



# NASPI PMU Registry

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**Austin, Texas**

## What is the Registry?

*The NASPI PMU Registry is the source of meta data on synchrophasor devices and the measurements (or signals) that is collects throughout in North America.*

- **Where is the measurement taken?**
- **What is the measurement?**
- **Who owns it?**
- **To what PDC (or Gateway) do I go to get the data?**

# PMU Registry Objectives

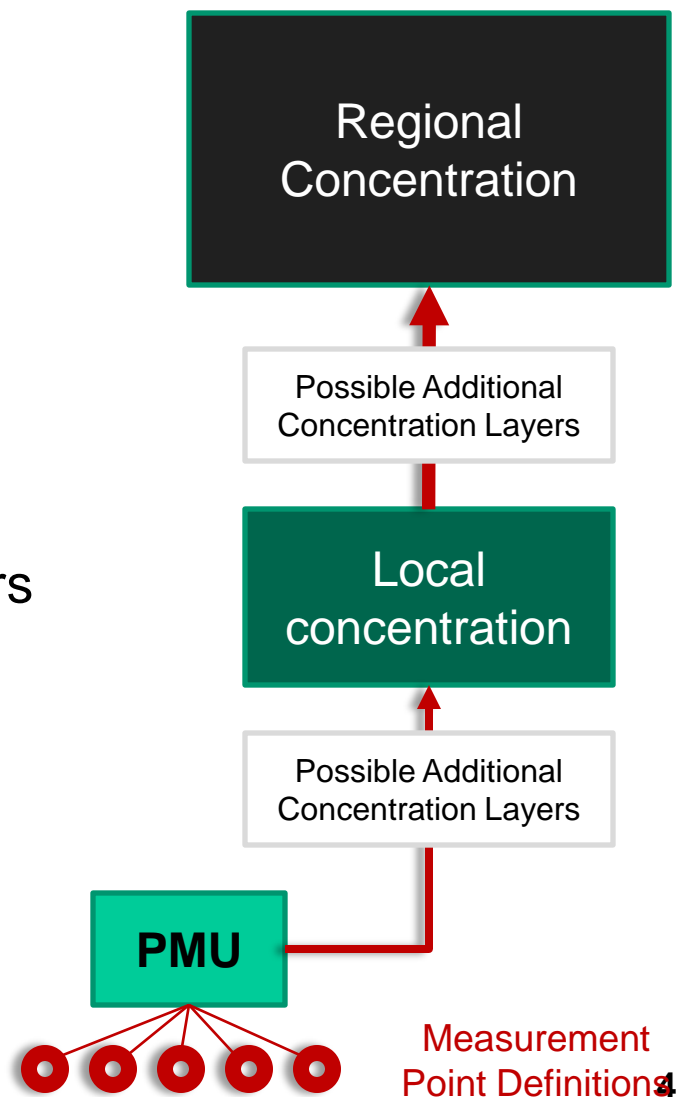
- To be the one-point stop for information on PMUs in North America (vis-à-vis NERC ISN data definitions)
- To establish uniform naming conventions for PMUs and their measurement descriptors to facilitate the exchange of PMU data for analysis and display
- To set the stage for NASPInet to provide a “measurement point (or signal) name server”.
- To support federal SGIG and industry investments in PMUs through collection and tracking of data on PMU equipment

*The registry software is being developed by NERC to serve all PMU owners across North America*

# PMU Registry Data Overview

- Simple Data Hierarchy
  - Regional concentration  
(Concentration for external users)
  - Local concentration (if present)
  - PMU
  - Measurement Descriptors
- Allows for multiple layers of data concentration and documents up to 2 layers
- Allows PMUs that do not provide data to external users to be a part of the registry
- Creates standard names for PMUs and measurement descriptors.

*The registry only holds meta data.*



Measurement Point Definitions

# Setting the stage for NASPInet

- **To publish a signal on NASPInet, a entity must:**
  - Have a NASPInet Phasor Gateway
  - Register the measurement (signal) with the NASPInet infrastructure.
  - Configure the Phasor Gateway to designate the authorized receiving Gateways (this configuration can be “all”) for this signal.
- **To subscribe to a signal on NASPInet, an entity must:**
  - Have a NASPInet Phasor Gateway
  - Discover the measurement (signal) needed through the NASPInet infrastructure
  - Request authorization to receive this signal from the publishing Phasor Gateway owner.

