Penguin Bank	Exploratorium_Demo	Exploratorium Demo Survey
300	102709	0007_20091027_210223_EX	Penguin Bank	Exploratorium_Demo	Exploratorium Demo Survey
300	102709	0008_20091027_220146_EX	Penguin Bank	Exploratorium_Demo	Exploratorium Demo Survey
300	102709	0009_20091027_221023_EX	Penguin Bank	Exploratorium_Demo	Exploratorium Demo Survey
300	102709	0010_20091027_231844_EX	Penguin Bank	Exploratorium_Demo	Exploratorium Demo Survey
300	102709	0011_20091027_231847_EX	Penguin Bank	Exploratorium_Demo	Exploratorium Demo Survey
301	102809	0000_20091028_055356_EX	Transit	EX0909_4_Transit	Transiting to Monument
301	102809	0001_20091028_070324_EX	Transit	EX0909_4_Transit	Transiting to Monument
301	102809	0002_20091028_130326_EX	Transit	EX0909_4_Transit	Transiting to Monument
301	102809	0003_20091028_190325_EX	Transit	EX0909_4_Transit	Transiting to Monument
302	102909	0004_20091029_000003_EX	Transit	EX0909_4_Transit	Transiting to Monument
302	102909	0005_20091029_060028_EX	Transit	EX0909_4_Transit	Transiting to Monument
302	102909	0006_20091029_120026_EX	Transit	EX0909_4_Transit	Transiting to Monument
302	102909	0007_20091029_180027_EX	Transit	EX0909_4_Transit	Transiting to Monument
302	102909	0008_20091029_190521_EX	Transit	EX0909_4_Transit	Transiting to Monument
303	103009	0009_20091030_000005_EX	Transit	EX0909_4_Transit	Transiting to Monument
303	103009	0010_20091030_060007_EX	Transit	EX0909_4_Transit	Transiting to Monument
303	103009	0011_20091030_120004_EX	Transit	EX0909_4_Transit	Transiting to Monument
303	103009	0012_20091030_180001_EX	Transit	EX0909_4_Transit	Transiting to Monument
303	103009	0013_20091030_203503_EX	Transit	EX0909_4_Transit	Transiting to Monument
304	103109	0014_20091031_000024_EX	Transit	EX0909_4_Transit	Transiting to Monument
304	103109	0015_20091031_060021_EX	Transit	EX0909_4_Transit	Transiting to Monument
304	103109	0016_20091031_120019_EX	Transit	EX0909_4_Transit	Transiting to Monument
304	103109	0017_20091031_164748_EX	Transit	EX0909_4_Transit	Transiting to Monument

304	103109	0000_20091031_165856_EX	PMNM	EX0909_PMNMSmnts	First line of survey
304	103109	0001_20091031_225853_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
305	110109	0002_20091101_000034_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
305	110109	0003_20091101_021110_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
305	110109	0004_20091101_023446_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
305	110109	0005_20091101_83440_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
305	110109	0006_20091101_111009_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
305	110109	0007_20091101_113444_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
305	110109	0008_20091101_173443_EX	PMNM	EX0909_PMNMSmnts	DNP
305	110109	0009_20091101_233438_EX	PMNM	EX0909_PMNMSmnts	DNP
305	110109	0010_20091101_001702_EX	PMNM	EX0909_PMNMSmnts	DNP
305	110109	0011_20091102_002255_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
306	110209	0012_20091102_062255_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
306	110209	0013_20091102_085603_EX	PMNM	EX0909_PMNMSmnts	DNP
306	110209	0014_20091102_094300_EX	PMNM	EX0909_PMNMSmnts	DNP
306	110209	0015_20091102_110944_EX	PMNM	EX0909_PMNMSmnts	DNP
306	110209	0016_20091102_170937_EX	PMNM	EX0909_PMNMSmnts	DNP
306	110209	0017_20091102_110944_EX	PMNM	EX0909_PMNMSmnts	DNP
307	110309	0018_20091103_005520_EX	PMNM	EX0909_PMNMSmnts	DNP
307	110309	0019_20091103_005911_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
307	110309	0020_20091103_034708_EX	PMNM	EX0909_PMNMSmnts	DNP
307	110309	0021_20091103_192544_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
308	110409	0022_20091104_000237_EX	PMNM	EX0909_PMNMSmnts	DNP
308	110409	0023_20091104_002754_EX	PMNM	EX0909_PMNMSmnts	DNP
308	110409	0024_20091104_181310_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
308	110409	0025_20091104_201948_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
309	110509	0026_20091105_024736_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
309	110509	0027_20091105_083022_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
309	110509	0028_20091105_110741_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
309	110509	0029_20091105_164324_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
309	110509	0030_20091105_174523_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
309	110509	0031_20091105_234525EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
310	110609	0032_20091106_024404_EX	PMNM	EX0909_PMNMSmnts	DNP
310	110609	0033_20091106_03146_EX	PMNM	EX0909_PMNMSmnts	DNP
310	110609	0034_20091106_043000_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
310	110609	0035_20091106_064936_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
310	110609	0036_20091106_071419_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
310	110609	0037_20091106_095331_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
310	110609	0038_20091106_100007_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
310	110609	0039_20091106_120341_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
310	110609	0040_20091106_121336_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
310	110609	0041_20091106_124335_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
310	110609	0042_20091106_133642_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
310	110609	0043_20091106_153649_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
310	110609	0044_20091106_154037_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
310	110609	0045_20091106_163240_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
310	110609	0046_20091106_170211_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
310	110609	0047_20091106_210916_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
310	110609	0048_20091106_211824_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
310	110609	0049_20091106_224311_EX	PMNM	EX0909_PMNMSmnts	DNP

310	110609	0050_20091106_230220_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
311	110709	0051_20091106_002404_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
311	110709	0052_20091107_012310_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
311	110709	0053_20091107_012834_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
311	110709	0054_20091107_031320_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
311	110709	0055_20091107_033454_EX	PMNM	EX0909_PMNMSmnts	DNP
311	110709	0056_20091107_033454_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
311	110709	0057_20091107_050902_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
311	110709	0058_20091107_072548_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
311	110709	0059_20091107_075744_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
311	110709	0060_20091107_110027_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
311	110709	0061_20091107_110835_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
311	110709	0062_20091107_110845_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
311	110709	0063_20091107_113609_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
311	110709	0064_20091107_113825_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
311	110709	0065_20091107_133202_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
311	110709	0066_20091107_142929_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
311	110709	0067_20091107_170708_EX	PMNM	EX0909_PNMNSmnts	PMNMSmnts Survey
311	110709	0068_20091107_174546_EX	PMNM	EX0909_PNMNSmnts	PMNMSmnts Survey
311	110709	0069_20091107_211043_EX	PMNM	EX0909_PNMNSmnts	PMNMSmnts Survey
311	110709	0070_20091107_213041_EX	PMNM	EX0909_PNMNSmnts	PMNMSmnts Survey
312	110809	0071_20091107_02441_EX	PMNM	EX0909_PNMNSmnts	PMNMSmnts Survey
312	110809	0072_20091107_010420_EX	PMNM	EX0909_PNMNSmnts	PMNMSmnts Survey
312	110809	0073_20091108_010420_EX	PMNM	EX0909_PNMNSmnts	PMNMSmnts Survey
312	110809	0074_20091108_032640_EX	PMNM	EX0909_PNMNSmnts	PMNMSmnts Survey
312	110809	0075_20091108_034850_EX	PMNM	EX0909_PNMNSmnts	PMNMSmnts Survey
312	110809	0076_20091108_060916_EX	PMNM	EX0909_PNMNSmnts	PMNMSmnts Survey
312	110809	0077_20091108_062826_EX	PMNM	EX0909_PNMNSmnts	PMNMSmnts Survey
312	110809	0078_20091108_084646_EX	PMNM	EX0909_PNMNSmnts	PMNMSmnts Survey
312	110809	0079_20091108_090725_EX	PMNM	EX0909_PNMNSmnts	PMNMSmnts Survey
312	110809	0080_20091108_111941_EX	PMNM	EX0909_PNMNSmnts	PMNMSmnts Survey
312	110809	0081_20091108_114344_EX	PMNM	EX0909_PNMNSmnts	PMNMSmnts Survey
312	110809	0082_20091108_140155_EX	PMNM	EX0909_PNMNSmnts	PMNMSmnts Survey
312	110809	0083_20091108_142621_EX	PMNM	EX0909_PNMNSmnts	PMNMSmnts Survey
312	110809	0084_20091108_163350_EX	PMNM	EX0909_PNMNSmnts	PMNMSmnts Survey
312	110809	0085_20091108_165723_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
312	110809	0086_20091108_183406_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
312	110809	0087_20091108_190835_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
312	110809	0088_20091108_193014_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
312	110809	0089_20091108_213904_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
312	110809	0090_20091108_232752_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
312	110809	0091_20091108_234951_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
312	110809	0092_20091108_234951_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
313	110909	0093_20091109_014041_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
313	110909	0094_20091109_020031_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
313	110909	0095_20091109_041211_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
313	110909	0096_20091109_043716_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Surveyy
313	110909	0097_20091109_061142_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
313	110909	0098_20091109_065918_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
313	110909	0099_20091109_080500_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey

313	110909	0100_20091109_085406_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
313	110909	0101_20091109_135059_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
313	110909	0102_20091109_163659_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
313	110909	0103_20091109_172948_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
313	110909	0104_20091109_190125_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
313	110909	0105_20091109_193628_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
313	110909	0106_20091109_212807_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
313	110909	0107_20091109_232446_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
314	111009	0108_20091110_000000_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
314	111009	0109_20091110_023020_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
314	111009	0110_20091110_025540_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
314	111009	0111_20091110_064958_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
314	111009	0112_20091110_071554_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
314	111009	0113_20091110_103720_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
314	111009	0114_20091110_105705_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
314	111009	0115_20091110_141006_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
314	111009	0116_20091110_143214_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
314	111009	0117_20091110_180234_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
314	111009	0118_20091110_182551_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
314	111009	0119_20091110_211024_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
314	111009	0120_20091110_213514_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
314	111009	0121_20091110_215226_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
315	111109	0122_20091111_000030_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
315	111109	0123_20091111_034009_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
315	111109	0124_20091111_062555_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
315	111109	0125_20091111_100208_EX	PMNM	EX0909_PMNMSmnts	PMNMSmnts Survey
315	111109	0018_20091111_100838_EX	Transit	EX0909_4_Transit	Transiting to Honolulu
315	111109	0019_20091111_101559_EX	Transit	EX0909_4_Transit	Transiting to Honolulu
315	111109	0020_20091111_131008_EX	Transit	DNP	Transiting to Honolulu
315	111109	0021_20091111_191014_EX	Transit	DNP	Transiting to Honolulu





## Appendix A: EM302 PU Parameters

```
//# Database Parameters                                #{ Com. settings //# Serial line
                                                    parameter settings.

//# Seafloor Information System
//# Kongsberg Maritime AS
//# Saved: 2009.09.01 01:13:33

//# Build info:
#* SIS:          [Version: 3.6.1, Build: 174,
DBVersion 16.0 CD generated: Tue Nov 11
15:39:05 2008]
[Fox ver = 1.6.29]
[db ver = 16, proc = 16.0]
[OTL = 4.0.-95]
[ACE ver = 5.5]
[Coin ver = 2.4.4]
[Simage ver = 1.6.2a]
[Dime ver = DIME v0.9]
[STLPort ver = 513]
[FreeType ver = 2.1.9]
[TIFF ver = 3.8.2]
[GeoTIFF ver = 1230]
[GridEngine ver = 2.3.0]

#* Language      [3] //# Current
language, 1-Norwegian, 2-German,3-
English, 4-Spanish

#* Type          [302]
#* Serial no.    [101]
#* Number of heads [2]
#* System descriptor [50331648] //#
03000000

//#
*****
*****

//# Installation parameters

#{ Input Setup //# All Input setup
parameters

    #{ COM1 //# Link settings.

                                                    #{ Com. settings //# Serial line
                                                    parameter settings.
#* Baud rate:      [9600]
#* Data bits       [8]
#* Stop bits:      [1]
#* Parity:         [NONE]
#} Com. settings

#{ Position //# Position input settings.
#* None            [1] [0]
#* GGK             [1] [0]
#* GGA             [1] [1]
#* GGA_RTK         [1] [0]
#* SIMRAD90        [1] [0]
#} Position

#{ Input Formats //# Format input
settings.
#* Attitude        [0] [0]
#* MK39 Mod2 Attitude, [0] [0]
#* ZDA Clock       [1] [1]
#* HDT Heading     [0] [0]
#* SKR82 Heading   [0] [0]
#* DBS Depth       [1] [0]
#* DBT Depth       [1] [0]
#* EA500 Depth     [0] [0]
#* ROV. depth      [1] [0]
#* Height, special purp [1] [0]
#* Ethernet AttVel [0] [0]
#} Input Formats

#} COM1

#{ COM2 //# Link settings.

    #{ Com. settings //# Serial line
    parameter settings.
#* Baud rate:      [19200]
#* Data bits       [8]
#* Stop bits:      [1]
#* Parity:         [NONE]
```

```

#} Com. settings

#{ Position #// Position input settings.
  #* None          [0] [1]
  #* GGK           [0] [0]
  #* GGA           [0] [0]
  #* GGA_RTK       [0] [0]
  #* SIMRAD90      [0] [0]
#} Position

#{ Input Formats #// Format input
settings.
  #* Attitude      [1] [1]
  #* MK39 Mod2 Attitude, [0] [0]
  #* ZDA Clock     [0] [0]
  #* HDT Heading   [0] [0]
  #* SKR82 Heading [0] [0]
  #* DBS Depth     [0] [0]
  #* DBT Depth     [0] [0]
  #* EA500 Depth   [0] [0]
  #* ROV. depth    [0] [0]
  #* Height, special purp [0] [0]
  #* Ethernet AttVel [0] [0]
#} Input Formats

#} COM2

#{ COM3 #// Link settings.

#{ Com. settings #// Serial line
parameter settings.
  #* Baud rate:    [4800]
  #* Data bits     [8]
  #* Stop bits:    [1]
  #* Parity:       [NONE]
#} Com. settings

#{ Position #// Position input settings.
  #* None          [1] [1]
  #* GGK           [1] [0]
  #* GGA           [1] [0]
  #* GGA_RTK       [1] [0]
  #* SIMRAD90      [1] [0]
#} Position

#{ Input Formats #// Format input
settings.
  #* Attitude      [0] [0]
  #* MK39 Mod2 Attitude, [0] [0]
  #* ZDA Clock     [0] [0]
  #* HDT Heading   [0] [0]
  #* SKR82 Heading [0] [0]
  #* DBS Depth     [1] [0]
  #* DBT Depth     [1] [0]
  #* EA500 Depth   [0] [0]
  #* ROV. depth    [1] [0]
  #* Height, special purp [1] [0]
  #* Ethernet AttVel [0] [0]
#} Input Formats

#} COM4

  #* MK39 Mod2 Attitude, [1] [0]
  #* ZDA Clock           [0] [0]
  #* HDT Heading         [1] [1]
  #* SKR82 Heading       [0] [0]
  #* DBS Depth           [1] [0]
  #* DBT Depth           [1] [0]
  #* EA500 Depth         [0] [0]
  #* ROV. depth          [1] [0]
  #* Height, special purp [1] [0]
  #* Ethernet AttVel     [0] [0]
#} Input Formats

#} COM3

#{ COM4 #// Link settings.

#{ Com. settings #// Serial line
parameter settings.
  #* Baud rate:    [9600]
  #* Data bits     [8]
  #* Stop bits:    [1]
  #* Parity:       [NONE]
#} Com. settings

#{ Position #// Position input settings.
  #* None          [1] [1]
  #* GGK           [1] [0]
  #* GGA           [1] [0]
  #* GGA_RTK       [1] [0]
  #* SIMRAD90      [1] [0]
#} Position

#{ Input Formats #// Format input
settings.
  #* Attitude      [0] [0]
  #* MK39 Mod2 Attitude, [0] [0]
  #* ZDA Clock     [0] [0]
  #* HDT Heading   [0] [0]
  #* SKR82 Heading [0] [0]
  #* DBS Depth     [1] [0]
  #* DBT Depth     [1] [0]
  #* EA500 Depth   [0] [0]
  #* ROV. depth    [1] [0]
  #* Height, special purp [1] [0]
  #* Ethernet AttVel [0] [0]
#} Input Formats

#} COM4

