

Introduction to MDSplus Terminology and Tools

Elements of an MDSplus Tree

A Traverser View of the various nodes

Icons, Types, and Syntax

The NSTX trees

Devices currently selectable

Looking at trees with TCL

Scope and Pad

Pad button grids and Scope displays

Setting up the Data Source

Copying from a Pad button to a Scope panel

What to Type

Logical Names and Directories

CMOD Web pages for MDSplus: <http://www.pfc.mit.edu/mdsplus/>

NSTX Web pages for MDSplus: <http://NSTX.pppl.gov/nstx/Software/>

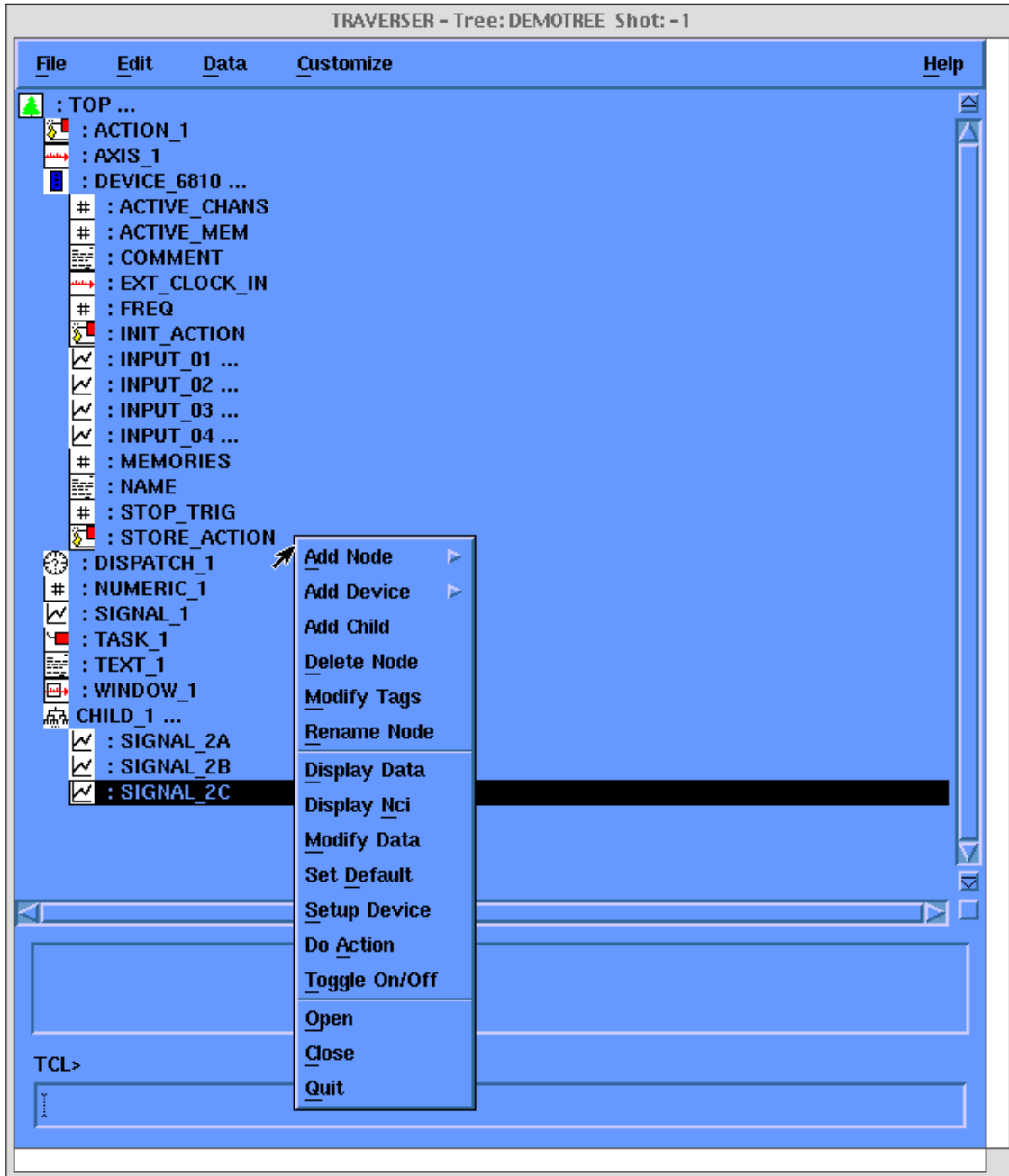
Introductory material on IDL:

http://NSTX.pppl.gov/nstx/Software/idl_intro.html

See individual application documents (or html versions)
for details about the Traverser and Scope programs;
no illustrated Pad document yet.

A Demo MDSplus Tree Showing All Node Types

The Device node is for an LC6810 digitizer:
choosing a device automatically adds all necessary tree nodes
for that device. Nodes with subnodes are followed by "..."



Mouse Button 3 (right button) brings up a short-cut menu;
any nodes added now will be subnodes of SIGNAL_2C,
since it is currently selected.

Nodes appear in Traverser in alphabetical order within a level.

MDSplus expressions require close attention to punctuation.

CHILD NODES:

"DOT" syntax

e.g.