# PMU Owner Data

- The owner is typically the transmission owner, but can be any entity.
- Registry will use standard company names and abbreviations

## **Data Elements**

- Company
- Company Abbreviation
- Contact Name(s)

# Access / Authorization Data

- **User Permission Roles** (includes XML services)
  - Company Viewer
  - Company Editor
  - Company Administrator (Manages company users)
  - Regional Viewer
  - Regional Administrator (Manages regional viewers)
  - Global Viewer
  - System Administrator (Manages company and regional administrators)

# PMU Data

**PMU / PDC**

- **Standard Name**
- **Physical Location**
- **Device Info – Vendor, Protocol**
- **Operational Status**

**Measurement  
Descriptors**

- **Standard Name**
- **Phase Measured**
- **Units**
- **Reasonability Limits**

**Network  
Element**

- **Standard Name**
- **Electrical One-Line Location**

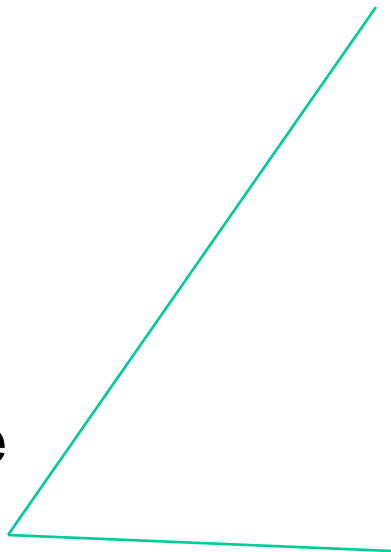


## PMU/PDC - Physical Location

- Interconnection
- NERC Region
- Regional PDC (optional)
- Location Name (Substation)
- Station ID or short name
- Lat / Long
- Time Zone
- SGIG Funding Info

# PMU/PDC - Device Info

- **Standard Device Name / ID** [system generated]  
(Company Abbv – Station Short Name – Count)
- Company Device Name
- Device Type
- Vendor
- Model
- Protocol
- Sampling Rate
- Device Status
- Comments / Description



**Device Status States**

- Planned (planned date)
  - Installed
- Regionally  
Operational (in-service date)
- Out-of-Service/Retired

# Measurement Descriptors

- **Measurement Point Name / ID** [system generated]  
(Company Abbv – Station Short Name – Device Count – Signal Type – [Count])
- **Measurement Type** (phasor\*, frequency, change in frequency, analog, calculated analog, binary, measurement system status.)
- **Phase** (+, -, 0, A, B, C)
- **Engineering Units**
- **Scaling Factors** ( $mx + b$ )
- **Reasonability Limits** (high / low)

*\*Phasors can be in polar form (magnitude and angle) or rectangular form and always generate a pair of master registry IDs.*

## Network Element Monitored

- Registry Network Element ID [system generated]  
(an ID for each line name for a company)
- Line / Bus Name
- Regional Line/Bus unique ID  
(e.g., MMWG / SDX ID in the east)
- Local Line/Bus ID  
(an ID with meaning to company)
- Extra Line/Bus ID
- Nominal kV

# PMU Registry Application Features

- Web based with performance optimized for data display and filtering
- System secured to protect data and to limit data operability to only a company or a region
- Ability to extract bulk data from the registry as XML files
- Daily data backups are archived
- All changes are logged

*For users ...*

- Use of “PMU connection tester” allows automated uploads to the PMU registry
- Multiple views and filters to allow navigation to the data of interest – including geographical-based navigation.
- Data integrity improved through liberal use of drop down dialogs

# Registry Application Status / Schedule

- **October 2009** - Registry commissioned at NASPI meeting
- **December 2009** - Beta version released for limited review / comment
- **February 2010** – Beta version release for broad review / comment
- **April 2010** – Pre-production release
- **May 2010** – Production release Version 1.0

# Public Splash Screen Provides Summary and "how to contribute"

### The PMU Registry

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- Mirum est notare quam littera gothica, quam nunc putamus parum claram, anteposuerit litterarum formas humanitatis per seacula quarta decima et quinta decima. Eodem modo typi, qui nunc nobis videntur parum clari, fiant sollemnes in futurum.