```

```
#{ UDP2 #// Link settings.

#{ Com. settings #// Serial line
parameter settings.
  #// N/A
#} Com. settings

#{ Position #// Position input settings.
  #* None      [1] [1]
  #* GGK       [1] [0]
  #* GGA       [1] [0]
  #* GGA_RTK   [1] [0]
  #* SIMRAD90  [1] [0]
#} Position
```

```
#{ Input Formats #// Format input
settings.
  #* Attitude      [0] [0]
  #* MK39 Mod2 Attitude, [0] [0]
  #* ZDA Clock     [0] [0]
  #* HDT Heading   [0] [0]
  #* SKR82 Heading [0] [0]
  #* DBS Depth     [0] [0]
  #* DBT Depth     [0] [0]
  #* EA500 Depth   [1] [0]
  #* ROV. depth    [0] [0]
  #* Height, special purp [0] [0]
  #* Ethernet AttVel [0] [0]
#} Input Formats
```

```
#} UDP2
```

```
#{ UDP3 #// Link settings.
```

```
#{ Com. settings #// Serial line
parameter settings.
  #// N/A
#} Com. settings

#{ Position #// Position input settings.
  #* None      [0] [1]
  #* GGK       [0] [0]
  #* GGA       [0] [0]
  #* GGA_RTK   [0] [0]
  #* SIMRAD90  [0] [0]
#} Position
```

```
#{ Input Formats #// Format input
settings.
```

```
  #* Attitude      [0] [0]
  #* MK39 Mod2 Attitude, [0] [0]
  #* ZDA Clock     [0] [0]
  #* HDT Heading   [1] [0]
  #* SKR82 Heading [0] [0]
  #* DBS Depth     [1] [0]
  #* DBT Depth     [1] [0]
  #* EA500 Depth   [0] [0]
  #* ROV. depth    [1] [0]
  #* Height, special purp [1] [0]
  #* Ethernet AttVel [0] [0]
#} Input Formats
```

```
#} UDP3
```

```
#{ UDP4 #// Link settings.
```

```
#{ Com. settings #// Serial line
parameter settings.
  #// N/A
#} Com. settings

#{ Position #// Position input settings.
  #* None      [0] [1]
  #* GGK       [0] [0]
  #* GGA       [0] [0]
  #* GGA_RTK   [0] [0]
  #* SIMRAD90  [0] [0]
#} Position
```

```
#{ Input Formats #// Format input
settings.
```

```
  #* Attitude      [1] [0]
  #* MK39 Mod2 Attitude, [0] [0]
  #* ZDA Clock     [0] [0]
  #* HDT Heading   [1] [0]
  #* SKR82 Heading [0] [0]
  #* DBS Depth     [1] [0]
  #* DBT Depth     [1] [0]
  #* EA500 Depth   [0] [0]
  #* ROV. depth    [1] [0]
  #* Height, special purp [1] [0]
  #* Ethernet AttVel [0] [0]
#} Input Formats
```

```
#} UDP4
```

```

#{ UDP5 #// Link settings.

  #{ Com. settings #// Serial line
parameter settings.
  #// N/A
  #} Com. settings

  #{ Position #// Position input settings.
  #* None          [0] [0]
  #* GGK           [0] [0]
  #* GGA           [0] [0]
  #* GGA_RTK       [0] [0]
  #* SIMRAD90      [0] [0]
  #} Position

  #{ Input Formats #// Format input
settings.
  #* Attitude      [0] [0]
  #* MK39 Mod2 Attitude, [0] [0]
  #* ZDA Clock     [0] [0]
  #* HDT Heading   [0] [0]
  #* SKR82 Heading [0] [0]
  #* DBS Depth     [0] [0]
  #* DBT Depth     [0] [0]
  #* EA500 Depth   [0] [0]
  #* ROV. depth    [0] [0]
  #* Height, special purp [0] [0]
  #* Ethernet AttVel [1] [1]
  #} Input Formats

  #{ Attitude Velocity settings #// Only
relevant for UDP5 on EM122, EM302 and
EM710, currently
  #* Attitude 1    [1] [1]
  #* Attitude 2    [1] [0]
  #* Use Ethernet 2 [1] [1]
  #* Port:         [5602]
  #* IP addr.:     [192.168.2.20]
  #* Net mask:     [255.255.255.0]
  #} Attitude Velocity settings

#} UDP5

#{ Misc. #// Misc. input settings.
  #* External Trigger [1] [0]
#} Misc.

```

```

#} Input Setup

#{ Output Setup #// All Output setup
parameters

  #* PU broadcast enable [1] [1]
  #* Log watercolumn to s [1] [1]

  #{ Host UDP1 #// Host UDP1 Port: 16100

  #{ Datagram subscription #//
  #* Depth          [0] [0]
  #* Raw range and beam a [0] [0]
  #* Seabed Image    [0] [0]
  #* Central Beams   [0] [0]
  #* Position        [0] [0]
  #* Attitude        [0] [0]
  #* Heading         [0] [0]
  #* Height          [0] [0]
  #* Clock           [0] [0]
  #* Single beam echosoun [0] [0]
  #* Sound Speed Profile [0] [1]
  #* Runtime Parameters [0] [1]
  #* Installation Paramet [0] [1]
  #* BIST Reply      [0] [1]
  #* Status parameters [0] [1]
  #* PU Broadcast    [0] [0]
  #* Stave Display   [0] [0]
  #* Water Column    [0] [0]
  #* Internal, Range Data [0] [0]
  #* Internal, Scope Data [0] [0]
  #} Datagram subscription

#} Host UDP1

#{ Host UDP2 #// Host UDP2 Port: 16101

  #{ Datagram subscription #//
  #* Depth          [1] [1]
  #* Raw range and beam a [1] [1]
  #* Seabed Image    [1] [1]
  #* Central Beams   [1] [0]
  #* Position        [1] [1]
  #* Attitude        [1] [1]
  #* Heading         [1] [1]
  #* Height          [1] [1]

```

```

    #* Clock          [1] [1]
    #* Single beam echosoun [1] [1]
    #* Sound Speed Profile [0] [1]
    #* Runtime Parameters [0] [1]
    #* Installation Paramet [0] [1]
    #* BIST Reply      [1] [1]
    #* Status parameters [0] [1]
    #* PU Broadcast    [1] [0]
    #* Stave Display   [0] [1]
    #* Water Column    [0] [1]
    #* Internal, Range Data [1] [0]
    #* Internal, Scope Data [1] [0]
#} Datagram subscription

#} Host UDP2

#{ Host UDP3 #// Host UDP3 Port: 16102

#{ Datagram subscription #//
    #* Depth          [0] [1]
    #* Raw range and beam a [0] [0]
    #* Seabed Image    [0] [0]
    #* Central Beams   [0] [0]
    #* Position        [0] [0]
    #* Attitude        [0] [1]
    #* Heading         [0] [0]
    #* Height          [0] [1]
    #* Clock           [0] [0]
    #* Single beam echosoun [0] [1]
    #* Sound Speed Profile [0] [1]
    #* Runtime Parameters [0] [0]
    #* Installation Paramet [0] [1]
    #* BIST Reply      [0] [0]
    #* Status parameters [0] [0]
    #* PU Broadcast    [0] [0]
    #* Stave Display   [0] [0]
    #* Water Column    [0] [0]
    #* Internal, Range Data [0] [0]
    #* Internal, Scope Data [0] [1]
#} Datagram subscription

#} Host UDP3

#{ Host UDP4 #// Host UDP4 Port 16103

#{ Datagram subscription #//
    #* Depth          [1] [0]
    #* Raw range and beam a [1] [0]
    #* Seabed Image    [1] [0]
    #* Central Beams   [1] [0]
    #* Position        [1] [0]
    #* Attitude        [1] [0]
    #* Heading         [1] [0]
    #* Height          [1] [0]
    #* Clock           [1] [0]
    #* Single beam echosoun [1] [0]
    #* Sound Speed Profile [1] [0]
    #* Runtime Parameters [1] [0]
    #* Installation Paramet [1] [0]
    #* BIST Reply      [1] [0]
    #* Status parameters [1] [0]
    #* PU Broadcast    [1] [0]
    #* Stave Display   [1] [0]
    #* Water Column    [1] [1]
    #* Internal, Range Data [1] [0]
    #* Depth          [1] [0]
    #* Raw range and beam a [1] [0]
    #* Seabed Image    [1] [0]
    #* Central Beams   [1] [0]
    #* Position        [1] [0]
    #* Attitude        [1] [0]
    #* Heading         [1] [0]
    #* Height          [1] [0]
    #* Clock           [1] [0]
    #* Single beam echosoun [1] [0]
    #* Sound Speed Profile [1] [0]
    #* Runtime Parameters [1] [0]
    #* Installation Paramet [1] [0]
    #* BIST Reply      [1] [0]
    #* Status parameters [1] [0]
    #* PU Broadcast    [1] [0]
    #* Stave Display   [1] [0]
    #* Water Column    [1] [0]
    #* Internal, Range Data [1] [0]
#} Datagram subscription

#} Host UDP4

#{ Watercolumn #// Host UDP4 Port
16103

#{ Datagram subscription #//
    #* Depth          [1] [0]
    #* Raw range and beam a [1] [0]
    #* Seabed Image    [1] [0]
    #* Central Beams   [1] [0]
    #* Position        [1] [0]
    #* Attitude        [1] [0]
    #* Heading         [1] [0]
    #* Height          [1] [0]
    #* Clock           [1] [0]
    #* Single beam echosoun [1] [0]
    #* Sound Speed Profile [1] [0]
    #* Runtime Parameters [1] [0]
    #* Installation Paramet [1] [0]
    #* BIST Reply      [1] [0]
    #* Status parameters [1] [0]
    #* PU Broadcast    [1] [0]
    #* Stave Display   [1] [0]
    #* Water Column    [1] [1]
    #* Internal, Range Data [1] [0]

```

```

    #* Internal, Scope Data [1] [0]
#} Datagram subscription

#} Watercolumn

#} Output Setup

#{ Clock Setup #// All Clock setup
parameters

    #{ Clock #// All clock settings.
    #* Source:      [1] #// External ZDA
Clock
    #* 1PPS Clock Synch. [1] [1]
    #* Offset (sec.):    [0]
#} Clock

#} Clock Setup

#{ Settings #// Sensor setup parameters

    #{ Positioning System Settings #// Position
related settings.

        #{ COM1 #// Positioning System Ports:
        #* P1T      [1] #// Datagram
        #* P1M      [0] #// Enable
position motion correction
        #* P1D      [0.000] #// Position
delay (sec.):
        #* P1G      [WGS84] #// Datum:
        #* P1Q      [1] #// Enable
        #* Pos. qual. indicator [] #//
    #} COM1

#} Positioning System Settings

    #{ Motion Sensor Settings #// Motion
related settings.

        #{ COM2 #// Motion Sensor Ports:
        #* MRP      [RP] #// Rotation
(POSMV/MRU)
        #* MSD      [0] #// Motion Delay
(msec.):
        #* MAS      [1.00] #// Motion
Sensor Roll Scaling:
    #} COM2

```

```

#} Motion Sensor Settings

#{ Active Sensors #//
    #* APS      [0] [COM1] #// Position:
    #* ARO      [2] [COM2] #// Motion:
    #* AHE      [2] [COM2] #// Motion:
    #* AHS      [3] [COM3] #//
Heading:
    #} Active Sensors

#} Settings

#{ Locations #// All location parameters

    #{ Location offset (m) #//

        #{ Pos, COM1: #//
        #* P1X      [0.00] #// Forward (X)
        #* P1Y      [0.00] #// Starboard
(Y)
        #* P1Z      [0.00] #// Downward
(Z)
        #} Pos, COM1:

        #{ Pos, COM3: #//
        #* P2X      [0.00] #// Forward (X)
        #* P2Y      [0.00] #// Starboard
(Y)
        #* P2Z      [0.00] #// Downward
(Z)
        #} Pos, COM3:

        #{ Pos, COM4/UDP2: #//
        #* P3X      [0.00] #// Forward (X)
        #* P3Y      [0.00] #// Starboard
(Y)
        #* P3Z      [0.00] #// Downward
(Z)
        #} Pos, COM4/UDP2:

        #{ TX Transducer: #//
        #* S1X      [6.147] #// Forward
(X)
        #* S1Y      [1.822] #// Starboard
(Y)
        #* S1Z      [6.796] #// Downward
(Z)

```



```

#} TX Transducer:

#{ RX Transducer: #//
  #* S2X      [2.497] #// Forward
(X)
  #* S2Y      [2.481] #// Starboard
(Y)
  #* S2Z      [6.790] #// Downward
(Z)
#} RX Transducer:

#{ Attitude 1, COM2: #//
  #* MSX      [0.00] #// Forward
(X)
  #* MSY      [0.00] #// Starboard
(Y)
  #* MSZ      [0.00] #// Downward
(Z)
#} Attitude 1, COM2:

#{ Attitude 2, COM3: #//
  #* NSX      [0.00] #// Forward (X)
  #* NSY      [0.00] #// Starboard
(Y)
  #* NSZ      [0.00] #// Downward
(Z)
#} Attitude 2, COM3:

#{ Waterline: #//
  #* WLZ      [1.838] #//
Downward (Z)
#} Waterline:

#} Location offset (m)

#} Locations

#{ Angular Offsets #// All angular offset
parameters

#{ Offset angles (deg.) #//

#{ TX Transducer: #//
  #* S1R      [0.0] #// Roll
  #* S1P      [0.00] #// Pitch
  #* S1H      [359.98] #// Heading
#} TX Transducer:

```

```

#{ RX Transducer: #//
  #* S2R      [0.0] #// Roll
  #* S2P      [0.00] #// Pitch
  #* S2H      [.03] #// Heading
#} RX Transducer:

#{ Attitude 1, COM2: #//
  #* MSR      [0.00] #// Roll
  #* MSP      [-0.70] #// Pitch
  #* MSG      [0.00] #// Heading
#} Attitude 1, COM2:

#{ Attitude 2, COM3: #//
  #* NSR      [0.00] #// Roll
  #* NSP      [0.00] #// Pitch
  #* NSG      [0.00] #// Heading
#} Attitude 2, COM3:

#{ Stand-alone Heading: #//
  #* GCG      [0.00] #// Heading
#} Stand-alone Heading:

#} Offset angles (deg.)

#} Angular Offsets

#{ ROV. Specific #// All ROV specific
parameters

#{ Depth/Pressure Sensor #//
  #* DSF      [1.00] #// Scaling:
  #* DSO      [0.00] #// Offset:
  #* DSD      [0.00] #// Delay:
  #* DSH      [N] #// Disable Heave
Sensor
#} Depth/Pressure Sensor

#} ROV. Specific

#{ System Parameters #// All system
parameters

#{ System Gain Offset #//
  #* GO1      [0.0] #// BS Offset (dB)
#} System Gain Offset

#{ Opening angles #//

```

```

    #* S1S          [0] #// TX Opening
angle:
    #* S2S          [1] #// RX Opening
angle:
    #} Opening angles

#} System Parameters

#//
*****
*****
#// Runtime parameters

#{ Sounder Main #//

    #{ Sector Coverage #//

        #{ Max. angle (deg.): #//
        #* MPA      [70] #// Port
        #* MSA      [70] #// Starboard
        #} Max. angle (deg.):

        #{ Max. Coverage (m): #//
        #* MPC      [5000] #// Port
        #* MSC      [5000] #// Starboard
        #} Max. Coverage (m):

        #* ACM      [1] #// Angular
Coverage mode: AUTO
        #* BSP      [2] #// Beam Spacing:
HIDENS EQDIST

    #} Sector Coverage

    #{ Depth Settings #//
    #* FDE          [4700] #// Force Depth
(m)
    #* MID          [500] #// Min. Depth
(m):
    #* MAD          [6000] #// Max. Depth
(m):
    #* DSM          [0] #// Dual swath
mode: OFF
    #* PMO          [0] #// Ping Mode:
AUTO
    #* FME          [1] #// FM enable
    #} Depth Settings