.child_1












\nstx::top.operations.flux_loops.rawdata

MEMBER NODES

"COLON" syntax

:device_6810:name

:sfl_h908_01:input_01

ICON	NODE TYPE	ICON	NODE TYPE
	CHILD		ACTION
			AXIS
	(sub) TREE		DEVICE
			DISPATCH
			NUMERIC
			SIGNAL
			TASK
			TEXT
			WINDOW

NODE NAMES are limited to 12 characters. The full path name to a node may be arbitrarily long. Life is made much simpler if a TAG NAME is defined. Tags may be 24 characters long; they represent the full path up to and including the named node. They can be used in further mixed expressions to reach subnodes without a lot of typing. *Short tags are best.* \IP1 is the tag for \OPERATIONS::TOP.IP_ROGOWSKI:PLASMA_CUR_1 \IP1:COMMENT points to the comment entered for that signal.

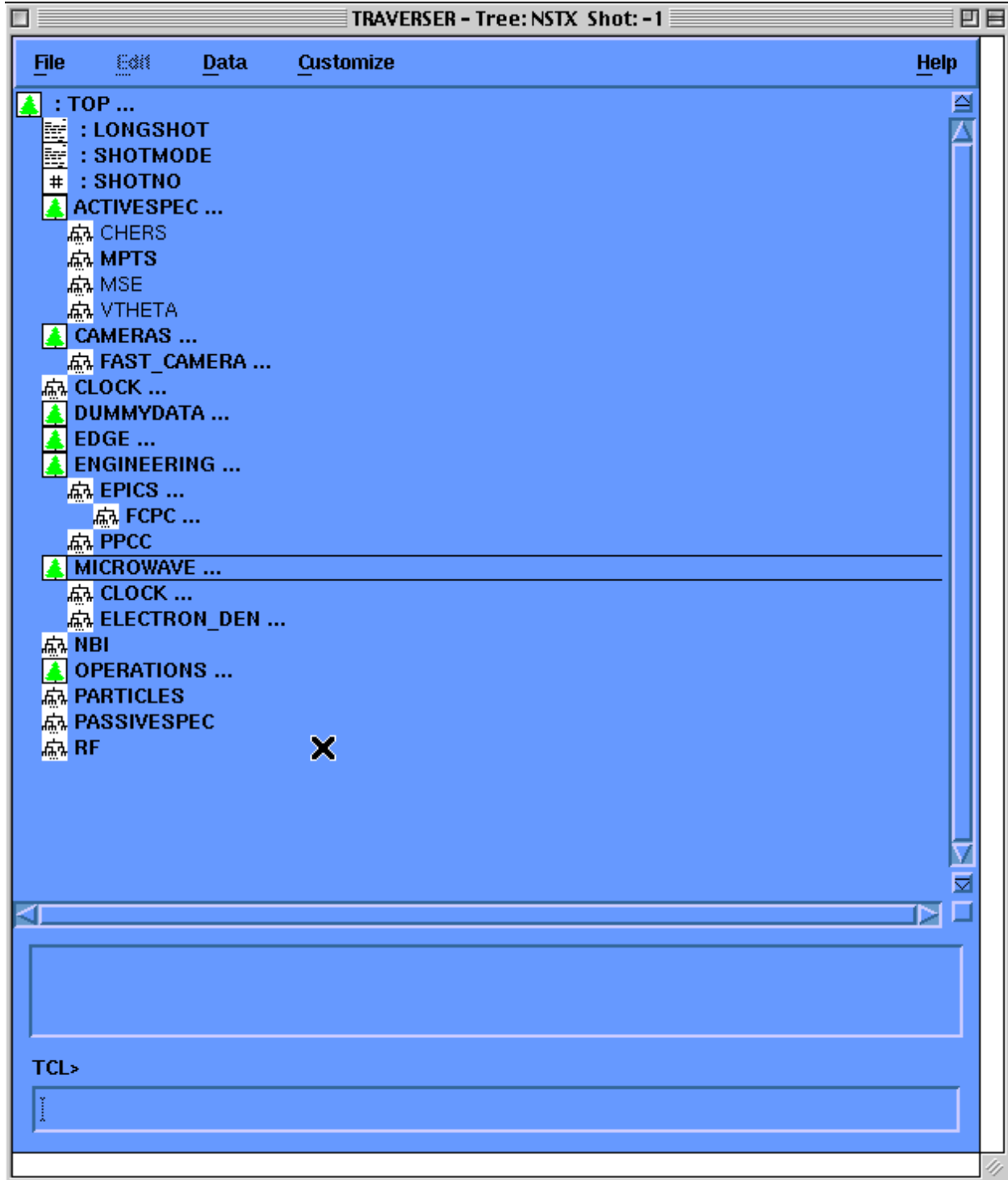
A node has one node name but may have multiple tags.