### Get a user account

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat.

### Become a contributor

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### Contact Us

- Lorem ipsum dolor sit amet
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- Lorem ipsum dolor sit amet

How can I contribute?

	# Devices	Coverage Statistics
Eastern	8	10
Western	0	0
ERCOT	0	0
Quebec	0	0
Alaskan	0	0
Hawaii	0	0
Total	8	10

# Logon for Access

**NASPI PMU Registry**


Select Company ▼ Select NERC Reg ▼ Select RC Area ▼

Quick View Devices Manage

Login to NASPI PMU Registry


User Name

Password

 LOGIN



# Overview / User Homepage




Select Company ▾
Select NERC Reg ▾
Select RC Area ▾

Quick View Devices Manage

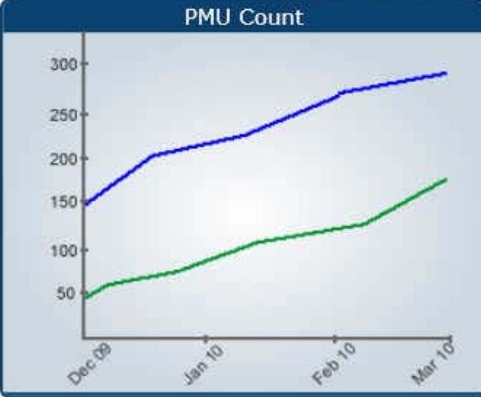
Quick View: PMU Locations Map

Road Aerial Labels <<



© 2010 Microsoft Corporation © 2009 NAVTEQ  
Image courtesy of NASA

**PMU Count**



**Recently Added**

SQUAREBUTTE2	12/03/2009 2:51:18 PM
MASSENA	12/03/2009 2:50:20 PM
FARLEY-SINAI	12/03/2009 2:48:37 PM
ARPIN	12/03/2009 2:47:35 PM
GRIMES	12/03/2009 2:45:56 PM
WOODRING	12/03/2009 2:31:41 PM
ORANGE	12/03/2009 2:30:18 PM
ORRINGTON	12/03/2009 2:28:43 PM

**Operational Stats**


Reporting PMUs	
Operational	5
Out of Service	3
Validated	3
<b>Total</b>	<b>11</b>
Planned PMUs	
In Progress	4
Planned	2
<b>Total</b>	<b>6</b>

# Browse Devices (PMUs)


Browse Devices							
						Search	Show All
Acronym	Company	Vendor Device	Concentrator	Status		Phasors	Measurements
BULLRUN	TVA	Macrodyne	<input type="checkbox"/>	Operational		Phasors	Measurements
COLLINS	TVA	SEL-421	<input type="checkbox"/>	Operational		Phasors	Measurements
CONCORD	TVA	SEL-421	<input type="checkbox"/>	Out of Service		Phasors	Measurements
CORDOVA	TVA	Arbiter-1133A	<input type="checkbox"/>	In Progress		Phasors	Measurements
CUMBERLAND	TVA	Mehtatech	<input type="checkbox"/>	Planned		Phasors	Measurements
DEFAULTPMU2	BPA		<input type="checkbox"/>	In Progress		Phasors	Measurements
FREE	TVA	Mehtatech	<input type="checkbox"/>	Validated		Phasors	Measurements
LOWNDES	TVA	ABB-521	<input type="checkbox"/>	Validated		Phasors	Measurements
SHELBY	TVA	NxtPhase	<input type="checkbox"/>	Retired		Phasors	Measurements
SULLIVAN	TVA	ABB-521	<input type="checkbox"/>	Out of Service		Phasors	Measurements