```

```

#{ Stabilization #//
    #* YPS          [1] #// Pitch
stabilization
    #* TXA          [3] #// Along Direction
(deg.):

    #{ Yaw Stabilization #//
    #* YSM          [2] #// Mode: REL.
MEAN HEADING
    #* YMA          [300] #// Heading:
    #* HFI          [1] #// Heading filter:
MEDIUM
    #} Yaw Stabilization

    #} Stabilization
#} Sounder Main

    #{ Sound Speed #//

        #{ Sound Speed at Transducer #//
        #* SHS      [0] #// Source SENSOR
        #* SST      [14672] #// Sound
Speed (dm/sec.):
        #* Sensor Offset (m/sec [0.0] #//
        #* Filter (sec.): [5] #//
        #} Sound Speed at Transducer

    #} Sound Speed

    #{ Filter and Gains #//

        #{ Filtering #//
        #* SFS      [2] #// Spike Filter
Strength: MEDIUM
        #* PEF      [2] #// Penetration
Filter Strength: MEDIUM
        #* RGS      [1] #// Range Gate:
NORMAL
        #* SLF      [1] #// Slope
        #* AEF      [1] #// Aeration
        #* STF      [1] #// Sector Tracking
        #* IFF      [1] #// Interference
        #} Filtering

    #{ Absorption Coefficient #//
    #* ABC          [5.415] #// 31.5 kHz
    #} Absorption Coefficient

```

```

#{ Normal incidence sector #//
  #* TCA          [12] #// Angle from
nadir (deg.):
  #} Normal incidence sector

#{ Mammal protection #//
  #* TXP          [0] #// TX power level
(dB): Max.
  #* SSR          [0] #// Soft startup
ramp time (min.):
  #} Mammal protection
#} Filter and Gains

#{ Data Cleaning #//
  #* Active rule:  [AUTOMATIC1] #//
  #{ AUTOMATIC1 #//
    #* PingProc.maxPingCountRadius
[10]
    #* PingProc.radiusFactor
[0.050000]
    #* PingProc.medianFactor
[1.500000]
    #* PingProc.beamNumberRadius
[3]
    #* PingProc.sufficientPointCount
[40]
    #* PingProc.neighborhoodType
[Elliptical]
    #* PingProc.timeRule.use
[false]
    #* PingProc.overhangRule.use
[false]
    #* PingProc.medianRule.use
[false]
    #* PingProc.medianRule.depthFactor
[0.050000]
    #* PingProc.medianRule.minPointCount
[6]
    #* PingProc.quantileRule.use
[false]
    #* PingProc.quantileRule.quantile
[0.100000]
    #* PingProc.quantileRule.scaleFactor
[6.000000]
    #* PingProc.quantileRule.minPointCount
[40]

```

```

  #* GridProc.minPoints
[8]
  #* GridProc.depthFactor
[0.200000]
  #* GridProc.removeTooFewPoints
[false]
  #*
GridProc.surfaceFitting.surfaceDegree
[1]
  #*
GridProc.surfaceFitting.tukeyConstant
[6.000000]
  #* GridProc.surfaceFitting.maxIteration
[10]
  #* GridProc.surfaceFitting.convCriterion
[0.010000]
  #*
GridProc.surfaceDistanceDepthRule.use
[false]
  #*
GridProc.surfaceDistanceDepthRule.depthFactor
[0.050000]
  #*
GridProc.surfaceDistancePointRule.use
[false]
  #*
GridProc.surfaceDistancePointRule.scaleFactor
[1.000000]
  #*
GridProc.surfaceDistanceUnitRule.use
[false]
  #*
GridProc.surfaceDistanceUnitRule.scaleFactor
[1.000000]
  #*
GridProc.surfaceDistanceStDevRule.use
[false]
  #*
GridProc.surfaceDistanceStDevRule.scaleFactor
[2.000000]
  #* GridProc.surfaceAngleRule.use
[false]
  #* GridProc.surfaceAngleRule.minAngle
[20.000000]
  #* SonarProc.use
[false]
  #* SonarProc.gridSizeFactor
[4]

```

```
    #* SonarProc.mergerType
[Average]
    #* SonarProc.interpolatorType
[TopHat]
    #* SonarProc.interpolatorRadius
[1]
    #* SonarProc.fillInOnly
[true]
    #} AUTOMATIC1
```

```
#{ Seabed Image Processing #//
    #* Seabed Image Process [1] [0]
#} Seabed Image Processing
#} Data Cleaning

#{ Advanced param. #//
#} Advanced param.
```

## Appendix B: Passed BIST results October 26, 2009

Saved: 2009.10.27 04:24:41

BSP 1 PCI TO SLAVE A2 HPI: ok

Sounder Type: 302, Serial no.: 101

Date	Time	Ser. No.	BIST	Result
-----				
-----				
2009.10.27	04:13:31.190	101	0	OK

BSP 1 PCI TO SLAVE B0 HPI: ok  
BSP 1 PCI TO SLAVE B1 HPI: ok  
BSP 1 PCI TO SLAVE B2 HPI: ok  
BSP 1 PCI TO SLAVE C0 HPI: ok  
BSP 1 PCI TO SLAVE C1 HPI: ok  
BSP 1 PCI TO SLAVE C2 HPI: ok  
BSP 1 PCI TO SLAVE D0 HPI: ok  
BSP 1 PCI TO SLAVE D1 HPI: ok  
BSP 1 PCI TO SLAVE D2 HPI: ok  
BSP 2 Master 2.2 081216 4.3 070913 4.3 070913  
BSP 2 Slave 2.2 081216 6.0 080902  
BSP 2 RXI FPGA 3.6 080821  
BSP 2 DSP FPGA A 4.0 070531  
BSP 2 DSP FPGA B 4.0 070531  
BSP 2 DSP FPGA C 4.0 070531  
BSP 2 DSP FPGA D 4.0 070531  
BSP 2 PCI TO SLAVE A1 FIFO: ok  
BSP 2 PCI TO SLAVE A2 FIFO: ok  
BSP 2 PCI TO SLAVE A3 FIFO: ok  
BSP 2 PCI TO SLAVE B1 FIFO: ok  
BSP 2 PCI TO SLAVE B2 FIFO: ok  
BSP 2 PCI TO SLAVE B3 FIFO: ok  
BSP 2 PCI TO SLAVE C1 FIFO: ok  
BSP 2 PCI TO SLAVE C2 FIFO: ok  
BSP 2 PCI TO SLAVE C3 FIFO: ok  
BSP 2 PCI TO SLAVE D1 FIFO: ok  
BSP 2 PCI TO SLAVE D2 FIFO: ok  
BSP 2 PCI TO SLAVE D3 FIFO: ok  
BSP 2 PCI TO MASTER A HPI: ok  
BSP 2 PCI TO MASTER B HPI: ok  
BSP 2 PCI TO MASTER C HPI: ok  
BSP 2 PCI TO MASTER D HPI: ok  
BSP 2 PCI TO SLAVE A0 HPI: ok  
BSP 2 PCI TO SLAVE A1 HPI: ok  
BSP 2 PCI TO SLAVE A2 HPI: ok  
BSP 2 PCI TO SLAVE B0 HPI: ok  
BSP 2 PCI TO SLAVE B1 HPI: ok  
BSP 2 PCI TO SLAVE B2 HPI: ok  
BSP 2 PCI TO SLAVE C0 HPI: ok

Number of BSP67B boards: 2  
BSP 1 Master 2.2 081216 4.3 070913 4.3 070913  
BSP 1 Slave 2.2 081216 6.0 080902  
BSP 1 RXI FPGA 3.6 080821  
BSP 1 DSP FPGA A 4.0 070531  
BSP 1 DSP FPGA B 4.0 070531  
BSP 1 DSP FPGA C 4.0 070531  
BSP 1 DSP FPGA D 4.0 070531  
BSP 1 PCI TO SLAVE A1 FIFO: ok  
BSP 1 PCI TO SLAVE A2 FIFO: ok  
BSP 1 PCI TO SLAVE A3 FIFO: ok  
BSP 1 PCI TO SLAVE B1 FIFO: ok  
BSP 1 PCI TO SLAVE B2 FIFO: ok  
BSP 1 PCI TO SLAVE B3 FIFO: ok  
BSP 1 PCI TO SLAVE C1 FIFO: ok  
BSP 1 PCI TO SLAVE C2 FIFO: ok  
BSP 1 PCI TO SLAVE C3 FIFO: ok  
BSP 1 PCI TO SLAVE D1 FIFO: ok  
BSP 1 PCI TO SLAVE D2 FIFO: ok  
BSP 1 PCI TO SLAVE D3 FIFO: ok  
BSP 1 PCI TO MASTER A HPI: ok  
BSP 1 PCI TO MASTER B HPI: ok  
BSP 1 PCI TO MASTER C HPI: ok  
BSP 1 PCI TO MASTER D HPI: ok  
BSP 1 PCI TO SLAVE A0 HPI: ok  
BSP 1 PCI TO SLAVE A1 HPI: ok

BSP 2 PCI TO SLAVE C1 HPI: ok  
BSP 2 PCI TO SLAVE C2 HPI: ok  
BSP 2 PCI TO SLAVE D0 HPI: ok  
BSP 2 PCI TO SLAVE D1 HPI: ok  
BSP 2 PCI TO SLAVE D2 HPI: ok

-----  
-----

2009.10.27 04:13:31.260 101 1 OK

High Voltage Br. 1

-----

TX36 Spec: 90.0 - 145.0

0-1 120.5  
0-2 121.3  
0-3 120.9  
0-4 121.7  
0-5 120.9  
0-6 120.9  
0-7 120.9  
0-8 121.3  
0-9 120.5  
0-10 122.1  
0-11 120.5  
0-12 120.1  
0-13 120.5  
0-14 120.9  
0-15 120.9  
0-16 120.9  
0-17 120.5  
0-18 122.1  
0-19 121.3  
0-20 121.7  
0-21 121.3  
0-22 120.1  
0-23 120.5  
0-24 120.9

High Voltage Br. 2

-----

TX36 Spec: 90.0 - 145.0

0-1 120.9  
0-2 121.3

0-3 120.9  
0-4 121.7  
0-5 120.9  
0-6 120.9  
0-7 120.5  
0-8 120.9  
0-9 120.5  
0-10 121.3  
0-11 120.1  
0-12 120.1  
0-13 120.9  
0-14 120.5  
0-15 120.9  
0-16 120.5  
0-17 120.5  
0-18 121.3  
0-19 121.3  
0-20 121.7  
0-21 121.3  
0-22 120.9  
0-23 120.5  
0-24 120.1

Input voltage 12V

-----

TX36 Spec: 11.0 - 13.0

0-1 11.9  
0-2 11.9  
0-3 11.9  
0-4 11.9  
0-5 11.9  
0-6 11.9  
0-7 11.9  
0-8 11.9  
0-9 11.9  
0-10 11.9  
0-11 11.9  
0-12 11.9  
0-13 11.9  
0-14 11.9  
0-15 11.9  
0-16 11.9  
0-17 11.9  
0-18 11.9  
0-19 11.9  
0-20 11.9  
0-21 11.9



0-22 11.8  
0-23 11.9  
0-24 11.9

Digital 3.3V

-----

TX36 Spec: 2.8 - 3.5

0-1 3.3  
0-2 3.3  
0-3 3.3  
0-4 3.3  
0-5 3.3  
0-6 3.3  
0-7 3.3  
0-8 3.3  
0-9 3.3  
0-10 3.3  
0-11 3.3  
0-12 3.3  
0-13 3.3  
0-14 3.3  
0-15 3.3  
0-16 3.3  
0-17 3.3  
0-18 3.3  
0-19 3.3  
0-20 3.3  
0-21 3.3  
0-22 3.3  
0-23 3.3  
0-24 3.3

Digital 2.5V

-----

TX36 Spec: 2.4 - 2.6

0-1 2.5  
0-2 2.5  
0-3 2.5  
0-4 2.5  
0-5 2.5  
0-6 2.5  
0-7 2.5  
0-8 2.5  
0-9 2.5  
0-10 2.5  
0-11 2.5

0-12 2.5  
0-13 2.5  
0-14 2.5  
0-15 2.5  
0-16 2.5  
0-17 2.5  
0-18 2.5  
0-19 2.5  
0-20 2.5  
0-21 2.5  
0-22 2.5  
0-23 2.5  
0-24 2.5

Digital 1.5V

-----

TX36 Spec: 1.4 - 1.6

0-1 1.5  
0-2 1.5  
0-3 1.5  
0-4 1.5  
0-5 1.5  
0-6 1.5  
0-7 1.5  
0-8 1.5  
0-9 1.5  
0-10 1.5  
0-11 1.5  
0-12 1.5  
0-13 1.5  
0-14 1.5  
0-15 1.5  
0-16 1.5  
0-17 1.5  
0-18 1.5  
0-19 1.5  
0-20 1.5  
0-21 1.5  
0-22 1.5  
0-23 1.5  
0-24 1.5

Temperature

-----

TX36 Spec: 15.0 - 75.0

0-1 26.0

0-2 25.6  
0-3 26.0  
0-4 27.6  
0-5 25.6  
0-6 24.0  
0-7 23.6  
0-8 23.6  
0-9 26.0  
0-10 28.0  
0-11 24.8  
0-12 24.4  
0-13 25.2  
0-14 24.4  
0-15 26.0  
0-16 26.8  
0-17 25.6  
0-18 26.8  
0-19 26.0  
0-20 26.8  
0-21 28.0  
0-22 27.6  
0-23 24.4  
0-24 25.6

0-21 0.7  
0-22 0.6  
0-23 0.8  
0-24 0.6

TX36 power test passed

IO TX MB Embedded PPC Embedded  
PPC Download  
1.11 Generic1.11 GenericDec 15 2005/1.06  
Mar 6 2006/1.07 Jul 21 2008/1.11

TX36 unique firmware test OK

-----  
-----  
2009.10.27 04:13:45.995 101 2 OK

Input Current 12V

-----  
TX36 Spec: 0.3 - 1.5

0-1 0.9  
0-2 0.7  
0-3 0.7  
0-4 0.7  
0-5 0.7  
0-6 0.6  
0-7 0.7  
0-8 0.7  
0-9 0.6  
0-10 0.7  
0-11 0.7  
0-12 0.7  
0-13 0.7  
0-14 0.6  
0-15 0.6  
0-16 0.6  
0-17 0.6  
0-18 0.7  
0-19 0.6  
0-20 0.6

Input voltage 12V

-----  
RX32 Spec: 11.0 - 13.0

7-1 11.7  
7-2 11.7  
7-3 11.7  
7-4 11.7

Input voltage 6V

-----  
RX32 Spec: 5.0 - 7.0

7-1 5.7  
7-2 5.7  
7-3 5.7  
7-4 5.7

Digital 3.3V

-----  
RX32 Spec: 2.8 - 3.5

7-1 3.3  
7-2 3.3

7-3 3.3  
7-4 3.3

RX32 power test passed

Digital 2.5V

-----

RX32 Spec: 2.4 - 2.6  
7-1 2.4  
7-2 2.5  
7-3 2.5  
7-4 2.4

IO RX MB Embedded PPC Embedded  
PPC Download  
1.12 Generic1.14 GenericMay 5 2006/1.06  
May 5 2006/1.07 Apr 25 2008/1.11

RX32 unique firmware test OK

Digital 1.5V

-----

RX32 Spec: 1.4 - 1.6  
7-1 1.5  
7-2 1.5  
7-3 1.5  
7-4 1.5

-----  
-----

2009.10.27 04:13:46.128 101 3 OK

Temperature

-----

RX32 Spec: 15.0 - 75.0  
7-1 24.0  
7-2 23.0  
7-3 24.0  
7-4 25.0

High Voltage Br. 1

-----

TX36 Spec: 90.0 - 145.0  
0-1 120.5  
0-2 120.9  
0-3 120.9  
0-4 121.7  
0-5 120.9  
0-6 120.9  
0-7 120.5  
0-8 120.9  
0-9 120.5  
0-10 121.7  
0-11 120.5  
0-12 120.1  
0-13 120.5  
0-14 120.9  
0-15 120.9  
0-16 120.9  
0-17 120.5  
0-18 121.7  
0-19 121.3  
0-20 121.3  
0-21 121.3  
0-22 120.1  
0-23 120.5  
0-24 120.5