NSTX policy so far is that we will

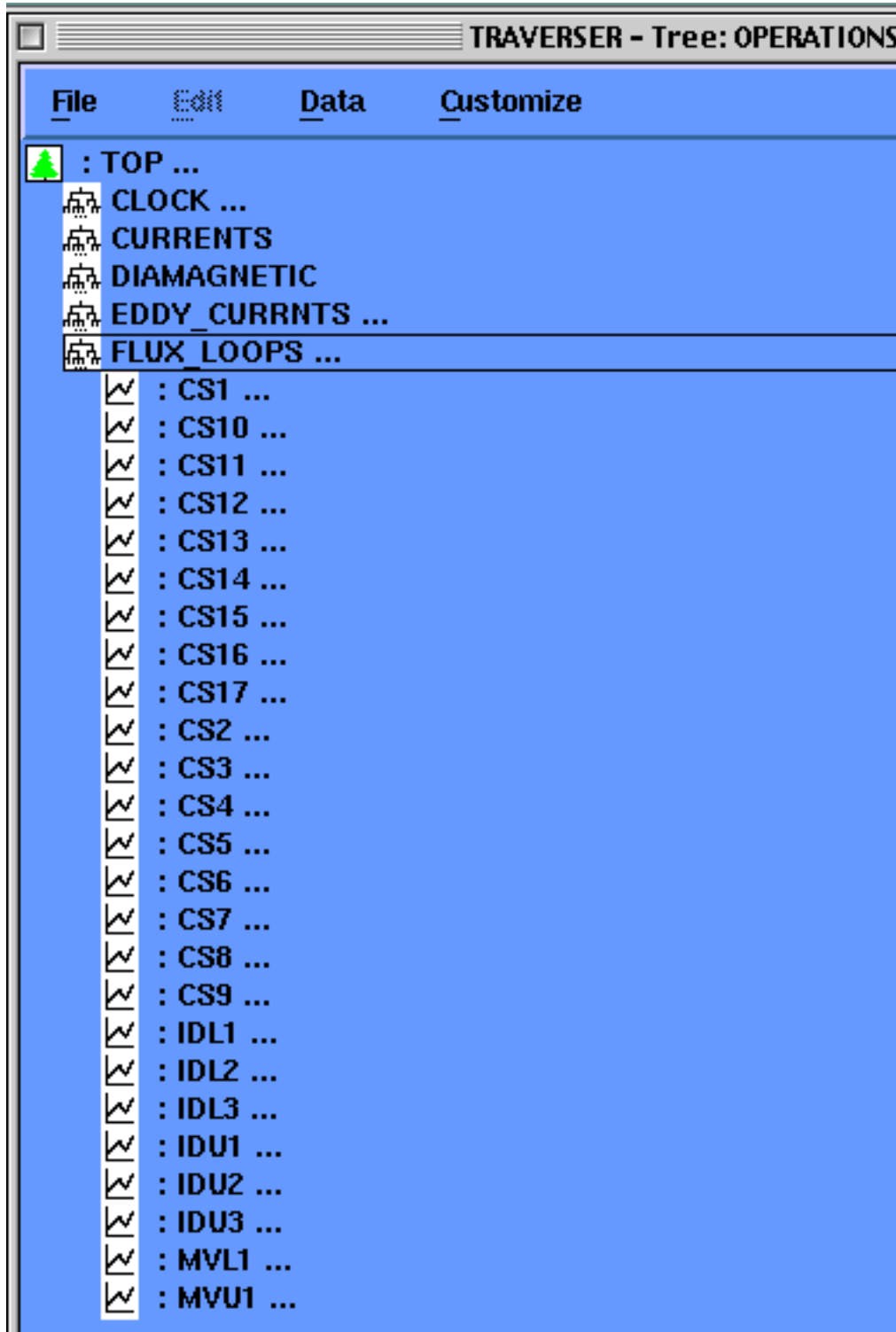
- always create tag names for all Physics or Engineering signals but not for "raw data" channels
- always add a :COMMENT subnode to a Physics or Engineering signal that can reasonably be used as a plotting label.

