POLARIS Taurus Workshop Ottawa, April 25-29, 2005 Isa Asudeh Part 1



- Day 1, Monday is spent assembling, at least, one full site kit (Vault, battery box, charge controller, GPS, seismometer, etc), and to prepare eight full test benches, one for each participant.
- Day 2, Tuesday, is designed for those who might want a one day crash-course. We will cover the basic Taurus installation, operation and maintenance.
- Day 3, Wednesday. should cover more in-depth field installation issues for Issam and others.
- Day 4, Thursday, is a Nanometrics Day. We will have a Nanometrics professional giving us factory briefing.
- Day 5, Friday, is for consolidation and preparing everything for shipment to the field.

Training Material

- 1. Taurus with GPS and Internet connection, indoor.
- 2. Laptop PC, connected to Sub-net.
- 3. One fully installed Taurus, outside.
- 4. Taurus User Guide.
- 5. NPtoNMXP User Guide.

Startup and Shutdown

Startup:

- 1. Insert Hard or Flash disk.
- 2. Connect Seismometer, if any.
- 3. Connect GPS.
- 4. Connect power cable.
- 5. Connect Internet cable.
- 6. Press Center Button On Taurus.

Shutdown:

- 1. On UI, go to Shutdown, and click on Shutdown button.
- 2. Wait for the shutdown to complete, then disconnect power cable.

Top or Side LED Status

- Off, Powered down.
- Red, Booting.
- Blinking Green: Slow in normal operation and Fast when UI is starting up.
- Blinking Orange: On power-up is normal.
 Otherwise singe of error.
- Blinking Red: Stopped.

Ethernet LED Status

- Off: Powered down.
- Orange: Booting.
- Blinking Green: Network is configured and carrier is detected.
- Blinking Orange: Network is not configured.
- Blinking Red: Network is configured but no carrier is found.

Taurus Basic Configuration:

- a. Network IP
- b. UI Time Out.
- c. Running Mode (Buffered or Communication).
- d. Seismometer set up.
- e. GPS timing option.
- f. Network, Station and Component names.
- g. Digitizer setup.
- h. Data storage.
- i. Clean start.

a. Taurus and PC Network IP Configuration

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- 1. Power up Taurus, click on Factory Settings, Networking and check Mode. Taurus units are normally shipped in DHCP mode.
- 2. Configure your PC for the Taurus in DHCP mode by setting IP properties to "Obtain an IP address automatically".
- 3. Connect each Taurus to PC and change its "Mode" to Static IP, see next slide.

Factory Settings	<u> </u>	SN: 0254 📥
h	letworking	
1	Mode: DHCP	
:	Static IP: 192.168.0.54	
t .	Net Mask: 255.255.255.0	
3	Stream to Nags	
l	Previous Apply Commit Reset	
	Internet Drotocol (TCD /ID) Droperties	2 x
	Concel	
	General	1
	You can get IP settings assigned automatically if your network support capability. Otherwise, you need to ask your network administrator for th	sthis
	appropriate IP settings.	
	Obtain an IP address automatically	
	C Use the following IP address:	
	IP address:	1
	Subnet mask:	
	Default gateway:	
	C Obtain DNS server address automatically	
	Use the following DNS server addresses:	
	Preferred DNS server:] '
	Alternate DNS server:	
	Adva	nced
	ОК	Cancel

a. Taurus and PC Network IP Configuration

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- In Taurus Factory Settings, Networking, set the Mode to "Static IP" and issue a unique private class IP number for the Taurus, e.g. 192.168.0.SerialNumber.
- Apply and Commit the new IP, restart Taurus
- Configure PC with the same static IP, private class with unique IP 192.168.0.xxx where xxx is a number less than 255 and will be allocated to you at the workshop.

Factory Settings 💌		SN: 0204 📥
Networkin	lg	
Mode:	Static IP	
Static IP:	192.168.0.204	
Net Mask:	255.255.255.0	
Stream To I	Nags	
Previous	Apply Commit Reset	
	Internet Protocol (TCP/IP) Properties	? ×
	General	
	You can get IP settings assigned automati capability. Otherwise, you need to ask you appropriate IP settings.	cally if your network supports this r network administrator for the
	Obtain an IP address automatically	
	• Use the following IP address:	
	IP address:	192 . 168 . 0 . 254
	Subnet mask:	255 . 255 . 255 . 0
	Default gateway:	· · ·
	C Obtain DNS server address automati	cally
	Use the following DNS server address	ses:
	Preferred DNS server:	
	Alternate DNS server:	
		Advanced
		OK Cancel

b. User Interface (UI) Time out

UI time out is set to 10 minutes by factory default to conserve battery.