Input Current 12V

-----

RX32 Spec: 0.4 - 1.5  
7-1 0.7  
7-2 0.7  
7-3 0.7  
7-4 0.7

Input Current 6V

-----

RX32 Spec: 2.4 - 3.3  
7-1 2.9  
7-2 2.7  
7-3 2.8  
7-4 2.8

High Voltage Br. 2

-----

TX36 Spec: 90.0 - 145.0

0-1 120.9  
 0-2 120.9  
 0-3 120.5  
 0-4 121.7  
 0-5 120.9  
 0-6 120.9  
 0-7 120.5  
 0-8 120.5  
 0-9 120.5  
 0-10 121.3  
 0-11 120.1  
 0-12 120.1  
 0-13 120.5  
 0-14 120.5  
 0-15 120.9  
 0-16 120.1  
 0-17 120.1  
 0-18 120.9  
 0-19 121.3  
 0-20 121.7  
 0-21 120.9  
 0-22 120.5  
 0-23 120.1  
 0-24 120.1

0-16 11.9  
 0-17 11.9  
 0-18 11.9  
 0-19 11.9  
 0-20 11.9  
 0-21 11.9  
 0-22 11.8  
 0-23 11.9  
 0-24 11.9

RX32 Spec: 11.0 - 13.0

7-1 11.7  
 7-2 11.7  
 7-3 11.7  
 7-4 11.7

Input voltage 6V

-----

RX32 Spec: 5.0 - 7.0

7-1 5.7  
 7-2 5.7  
 7-3 5.7  
 7-4 5.7

TRU power test passed

Input voltage 12V

-----

TX36 Spec: 11.0 - 13.0

0-1 11.9  
 0-2 11.9  
 0-3 11.9  
 0-4 11.9  
 0-5 11.9  
 0-6 11.9  
 0-7 11.9  
 0-8 11.9  
 0-9 11.9  
 0-10 11.9  
 0-11 11.9  
 0-12 11.9  
 0-13 11.9  
 0-14 11.9  
 0-15 11.9

-----  
-----

2009.10.27 04:13:46.311 101 4 OK

EM 302 High Voltage Ramp Test

Test Voltage:20.00 Measured Voltage:  
 18.00 PASSED  
 Test Voltage:40.00 Measured Voltage:  
 39.00 PASSED  
 Test Voltage:60.00 Measured Voltage:  
 59.00 PASSED  
 Test Voltage:80.00 Measured Voltage:  
 79.00 PASSED

Test Voltage:100.00 Measured Voltage:  
101.00 PASSED  
Test Voltage:120.00 Measured Voltage:  
121.00 PASSED  
Test Voltage:120.00 Measured Voltage:  
120.00 PASSED  
Test Voltage:100.00 Measured Voltage:  
106.00 PASSED  
Test Voltage:80.00 Measured Voltage:  
85.00 PASSED  
Test Voltage:60.00 Measured Voltage:  
65.00 PASSED  
Test Voltage:40.00 Measured Voltage:  
45.00 PASSED

11 of 11 tests OK

-----  
-----  
2009.10.27 04:16:22.171 101 5 OK

BSP 1 RXI TO RAW FIFO: ok  
BSP 2 RXI TO RAW FIFO: ok

-----  
-----  
2009.10.27 04:16:26.438 101 6 OK

Receiver impedance limits [600.0 1000.0]  
ohm  
Board 1 2 3 4  
1: 876.0 860.3 869.9 828.8  
2: 871.7 833.3 848.3 832.9  
3: 847.5 824.6 860.2 859.0  
4: 853.2 842.7 843.4 851.6  
5: 871.7 848.8 859.4 784.8  
6: 837.1 854.3 866.0 840.0

7: 873.5 841.4 863.8 851.1  
8: 794.3 846.4 857.8 862.7  
9: 886.9 843.6 857.8 837.8  
10: 859.0 824.6 864.6 793.8  
11: 873.4 843.6 848.1 845.1  
12: 874.1 853.6 828.2 837.1  
13: 857.4 847.6 848.5 831.5  
14: 863.7 835.1 853.1 865.9  
15: 844.6 830.0 852.4 854.5  
16: 891.5 852.0 843.8 864.7  
17: 882.9 830.5 890.1 858.8  
18: 855.0 849.3 865.7 866.5  
19: 867.6 823.7 854.6 833.1  
20: 877.3 838.6 879.5 858.5  
21: 900.5 864.2 855.1 893.9  
22: 837.0 882.9 858.0 848.8  
23: 888.6 876.3 875.9 866.9  
24: 878.9 883.8 889.0 883.2  
25: 885.7 844.5 852.8 851.0  
26: 876.7 848.0 853.9 859.5  
27: 867.9 834.1 849.6 852.7  
28: 868.1 825.6 849.0 829.3  
29: 867.5 824.1 868.9 846.8  
30: 865.8 860.3 849.6 850.2  
31: 859.1 842.0 852.7 862.9  
32: 888.8 859.8 884.5 860.9

Transducer impedance limits [250.0 2000.0]  
ohm

Board 1 2 3 4  
1: 333.4 339.7 339.8 350.4  
2: 342.8 357.0 346.2 356.0  
3: 342.4 339.0 358.0 343.0  
4: 342.9 343.7 367.4 345.5  
5: 340.3 339.4 360.0 347.1  
6: 344.4 336.4 344.5 347.0  
7: 337.4 349.0 365.3 354.5  
8: 358.8 325.8 357.5 346.7  
9: 362.8 346.8 366.6 356.9  
10: 346.7 346.6 353.4 358.7  
11: 334.9 340.1 366.1 340.4  
12: 341.3 348.2 361.6 348.0  
13: 344.5 345.1 355.3 358.8  
14: 358.3 344.9 359.4 346.3  
15: 336.9 342.8 348.1 337.9  
16: 327.3 343.7 371.0 352.5  
17: 333.9 339.5 344.1 349.0  
18: 355.4 332.2 360.6 350.3



19: 358.3 334.3 354.8 351.7  
20: 345.4 337.0 346.7 341.8  
21: 340.3 333.5 342.9 350.8  
22: 350.9 353.8 350.9 353.0  
23: 348.6 347.8 343.6 354.5  
24: 346.7 359.0 343.2 341.5  
25: 340.6 345.5 348.6 351.2  
26: 341.4 350.9 368.0 346.5  
27: 329.9 357.1 343.8 346.9  
28: 338.9 367.4 356.7 334.7  
29: 354.3 341.4 360.1 361.5  
30: 336.8 330.6 337.1 347.8  
31: 348.0 345.6 348.7 339.3  
32: 341.1 337.0 350.4 341.1

Receiver Phase limits [-50.0 20.0] deg

Board	1	2	3	4
1:	-2.0	-1.4	1.1	4.7
2:	-3.1	2.2	1.3	3.7
3:	2.9	3.5	-2.4	-0.9
4:	1.0	0.5	3.0	0.8
5:	0.1	-0.4	0.5	9.1
6:	6.2	-2.3	-2.8	0.8
7:	-2.1	1.8	-0.5	1.9
8:	12.1	-1.4	-0.3	-4.3
9:	-2.1	-0.6	2.6	3.2
10:	-1.6	3.5	-2.3	7.8
11:	0.3	-2.4	2.5	-1.5
12:	-1.6	-1.5	4.3	0.9
13:	3.6	1.0	1.2	3.8
14:	0.1	2.1	-0.6	-0.6
15:	3.5	1.1	-2.7	-0.7
16:	-4.9	-1.6	2.7	-3.2
17:	-0.9	0.7	-3.2	-2.0
18:	2.5	-2.8	0.6	-3.3
19:	0.9	1.8	2.1	0.5
20:	0.2	1.4	-2.6	-1.2
21:	-3.7	-0.7	3.0	-7.0
22:	5.2	-2.5	-0.6	0.5
23:	-2.8	-0.4	-3.6	-1.4
24:	-2.9	-2.6	-2.2	-5.3
25:	-3.6	0.1	2.1	1.1
26:	-3.3	-0.8	3.2	-3.9
27:	-2.8	1.7	-1.2	-0.6
28:	-0.7	5.3	-0.8	1.5
29:	2.4	2.6	0.6	0.9
30:	0.9	-3.3	-0.3	-0.6
31:	1.4	-0.3	-0.3	-2.6

32: -5.1 -4.3 -4.3 -1.9

Transducer Phase limits [-100.0 0.0] deg

Board	1	2	3	4
1:	-31.5	-37.2	-32.5	-35.2
2:	-35.8	-35.2	-30.1	-40.5
3:	-30.1	-39.6	-33.4	-41.1
4:	-35.4	-36.1	-34.0	-34.6
5:	-35.1	-39.7	-38.8	-33.1
6:	-29.9	-34.7	-34.8	-36.5
7:	-33.3	-37.8	-36.0	-37.3
8:	-29.1	-40.1	-37.7	-39.5
9:	-36.3	-37.0	-32.6	-39.0
10:	-41.8	-35.2	-29.6	-31.5
11:	-34.5	-39.2	-38.1	-39.6
12:	-32.4	-37.8	-39.1	-39.1
13:	-32.6	-40.9	-31.4	-40.8
14:	-34.8	-40.6	-33.0	-38.4
15:	-26.4	-43.9	-34.8	-31.4
16:	-35.7	-39.6	-30.3	-34.5
17:	-27.0	-33.7	-37.0	-36.7
18:	-28.5	-35.7	-33.5	-39.2
19:	-35.4	-34.1	-29.3	-39.2
20:	-31.5	-37.5	-38.9	-39.5
21:	-31.8	-37.2	-28.3	-39.6
22:	-30.5	-39.8	-29.5	-36.5
23:	-34.3	-41.3	-32.7	-35.1
24:	-34.7	-38.2	-37.0	-34.0
25:	-28.3	-35.6	-32.6	-36.4
26:	-37.5	-38.3	-29.0	-41.4
27:	-31.2	-36.6	-31.5	-39.7
28:	-36.4	-34.4	-31.4	-35.7
29:	-36.1	-39.9	-33.4	-36.1
30:	-31.0	-39.8	-34.2	-33.4
31:	-37.4	-40.3	-30.6	-31.9
32:	-38.4	-38.9	-32.1	-38.6

Rx Channels test passed

-----  
-----  
2009.10.27 04:16:53.456 101 7 OK

Tx Channels test passed

Maximum noise at Board 4 Channel 19  
Level: 53.8 dB

-----  
-----  
2009.10.27 04:19:33.766 101 8 OK

Broadband noise test  
-----

Average noise at Board 1 48.7 dB OK  
Average noise at Board 2 47.8 dB OK  
Average noise at Board 3 46.5 dB OK  
Average noise at Board 4 49.5 dB OK

RX NOISE LEVEL

Board No:	1	2	3	4	
0:	52.3	45.0	45.2	45.8	dB
1:	51.0	46.8	48.5	45.5	dB
2:	50.4	49.3	48.4	46.5	dB
3:	47.4	50.1	50.1	48.0	dB
4:	48.0	49.7	52.1	45.1	dB
5:	49.1	46.2	47.1	45.6	dB
6:	50.8	50.0	46.1	45.8	dB
7:	48.9	47.8	47.1	44.4	dB
8:	48.3	51.4	49.0	49.2	dB
9:	47.3	48.1	44.2	46.5	dB
10:	48.6	48.0	46.8	47.2	dB
11:	47.9	47.1	47.5	49.8	dB
12:	48.0	48.5	45.7	49.5	dB
13:	45.5	46.8	45.3	46.9	dB
14:	49.6	50.1	45.4	48.1	dB
15:	46.2	44.3	47.4	46.1	dB
16:	48.6	43.5	43.7	50.2	dB
17:	50.9	48.6	43.9	50.4	dB
18:	49.3	45.6	45.0	50.9	dB
19:	50.9	45.6	44.2	53.8	dB
20:	49.5	44.6	46.8	50.5	dB
21:	45.8	45.5	44.2	47.7	dB
22:	49.4	48.1	46.9	48.8	dB
23:	44.9	45.7	46.6	46.8	dB
24:	47.7	43.4	45.1	49.5	dB
25:	44.9	45.9	45.3	48.3	dB
26:	46.1	48.3	43.5	49.2	dB
27:	49.8	51.2	42.5	53.3	dB
28:	49.5	48.8	44.0	53.6	dB
29:	44.1	45.4	43.0	52.1	dB
30:	47.2	47.8	44.1	51.8	dB
31:	47.6	46.3	45.0	51.5	dB

-----  
-----  
2009.10.27 04:19:39.400 101 9 OK

RX NOISE SPECTRUM

Board No:	1	2	3	4
26.1 kHz:	44.7	40.8	40.9	43.6
dB				
26.3 kHz:	40.1	38.2	39.0	41.2
dB				
26.5 kHz:	41.3	38.7	38.5	39.8
dB				
26.7 kHz:	41.4	38.8	37.6	39.6
dB				
26.9 kHz:	42.2	38.8	37.2	39.0
dB				
27.1 kHz:	41.1	38.9	37.4	39.0
dB				
27.3 kHz:	41.0	38.7	38.0	39.2
dB				
27.5 kHz:	41.0	38.7	38.1	38.7
dB				
27.7 kHz:	40.6	38.0	36.9	38.8
dB				
27.9 kHz:	41.3	38.4	37.1	39.0
dB				
28.1 kHz:	40.5	38.7	38.0	39.6
dB				
28.3 kHz:	41.2	38.7	38.3	39.3
dB				

28.5 kHz: 41.8 39.8 38.5 39.7  
 dB  
 28.7 kHz: 43.9 39.3 38.9 39.5  
 dB  
 28.9 kHz: 41.5 39.2 37.9 39.6  
 dB  
 29.1 kHz: 40.3 38.7 38.7 40.4  
 dB  
 29.3 kHz: 40.7 39.2 38.0 40.0  
 dB  
 29.5 kHz: 39.7 39.0 38.2 39.2  
 dB  
 29.7 kHz: 40.3 38.4 38.6 39.4  
 dB  
 29.9 kHz: 41.8 39.1 37.9 38.5  
 dB  
 30.1 kHz: 40.1 38.4 38.0 38.7  
 dB  
 30.3 kHz: 40.4 38.5 37.4 37.7  
 dB  
 30.5 kHz: 39.8 38.9 37.9 40.9  
 dB  
 30.7 kHz: 40.8 38.9 38.6 39.2  
 dB  
 30.9 kHz: 39.5 38.3 37.4 38.0  
 dB  
 31.1 kHz: 39.7 38.2 37.5 38.0  
 dB  
 31.4 kHz: 38.5 38.1 37.9 38.8  
 dB  
 31.6 kHz: 37.7 37.9 37.8 39.4  
 dB  
 31.8 kHz: 38.1 37.5 37.5 38.9  
 dB  
 32.0 kHz: 38.2 38.3 37.3 38.8  
 dB  
 32.2 kHz: 37.9 37.7 36.9 38.1  
 dB  
 32.4 kHz: 39.2 39.4 38.0 38.4  
 dB  
 32.6 kHz: 41.7 41.1 40.2 39.8  
 dB  
 32.8 kHz: 44.0 43.0 40.9 41.3  
 dB  
 33.0 kHz: 45.3 43.4 40.7 41.0  
 dB  
 33.2 kHz: 44.3 41.8 39.4 40.3  
 dB

33.4 kHz: 40.9 38.8 37.4 37.9  
 dB  
 33.6 kHz: 37.8 36.2 36.5 37.2  
 dB  
 33.8 kHz: 37.3 36.8 36.8 37.7  
 dB  
 34.0 kHz: 37.1 36.7 37.0 38.1  
 dB