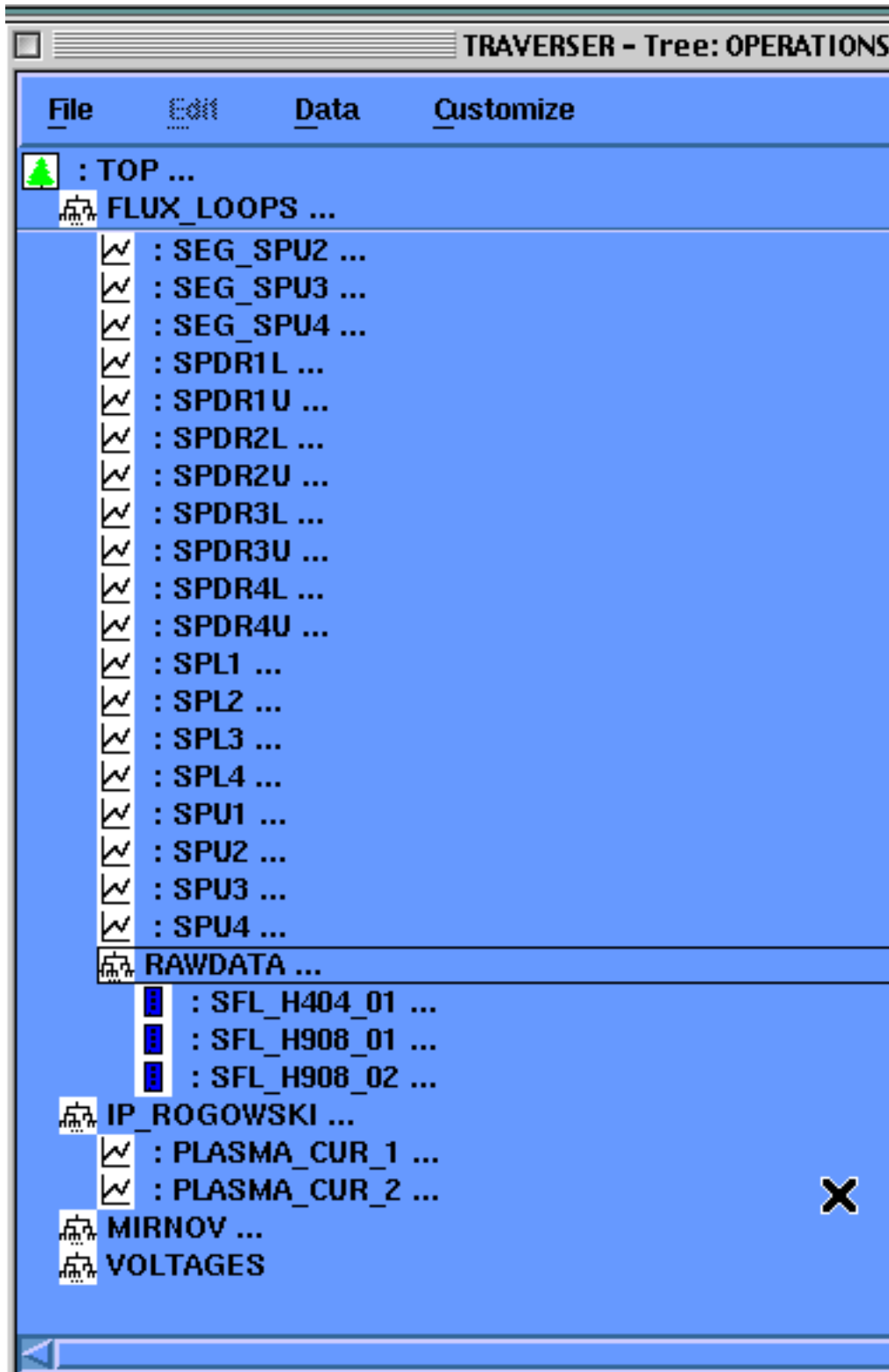
The NSTX Trees as of 2/1/99

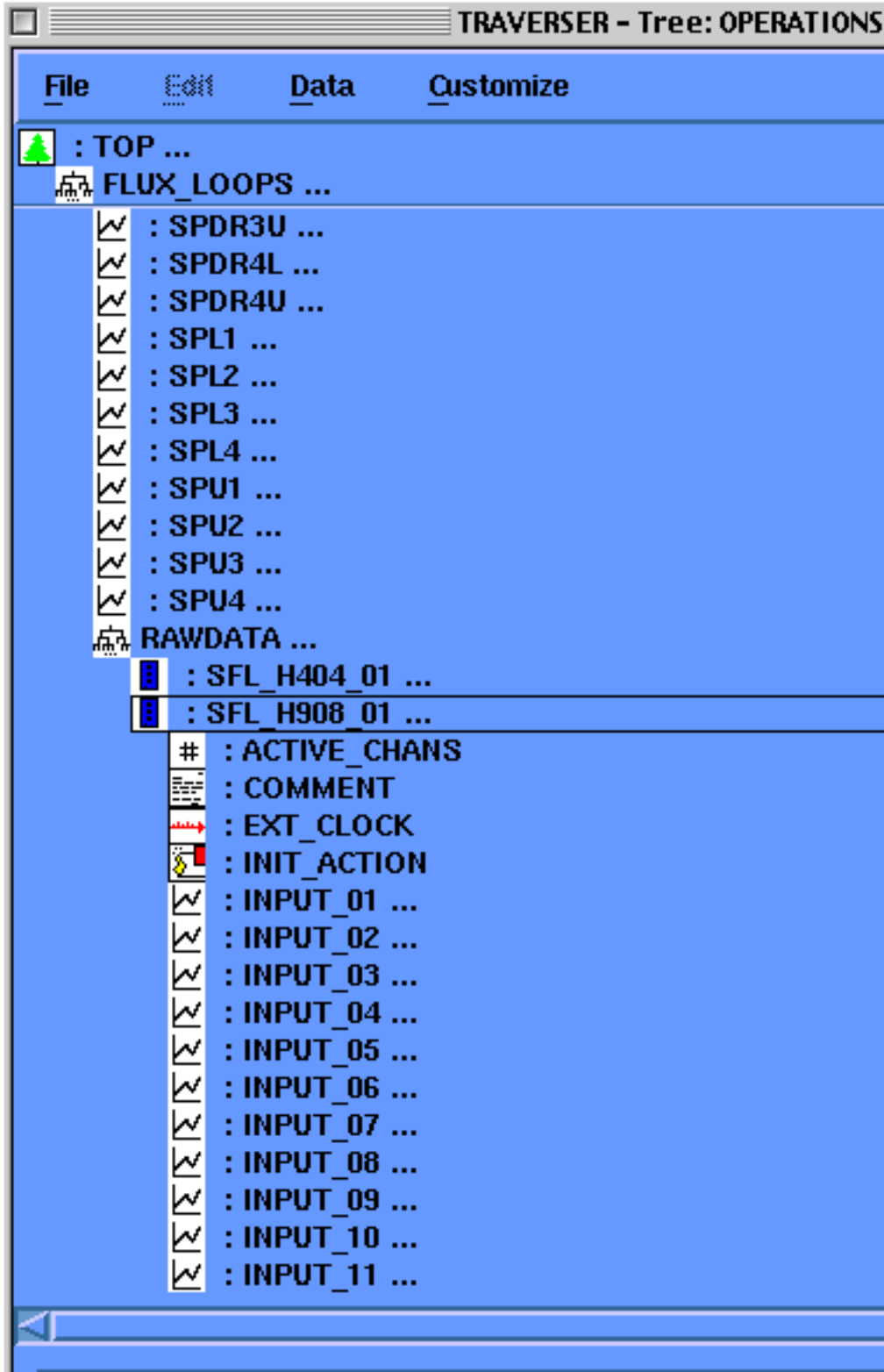
A Top-level view from Traverser of the NSTX tree:



A Closer Look at the Operations Tree:







On the following page, the TCL utility shows the same information in a more concise format, but it is harder to get the overall picture.

```
BIRCH$ tcl
TCL> set tree nstx/shot=-1
TCL> dir
```

```
\NSTX::TOP
```

```
:LONGSHOT      :SHOTMODE      :SHOTNO

ACTIVESPEC      CAMERAS        CLOCK          DUMMYDATA      EDGE
ENGINEERING     MICROWAVE      NBI            OPERATIONS     PARTICLES
PASSIVESPEC     RF
```

```
Total of 15 nodes.
```

```
TCL> set def .operations
TCL> dir
```

```
\OPERATIONS::TOP
```

```
CLOCK          CURRENTS        DIAMAGNETIC    EDDY_CURRNTS   FLUX_LOOPS
IP_ROGOWSKI    MIRNOV         VOLTAGES
```

```
Total of 8 nodes.
```

```
TCL> set def .flux_loops
TCL> dir
```

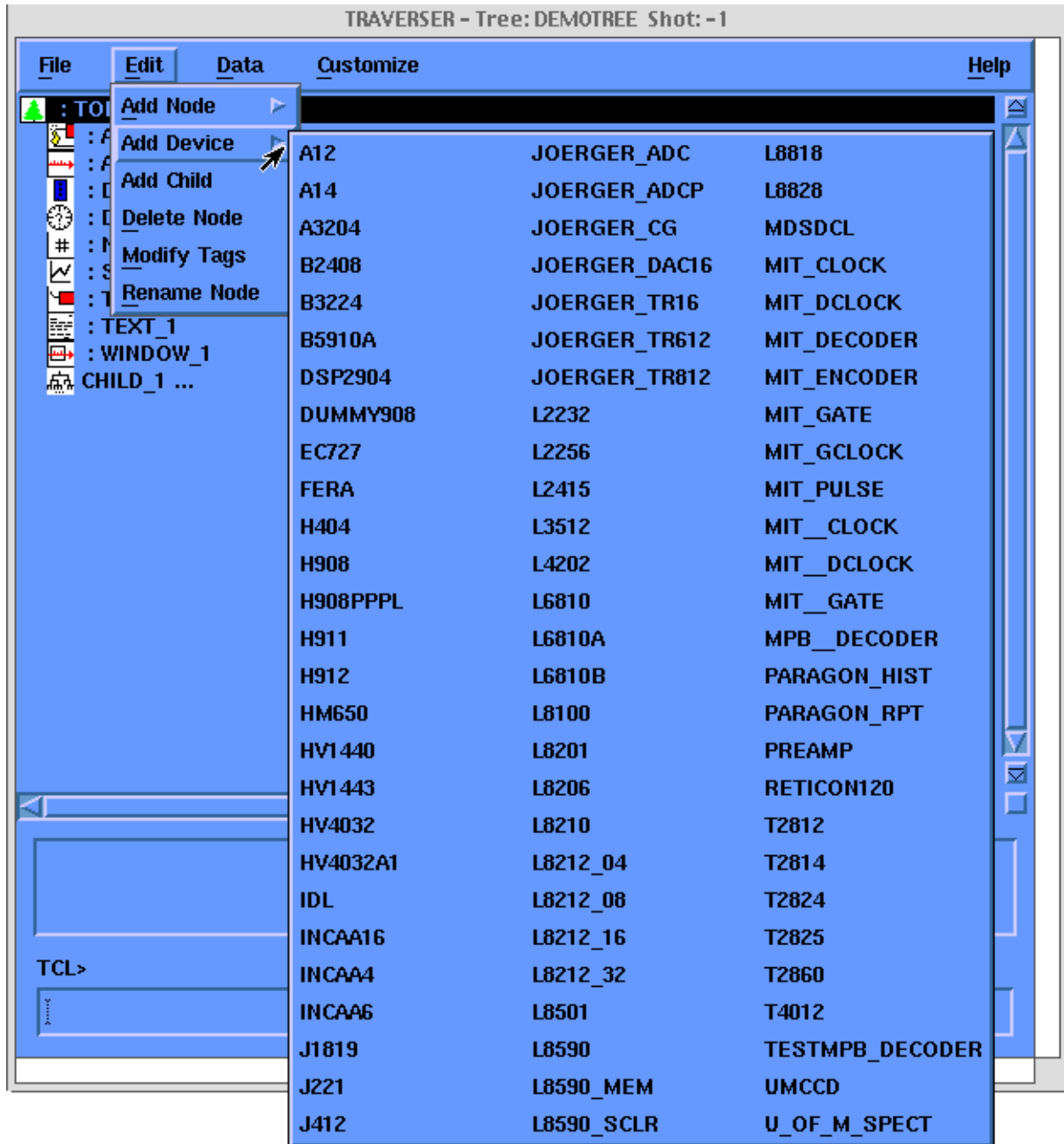
```
\OPERATIONS::TOP.FLUX_LOOPS
```

```
:CS1           :CS10          :CS11          :CS12          :CS13
:CS14          :CS15          :CS16          :CS17          :CS2
:CS3           :CS4           :CS5           :CS6           :CS7
:CS8           :CS9           :IDL1          :IDL2          :IDL3
:IDU1          :IDU2          :IDU3          :MVL1          :MVU1
:ODL1          :ODL2          :ODL3          :ODL4          :ODU1
:ODU2          :ODU3          :ODU4          :PF2L          :PF2U
:PF3L          :PF3U          :PF4L          :PF4U          :PF5L
:PF5U          :PPDR1L        :PPDR1U        :PPDR2L        :PPDR2U
:PPDR3L        :PPDR3U        :PPDR4L        :PPDR4U        :PPL1
:PPL2          :PPL3          :PPL4          :PPU1          :PPU2
:PPU3          :PPU4          :SEG_PPL1      :SEG_PPL2      :SEG_PPL3
:SEG_PPL4      :SEG_PPL5      :SEG_PPL6      :SEG_PPL7      :SEG_PPL8
:SEG_PPU1      :SEG_PPU2      :SEG_PPU3      :SEG_PPU4      :SEG_PPU5
:SEG_PPU6      :SEG_PPU7      :SEG_PPU8      :SEG_SPL1      :SEG_SPL2
:SEG_SPL3      :SEG_SPL4      :SEG_SPU1      :SEG_SPU2      :SEG_SPU3
:SEG_SPU4      :SPDR1L        :SPDR1U        :SPDR2L        :SPDR2U
:SPDR3L        :SPDR3U        :SPDR4L        :SPDR4U        :SPL1
:SPL2          :SPL3          :SPL4          :SPU1          :SPU2
:SPU3          :SPU4
```

```
RAWDATA
```