For workshop, go to Factory Settings, General and increate time out to 120 minutes.

For field use, we will restore the time out to 10 minutes after the workshop.

$\overline{\nabla}$	Factory Settings		SN: 0204
		General	
		Ul Time Out [min]: 120	
		Log Verbosity: info	
		0 duran and	
		Advanced	
		Previous Apply Commit Reset	
			7

c. Running Modes

Buffered: For low-power, field use where there is no Internet. UI will time-out to conserve power.

Communications: For workshop and locations with Internet access. UI is always on. This option uses more power.

Factory Setting	3.▼	SN: 0204
	Sensor&Timing	
	Running Mode: Communications	
	Soh Report Interval: 60 Seconds 📃 💌	
	Log Verbosity: INFO	
	Calibration Sensor Timing Previous Apply Commit Reset	

d. Seismometer set up

Factory Settings, Sensor and Timing, Sensor,

Typical for a CMG-40T.

Factory	Settings 💌		SN: 0204
	Sensor		
	Sensor Id:	40T	
	SP/LP Mode:	LP 🔽	
	XYZ/UVW Mode:	XYZ 🔽	
	Calibration Mode:	VOLTAGE	
	Output Units:	m/s/s 💌	
	Sensitivity (V/output)	Jnit): 800.0	
		-	
	Control Lines Display	Inresholds	
	Previous	Apply Commit Reset	

d. Seismometer set up

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Factory Settings, Sensor and Timing, Sensor, Display Thresholds,

These control the mass-centering indicator bars in the "Sensor" option.

Factory Settings	SN: 0204 📥
Display Thresholds	
Sensor Power Yellow: 1.000000	
Sensor Power Red: 4.0	
Mass Position Yellow: 1.000000	
Mass Position Red: 4.0	
Previous Apply Commit Reset	

d. Seismometer set up

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Factory Settings, Sensor and Timing, Sensor, Control Lines,

These are typical for a Guralp seismometer.

Factory Settings		SN: 0204 📥
Control Lines		
Assert (On) Level:	ZERO 💌	
Deassert (Off) Level:	HIGH_Z 💌	
Positive Voltage Level:	PLUS_12	
Pulse Duration (sec):	10 💌	
Ctrl Line 1 (pin H):	Mass Center 📃 💌	
Ctrl Line 2 (pin VV):	Mass Unlock 📃 💌	
Ctrl Line 3 (pin G):	Mass Lock 📃 💌	
Ctrl Line 4 (pin Z):	Ch 1 Cal Enable 📃 💌	
Ctrl Line 5 (pin c):	Ch 2 Cal Enable 📃 💌	
Ctrl Line 6 (pin Y):	Ch 3 Cal Enable 📃 💌	
Previous	ly Commit Reset]

e. GPS timing option

Factory Settings, Sensor and Timing, Timing: GPS Duty Cycle Mode is "Always On" since we know Taurus is in Communication mode and power conservation is not critical.

For field use, we will reset timing to "Automatic".

Factory Setting	s 🔽			SN: 0204
	Timing			
	GPS Duty Cycle Mode:	Always On	-	
	Correction Mode:	No Alignment	-	
	VCXO Mode:	GPS Control	-	
	Vexo PPM:	11.000000		
	Previous App	oly Commit R	eset	

f. Network, Station and Component names

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Factory Settings, Naming,

Typical names for POLARIS.

Network name is kept to 2 characters and Station name can have maximum 5 characters to conform to SEED standards.

Factory Settings	SN: 0204 🔼
Naming	
Network Name: PO	
Station Name: 204T	
Channel 1 Name: HHZ	
Channel 2 Name: HHN	
Channel 3 Name: HHE	
Previous Apply Commit Reset	

g. Digitizer setup

Factory Settings, Digitizer, Main,

The factory defaults are shown here.