Page 1 of 1

# Enter Device (PMU) Configuration Data

Select Company Select NERC Reg Select RC AreaQuick View Devices Manage

### Manage Devices

<b>Acronym</b>	<input type="text"/>	<b>Name</b>	<input type="text"/>
<b>Substation Acronym</b>	<input type="text"/>	<b>Substation Name</b>	<input type="text"/>
<b>Company</b>	<input type="text" value="Allegheny Power"/>	<b>Concentrator</b>	<input type="text" value="Select Device"/> 
<b>Interconnection</b>	<input type="text" value="Alaskan Interconnection"/>	<b>Device Vendor</b>	<input type="text" value="Select Vendor Device"/>
<b>Protocol</b>	<input type="text" value="Select Protocol"/>	<b>Time Zone</b>	<input type="text" value="Select Timezone"/>
<b>Longitude</b>	<input type="text"/>	<b>Latitude</b>	<input type="text"/>
<b>Measured Lines</b>	<input type="text"/>	<b>Status</b>	<input type="text" value="In Progress"/>
<b>Technical Contact</b>	<input type="text" value="Select Technical Contact"/>	<input type="checkbox"/> <b>Concentrator</b>	

# Wizard to upload Device (PMU) Configuration Data

### Device Configuration Wizard

**Step 1: Upload Configuration**

Select XML Configuration File (from PMU Connection Tester)

**Browse**

Device Protocol: **BPA\_PDCstream**

Select INI File to Upload

**Browse**

Connect to PDC

PDC Name:

Acronym:

PDC Device Vendor: **Select Vendor Device**

**Step 2: Configure Connection Settings**

**Step 3: Select Devices to Configure**

**1**

**Connect to device**

**Upload XML Configuration**

**Save XML Configuration**

```
<?xml version="1.0" encoding="UTF-8" ?>
<SOAP-ENV:Envelope xmlns:env="http://www.w3.org/2001/XMLSchema-instance"
xmlns:cod="http://www.w3.org/2001/XMLSchema" xmlns:SOA="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:chr="http://schemas.microsoft.com/soap/encoding/cr/1.0" SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" >
  <SOAP-ENV:Body>
    <a1:ConfigurationFrame id="ref-1"
xmlns:a1="http://schemas.microsoft.com/cr/nsassem/TVA.PhasorProtocols.Ieee1344/TVA.PhasorProtocols"
>
      <@Code>2</@Code>
      <@Cell href="#ref-3" />
      <@Timestamp>623122117120000000</@Timestamp>
      <@FrameRate>30</@FrameRate>
      <@FrameHeader href="#ref-4" />
      <@Code48bit>2</@Code48bit>
    </a1:ConfigurationFrame>
    <a1:ConfigurationCellCollection id="ref-3"
xmlns:a1="http://schemas.microsoft.com/cr/nsi"
>
      <@MaximumCount>4</@MaximumCount>
      <@Count>1</@Count>
      <@Zero href="#ref-5" />
      <@ConstantCellLength>true</@ConstantCellLength>
    </a1:ConfigurationCellCollection>
    <a1:CommonFrameHeader id="ref-4"
xmlns:a1="http://schemas.microsoft.com/cr/nsassem/TVA.PhasorProtocols.Ieee1344/TVA.PhasorProtocols"
>
      <@StatusFlags>100</@StatusFlags>
    </a1:CommonFrameHeader>
    <a1:ConfigurationCell id="ref-5" />
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

# Wizard to upload Device (PMU) Configuration Data

## Device Configuration Wizard

2

▶ Step 1: Upload Configuration

▼ Step 2: Configure Connection Settings

Company

Select Company ▼

Interconnection

Select Interconnection ▼

Select Interconnection

Alaskan Interconnection

Eastern Interconnection

Islands of Hawaii

Quebec Interconnection

Texas Interconnection

Western Interconnection

▶ Step 3: Select Devices to Configure

◀ Previous

Next ▶



# Wizard to upload Device (PMU) Configuration Data

Device Configuration Wizard

▶ Step 1: Upload Configuration  
▶ Step 2: Configure Connection Settings  
▼ Step 3: Select Devices to Configure

3

Acronym	Name	Vendor	Status	Longitude	Latitude	Digitals	Analogs
<input checked="" type="checkbox"/>	DEFAULTPMU2	Default Pmu 2	SEL-421	In Progress	0	0	<input type="checkbox"/> Add[0] <input type="checkbox"/> Add[0]
Label	Type	Phase	Destination				
<input checked="" type="checkbox"/>	Voltage A	Voltage	Phase A				
<input checked="" type="checkbox"/>	Voltage B	Voltage	Phase B				
<input checked="" type="checkbox"/>	Voltage C	Voltage	Phase C				
<input checked="" type="checkbox"/>	Current A	Current	Phase A				
<input checked="" type="checkbox"/>	Current B	Current	Phase B				
<input checked="" type="checkbox"/>	Current C	Current	Phase C				
<input checked="" type="checkbox"/>	Current Sum	Current	Positive				

Previous Finish

# Manage Companies



## Manage Companies

<b>Acronym</b>	<input type="text" value="TVA"/>	<b>Map Acronym</b>	<input type="text" value="TVA"/>
<b>Name</b>	<input type="text" value="Tennessee-Valley Authority"/>	<b>Timezone</b>	<input type="text" value="(GMT) Casablanca"/>
<b>Interconnection</b>	<input type="text" value="Eastern Interconnection"/>	<b>NERC Region</b>	<input type="text" value="Default Region"/>
<b>URL</b>	<input type="text" value="http://www.tva.com/"/>		

 Clear  Save

Acronym	Name	Interconnection	NERC Region	
METC	<a href="#">Michigan Electric Transmission Co.</a>	Eastern Interconnection	Default Region	<a href="#">Contacts</a>
MISO	<a href="#">Midwest ISO</a>	Eastern Interconnection	Default Region	<a href="#">Contacts</a>
MPC	<a href="#">Minnkota Power Collective</a>	Eastern Interconnection	Default Region	<a href="#">Contacts</a>
MTB	<a href="#">Manitoba Hydro</a>	Eastern Interconnection	Default Region	<a href="#">Contacts</a>