Maximum noise at Board 1 Frequency 33.0  
 kHz Level: 45.3 dB

Spectral noise test

-----  
 Average noise at Board 1 41.1 dB OK  
 Average noise at Board 2 39.2 dB OK  
 Average noise at Board 3 38.3 dB OK  
 Average noise at Board 4 39.5 dB OK

-----  
 -----  
 2009.10.27 04:19:44.901 101 10  
 OK

KONTRON CP6011  
 Clock 1795 MHz  
 Die 35 oC (peak: 39 oC @ 2009-10-27 -  
 04:17:05)  
 Board 30 oC (peak: 30 oC @ 2009-10-27 -  
 04:19:05)  
 Core 1.34 V  
 3V3 3.30 V  
 12V 12.05 V  
 -12V -12.04 V  
 BATT 3.49 V  
 Primary network: 157.237.14.60:0xffff0000  
 Secondary network: 192.168.2.20:0xfffff00

-----  
-----  
2009.10.27 04:19:45.001 101 15  
OK

EM 302

BSP67B Master: 2.2.2 081216  
BSP67B Slave: 2.2.2 081216  
CPU: 1.4.5 090421  
DDS: 3.4.9 070328  
RX32 version : Apr 25 2008 Rev 1.11  
TX36 version : Jul 21 2008 Rev 1.11

-----  
-----

## Appendix C: Failed BIST results October 28, 2009

Saved: 2009.10.29 05:59:23

BSP 1 PCI TO SLAVE A1 HPI: ok  
BSP 1 PCI TO SLAVE A2 HPI: ok

Sounder Type: 302, Serial no.: 101

Date	Time	Ser. No.	BIST	Result
-----				
-----				
2009.10.29	05:52:38.152	101	0	OK

BSP 1 PCI TO SLAVE B0 HPI: ok  
BSP 1 PCI TO SLAVE B1 HPI: ok  
BSP 1 PCI TO SLAVE B2 HPI: ok  
BSP 1 PCI TO SLAVE C0 HPI: ok  
BSP 1 PCI TO SLAVE C1 HPI: ok  
BSP 1 PCI TO SLAVE C2 HPI: ok  
BSP 1 PCI TO SLAVE D0 HPI: ok  
BSP 1 PCI TO SLAVE D1 HPI: ok  
BSP 1 PCI TO SLAVE D2 HPI: ok  
BSP 2 Master 2.2 081216 4.3 070913 4.3  
070913

Number of BSP67B boards: 2  
BSP 1 Master 2.2 081216 4.3 070913 4.3  
070913  
BSP 1 Slave 2.2 081216 6.0 080902  
BSP 1 RXI FPGA 3.6 080821  
BSP 1 DSP FPGA A 4.0 070531  
BSP 1 DSP FPGA B 4.0 070531  
BSP 1 DSP FPGA C 4.0 070531  
BSP 1 DSP FPGA D 4.0 070531  
BSP 1 PCI TO SLAVE A1 FIFO: ok  
BSP 1 PCI TO SLAVE A2 FIFO: ok  
BSP 1 PCI TO SLAVE A3 FIFO: ok  
BSP 1 PCI TO SLAVE B1 FIFO: ok  
BSP 1 PCI TO SLAVE B2 FIFO: ok  
BSP 1 PCI TO SLAVE B3 FIFO: ok  
BSP 1 PCI TO SLAVE C1 FIFO: ok  
BSP 1 PCI TO SLAVE C2 FIFO: ok  
BSP 1 PCI TO SLAVE C3 FIFO: ok  
BSP 1 PCI TO SLAVE D1 FIFO: ok  
BSP 1 PCI TO SLAVE D2 FIFO: ok  
BSP 1 PCI TO SLAVE D3 FIFO: ok  
BSP 1 PCI TO MASTER A HPI: ok  
BSP 1 PCI TO MASTER B HPI: ok  
BSP 1 PCI TO MASTER C HPI: ok  
BSP 1 PCI TO MASTER D HPI: ok  
BSP 1 PCI TO SLAVE A0 HPI: ok

BSP 2 Slave 2.2 081216 6.0 080902  
BSP 2 RXI FPGA 3.6 080821  
BSP 2 DSP FPGA A 4.0 070531  
BSP 2 DSP FPGA B 4.0 070531  
BSP 2 DSP FPGA C 4.0 070531  
BSP 2 DSP FPGA D 4.0 070531  
BSP 2 PCI TO SLAVE A1 FIFO: ok  
BSP 2 PCI TO SLAVE A2 FIFO: ok  
BSP 2 PCI TO SLAVE A3 FIFO: ok  
BSP 2 PCI TO SLAVE B1 FIFO: ok  
BSP 2 PCI TO SLAVE B2 FIFO: ok  
BSP 2 PCI TO SLAVE B3 FIFO: ok  
BSP 2 PCI TO SLAVE C1 FIFO: ok  
BSP 2 PCI TO SLAVE C2 FIFO: ok  
BSP 2 PCI TO SLAVE C3 FIFO: ok  
BSP 2 PCI TO SLAVE D1 FIFO: ok  
BSP 2 PCI TO SLAVE D2 FIFO: ok  
BSP 2 PCI TO SLAVE D3 FIFO: ok  
BSP 2 PCI TO MASTER A HPI: ok  
BSP 2 PCI TO MASTER B HPI: ok  
BSP 2 PCI TO MASTER C HPI: ok  
BSP 2 PCI TO MASTER D HPI: ok  
BSP 2 PCI TO SLAVE A0 HPI: ok  
BSP 2 PCI TO SLAVE A1 HPI: ok  
BSP 2 PCI TO SLAVE A2 HPI: ok  
BSP 2 PCI TO SLAVE B0 HPI: ok

BSP 2 PCI TO SLAVE B1 HPI: ok  
BSP 2 PCI TO SLAVE B2 HPI: ok  
BSP 2 PCI TO SLAVE C0 HPI: ok  
BSP 2 PCI TO SLAVE C1 HPI: ok  
BSP 2 PCI TO SLAVE C2 HPI: ok  
BSP 2 PCI TO SLAVE D0 HPI: ok  
BSP 2 PCI TO SLAVE D1 HPI: ok  
BSP 2 PCI TO SLAVE D2 HPI: ok

-----  
-----

2009.10.29 05:52:38.222 101 1  
Error

High Voltage Br. 1

-----

TX36 Spec: 90.0 - 145.0

0-1 121.3  
0-2 121.7  
0-3 121.7  
0-4 122.6  
0-5 121.3  
0-6 121.3  
0-7 121.3  
0-8 121.7  
0-9 120.9  
0-10 122.6  
0-11 120.9  
0-12 120.5  
0-13 120.9  
0-14 121.7  
0-15 121.3  
0-16 7.6 \*  
0-17 120.9  
0-18 122.6  
0-19 122.1  
0-20 122.1  
0-21 122.1  
0-22 120.5  
0-23 120.9  
0-24 121.3

High Voltage Br. 2

-----  
TX36 Spec: 90.0 - 145.0  
0-1 121.3  
0-2 121.7  
0-3 121.3  
0-4 122.2  
0-5 121.3  
0-6 121.7  
0-7 120.9  
0-8 121.3  
0-9 120.9  
0-10 122.2  
0-11 120.9  
0-12 120.5  
0-13 120.9  
0-14 121.3  
0-15 121.7  
0-16 120.9  
0-17 120.9  
0-18 122.2  
0-19 121.7  
0-20 122.2  
0-21 122.2  
0-22 121.3  
0-23 120.9  
0-24 120.9

Input voltage 12V

-----

TX36 Spec: 11.0 - 13.0

0-1 11.9  
0-2 11.8  
0-3 11.9  
0-4 11.9  
0-5 11.9  
0-6 11.9  
0-7 11.9  
0-8 11.9  
0-9 11.9  
0-10 11.9  
0-11 11.8  
0-12 11.9  
0-13 11.9  
0-14 11.8  
0-15 11.9  
0-16 11.8  
0-17 11.8



0-18 11.8  
0-19 11.8  
0-20 11.9  
0-21 11.9  
0-22 11.8  
0-23 11.8  
0-24 11.8

Digital 3.3V

-----

TX36 Spec: 2.8 - 3.5

0-1 3.3  
0-2 3.3  
0-3 3.3  
0-4 3.3  
0-5 3.3  
0-6 3.3  
0-7 3.3  
0-8 3.3  
0-9 3.3  
0-10 3.3  
0-11 3.3  
0-12 3.3  
0-13 3.3  
0-14 3.3  
0-15 3.3  
0-16 3.3  
0-17 3.3  
0-18 3.3  
0-19 3.3  
0-20 3.3  
0-21 3.3  
0-22 3.3  
0-23 3.3  
0-24 3.3

Digital 2.5V

-----

TX36 Spec: 2.4 - 2.6

0-1 2.5  
0-2 2.5  
0-3 2.5  
0-4 2.5  
0-5 2.5  
0-6 2.5  
0-7 2.5

0-8 2.5  
0-9 2.5  
0-10 2.5  
0-11 2.5  
0-12 2.5  
0-13 2.5  
0-14 2.5  
0-15 2.5  
0-16 2.5  
0-17 2.5  
0-18 2.5  
0-19 2.5  
0-20 2.5  
0-21 2.5  
0-22 2.5  
0-23 2.5  
0-24 2.5

Digital 1.5V

-----

TX36 Spec: 1.4 - 1.6

0-1 1.5  
0-2 1.5  
0-3 1.5  
0-4 1.5  
0-5 1.5  
0-6 1.5  
0-7 1.5  
0-8 1.5  
0-9 1.5  
0-10 1.5  
0-11 1.5  
0-12 1.5  
0-13 1.5  
0-14 1.5  
0-15 1.5  
0-16 1.5  
0-17 1.5  
0-18 1.5  
0-19 1.5  
0-20 1.5  
0-21 1.5  
0-22 1.5  
0-23 1.5  
0-24 1.5

Temperature

-----

TX36 Spec: 15.0 - 75.0

0-1 43.2  
 0-2 42.0  
 0-3 41.6  
 0-4 42.8  
 0-5 41.2  
 0-6 40.0  
 0-7 40.8  
 0-8 41.6  
 0-9 42.8  
 0-10 44.0  
 0-11 40.4  
 0-12 41.2  
 0-13 42.8  
 0-14 43.6  
 0-15 44.8  
 0-16 48.0  
 0-17 44.4  
 0-18 46.0  
 0-19 44.4  
 0-20 44.8  
 0-21 45.2  
 0-22 44.0  
 0-23 40.8  
 0-24 42.8

0-17 0.6  
 0-18 0.7  
 0-19 0.7  
 0-20 0.7  
 0-21 0.7  
 0-22 0.7  
 0-23 0.8  
 0-24 0.6

TX36 power test failed

IO TX MB Embedded PPC Embedded  
 PPC Download  
 1.11 Generic1.11 GenericDec 15 2005/1.06  
 Mar 6 2006/1.07 Jul 21 2008/1.11

TX36 unique firmware test OK

-----  
-----

2009.10.29 05:52:38.405 101 2 OK

Input Current 12V

-----

TX36 Spec: 0.3 - 1.5

0-1 0.9  
 0-2 0.7  
 0-3 0.7  
 0-4 0.6  
 0-5 0.7  
 0-6 0.7  
 0-7 0.7  
 0-8 0.7  
 0-9 0.7  
 0-10 0.7  
 0-11 0.7  
 0-12 0.7  
 0-13 0.7  
 0-14 0.6  
 0-15 0.7  
 0-16 1.8 \*

Input voltage 12V

-----

RX32 Spec: 11.0 - 13.0

7-1 11.7  
 7-2 11.6  
 7-3 11.7  
 7-4 11.7

Input voltage 6V

-----

RX32 Spec: 5.0 - 7.0

7-1 5.7  
 7-2 5.7  
 7-3 5.7  
 7-4 5.7

Digital 3.3V

-----  
RX32 Spec: 2.8 - 3.5  
7-1 3.3  
7-2 3.3  
7-3 3.3  
7-4 3.3

Digital 2.5V

-----  
RX32 Spec: 2.4 - 2.6  
7-1 2.4  
7-2 2.5  
7-3 2.5  
7-4 2.4

Digital 1.5V

-----  
RX32 Spec: 1.4 - 1.6  
7-1 1.5  
7-2 1.5  
7-3 1.5  
7-4 1.5

Temperature

-----  
RX32 Spec: 15.0 - 75.0  
7-1 46.0  
7-2 47.0  
7-3 48.0  
7-4 48.0

Input Current 12V

-----  
RX32 Spec: 0.4 - 1.5  
7-1 0.7  
7-2 0.7  
7-3 0.7  
7-4 0.7

Input Current 6V

-----  
RX32 Spec: 2.4 - 3.3  
7-1 2.9

7-2 2.7  
7-3 2.8  
7-4 2.8

RX32 power test passed

IO RX MB Embedded PPC Embedded  
PPC Download  
1.12 Generic1.14 GenericMay 5 2006/1.06  
May 5 2006/1.07 Apr 25 2008/1.11

RX32 unique firmware test OK

-----  
-----  
2009.10.29 05:52:38.539 101 3  
Error

High Voltage Br. 1

-----  
TX36 Spec: 90.0 - 145.0  
0-1 121.3  
0-2 121.7  
0-3 121.7  
0-4 122.6  
0-5 121.3  
0-6 121.7  
0-7 121.3  
0-8 121.7  
0-9 120.9  
0-10 122.6  
0-11 120.9  
0-12 120.5  
0-13 120.9  
0-14 121.7  
0-15 121.3  
0-16 7.6 \*  
0-17 121.3  
0-18 122.6  
0-19 122.1  
0-20 122.1

0-21 122.1  
0-22 120.9  
0-23 121.3  
0-24 121.3

High Voltage Br. 2

-----

TX36 Spec: 90.0 - 145.0

0-1 121.3  
0-2 121.7  
0-3 121.3  
0-4 122.6  
0-5 121.3  
0-6 121.3  
0-7 120.9  
0-8 121.3  
0-9 121.3  
0-10 122.2  
0-11 120.9  
0-12 120.5  
0-13 121.3  
0-14 121.3  
0-15 121.7  
0-16 120.9  
0-17 120.9  
0-18 121.7  
0-19 121.7  
0-20 122.2  
0-21 121.7  
0-22 121.3  
0-23 120.9  
0-24 120.9

Input voltage 12V

-----

TX36 Spec: 11.0 - 13.0

0-1 11.9  
0-2 11.8  
0-3 11.9  
0-4 11.9  
0-5 11.9  
0-6 11.9  
0-7 11.9  
0-8 11.9  
0-9 11.8  
0-10 11.9

0-11 11.8  
0-12 11.9  
0-13 11.9  
0-14 11.8  
0-15 11.9  
0-16 11.8  
0-17 11.9  
0-18 11.8  
0-19 11.8  
0-20 11.8  
0-21 11.9  
0-22 11.8  
0-23 11.8  
0-24 11.9

RX32 Spec: 11.0 - 13.0

7-1 11.7  
7-2 11.6  
7-3 11.7  
7-4 11.7

Input voltage 6V

-----

RX32 Spec: 5.0 - 7.0

7-1 5.7  
7-2 5.7  
7-3 5.7  
7-4 5.7

TRU power test failed

-----  
-----

2009.10.29 05:52:38.722 101 4 OK

EM 302 High Voltage Ramp Test  
Test Voltage:20.00 Measured Voltage:  
19.00 PASSED

Test Voltage:40.00 Measured Voltage:  
39.00 PASSED  
Test Voltage:60.00 Measured Voltage:  
59.00 PASSED  
Test Voltage:80.00 Measured Voltage:  
79.00 PASSED  
Test Voltage:100.00 Measured Voltage:  
101.00 PASSED  
Test Voltage:120.00 Measured Voltage:  
121.00 PASSED  
Test Voltage:120.00 Measured Voltage:  
121.00 PASSED  
Test Voltage:100.00 Measured Voltage:  
106.00 PASSED  
Test Voltage:80.00 Measured Voltage:  
85.00 PASSED  
Test Voltage:60.00 Measured Voltage:  
65.00 PASSED  
Test Voltage:40.00 Measured Voltage:  
45.00 PASSED