Factory Settings	SN: 0204 🦰
Main	
Sample Rate (Hz): 100	
Output Channels: 3	
DC Removal Enabled:	
Advanced Previous Apply Commit Reset	
	-

g. Digitizer setup

Factory Settings, Digitizer, Front End,	Factory Settings SN: 0204
Typical setting for Guralp CMG-3ESP	Input Impedance: Low Impedance
seismometer.	Previous Apply Commit Reset

h. Data Storage

Configuration, Storage

Recreate the store ONLY at the start of a new project and AFTER old store data are backed up.



h. Data Storage

Configuration, Storage

Note additional warning before proceeding.



h. Data Storage

Configuration, Storage

From here on, new data will be stored in a "clean" storage file.



i. Clean start

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Data Availability, Text Mode

Just about 5 minutes after Storage is re-configured, there should be no Gaps or Time Tears in the data.

In ideal recording, there should never be Gaps or Time Tears after months of recording.

Data Availability 🔽				SN: 0254 📥
Data <u>Other</u>				
Channel Available Time Range	Gaps	Time Tear:	: % of s Total	
Taurus0254/ts1/	0	0	11.7%	
2005-04-19 14:40:10			4.0m	
to 2005-04-19 14:45:06			4.90	
Taurus0254/ts2/	0	0	11.7%	
2005-04-19 14:40:10 to 2005-04-19 14:45:06			4.9m	
Taurus0254/ts3/	0	0	11.7%	
2005-04-19 14:40:10			4.0m	
to 2005-04-19 14:45:06			4.30	
<u>Refresh Month Week Today</u>				

Ψ.

Monitoring Taurus:

Next few slides show typical Taurus screens:

- 1. Current Status
- 2. Timing.
- 3. GPS Map.
- 4. Sensor.
- 5. Data Availability.
- 6. System Info.

Current Status:

The "main" page of Taurus website showing vital signs.

This Taurus is in "Communications" mode connected to a 40T seismometer. Its average power use is 2.6 W. We will see later on that the average power use in "Buffered" mode is only 1.5 W.

Current Status			SN: 0204 🦰
	 Mode:	Communications	
	Channels:	3 @ 100 sps	
	Store:	26.1% of 9.76 G	
	Store Time Left:	149.3 Days	
	IP:	192.168.0.204	
	Time:	2005-04-20 11:39:24	
	Battery: 13.3 V	Power: 2.6 W	
	Temp: 18.0° C	Packets: 1065215	
	Timing OK Dool	r Closed Recording	
	Z		
		Barris and a state of the second s	
		and an an and a second se	
	11:38	10 [–] 20	
	E		
	11:38 P	20	
			_

Timing: GPS Duty Cycle was configured to "Always On" and System Clock shows Fine Lock with Time Error in ns range.



GPS Map: GPS is Always On and shows good coverage.



Sensor,

Showing waveform and mass-centering bars.

This Taurus is connected to a 40T seismometer with no mass-centering option.

Sensor	SN: 0204 📥
Center M1: 1.01V	
Mass Lock M2: 0.56V	
Unlock M3: -2.55V	
Sensor On Off 0.623 W	
Sensitivity 3 cnts/(m/s/s)	
Calibration Start Abort Setup	
Time: 30s 💌 Scale: Auto 💌	
Pause Show One	
18:48 JU 10 JU 20	

Data Availability,

Monthly view shows good data April 12-17. April 11 is starting day and data are incomplete, April 18 has full data, up to this time.



Data Availability, Text Version,

Shows only one Time Tear.

🗸 Data Availability 🔽			
Data <u>Other</u>			
Channel Available Time Range	Gaps	Time Tear	e % of s Total
Taurus0204/ts1/	0	1	5.9%
2005-04-11 18:28:36 to 2005-04-18 19:05:59			7.0d
Taurus0204/ts2/	0	1	5.8%
2005-04-11 18:28:36 to 2005-04-18 19:06:00			7.0d
Taurus0204/ts3/	0	1	5.9%
2005-04-11 18:28:36 to 2005-04-18 19:06:00			7.0d
<u>Refresh</u> <u>Month</u> <u>Week</u> <u>Today</u>			

Data Availability, Text Version,

Shows only one Time Tear at the start of this recording on April 11.

 ✓
 Channel Data
 SN: 0204

 Taurus0204/ts1/
 5.9% of Used Space in Store
 2005-04-11 18:28:36

 to 2005-04-11 18:28:36
 to 2005-04-18 19:07:26

 Gap Tolerance:
 none
 ✓

 I Gaps
 Gap Start Time
 Pkts
 Duration

 2005-04-11 18:29:26
 0
 00:00:02.050

 Refresh
 All Channels
 Month
 Week
 Today

Data Availability, Click on April 18,

Shows data for today are good, so far.