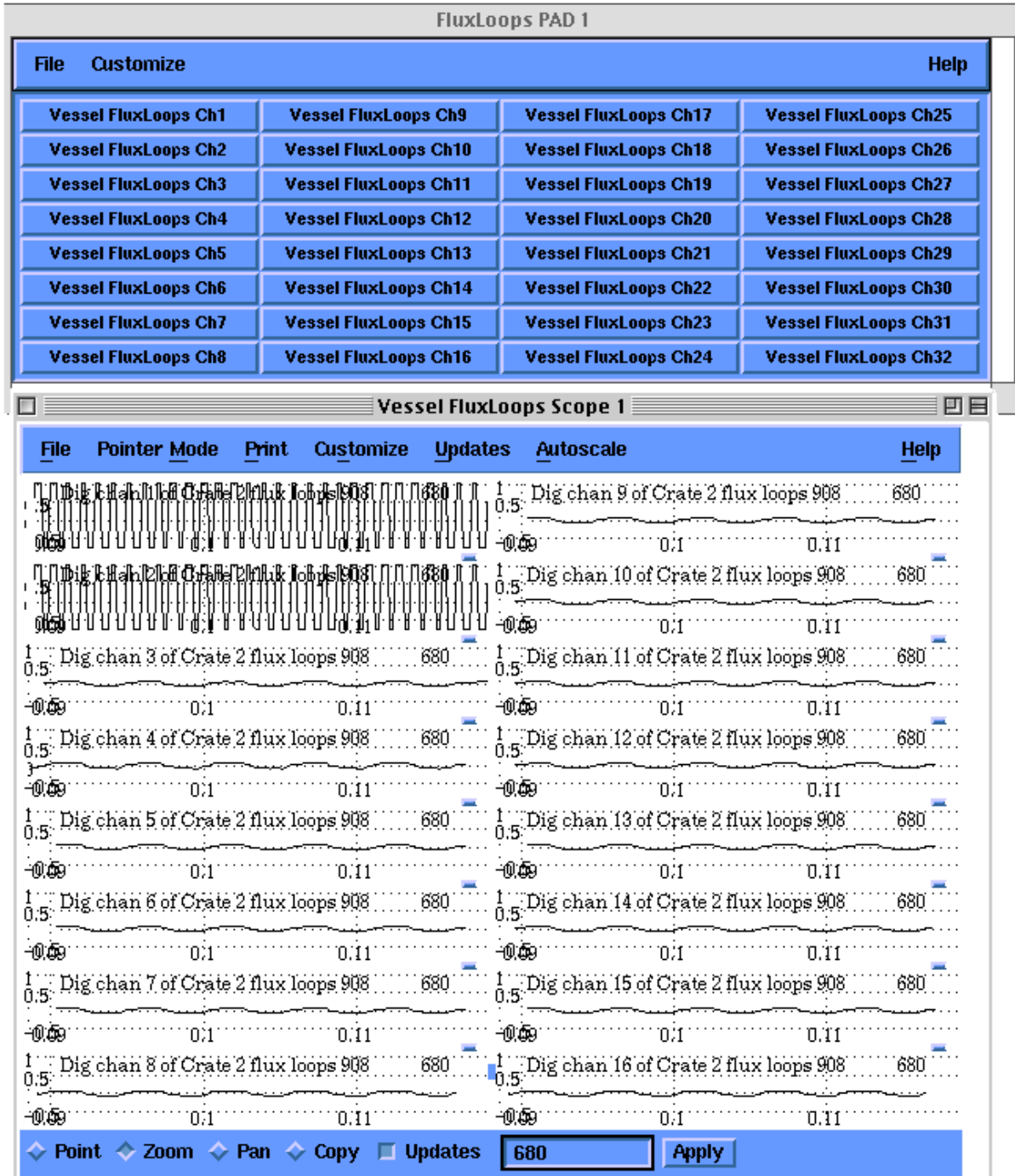
```
Total of 98 nodes.
```


A wide variety of standard CAMAC devices are already supported in MDSplus. While in EDIT mode, add the device node, then choose Data/Setup Device.