11 of 11 tests OK

-----  
-----  
2009.10.29 05:55:14.581 101 5 OK

BSP 1 RXI TO RAW FIFO: ok  
BSP 2 RXI TO RAW FIFO: ok

-----  
-----  
2009.10.29 05:55:18.864 101 6 OK

Receiver impedance limits [600.0 1000.0]  
ohm  
Board 1 2 3 4

1: 860.9 863.4 860.6 822.5  
2: 856.0 836.3 861.0 826.9  
3: 835.6 826.8 854.7 852.5  
4: 856.8 846.4 840.1 842.6  
5: 859.5 852.5 853.3 807.8  
6: 850.5 858.9 859.8 836.3  
7: 856.0 842.0 855.8 838.6  
8: 812.5 850.8 851.2 853.1  
9: 869.5 843.0 850.0 829.9  
10: 844.6 827.2 857.7 786.6  
11: 858.7 844.4 840.4 836.7  
12: 860.9 856.1 834.4 850.7  
13: 842.7 848.6 843.4 821.9  
14: 849.1 836.2 846.6 859.2  
15: 828.6 831.1 844.3 844.3  
16: 875.8 854.9 836.1 854.1  
17: 869.1 834.3 881.5 859.5  
18: 839.1 852.0 858.8 857.4  
19: 852.9 826.0 848.3 845.4  
20: 861.7 840.6 868.9 851.0  
21: 886.6 867.4 852.0 878.0  
22: 849.5 886.2 853.5 841.2  
23: 872.4 878.0 869.2 860.7  
24: 864.5 887.9 881.9 875.7  
25: 872.8 847.2 845.6 842.6  
26: 861.4 849.3 845.3 848.7  
27: 853.8 835.6 844.3 844.2  
28: 851.8 828.3 845.0 819.2  
29: 852.4 826.9 862.5 839.2  
30: 849.7 863.3 842.3 842.1  
31: 849.4 843.4 843.8 850.9  
32: 875.5 862.3 879.7 854.5

Transducer impedance limits [250.0 2000.0]  
ohm

Board 1 2 3 4  
1: 328.0 338.1 340.1 350.2  
2: 335.6 355.8 338.4 353.3  
3: 335.9 338.8 356.4 339.7  
4: 331.6 341.7 361.0 342.5  
5: 334.8 339.7 359.0 336.3  
6: 332.0 334.0 342.5 342.2  
7: 332.3 348.1 362.7 349.4  
8: 345.2 325.5 355.1 344.0  
9: 356.3 346.1 365.5 354.8  
10: 344.3 347.9 353.2 359.6  
11: 329.9 338.8 363.7 351.1  
12: 336.7 347.0 354.0 340.3

13: 341.2 343.4 352.1 357.9  
14: 351.8 344.7 355.9 342.2  
15: 333.6 343.1 346.0 334.3  
16: 332.1 345.8 368.5 350.1  
17: 329.4 341.2 343.0 342.7  
18: 354.8 331.6 356.6 345.7  
19: 352.4 333.1 351.0 340.5  
20: 339.5 335.9 345.5 334.8  
21: 333.5 333.7 340.7 354.4  
22: 336.9 352.0 347.0 351.4  
23: 342.5 347.1 342.2 350.3  
24: 340.5 358.7 342.4 338.2  
25: 335.0 344.3 345.7 346.9  
26: 337.0 349.3 363.3 346.4  
27: 327.1 356.4 339.6 346.6  
28: 334.3 366.0 353.4 334.3  
29: 349.7 339.6 356.5 361.8  
30: 331.4 328.1 334.5 345.0  
31: 340.8 344.6 345.8 338.4  
32: 336.4 336.3 347.9 339.7

Receiver Phase limits [-50.0 20.0] deg

Board 1 2 3 4  
1: -1.3 -1.6 1.8 4.7  
2: -2.1 2.2 -3.4 3.6  
3: 2.8 3.6 -2.5 -0.9  
4: -3.0 0.1 2.3 1.3  
5: 0.4 -0.5 0.5 4.5  
6: 1.2 -2.7 -2.5 0.2  
7: -0.8 2.3 0.2 3.0  
8: 7.7 -1.9 0.1 -3.3  
9: -1.0 -0.1 2.8 3.3  
10: -0.8 3.4 -1.7 8.0  
11: 0.8 -2.0 2.6 -0.8  
12: -1.4 -1.5 1.9 -3.6  
13: 4.1 1.1 1.4 4.4  
14: 0.8 2.2 -0.4 -0.8  
15: 4.4 1.4 -1.9 0.0  
16: -3.9 -1.8 3.1 -2.0  
17: -0.5 0.5 -2.4 -3.8  
18: 3.3 -2.9 0.5 -2.8  
19: 1.6 1.9 2.0 -3.9  
20: 1.0 1.6 -1.4 -1.1  
21: -3.2 -0.7 2.5 -4.3  
22: 0.3 -2.7 -1.0 0.7  
23: -1.7 -0.1 -3.3 -1.4  
24: -2.2 -2.9 -1.7 -4.8  
25: -3.5 0.0 2.4 1.6

26: -2.3 -0.5 3.6 -2.8  
27: -2.4 2.0 -1.1 0.1  
28: 0.4 5.3 -1.4 2.3  
29: 3.2 2.4 0.7 0.9  
30: 1.8 -3.5 0.1 -0.1  
31: 1.1 0.0 0.5 -0.9  
32: -4.6 -4.4 -4.3 -1.5

Transducer Phase limits [-100.0 0.0] deg

Board 1 2 3 4  
1: -32.3 -38.5 -34.2 -36.0  
2: -36.7 -36.2 -34.1 -41.5  
3: -31.4 -40.4 -35.4 -41.9  
4: -38.2 -37.7 -36.5 -35.9  
5: -36.2 -40.3 -40.0 -36.0  
6: -32.9 -36.4 -36.4 -38.1  
7: -33.9 -38.5 -37.4 -38.4  
8: -32.2 -40.6 -39.4 -40.3  
9: -37.2 -37.8 -34.5 -40.7  
10: -42.1 -35.9 -30.8 -37.3  
11: -35.2 -40.6 -39.8 -42.2  
12: -34.0 -39.2 -41.6 -42.0  
13: -32.8 -41.1 -33.2 -41.7  
14: -36.1 -41.4 -34.9 -39.6  
15: -27.4 -43.8 -36.1 -33.4  
16: -35.6 -40.6 -32.4 -36.0  
17: -28.1 -34.7 -37.5 -39.0  
18: -30.0 -37.3 -35.2 -40.8  
19: -36.3 -35.1 -31.0 -42.2  
20: -32.6 -38.6 -39.5 -40.7  
21: -33.1 -38.7 -30.3 -41.6  
22: -33.9 -40.9 -31.7 -37.4  
23: -35.1 -41.4 -34.2 -36.4  
24: -35.9 -39.9 -37.9 -35.3  
25: -29.8 -37.0 -33.7 -37.8  
26: -37.4 -39.5 -30.7 -43.1  
27: -32.8 -37.5 -33.3 -40.1  
28: -37.2 -35.9 -33.5 -36.4  
29: -37.1 -40.8 -34.6 -38.0  
30: -32.1 -41.0 -35.6 -34.9  
31: -38.7 -41.2 -31.9 -32.8  
32: -38.7 -39.8 -33.9 -39.0

Rx Channels test passed

-----  
-----

2009.10.29 05:55:45.799 101 7  
Error

-----  
Rack 0 Slot 1  
Ch: 0 High Z  
Ch: 1 High Z  
Ch: 2 High Z

-----  
Rack 0 Slot 2  
No channel errors

-----  
Rack 0 Slot 3  
No channel errors

-----  
Rack 0 Slot 4  
No channel errors

-----  
Rack 0 Slot 5  
No channel errors

-----  
Rack 0 Slot 6  
Ch: 21 High Z

-----  
Rack 0 Slot 7  
No channel errors

-----  
Rack 0 Slot 8  
No channel errors

-----  
Rack 0 Slot 9  
No channel errors

-----  
Rack 0 Slot 10  
No channel errors

-----  
Rack 0 Slot 11  
Ch: 24 Open Z  
Ch: 25 FFT err L  
Ch: 26 FFT err L  
Ch: 27 FFT err L  
Ch: 28 FFT err L  
Ch: 29 FFT err L  
Ch: 30 FFT err L  
Ch: 31 FFT err L

-----  
Rack 0 Slot 12  
Ch: 2 High Z  
Ch: 33 High Z  
Ch: 34 High Z  
Ch: 35 High Z

-----  
Rack 0 Slot 13  
Ch: 0 High Z  
Ch: 1 High Z  
Ch: 2 High Z

-----  
Rack 0 Slot 14  
No channel errors

-----  
Rack 0 Slot 15  
No channel errors

-----  
Rack 0 Slot 16  
Ch: 3 Low Voltage  
Ch: 7 Low Voltage  
Ch: 8 Low Voltage  
Ch: 9 Low Voltage  
Ch: 10 Low Voltage  
Ch: 11 Low Voltage  
Ch: 12 Low Voltage  
Ch: 13 Low Voltage  
Ch: 14 Low Voltage  
Ch: 15 Low Voltage  
Ch: 16 Low Voltage  
Ch: 17 Low Voltage  
Ch: 18 Low Voltage  
Ch: 19 Low Voltage



Ch: 20 Low Voltage  
 Ch: 21 Low Voltage  
 Ch: 22 Low Voltage  
 Ch: 23 Low Voltage  
 Ch: 24 FFT err L  
 Ch: 25 FFT err L  
 Ch: 26 FFT err L  
 Ch: 27 FFT err L  
 Ch: 28 FFT err L  
 Ch: 29 FFT err L  
 Ch: 30 FFT err L  
 Ch: 31 FFT err L

\*\* Tx Channels test failed \*\*

-----  
 -----  
 2009.10.29 05:58:26.142 101 8 OK

RX NOISE LEVEL

	Board No: 1	2	3	4
----- Rack 0 Slot 17 No channel errors	0: 54.4	47.5	46.6	50.4 dB
-----	1: 52.4	47.5	46.0	49.8 dB
----- Rack 0 Slot 18 No channel errors	2: 51.0	46.4	46.3	49.6 dB
-----	3: 47.9	45.9	48.2	51.2 dB
----- Rack 0 Slot 19 No channel errors	4: 48.7	48.4	48.7	51.9 dB
-----	5: 47.2	46.8	47.0	51.4 dB
----- Rack 0 Slot 20 No channel errors	6: 46.9	46.4	47.2	52.6 dB
-----	7: 46.4	46.3	47.2	50.9 dB
----- Rack 0 Slot 21 No channel errors	8: 46.6	48.4	50.1	55.9 dB
-----	9: 45.9	46.2	46.1	54.0 dB
----- Rack 0 Slot 22 No channel errors	10: 46.7	46.8	47.8	50.8 dB
-----	11: 45.9	48.0	47.3	50.7 dB
----- Rack 0 Slot 23 No channel errors	12: 46.4	47.3	46.9	52.0 dB
-----	13: 46.1	46.2	46.8	50.4 dB
----- Rack 0 Slot 24 Ch: 33 High Z	14: 45.8	47.2	46.0	51.0 dB
-----	15: 46.7	47.7	48.4	51.6 dB
----- Ch: 34 High Z	16: 44.8	45.8	45.7	50.3 dB
-----	17: 45.1	46.5	44.4	48.7 dB
----- Ch: 35 High Z	18: 45.5	45.7	44.6	50.3 dB
-----	19: 46.3	45.5	44.5	52.8 dB
-----	20: 46.1	45.6	46.0	49.4 dB
-----	21: 45.9	44.8	43.6	47.0 dB
-----	22: 47.3	45.3	43.6	47.5 dB
-----	23: 47.1	45.4	43.8	47.5 dB
-----	24: 47.6	44.6	45.1	52.4 dB
-----	25: 45.9	44.9	43.7	51.3 dB
-----	26: 46.8	45.1	43.5	56.3 dB
-----	27: 46.3	45.1	43.6	58.8 dB
-----	28: 47.4	45.3	44.7	56.4 dB
-----	29: 46.2	44.8	43.8	53.8 dB
-----	30: 45.7	44.3	45.2	53.5 dB
-----	31: 46.8	45.9	45.3	52.6 dB

Maximum noise at Board 4 Channel 27  
Level: 58.8 dB

Broadband noise test

-----  
Average noise at Board 1 47.7 dB OK  
Average noise at Board 2 46.3 dB OK  
Average noise at Board 3 46.2 dB OK  
Average noise at Board 4 52.5 dB OK  
-----  
-----

2009.10.29 05:58:31.809 101 9 OK

RX NOISE SPECTRUM

Board No:	1	2	3	4
26.1 kHz:	46.3	43.7	41.6	44.1
dB				
26.3 kHz:	43.7	43.3	42.1	45.4
dB				
26.5 kHz:	44.3	43.0	41.3	45.5
dB				
26.7 kHz:	44.3	43.7	41.7	44.0
dB				
26.9 kHz:	44.9	43.6	41.6	44.2
dB				
27.1 kHz:	43.7	43.3	42.0	44.1
dB				
27.3 kHz:	44.2	42.5	41.5	44.4
dB				
27.5 kHz:	43.9	42.3	41.6	44.1
dB				
27.7 kHz:	43.8	42.8	42.0	44.3
dB				
27.9 kHz:	44.7	42.9	40.9	43.8
dB				
28.1 kHz:	45.0	43.4	42.2	44.7
dB				
28.3 kHz:	44.9	43.0	43.0	46.3
dB				

28.5 kHz:	45.5	43.4	43.3	46.8
dB				
28.7 kHz:	45.9	43.1	42.6	44.5
dB				
28.9 kHz:	45.1	43.0	42.9	45.2
dB				
29.1 kHz:	44.7	42.9	42.4	44.3
dB				
29.3 kHz:	44.1	41.4	41.7	44.1
dB				
29.5 kHz:	44.4	41.8	41.5	43.7
dB				
29.7 kHz:	44.3	42.1	40.2	42.7
dB				
29.9 kHz:	44.5	42.5	41.8	44.8
dB				
30.1 kHz:	43.5	42.4	42.1	43.7
dB				
30.3 kHz:	44.0	42.2	40.7	43.3
dB				
30.5 kHz:	44.4	42.6	41.3	43.6
dB				
30.7 kHz:	44.4	41.4	41.0	43.6
dB				
30.9 kHz:	43.8	41.9	41.0	44.1
dB				
31.1 kHz:	43.8	41.2	41.5	44.4
dB				
31.4 kHz:	43.1	41.0	40.1	42.2
dB				
31.6 kHz:	42.7	41.0	39.5	42.2
dB				
31.8 kHz:	42.6	40.5	39.5	42.1
dB				
32.0 kHz:	44.0	40.9	40.2	43.1
dB				
32.2 kHz:	44.0	40.9	41.0	43.9
dB				
32.4 kHz:	43.7	41.0	39.9	42.8
dB				
32.6 kHz:	44.2	41.9	41.6	44.5
dB				
32.8 kHz:	44.8	41.9	42.3	45.0
dB				
33.0 kHz:	43.9	41.1	39.4	42.5
dB				
33.2 kHz:	42.8	40.3	39.3	42.7
dB				

33.4 kHz: 42.7 40.2 40.0 42.8  
dB  
33.6 kHz: 42.2 39.3 38.3 41.4  
dB  
33.8 kHz: 41.2 39.9 39.0 41.4  
dB  
34.0 kHz: 40.8 38.6 38.5 41.0  
dB

Maximum noise at Board 4 Frequency 28.5  
kHz Level: 46.8 dB

Spectral noise test

-----  
Average noise at Board 1 44.1 dB OK  
Average noise at Board 2 42.1 dB OK  
Average noise at Board 3 41.3 dB OK  
Average noise at Board 4 44.0 dB OK

-----  
-----  
2009.10.29 05:58:37.309 101 10  
OK

KONTRON CP6011  
Clock 1795 MHz  
Die 44 oC (peak: 60 oC @ 2009-10-29 -  
00:29:15)  
Board 46 oC (peak: 50 oC @ 2009-10-29 -  
04:14:22)  
Core 1.34 V  
3V3 3.30 V  
12V 12.05 V  
-12V -12.04 V  
BATT 3.50 V  
Primary network: 157.237.14.60:0xffff0000  
Secondary network: 192.168.2.20:0xfffff00