System Info

Shows we are running Taurus Product Version 1.01.08.

Everence Site Firmware Hardware Taurus Product V: 1.01.08 Digital Processor V: 1.01.05 Date: 2005-03-23 16:11:04 Signal Processor V: 1.01 Date: 2005-02-04 20:01:26 Power Manager V: 0.50.00 Date: 2005-03-07 22:06:25 Filter Coefficients V: 1.00 Date: 2004-09-13 13:49:06 Fpga V: 0.68 Date: 2005-03-07 20:57:45 Flash Boot System V: 0.48 NMX 0.0.18 Root File System V: 0.48 NMX 0.0.18 Root File System V: 0.48 NMX 0.0.27 Kernel V: 2.4:24-NMX-0.0.24 Taurus Server V: 1.01.18	System In		ຣທ - ດວງ
Taurus Product V: 1.01.08 Digital Processor V: 1.01.05 Date: 2005-03-23 16:11:04 Signal Processor V: 1.01 Date: 2005-02-04 20:01:26 Power Manager V: 0.50.00 Date: 2005-03-07 22:06:25 Filter Coefficients V: 1.00 Date: Date: 2004-09-13 13:49:06 Fpga V: 0.68 Date: 2005-03-07 20:57:45 Flash Boot System V: 0.4.8 NMX 0.0.18 Root File System V: 0.4.8 NMX 0.0.27 Kernel V: 2.4.24-NMX-0.0.24 Taurus Server V: 1.01.18		Firmware Hardware	34. 02
Taurus Product V: 1.01.08 Digital Processor Date: 2005-03-23 16:11:04 Signal Processor V: 1.01 Date: 2005-02-04 20:01:26 Power Manager V: 0.50.00 Date: 2005-03-07 22:06:25 Filter Coefficients V: 1.00 Date: 2004-09-13 13:49:06 Fpga V: 0.68 Date: 2005-03-07 20:57:45 Flash Boot System V: 0.4.8 NMX 0.0.18 Root File System V: NMX-0.0.27 Kernel V: 2.4.24-NMX-0.0.24 Taurus Server V: 1.01.18			
Digital Processor V: 1.01.05 Date: 2005-03-23 16:11:04 Signal Processor V: 1.01 Date: 2005-02-04 20:01:26 Power Manager V: 0.50.00 Date: 2005-03-07 22:06:25 Filter Coefficients V: 1.00 Date: 2004-09-13 13:49:06 Fpga V: 0.68 Date: 2005-03-07 20:57:45 Flash Boot System V: 0.4.8 NMX 0.0.18 Root File System V: NMX-0.0.27 Kernel V: 2.4.24-NMX-0.0.24 Taurus Server V: 1.01.18		Taurus Product V: 1.01.08	
Date: 2005-03-23 16:11:04 Signal Processor V: 1.01 Date: 2005-02-04 20:01:26 Power Manager V: 0.50.00 Date: 2005-03-07 22:06:25 Filter Coefficients V: 1.00 Date: 2004-09-13 13:49:06 Fpga V: 0.68 Date: 2005-03-07 20:57:45 Flash Boot System V: 0.48 NMX 0.0.18 Root File System V: 2.4:24-NMX-0.0.24 Taurus Server V: 1.01.18		Digital Processor V: 1.01.05	
Signal Processor V: 1.01 Date: 2005-02-04 Power Manager V: 0.50.00 Date: 2005-03-07 2015 Filter Coefficients V: 1.00 Date: 2004-09-13 13:49:06 Fpga V: Date: 2005-03-07 2015 Filter Coefficients V: 0.68 Date: 2005-03-07 2015 V: Flash Boot System V: NMX 0.0.18 Root File System Root File System V: 2.4.24-NMX-0.0.24 Taurus Server Upload Download V:		Date: 2005-03-23 16:11:04	
Date: 2005-02-04 20:1:26 Power Manager V: 0.50.00 Date: 2005-03-07 22:06:25 Filter Coefficients V: 1.00 Date: 2004-09-13 13:49:06 Fpga V: 0.68 Date: 2005-03-07 20:57:45 Flash Boot System V: 0.48 NMX 0.0.18 Root File System V: 2.4.24-NMX-0.0.24 Taurus Server V: 1.01.18		Signal Processor V: 1.01	
Power Manager V: 0.50.00 Date: 2005-03-07 22:06:25 Filter Coefficients V: 1.00 Date: 2004-09-13 13:49:06 Fpga V: 0.68 Date: 2005-03-07 20:57:45 Flash Boot System V: 0.48 <nmx 0.0.18<="" td=""> Root File V: 2.4.24+NMX-0.0.24 Taurus Server V: 1.01.18</nmx>		Date: 2005-02-04 20:01:26	
Date: 2005-03-07 22:06:25 Filter Coefficients V: 1.00 Date: 2004-09-13 13:49:06 Fpga V: 0.68 Date: 2005-03-07 20:57:45 Flash Boot System V: 0.4.8 NMX 0.0.18 Root File V: 0.4.8 NMX 0.0.18 Root File V: 2.4.24-NMX-0.0.24 Taurus Server V: 1.01.18		Power Manager V: 0.50.00	
Filter Coefficients V: 1.00 Date: 2004-09-13 13:49:06 Fpga V: 0.68 Date: 2005-03-07 20:57:45 Flash Boot System V: 0.4.8 NMX 0.0.18 Root File System V: NMX-0.0.27 Kernel V: 2.4.24-NMX-0.0.24 Taurus Server V: 1.01.18		Date: 2005-03-07 22:06:25	
Date: 2004-09-13 13:49:06 Fpga V: 0.68 Date: 2005-03-07 20:57:45 Flash Boot System V: 0.4.8 NMX 0.0.18 Root File System V: 0.4.8 NMX 0.0.27 Kernel V: 2.4.24-NMX-0.0.24 Taurus Server V: 1.01.18		Filter Coefficients V: 1.00	
Fpga V: 0.68 Date: 2005-03-07 20:57:45 Flash Boot System V: 0.4.8 NMX 0.0.18 Root File System V: NMX-0.0.27 Kernel V: 2.4.24-NMX-0.0.24 Taurus Server V: 1.01.18		Date: 2004-09-13 13:49:06	
Date: 2005-03-07 20:57:45 Flash Boot System V: 0.4.8 NMX 0.0.18 Root File System V: NMX-0.0.27 Kernel V: 2.4.24-NMX-0.0.24 Taurus Server V: 1.01.18		Fpga V: 0.68	
Flash Boot System V: 0.4.8 NMX 0.0.18Root File SystemV: NMX-0.0.27KernelV: 2.4.24-NMX-0.0.24Taurus ServerV: 1.01.18Upload Download		Date: 2005-03-07 20:57:45	
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Kernel V: 2.4.24-NMX-0.0.24 Taurus Server V: 1.01.18 Upload Download		Root File System V: NMX-0.0.27	
Taurus Server V: 1.01.18 Upload Download		Kernel V: 2.4.24-NMX-0.0.24	
Upload Download		Taurus Server V: 1.01.18	
		Lipload Dowpload	