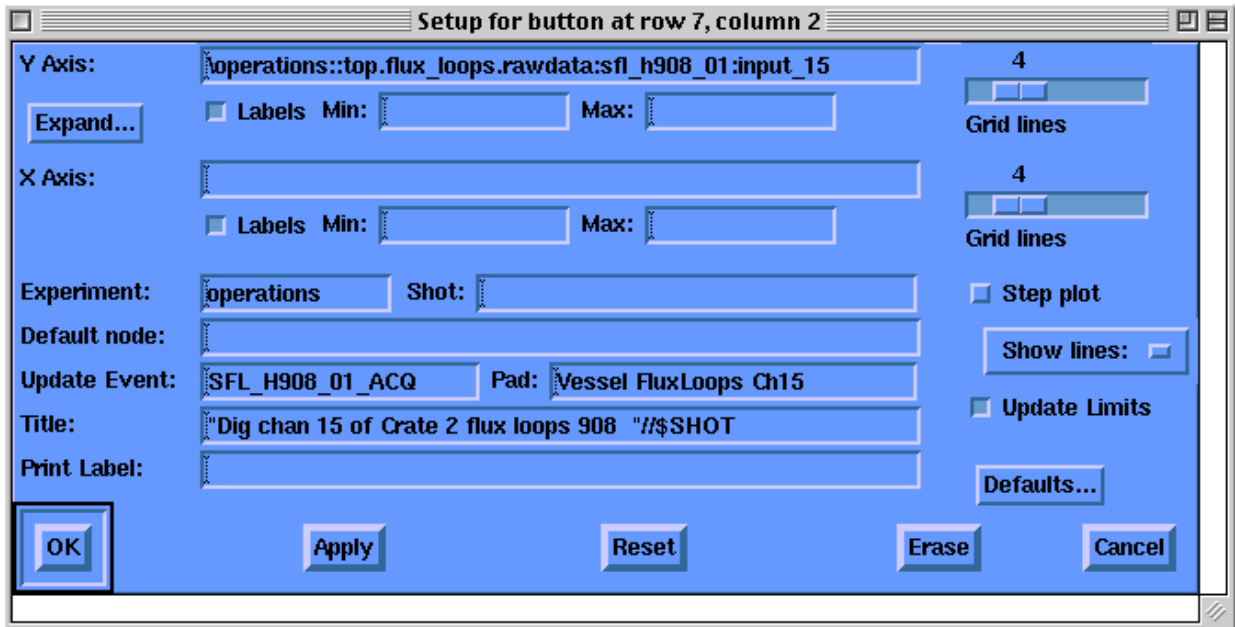
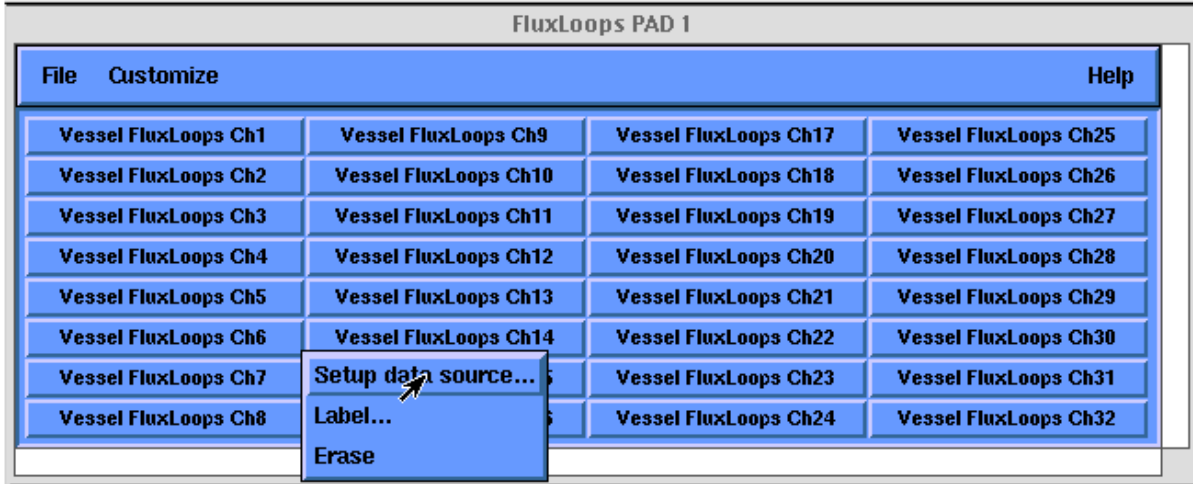


The CMOD MDSplus web pages give a more complete description of the supported devices. The "H404", not described there, is the Clock Decoder/Trigger Generator module needed to synchronize diagnostics.