-----  
-----  
2009.10.29 05:58:37.409 101 15  
OK

EM 302

BSP67B Master: 2.2.2 081216  
BSP67B Slave: 2.2.2 081216  
CPU: 1.4.5 090421  
DDS: 3.4.9 070328  
RX32 version : Apr 25 2008 Rev 1.11  
TX36 version : Jul 21 2008 Rev 1.11

-----  
-----  
Appendix D: Failed BIST results 110309 after  
swapping boards 16 & 24 back to original  
slots  
Saved: 2009.11.04 03:17:57

Sounder Type: 302, Serial no.: 101

Date	Time	Ser. No.	BIST	Result
2009.11.04	03:10:01	366 101	0	OK

-----  
-----  
Number of BSP67B boards: 2  
BSP 1 Master 2.2 081216 4.3 070913 4.3  
070913

BSP 1 Slave 2.2 081216 6.0 080902  
BSP 1 RXI FPGA 3.6 080821  
BSP 1 DSP FPGA A 4.0 070531  
BSP 1 DSP FPGA B 4.0 070531  
BSP 1 DSP FPGA C 4.0 070531  
BSP 1 DSP FPGA D 4.0 070531  
BSP 1 PCI TO SLAVE A1 FIFO: ok  
BSP 1 PCI TO SLAVE A2 FIFO: ok  
BSP 1 PCI TO SLAVE A3 FIFO: ok  
BSP 1 PCI TO SLAVE B1 FIFO: ok  
BSP 1 PCI TO SLAVE B2 FIFO: ok  
BSP 1 PCI TO SLAVE B3 FIFO: ok  
BSP 1 PCI TO SLAVE C1 FIFO: ok  
BSP 1 PCI TO SLAVE C2 FIFO: ok  
BSP 1 PCI TO SLAVE C3 FIFO: ok  
BSP 1 PCI TO SLAVE D1 FIFO: ok  
BSP 1 PCI TO SLAVE D2 FIFO: ok  
BSP 1 PCI TO SLAVE D3 FIFO: ok  
BSP 1 PCI TO MASTER A HPI: ok  
BSP 1 PCI TO MASTER B HPI: ok  
BSP 1 PCI TO MASTER C HPI: ok  
BSP 1 PCI TO MASTER D HPI: ok  
BSP 1 PCI TO SLAVE A0 HPI: ok  
BSP 1 PCI TO SLAVE A1 HPI: ok  
BSP 1 PCI TO SLAVE A2 HPI: ok  
BSP 1 PCI TO SLAVE B0 HPI: ok  
BSP 1 PCI TO SLAVE B1 HPI: ok  
BSP 1 PCI TO SLAVE B2 HPI: ok  
BSP 1 PCI TO SLAVE C0 HPI: ok  
BSP 1 PCI TO SLAVE C1 HPI: ok  
BSP 1 PCI TO SLAVE C2 HPI: ok  
BSP 1 PCI TO SLAVE D0 HPI: ok  
BSP 1 PCI TO SLAVE D1 HPI: ok  
BSP 1 PCI TO SLAVE D2 HPI: ok  
BSP 2 Master 2.2 081216 4.3 070913 4.3  
070913  
BSP 2 Slave 2.2 081216 6.0 080902  
BSP 2 RXI FPGA 3.6 080821  
BSP 2 DSP FPGA A 4.0 070531  
BSP 2 DSP FPGA B 4.0 070531  
BSP 2 DSP FPGA C 4.0 070531  
BSP 2 DSP FPGA D 4.0 070531  
BSP 2 PCI TO SLAVE A1 FIFO: ok  
BSP 2 PCI TO SLAVE A2 FIFO: ok  
BSP 2 PCI TO SLAVE A3 FIFO: ok  
BSP 2 PCI TO SLAVE B1 FIFO: ok  
BSP 2 PCI TO SLAVE B2 FIFO: ok  
BSP 2 PCI TO SLAVE B3 FIFO: ok

BSP 2 PCI TO SLAVE C1 FIFO: ok  
BSP 2 PCI TO SLAVE C2 FIFO: ok  
BSP 2 PCI TO SLAVE C3 FIFO: ok  
BSP 2 PCI TO SLAVE D1 FIFO: ok  
BSP 2 PCI TO SLAVE D2 FIFO: ok  
BSP 2 PCI TO SLAVE D3 FIFO: ok  
BSP 2 PCI TO MASTER A HPI: ok  
BSP 2 PCI TO MASTER B HPI: ok  
BSP 2 PCI TO MASTER C HPI: ok  
BSP 2 PCI TO MASTER D HPI: ok  
BSP 2 PCI TO SLAVE A0 HPI: ok  
BSP 2 PCI TO SLAVE A1 HPI: ok  
BSP 2 PCI TO SLAVE A2 HPI: ok  
BSP 2 PCI TO SLAVE B0 HPI: ok  
BSP 2 PCI TO SLAVE B1 HPI: ok  
BSP 2 PCI TO SLAVE B2 HPI: ok  
BSP 2 PCI TO SLAVE C0 HPI: ok  
BSP 2 PCI TO SLAVE C1 HPI: ok  
BSP 2 PCI TO SLAVE C2 HPI: ok  
BSP 2 PCI TO SLAVE D0 HPI: ok  
BSP 2 PCI TO SLAVE D1 HPI: ok  
BSP 2 PCI TO SLAVE D2 HPI: ok

-----  
-----

2009.11.04 03:10:01.437 101 1  
Error

High Voltage Br. 1

-----  
TX36 Spec: 90.0 - 145.0  
0-1 120.1  
0-2 120.9  
0-3 120.5  
0-4 121.3  
0-5 120.5  
0-6 120.5  
0-7 120.5  
0-8 120.9  
0-9 120.1  
0-10 121.7  
0-11 120.1  
0-12 119.7  
0-13 120.1

0-14 120.5  
0-15 120.5  
0-16 6.4 \*  
0-17 120.1  
0-18 121.7  
0-19 120.9  
0-20 120.9  
0-21 120.9  
0-22 119.7  
0-23 120.5  
0-24 120.1

High Voltage Br. 2

-----

TX36 Spec: 90.0 - 145.0

0-1 120.5  
0-2 120.9  
0-3 120.1  
0-4 121.3  
0-5 120.1  
0-6 120.5  
0-7 120.1  
0-8 120.1  
0-9 120.1  
0-10 121.3  
0-11 119.7  
0-12 119.7  
0-13 120.5  
0-14 120.1  
0-15 120.9  
0-16 119.7  
0-17 120.1  
0-18 120.9  
0-19 120.9  
0-20 121.3  
0-21 120.9  
0-22 120.1  
0-23 120.1  
0-24 119.7

Input voltage 12V

-----

TX36 Spec: 11.0 - 13.0

0-1 11.9  
0-2 11.8  
0-3 11.9

0-4 11.9  
0-5 11.9  
0-6 11.9  
0-7 11.9  
0-8 11.9  
0-9 11.9  
0-10 11.9  
0-11 11.9  
0-12 11.9  
0-13 11.9  
0-14 11.9  
0-15 11.9  
0-16 11.8  
0-17 11.8  
0-18 11.9  
0-19 11.9  
0-20 11.9  
0-21 11.9  
0-22 11.8  
0-23 11.9  
0-24 11.9

Digital 3.3V

-----

TX36 Spec: 2.8 - 3.5

0-1 3.3  
0-2 3.3  
0-3 3.3  
0-4 3.3  
0-5 3.3  
0-6 3.3  
0-7 3.3  
0-8 3.3  
0-9 3.3  
0-10 3.3  
0-11 3.3  
0-12 3.3  
0-13 3.3  
0-14 3.3  
0-15 3.3  
0-16 3.3  
0-17 3.3  
0-18 3.3  
0-19 3.3  
0-20 3.3  
0-21 3.3  
0-22 3.3

0-23 3.3  
0-24 3.3

Digital 2.5V

-----

TX36 Spec: 2.4 - 2.6

0-1 2.5  
0-2 2.5  
0-3 2.5  
0-4 2.5  
0-5 2.5  
0-6 2.5  
0-7 2.5  
0-8 2.5  
0-9 2.5  
0-10 2.5  
0-11 2.5  
0-12 2.5  
0-13 2.5  
0-14 2.5  
0-15 2.5  
0-16 2.5  
0-17 2.5  
0-18 2.5  
0-19 2.5  
0-20 2.5  
0-21 2.5  
0-22 2.5  
0-23 2.5  
0-24 2.5

Digital 1.5V

-----

TX36 Spec: 1.4 - 1.6

0-1 1.5  
0-2 1.5  
0-3 1.5  
0-4 1.5  
0-5 1.5  
0-6 1.5  
0-7 1.5  
0-8 1.5  
0-9 1.5  
0-10 1.5  
0-11 1.5  
0-12 1.5

0-13 1.5  
0-14 1.5  
0-15 1.5  
0-16 1.5  
0-17 1.5  
0-18 1.5  
0-19 1.5  
0-20 1.5  
0-21 1.5  
0-22 1.5  
0-23 1.5  
0-24 1.5

Temperature

-----

TX36 Spec: 15.0 - 75.0

0-1 31.2  
0-2 30.4  
0-3 30.0  
0-4 31.2  
0-5 29.6  
0-6 28.4  
0-7 29.6  
0-8 30.0  
0-9 31.6  
0-10 33.2  
0-11 29.6  
0-12 29.6  
0-13 30.4  
0-14 30.0  
0-15 31.2  
0-16 35.6  
0-17 32.8  
0-18 34.0  
0-19 33.2  
0-20 33.6  
0-21 34.0  
0-22 32.8  
0-23 30.0  
0-24 31.2

Input Current 12V

-----

TX36 Spec: 0.3 - 1.5

0-1 0.9  
0-2 0.7

0-3 0.7  
0-4 0.7  
0-5 0.7  
0-6 0.6  
0-7 0.7  
0-8 0.7  
0-9 0.6  
0-10 0.7  
0-11 0.7  
0-12 0.7  
0-13 0.7  
0-14 0.6  
0-15 0.7  
0-16 1.8 \*  
0-17 0.6  
0-18 0.7  
0-19 0.6  
0-20 0.6  
0-21 0.7  
0-22 0.6  
0-23 0.8  
0-24 0.6

TX36 power test failed

IO TX MB Embedded PPC Embedded  
PPC Download  
1.11 Generic1.11 GenericDec 15 2005/1.06  
Mar 6 2006/1.07 Jul 21 2008/1.11

TX36 unique firmware test OK

-----  
-----

2009.11.04 03:10:01.770 101 2 OK

Input voltage 12V

-----  
RX32 Spec: 11.0 - 13.0  
7-1 11.7  
7-2 11.6

7-3 11.7  
7-4 11.7

Input voltage 6V

-----  
RX32 Spec: 5.0 - 7.0  
7-1 5.7  
7-2 5.7  
7-3 5.7  
7-4 5.7

Digital 3.3V

-----  
RX32 Spec: 2.8 - 3.5  
7-1 3.3  
7-2 3.3  
7-3 3.3  
7-4 3.3

Digital 2.5V

-----  
RX32 Spec: 2.4 - 2.6  
7-1 2.4  
7-2 2.5  
7-3 2.5  
7-4 2.5

Digital 1.5V

-----  
RX32 Spec: 1.4 - 1.6  
7-1 1.5  
7-2 1.5  
7-3 1.5  
7-4 1.5

Temperature

-----  
RX32 Spec: 15.0 - 75.0  
7-1 33.0  
7-2 33.0  
7-3 35.0  
7-4 35.0

Input Current 12V

-----

RX32 Spec: 0.4 - 1.5

7-1 0.7  
7-2 0.7  
7-3 0.7  
7-4 0.7

Input Current 6V

-----

RX32 Spec: 2.4 - 3.3

7-1 2.9  
7-2 2.7  
7-3 2.8  
7-4 2.8

RX32 power test passed

IO RX MB Embedded PPC Embedded  
PPC Download  
1.12 Generic1.14 GenericMay 5 2006/1.06  
May 5 2006/1.07 Apr 25 2008/1.11

RX32 unique firmware test OK

-----  
-----

2009.11.04 03:10:01.904 101 3  
Error

High Voltage Br. 1

-----

TX36 Spec: 90.0 - 145.0

0-1 120.1  
0-2 120.9  
0-3 120.5  
0-4 121.3  
0-5 120.5  
0-6 120.5

0-7 120.5  
0-8 120.9  
0-9 120.1  
0-10 121.7  
0-11 120.1  
0-12 119.7  
0-13 120.1  
0-14 120.5  
0-15 120.5  
0-16 6.0 \*  
0-17 120.1  
0-18 121.7  
0-19 120.9  
0-20 120.9  
0-21 120.9  
0-22 119.7  
0-23 120.1  
0-24 120.5

High Voltage Br. 2

-----

TX36 Spec: 90.0 - 145.0

0-1 120.5  
0-2 120.9  
0-3 120.1  
0-4 121.3  
0-5 120.5  
0-6 120.5  
0-7 119.7  
0-8 120.1  
0-9 120.1  
0-10 120.9  
0-11 119.3  
0-12 119.7  
0-13 120.5  
0-14 120.1  
0-15 120.9  
0-16 119.7  
0-17 119.7  
0-18 120.9  
0-19 120.9  
0-20 121.3  
0-21 120.9  
0-22 120.1  
0-23 120.1  
0-24 119.7



Input voltage 12V

-----  
TX36 Spec: 11.0 - 13.0

0-1 11.9  
0-2 11.8  
0-3 11.9  
0-4 11.9  
0-5 11.9  
0-6 11.9  
0-7 11.9  
0-8 11.9  
0-9 11.9  
0-10 11.9  
0-11 11.9  
0-12 11.9  
0-13 11.9  
0-14 11.9  
0-15 11.9  
0-16 11.8  
0-17 11.8  
0-18 11.9  
0-19 11.8  
0-20 11.9  
0-21 11.9  
0-22 11.8  
0-23 11.9  
0-24 11.9

-----  
-----  
2009.11.04 03:10:02.087 101 4 OK

EM 302 High Voltage Ramp Test  
Test Voltage:20.00 Measured Voltage:  
18.00 PASSED  
Test Voltage:40.00 Measured Voltage:  
39.00 PASSED  
Test Voltage:60.00 Measured Voltage:  
59.00 PASSED  
Test Voltage:80.00 Measured Voltage:  
79.00 PASSED  
Test Voltage:100.00 Measured Voltage:  
101.00 PASSED  
Test Voltage:120.00 Measured Voltage:  
121.00 PASSED  
Test Voltage:120.00 Measured Voltage:  
120.00 PASSED  
Test Voltage:100.00 Measured Voltage:  
106.00 PASSED  
Test Voltage:80.00 Measured Voltage:  
85.00 PASSED  
Test Voltage:60.00 Measured Voltage:  
65.00 PASSED  
Test Voltage:40.00 Measured Voltage:  
45.00 PASSED

11 of 11 tests OK

Input voltage 6V

-----  
RX32 Spec: 5.0 - 7.0

7-1 5.7  
7-2 5.7  
7-3 5.7  
7-4 5.7

-----  
-----  
2009.11.04 03:12:37.946 101 5 OK

TRU power test failed

BSP 1 RXI TO RAW FIFO: ok

BSP 2 RXI TO RAW FIFO: ok

-----  
-----

2009.11.04 03:12:42.246 101 6 OK

Receiver impedance limits [600.0 1000.0]  
ohm

Board 1 2 3 4

1: 854.2 855.7 861.2 814.4  
 2: 855.6 828.3 854.1 818.1  
 3: 828.4 813.6 848.9 845.6  
 4: 847.3 840.5 833.5 836.8  
 5: 852.6 843.8 845.0 791.2  
 6: 834.1 852.0 855.6 829.2  
 7: 849.9 832.7 853.9 830.7  
 8: 794.6 842.4 846.3 850.2  
 9: 866.4 833.4 845.3 819.2  
 10: 837.0 817.2 857.7 778.3  
 11: 851.6 836.5 834.2 830.2  
 12: 855.7 846.8 824.6 842.4  
 13: 832.4 839.0 835.0 812.6  
 14: 844.2 824.4 840.6 852.7  
 15: 823.6 822.0 844.9 843.4  
 16: 877.4 846.4 829.8 848.2  
 17: 862.3 824.3 883.0 851.7  
 18: 832.2 846.0 851.8 854.9  
 19: 845.1 817.4 844.1 836.3  
 20: 855.1 830.2 872.1 845.9  
 21: 882.9 859.2 844.6 879.7  
 22: 832.6 876.5 851.3 833.8  
 23: 866.8 869.0 868.6 855.5  
 24: 860.4 879.7 884.6 873.6  
 25: 868.9 839.2 840.6 835.3  
 26: 855.4 842.0 838.7 844.8  
 27: 851.9 827.9 839.8 837.3  
 28: 843.9 817.0 839.8 810.9  
 29: 848.2 817.3 858.3 831.8  
 30: 846.8 855.8 837.2 840.8  
 31: 841.3 834.9 840.3 848.6  
 32: 873.5 855.8 879.6 854.3