Next few slides show Taurus performance at warm and cold temperatures and its average power use during a month of operation.

The Taurus is installed outside in a battery box and using a hard disk. GPS is in duty cycle and on every 30 minutes.

Taurus is running in Buffered mode and is connected to a CMG-40T seismometer.

Taurus SOH data showing that in the first 0.22 hours of operation, TCP is still on and using power.

Hours	Temperature	BatteryVoltage	SensorCurrent	TcpCurrent	TdpCurrent	Power
0.00	20.95639	13261	50	90	70	1591
0.02	21.167786	13261	51	94	63	1512
0.03	20.904602	13261	45	92	71	1538
0.05	20.843292	13261	48	98	68	1538
0.07	20.775665	13261	51	90	72	1631
0.08	21.107544	13274	45	84	67	1487
0.10	20.983887	13274	51	85	69	1593
0.12	20.799957	13274	50	86	69	1580
0.13	21.250214	13261	45	101	69	1512
0.15	20.988098	13274	52	85	68	1593
0.17	21.178345	13261	51	86	70	1605
0.18	21.174133	13220	50	210	68	1560
0.20	21.14981	13261	52	110	74	1671
0.22	21.0029	13261	45	97	75	1591

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SOH graph shows drop in Taurus current after TCP is turned off.



SOH graph shows Taurus average power use in Buffered mode over 20 days. A CMG-40T seismometer is used, GPS is turned on every 30 minutes.