A dwScope display and the dwPad it was created from

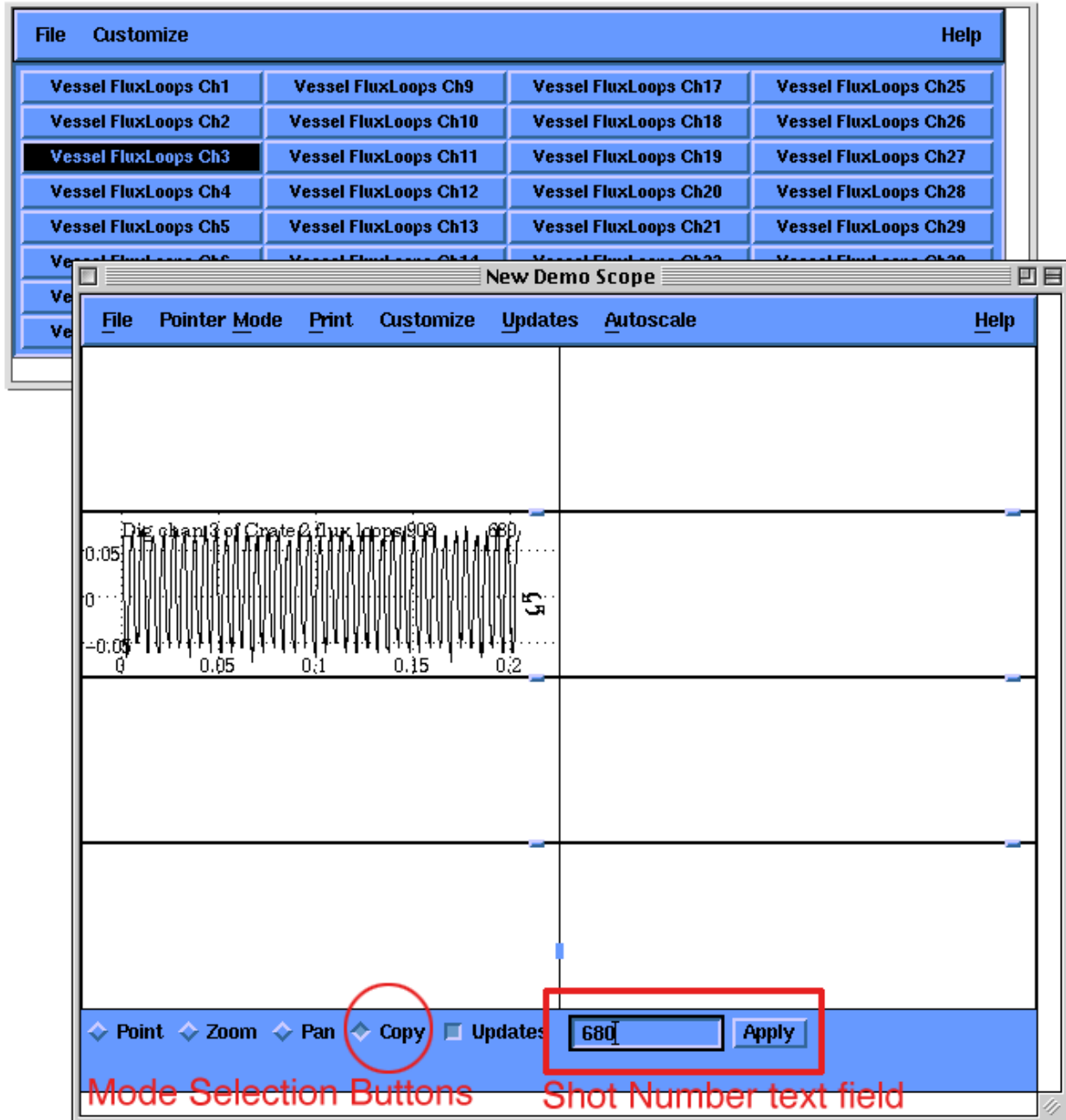


The Data Source set up in a Pad button can easily be copied into an identical structure in a Scope to define a data panel



...the trick is knowing how to define the Y axis and the event
 "Experiment" is the (sub)tree name, and the title may be simply text
 Notice how the shot number is appended

After choosing the number of rows and columns with "Customize/Window", put the Scope into COPY mode and enter any good shot number



Click on a Pad button with Mouse Button 1 (left button) and then click on the destination Scope panel with MB2 (middle button). The curved arrow cursor is displayed when in COPY mode.

WHAT TO TYPE:

On a PPPL VMS Alpha (KEES or BIRCH recommended):

To get the NSTX MDSplus definitions:

```
$ setup nstx
```

To get a Scope display using the SCOPE_DEFAULTS.DAT description file in your local directory:

```
$ dwscope
```

To choose another description file:

```
$ dwscope -default <filename>
```

e.g.

```
$ dwscope -default nstx$config:vessel_fluxloops_1.scope
```

[We will try to put lots of generally useful stuff into the NSTX\$CONFIG directory; if you make Scope or Pad files that you would like to share, let us know. This directory is read-only, to prevent accidental changes to public files.]

To browse the structure of NSTX model tree (-1 is the shot number of the model tree):

```
$ traverser -tree nstx -shot -1
```

An NSTX shot number that currently has some "data" is 999999. For OPERATIONS, 679 and 680 also work. To locate other possibilities:

```
$ dir nstx$data:nstx_*.datafile
```

Other tree-names can be used instead of NSTX.

OPERATIONS
CAMERAS

ENGINEERING
MICROWAVE

Trees, Logical Names and Directories

MDSplus does NOT make any assumptions about the relationship between subtrees and directory structure. It is not necessary that the VMS directory hierarchy echo the MDSplus tree hierarchy, although it may. On CMOD, it does, on NSTX, it most definitely does not.

MDSplus always locates tree files using the logical names <treename>\$DATA.

For NSTX, we have

NSTX\$DATA
OPERATIONS\$DATA
ENGINEERING\$DATA
MICROWAVE\$DATA
Etc.

If you create your own private tree, you must define a <treename>\$DATA logical name that points to a directory where you have write privileges.

"Current" vs. "Archived" Data Directories

The data acquisition computer, KEES.PPPL.GOV, has a 26GB local RAID5 disk set where we will keep "current" data. We are expecting this to hold about a week's data, at least at first. Directories here are under KEES1:[NSTX_NEW].

Generally, looking for <treename>\$DATA:<treename>_<shotnumber>.DATAFILE
Or <treename>\$DATA:<treename>_<shotnumber>.TREE
will show you which shots have been taken. (`$ DIR NSTX$DATA:*.DATAFILE;` will work. The semicolon restricts the output to the most recent version of the file where there is more than one.)

"Mature" trees will be moved to a separate (collection of) RAID5 set(s) on BIRCH. Directories here will be in directories beginning with [NSTX_ARC], but then will be broken down into groups by shot number. A utility program, not yet written, will let users check on the existence of shot files. ALL SHOT DATA WILL REMAIN ON DISK FOR AS LONG AS POSSIBLE, and we hope that will be for 3 years, except for certain very large data sets.