Transducer impedance limits [250.0 2000.0]  
ohm

Board 1 2 3 4

1: 395.9 370.3 368.7 367.2  
 2: 380.5 420.3 363.1 354.9  
 3: 360.4 424.3 364.9 352.8  
 4: 560.0 359.8 380.5 361.5  
 5: 366.6 349.6 380.5 404.4  
 6: 428.2 368.7 357.6 362.9  
 7: 479.7 372.0 367.6 355.1  
 8: 507.4 472.5 422.0 465.6  
 9: 434.3 417.9 520.2 482.8  
 10: 398.3 466.6 663.3 716.5  
 11: 435.0 472.7 644.4 431.8  
 12: 419.2 398.6 421.0 405.1  
 13: 372.1 423.3 480.4 401.7  
 14: 387.0 537.0 391.5 360.9  
 15: 492.3 399.5 361.6 338.8  
 16: 328.6 344.3 401.8 358.8  
 17: 343.4 373.8 366.3 356.1  
 18: 394.5 384.4 396.0 465.1  
 19: 421.3 433.2 429.0 515.6  
 20: 422.5 419.6 426.4 508.0  
 21: 387.8 406.9 377.8 420.9  
 22: 361.2 463.9 432.0 516.8  
 23: 404.2 384.9 411.0 603.7  
 24: 402.5 378.1 445.7 542.1  
 25: 360.6 435.3 479.7 503.6  
 26: 396.5 389.6 478.7 389.3  
 27: 399.4 425.0 416.2 488.8  
 28: 357.4 587.6 411.8 396.3  
 29: 368.1 429.7 478.7 408.3  
 30: 344.0 490.4 484.6 412.8  
 31: 366.0 359.6 393.1 371.0  
 32: 368.2 380.1 434.9 361.1

Receiver Phase limits [-50.0 20.0] deg

Board 1 2 3 4

1: -1.1 -1.7 0.8 4.6  
 2: -3.3 1.8 -2.2 3.8  
 3: 2.8 4.0 -1.8 -0.6  
 4: -1.8 -0.4 2.7 1.2  
 5: 0.3 -0.6 1.3 5.9  
 6: 3.1 -3.0 -2.3 0.4  
 7: -0.7 2.2 -0.3 3.1  
 8: 8.9 -1.8 0.2 -3.6  
 9: -1.6 0.2 2.8 3.9  
 10: -0.5 3.5 -2.5 7.8  
 11: 0.9 -2.0 2.9 -0.7  
 12: -1.5 -1.2 2.9 -2.6

13: 4.4 1.3 1.9 4.6  
14: 0.4 2.6 0.1 -0.5  
15: 3.8 1.3 -2.8 -0.9  
16: -5.5 -1.6 3.3 -1.9  
17: -0.4 0.7 -3.5 -3.0  
18: 3.0 -3.2 1.2 -3.2  
19: 1.7 1.7 2.0 -2.6  
20: 0.9 1.8 -2.9 -1.1  
21: -3.4 -0.8 3.0 -5.7  
22: 2.4 -2.3 -1.2 0.9  
23: -1.6 -0.1 -3.7 -1.4  
24: -2.4 -2.9 -3.1 -5.2  
25: -3.7 -0.2 2.3 1.6  
26: -2.1 -0.8 3.8 -2.9  
27: -3.0 1.6 -0.9 0.2  
28: 0.6 5.3 -0.8 2.5  
29: 2.4 2.5 0.8 1.2  
30: 0.9 -3.4 0.4 -1.1  
31: 1.3 -0.1 0.4 -1.8  
32: -5.2 -4.5 -4.9 -2.7

Transducer Phase limits [-100.0 0.0] deg

Board 1 2 3 4

1: -39.7 -42.9 -40.4 -42.8  
2: -43.9 -42.3 -34.5 -43.1  
3: -36.1 -41.1 -37.5 -44.3  
4: -26.9 -35.9 -37.7 -38.2  
5: -40.1 -42.0 -41.9 -39.2  
6: -35.0 -37.4 -37.6 -41.5  
7: -33.4 -41.5 -38.0 -39.5  
8: -29.3 -37.9 -45.2 -40.8  
9: -38.9 -38.4 -39.8 -40.6  
10: -49.0 -38.8 -19.6 -10.2  
11: -42.4 -40.1 -38.1 -46.1  
12: -36.1 -41.5 -48.1 -45.3  
13: -37.6 -43.8 -34.5 -46.5  
14: -37.8 -16.6 -37.4 -44.7  
15: -30.0 -45.7 -39.1 -33.9  
16: -39.4 -41.3 -35.5 -37.8  
17: -29.2 -40.1 -43.8 -39.0  
18: -34.0 -39.6 -35.4 -37.5  
19: -37.8 -33.6 -28.1 -41.1  
20: -35.3 -43.2 -41.5 -40.5  
21: -35.3 -41.6 -27.4 -45.8  
22: -35.5 -46.1 -35.7 -36.6  
23: -39.7 -48.5 -33.8 -20.8  
24: -42.2 -42.8 -39.4 -31.5  
25: -32.0 -41.3 -31.0 -35.7

26: -44.1 -43.1 -29.4 -44.4  
27: -35.6 -41.2 -30.0 -46.7  
28: -40.1 -27.0 -32.8 -43.5  
29: -39.6 -43.1 -35.6 -39.4  
30: -36.7 -36.9 -33.5 -37.4  
31: -41.0 -44.1 -34.7 -35.3  
32: -44.9 -43.9 -37.6 -44.4  
Rx Channels test passed

-----  
-----  
2009.11.04 03:13:09.215 101 7  
Error

-----  
Rack 0 Slot 1  
Ch: 0 High Z  
Ch: 1 High Z  
Ch: 2 High Z

-----  
Rack 0 Slot 2  
No channel errors

-----  
Rack 0 Slot 3  
No channel errors

-----  
Rack 0 Slot 4  
No channel errors

-----  
Rack 0 Slot 5  
No channel errors

-----  
Rack 0 Slot 6  
Ch: 21 High Z

-----  
Rack 0 Slot 7  
No channel errors

-----  
Rack 0 Slot 8  
No channel errors

-----  
Rack 0 Slot 9  
No channel errors

-----  
Rack 0 Slot 10  
No channel errors

-----  
Rack 0 Slot 11  
Ch: 24 Open Z  
Ch: 25 FFT err L  
Ch: 26 FFT err L  
Ch: 27 FFT err L  
Ch: 28 FFT err L  
Ch: 29 FFT err L  
Ch: 30 FFT err L  
Ch: 31 FFT err L

-----  
Rack 0 Slot 12  
Ch: 2 High Z  
Ch: 33 High Z  
Ch: 34 High Z  
Ch: 35 High Z

-----  
Rack 0 Slot 13  
Ch: 0 High Z  
Ch: 1 High Z  
Ch: 2 High Z

-----  
Rack 0 Slot 14  
No channel errors

-----  
Rack 0 Slot 15  
No channel errors

-----  
Rack 0 Slot 16  
Ch: 3 Low Voltage

Ch: 7 Low Voltage  
Ch: 8 Low Voltage  
Ch: 9 Low Voltage  
Ch: 10 Low Voltage  
Ch: 11 Low Voltage  
Ch: 12 Low Voltage  
Ch: 13 Low Voltage  
Ch: 14 Low Voltage  
Ch: 15 Low Voltage  
Ch: 16 Low Voltage  
Ch: 17 Low Voltage  
Ch: 18 Low Voltage  
Ch: 19 Low Voltage  
Ch: 20 Low Voltage  
Ch: 21 Low Voltage  
Ch: 22 Low Voltage  
Ch: 23 Low Voltage  
Ch: 24 FFT err L  
Ch: 25 FFT err L  
Ch: 26 FFT err L  
Ch: 27 FFT err L  
Ch: 28 FFT err L  
Ch: 29 FFT err L  
Ch: 30 FFT err L  
Ch: 31 FFT err L

-----  
Rack 0 Slot 17  
Ch: 33 High Z

-----  
Rack 0 Slot 18  
No channel errors

-----  
Rack 0 Slot 19  
Ch: 0 High Z  
Ch: 29 High Z  
Ch: 30 High Z

-----  
Rack 0 Slot 20  
Ch: 3 High Z  
Ch: 7 High Z

-----  
Rack 0 Slot 21  
Ch: 5 Hi phase

-----  
Rack 0 Slot 22  
No channel errors

-----  
Rack 0 Slot 23  
No channel errors

-----  
Rack 0 Slot 24  
Ch: 33 High Z  
Ch: 34 High Z  
Ch: 35 High Z

17: 37.5 39.5 37.0 38.0 dB  
18: 39.5 38.3 37.8 39.7 dB  
19: 38.9 38.3 37.3 38.4 dB  
20: 41.0 38.8 38.7 42.0 dB  
21: 41.4 41.6 39.2 44.5 dB  
22: 41.5 42.2 37.4 45.6 dB  
23: 42.1 42.8 43.0 44.1 dB  
24: 41.5 41.9 41.1 46.2 dB  
25: 40.2 42.3 44.0 44.2 dB  
26: 40.7 41.0 42.0 45.2 dB  
27: 40.6 41.5 42.3 46.2 dB  
28: 42.5 42.4 41.6 46.2 dB  
29: 40.2 39.6 41.7 44.4 dB  
30: 42.2 39.9 41.3 46.2 dB  
31: 41.7 41.8 40.8 48.0 dB

\*\* Tx Channels test failed \*\*

Maximum noise at Board 4 Channel 31  
Level: 48.0 dB

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2009.11.04 03:15:49.558 101 8 OK

Broadband noise test

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Average noise at Board 1 41.5 dB OK  
Average noise at Board 2 41.1 dB OK  
Average noise at Board 3 41.2 dB OK  
Average noise at Board 4 43.9 dB OK

RX NOISE LEVEL

Board No:	1	2	3	4
0:	45.2	38.9	38.5	40.9 dB
1:	43.1	39.9	38.0	40.4 dB
2:	41.8	39.2	38.8	41.9 dB
3:	41.9	37.9	39.1	39.1 dB
4:	42.8	41.0	40.5	43.2 dB
5:	42.7	41.6	42.0	43.6 dB
6:	41.3	42.4	42.0	42.6 dB
7:	40.7	40.9	41.6	42.3 dB
8:	40.8	41.7	43.6	43.7 dB
9:	39.3	42.8	40.5	41.9 dB
10:	42.6	41.9	40.3	43.9 dB
11:	41.1	41.3	42.8	44.8 dB
12:	41.8	43.3	43.3	44.2 dB
13:	42.3	40.2	42.3	44.6 dB
14:	42.3	42.0	43.4	44.6 dB
15:	39.9	42.2	42.8	43.4 dB
16:	36.9	38.1	37.4	38.4 dB

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2009.11.04 03:15:55.225 101 9 OK

RX NOISE SPECTRUM

Board No:	1	2	3	4
26.1 kHz:	52.8	57.8	38.9	41.5 dB
26.3 kHz:	51.7	57.3	39.2	41.8 dB
26.5 kHz:	51.6	56.5	38.5	40.7 dB
26.7 kHz:	51.1	55.7	37.2	40.9 dB

26.9 kHz:	50.4	54.7	38.2	41.3	31.8 kHz:	41.6	44.8	38.5	40.8
dB					dB				
27.1 kHz:	49.8	53.7	38.1	40.6	32.0 kHz:	41.0	44.7	38.1	40.8
dB					dB				
27.3 kHz:	49.0	52.8	37.5	40.5	32.2 kHz:	41.0	44.6	38.0	40.6
dB					dB				
27.5 kHz:	48.2	51.9	37.9	40.7	32.4 kHz:	41.8	44.8	38.2	40.4
dB					dB				
27.7 kHz:	47.0	50.7	37.7	41.4	32.6 kHz:	46.1	46.0	43.0	43.6
dB					dB				
27.9 kHz:	45.9	49.8	37.1	40.4	32.8 kHz:	49.2	47.4	46.6	45.9
dB					dB				
28.1 kHz:	45.1	48.8	38.2	41.2	33.0 kHz:	50.3	48.2	47.9	47.1
dB					dB				
28.3 kHz:	44.3	47.9	38.1	40.9	33.2 kHz:	49.1	47.4	47.0	46.3
dB					dB				
28.5 kHz:	44.0	47.9	38.4	40.7	33.4 kHz:	45.1	44.6	43.2	42.5
dB					dB				
28.7 kHz:	43.6	47.8	38.5	40.7	33.6 kHz:	39.7	41.0	37.6	38.9
dB					dB				
28.9 kHz:	43.3	48.1	39.0	41.6	33.8 kHz:	40.8	41.8	39.0	40.3
dB					dB				
29.1 kHz:	44.0	48.6	38.6	41.7	34.0 kHz:	41.5	41.3	37.8	39.7
dB					dB				
29.3 kHz:	44.1	48.5	38.7	41.4					
dB									
29.5 kHz:	43.6	47.9	37.5	40.8					
dB									
29.7 kHz:	43.5	47.3	37.3	40.7					
dB									
29.9 kHz:	43.3	46.8	37.8	41.1					
dB									
30.1 kHz:	43.1	46.4	37.9	41.3					
dB									
30.3 kHz:	42.8	46.2	38.0	40.8					
dB									
30.5 kHz:	42.6	46.2	37.3	40.7					
dB									
30.7 kHz:	42.4	45.7	36.8	40.4					
dB									
30.9 kHz:	42.7	45.3	37.0	39.4					
dB									
31.1 kHz:	42.2	45.1	37.8	40.8					
dB									
31.4 kHz:	41.8	44.6	37.5	39.9					
dB									
31.6 kHz:	41.4	44.6	37.1	39.9					
dB									

Maximum noise at Board 2 Frequency 26.1 kHz Level: 57.8 dB

Spectral noise test  
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Average noise at Board 1	46.7 dB	OK
Average noise at Board 2	50.4 dB	OK
Average noise at Board 3	40.2 dB	OK
Average noise at Board 4	41.7 dB	OK

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2009.11.04 03:16:00.725 101 10  
OK

KONTRON CP6011  
Clock 1795 MHz  
Die 40 oC (peak: 45 oC @ 2009-11-04 -  
03:12:42)  
Board 36 oC (peak: 36 oC @ 2009-11-04 -  
03:04:30)  
Core 1.34 V  
3V3 3.30 V  
12V 12.11 V  
-12V -12.04 V  
BATT 3.49 V  
Primary network: 157.237.14.60:0xffff0000  
Secondary network: 192.168.2.20:0xfffff00

2009.11.04 03:16:00.825 101 15  
OK

EM 302

BSP67B Master: 2.2.2 081216  
BSP67B Slave: 2.2.2 081216  
CPU: 1.4.5 090421  
DDS: 3.4.9 070328  
RX32 version : Apr 25 2008 Rev 1.11  
TX36 version : Jul 21 2008 Rev 1.11

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## Appendix D: Software versions in use during the cruise

Hypack 9.0.0.22

Hypack Survey Data Acquisition 9.0.4.0

CARIS 6.1 Service Pack 2

Fledermaus 6.7.0h Build 419 Professional

SIS

DP System

ECDIS