SOH graph shows Taurus average temperature in its first 20 days of operation, for a Taurus installed outside in a battery box.



SOH graph shows Taurus average temperature in its last 6 days of operation. The Taurus with hard disk has worked well in temperature variations.



Next few slides show Taurus power use over a 24 hours cycle.

The Taurus is installed inside and is using a hard disk. GPS is in duty cycle and on every 30 minutes.

Taurus is running in Buffered mode and is connected to a CMG-3ESP seismometer.

Average sensor power use was only 0.67 W.



Average Taurus power use was only 0.86 W. Spikes in power happen during disk writes and GPS engine "on" periods.



Average total power use was only 1.53 W. Spikes in power happen during disk writes and GPS engine "on" periods.



Spikes in power happen about every 20 minutes, in this case. They depend on frequency of disk writes, GPS "on", etc.



During a spike in power use lasting about 2 minutes, in this case, power usage is about twice the average power.



Vancouver, BC: The following calculations are based on the following assumptions:

- 1. We can maintain a battery vault temperature of about zero..
- 2. Maximum number of continuous no-sun no-charge December days are 31.
- 3. Batteries are fully charged on December 1.

	Taurus Power Usage	
а	Average load current in Amps	0.122
b	Load voltage, in Volts	12.3
С	Power in Watts, c = a * b	1.5
d	Watt Hours / Day, d = c * 24	36.0
e	AH / Day, e = a * 24	2.9

	Daily Battery Capacity Needed	
f	Battery efficiency at about zero vault temperature	65.0%
g	Depth of discharge for battery	80.0%
h	Daily Taurus AH battery need at about zero vault temperature; h = e / f / g	5.6

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	SP75 Solar Panel Stats	
i	Daily average SP75 solar module output in December, from Soltek 2000 catalog for this location, Watt- hours/day (WH/D)	93.0
j	Minimum number of SP75 modules to power the Taurus in December; j = d / i	0.39

Location data, from Soltek	2000
Location	Vancouver, BC
Average daily, WH/D	223
Maximum daily, WH/D	307
MDA, December, WH/D	93.0

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	Battery Stats	
k	Capacity of a GNB 12-500X deep-cycle battery, AH	100
I	Suggested number of 12-5000X batteries at each site	2
m	Total battery capacity at each site, AH; m = k * l	200.0

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	Site Stats	
n	Number of December days, we can power the Taurus from batteries only, if no sun or wind charge were available; n = m / h	35
0	Additional AH available for battery charge in December assuming the Taurus is powered by solar panels only; o = (i* j * 31) / b - 31 * e	0.00

Next few slides show Taurus software upgrade. In the future, software upgrade will be done entirely from the UI.

For now, it is done through the Linux interface.

Note the Taurus Produce Firmware Version of 1.01.07 and Taurus Server Version of 1.01.17.

We will upgrade the Product version and Taurus Server.

V	System Info	.			SN: 0254
		Firmware	Hardwar	<u>e</u>	
		Taurus Pi	roduct V:	1.01.07	
		Digital Pro	ocessor	V: 1.01.05	
		Date:	2005-0	3-23 16:11:04	
		Signal Pro	ocessor	V: 1.01	
		Date:	2005-0	2-04 20:01:26	
		Power Ma	anager	V: 0.50.00	
		Date:	2005-0	3-07 22:06:25	
		Filter Coe	fficients	V: 1.00	
		Date:	2004-0	9-13 13:49:06	
		Fpga		V: 0.68	
		Date:	2005-0	3-07 20:57:45	
		Flash Boo	t Systen	V: 0.4.8 NMX 0.0.18	
		Root File	System	V: NMX-0.0.27	
		Kernel		V: 2.4.24-NMX-0.0.24	
		 Taurus Se 	егчег	V: 1.01.17	

First, we store the Taurus upgrade files in a directory on PC. The tauruspatch-1.01.07-to-1.01.08.tgz file will be transferred to the Taurus hard disk using FTP. See next slide.