NEISO	<a href="#">New England ISO</a>	Eastern Interconnection	Default Region	<a href="#">Contacts</a>
NYPA	<a href="#">New York Power Authority</a>	Eastern Interconnection	Default Region	<a href="#">Contacts</a>
OGE	<a href="#">Oklahoma Gas &amp; Electric</a>	Eastern Interconnection	Default Region	<a href="#">Contacts</a>
PGE	<a href="#">Pacific Gas and Electric</a>	Eastern Interconnection	Default Region	<a href="#">Contacts</a>
PJM	<a href="#">PJM Interconnection</a>	Eastern Interconnection	Default Region	<a href="#">Contacts</a>
PPL	<a href="#">PPL Electric Utilities</a>	Eastern Interconnection	Default Region	<a href="#">Contacts</a>
SCE	<a href="#">Southern California Edison</a>	Eastern Interconnection	Default Region	<a href="#">Contacts</a>
SOCO	<a href="#">Southern Company</a>	Eastern Interconnection	Default Region	<a href="#">Contacts</a>
SPP	<a href="#">Southwest Power Pool</a>	Eastern Interconnection	Default Region	<a href="#">Contacts</a>
SWT	<a href="#">Southwest (APS and SRP)</a>	Eastern Interconnection	Default Region	<a href="#">Contacts</a>
TVA	<a href="#">Tennessee Valley Authority</a>	Eastern Interconnection	Default Region	<a href="#">Contacts</a>
VT	<a href="#">Virginia Tech</a>	Eastern Interconnection	Default Region	<a href="#">Contacts</a>
WAPA	<a href="#">Western Area Power Administration</a>	Eastern Interconnection	Default Region	<a href="#">Contacts</a>

# Manage Vendors

Select Company ▾ Select NERC Reg ▾ Select RC Area ▾ 

Quick View Devices Manage

### Manage Vendors

**Acronym**  **Name**

**Phone Number**  **Contact Email**

**URL**

✖ Clear 💾 Save

Acronym	Name	URL
ABB	ABB	<a href="http://www.abb.com/">http://www.abb.com/</a>
ATK	Ametek	<a href="http://www.ametek.com/">http://www.ametek.com/</a>
ARB	Arbiter	<a href="http://www.arbiter.com/">http://www.arbiter.com/</a>
BPA	Bonneville Power Administration	<a href="http://www.bpa.gov/">http://www.bpa.gov/</a>
GE	General Electric	<a href="http://www.ge.com/">http://www.ge.com/</a>
HWY	Hathaway	<a href="http://www.qualitrolcorp.com/">http://www.qualitrolcorp.com/</a>
MAC	Macrodyne	<a href="http://www.macrodyneusa.com/">http://www.macrodyneusa.com/</a>
MTA	Mehtatech	<a href="http://www.mehtatech.com/">http://www.mehtatech.com/</a>
NPT	NxtPhase	<a href="http://www.nxtphase.com/">http://www.nxtphase.com/</a>
OTR	Other / Unspecified	
SEL	Schweitzer	<a href="http://www.selinc.com/">http://www.selinc.com/</a>
TVA	TVA	<a href="http://www.tva.gov/">http://www.tva.gov/</a>
VT	Virginia Tech	<a href="http://www.vt.edu/">http://www.vt.edu/</a>



# Manage Vendor Devices

## Manage Vendor Devices

Vendor

Name

Description

URL

 Clear

 Save

Name	Description	URL
ABB-521	ABB RES521	<a href="http://library.abb.com/GLOBAL/SCOT/SCOT296.nsf/VerityDisplay/79B1">http://library.abb.com/GLOBAL/SCOT/SCOT296.nsf/VerityDisplay/79B1</a>
Ametek	Ametek TR-2000 Multi-Function Recorder	<a href="http://www.ametekpower.com/products/sku.cfm?SKU_Id=12328">http://www.ametekpower.com/products/sku.cfm?SKU_Id=12328</a>
Arbiter-1133A	Arbiter 1133A Power Sentinel	<a href="http://www.arbiter.com/catalog/power/1133a/1133a.php">http://www.arbiter.com/catalog/power/1133a/1133a.php</a>
BPA PDC	Bonneville Power Administration	<a href="http://www.bpa.gov/">http://www.bpa.gov/</a>
FNET	Virginia Tech FNET Device	
GE N60	GE N60 Synchrophasor Measurement System	<a href="http://www.geindustrial.com/cwc/products?pnlid=6&amp;famid=31&amp;catid=:">http://www.geindustrial.com/cwc/products?pnlid=6&amp;famid=31&amp;catid=:</a>
Hathaway IDM	Qualitrol Hathaway IDM Fault Recorder	<a href="http://www.qualitrolcorp.com/docs/home/IDM_Brochure.pdf">http://www.qualitrolcorp.com/docs/home/IDM_Brochure.pdf</a>
Macrodyne	Macrodyne 1690	<a href="http://www.macrodyneusa.com/model_1690.htm">http://www.macrodyneusa.com/model_1690.htm</a>
Mehtatech	Metha Tech Transcan 2000 IED	<a href="http://www.mehtatech.com/pdf/IEDbrochMay02b.pdf">http://www.mehtatech.com/pdf/IEDbrochMay02b.pdf</a>