Directory	of P:\POLARIS	-Software\NMX\Taurus\Taurus Firmware Release 1.01.08 2005-04-1
04/11/2005	02:38p	(DIR) .
04/11/2005	02:38p 02:00	$\langle DIR \rangle$
04/11/2005	03-002 02-02D	909 Thus Palaze 1 01 00 Notes with
04/11/2005	03:09p	$3.048.496$ taugus match $-1.01.02 - t_0 - 1.01.08.tgz$
04/11/2005	03:090	17.213.526 taurus release 1.01.08.tgz
04/11/2005	03:090	2.416 TaurusUpgrade.txt
04/11/2005	03:10p	549.180 Taurus_ÜserGuide_15148R1.pdf
	6 File(s)	20,893,990 bytes
	2 Dir(s)	5,237,219,328 bytes free
P:\POLARIS-	Software \NMX \	.Taurus\Taurus Firmware Release 1.01.08 2005-04-11>_

Now, we ftp to Taurus, with both User and Password as "root". Set file type to Binary, cd to /mnt/ide and transfer tauruspatch-1.01.07-to-1.01.08.tgz file using a "put" command.

Cond P:\POLARIS-Software\NMX\Taurus\Taurus Firmware Release 1.01.08 2005-04-11>ftp 192.168.0.54 Connected to 192.168.0.54. Connected 10.102 C

Next, we telnet to Taurus with both User and Password as "root".

cd to /mnt/ide and uncompress the .tgz file using a tar command:

tar zxvf ...

🖾 cmd - telnet 192.168.0.54	
Linux 2.4.24-NMX-0.0.24 (192.168.0.54) (14:30 on Tuesd	lay, 19 April 2005)
login: root	
Password:	
sh-2.05# cd /mnt/ide	
sh-2.05# 1s	
logs store	07 · · · · 01 · 00 · ·
lost+found taurus-patch-1.01	.07-to-1.01.08.tgz
SN-2.05# tar 2XVF taurus-patch-1.01.07-to-1.01.08.tg2	
patch-1.01.07-to-1.01.08/	
patch-1.01.07-to-1.01.007taurus_Install.sn patch-1.01.07-to-1.01.08/taurusSemuen-patch-1.01.07-to	-1 01 08 toz
oatch=1 01 07-to=1 01 08/RFADMF	1.01.00.092
sh-2.05#	

In the telnet session, cd to patch-1.01.07-to-1.01.08 directory and run taurus_install.sh

This would complete the upgrade.

🖾 cmd - telnet 192.168.0.54	>
sh-2.05# ls store logs store lost+found taurus-patch-1.01.07-to-1.01.08.tgz patch-1.01.07-to-1.01.08 sh-2.05# cd patch-1.01.07-to-1.01.08/ sh-2.05# ./taurus_install.sh taurus_install_patch.sh	_
Killing running applications Starting heart beatDone 14:32:22 http://127.0.0.1/exit.page?noPowerDown => `/dev/null' Connecting to 127.0.0.1:80 connected. HTTP request sent, awaiting response 200 OK Length: unspecified [text/html]	
[<=>] 4,533 4.32M∕s	
14:32:27 (4.32 MB/s) – `/dev/null' saved [4533]	
Mounting local filesystems. mount: Mounting /dev/hda1 on /mnt/ide failed: Device or resource busy mount: Mounting /dev/hdc1 on /mnt/cf failed: No such device or address Starting heart beatDone Installing taurus applications ./taurusServer-patch-1.01.07-to-1.01.08.tgz: Done	
Install complete.	
Restarting Taurus Done	

Note the Taurus Produce Firmware Version is now 1.01.08 and Taurus Server Version of 1.01.18.

System Info St: 0254 Firmware Hardware Firmware Hardware Taurus Product V: 1.01.05 Digital Processor V: 1.01.05 Date: 2005-03-23 16:11:04 Signal Processor V: 1.01 Date: Date: 2005-02-04 20:01:26 Power Manager V: 0.50.00 Date: 2005-03-07 22:06:25 Filter Coefficients V: 1.00 Date: Date: 2004-09-13 13:49:06 Force V: 0.68

· Pa-			0.00
Date:	2005-03	-07	20:57:45
Flash Boot	System	V:	0.4.8 NMX 0.0.18
Root File Sy	/stem	V:	NMX-0.0.27
Kernel		V:	2.4.24-NMX-0.0.24
Taurus Ser	ver	V:	1.01.18

Upload Download

Ψ.

When Taurus Web Server is on, the "ps" command should show a few ./taurus process running among many others.

🎬 cmd - teinet 19	2.168.0.54			× 🗖 🖕
sh-2.05# ps				A
PID TTY	Uid	Size	State	Command
1	root	1484	S	init [2]
2	root	Ø	S	[keventd]
3	root	Ø	S	[ksoftirqd_CPU0]
4	root	Ø	S	[kswapd]
5	root	Ø	S	[bdflush]
6	root	Q	S	[kupdated]
?	root	Ø	S	[mtdblockd]
8	root	00	S	[jffs2_gcd_mtd2]
20	root	2376	S	/usr/bin/sntp -r -P no -x 60 -1 /tmp/msntp.pid -f /tm
21	root	2372	S	/usr/bin/sntp -S -4
24	root	Ø	S	[kjournald]
35	root	2928	S	/usr/sbin/xinetd_stayalive_reuse_pidfile_/tmp/xine
36	root	1584	ş	redir lport=8080 cport=80 caddr=1.0.0.2 timeo
_44	root	1472	S	/sbin/mingettynoclearlong-hostname console
740	root	1740	S	in.telnetd: 192.168.0.11
741	root	2972	S	login root
743 ttyp0	root	2504	S	-sh
805 ttyp0	root	1456	S	/home/taurus/hb.ppc
811 ttyp0	root	2280	S	/bin/sh ./run
815 ttyp0	root	50392	S	./taurus
816 ttyp0	root	50392	S	./taurus
817 ttyp0	root	50392	ş	./taurus
818 ttyp0	root	50392	S	./taurus
829 ttyp0	root	50392	S	./taurus
833 ttyp0	root	50392	ş	./taurus
842 ttyp0	root	50392	ş	./taurus
843 ttyp0	root	50392	ş	./taurus
853	root	2424	S	/bin/bash/etc/init.d/log_manager
857	root	1816	S	sleep 1000
864 ttyp0	root	50392	S	./taurus
868 ttyp0	root	50392	S	./taurus

Next few slides show masscentering and calibration of Taurus. Just after mass-centering Taurus connected to a CMG-ESP seismometer.

Sensor			SN: 0239 📥
	Center M1:-0	.62\	
	Mass Lock M2: 0	.68\/ 💻 💶 🖌	
	Unlock M3: -0	.15\ 💶 📭 💼	
	Sensor On Off 0.67	7 W	
	Sensitivity 8 cr	ts/(m/s/s)	
	Calibration Start Ab	ort Setup	_
	Time: 30s 💌	Scale: Auto 💌	
	Pause Show One		
		hur o	
		<mark>W , Ud</mark>	
		wiv isu ju	

Sine-wave calibration at 1 Hz, Taurus connected to a CMG-3ESP seismometer.

Sensor		SN: 0239 📥
	Center M1:-0.61V	
	Mass Lock M2: 0.70V	
	Unlock M3:-0.11V	
	Sensor On Off 0.660 W	
	Sensitivity 8 cnts/(m/s/s)	
	Calibration Start Abort Setup	
	Time: 30s 💌 Scale: Auto 💌	
	Pause Show One	
	ΖΑΛΛΑΛΑΛΑΛΑΛΑΛΑΛΑΛ	
	14:49 80 1 F 1 40 F 1 50	
	- <u>h</u> <u></u>	
	14:49 88 Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y	

Calibration setup for Sine Wave at 0.2 Hz (5 seconds).

7 - 0	alibration 📃 💌				SN: 0239 📥
	Succe	essful Commit.			
	Calibr	ration			
	Calibr	ation Type:	SINE		
	Chanr	nel 1:	V		
	Chanr	nel 2:	V		
	Chanr	nel 3:	N		
	Atten	uation:	1	•	
	Ampli	tude:	0.100000		
	vVait 1	lime (sec):	0	•	
	Ramp	Duration (sec):	0	•	
	Durati	ion (sec):	60	•	
	Frequ	iency (Hz):	0.2		
	Pulse	Duration (ms):	1000	-	
	Unit P	ulse Width (ms):	1000	T	
	Арр	ly Commit	Reset		
	Senso	<u>or</u>			

Calibration at 5 seconds for Taurus connected to a CMG-ESP seismometer.

Sensor		SN: 0239 📥
	Center M1:-0.60V	
	Mass Lock M2: 0.70V	
	Unlock M3:-0.11V	
	Sensor On Off 0.749 W	
	Sensitivity 8 cnts/(m/s/s)	
	Calibration Start Abort Setup	
	Time: 30s 💌 Scale: Auto 💌	
	Pause Show One	