NxtPhase	NxtPhase Telsa 2000 Fault Recorder	<a href="http://www.nxtphase.com/sub-products-relays-tesla-model-2000P.htm">http://www.nxtphase.com/sub-products-relays-tesla-model-2000P.htm</a>
openPDC	TVA Open Source Phasor Data Concentrator	<a href="http://openPDC.codeplex.com/">http://openPDC.codeplex.com/</a>
Other	Other Device	
SEL-3306	SEL-3306 Synchrophasor Processor	<a href="http://synchrophasor.selinc.com/">http://synchrophasor.selinc.com/</a>
SEL-421	SEL-421 Relay	<a href="http://www.selinc.com/sel-421.htm">http://www.selinc.com/sel-421.htm</a>
SEL-451	SEL-451 Relay	<a href="http://www.selinc.com/sel-451.htm">http://www.selinc.com/sel-451.htm</a>
SEL-5077	SEL-5077 SynchroWAVE Server Software	<a href="http://www.selinc.com/synchrowave.htm">http://www.selinc.com/synchrowave.htm</a>

# Describe Measurements for Devices



**Manage Phasors For Device: DEFAULTPMU2**

### Manage Phasors

**Label**  **Type**

**Phase**  **Destination Phasor**

**Source Index**  **Network Model Line**

 **Clear**  **Save**

Label	Type	Phase	Source Index
Voltage A	Voltage	Positive	1
Voltage B	Voltage	Positive	2
Voltage C	Voltage	Positive	3
Current A	Current	Phase A	4
Current B	Current	Phase B	5
Current C	Current	Phase C	6
Current Sum	Current	Positive	7


# Manage Network Location Data

## Manage Network Models

**Network Element UID**  **Line/Bus Name**

**Regional Line/Bus ID**  **Local Line/Bus ID**

**Extra Line/Bus ID**  **Nominal kV**

 Clear  Save

UID	Line / Bus Name	Nominal kV
Sample UID	Sample Line Name	345

# Browse / Edit Measurement Configuration Data

Manage Measurements

<b>Signal ID</b>	66a8ca8a-4f51-4262-8bf2-81aef9de68be	<b>Device</b>	DEFAULTPMU2
<b>Signal Type</b>	Voltage Phase Angle	<b>Point Tag</b>	BPA_DEFAULTPMU2-PA1:VH
<b>Alternate Tag</b>		<b>Signal Reference</b>	DEFAULTPMU2-PA1
<b>Phasor Source</b>	Voltage A	<b>Description</b>	Default Pmu 2 Voltage A Positive Voltage P
<b>Adder</b>	0	<b>Multiplier</b>	1

**Enabled**
 Clear
 Save

Signal ID	Device	Point Tag	Signal Reference	Enabled
9ef32504-e2b7-4f7d-a05c-25b18a6cee77	CUMBERLAND	TVA_CUMBERLAND:MTAS	CUMBERLAND-SF	<input checked="" type="checkbox"/>
bb7c79ba-82d3-4fda-8ddd-db58e136e979	DEFAULTPMU2	BPA_DEFAULTPMU2:A0	DEFAULTPMU2-AV0	<input checked="" type="checkbox"/>
d0fc6bdc-77c8-4347-b871-878a36124fc9	DEFAULTPMU2	BPA_DEFAULTPMU2:D0	DEFAULTPMU2-DV0	<input checked="" type="checkbox"/>
d790a153-f996-4544-b9ed-0f170708d050	DEFAULTPMU2	BPA_DEFAULTPMU2:D1	DEFAULTPMU2-DV1	<input checked="" type="checkbox"/>
59bd358e-3268-477a-ab0c-b5119a68a805	DEFAULTPMU2	BPA_DEFAULTPMU2:D2	DEFAULTPMU2-DV2	<input checked="" type="checkbox"/>
5a01e982-89b3-4b87-aab5-6380a0d26912	DEFAULTPMU2	BPA_DEFAULTPMU2:DF	DEFAULTPMU2-DF	<input checked="" type="checkbox"/>
9f0ebf29-8839-4bb2-8e6d-eff55f5ef2e7	DEFAULTPMU2	BPA_DEFAULTPMU2:F	DEFAULTPMU2-FQ	<input checked="" type="checkbox"/>
e3d3b98c-05b2-411d-98f4-310e7f1a74bd	DEFAULTPMU2	BPA_DEFAULTPMU2:S	DEFAULTPMU2-SF	<input checked="" type="checkbox"/>
66a8ca8a-4f51-4262-8bf2-81aef9de68be	DEFAULTPMU2	BPA_DEFAULTPMU2-PA1:VH	DEFAULTPMU2-PA1	<input checked="" type="checkbox"/>
3f865c5e-4fc0-4304-a717-18497823a936	DEFAULTPMU2	BPA_DEFAULTPMU2-PA2:VH	DEFAULTPMU2-PA2	<input checked="" type="checkbox"/>
871e3f1a-4404-4603-863d-511e29228e3a	DEFAULTPMU2	BPA_DEFAULTPMU2-PA3:VH	DEFAULTPMU2-PA3	<input checked="" type="checkbox"/>
179de505-cdbe-4d7f-a569-cfd0ec71ca8e	DEFAULTPMU2	BPA_DEFAULTPMU2-PA4:IH	DEFAULTPMU2-PA4	<input checked="" type="checkbox"/>
d50e5c6d-fc21-4b66-9d6d-e73d2b5f3207	DEFAULTPMU2	BPA_DEFAULTPMU2-PA5:IH	DEFAULTPMU2-PA5	<input checked="" type="checkbox"/>
3a7e51ec-0d8e-4b7b-99c1-e84b6fe855a0	DEFAULTPMU2	BPA_DEFAULTPMU2-PA6:IH	DEFAULTPMU2-PA6	<input checked="" type="checkbox"/>

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Now we need your comments !

**Please contact me for testing:  
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